68th and Rock Creek Station

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UNIVERSITY OF OREGON

TRIMET

SCI Sustainable Cities Initiative

SCYP Sustainable City Year Program

Acknowledgements

The authors wish to acknowledge and thank TriMet and the City of Tigard, and the many planners, developers, and engineers who dedicated their time to provide us with direction and feedback. We would also like to thank the following people that were instrumental in the completion of this report. Their direct communication, contribution, and dedication were invaluable.

Jeb Doran, Senior Project Manager, TriMet

Gary Pagenstecher, Associate Planner, City of Tigard

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. We are redefining higher education for the public good and catalyzing community change toward sustainability. Our 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. Our work connects student energy, faculty experience, and community needs to produce innovative, tangible solutions for the creation of a sustainable society.

About SCYP

The Sustainable City Year Program (SCYP) is a year-long partnership between SCI and a partner in Oregon, in which students and faculty in courses from across the university collaborate with a public entity on sustainability and livability projects. SCYP faculty and students work in collaboration with staff from the partner agency 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.

SCI Directors and Staff

Marc Schlossberg, SCI Co-Director, and Professor of Planning, Public Policy, and Management, University of Oregon

Nico Larco, SCI Co-Director, and Associate Professor of Architecture, University of Oregon

Megan Banks, SCYP Manager, University of Oregon

About TriMet

The Tri-County Metropolitan Transportation District of Oregon was created by the Oregon Legislature in 1969 to operate and oversee mass transit in the Portland Metropolitan region. This public entity was formed by the legislature as a municipal corporation to replace the multiple private interest mass transit companies that previously operated in Multnomah County, Clackamas County, and Washington County; the counties that make up TriMet.

In addition to operating bus lines, light rail, and paratransit in the defined Tri-Metropolitan district, TriMet also connects to external mass transit services to provide wider blanket coverage for the region. TriMet's nationally recognized transit system provides more than 100 million rides annually, and carries 45% of rush hour commuters going into the downtown Portland area. TriMet not only moves people, but helps build sustainable cities by improving public health; creating vibrant, walkable communities; supporting economic growth; and working to enhance the region's livability.

Several civic leaders have been highlighted as key Figures in the creation, establishment, and ultimate success of TriMet. Governor Tom McCall is credited with the initial call for the creation of the public corporation; other key contributors include Congressman Earl Blumenauer, Rick Gustafson, Dick Feeney, and Mayor Neil Goldschmidt. All were instrumental in shaping the organization itself, as well as the land use, civic development, and transformation policies that make TriMet the success that it is today.

The vision and efforts of these individuals and countless others have borne fruit. Recently, TriMet celebrated the second anniversary of the opening of its most recent light rail line. Since its inauguration the 7.3-mile MAX Orange Line has experienced continued growth, having a six percent year-to-year increase in ridership. Illustrating the holistic approach that has been a part of TriMet from its inception, there have been wider community benefits such as a positive impact on employment and a focus on sustainable practices such as bio-swales, eco-roofs, a first-in-the-nation eco-track segment, solar paneling, and regenerative energy systems.

TriMet is a key partner in the region's Southwest Corridor Plan and Shared Investment Strategy. Eleven partner agencies are participating in planning for a new 12-mile light rail line in southwest Portland and southeast Washington County that will also include bicycle, pedestrian, and roadway projects to improve safety and access to light rail stations. Southwest Corridor stakeholders include Metro (the regional government), Washington County, Oregon Department of Transportation, and the cities of Beaverton, Durham, King City, Portland, Sherwood, Tigard, and Tualatin. This collaborative approach strives to align local, regional, and state policies and investments in the Corridor, and will implement and support adopted regional and local plans. These initiatives and outcomes from participation with the UO's Sustainable City Year Program will help develop ideas that are cost effective to build and operate, provide safe and convenient access, and achieve sustainability goals while supporting the corridor's projected growth in population and employment.

Table of Contents

Course Participants

Kailee Bell, Landscape Architecture
Adam DeHeer, Landscape Architecture Graduate
Thomas Cooper, Architecture Undergraduate
Brianna Heese, Landscape Architecture Graduate
Yumna Imtiaz, Architecture Graduate
Bocong Li, Landscape Architecture Undergraduate
Tori Murphy, Landscape Architecture Graduate
Chrissy Stillman, Landscape Architecture Graduate
Emma Stone, Landscape Architecture Graduate
Nick Sund, Landscape Architecture Graduate

Executive Summary

This studio project was organized around the plans for a new TriMet light rail line to Tigard, Tualatin, and Washington County. Though this Southwest Corridor project is still in the early phases of planning and design, the studio collaborated with TriMet planners and the City of Tigard to visualize the future of a site that is likely to become a major station area. In addition, the site is seen as a critical location for a Park and Ride structure as this point marks where traffic into Portland drastically increases. The merge from Pacific Highway (99W) onto Interstate 5 (I-5) lies one-half mile east of the site, and the intersection of the two sees daily congestion and long waiting traffic.

This site provides opportunities beyond transit. Older development near the site has potential to be acquired by the project for use as Park & Ride, LRT station, and for potential development of parking and transportation-related uses. Other adjacent sites can be critical purchases for developers given the benefits of the transit station. The City of Tigard supports plans for these future developments that include sustainable transit-oriented design, and restoration of environmental assets, such as Red Rock Creek, as opposed to box commercial development that maintains an auto-oriented focus. Students were tasked with considering the area surrounding the future station site as well as places that may be developed in later phases.

The class divided into groups of various sizes, each focusing on a different approach to the transit-oriented development (TOD) proposed around the new TriMet station. Most teams developed 80- and 40-scale designs to create a cohesive master plan across the site before taking a more individual approach on an area with a smaller extent and more detail. Groups included:

- “Stormwater Impacts”, Chrissy Stillman
  This design focuses on Red Rock Creek as its own entity. Chrissy calculated on and off-site storm water entering the creek, its ephemeral flooding zones, and the impacts of more hardscape in the area. Much of her design strategies for reducing the “flashiness” of the creek occurred east of the study area toward I-5.
- “68th and Rock Creek Parking Structure”, Kailee Bell
  This design focuses on the opportunity of an off-site parking structure west of SW 68th Parkway that could provide rooftop amenities and access to a multimodal path along the bridged rail line leading into the station. This alternative solution frees up space for transit-oriented development in the site south of the station by providing at least half the required parking within a reasonable off-site distance.
- “Place over Parking”, Thomas Copper and Nick Sund
  This design focuses on the maximum integration of parking in a high-density transit-oriented development site adjacent to the light rail station. This team focused on TOD1, the second thing likely to be built by developers after the station.
- “Positively Tigard” Adam DeHeer and Yumna Imtiaz
  This team focused on a design of the station and the transit-oriented development with an approach of impact mitigation and sustainability. This group focused on the station plaza and TOD1 and worked closely with Chrissy Stillman for assessing storm water impact of their design proposal.
- “Tigard Terraces”, Brianna Heese, Emma Stone, Bocong Li, and Tori Murphy
  This team focused on the topography of the site to integrate a medium density transit-oriented development. The team proposed designs for the station plaza, TOD1, Red Rock Creek, and TOD2 to meet the long-term phasing goals of TriMet and Tigard.

Students generally found the site challenging in terms of balancing programmatic requirements with creating livable and enjoyable spaces. The student designs offer the best attempts to combine the two goals and do so in many ways. The required amount of parking was a challenge, and most students found that the best way to create a functioning transit-oriented development was either to invest in a parking structure below development or to site the parking across SW 68th Parkway. Additionally, if Tigard and TriMet desire sustainable and ecological designs, many teams suggest partnering with developers now and planning for elements to be incorporated. Finally, Red Rock Creek presents a potential flood problem for nearby development. Teams recommend multiple ways to reduce the flashiness of the creek, such as capturing stormwater on site for any new development.

Introduction

This report focuses on the Southwest Corridor Project and its intersection with the Triangle in Tigard, Oregon. A new MAX light rail line is purposed through the area, extending southwest along Barbur Boulevard and Highway 99W to connect the Cities of Tigard, and Tualatin, in Washington County to downtown Portland. This project aims to improve the quality of life for both residents of the corridor commuting out as well as those commuting in for work.

The student designs that follow address the needs and desires of both TriMet and the City of Tigard. The following list of programmatic elements provides a clearer understanding of the goals students attempted to fulfill:

TriMet

- Site a Park and Ride lot or garage adjacent to the proposed MAX line station that provides at least 400 parking spaces
- Provide bike parking near the station
- Maintain the street and arterial rights-of-way of 99W and SE 68th
- Provide a social plaza with shops and places to wait next to station
- Consider pedestrian crossing for HW 99W and SW 68th Parkway. Is there an opportunity for a pedestrian bridge?
- Manage stormwater flowing into Red Rock Creek. Riparian integrity must be maintained and buffered, if not improved, through design strategies
- Stormwater must be detained and/or cleaned to minimize flood and pollution in a 20-year storm event
- Propose design opportunities for mixed use housing/ transit-oriented development on the site south of the proposed station.
- Design to include the CELA low income housing to be located near Red Rock Creek and 68th Parkway.
- Design to prioritize the pedestrian, bike commuter, and then people commuting to the Park and Ride garage.
- Consider phasing given potential purchase of future lands both by TriMet and the City of Tigard.

City of Tigard Strategic Plan

- Vision: create “the most walkable community in the Pacific Northwest where people of all ages and abilities enjoy healthy and interconnected lives”

- “Create a unique, vibrant identify for the city”
- “Facilitate walking connections that further develop the identity”
- “Encourage town center development and business expansion (Washington Square, Downtown, Triangle), including high-density housing development around shopping, business and transit”
- Explore the possibility of a pedestrian path through Red Rock Creek area as a way to provide connections and put “eyes in the forest” to reduce unwanted activity. Make the creek and forest an amenity
- Provide a public park that can serve existing and proposed neighborhoods

To explore these ideas in design form, students were asked to perform the following tasks throughout the term:

- Research a relevant case study.
- Perform site analysis of the study area.
- Propose 80-scale design plans for the study area as a team.
- Construct conceptual diagrams to explain the design.
- Resolve important parts of the site plan at 40-scale, developed and produced by different team members for their chosen zones (A, B, C, or D, see below).
- Produce a 3-D model with chosen software to explain topographical relationships and to produce strong representational graphics.
- Resolve a detailed design area at 20-scale to illustrate critical parts of the overall design.

These elements will consistently appear throughout student designs and were critical to the exploration of the site. Site analysis, student designs, and final considerations will appear in the following sections of this report. Precedents and case studies will appear in individual designs as necessary.

Site Analysis/Context

This studio focused on a station and surrounding property on the proposed Southwest Corridor MAX line. This proposed station lies in the northeast corner of Tigard, Oregon along Highway 99W. The site also exists within what is known as the Tigard Triangle, an intersection of land bordered northwest by Highway 99W, southwest by Highway 217, and to the east by Interstate 5 (see Figures 1 and 2).

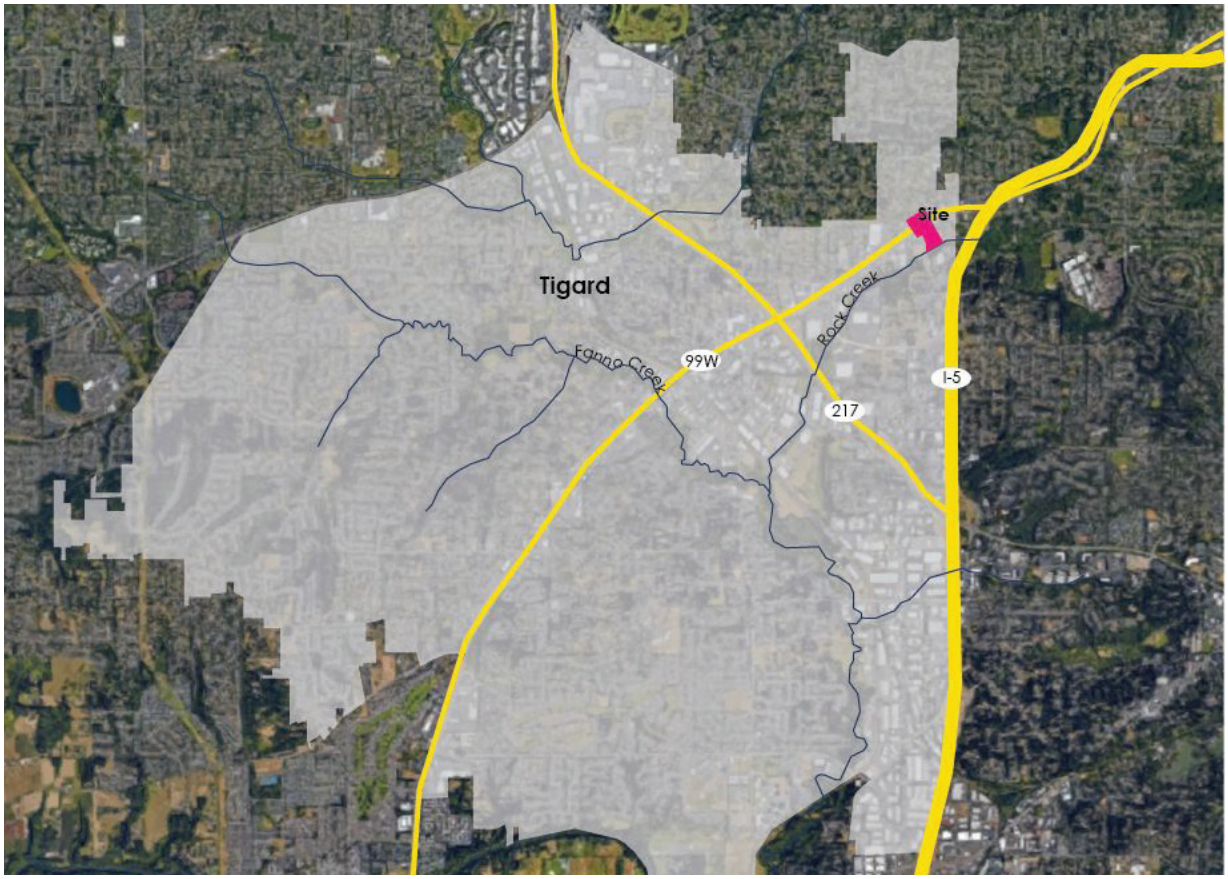


Figure 1: Context map of the site (pink) and the main arterial highways structuring the Tigard Triangle, rendered by Emma Stone.

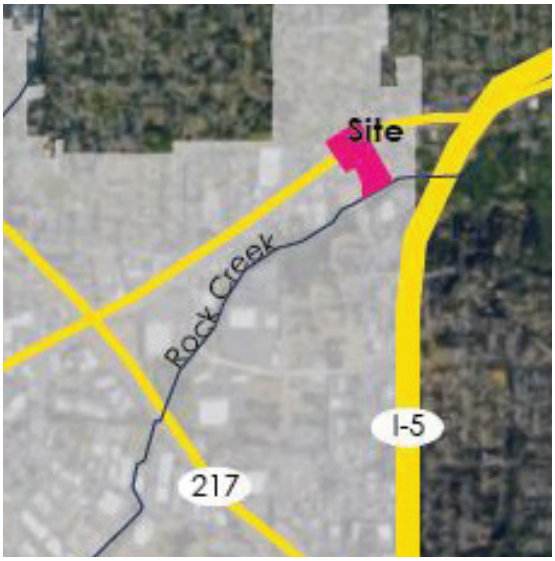


Figure 2: Site area

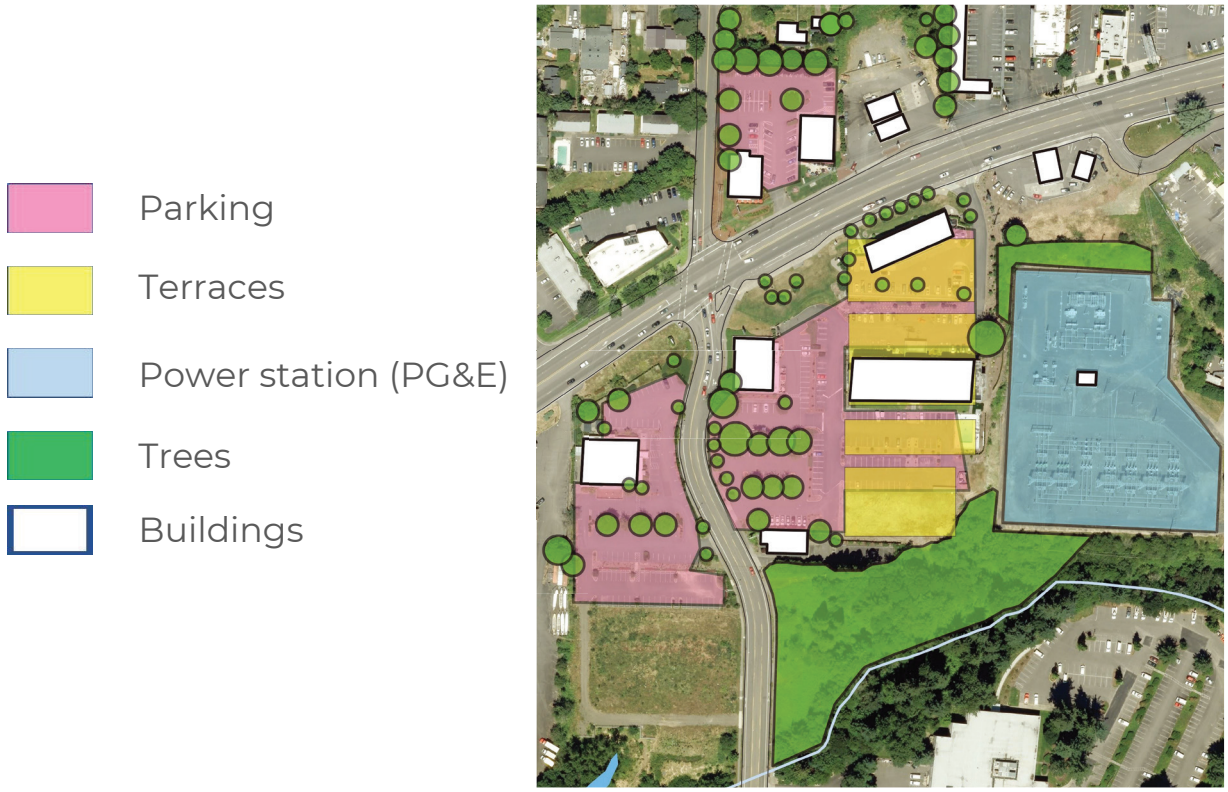


Figure 3: Current site conditions, rendered by Bocong Li.

Existing Conditions

At a finer grain, the site for the future light rail station is located at the intersection of Highway 99W and SW 68th Parkway. The area around the arterial strip is populated by a few stores, restaurants, and hotels, and is highly organized around car transportation. The landscape is currently dominated by these business and parking lots. Unique to the site is its topography with extensive terracing for development having taken place on the land south of the proposed station where TriMet and Tigard would like to implement transit-oriented development. Red Rock Creek lies at the bottom of the site, receiving much of the runoff from the site, the roads, and the PG&E power station (see Figure 3). While the riparian forest around the creek is wide, it is populated with invasive blackberry bushes and cherry trees, and its density invites homeless camps. Tigard desires extensive creek restoration, and plans to extend the Red Rock Creek trail through the triangle to expand the pedestrian network and provide access to the natural areas around the creek.

Existing conditions

Site Zones

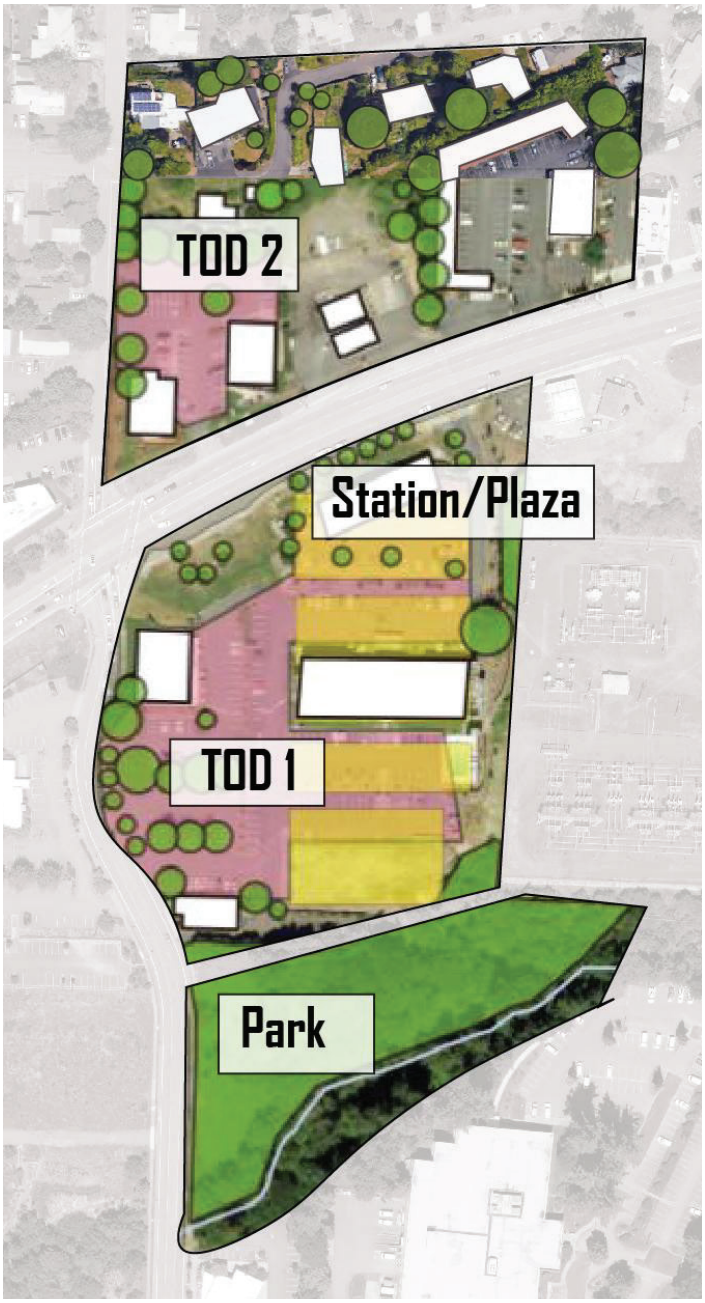


Figure 4: Zone descriptions of the study area into programmatic sites, rendered by Brianna Heese.

Site Zones

The programmatic goals of TriMet and Tigard were addressed within multiple sites. Figure 4 shows the site broken up into four established sites for the student designs to tackle. The station and plaza are adjacent to a potential transit-oriented development (TOD1) to the south. A second transit-oriented development (TOD2) across Highway 99W is desirable, but likely to be developed later.

Topography

The existing topography of the site proved interesting and challenging to the students. The main site for transit-oriented housing development has been extensively terraced by development. Currently, the proposed site for the station, rests at the top of the “first terrace”. Four distinct terraces occur between the station and Red Rock Creek, totaling about a 60’ drop over the span of 500’. Red Rock Creek is subject to a large amount of runoff from I-5 and Highway 99W due to the extensive terracing of the site and occasional steep slopes (see Figure 5).

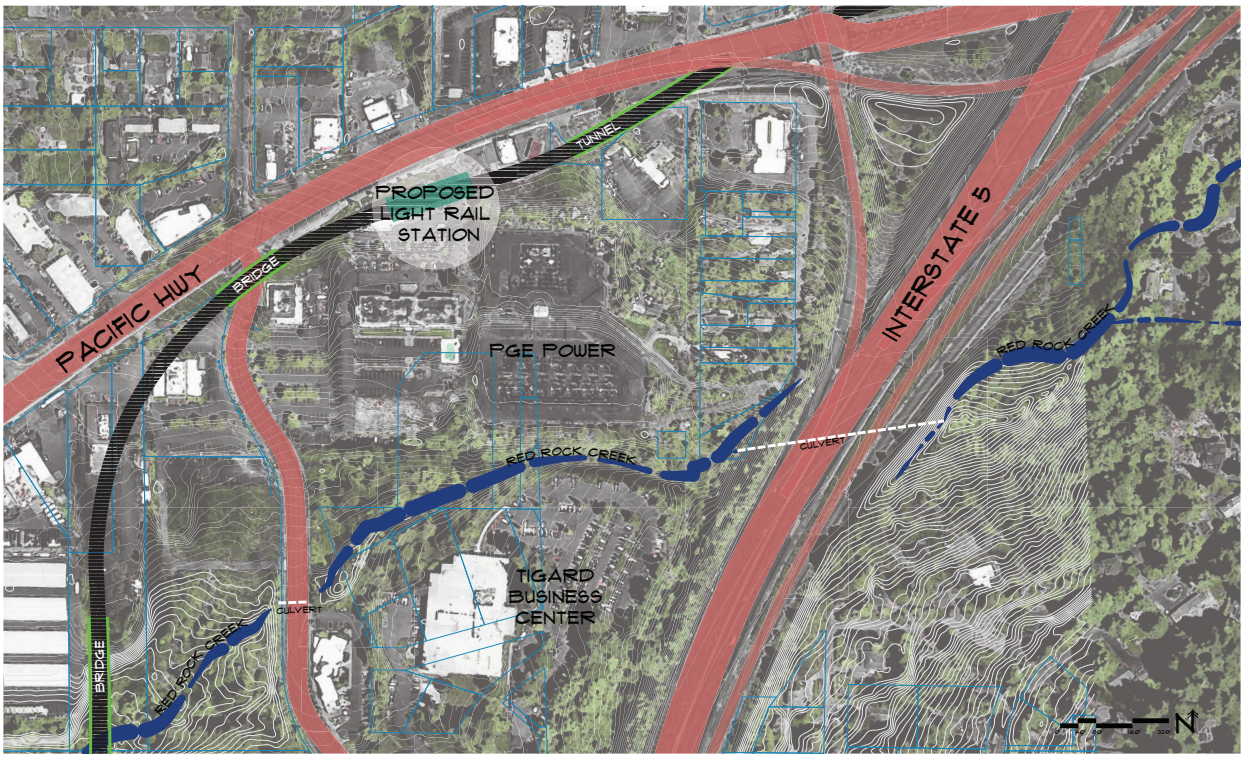


Figure 5: Topography of the study area, rendered by Chrissy Stillman, showing the relationship between the major arterial roads (red), the proposed light rail line (black), the proposed station (white), and Red Rock Creek (blue) amongst the existing topography.

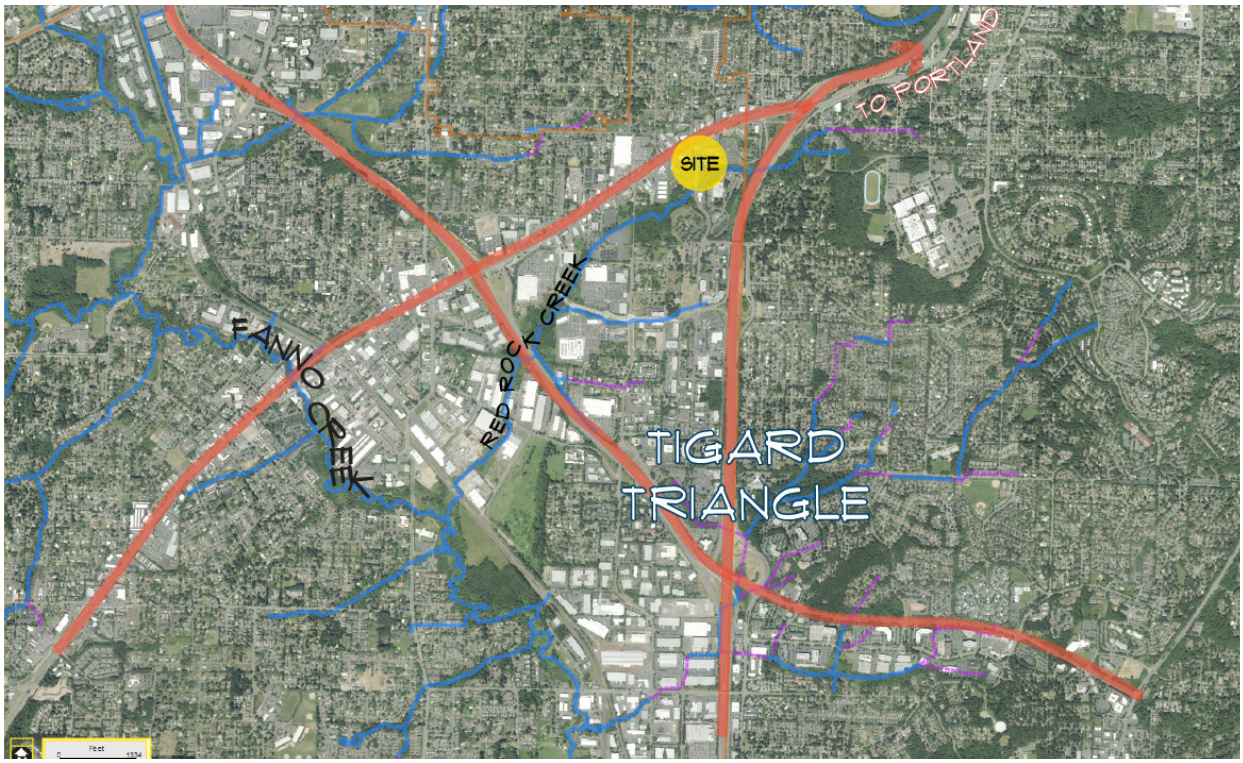


Figure 6: Map of the watershed of Tigard, rendered by Chrissy Stillman. Red Rock Creek flows south through our site into Fanno Creek.

Watershed/Creeks

Our site sits within a larger watershed, meaning that changes upstream can be beneficial or detrimental to downstream systems. Red Rock Creek flows southwest into Fanno Creek with its headwaters to the east of I-5. To reach our site, Red Rock Creek is put through a culvert under I-5 and exits our site through another culvert under SW 68th Parkway, which is highly eroded due to the drop impact. Although the portion of the creek on our site is not salmon bearing, the teams were tasked with minimizing pollution downstream and decreasing runoff impacts due to the steep topography.

Student Designs

Students collaborated with TriMet and the City of Tigard on realizing the goals and desires described in the introduction through site visits, continual communication, desk critiques, and a midterm review to arrive at final design proposals. These proposals were shared with the interested parties in Tigard in June and are presented in the remainder of this report.

Stormwater Impacts

Design by Chrissy Stillman

Concepts and Goals

Both TriMet and the City of Tigard highly prioritize the health of the local waterways, thus this design chose to explore the historic, existing, and potential change to water flow in Red Rock Creek related to future development. Chrissy partnered with Adam DeHeer and Yumna Imtiaz in the early stages of design to mitigate the stormwater created from their transit-oriented design scenario and propose interventions to restore the integrity of the creek. Additionally, given the desire for a public park near the creek, Chrissy proposes a public plaza and park that can integrate Red Rock Creek into the transit-oriented development to the north.

Challenges and Opportunities

The shape and flow of Red Rock Creek in more natural portions of its course reveals the historic character of this local waterway. Prior to development, the creek appears to have had a broad, shallow floodplain with water percolating slowly near the surface of the soil, as can be analyzed a mile down the creek. Today, with the addition of modern roadways, parking lots, and other impervious development, the portion of the creek in the study area has an uncharacteristically narrow floodplain, steeply sloped banks, and seasonally high flow-volumes.

Additionally, the creek lies at the bottom of a slope, which has seen intense development. The proposed transit-oriented development, centered around the new TriMet light-rail station, is bounded on three sides by major arterial roads. All these features present major runoff issues for Red Rock Creek. Although Red Rock Creek is not a salmon bearing creek, it is important to preserve its integrity in the face of future development and minimize pollution further downstream. With knowledge of these limitations, challenges, and historic conditions, the project explores options for rebuilding the integrity of Red Rock Creek on the site and, more importantly, how this site can improve the creek across its entire course.

Site Conditions:
Establishing a reference condition

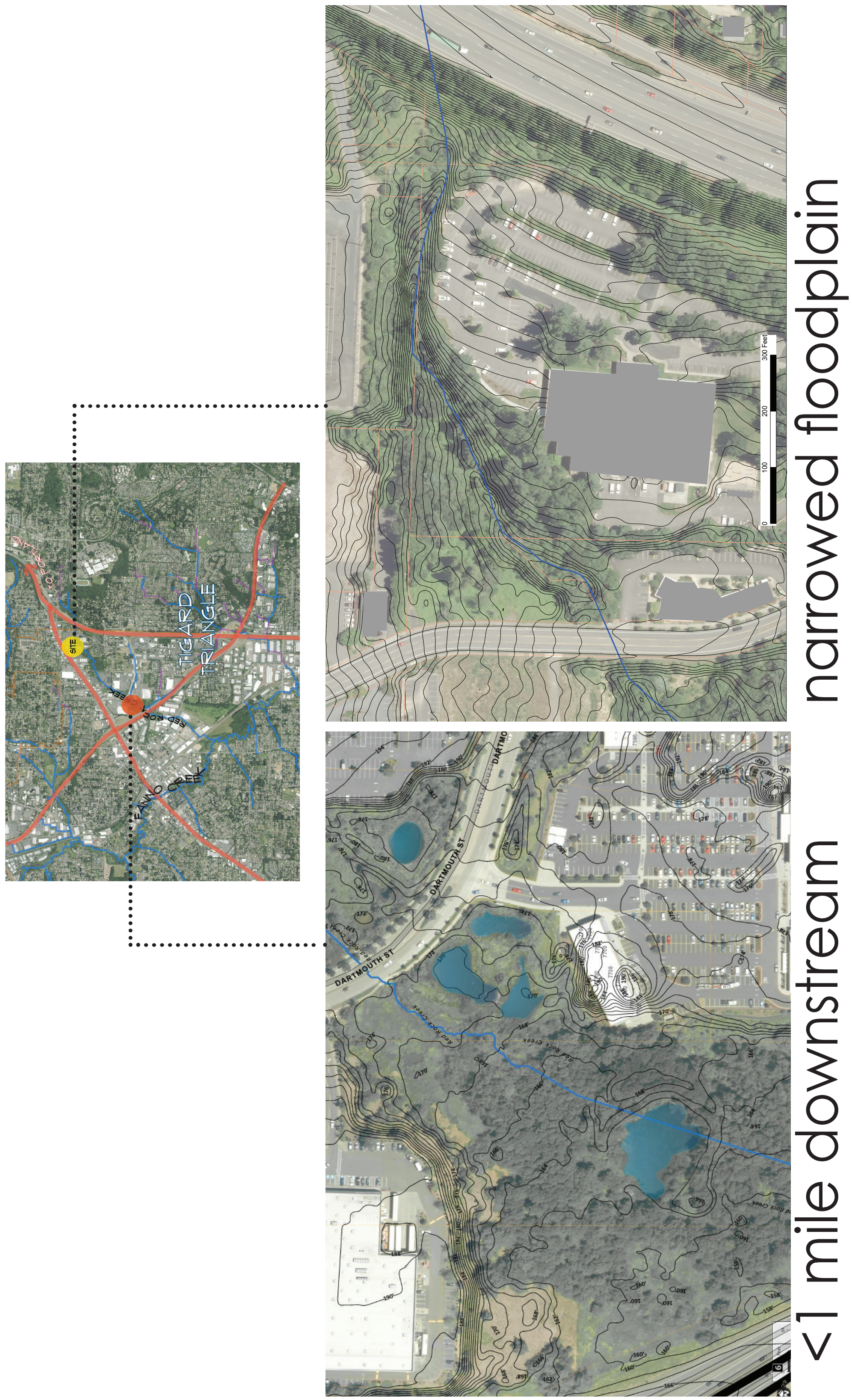


Figure 7: Historic, natural conditions of Red Rock Creek one mile downstream (left) compared to the steep, narrow channel in the study area right.

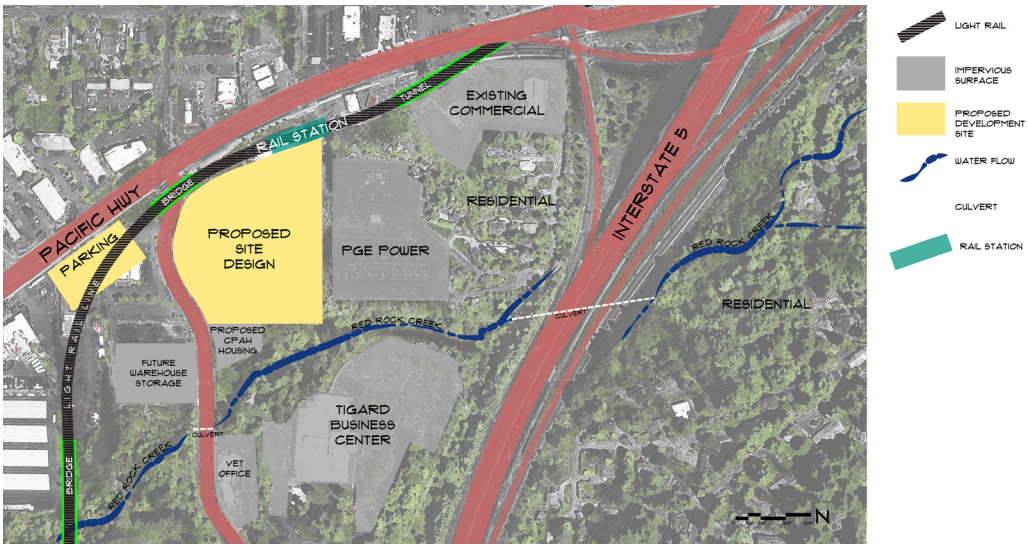


Figure 8: Current hardscape conditions of the study area.

Watershed Analysis and Stormwater Calculations

Chrissy performed significant analysis of the surround topography and identified the local watershed for Red Rock Creek on the site. In the study area alone, the creek receives the runoff for 2,194,000 square feet of area (sq ft), of which 800,000 sq ft come from the east side of I-5. These measurements aided in the calculation of water volume for sizing a cistern as a potential solution.

This amount of coverage, with a decent amount runoff from hardscape, has caused erosion on multiple banks within the study area. The City of Tigard has already identified the creek in our study area and in an adjacent site within the top 20 candidates for Capital Improvement Projects. Suggested improvements include structural grade control, outfall protection for the culvert diverting the creek under SW 68th Parkway, and streambed fill to reduce erosion. West of the study area, some efforts for restoration have already been made to reduce erosion, which presents a serious problem to the creek's integrity (see Figure 9).

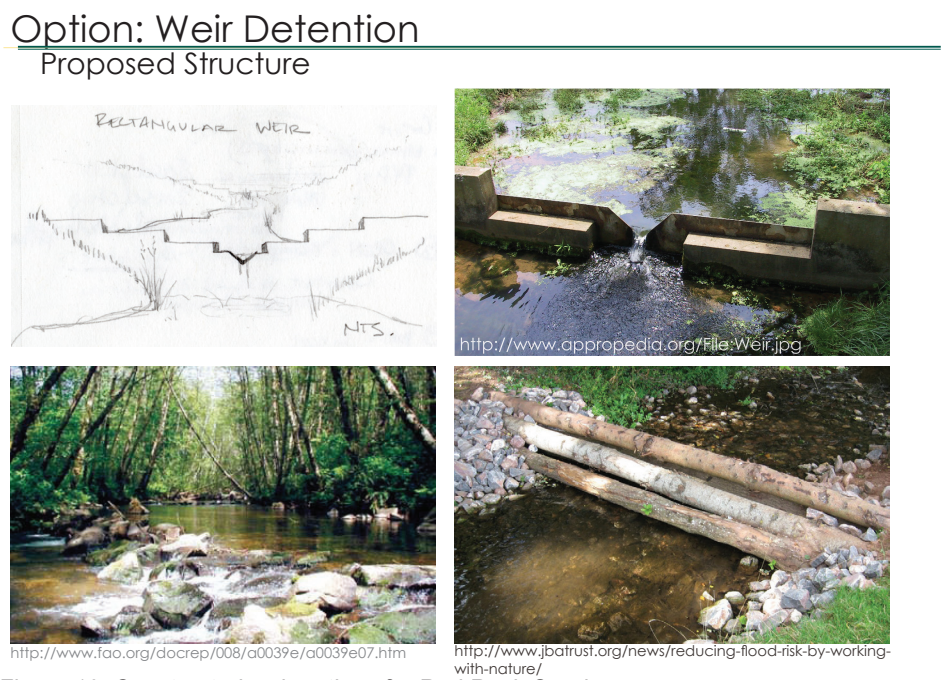
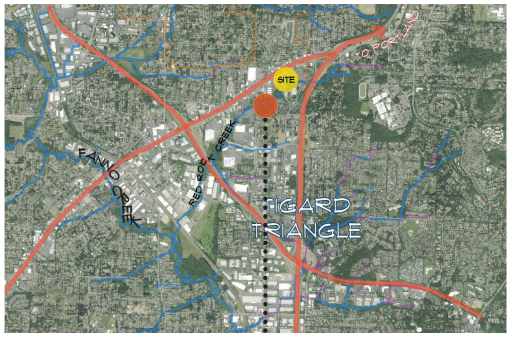


Figure 10: Constructed weir options for Red Rock Creek.

Site Conditions:

Downstream Bank Erosion



erosion west of 68th

modified erosion control

Figure 10: Pictures of bank erosion (left) and control efforts (right) of Red Rock Creek taken during the site visit.

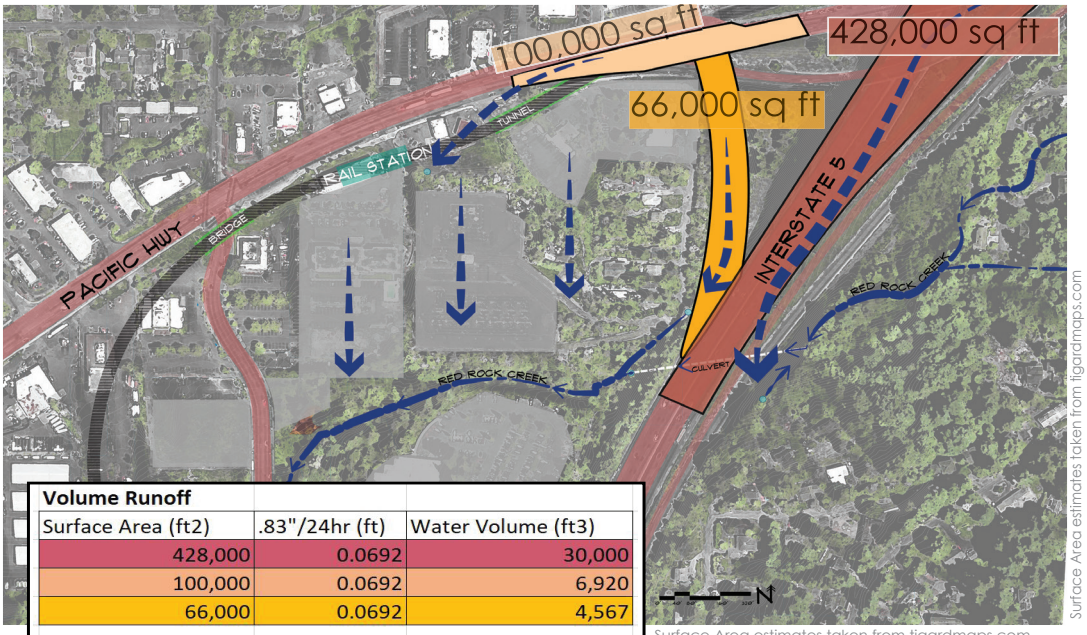
Intervention Options

With the goal of making the alterations required to mimic the creek's historic processes and reduce erosion from flashy flooding, this project suggests two large landscape interventions.

The first is to install a series of weirs that function as volume control measures. Weirs placed in Red Rock Creek would detain water from 90% of all storm events, slowing it down to flow-rates closer to historic conditions. The weirs function to protect downstream infrastructure, water quality, and habitat but also visualize the unique and beautiful characteristic of historic Red Rock Creek, as detained water would overflow into riparian areas and establish ephemeral wetlands.

Weirs can come in the form of constructed, concrete barriers, which are designed to allow outlets for low, medium, and high flow volumes, or as log barriers (see Figure 10). They create a series of riffles and pools that improves the quality and variety of habitat. According to studies, log and boulder structures appear successful at increasing fish abundance, particularly for salmon. Because of the culverts and washouts downstream, salmon habitat does not apply here. Log and boulder structures typically last less than 10 years before needing replacement or restoration, and in high energy channels, such as Red Rock Creek in the study area, may prevent the effectiveness or cause washout of a log or boulder system. This design incorporates concrete weirs, which could more effectively create large changes in physical habitat of the watershed while being more durable and long lasting.

The volume for weir sizing was determined by the amount of surface area in the study area contributing directly to current runoff as a baseline value. The hardscape of a section of Highway 99W and the entrance and body of I-5 total, receiving an average annual rainfall rate of 0.83" in 24 hours, totals to around 40,000 cubic feet of water entering the watershed in the study area (see Figure 11). A series of three weir installations along Red Rock Creek appear in the design plan in Figure 13. The culvert under SW 68th Parkway is treated as an additional weir-like system, and altogether the weirs can detain 59,500 cubic feet of water, drastically reducing the flashiness.



Volume Runoff		
Surface Area (ft2)	.83"/24hr (ft)	Water Volume (ft3)
428,000	0.0692	30,000
100,000	0.0692	6,920
66,000	0.0692	4,567
TOTAL		appx 40,000 ft3

Surface Area estimates taken from tigardmaps.com
Pool Volume = 0.5(Surface Area * greatest depth)
City of Portland Stormwater Management Manual, August 2016, pg A-18

Figure 11: Runoff calculations for weir sizing.

The second proposed option preserves the existing channel and slows water by using a series of stormwater planters and a large underground vault (see figure 15). The stormwater planters are placed to capture and treat I-5 runoff draining directly into the study area, and the existing parking lot of the Tigard Business Center could be retrofitted to house an underground water storage cistern. The stormwater planters are sited near the I-5 stormwater outflow and are meant to slow and remove toxins before they enter Red Rock Creek. Planters would be a switchback series six feet wide to total 200' of length to hold 1200 cubic feet of water, the amount that would collect with a runoff rate of 0.19" water/hour.

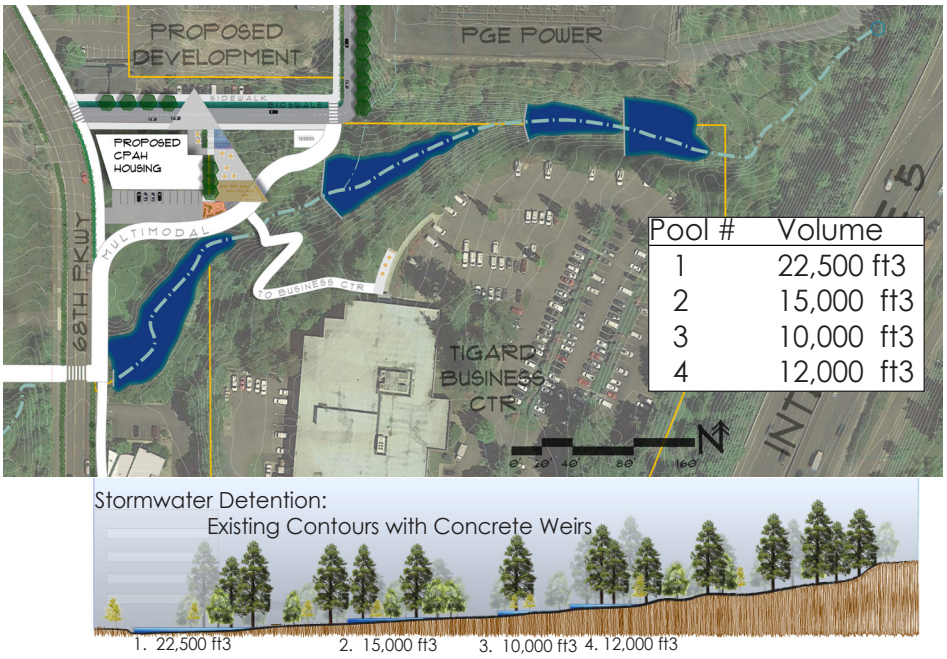


Figure 12: Site plan with constructed weirs in Red Rock Creek.

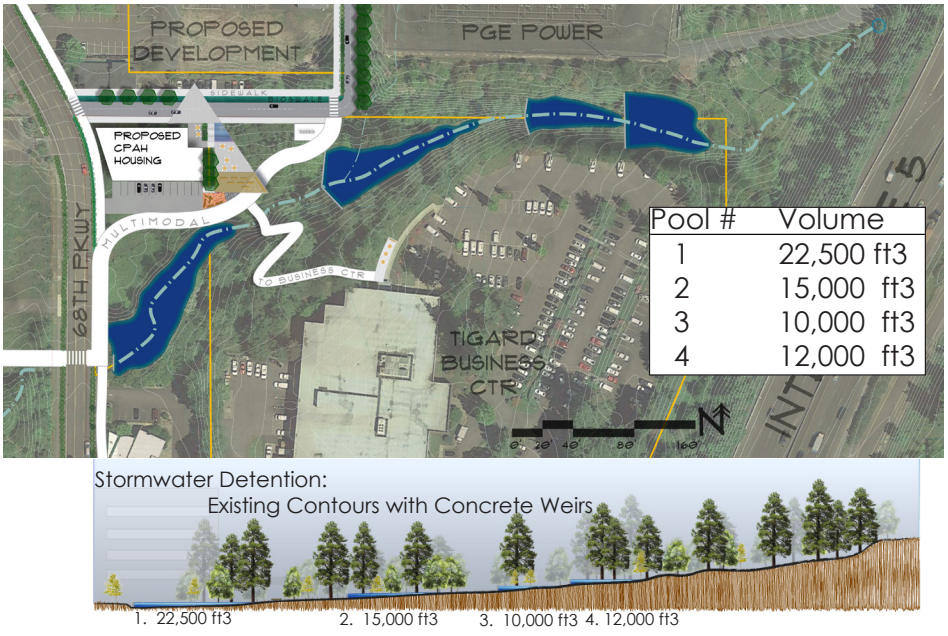
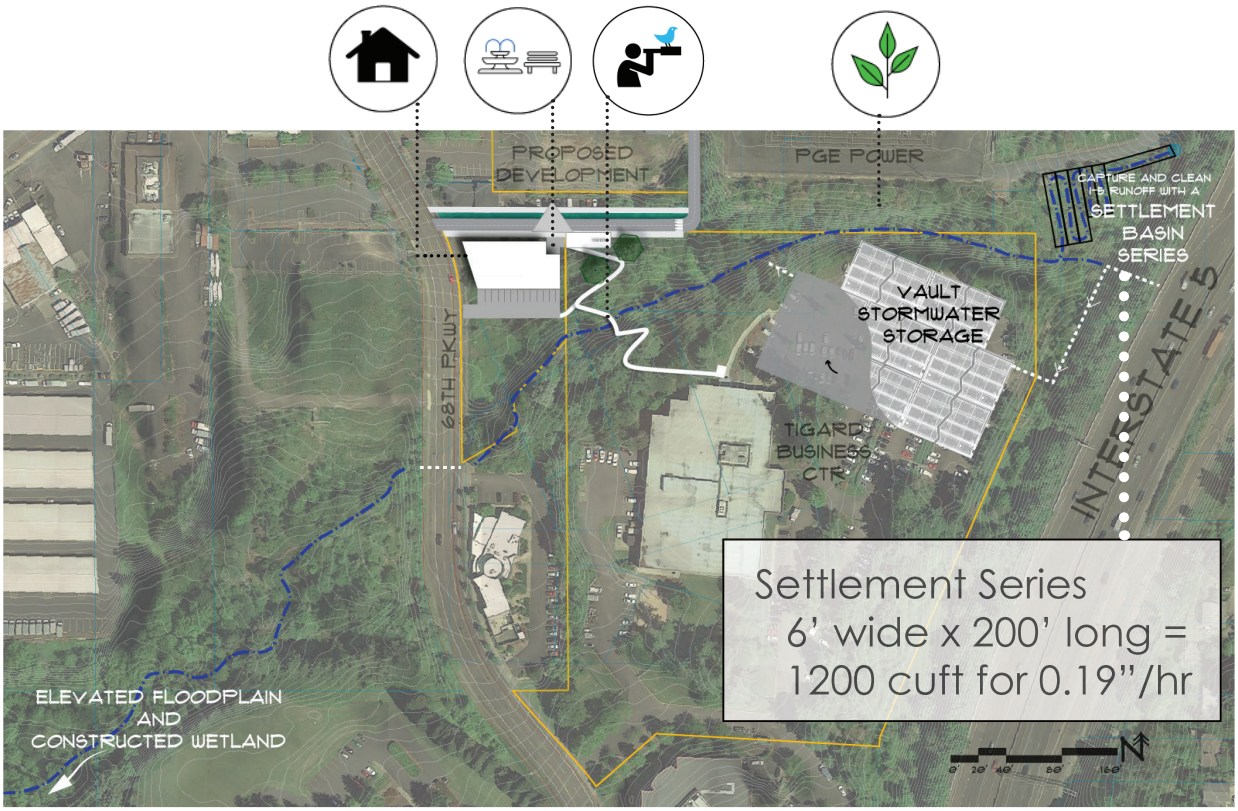


Figure 13: Section facing north along the creek, site showing topography and pool collection.

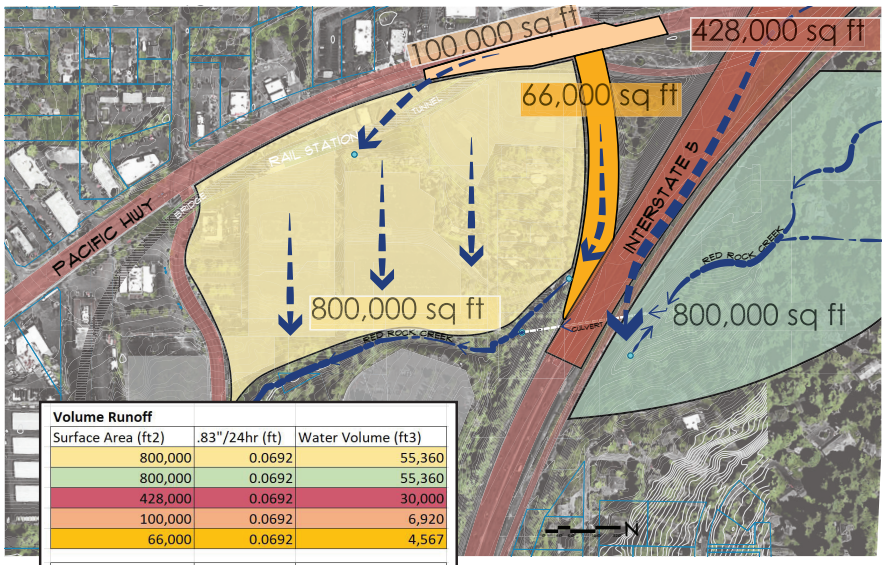
The cistern is sized based on runoff calculations for the entire site at 0.83” rainfall in 24 hours (see Figure 14). The benefit of the cistern is that stored water can be slowly released at rates that mimic historic flows, thereby protecting existing downstream infrastructure and habitat. This proposal enacts very little change to Red Rock Creek as it is today by suggesting offsite methods to reduce flash flooding. The Portland Stormwater Manual suggests sizing cisterns with safety factor of 200% volume, leading to a total cistern volume of 300,000 cubic feet. This design recommends installing an Oldcastle precast cistern in one layer beneath the Tigard Business Center parking lot. One level of this cistern brand holds 320,000 cubic feet and has metered water release. Using a reference flow from Fanno Creek, water volume could be released from May through August at one cubic feet/sec and from September through April at 10 cubic feet/sec.

Option: Container Detention



Rate-flow systems require a design storm of 0.19”/hour per the City of Portland Stormwater Management Manual, August 2016 pg A-18

Figure 14: Design proposal with a series of infiltration planters (dashed blue) and an underground cistern to capture stormwater.



Volume Runoff		
Surface Area (ft2)	.83"/24hr (ft)	Water Volume (ft3)
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428,000	0.0692	30,000
100,000	0.0692	6,920
66,000	0.0692	4,567
TOTAL		150,000 ft3
SAFETY FACTOR	X 2	300,000 ft3

Figure 15: Site based calculations for sizing a stormwater vault.

Space Creation

Although the focus of this project was protective methods for Red Rock Creek, the design also considers the creek's roll as a public park and amenity. A triangular plaza intersects the CEPH housing with different seating options, creek related water features, solar energy, and wildlife viewing opportunities (see Figure 16). The design also proposes pedestrian connections across Red Rock Creek to connect pedestrians from the south through the site. This separate pedestrian path will join with the main multimodal path and lead up to the TOD1 site and the light rail station.

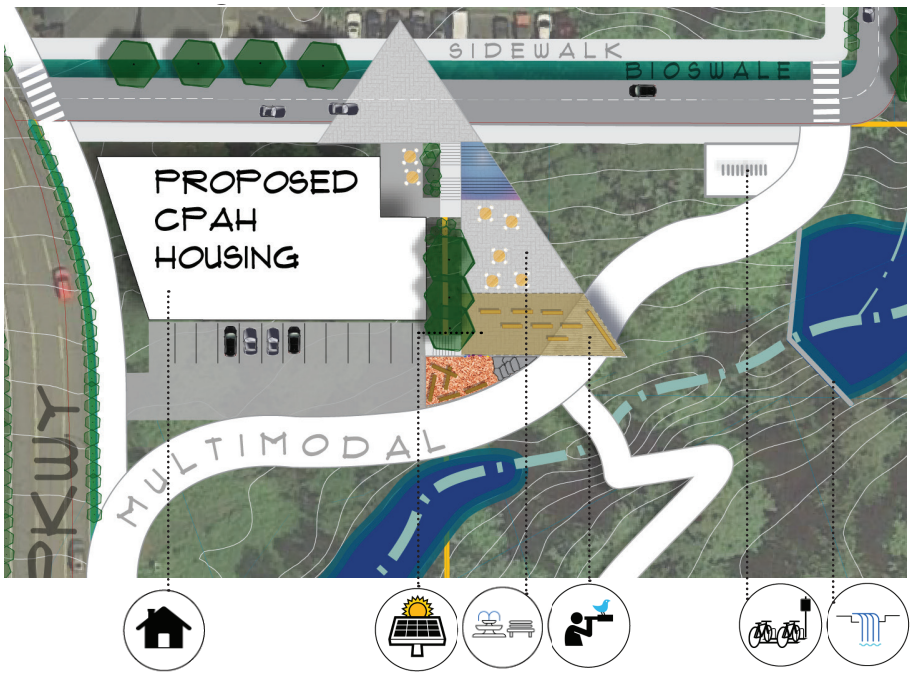

Figure 16: Site plan of proposed plaza and amenities.

Design Summary

This design proposes two solutions the restoring Red Rock Creek to more historic conditions: a series of constructed weirs and a cistern with regulated flow control. The weirs present a more drastic intervention in the creek, whereas a cistern would cause relatively little damage to creek's current structure. Both present their benefits in different areas (see Figure 17), and it is at the discretion of a team of professionals to decide which might provide the best solution. The main recommendation of this proposal is to consider current and future conditions of Red Rock

Evaluation: Trade-offs and Trajectories

	Weir	Container
pros	-protects downstream infrastructure -decreased cost due to less downstream maintenance -improved water quality and hydrologic function -can generate awareness of stormwater, low-income housing, and walkability	-minimal channel-bed intervention -preserves existing land uses -protects downstream infrastructure -can support constructed wetland function downstream
cons	-potentially prevents fish migrations -potentially inturrupts a "natural" aesthetic -log/boulder weirs may be short-lived and/or underdesigned	-cost prohibitive -does not restore floodplain habitat on-site

Figure 17: Table comparing constructed weirs to vault storage.

Creek and the potential impacts on a larger watershed.

References

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68th and Rock Creek Parking Structure

Design by Kailee Bell

Concepts and Goals

At the beginning of the term, several options were considered on where to site parking. Many students proposed placing the Park and Ride garage in the site across from SW 68th Parkway, still within a five-minute walk of the station, to focus more on place-making in the transit-oriented development adjacent to the station. This project envisioned a parking garage that could not only meet the recommended amount of parking but provide other amenities to the commuters and residents of the area. At midterm, the class was informed that TriMet had decided to site the garage in TOD1 to be as close to the station as possible. Given this information, many teams using Kailee's parking garage decided to design parking on the TOD1 site as well. Kailee decided to pursue her vision of a garage on the site west of the station to give TriMet options to consider. In the bigger picture, the design can also be an example as to what an integrative and adaptive parking garage can be.

Kailee's goals were to:

- Provide an alternative option for TriMet's parking allotment.
- Create a "great place" out of a parking garage and design a parking garage compatible for future use transitions.
- Provide a variety of parking for cars, bikes, motor-scooters, and more.
- Design a space that is user-friendly, accessible and enjoyable to be in.
- Incorporate solar energy collection.
- Design for alternative future uses such as micro-apartments, retail, and emergency shelter.

Design Proposal

At 80-scale, the focus was on properly siting the garage within the given sub-study area (see Figure 18). The site was challenging as it was bisected by the alignment of the light rail and multimodal path. One major advantage of the location was the proximity and accessibility to both Highway 99W to the north and SW 68th Parkway the east. Likewise, there were opportunities for a pedestrian connection between the garage and multi-modal path due to the alignment running directly over the garage. Additionally, the walking distance from the station was only 475', approximately a five-minute walk via the multimodal path.

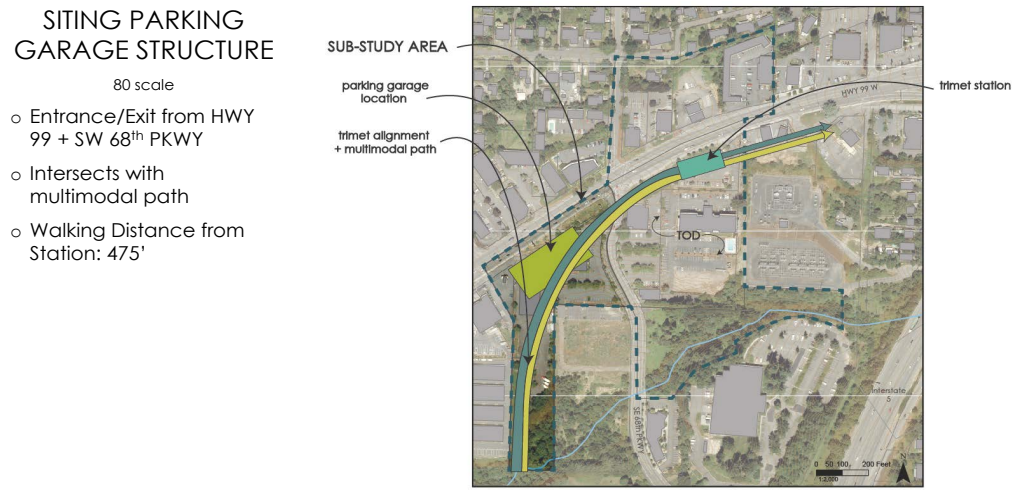


Figure 18: Site plan of the parking garage (light green) adjacent to the proposed light rail line and multimodal path.

The design process at 40-scale focused on logistical factors, experimenting with a variety of vehicular circulation and parking configurations before settling on two-way drives and 90-degree stalls. To accommodate alternative future uses, the floor-to-floor height was set at 15', and levels were designed to be flat. There are two levels of parking with a 3rd rooftop level reserved for a garden and other mixed-uses. The Highway 99W vehicular entrance and exit occurs on the 2nd level of the garage on the north side, while the 68th Parkway entrance and exit occurs on the bottom level of the garage on the south side (see Figure 19). An exterior ramp on the southwest side of the structure connects the two parking levels, allowing the parking floors to be level and not used as the main elevation tool.

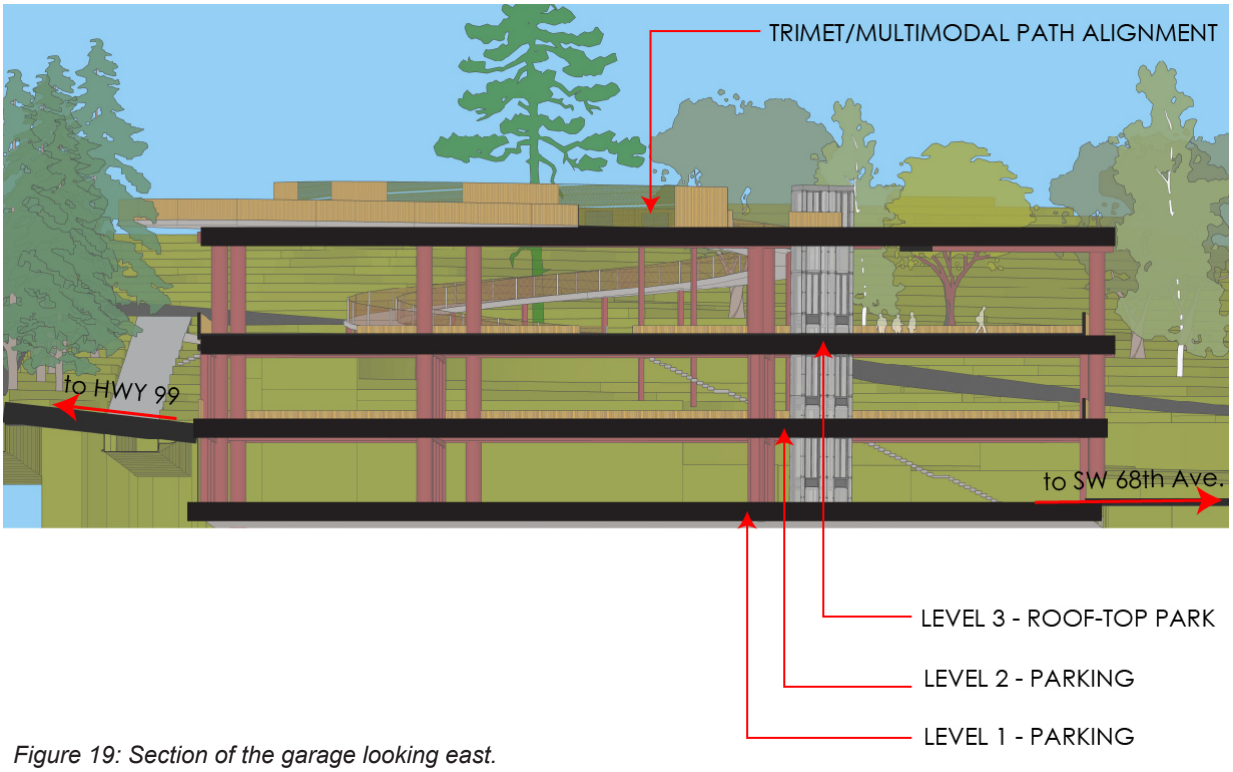


Figure 19: Section of the garage looking east.

Due to the topography of the site, the light rail line crosses SW 68th Parkway on a bridge and remains elevated until it reaches grade further south of the site. This provided an opportunity for the light rail and the garage to occupy the same space but at different elevations (see Figure 20). The garage is dimensioned at 352' x 162', with an area of 77,024 square feet per level (see Figure 19). With two levels and 114,048 square feet, the parking garage can hold 298 standard parking spaces.

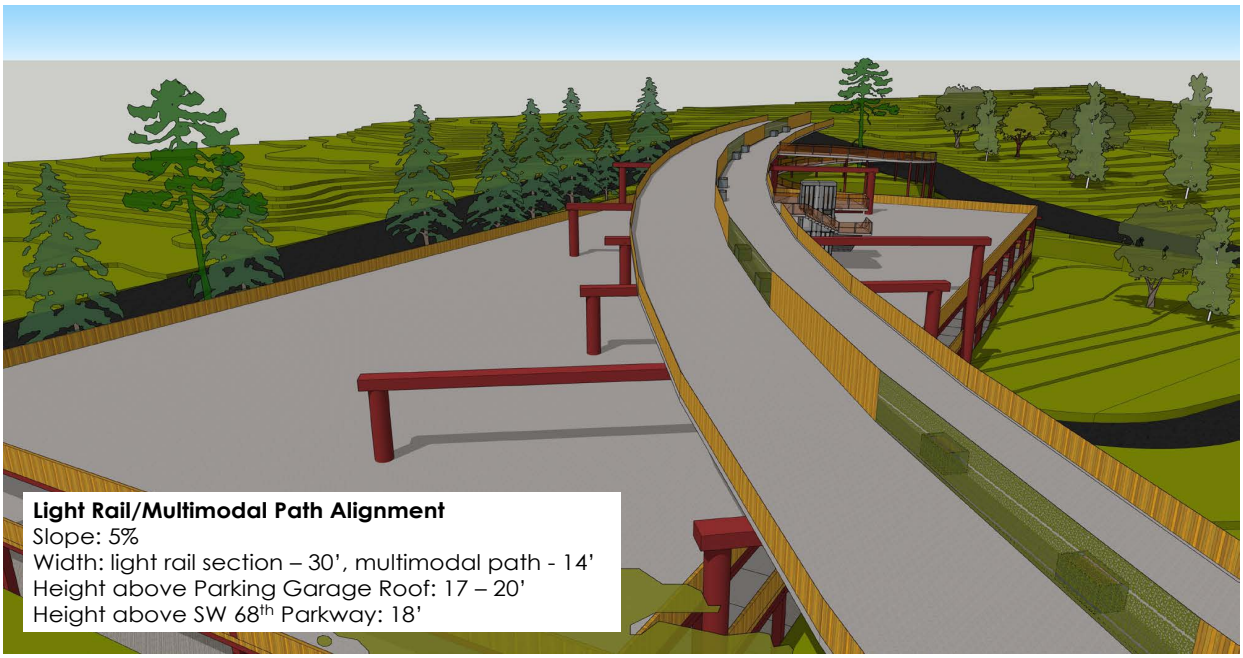


Figure 20: Perspective model of the garage in relation to the light rail line and multimodal path.

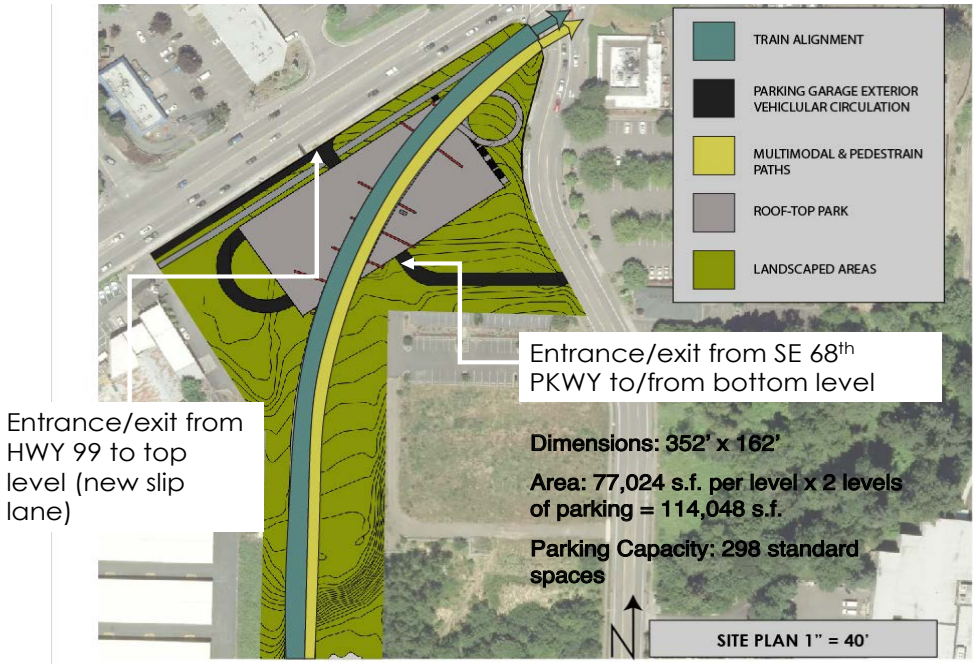


Figure 21: Garage placement on the site in relation to the light rail line running above it.

Space Creation

At 20-scale, the design focuses on the creation of a garage rooftop that could provide other amenities for the area such as providing additional types of parking, collecting solar energy and creating an enjoyable and memorable place. The design met these goals by providing 220 sheltered bike and motor-scooter parking spaces, lining rooftops of bike parking and mixed-use buildings with solar panels, creating an outdoor dining and play area, and providing options for pedestrian circulation to and from the station and around the garage garden (see Figure 22).

DESIGNING THE ROOF-TOP

20 Scale Design

- Green Roof Planted with Sedums and other vegetation native to the Cascade mountains
- Covered bike parking (220 spaces)
- Swings and Outdoor Café Area Dining /Retail Space
- Solar Tiles lining rooftops of structures (SW and SE facing – no more than 35 degrees E or W)

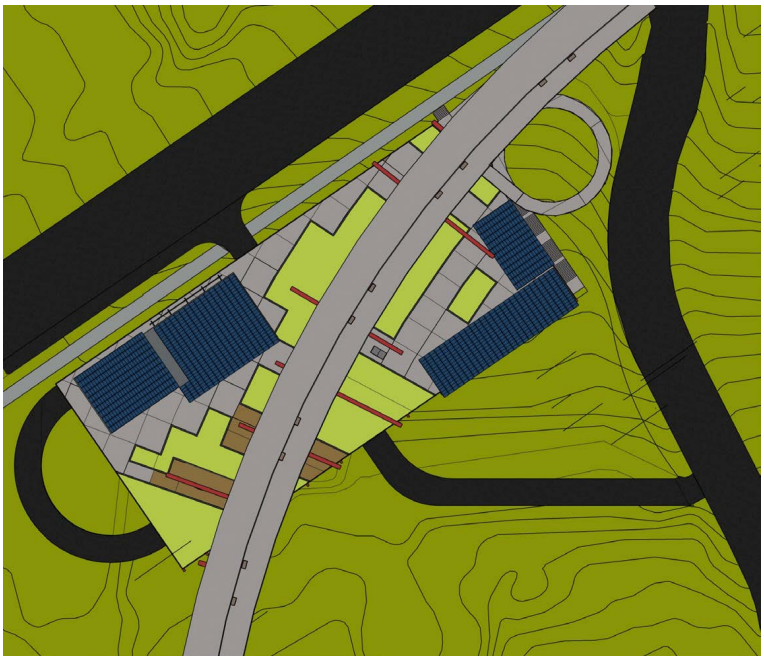


Figure 22: Garage site plan in 20 scale showing key amenities and structures.

Pedestrians can access the rooftop garden through an elevator connecting the garage floors of the circular pedestrian ramp on the northeast side of the garage (see Figure 23). The ramp provides easy an accessibility alternative to the elevator and the stairs. Additionally, the garage provides space for a few retail buildings on the garden top, allowing the space to both function as a garage for commuters and as a separate destination entirely.

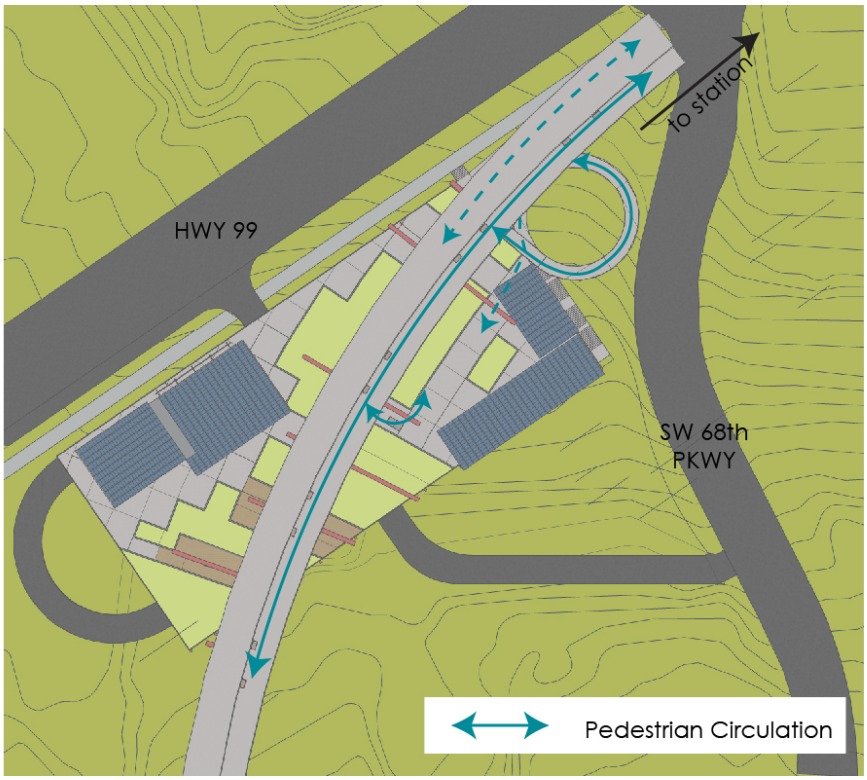


Figure 23: Pedestrian circulation around the garage and multimodal path.

Figure 24: Perspective of the pedestrian access to the multimodal path.

The garage is sited below the rail line and chose to integrate the beams and piers of the light rail into the garage configuration. This proved a challenging task as the garage was designed with 18” steel piers placed 30-60’ on center, and the combined rail and path’s piers were 36” steel piers ranging 50-100’ on center. The unusually long span between rail and path piers was an attempt to cover at least the width of the 44’ alignment while simultaneously avoiding placing piers in the middle of parking aisles and stalls (see Figure 25).

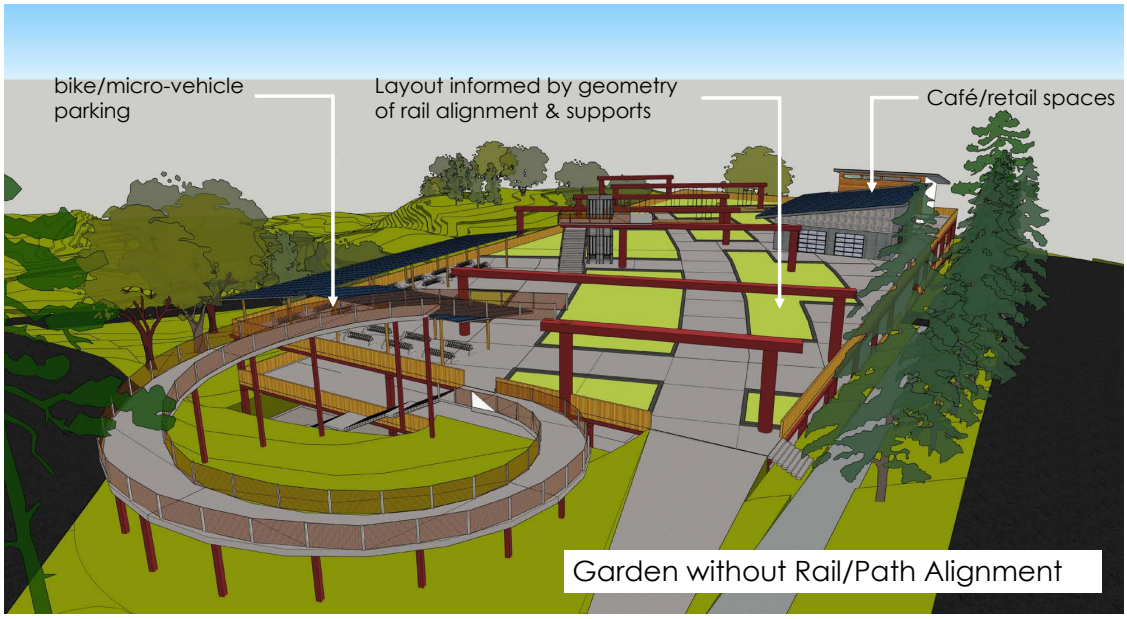


Figure 25: View from above of the beam and post supports of the rail line and path.

The secondary focus of the garage after functionality and programmatic elements was to seize the opportunity to make a unique garden and park that could be an amenity for the surrounding neighborhoods. The beams provided an opportunity for interactive elements such as swings and benches for people of all ages (see Figure 26).

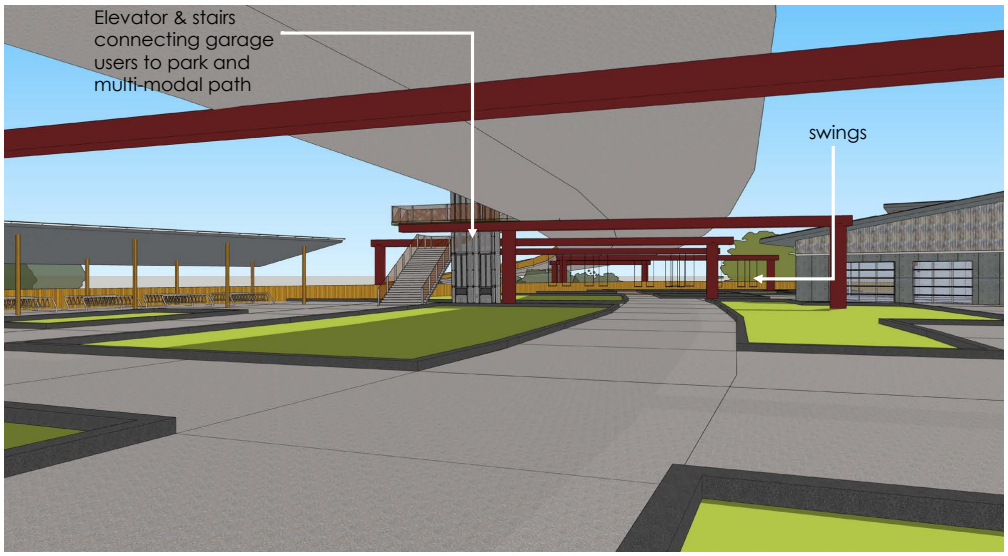
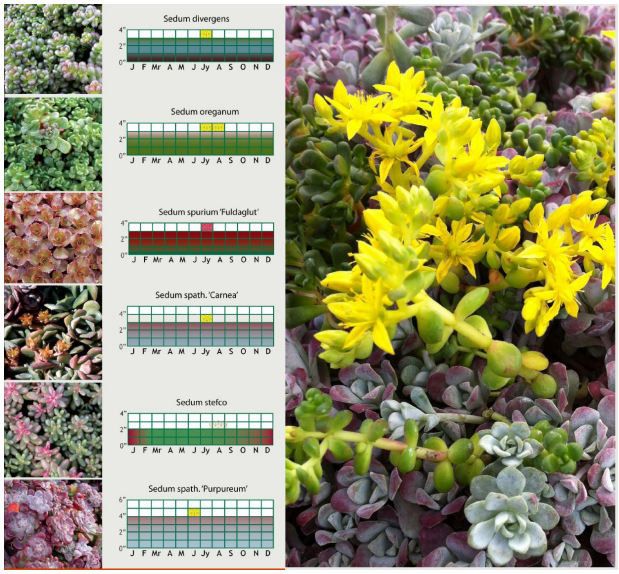


Figure 26: Beam alignment under the rail and path create unique place-making opportunities.

Capitalizing on the placement of the beams would not have been as iconic if the rest of the garage remained a typical garage. Kailee researched and proposed a planting palette of sedum and other native plants.

The design recommends the GreenFeathers Cascade Native MixTM for seasonal variety (see Figure 27) consisting of the following plants:

- Sedum divergens
- Sedum oreganum
- Sedum spurium ‘Fuldagult’
- Sedum spath ‘Carnea’
- Sedum stefco and Sedum spath ‘Pupureum’Additionally, Arctostaphylos, Achilea, Allium, and Agastache selections would work well in places where deeper soil medium can be accommodated.



GREENFEATHERS
CASCADE NATIVE MIX™

- Sedum divergens
- Sedum oreganum
- Sedum spurium ‘Fuldaglut’
- Sedum spath. ‘Carnea’
- Sedum stefco
- Sedum spath. ‘Purpureum’

Figure 27: Seasonal interest can be provided in sedum mix.

With the integration of specific placemaking elements, such as functionality, natural beauty, retail, food, and play, the garage has the potential to be a beautiful landmark and amenity to the surrounding and future communities of the Tigard Triangle.

Figure 28: Perspective rendering of the rooftop garden and retail space.

Design Summary

This design attempted to transform a programmatic necessity–parking–into a placemaking. The topography and orientation of the site offered opportunities to create unique spaces underneath the light rail bridge. Given more time, the design would have explored stormwater complications on the garage and investigate ways to slow and filter it. Furthermore, since the garage is designed with future conversion in mind, it is pertinent to know what futures it could be designed for and what services will be needed in the future (see Figure 29). On the whole, the design suggests that even with the most difficult programmatic needs, special places can be made.

Stormwater Management

Future Conversion of Parking Area

Figure 29: Further explorations of stormwater and garage conversion.

Place over Parking

Design by Thomas Cooper and Nick Sund

Concepts and Goals

The main goal of this project was to resolve the tension between the clients' desires to make a great transit-oriented development while simultaneously maintaining a Park and Ride garage that accommodates 400 desired parking spaces. There is a desire to design a livable and walkable transit-oriented development that contributes to the community in Tigard, but the amount of parking and vehicular access is a potential force against this goal.

Challenges and Opportunities

This project focused on the primary challenge of how to provide parking without sacrificing sense of place. First, the team identified a series of potential developments that would be typical but less ideal on the site. First, the design could run with the typical surface parking lot as a Park and Ride, but there would be no space left for housing.

Second, the design could consolidate the parking into a large garage, but that would loom over the housing and be a barrier separating people from the station, resulting in several issues that would not make a great social space.

Third, the design could consolidate the housing and create a park as a buffer, but the housing becomes too concentrated, lacks community-building space, and runs the risk of resembling a housing project (see Figure 30).

The team concluded that none of the previous options work well to fulfill the goals of Tigard and TriMet. They found that at each attempt, placemaking was being sacrificed to accommodate parking.

Figure 30: Traditional Park and Ride and development strategies. Option 1: a parking lot, option 2: a garage and development, and option 3: garage and development setback.

Design Development

The project uses the existing terracing to propose a fourth solution to the problem, one that attempts to integrate parking and housing and create a unique series of social spaces among elevated housing units. This proposal works with phasing of the project. The design suggests that first, TriMet build parking lots on the three existing terraces with a road connecting the three. Next, a second story of parking could be added as demand or funds were available. This would create an initial series of shorter parking garages that can then be connected to the station. The roof of the first two garages would be level with the station. When not needed for parking, they can be transformed to accommodate housing, acting as an extended platform.

Figure 31: The first phases of development and the creation of the parking and housing units.

Design Proposal

The final plan shows elevated walkways that can connect a variety of residential housing options to the station and start to create a series of private and public social spaces (see Figures 32 and 33). Buildings that have a southern exposure can be used for solar collection and potentially provide energy for the residential units and station operation. A highlight of this design is that people can walk to from their apartment to the station, the park, and other mixed-use amenities without having to negotiate traffic.

PLACE OVER PARKING FINAL PLAN

Figure 32: The final plan showing buildings (tan), the light-rail station, a public park, and commercial areas (white) near SW 68th Parkway.

Figure 33: A section cut of the site facing west. The development is nestled in the existing topography.

Social Spaces

A critical part of this proposal revolved around the social spaces that could be created with such an extensive development. Thomas identified spaces along the main east-west housing corridor with 20-scale detail. The design creates many small courtyards that can act as private, semi-private, and pubic social spaces and provide some communal amenities such as barbeque grills, open and covered dining areas, and play areas. The public corridor connects people to the parking below, creating lookdown moments and a connection to a greater functionality of the space (see Figure 34).

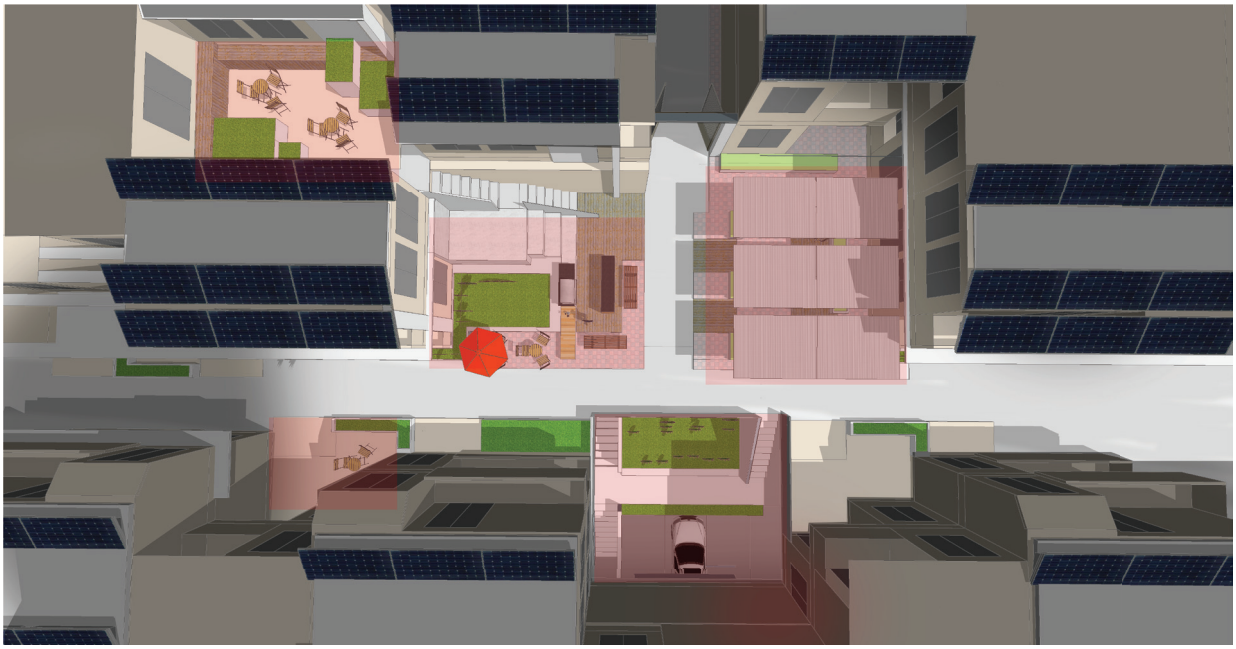


Figure 34: Main residential corridor with different social spaces highlighted in pink.

The following images display different perspectives of the corridor and give an idea to how the place may function and feel like. The first was rendered as a post-digital collage to display the concepts of the site, highlighting place-making and parking in balanced co-habitation. This is a cutaway view meant to highlight the life below the platform, and the cars cannot be seen in the design (see Figure 35).

Figure 35: A conceptual rendering of the social spaces.

In this courtyard, there are many opportunities to see other functions of the site. Through the buildings, a resident can see the train and the station above and at the same time pass holes that lead down to the parking. Islands of plantings bring a garden-like feeling to the cutaway staircases (see Figures 36-38).

Figure 36: Courtyard showing the spatial composition and potential uses of the space.

Figure 37: A lengthwise view of the main east-west residential corridor.

Figure 38: A section cut facing east visualizes the spatial relationship between the garage, corridor, and residential units.

Elevated Public Park

This part of the design focused on the creation of a public park as an amenity for future residences, existing neighborhoods, and commuters to the TriMet station (see Figure 39). The park's main entrance is off SW 68th Parkway and connects commuters up to the main pedestrian path leading to the station. Ideally, the bottom floors of the mixed-use buildings will house socially engaging amenities such as cafes, restaurants, and a daycare.

There is a central park that can be dog friendly, but a lot of the play element exists in the topography of the park as a whole. This design reiterates the boxlike feeling of a development in a special and unique way with planters of various sizes. Squares of planters and different levels of pavement break up the space to create smaller spaces and intimate moments as well as features of play. People of all ages can climb on the planters, which primarily will be pastoral in nature with sitting grass and trees for shade. Other planters will include diversified planting palettes. A dining area next to the park, however, can provide more formal public seating.

Going up from the park toward the residences, one can stop at a look-out platform and see from the spot down to Red Rock Creek at the bottom of the hill.

Figure 39: Site plan model of the neighborhood park.

Figure 40: Perspective rendering from the public park vista.

Design Summary

The goal of this design was to resolve the conflict between the need for parking and the desire for a transit-oriented development for the proposed area. This design was successful in offering a unique solution—to work with the existing topography and build on top of parking in a way that can be phased over time. This higher density solution offers one possibility for what the Tigard Triangle could transform into around the new light rail connections and provides multiple opportunities for the design of intricate and diverse social spaces.

Positively Tigard

Team members: Adam DeHeer and Yumna Imtiaz

Concepts and Goals

This team turned to the Tigard Triangle Urban Renewal Plan and TriMet's Southwest Corridor Plan to meet the clients' desires for the site. From their research, they identified three design priorities:

- Provide universal access
- Easy access to station
- Park and ride facilities
- Walking and biking infrastructure
- Achieve sustainability goals
- Improve water quality
- Create the most livable and walkable city in the Pacific Northwest
- Socially and economically thriving
- Non-vehicular circulation
- Stormwater
- Parks

Beyond meeting the design goals of the clients, the team was interested in creating a place that would be an iconic transit center for Tigard while remaining true to ecological functionality. Eco-revelatory design strategies are employed in the stormwater and circulation system throughout the site to artistically reveal the hydrology of the site and its relationship to the headwaters of Red Rock Creek. Stormwater strategies were designed to work with Chrissy Stillman's design for Red Rock Creek.

To help identify the three main goals of the project—universal access, sustainability, and livability—and where they can be implemented across the site, the team developed an inventory of icons (see Figure 41).

Figure 41: Icons representing the three main goals and specific associated features.

Challenges and Opportunities

These ambitious goals and the site's strategic location and substantial room for development led the team to suggest partnering with a development group to seize all the opportunities this project has to offer.

The team identified a development group that specializes in funding sustainably driven and pedestrian connected transit-oriented development, Long Haul Capital Group LLC. The team talked with a representative of Long Haul and used the idea of collaboration in their project. The team suggests that Long Haul would be a beneficial partner for TriMet and the City of Tigard to reach each party's goals for the site (see Figure 42).

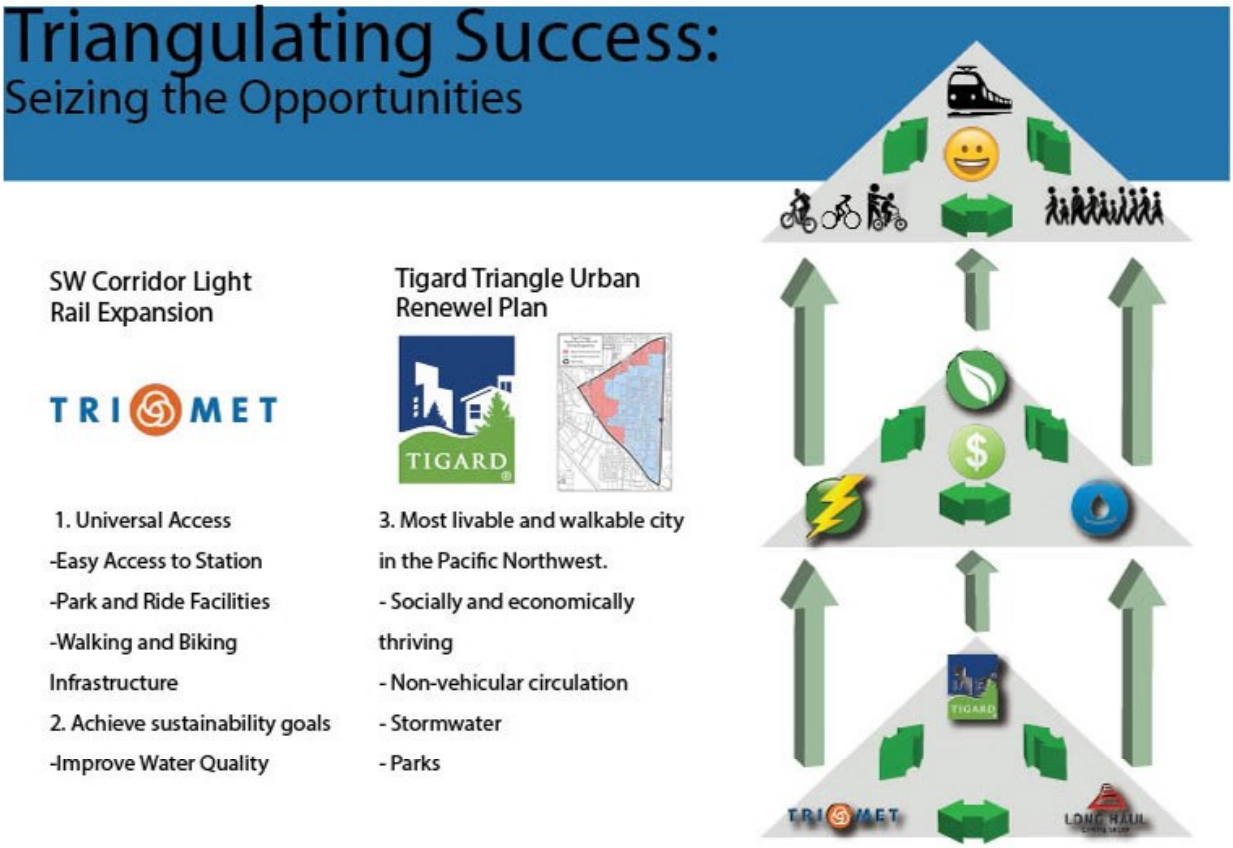


Figure 42: Diagram of site goals starting with key partnerships on the bottom leading to sustainable elements on site.

Design Proposal

The master plan is divided into three distinct zones: the northern part consists of the TriMet Station area with intensive commercial development, the central zone contains housing units on the east and mixed-use buildings on the west, and the bottom zone accommodates the Community Partners for Affordable Housing (CPAH) lot and a restoration plan for Red Rock Creek. Thus, the master plan itself is representative of an inclusive design that has commercial activities generating income, restoration zones that enhance natural habitat, and housing that ties the site together (see Figure 43).

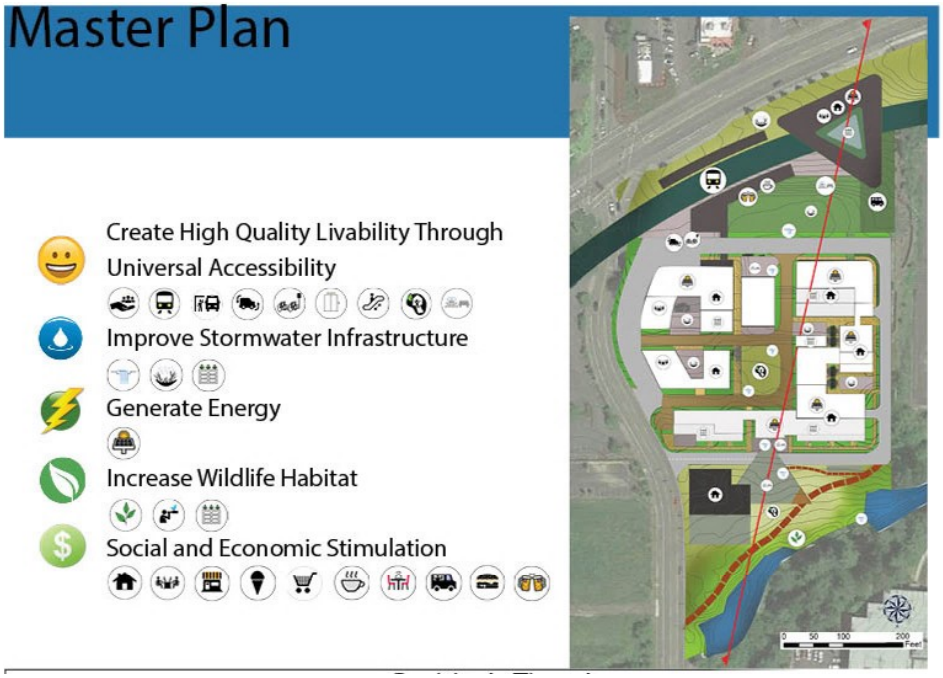


Figure 43: Entire site plan with icons of associated uses that fulfill the overarching goals.

The station area has a multi-story triangular building at the top that is intended to be an iconic structure that identifies entry into the City of Tigard as one drives in west from Portland on the Pacific Highway. This area is envisioned as a very active space with commerce, food, offices and residential development, and all these activities occur around a plaza that is built on top of the Park-and-Ride structure. The team was inspired by the proposal by JRDV Architects for a transit-oriented development with high-rise buildings and a light rail through the commercial center for the West Oakland BART Station in California (see Figure 44).

Figure 44: Rendering by JRDV Architects for a light rail transit-oriented station in West Oakland.

A blue building in the site model (see Figure 46) marks the high-rise commercial building through which the MAX would pass through. Following the MAX station down the site is a green plaza that houses the Park and Ride garage below. Residential and units and mixed-use buildings take up the middle section of the site while maintaining a central corridor for pedestrian access and stormwater daylighting. The pink represents an exit road for the Park and Ride garage and the brown represents the light rail path.

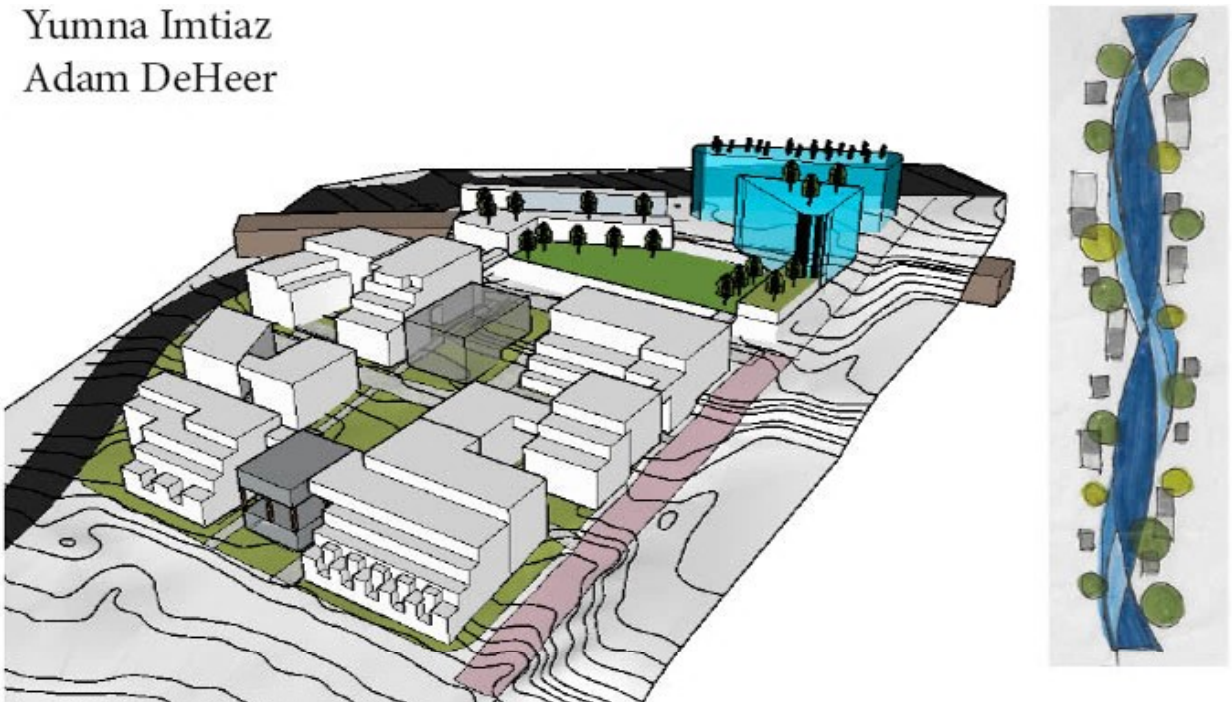


Figure 45: Site model of the team's design.

Figure 46: Section looking west of the site model along with the identifying icons.

Design Diagrams

The team explored the design's main elements and functionality through spatial diagrams covering topographical analysis, park and ride placement, vehicular circulation, pedestrian circulation, land use, greenspace, and water flow throughout the site. One such focus was on the relationship of the terraces and the design elements. Traversing the topography proved a challenge for all teams, and this design chose to implement a series of stairs and covered elevators to assist people traveling from the southern end of the site up to the station (see Figure 47). The Park and Ride garage is located at the top of the site beneath mixed use buildings, and an additional underground garage serves the residents in the middle of the site (see Figure 48).

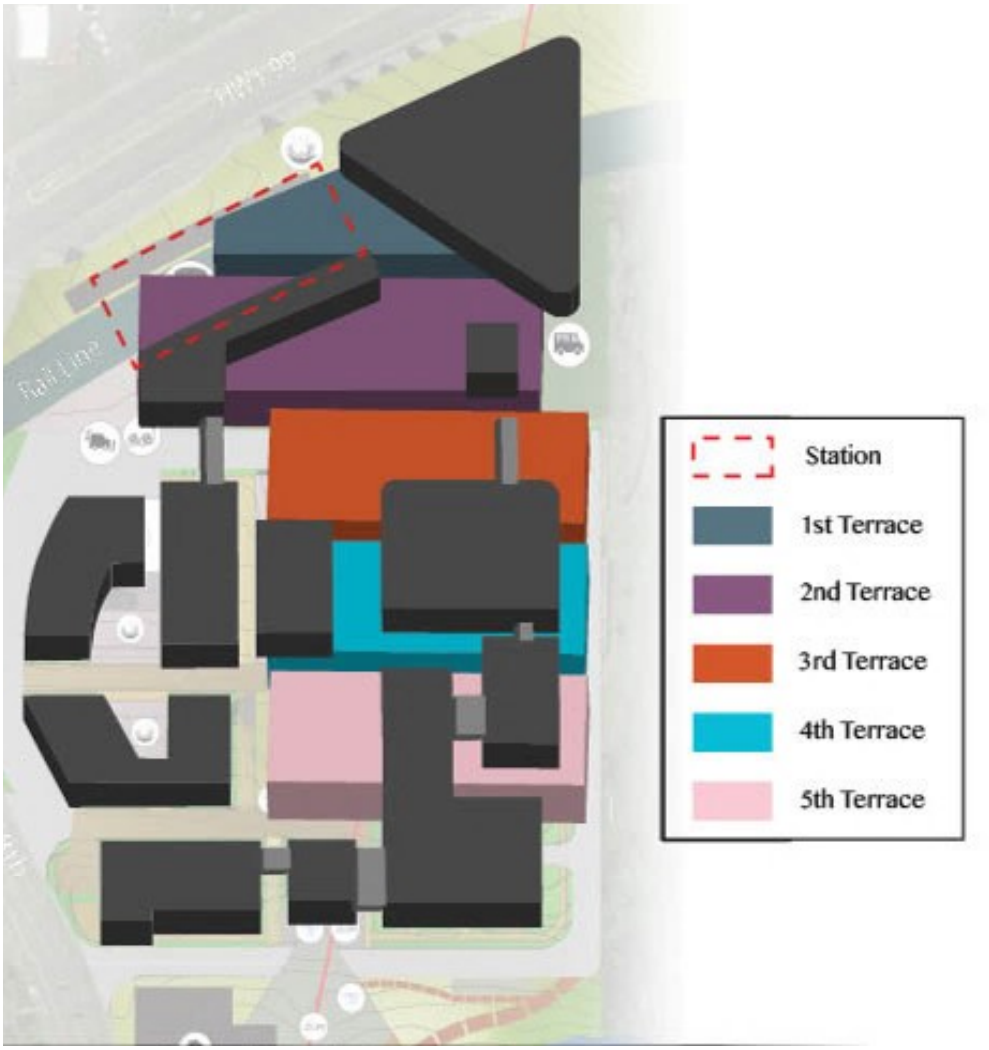


Figure 47: Diagram of the existing terraces on the site and their relationship with proposed development.

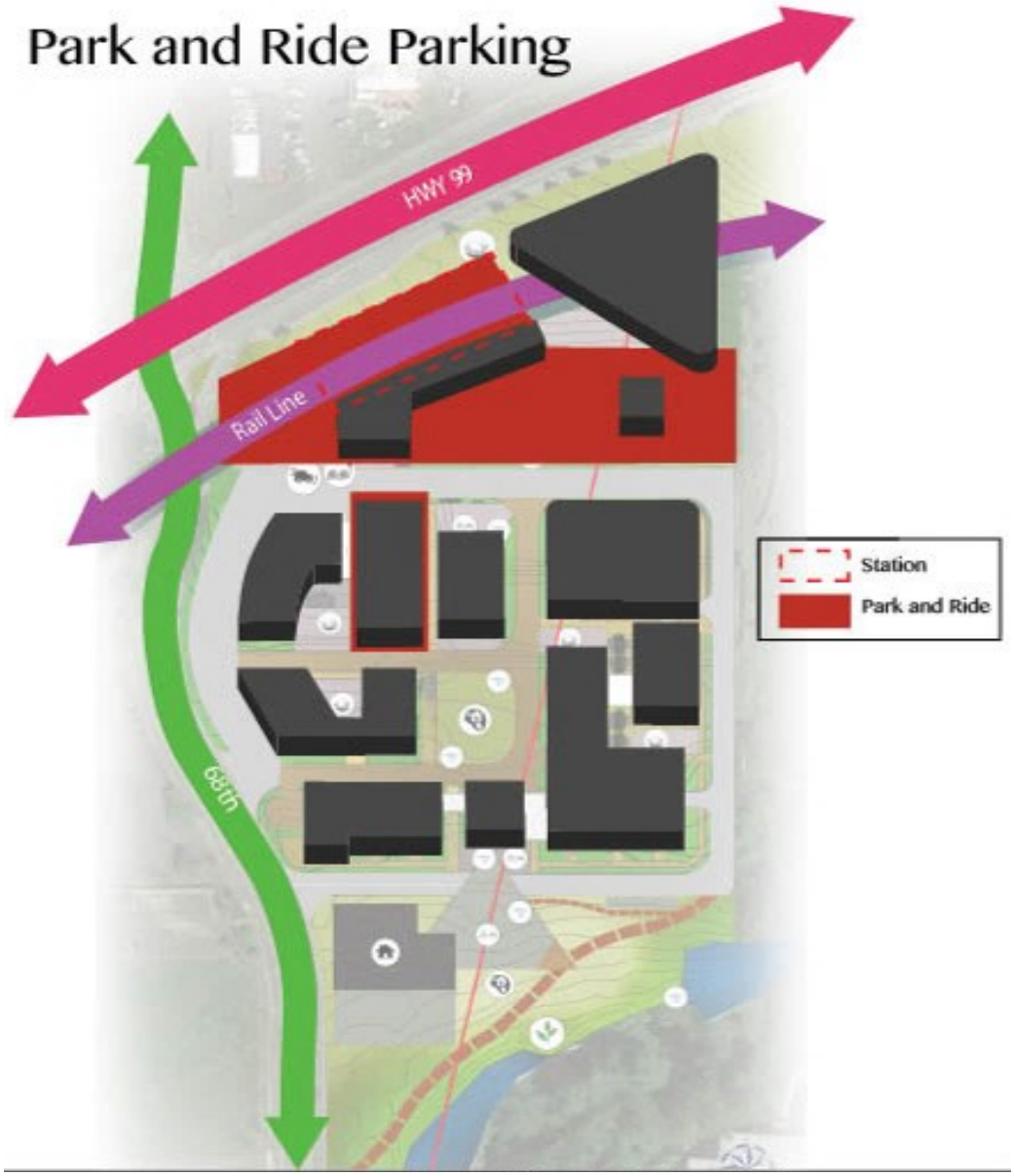


Figure 48: Diagram of the Park and Ride station in relationship to proposed development, the rail line, and the station.

Vehicular and pedestrian circulation for the Park and Ride and for residents was an important consideration. Both garages are accessed on the periphery of the residential area, which also serves for residential use and for station drop-offs. The internal part of the residences is pedestrian only but material and width along the corridor allow enough for emergency vehicles (see Figure 49).

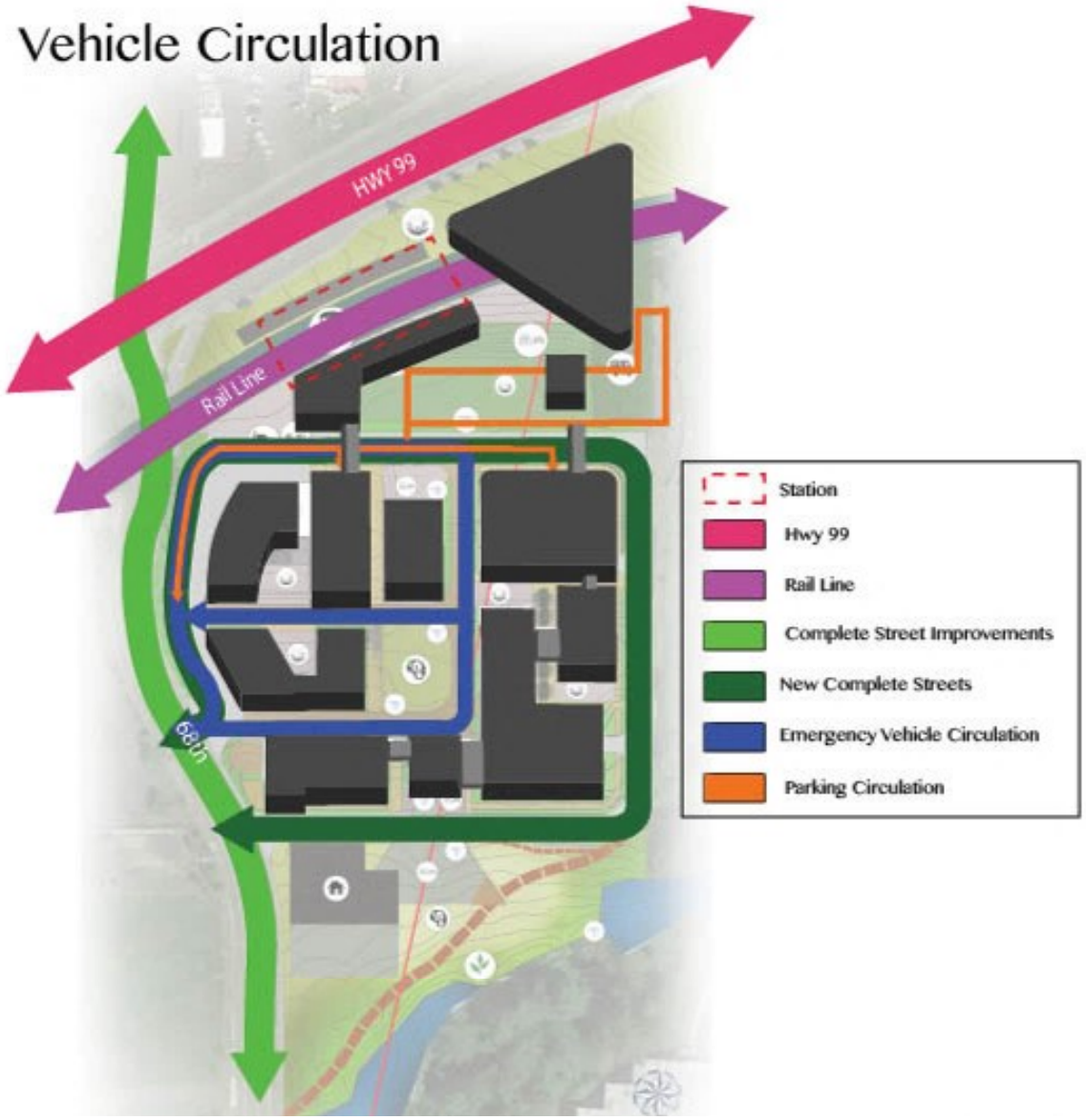


Figure 49: Diagram of the vehicular and pedestrian circulation for the Park and Ride and TOD1.

The central housing area is distributed into three portions (see Figure 51). The buildings nearest SW 68th Parkway are proposed to be mixed-use commercial and residential. A community corridor occupies the north-south center of the residential area with a community center at top, park and playground area in middle and an open building containing mechanically aided circulation for people with disabilities. The buildings east of the corridor are solely residential, but some of the units are proposed as affordable housing to provide more opportunities in addition to the CELA housing at the bottom of the site. Buildings are clustered to act as edges containing the network of outdoor and pedestrian spaces for inhabitants of those buildings.

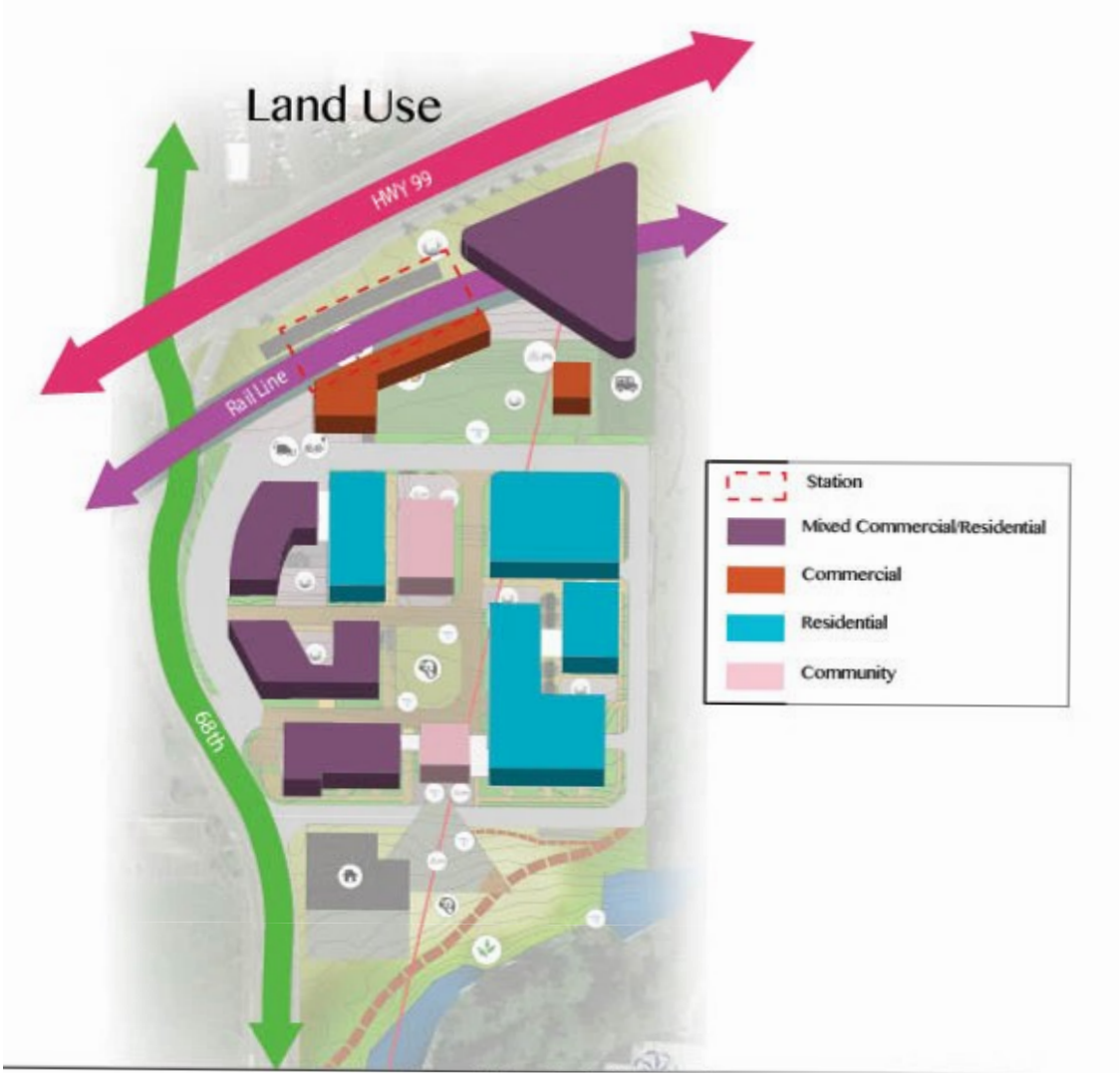


Figure 50: Shows the land use designation throughout the site. Mixed-use commercial and residential areas are depicted in purple, purely commercial areas red, community areas pink, and purely residential areas blue.

The roofs of all the buildings within the site are envisioned either as green spaces with solar panels or as roof top gardens. Generation of electricity, retention of rain water and enhanced performance of solar panels due to the decrease of temperature in the micro climate of these roofs, caused by the garden are the aims of this proposition (see Figure 51).

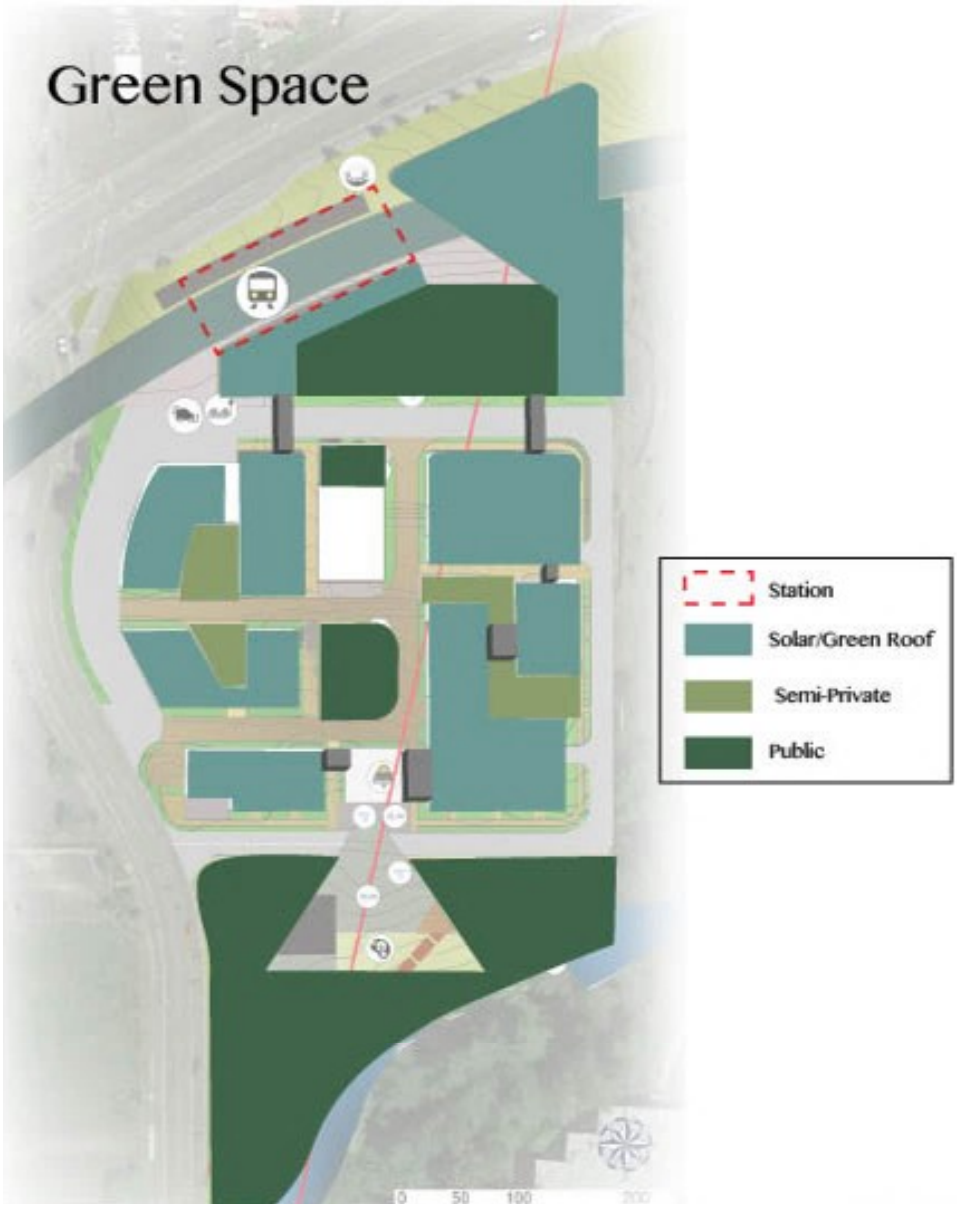


Figure 51: Diagram of the green roof and energy use potential across the site.

One of the main features of the plaza is the system of bioswales that cleanses rainwater collected from the entire site and then feeds all the water features down the slope, which is released from an underground cistern. These water features are woven into the circulation paths that lead through the community corridor, down to the habitat restoration zones. In the rainy season the water running down these features joins the creek. In the dry season, the water can be recirculated to the top of site and supplemented with gray water from the surrounding buildings to fuel the water features. This design not only collects and cleans stormwater, but also uses it as a celebratory feature. It exposes the public and the residents their place in a larger watershed and provides an example of cleaning and reuse (see Figure 52).

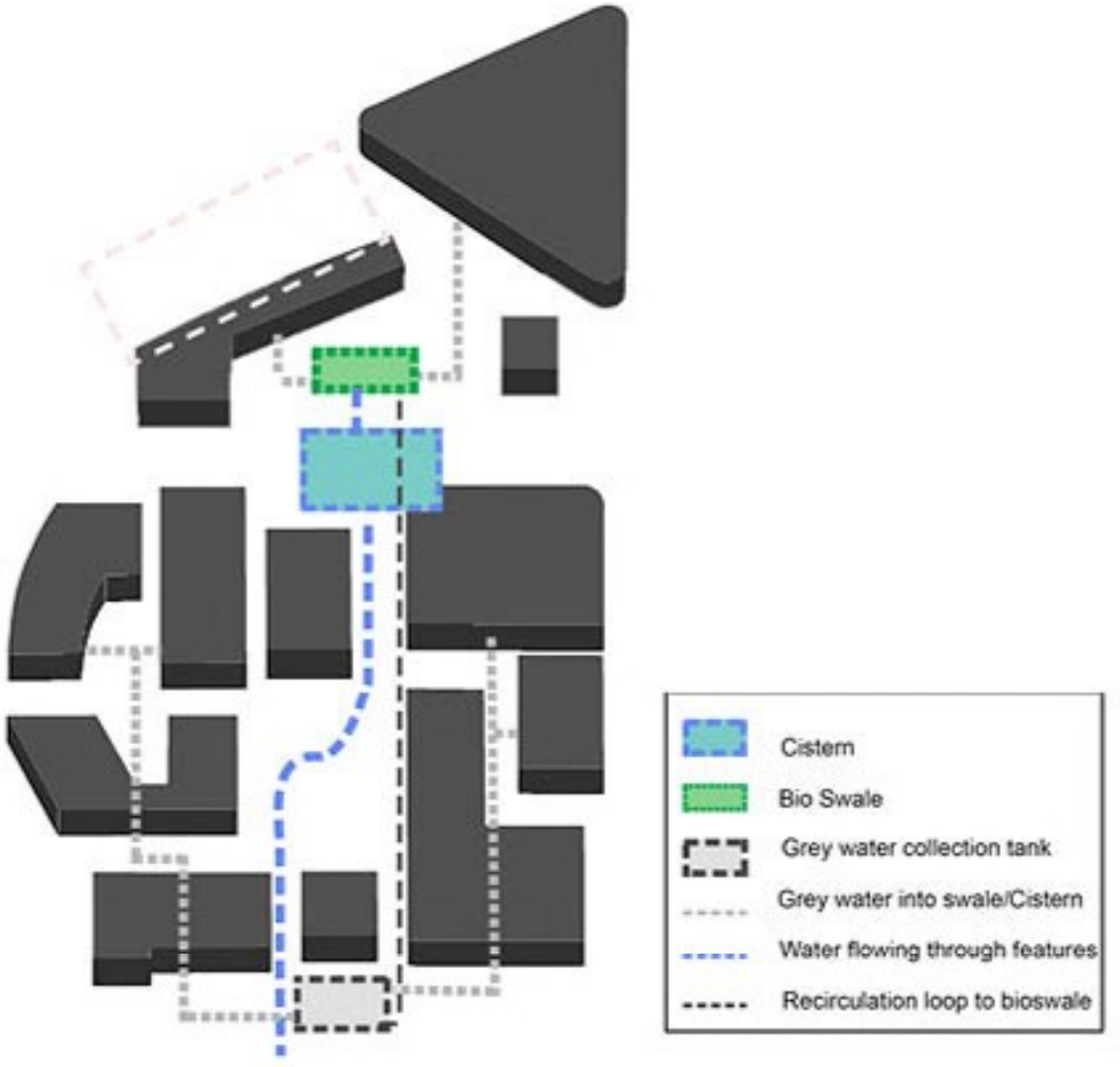


Figure 52: Diagram of water circulation on the site.

The Station Plaza

This part of the design focuses on the station plaza. Continuing with the team's goals of access, sustainability, and livability, the buildings provide functions that generate income and provide resources for both people going to the station and for residents. The buffer between Highway 99W and the light rail has been transformed into a series of stormwater gardens that are bisected by a winding pedestrian path that connects to various entrances into the station. These bioswales continue into the plaza area to collect stormwater from the site and start to follow the pedestrian path that will lead to the residential area.

Buildings next to the station house a variety of amenities such as a market, café, microbrew, and convenience shop. The bottom floor of the landmark triangular building holds a grocery store on one end and a restaurant on the other, while the top floors of the building are a mix of office, commercial, and residential spaces. The following images visualize these features in plan and explain the functions through diagrams.

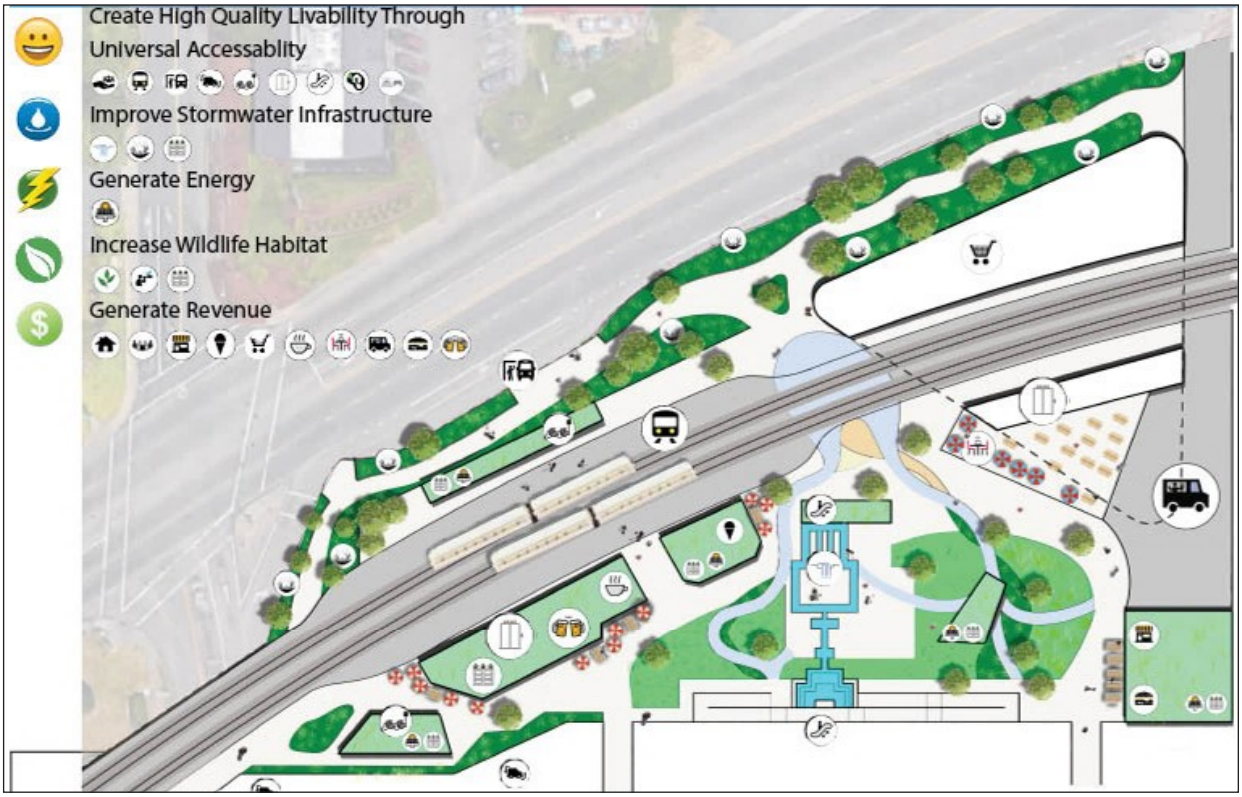


Figure 53: Diagram of water circulation on the site.

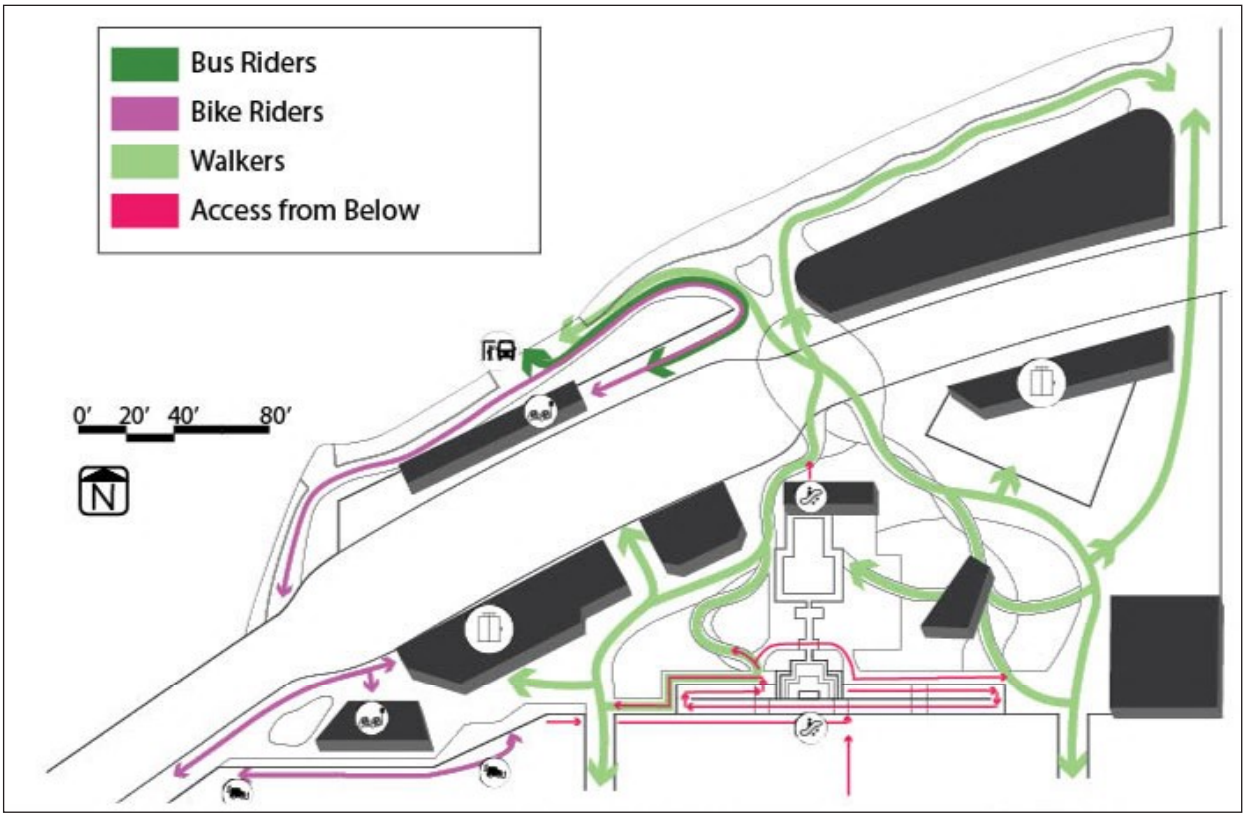


Figure 54: Diagram showing circulation around the plaza for a variety of pedestrian commuters.

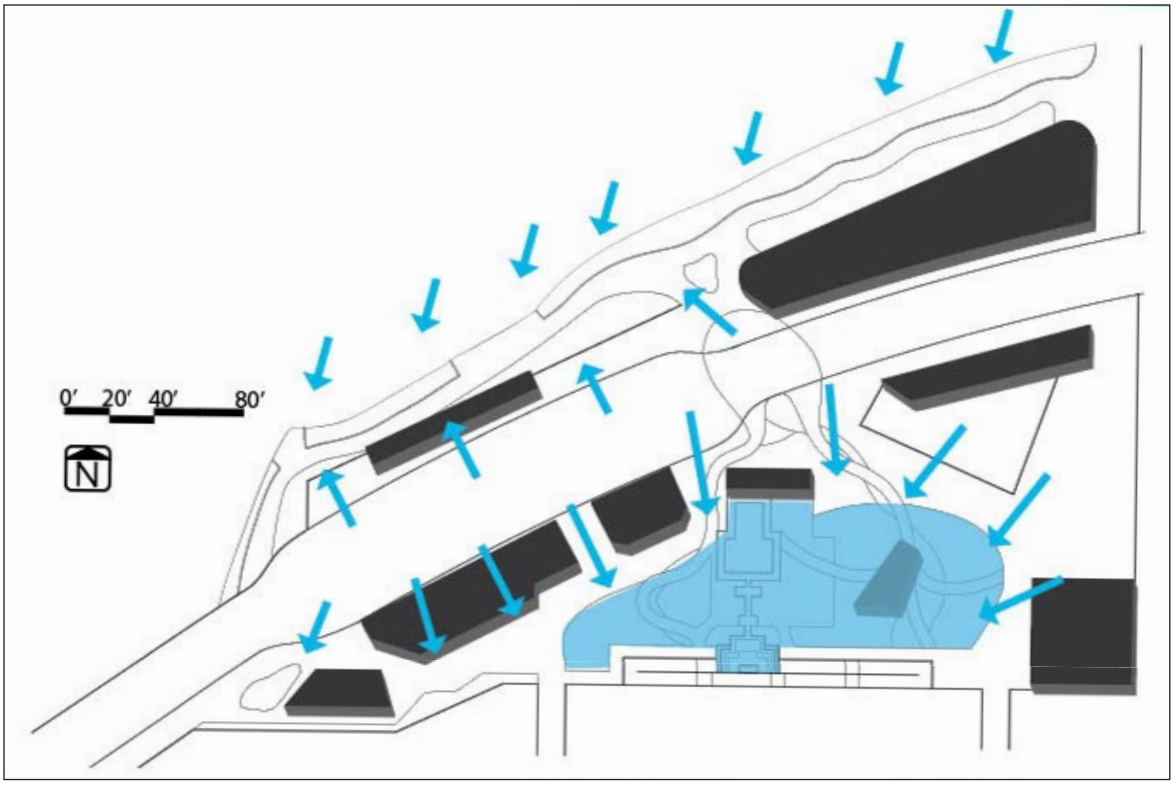


Figure 55: water flow through the station plaza. Arrows indicate the direction of runoff into the bioswale system, which drain into the cistern (blue).

Residential Area and Community Corridor

This design focuses on the residential area south of the station and plaza. The concepts Yumna desired to achieve specifically with this site were the following:

- Connect the site from top to bottom with water, circulation, and activity
- Create a journey
- Minimize surface parking and impervious surface
- Create abundant open green space

As described earlier in the design analysis, the housing was clustered to act as an edge to the pedestrian area and to maximize interior open space. At 20-scale Yumna focused on the development of the community corridor.

The corridor acts as a linear plaza as well as a motive space. The main motive space occurs through stairs and paths along the side while the interior spaces are reserved for accessible transport, water features, and mini plazas (see Figure 56). Water features throughout the corridor allow for viewing, interactive play, and innovative planting design for a unique pedestrian experience (see Figure 57).

Figure 56: Perspective rendering from the second terrace looking northeast toward the iconic commercial building. A central staircase bisects a waterfall and an ADA ramp follows wall planter as it makes its way up to the first terrace.

Figure 57: Plan view of the development site with the corridor highlighted.

Residential units on the exterior faces of the building have terraced balconies to provide private outdoor space and some of the architectural faces are designed as green walls with stormwater filtration systems (see Figure 58). The differentiation in the building façade adds a variety of open space along the corridor.

Figure 58: Section along the span of the corridor looking east from top to bottom of the site.

The community corridor is a series of open spaces running north to south along the site. Accessibility is achieved throughout the corridor with options for stairways or covered elevator houses to access the top of the site. Along the way, seating areas, planters, and shade, allow for rest or a quite spot to read in the neighborhood. Water features are made present through the topographical changes of the site, and occur in terraced planting moments, waterfalls, and other playable features (see Figure 59).

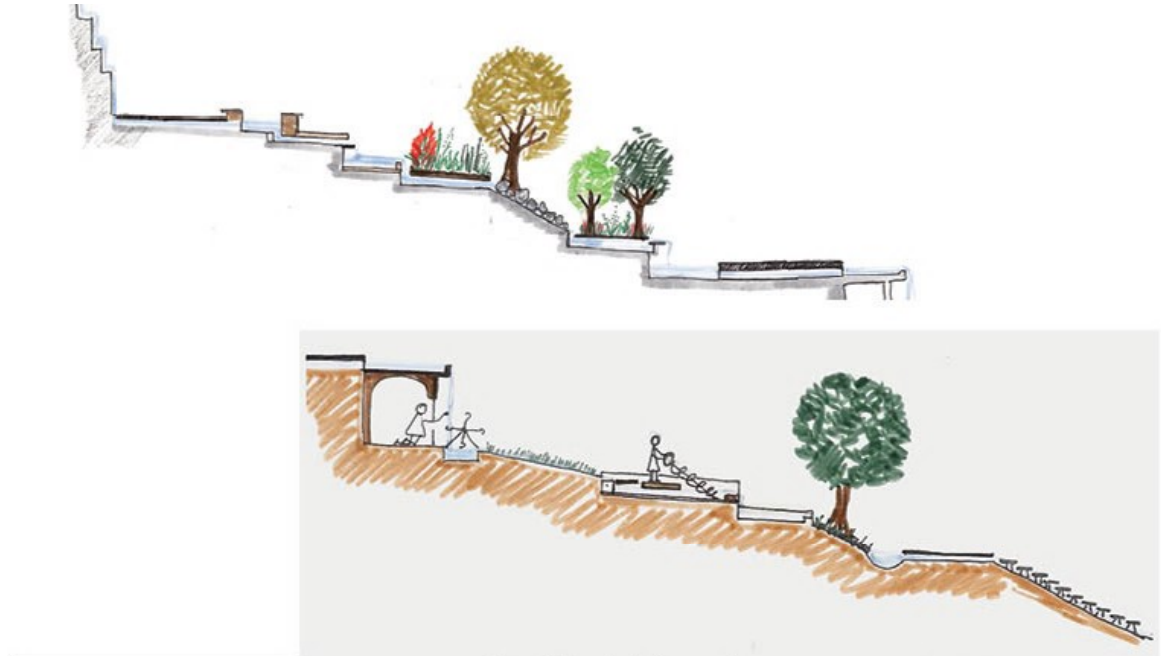


Figure 59: Section cuts looking east of water features in the corridor..

Figure 60: Concept diagram for the Tigard Terraces.

Team Design Summary

The Positively Tigard Team created a design that could serve as an accessible, sustainable, and livable solution to the client's desires of merging a light rail station, park and ride garage, and extensive mixed-use development. The focus on the capture of stormwater and the stimulation of business revenue truly add to their sustainable goals while meeting other programmatic needs.

Recommendations

The team sees great potential in the site to become a special place for Tigard as well as a critical addition to the TriMet extension and to the greater Portland area. The team suggests that the most important step is to partner with the right sustainable developer, as sustainability is the crux for making a positive move for the future. From there, special elements of the design can follow and will be more meaningful and unique from a basis in sustainable design.

Credits

https://jrdv.com/work/west-oakland-bart-station-mixed-use-development/

https://thenounproject.com/

Tigard Terraces

Group Members: Brianna Heese, Emma Stone, Tori Murphy, and Bocong Li (BETT)

Concepts and Goals

The BETT Team identified design goals from the City of Tigard and TriMet's programmatic goals and were prioritized into three main components:

- Design for the quality of life of residents (a standard of health, comfort, and happiness).
- Connect neighboring residents with a pleasant pedestrian experience through the terraced gardens.
- Provide accessibility, functionality, and financial opportunity for Tigard through transit-oriented development.

The team's design concepts were inspired by historical and existing conditions of the site. Looking back at the agrarian history of Tigard via a 1947 historic photograph, the team identified orchards and Christmas tree farms as a persistent landscape language. Through suburban development, the site transitioned from its agrarian roots to development made possible by extensive terracing. In design elements, decisions were made to respond to existing terraces and the historic agrarian conditions (see Figure 61). Additionally, a central pedestrian corridor running across the site north to south transects the terraces and the orchard design, influencing design decisions from this armature.

The agricultural influence in the design was combined with Tigard's goal of increasing and maintaining the urban forest in their comprehensive plan. Thus, the design accommodates trees whenever possible and at times translates the planting with the agricultural grid arrangement.

Challenges and Opportunities

The team decided to focus on the biggest challenge and opportunity all teams faced: the existing terracing and topography. Forms of terraces and terraced garden housing appear throughout the sites as a concept anchor. Rather than plopping down a high-density development that would be completely foreign to Tigard's suburban form, the team proposed decreasing density as housing radiated out from the station to reintegrate into the existing landscape language (see Figure 61).

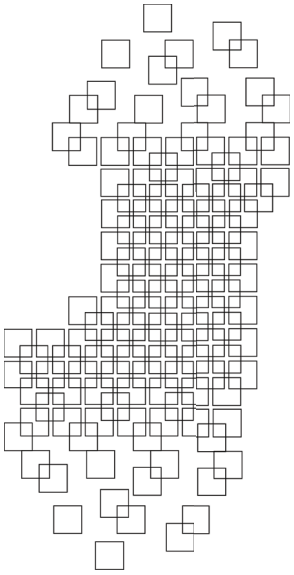


Figure 61: Structural diagram illustrating the idea of integrating the new transit-oriented development back into the existing suburban landscape of Tigard.

Design Proposal

The team structured their design proposal in terms of phasing. The station, plaza, mixed use buildings and parking are assumed to be built within the next ten years. The team's design presumes that TriMet will partner with a developer who could build the terraced housing units and make efforts to restore Red Rock Creek in five years following the light rail station and Park and Ride garage (see Figure 62). The north side of Highway 99W will be the last phase of transit-oriented development. Ride sharing vehicles and autonomous vehicles are predicted to be the norm 30 to 50 years in the future, and the north side will provide a drop off lane for commuters, an indoor market for convenience and additional housing opportunities with open space amenities (see Figure 63).

Figure 62: Diagram of the building programs throughout the site (yellow-mixed-use, purple-residential, green-commercial).
Figure 63: Site plan with each zone's 80-scale design and their relationship to the light rail and station.

The entire site was designed to make use of the existing topography to build a place that would provide the desired programs of TriMet and Tigard and to fulfill the team's conceptual goals.

To design for the quality of life, priority was given to the pedestrian and the structure of the residential units through private outdoor balconies with views of Red Rock Creek and the Crescent Meadow Park. Amenities for the residents, neighbors, and commuters can be found on the development on top of the Park and Ride garage, emphasizing the transit-oriented lifestyle. Additionally, there is abundant green space, walkable social streets, and plazas to provide places people can relax and socialize.

To design for a great pedestrian experience, a main pedestrian and bike corridor with ADA accessibility connects the southern end of the site to the station and the northern end of the site to Crescent Meadow Park or the Tigard Business Center.

To provide for financial opportunity, the design suggests multiple building options for commercial, retail, office, restaurants, and housing, and future development across Highway 99W can increase those options and provide residents with other amenities (see Figure 64). Finally, houses and commercial buildings are designed for solar exposure to help source energy for the development and the station.

Figure 64: Diagram of the active and passive pedestrian circulation throughout the site.

During the studio, the alignment of the light rail line changed several times. This team adopted the current alignment of the rail line but chose to explore options of the MAX crossing SW 68th Parkway on grade assuming that the intersection would be re-engineered as opposed to the MAX crossing the SW 68th Parkway on a bridge as other teams did. This decision required the station to be sunken 4' from current grade to cross 68th Parkway at grade without surpassing a 6% slope (see Figure 65).

Figure: 65: Site plan with each zone's 80-scale design and their relationship to the light rail and station.

Design Diagrams

Important to the function of the design was organizing vehicular and pedestrian circulation for minimal conflict. For pedestrians, a bridge crossing the creek can connect the Tigard Business Center to the station through the main pedestrian corridor. Main motive spaces are the corridor up to the plaza, and main passive spaces are the plazas and parks (see Figure 66).

The main vehicular circulation through the site occurs on the exterior of the residential area. A separate access lane conveys Park and Ride users into a two-story garage, with parking and drop off options, under the main commercial area and then loops out to allow for smooth flow even with high volume traffic (see Figure 67).

North of Highway 99W, an added road connecting SW 68th Parkway to 99W can service the TOD2 area and provide additional station drop-offs if a pedestrian bridge is built over Highway 99W. Traffic can recirculate to SW 68th Parkway to head back west or exit east on 99W toward Portland.

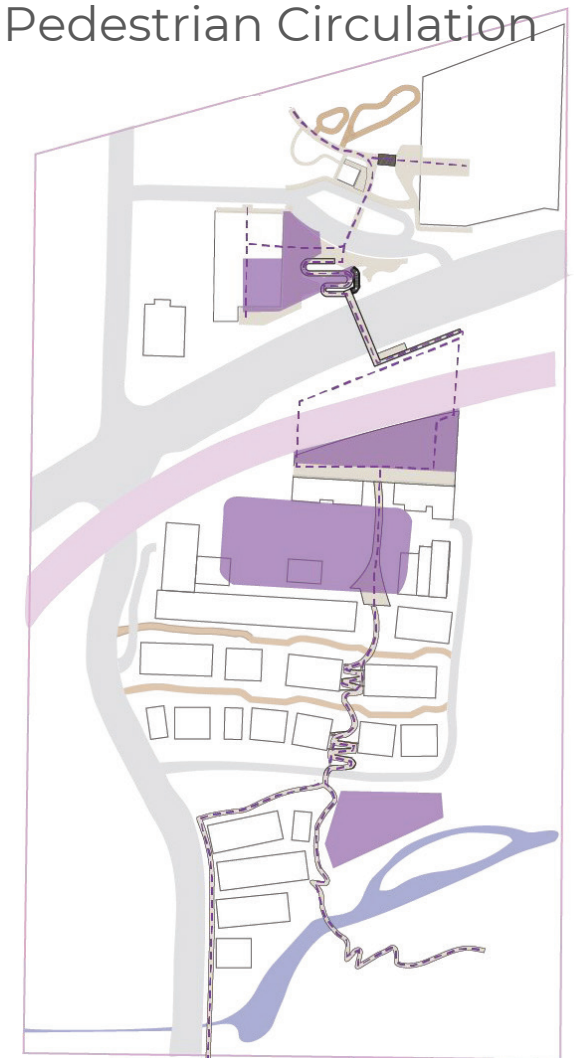


Figure 66: Diagram of the active and passive pedestrian circulation throughout the site.
Figure 67: Diagram of the main vehicular circulation and parking areas throughout the site.

Additionally, the design attempted to meet the goals of stormwater treatment and energy generation on the site. Water flows from the top of the site down to Red Rock Creek, meaning that any extensive development on the site can affect the creek below. Throughout the residential area, stormwater swales and rain gardens will capture the stormwater generated on-site. The overall goal is to slow and treat water uphill from the creek, which will have its own management strategy to deal with off-site water (see Figure 68).

To generate energy, the design suggests putting solar panels on most of the residential units, which will have angled, south facing roofs (see Figure 69). The top of the park and ride garage will act as a large green roof, but most taller buildings will utilize solar or a mix of solar and green roof to capture as much solar energy as possible.

Figure 68: Diagram of stormwater strategies on the site.
Figure 69: Diagram of the green roof and solar potential across the site.

The Terraced Gardens

This design proposes development solutions for the residential, transit-oriented development south of the light rail station and plaza (TOD1). Brianna identified goals specific to this site that rest within the three team-identified goals. They are to:

- Provide housing and mixed-use opportunities
- Prioritize quality of life through housing development, street design, and open space planning
- Emphasize the pedestrian experience and transit-oriented living style

The design is made up of a plaza to the north, which houses the Park and Ride garage below, and the residential "terraced gardens" down the hill (see Figure 70). The two-level garage can hold TriMet's desired 400 parking spaces while providing a social and commercial space above. This design zones potential uses of the roof, such as a play area, restaurant seating, informal movable seating areas, art, and water features but develops the residential area in more detail.

The housing units are situated on the terrace slopes to allow the flat areas to be used for streets, which are pedestrian oriented "living streets."

Programmatic Zones

Figure 70: Diagram of the main zones of the site.

Like previous teams, this design wrestled with the need for parking and the desire to make great social spaces and areas for revenue. A one-way entrance street for the Park and Ride garage is added further down from the intersection of SW 68th Parkway and Highway 99W for safety and exits on an exterior road around the site. The park and ride traffic designed not to enter the residential area.

This design suggests that TriMet partner with a developer to provide housing in exchange for an allotment of residential parking spaces within the garage. With garage and street parking, 116 spots can be provided for 117-145 residences while still supplying 310 parking spots for the Park and Ride users (see Figure 71).

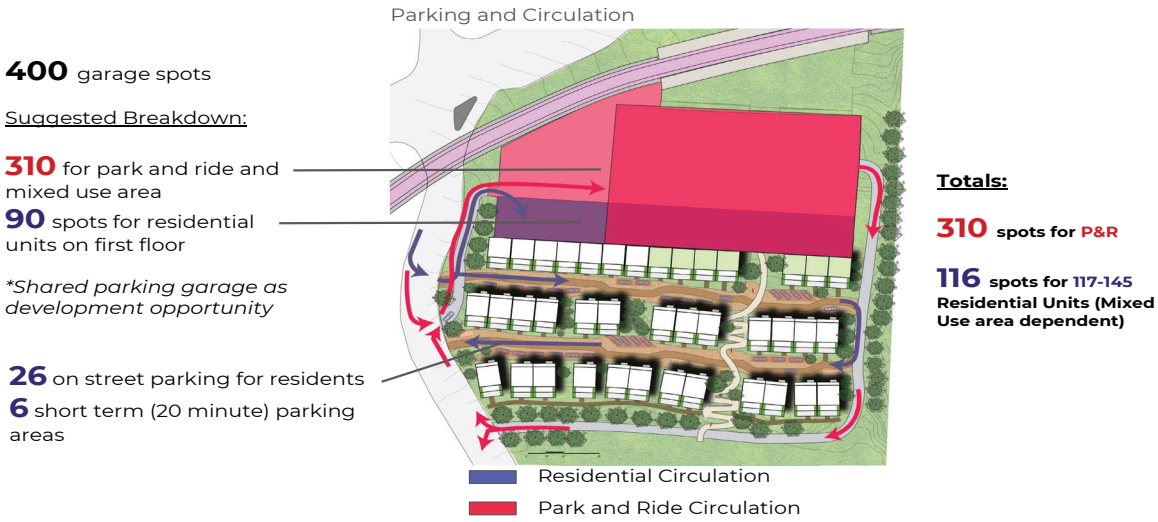


Figure 71: Diagram of residential and Park and Ride circulation and parking numbers

The main pedestrian areas of the site demonstrate a coexistence with the parking below. Pedestrians coming from the neighborhood enter the garage and take an elevator up to the roof or can walk around via the sidewalk on SW 68th Parkway (see Figure 72).

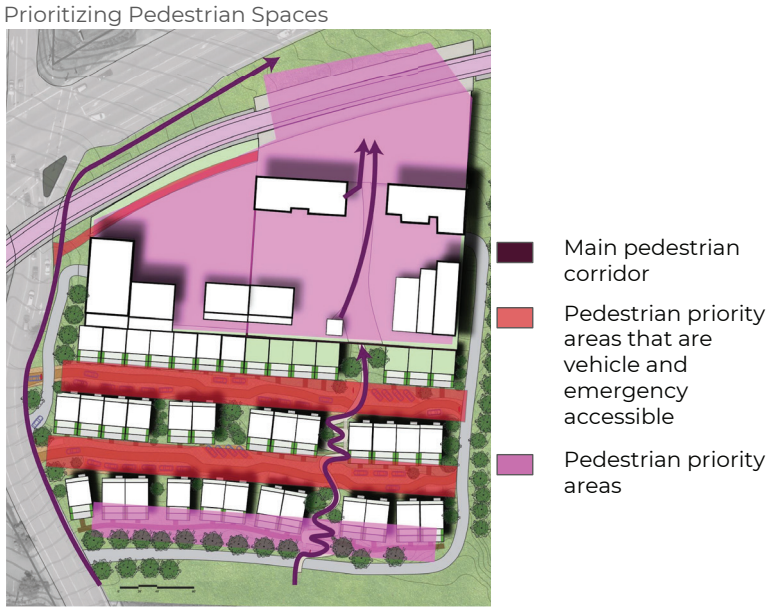


Figure 72: Diagram of the main pedestrian areas on the site

Site Plan

Goal 1:

Provide **housing and mixed use opportunities**

Site Elements:

- Park and Ride Garage (400 spots)
- Light Rail Station Access
- Commercial and Mixed Use Area
- Transit Oriented Residential Neighborhood (117 units)
- Pedestrian Corridor
- Separate Park and Ride and Residential Access Roads
- Emergency Accessibility
- Solar Energy
- Stormwater Management ~ 6700 cf water

Figure 73: Site plan in 40-scale design of the TOD1.

Figure 74: Rendering of the site model looking up to the rooftop of the garage through the main pedestrian corridor.

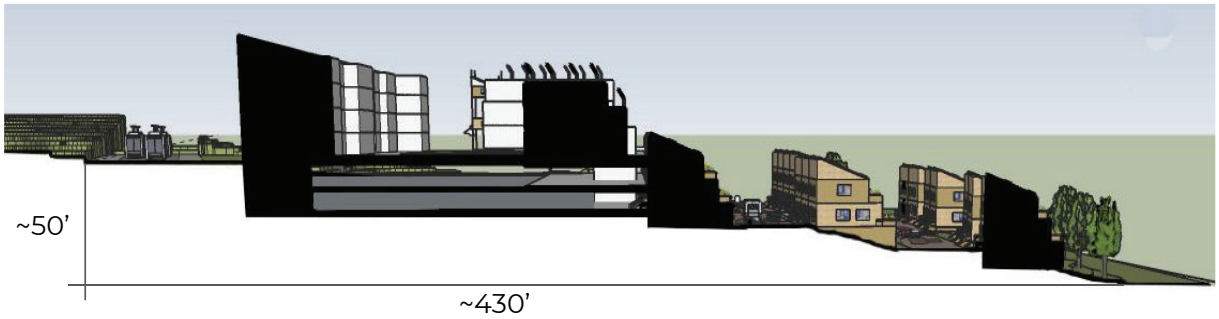


Figure 75: Section of the site facing east.

This design focused on the housing structure and dimensions to provide a variety of units with certain amenities. Each housing component holds three units and are clustered in a townhouse style. The southern sides of the upper story units have balconies to allow private outdoor space, thus increasing quality of life in a higher density development, and ways to activate the street were considered. Space activation of the street interface was considered to keep eyes on the street but still allow people private space for customization (see Figure 75).

Street Activation

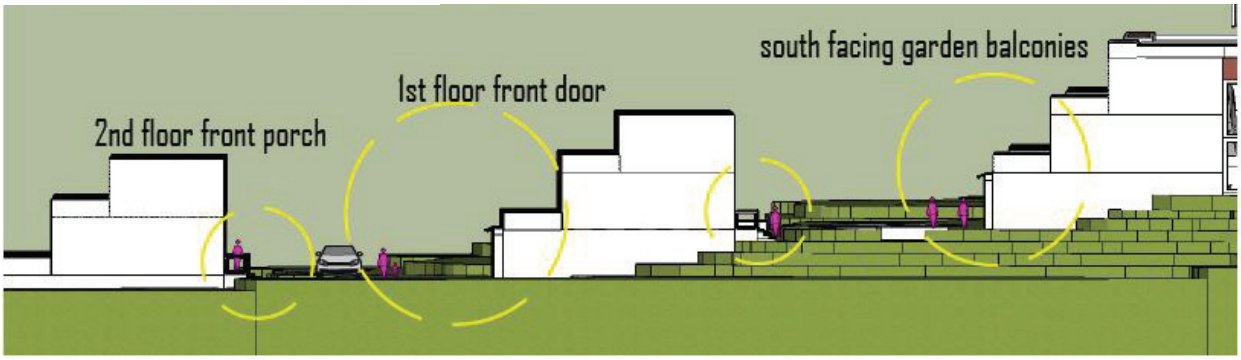


Figure 76: Diagram showing the different ways space activation was considered in housing development.

Housing development considered providing a variety of housing types for people of different needs (see Figure 77). The first floor is the largest unit (1,000 sqft) with street access but lacks a balcony. This unit may be ideal for families and is an accessible unit. The second-floor unit (825 sqft) has an additional 175 sqft balcony and a north facing front porch, which accesses the street on the terrace above. The top floor (650 sqft) with the 175 sqft balcony is accessed via a stairway on the north-facing street. Although the smallest unit, it has the best solar exposure and views to the creek and may be ideal for two-person families or young professionals.

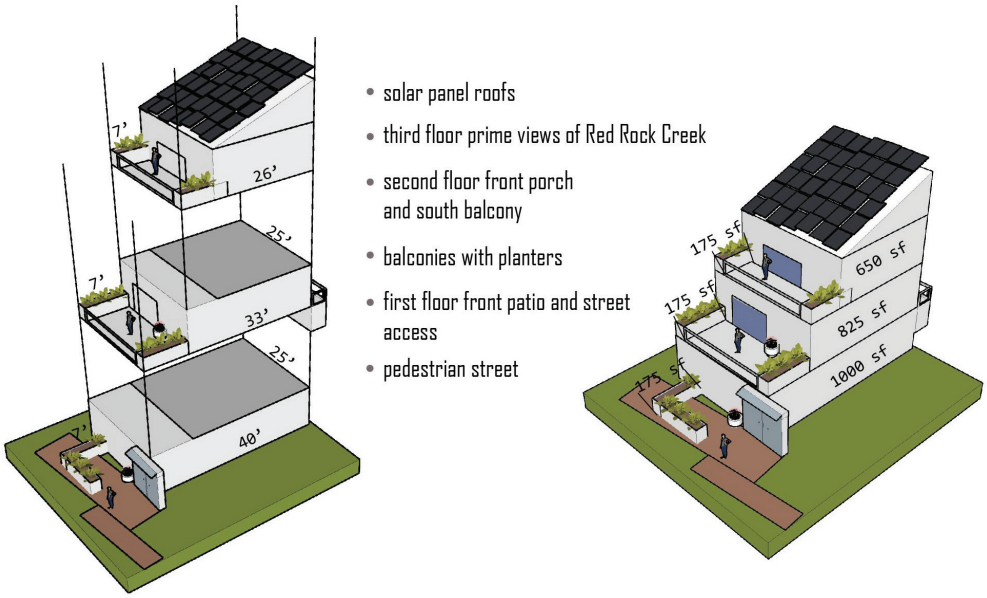


Figure 77: Diagram of housing units, sizes, and amenities.

The 20-scale part of the design focused on the intersection of the residential street and the pedestrian corridor. The streets were designed as “woonerfs” or “living streets” (see Figure 78). The woonerf concept originates in the Netherlands and other parts of Europe and is defined by being pedestrian-oriented spaces with the following qualities:

- Winding roads to slow traffic
- Clear signage
- Little distinction between car and walking areas
- Customizable outdoor spaces
- Places for pop-up socialization and play

Figure 78: Woonerf street example from the Hortusbuurt neighborhood of Groningen, Netherlands.

The 20-scale design focuses on the intersection of the woonerf street and the pedestrian corridor. Although pedestrian-oriented, the road is always accessible to service and emergency vehicles. Additionally, a safe crossing would be designed for pedestrians entering and leaving site for the Crescent Meadow Park below.

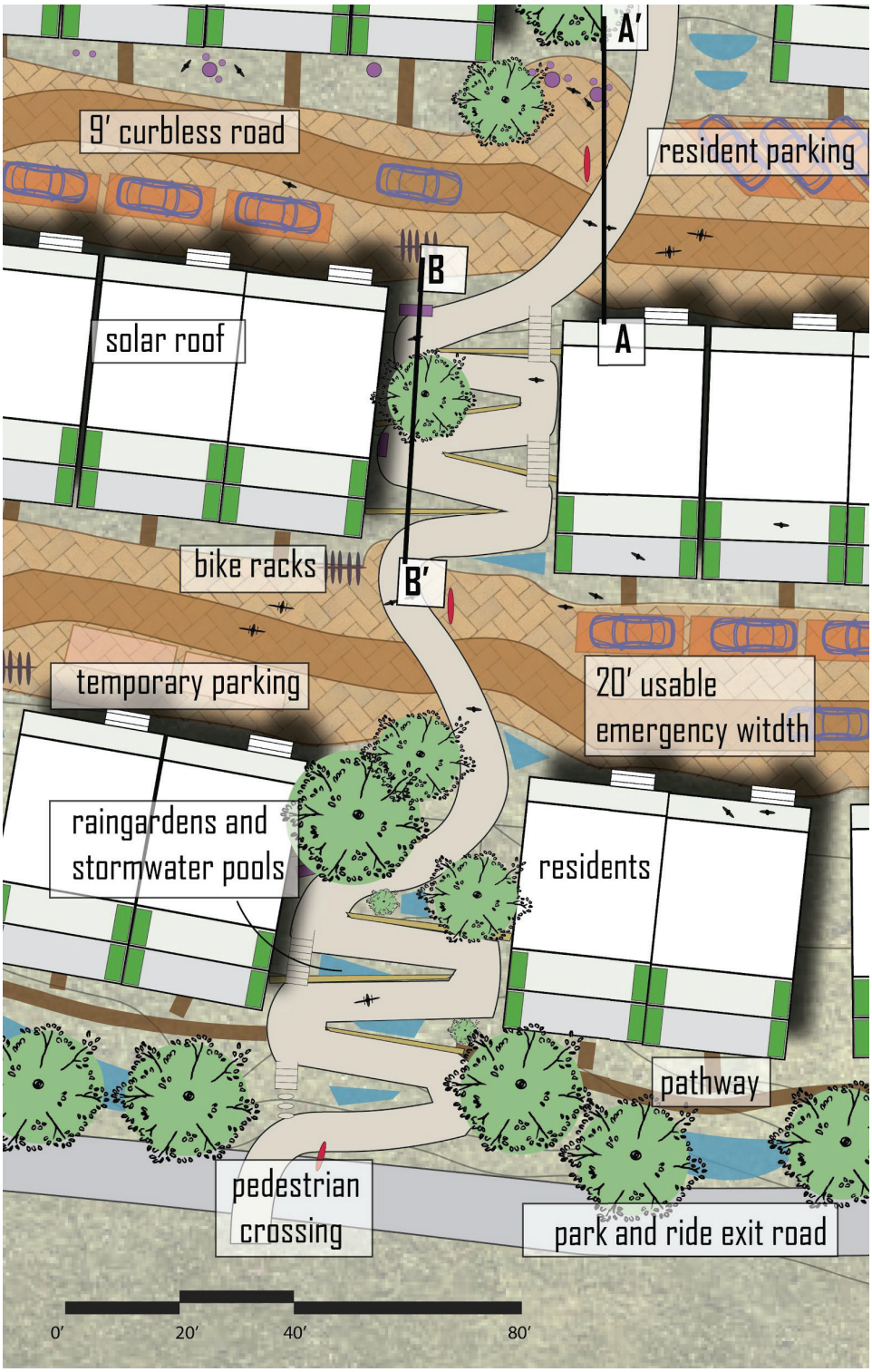


Figure 79: 20-scale site plan.

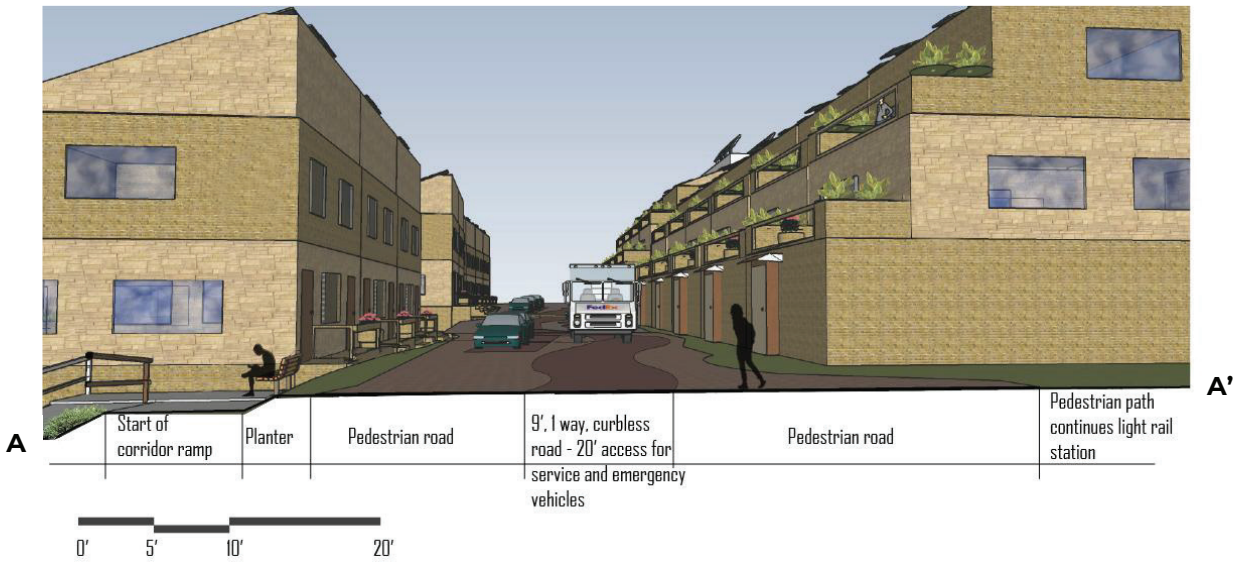


Figure 80: Section looking west through the designed woonerf street in the Terraced Gardens.

A closer look was given to the pedestrian corridor to visualize how it could be a great experience for the residents and commuters. The terraced planter units are meant to act as rain gardens to collect stormwater and provide beautiful and functional planting design (see Figure 81). For connections, an ADA and bike accessible ramp winds through the terraced planter beds while a staircase to the side allows quick access (see Figure 82). The corridor brings together many unique and special outdoor spaces – private, semi-private, and public – in the Terraced Gardens.

Figure 81: Section looking east of the pedestrian corridor on the terraced slope.

Figure 82: Perspective rendering of the terraced corridor.

Station Plaza

Design by Bocong Li

This design focuses on how the station plaza will improve the overall aesthetics of the surrounding area while boosting economic vitality, pedestrian mobility, and commuter safety. The station plaza is designed to create a welcoming and safe place for people visiting the commercial development or commuting on the MAX to wait, socialize, shop, and enjoy music.

The specific goals of the design were to:

- Create a welcoming and safe place for people to gather
- Support commercial development
- Provide comfort and amenities
- Manage the stormwater off Highway 99W

The plaza contains several elements to create a safe and welcoming transit station and provides for many other activities, such as a small music venue and eating opportunities (see Figure 83).

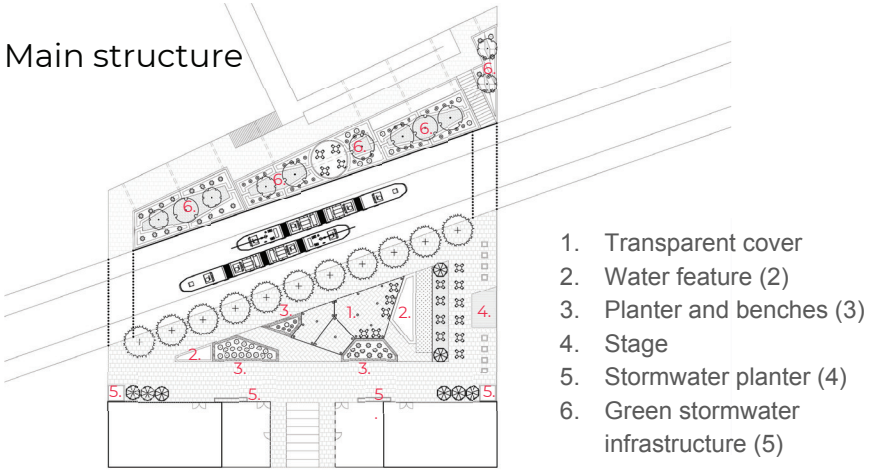


Figure 83: Plaza and station site plan.

The design focused a lot on the pedestrian experience. Pedestrians can cross the station at either end or go up a ramp or stairway to cross Highway 99W on a bridge if needing to commute north (see Figure 84). Entrances and exits also exist along SW 68th parkway and down into the transit-oriented development.

Additionally, it was important to consider other uses of the site, which could capitalize on the transit station. Two restaurants, a coffee shop, and a bookstore provide shopping and eating opportunities with both covered and uncovered outdoor seating areas (see Figure 84). Planters benches allow for informal seating while one waits for the train, and small water features can provide viewing entertainment or play for children. A green wall encloses the eastern side of the plaza to shield the garage's drop-off as the plaza extends south.

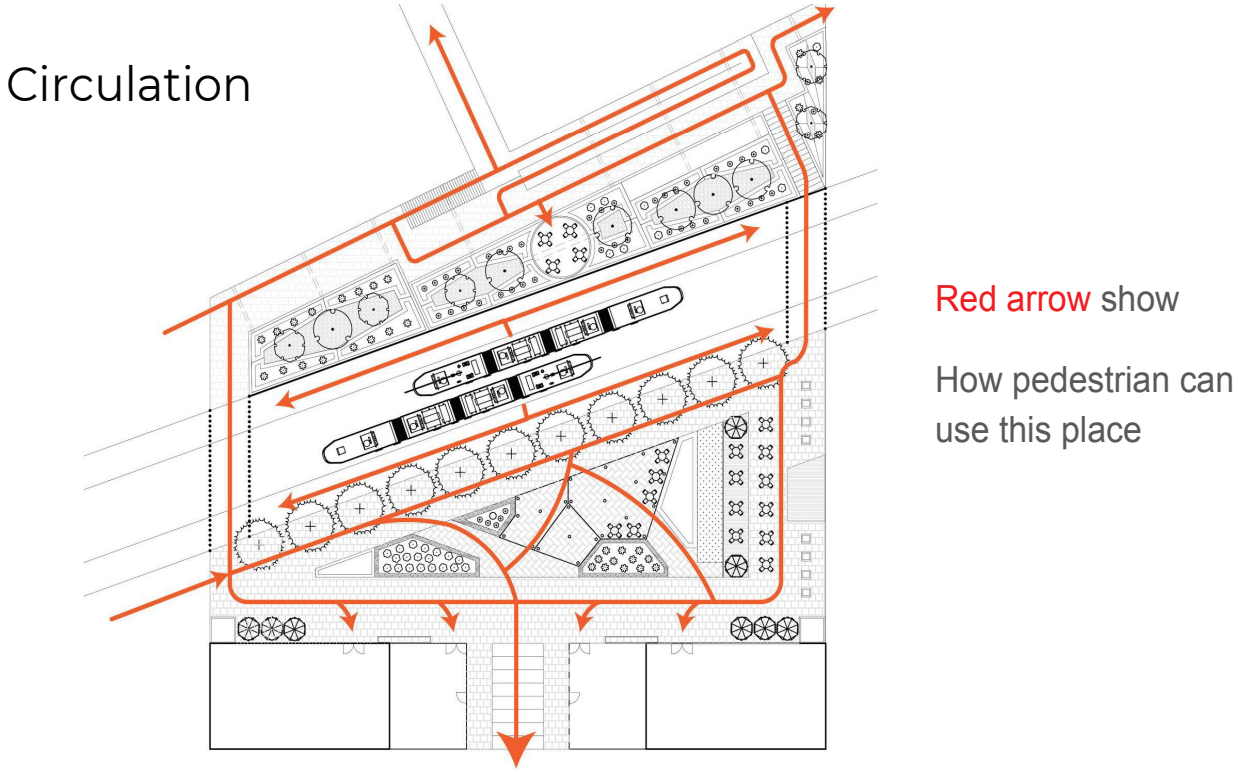
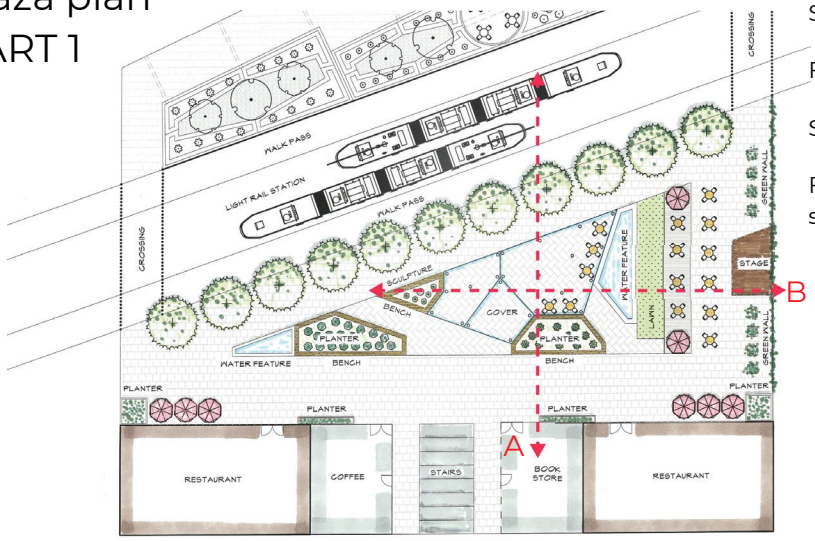


Figure 84: Diagram of the pedestrian circulation through the site.

Plaza plan
PART 1



Section A: vertical

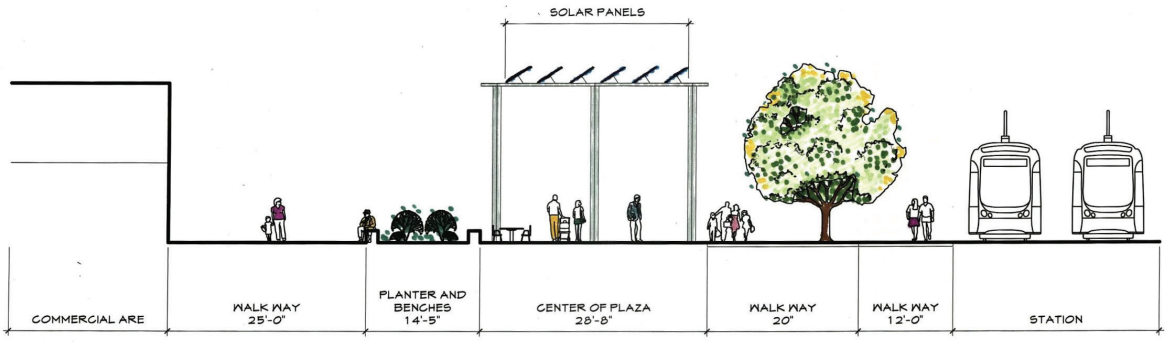
From stage to planter

Section B: horizontal

From bookstore to station

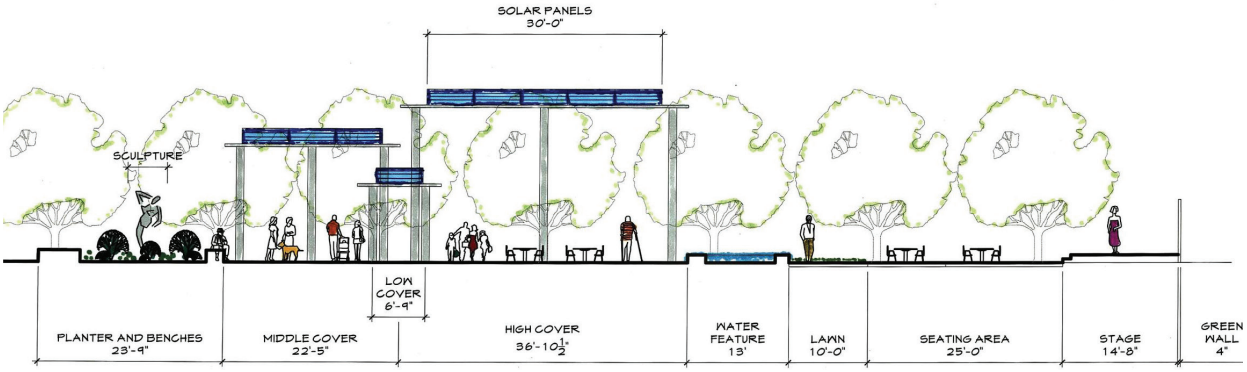
SCALE: 1" = 20'-0"

Figure 85: Rendered site plan of plaza with key amenities.



SCALE: 1" = 10'-0"

Figure 86: Section A from the rendered site plan (Figure 85), looking west.



SCALE: 1" = 10'-0"

Figure 87: Section B from the rendered site plan, looking west.

The north side of the station plaza is designed to capture stormwater and function for pedestrian circulation. A series of stormwater planters capture and clean runoff from Highway 99W, and a small seating area between them creates a waiting area good for people and train watching (see Figure 88). As mentioned earlier, for the rail to cross SW 68th Parkway at grade, the station is itself excavated below the existing topography. A retaining wall is present on the northern part of the station and is detailed clearly in Section C (see Figure 89). The creation of multiple areas for people to sit and enjoy activities creates a plaza that not only suits the needs of commuters, but also provides an opportunity to be a special feature for Tigard and nearby residences.

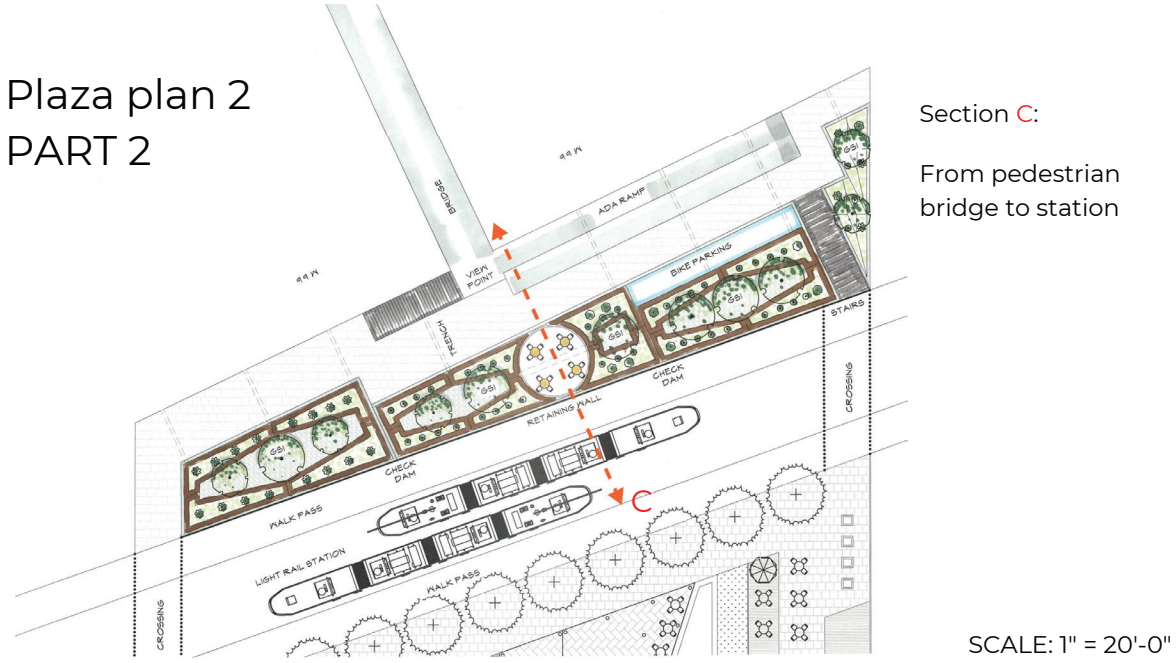


Figure 88: Northern half of the site plan detailing the pedestrian bridge to the station.

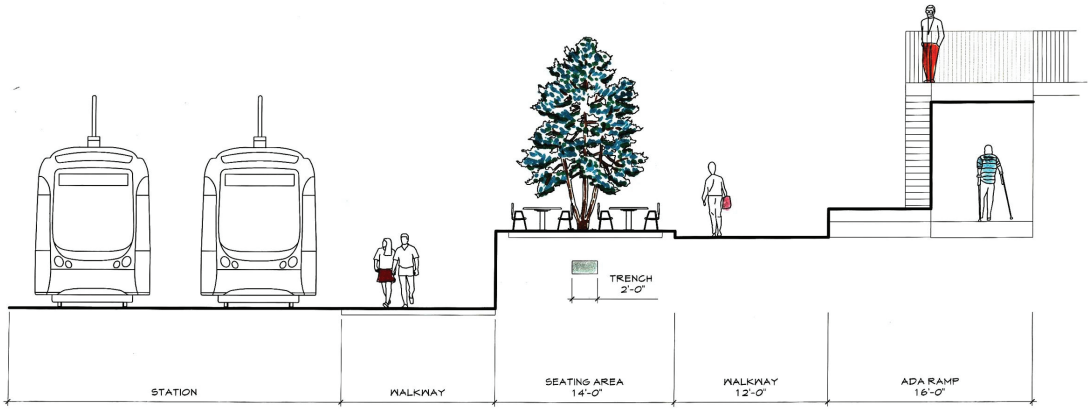


Figure 89: Section C of the north end of the station looking west. Pictured is the light rail platform, retaining wall, elevated seating area, and entrance to the pedestrian bridge via ramp and stairway.

Figure 90: Perspective of the plaza in one of the seating areas against the green wall.

Crescent Meadow Park

The goals of this design follow the same three goals laid out by the Tigard Terraces team: to design for a quality of life, provide connections, and provide functionality and financial opportunity for Tigard. The design met these goals by:

- Designing open space and an inclusive playground
- Proposing a pedestrian bridge crossing Red Rock Creek
- Serving as the threshold to the transit-oriented development
- Reconnecting people with Red Rock Creek
- Managing the stormwater impacts on Red Rock Creek

Currently, the majority of this site is a riparian forest dominated by aggressive invasive species such as blackberry. Instead of trying to fight a losing battle against the invasive plants, this design proposes their elimination and the construction of a large berm between the creek and the future development (see Figure 90). The berm will protect the development from flooding and regrading adds an additional creek branch to allow for back flow of water during high storm events and to improve habitat. The riparian forest is maintained for bank stabilization on the southern side of the creek, which is steeper and would be more prone to erosion if construction ensued.

Plan

Figure 91: Site plan for the Red Rock Creek Site.

The design also accommodates the residences of the CPAH housing units with a generic building configuration, but importantly considers their needs as future residents to this public park.

A benefit of the berm is that is provides a wide open, sunny, grassy location that can serve park benefits for residents all around the area. Seating can be placed on the top of the berm outside of the flood zone, and a park east of the seating area is designed for inclusive play, meaning that kids of all ages and abilities can enjoy this park.

In Crescent Meadow Park, portions of the trees are designed in a grid, harkening back to the agricultural orchard practices of the site while creating an interesting urban forest experience. Additionally, connections are made between the Terraced Gardens to the north to the Tigard Business Center to the south.

The focus of the design was to retain and treat offsite stormwater flowing into Red Rock Creek from I-5. Grading for a new channel allows for water to back up at the pedestrian bridge, creating a first check damn. This slows down and holds water from 1-5. The culvert on SW 68th Parkway acts a second check damn (see Figure 92). These interventions are designed to retain water and reduce the flood impacts downstream. The TOD1 and the station plaza are designed separately to capture their on-site stormwater, so the creek intervention only needs to manage off-site sources.

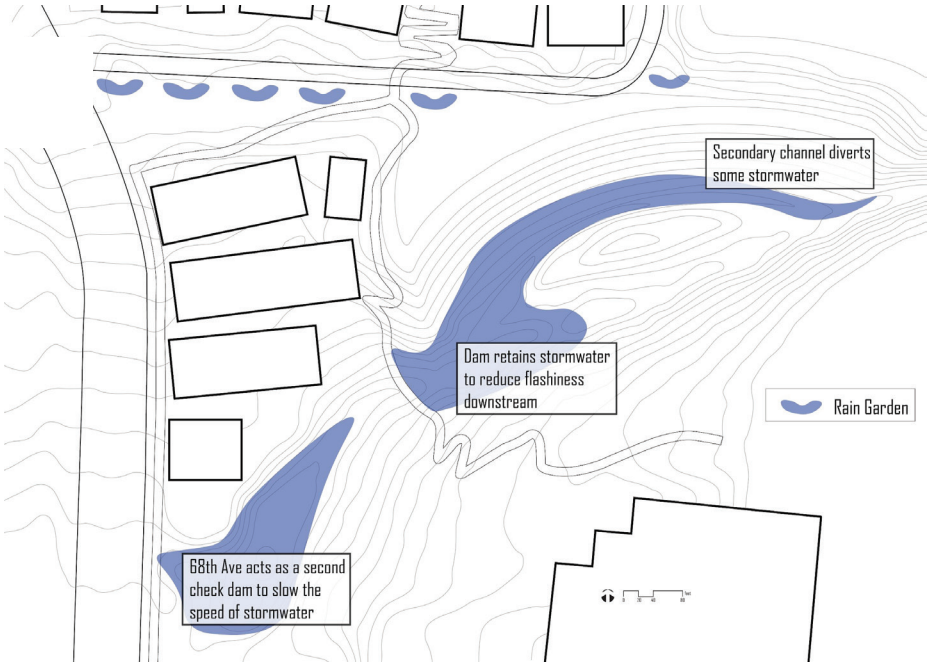


Figure 92: Management strategies for Red Rock Creek.

While this design was created to serve a functional purpose for stormwater, it also considers the pedestrian experience of commuters and park users (see Figure 93). As a park providing places where people will want to be, a variety of microclimates are created to provide shade along the pedestrian path along with warm southern sun year-round on the berm (see Figure 94).

Figure 93: Diagram of pedestrian circulation through the site, including nodes where people are likely to hang out or play.

Figure 94: Diagram of microclimates in the site.

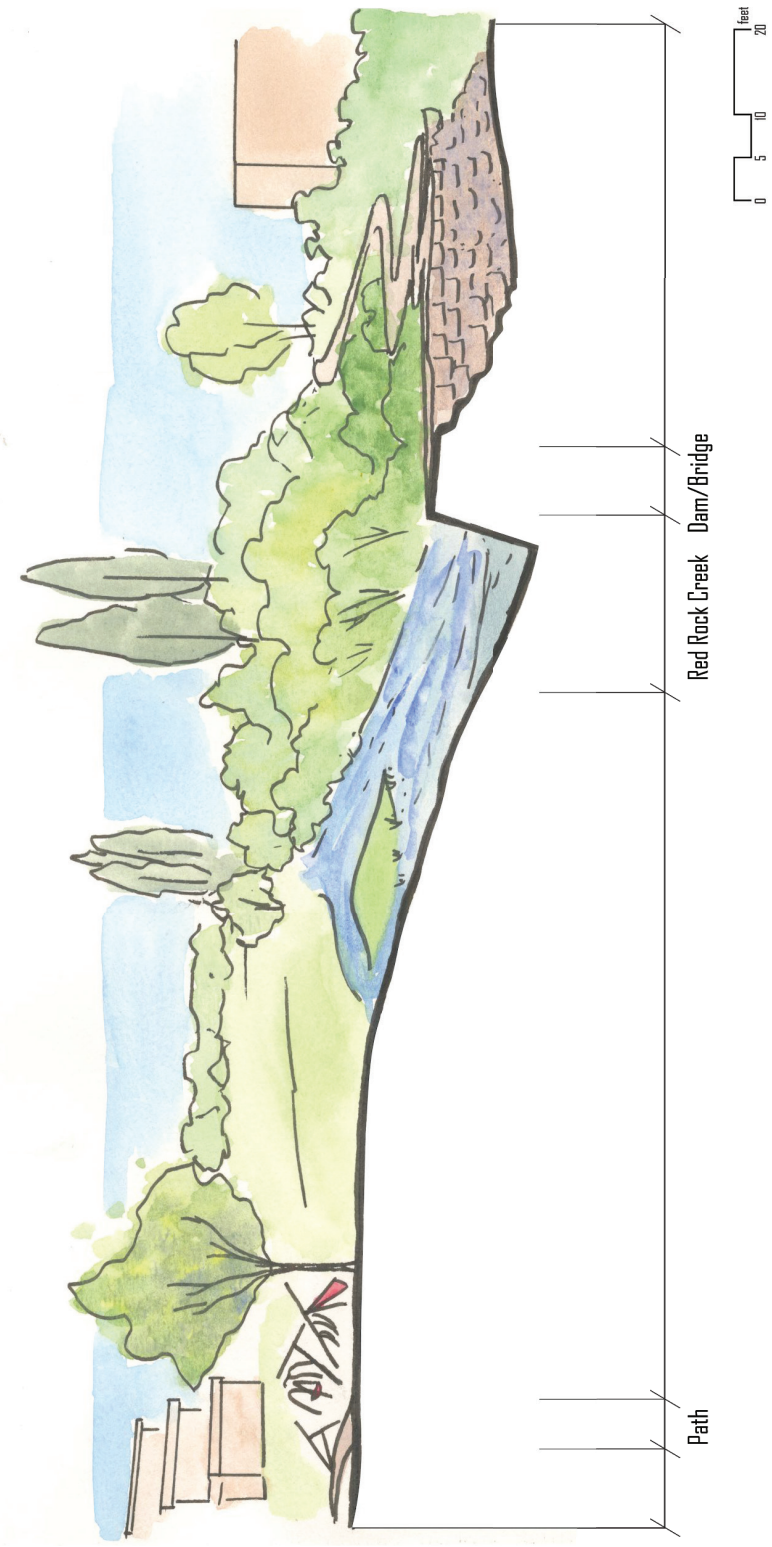


Figure 95: Section of the site through the pedestrian bridge, illustrating how the bridge can act as a dam in high water flows.

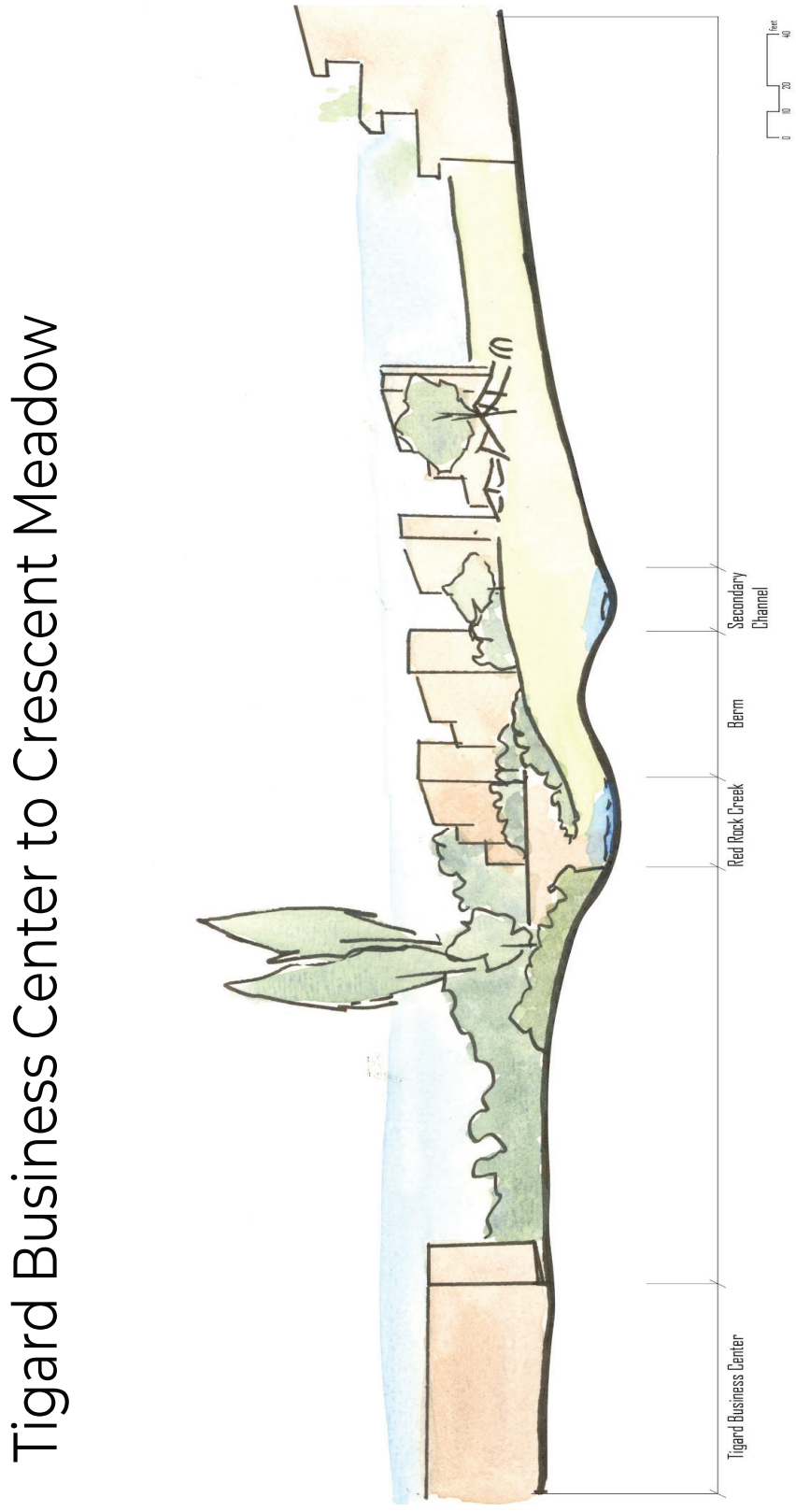


Figure 96: Section looking west across the site with the CPAH housing and inclusive playground in the distance.

Figure 97: Perspective of the picnic area looking west at the housing units. The grassy meadow provides an ideal spot to enjoy a sunny summer day.

Figure 98: Perspective out of one of the CPAH windows at Crescent Meadow Park and the inclusive playground.

Transit-Oriented Development 2

This design focuses on the future development of the site across Pacific Highway, north of the station. A moderate transit-oriented development is proposed for this site with focus on providing amenities. The goals of this site are to:

- Design for quality of life by providing residential amenities, such as a dog park, picnic areas, market place, restaurants, playgrounds, and an urban forest
- Create a pleasant pedestrian experience to the station via a pedestrian bridge and terraced native plantings
- Provide accessible, functional, and profitable design with mixed use buildings, bike parking, and stormwater planters

To accomplish these goals, establishing pedestrian access was most important. A pedestrian bridge from the station crosses over Highway 99W to arrive at the site and descends to an artistic, ADA accessible, ramp with trees growing in the gaps. One of the main features of the site is the market and its corresponding orchard, which expands its gridded form into the rest of the site. The grid alludes to the historic agricultural areas of Tigard while also providing food and literal functionality to the residents. The goal of the site is mostly to provide amenities to the current and future residents of the area. Across the access road, more park-like amenities are located along with a café, a dog park, and a picnic area (see Figure 99).

Figure 99: Site plan showing the main elements of the design in the last stages of development.

For this design to work, elements must be included now in the planning phase, as phasing serves an important part of its development. The first things to be considered for development (perhaps 10 years after TOD1 is built) are elements related to improving connection: the pedestrian bridge, a new vehicular lane, neighborhood trails, and a coffee shop. The second phase would be to build the uses of the space: the market, an outdoor seating area, and a playground. Finally, a residential phase focuses on the conversion of the motel on the site into a mixed-use residential building, and a picnic area and dog park that serve the neighborhood (see Figure 100).

THE COMMUTER
Connectivity to neighborhood
The new road
Coffee shop
Pedestrian bridge

AN ACTIVE PLACE
The indoor market
Outdoor seating
Small child playground

RESIDENTS
Mixed use building
Picnic Terrace
Dog Park

Figure 100: Phases of development for TOD2.

Figure 101: Diagram of the gridded urban forest and the historical reference from the 1947 aerial across the site.

The urban forest and agricultural history was particularly important in this site. The design constructs for different gridded zones in which the planting palette could tell a unique story of the site (see Figure 102). Each area tells a unique story of the site. On the north end of the site, the planning palate will celebrate native plants and indigenous uses as an educational experience. The trees on the grid closest to the market will be fruit trees that can be used for the restaurant and the vendors and will be reminiscent of the historic orchards. The middle portion of the grid will serve a stormwater functionality and daylight the importance of capturing, treating water, and reusing water. Finally, the section to the east will be of evergreen trees alluding both to the historic Christmas tree farms and to the current typology of fir forests in Oregon.

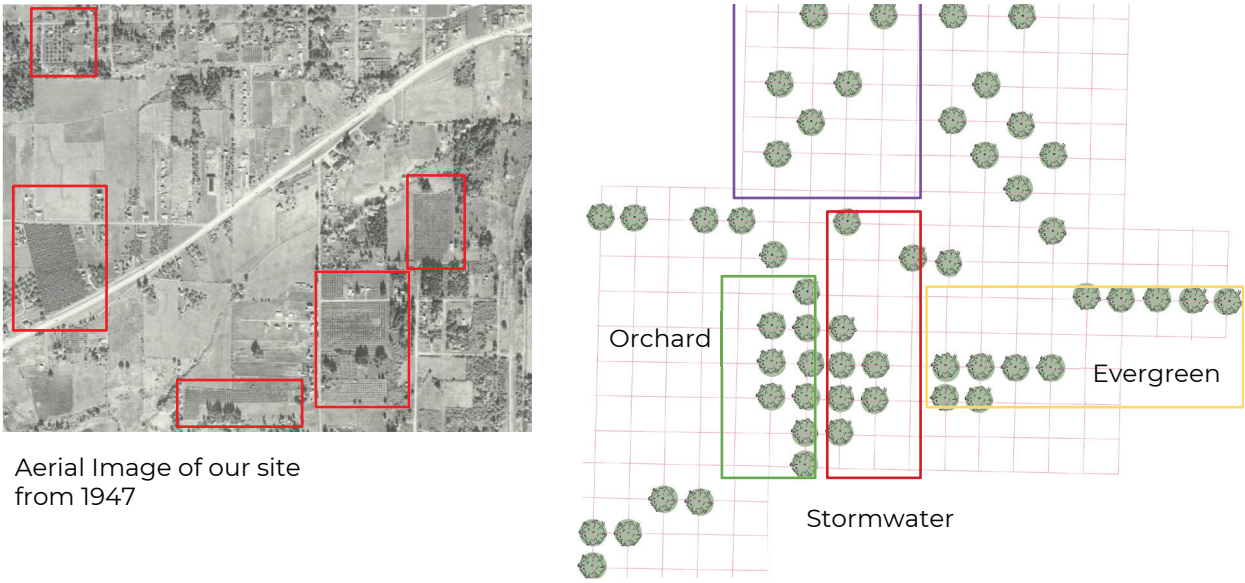


Figure 102: Diagram of the gridded urban forest and the historical reference from the 1947 aerial across the site.

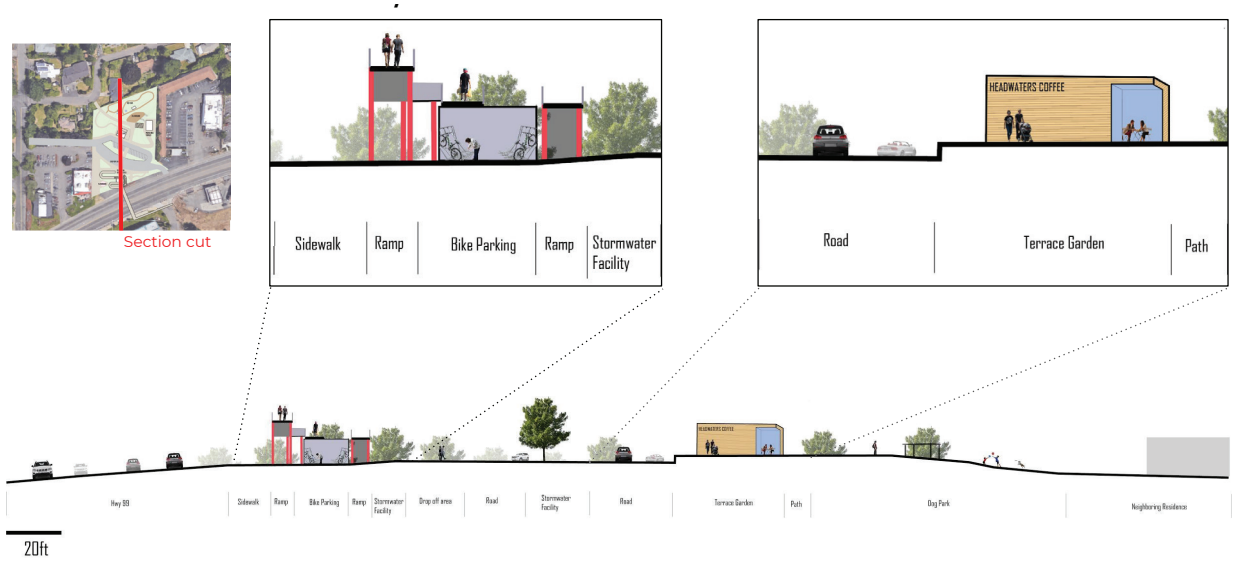


Figure 103: Section cut across the site from north to south, with close-ups on the pedestrian bridge, which houses bike parking and the terraced garden café.

Figure 104: Section of the site from east to west. The market would have an open bottom floor to allow for permeable entrances and seating options.

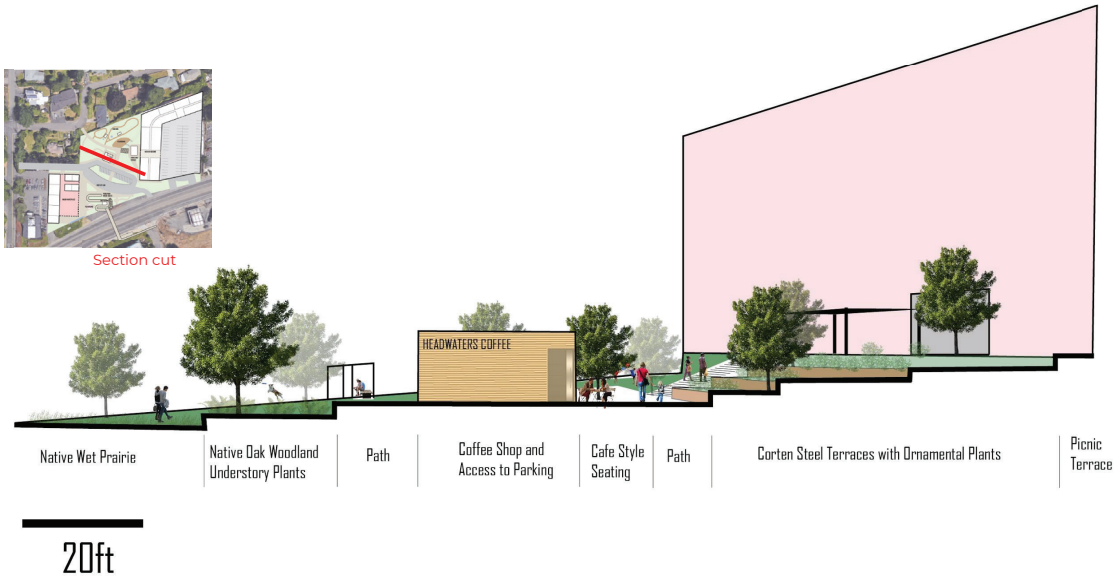


Figure 105: Section of the terraced garden café area and the future mixed-use residential building on the right.

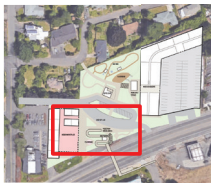


Figure 106: Perspective rendering of the site looking south to Highway 99W, showing future connections and opportunities.

Design Summary

The focused on designing for three goals: improving quality of life, the pedestrian experience, and creating financial opportunities for Tigard. Amenities were designed for throughout the site for residents, neighbors, and commuters. Walkability is encouraged through new pedestrian connections and amenities along the long route uphill from the bottom of the site to the station. Financial opportunities can be achieved through the planning of new development and anticipating the needs of commuters and residents alike. Overall, the team suggests, like many other teams, that much consideration is given to future phasing of the site. There is much opportunity for commercial and residential development around the new transit station and across Highway 99W, which can make the site a transit-oriented development landmark for Tigard in the future.

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"Portland Stormwater Manual," August 19, 2016, 2011.

Conclusion

The goal of the studio project was to combine the desires of the City of Tigard and TriMet to visualize a future light rail station and transit-oriented development. This site is a critical additional along the potential line given the traffic congestion from this point on toward Portland.

There were many opportunities identified by the students. For one, the site shows high potential for a transit-oriented residential and mixed-use area, and many designs gave options for such a development that can work with, and utilize, the existing topography. Through partnership with a developer and careful planning toward a future vision, the site has potential to become a special place for Tigard.

Above all, the requirement of parking on the site will prove to be a challenge in future development. Most teams suggest that if a transit-oriented development is to succeed, parking must be placed beneath development, which could be a long-term and costly investment.

However, such an investment could prove worthwhile in the long-term for both TriMet and Tigard, and it's possible that a viable option is to place half the parking requirement across SW 68th Parkway.

And finally, Red Rock Creek is a major asset to the area, and one that should be protected in the case of future development. Already the creek is receiving more than its historic share of water volume due to existing infrastructure, and many designs suggest attempting to reduce that volume in addition to anticipating future additions with station and TOD1 development.

Above all, the students recognize that the design task is incredibly complicated, with many stakeholders and many goals, and are grateful to have had the chance to work with such an opportunity. Suggestions offered are based on a short-term inquiry into the intricacies of design, and the students hope that those suggestions can be helpful even in the most minor ways.

Appendix: Supplemental Maps

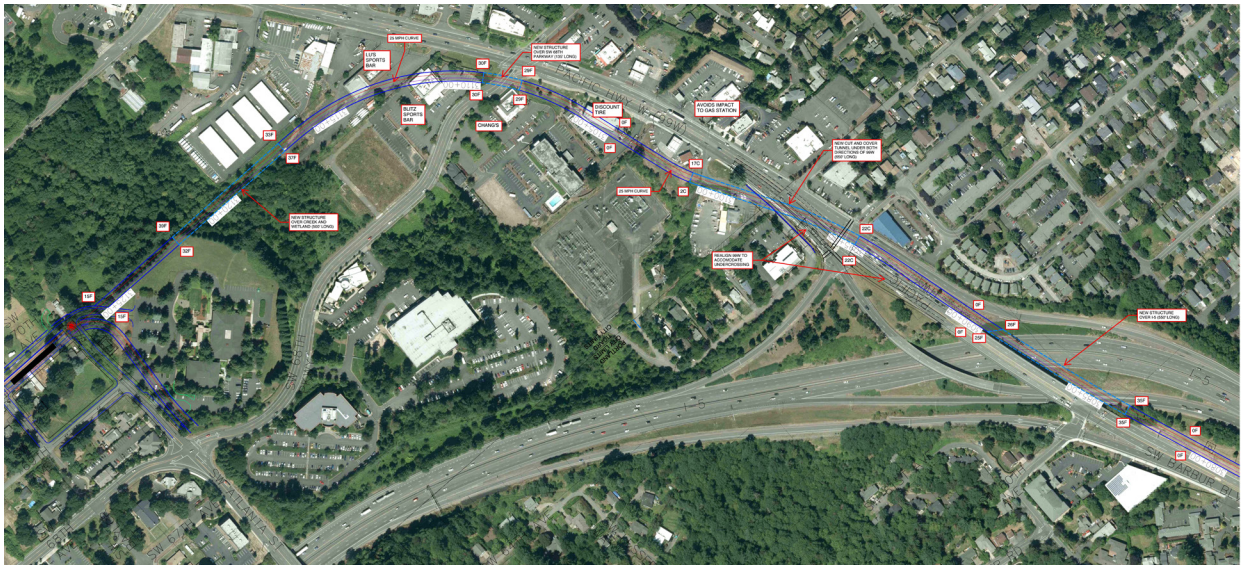

Figure 107: Aerial map showing the potential placement of the light rail line, as sent to the studio by TriMet.

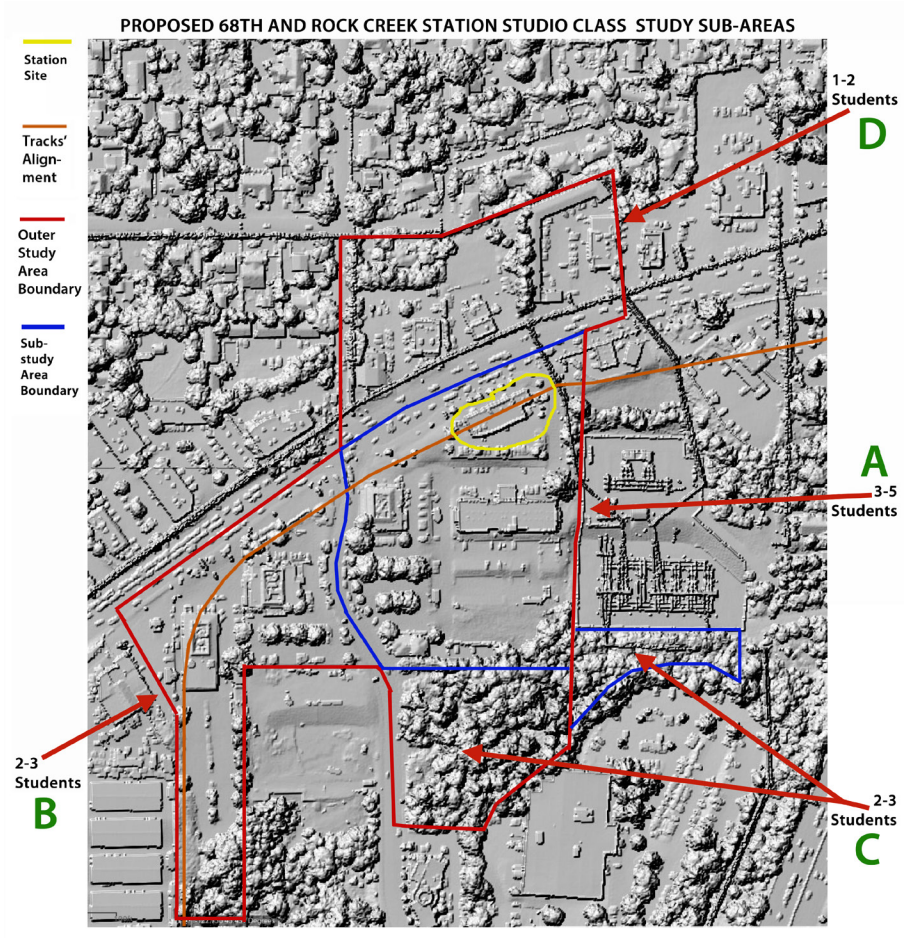

Figure 108: Lidar image of the study area showing the highest hits topography and the initial site outlines for students in the studio.

References

"City of Tigard Comprehensive Plan, 2027," Community Development Department, published 2007, http://www.tigard-or.gov/document_center/Comp_Plan/comp_plan_volume2.pdf

"City of Tigard Strategic Plan, 2014-2034," published November 26, 2014, http://www.tigard-or.gov/strategic_plan.php

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"Tigard Greenways and Trail System Master Plan," prepared by Kittelson & Associates Inc. and Alta Planning + Design, April 2011. http://www.tigard-or.gov/community/parks/docs/trail_system_master_plan.pdf