

Exploring New Mobility Street Designs for a Suburban Downtown in Transition

Spring 2019
Gresham

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COLLEGE OF DESIGN

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This report represents original student work and recommendations prepared by students in the University of Oregon's Sustainable City Year Program for the City of Gresham. Text and images contained in this report may not be used without permission from the University of Oregon.

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About SCI

The Sustainable Cities Institute (SCI) is an applied think tank focusing on sustainability and cities through applied research, teaching, and community partnerships. We work across disciplines that match the complexity of cities to address sustainability challenges, from regional planning to building design and from enhancing engagement of diverse communities to understanding the impacts on municipal budgets from disruptive technologies and many issues in between.

SCI focuses on sustainability-based research and teaching opportunities through two primary efforts:

1. Our Sustainable City Year Program (SCYP), a massively scaled university-community partnership program that matches the resources of the University with one Oregon community each year to help advance that community's sustainability goals; and

2. Our Urbanism Next Center, which focuses on how autonomous vehicles, e-commerce, and the sharing economy will impact the form and function of cities.

In all cases, we share our expertise and experiences with scholars, policymakers, community leaders, and project partners. We further extend our impact via an annual Expert-in-Residence Program, SCI-China visiting scholars program, study abroad course on redesigning cities for people on bicycle, and through our co-leadership of the Educational Partnerships for Innovation in Communities Network (EPIC-N), which is transferring SCYP to universities and communities across the globe. Our work connects student passion, 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.

About Gresham, Oregon

With over 110,000 people, Gresham is the fourth largest city in Oregon. Portland, the largest city in the state, borders it to the west. Gresham is ideal for families and businesses wanting to start something new and grow.

Gresham is near the Columbia Gorge National Scenic Area and Mount Hood, the highest point in Oregon. It has a wide variety of neighborhoods including: the Civic Center, known for its active transportation network, rapid transit connections, and residential,

commercial, and retail mix; Historic Downtown which offers a walkable blend of shops, restaurants, and service businesses; and Rockwood, one of the youngest and most diverse neighborhoods in Oregon.

Course Participants

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Executive Summary

The following report documents student work that explores the redesign of several streets and the historic core of Gresham's downtown. Students in the University of Oregon's Landscape Architecture 4/589 design studio worked with the City of Gresham as part of the Sustainable City Year Program (SCYP) to investigate how streets and related development could be planned and designed to meet and benefit from the emergence of new mobility options such as autonomous vehicles, ride-sharing, and micro-vehicles.

Students were divided into teams and tasked initially with studying their assigned areas and developing a set of deliverables detailing existing current conditions. Students then worked, either in the same teams or independently, to create incremental design options for the near- and long-term. These designs were informed by an initial set of parameters, discussed between the studio instructor and the City of Gresham. The design parameters varied and were specific to the identified study area but were generally concerned with issues such as reducing the amount of on-street parking, delineating traffic lanes and narrowing lane widths, and repurposing any reclaimed space for stormwater management, planters, and other creative spatial uses when viewed through the lens of these emerging modes of transportation.

THE STUDY AREAS INCLUDED:

Historic Downtown Gresham within NW Miller Avenue to NE Hood Avenue and NW Second Street to NW Fifth Street

These study areas were selected to create design problems of scale, scope, and complexity within the capabilities of the students at their level

of development upon taking the class. Students focused on finding solutions to revitalize the historic downtown core as a social and economic hub for downtown Gresham. Proposals include creating pedestrian streets and promoting multiple modes of mobility, establishing connected transportation hubs across the core area, and finally developing uniquely programmed plazas and streets.

NE Hood Avenue from E Powell Boulevard to NE Tenth Street

Students explored design solutions for developing this street as a high-volume, last mile traffic way. Solutions propose developing dedicated traffic lanes with strategic drop-off/pick-up nodes. Here, interventions such as parklets and plazas supported social interaction while strategic crosswalks, dividers, and planting promoted safety and accessibility.

NE Kelly Avenue from E Powell Boulevard to NE Eighth Street

Design solutions for this street focused on the entrance and exit thresholds to the street and creating unique experiences in between, taking advantage of the assumed low traffic

volume. Key proposals included developing gateways, promoting integration of stormwater systems, and developing key social hubs to promote social cohesion and permeability of the public and private realm.

NE Third Street from NE Hood Avenue to NE Cleveland Avenue

Two sets of proposals were developed for NE Third Street. One student saw potential for high-density development and focused on a safer public streetscape and on interventions that promote vibrant public street life. The other student's work explored solutions that balance development to meet the assumed densification and arrival of autonomous vehicles with placemaking for social cohesion, active street life, and integrated green infrastructure.

NE Second Street from NE Hood Avenue to NE Cleveland Avenue

Students saw a strong potential for housing development to be integrated with interventions on the street. A part of their in-depth proposals focused on siting businesses and hubs at key locations across the street and providing design elements such as planting buffers, seating, and public plazas to catalyze the potential of the proposed developments.

NE Fifth Street from NE Hood Avenue to NE Cleveland Avenue

Students each explored their own design solutions for this street. One student focused on facilitating micro-housing on NE Fifth Street while integrating necessary changes to the street itself. Another student's work explores the development of a transitional housing community with a variety of housing types and on the activation of the street as public space with different creative

uses. The final student's design also explores development with village-style densification and a diversity of public and private spaces. Her design also proposes developing the sidewalk as a strong public space with potential for urban foraging, seating, and recreation.

DESIGN AS RESEARCH QUESTIONS:

The design explorations of new mobility futures for some of Gresham's downtown streets centered on investigating a few key questions:

- Might future streets become more civic places at least as much for people and social life as for vehicles and transportation?
- To what extent might a suburban city center's future dominated by autonomous vehicles and micro-vehicles gain new "found spaces" within street rights-of-way, and what might be done with those spaces?
- How might new mobility streets be designed in different ways depending on each street's context and adjacent land uses?
- Are there design principles that might be used toward developing new street design standards for categories of streets for both safety and enabling streets to become new civic assets?

ASSUMPTIONS THAT STRUCTURED STREET DESIGNS:

The design experiments needed some programmatic and technical assumptions and goals to structure design solutions. This structure was built on assumptions that were highly speculative. First, reasonable but uncertain assumptions were made about the future densification

of Gresham's downtown district. These were based upon optimistic expectations expressed in Gresham's comprehensive plans and an assumption that zoning and code changes will be forthcoming to promote those changes in ways adaptive to evolving land use markets and transportation technologies.

Secondly, speculative assumptions were made about the types and characteristics of putative future new mobility technologies, based upon conjectural claims found by students in books, reports, and websites. These transportation technology assumptions were made with little confidence because they are not evidence-based, were mainly derived by reference to large city center arterial streets, often obviously overly-idealistic, exhibited conflicting opinions across sources, are based upon expected technological developments that may not happen or not be affordable in good time, and/or are based upon unproven assumptions about future human behavior and preferences.

Partial lists of these design assumptions are found below. These are perhaps the first attempt to speculatively describe some of the parameters of new mobility street design problems in suburban city center streets. The latter entries in the second list also begin to implicate potential street design standards.

KEY FINDINGS:

1. There may often be no newfound street space for civic life:

This finding came late in the class and is not reflected in the designs. It suggests that many new mobility streets may not actually provide any new "found" spaces for civic and social life. A multiplicity of new vehicle types may often require their own designated

lanes so as to consume entire existing rights-of-way even after parking spaces are eliminated.

It seems quite possible that micro-vehicles will be developed in at least four classes: (1) human-powered and/or less powerful motor-assisted vehicles, like bicycles or motorized skateboards or roller-boards; (2) smaller motorized vehicles with little protection, like e-scooters, haptic segways, or motor scooters; (3) autonomous roller drones that may travel as fast as 29 mph to make deliveries of small quantities of goods, like groceries or meals; and (4) small electric cars that are larger than the first three types and carry 1-4 people and some cargo.

If substantial quantities of all these types share the same street, safety may necessitate that each of the first two or three types has its own dedicated lane going in both directions in addition to lanes and sidewalks for AVs and pedestrians. This design requirement could often consume the width of streets now dedicated to parking such that no new street space is freed up for civic uses.

2. Safety of intersections must be addressed:

Safety of intersections needs to be considered if a wide variety of modes (including pedestrians, human-powered, and micro-vehicles) share a street. If signals are used, many signal-cycles may be required, although AVs may be very efficient at turning right or left by detecting gaps in micro-vehicle or pedestrian traffic. The designs herein assumed that all micro-vehicles would share single lanes and would be regulated the same simultaneously, although the above finding suggests that this assumption may be wrong. The only viable solution the students often proposed was the inefficient,

simple, four-way stop intersection with all classes of vehicles and pedestrians taking their turns. Other solutions entailed expanding the extent of public space dedicated to intersections compared to current conditions.

These observations are driven mainly by the possibility of high volumes of micromobility devices interacting with AVs. Many speculative designs and new mobility publications and websites describe a future of intersections with no signals or signs. They forecast that AVs will simply detect each other and predict the movements of well behaved, careful pedestrians who stay within sidewalks and designated crosswalks. The advent of possibly numerous and fast-moving micro-vehicles may disprove these forecasts.

3. Safety design issues may be inverted from current dogma:

The principal engineering concern of street safety is to minimize vehicle collisions with pedestrians and bicyclists, with the driver assumed to be legally responsible. AVs, on the other hand, may be able to anticipate and predict the movement of pedestrians and micro-vehicles, so that such accidents attributable to large vehicle errors become rare. The new hazardous behavior in producing dangerous accidents may be many human drivers of micro-vehicles, particularly if they are over-confident that AVs will always stop for them, as referenced above.

Safety design—and legal responsibility—may now center upon this problem of human micro-vehicle drivers. It may be necessary to build long barriers between AV and micro-vehicle lanes with only a few, clearly marked and obvious points of conflict. These could be space-consuming or unattractive so as to reduce the civic social quality of streets. Such barriers

might block AV sensors from detecting and predicting the behavior of micro-vehicles and pedestrians as they approach intersections or mid-block crosswalks. It may be necessary to make all vehicles autonomously driven irrespective of size or speed.

4. Some vehicle classes may need to be restricted in places:

Some students' designs found street space for civic, social, and environmental uses by completely eliminating AV access through blocks. Others allowed only small numbers of local-access AVs to travel in both directions in only one lane and to use their smart devices to pass each other by use of siding slip spaces. Other students provided just enough paved right-of-way for AVs to pass each other but required that micro-vehicles share this right-of-way. This might only be safely done with a low speed limit for all vehicles, given that over-confident, human-driven micro-vehicles and pedestrians might make sudden moves that fast-moving AVs cannot evade.

5. Maintaining access for large trucks can limit creative civic street designs:

Some speculative designs and new mobility publications and websites describe a future of mostly green streets full of spaces such as playgrounds, gardens, sculpture plazas, and food courts with AVs moving through these wonderful streetscapes on their own narrow tracks. These design proposals may prove naïve and never to be realized unless new ways are found to provide emergency and freight access to these streets. The students were required to maintain straight ten-foot-wide access ways for fire trucks, ambulances, and freight trucks along all streets. They were also required to maintain unfettered fire

truck turning radii within intersection designs. Given the narrow 35-to 50-foot-wide street rights-of-way in Gresham, and the other traffic design requirements, this emergency and freight access requirement prevented the students from proposing their most creative design ideas.

6. Strong options may derive from private designs:

Some creative design ideas proposed by students did not derive solely from street space gained by eliminating parking. They offered ways that new, higher-density private residential developments can interact with the street by virtue of the elimination of on-street parking. New developments can contribute to widened sidewalks, provisions for semi-private or semi-public porches or entry plazas, and first-floor commercial, social-service, or office uses that engage with the street in ways made possible by the elimination of on-street parking and the growth of pedestrian and micro-vehicle traffic.

7. New potential street uses are diverse:

To the extent that new mobility streets will have newfound spaces for civic uses, the possibilities are endless. The students in this class were challenged so much by land use proposals and logistical issues in street designs for AVs and micro-vehicles that they typically found too little time to develop creative, innovative, and fully detailed proposals for the micro-spaces within their street designs. The nascent proposals they offered included street forests, community gardens, playgrounds, eating arcades, arbor barriers, private nooks, food courts, food trucks, people-watching benches, micro-housing sites, micro plazas, and other ideas. Class work and the literature review found that there remain too many uncertainties and unknown future technologies to definitively define road and vehicle types. This remains an important area for further research by professional researchers.

Introduction

New mobility options, including autonomous vehicles, have huge implications on future urban transportation modes and behaviors. This shift will probably entail shifts from private vehicle ownership to shared mobility options including ride-hailing, shared micro-vehicles, and ride-sharing (including autonomous vehicles).

Streets and public transit systems will need to be adaptively reconfigured to safely and efficiently transmit new configurations of vehicle types and speeds with various intelligent capabilities. Redesigned streets will probably need to accommodate much less parking. They will need to relate to evolving land uses, smart-street sensors and signaling systems, and human-movement demand patterns in new ways.

Taking downtown Gresham as the study area, the class investigated how streets can be redesigned in central parts of suburban cities or other suburban areas targeted for greater residential densities. There was an emphasis on creative and appropriate

ways of making use of reclaimed space within street rights-of-way due to reduced parking and driving lanes and reduced lane widths. There was also an emphasis, where necessary, on safely separating different modes of travel by pedestrians, micro-vehicles, and larger “heavy” autonomous and/or ride-sharing vehicles, each with its own speed range and behavioral requirements. Other issues included how autonomous vehicles signal each other and pass, interface at intersections, manage pick-up/drop-off points and hubs, gateways, interact with traditional public transit stations, interact with parking structures, and street sensors and signaling systems’ effects upon these vehicles.

Key Assumptions

The class assumed the downtown study area will become more densely populated with residents over time, based on the City of Gresham’s plan documents.

It is also assumed that new 3–5 story residential and mixed-use developments will not include appreciable vehicular parking, both because new residents will not wish to own vehicles and the City will promote no-parking developments via policies.

The streets have been redesigned with the assumption that there will be a transition period, of unknown length, from current street use patterns to “urbanism next” ones. Contemporary conventional vehicles will continue to use, and be accommodated on, the streets during this transition. The class also assumed that freight and emergency vehicles will maintain their current large dimensions during this transition and beyond.

ASSUMPTIONS ABOUT DOWNTOWN GRESHAM’S FUTURE:

- The downtown Gresham district — not just the historic downtown district — will become dominated by multi-story residential buildings of a variety of types with some entailing mixed uses.
- These new residential developments will exhibit residential densities at least four times greater than the single-family residential lot densities that now prevail.
- 80% or more of the households residing in these new buildings will not own a car and will instead rely on ride-sharing, micro-vehicles, or public transit to get around. Parking needs on streets and in private lots will shrink accordingly.

- Developers of these new residential podium buildings, village complexes, town houses, or “missing middle” multi-unit structures will not be required to provide vehicular parking within their properties, and few will actually do so.
- All these new residential, mixed-use, and other buildings will still need to be accessed and serviced by large (10-foot wide and up to 50 feet long) vehicles for garbage collection, freight deliveries and pick-ups, ambulance rescues, and fire-fighting.
- Newly redesigned and constructed streets will typically conform to the existing public rights-of-way.

ASSUMPTIONS ABOUT FUTURE TRANSPORTATION TECHNOLOGIES:

- Autonomous vehicles (AVs) will have many different sensors and be “super smart” at “talking to” each other and avoiding collisions with all manner of other vehicles and pedestrians. The collisions they will most likely exhibit will involve pedestrians and micro-vehicles that suddenly change direction into the path of an AV that is already too close to stop or evade in time.
- Because AVs will likely be effectively “risk averse” in avoiding collisions, pedestrians and micro-vehicle drivers may enter into AV traffic with the expectation that AVs will reliably safely yield to them. This could result in clogged AV lanes and very

- slow net speeds for many AVs. It may therefore be necessary to use long barriers or other techniques to protect AV lanes and limit points of access into or across AV traffic lanes.
- Autonomous vehicles for carrying people, including shared-ride vans and micro-buses, will all be eight feet wide or less. (This is a figure that is frequently cited in the literature, apparently based upon an informal agreement among AV developers and manufacturers.)
 - A time may come when all, or virtually all, vehicles larger than micro-vehicles will be autonomous and streets can be designed accordingly, but there will be a transitional period when legacy human-driven vehicles will share the same streets. Policies, prices, and incentives will affect the length of this transition period. It may be possible to plan and designate certain streets as autonomous only to advance an agenda of creating civic streets for people in strategic places.
 - In time, virtually all shared and unshared ride-hailing vehicles, micro-buses, and private vehicles will be autonomous. Large buses, trolleys and light rail trains may also become autonomous.
 - Micro-buses and ride-sharing vans will frequently share the same streets and lanes as AVs, but if they make frequent stops at designated station points along busy streets they will likely require “siding slip” spaces to pull over and stop so other AVs can pass.
 - Most micro-vehicles will likely remain substantially human-controlled.
 - Micro-vehicles will take on a large variety of forms, sizes, and speeds up to four feet wide and traveling up to 29 miles per hour on a level track (the current Oregon standard). These will include motorized (or not) scooters, motorized (or not) bicycles, motorized (or not) skateboards, subcompact and lightweigh electric cars, and many other possibilities.
 - People will still walk and run around as pedestrians, and they will need dedicated paths and sidewalks apart from micro-vehicles and AVs to safely do this.
 - When traffic counts of AVs are expected to remain below an as-yet-undetermined threshold, they can travel in both directions within one ten-foot-wide lane if “siding slip” spaces are provided for one vehicle to pull over to let the other pass, as directed by communication between the vehicles’ computers.
 - When traffic counts of autonomous vehicles exceed some unknown threshold, they will require either separate directionally-differentiated lanes, or an 18-foot-wide street within which to navigate past each other in their various super-smart, communicative ways.
 - When traffic counts of micro-vehicles are expected to remain below some unknown threshold, and counts of AVs also remain under an unknown threshold, the two vehicle types can mix within a shared right of way (probably at least 16 feet wide), provided that all such vehicles obey a low speed limit (perhaps 15 mph).
 - When traffic counts of micro-vehicles are expected to exceed some unknown threshold, irrespective of

AV counts, they will require their own dedicated and separated directionally-differentiated lanes (probably 4–5 feet wide).

- On traffic count streets below an unknown threshold, ride-sharing AVs likely will not require special “siding slip: spaces to move over and pick up or drop off passengers. They will simply stop in traffic to do so.
- On traffic count streets above an unknown threshold, ride-sharing AVs will likely require special “siding slip” spaces to move over and pick up or drop off passengers to let other AVs pass by. On busy collector or minor arterial streets these “kiss and go” or “ride-sharing station” siding lanes will need to be quite long to

accommodate many AVs stopped at once end to end.

- On high-traffic streets or at major civic gathering places (like theaters, shopping centers, outdoor markets, or convention centers) ride sharing AVs will likely require extensive ride-hailing hubs managed by TNC employed “bailiffs” that may even have to be split between different drop-off versus pick-up areas. Such hubs may also be needed where ride-sharing services interface with regional public transit. If ride-sharing TNCs are to be found in downtown suburban settings they will likely consume much of the curb space now used for parking and thereby likely obviate the possibility of new street designs.

KEY TO ABBREVIATIONS:

CV = Conventional vehicles

CT = Conventional freight and service trucks, including fire trucks and ambulances

AV = Low-occupancy autonomous vehicles

AJ = Smaller sized shared-ride autonomous jitneys

MV = Micro-vehicles, i.e. motor scooters, motorized bikes, motorized skateboards, segways, etc.

BY = Bicycles and other human-powered micro-vehicles.

Study Areas

The studio focused on the historic downtown in Gresham, Oregon. Three students focused on the area between NE 5th Street and NE 2nd Street from north to south, and between NW Miller Avenue and NE Hood Avenue from west to east.

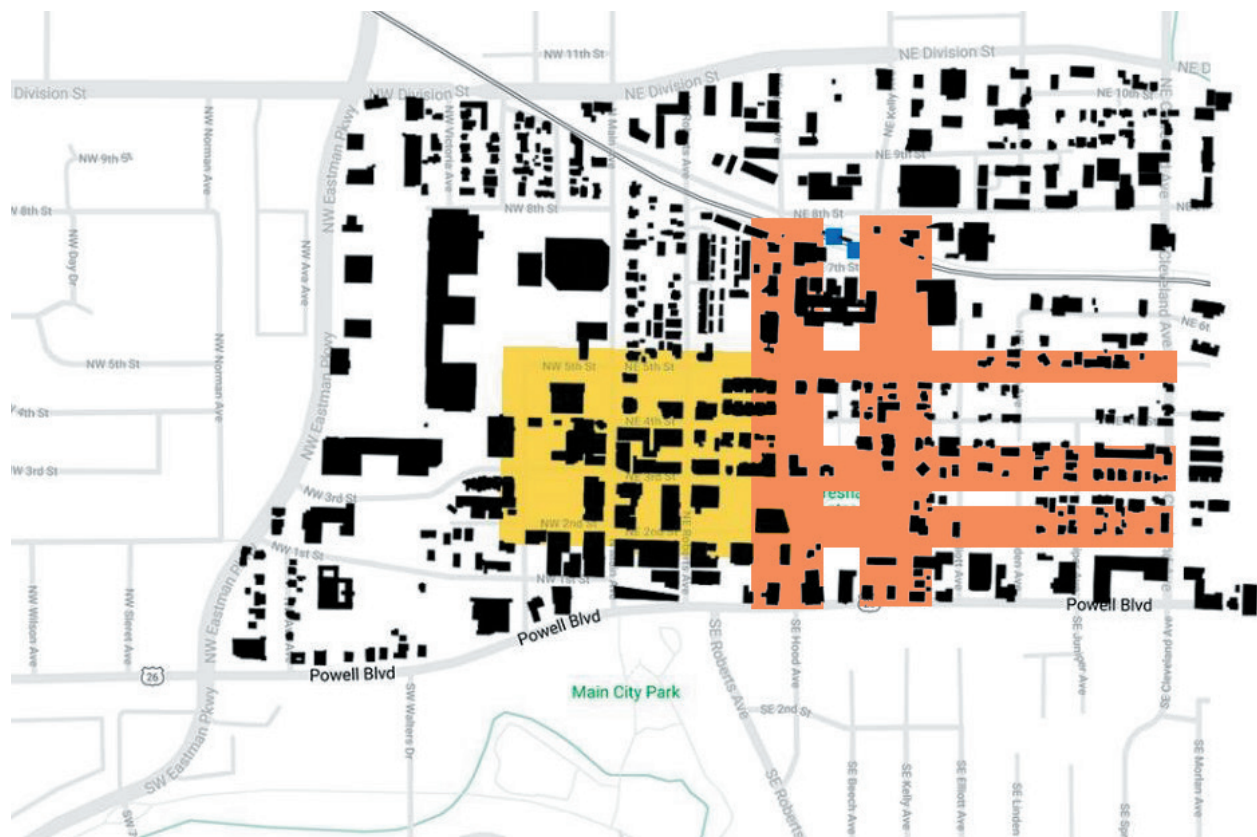
The rest of the class were assigned several street lengths throughout the downtown region as their specific areas of investigation. These street lengths (orange) along with the historic downtown study area (yellow) are illustrated below in [Figure 1](#).

The study area is comprised of mostly mixed commercial and mixed residential land uses. Currently, almost 50 percent of the historic downtown

core consists of parking and or vacant lots, with a primarily vehicle dominated roadway. As for the selected streets, a general observation has been that they are also car centric with wide trafficways and on street parking. Intermittent sidewalks, unused greenspace, lack of social gathering space, and lack of safety signages and crosswalks were other common observations throughout the study area.

FIG. 1

Map of downtown Gresham with highlighted study areas



Student Designs

Historic Downtown Study

SPENCER SANDELLO, TOMMY CHEN, AND ASHLYN TAHLLER



INITIAL DESIGN PARAMETERS

Concept: Gresham's vibrant front yard, hearth, and block party space for urban social life. Downtown becomes a social hub with more compelling destinations and a diversity of small-scale commercial services. The streets become more pedestrian as traditional vehicle access is phased out. Some streets might cease to be streets at all.

Transitional mixed vehicle type design:

- No on-street parking
- Parking areas for traditional vehicles are established on or near the edges of downtown
- One 10/11-foot-wide, one-way lane only for AJ, AV, ride-share-CV and CT
- Low speed limits, i.e. 15–20 mph
- Reclaimed space used creatively: parklets, eating, galleries, plazas, planters, bike parking
- Add pedestrian alley ways between or through buildings as a secondary grid
- Private cars park at the MAX station parking facilities and take ride share buses to downtown

FIG. 2

Historic downtown core study area (in yellow) within Miller Avenue to Hood Avenue and Second Street to Fifth Street

Rationale: Streets become pedestrian realm rich in amenities with limited vehicle access.

Long-term no conventional vehicle design:

- No vehicle access except to AV and AJ drop-off and pick-up points
- CT allowed access along fire-lane ways after hours and in emergencies
- MV and BY have designated and marked lanes through streets with very low speed limits
- Some streets may be completely closed to any vehicles, perhaps including MV and BY
- Reclaimed space used creatively: parklets, eating, galleries, plazas, planters, bike parking

Rationale: Streets become pedestrian realm rich in amenities with very limited vehicle access.

Historic Downtown Gresham Redevelopment Strategy

SPENCER SANDELLO AND TOMMY CHEN



DESIGN PRINCIPLES

The historic downtown core area is comprised of mostly mixed commercial and mixed residential land uses. Currently, almost 50% of the study area consists of parking and or vacant lots, with a primarily vehicle dominated streetscape. The 'Historic Downtown Gresham Redevelopment Strategy' aims to transform downtown Gresham into a core social hub by connecting it to the MAX station and making streets more pedestrian focused. Key interventions include adding parklets, increasing gathering places, planning jitney and autonomous vehicle (AV) routes, and keeping traditional vehicle out of the core downtown area. The ultimate goal here is to create a better urban social life for the community.

FIG. 3

DESIGN PROPOSAL

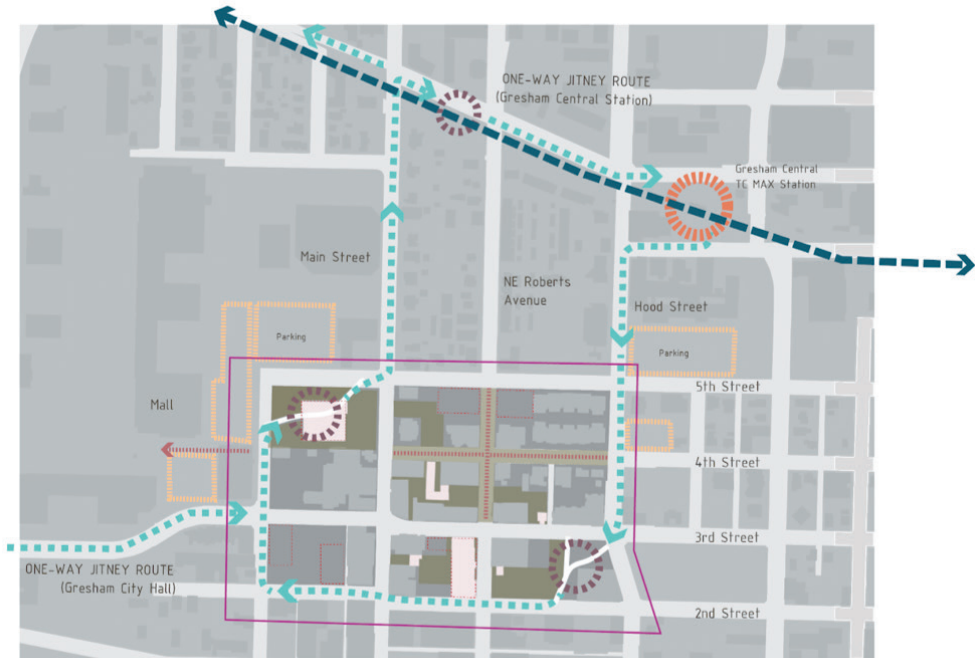
In the short term, the design proposes first addressing issues of circulation and of street design. Then, in the long-term, focus is shifted to the development of jitney hubs and to creating connecting infrastructure.

TRANSITIONAL DESIGN

The transitional design proposals are as follows:

FIG. 4

Site plan illustrating the proposed jitney routes across future downtown Gresham



Transportation / Jitney Circulation Framework

One challenge to making downtown Gresham a social hub is getting residents as well as visitors to the downtown. To achieve this, the design proposes two one-way jitney routes, one from Gresham Central MAX station and another from City Hall.

FIG. 5

Site plan of proposed designated drop off/pick up zones for AVs and ride-sharing services.



Rideshare and AV Circulation Framework

The development strategy proposes that the NE 4th Street and NE Roberts Avenue be closed to vehicles and only accessible for pedestrian usage. This is in response to the current state of downtown where parking covers most the study area and vehicles dominate the road. On-street parking will be reduced by 80 percent and designated drop-off zones will be created for rideshare vehicles and/or AVs. Parking lots will remain as they are during the transitional period, but eventually they will be repurposed for future development.

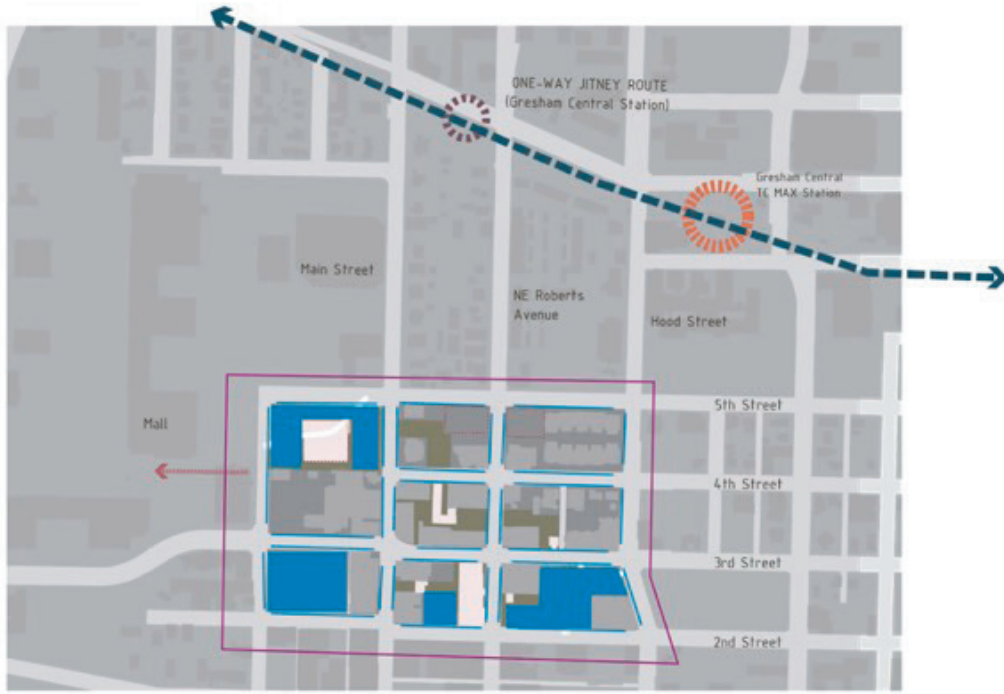


FIG. 6
Existing parking lots (blue solid polygons) in downtown Gresham that will be utilized during the transition period



FIG. 7
Proposed parking lots (blue hollow polygons) outside of the downtown core in the long-term.

Parking

On-street parking will be limited to NE 3rd Street with existing parking utilized during the transitional period. Then, in the long term, parking will be limited to outside of the downtown core allowing for a safer pedestrian experience within the core. Other parking spaces besides those on NE 3rd Street will be utilized for parklets, bike carrels, bike sharing, and as public space.

FOCUS SITES

As part of the transitional design, the “Historic Downtown Gresham Redevelopment Strategy” also investigates the design of key streets and locations, of which 4th Street and Roberts Avenue and Big Tree Plaza are discussed in the following pages

FIG. 8

Context map showing Main Avenue, 4th Street and Roberts Avenue, and the Big Tree plaza

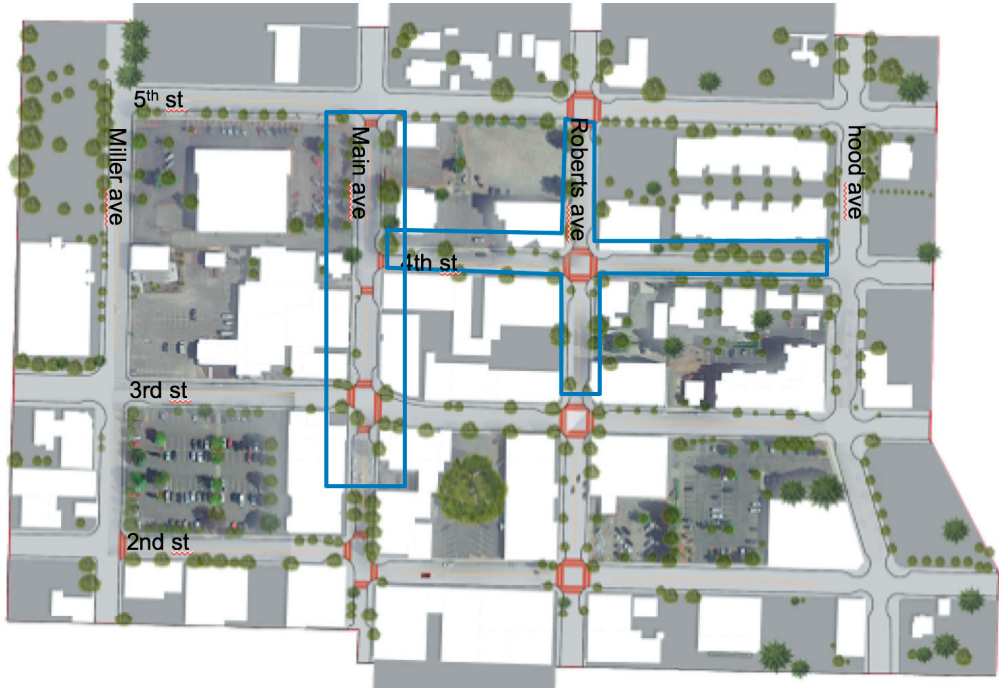
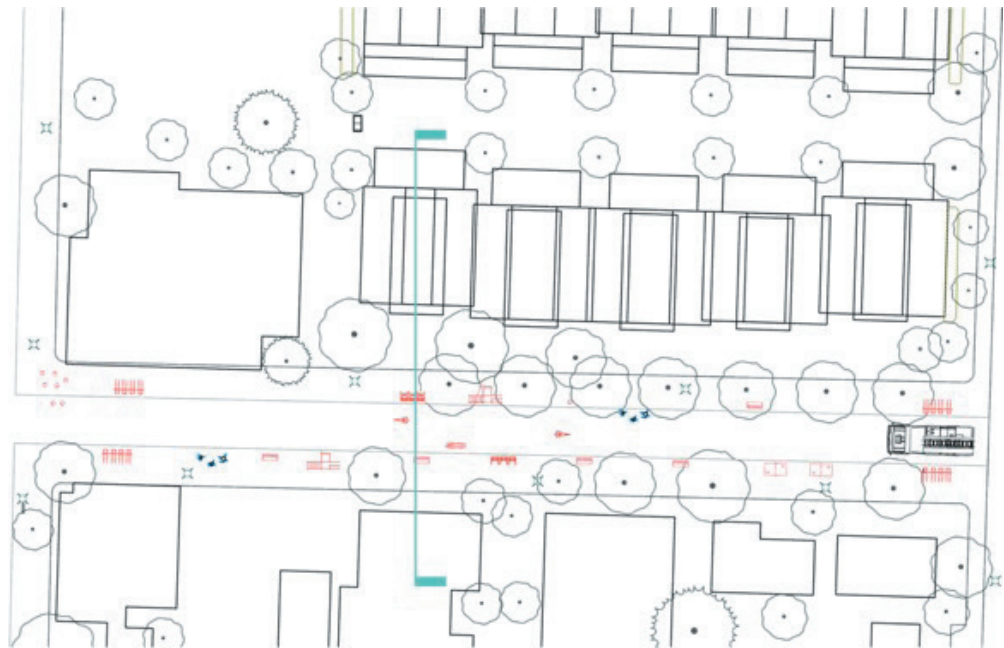


FIG. 9

Site plan of 4th Street showing proposed interventions



NE 4th Street and NE Roberts Avenue

NE 4th Street and NE Roberts Avenue will serve as an example of what a pedestrian dominated downtown could be. There will only be access for emergency vehicles

or scheduled deliveries. On-street parking will be reduced by 80 percent. Outside of the remaining 20 percent, parking spaces will be repurposed into parklets, micro-vehicle parking, and AV drop-off zones. Here, new jitney stops will be situated along existing streets. Based on the success of this intervention, the other remaining blocks along NE Roberts Avenue could be closed to vehicles.

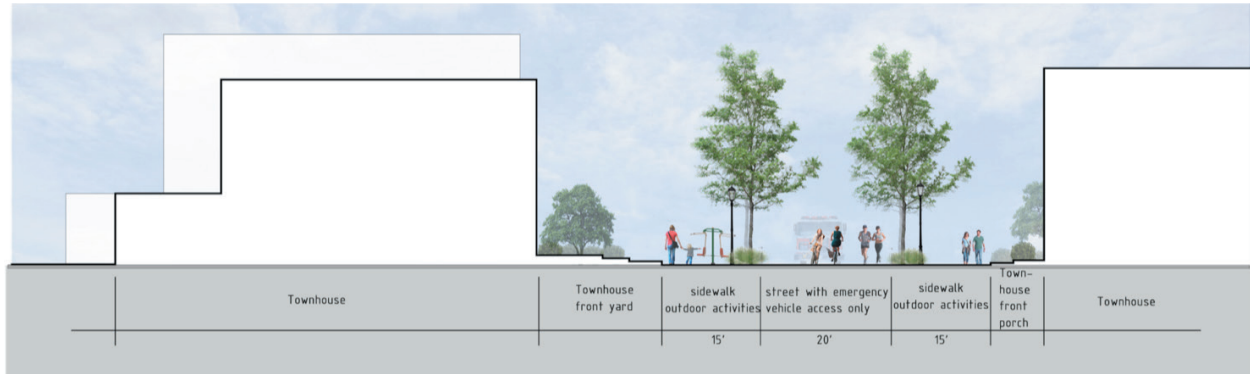


FIG. 10 (TOP)
Section of 4th Street illustrating the changes in the streetscape

FIG. 11 (BOTTOM)
Rendering of future 4th Street in Downtown Gresham

Big Tree Plaza

The Discounts Plus building will be redeveloped and transformed into an inviting place with attractive stores and restaurants. This location will feature a plaza—Big Tree Plaza—that can be used for various performances and community experiences.

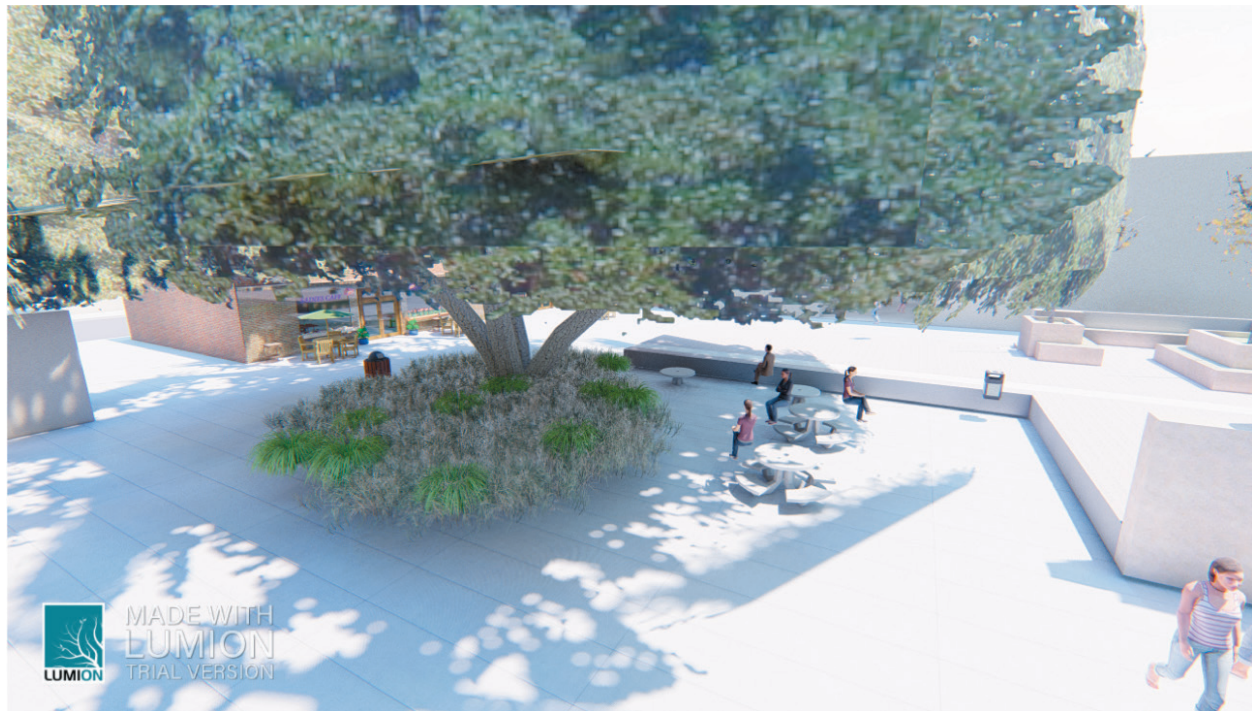


FIG. 12 (TOP)
Section of the Big Tree Plaza

FIG. 13 (BOTTOM)
Rendering illustrating the plaza activated through design interventions

LONG-TERM DESIGN

The long-term design proposals are as follows:

In the long term, the redevelopment strategy proposes development of designated jitney hubs in southeast and northwest corners of downtown. These hubs will serve as core public spaces and will be connected by a greenway.

FIG. 14

Rendering illustrating the plaza activated through design interventions



Proposed Southeast Hub

The first jitney stop in the southeast section of downtown will create a new attraction and point of interest through a play of light, shade, and color. This plaza will serve as an anchor in the southern portion of downtown and provide a landmark destination for visitors.



FIG. 15 (TOP)
Site plan of the Southeast Hub

FIG. 16 (BOTTOM)
Rendering showing how the hub might be used as a connection between jitneys and autonomous vehicles

Proposed Southeast Hub

The hub on the northwest side of downtown will repurpose an existing downtown building where it will make sustainable transportation more attractive. The building will be an indoor jitney stop that will house various small businesses and food shops. This hub will serve as the main jitney stop where both jitney routes connect. The outside area will be used for different public activities, including small performances or farmers markets. This hub will also feature a new statue of liberty that celebrates Gresham's history.



FIG. 17
Site plan of the
Northwest Hub



FIG. 18

Rendering of the plaza
space outside the
Northwest Hub.

Proposed Greenway

This greenway will serve as the main connection between the two downtown hubs and allow visitors and residents to slowly experience a pleasant walk through the heart of downtown. This walk, through planting and open green spaces, could open up opportunities for art walks or even outdoor seating for future restaurants.



FIG. 19

A greenway is proposed to serve as an important connection between key downtown hubs

DESIGN SUMMARY

The design strategy illustrates that the historic downtown core can be converted into a vibrant, walkable, and social hub of the larger downtown Gresham. To achieve this, the transition phase proposes establishing jitney routes and hubs, developing a network of rideshare drop off points, and making parts of the core area walkable. In the long-term, the strategy proposes that the jitney hubs be further developed into more substantial plaza spaces with businesses and opportunities for public activities. Complementary to this notion is the suggested greenway, which becomes a connective pathway through the heart of historic downtown.

Envisioning the Future of Streets in Historic Downtown Gresham

ASHLYN TAHLIER



FIG. 20

A future downtown where multiple mixed modes of transportation are supported

DESIGN PRINCIPLES

This design seeks to activate and transform historic downtown Gresham through pedestrian friendly street design, integrated alternative mobility, and strategic retail and mixed-use housing development. These interventions seek to create a vibrant public realm, stimulating the economy, serving the community as well as promoting tourism. Design implementation would be done in phases, with the proposed transition designs happening during phase one. The transition designs seek to create pedestrian-friendly streets, while the long-term designs explore the development of the central core of downtown.

In the following pages, an overall design framework that guides the development through transitional and long-term stages is presented first followed by detailed studies of key areas within the historic downtown area.

Further discussion of these principles categorized according to different focuses are as follows:

Autofocus

Conventional vehicles are phased out of the historic downtown core as ride-share shuttles and AVs or micro-vehicles become the primary modes of transit. All on-street parking is eliminated, and vehicle lanes are narrowed to 20 percent of current right-of-way.

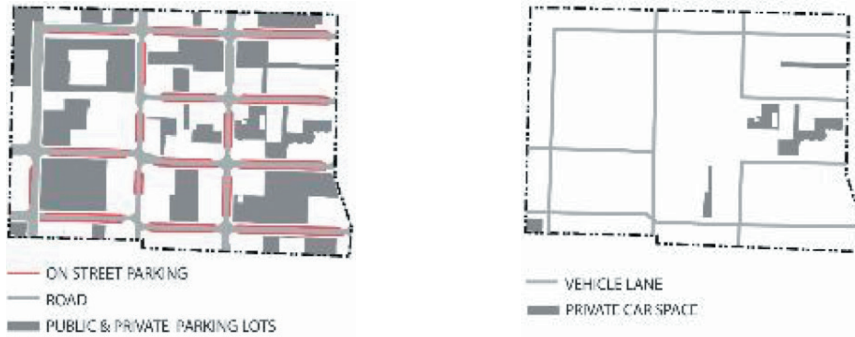


FIG. 21
Diagrams showing how conventional vehicles might be phased out of historic downtown

Development

Development could focus on activating the historic core with increased dining, retail, and mixed-use housing. Here, blocks around 3rd Street are proposed to be developed into 3-4 story mixed-use podium buildings.

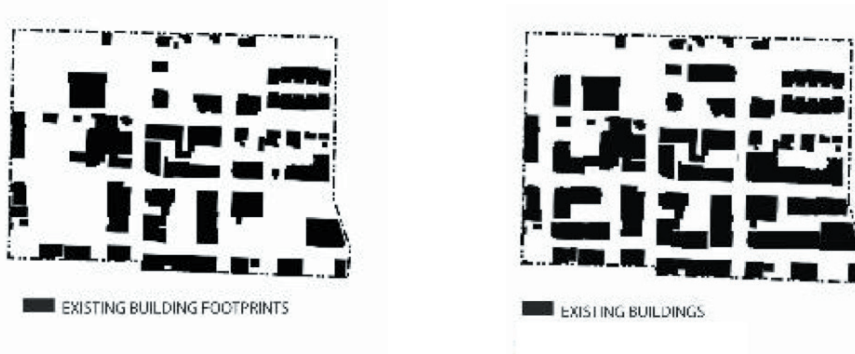


FIG. 22
Diagrams of proposed densification in downtown Gresham

Public Realm

Primary focus will be on creating human-centered streets leading to a vibrant public realm that attracts tourism, stimulates the economy, and serves the existing community.



FIG. 23
Diagrams illustrating reclaimed pedestrian-focused spaces

Green Space

Public green space, in the form of an urban forest, will be increased by taking back streets and parking space as green corridors that connect people to nature. This is protected and enhanced for the long-term as green infrastructure, stormwater management, and a diverse street canopy.

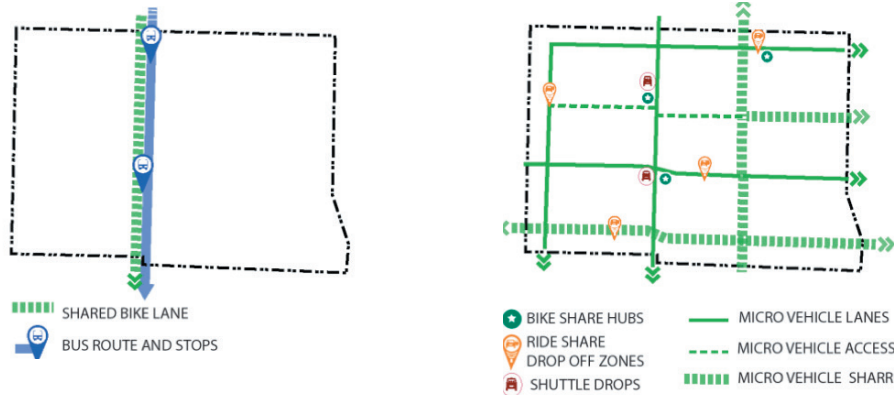
FIG. 24
Diagrams of urban forest and green infrastructure



Alternative Mobility

Alternative mobility is celebrated as the primary mode of transportation. Frequent automated shuttles from the light rail and parking garage bring people directly into the core. Designated drop-off points for ride-share are established as “hubs” and micro-vehicle transit is encouraged through designated lanes and pick-up and drop-off points

FIG. 25
Diagram of alternative transportation network and hubs



DESIGN PROPOSAL

Transitional Design

Among the main goals of the transitional design is to create a more pedestrian-friendly downtown. The design framework proposes that the majority of the parking can be eliminated. Here, half of the conventional vehicle roads will be replaced with slow, one-way AV lanes. N Main Avenue and central NE 3rd and NE 4th Streets are activated through tactical design interventions such as parklets and murals, and are more focused on pedestrian usage. Additionally, car-share and bike zones are introduced.

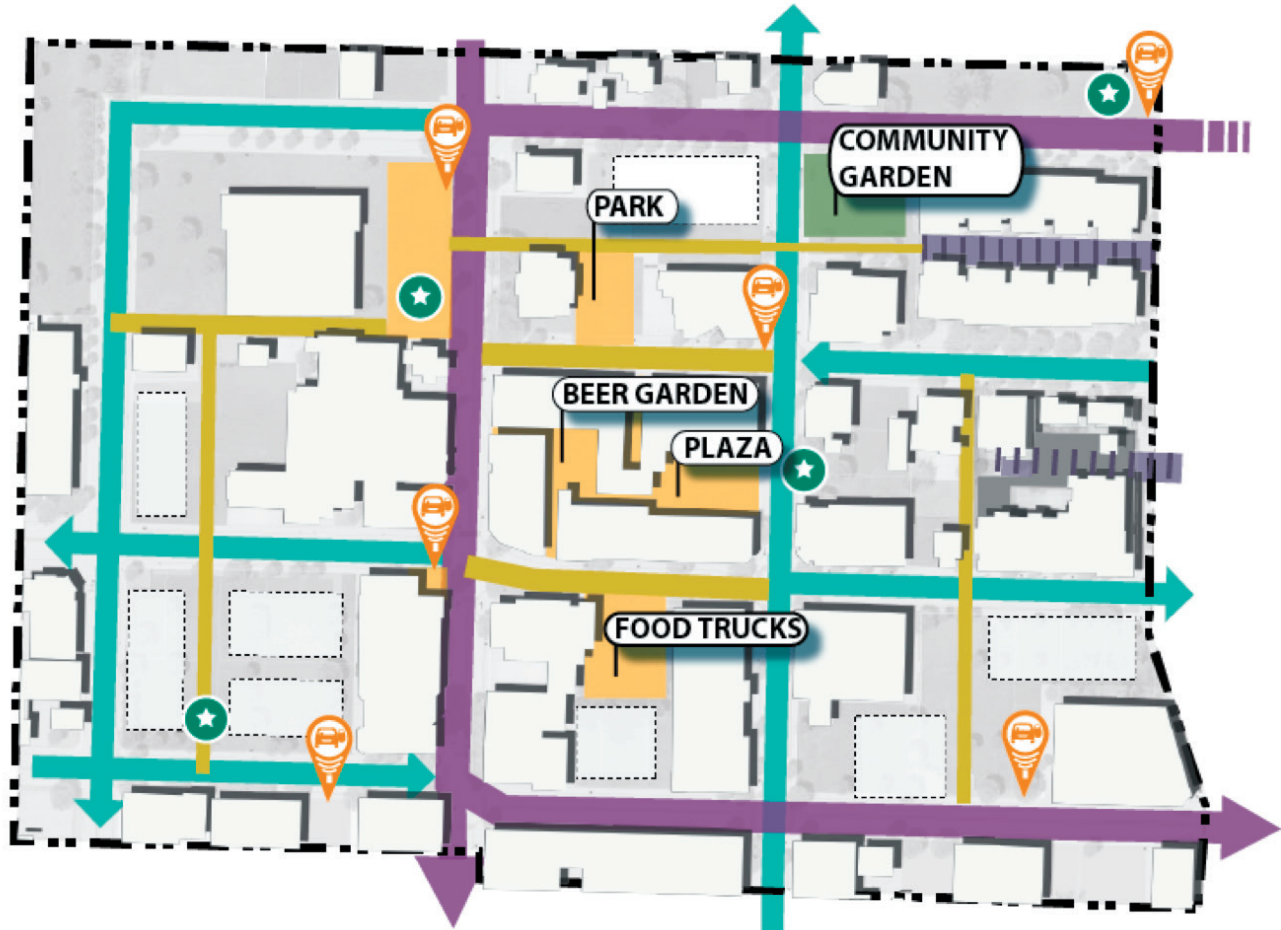
FIG. 26
Transitional design framework for downtown Gresham



LONG-TERM DESIGN

The long-term design focuses on developing the downtown core, the “Heart of Downtown.” The framework proposes that all city public parking will be eliminated, and all streets be closed to conventional vehicles. Plazas will be activated and are programmed to contribute as pedestrian-focused centers. There will be development of mixed-use residential podium buildings on public and “likely to develop” lots based on land value ratio. Car-share and bike-share zones will be established.

FIG. 27
Long-term design framework for downtown Gresham

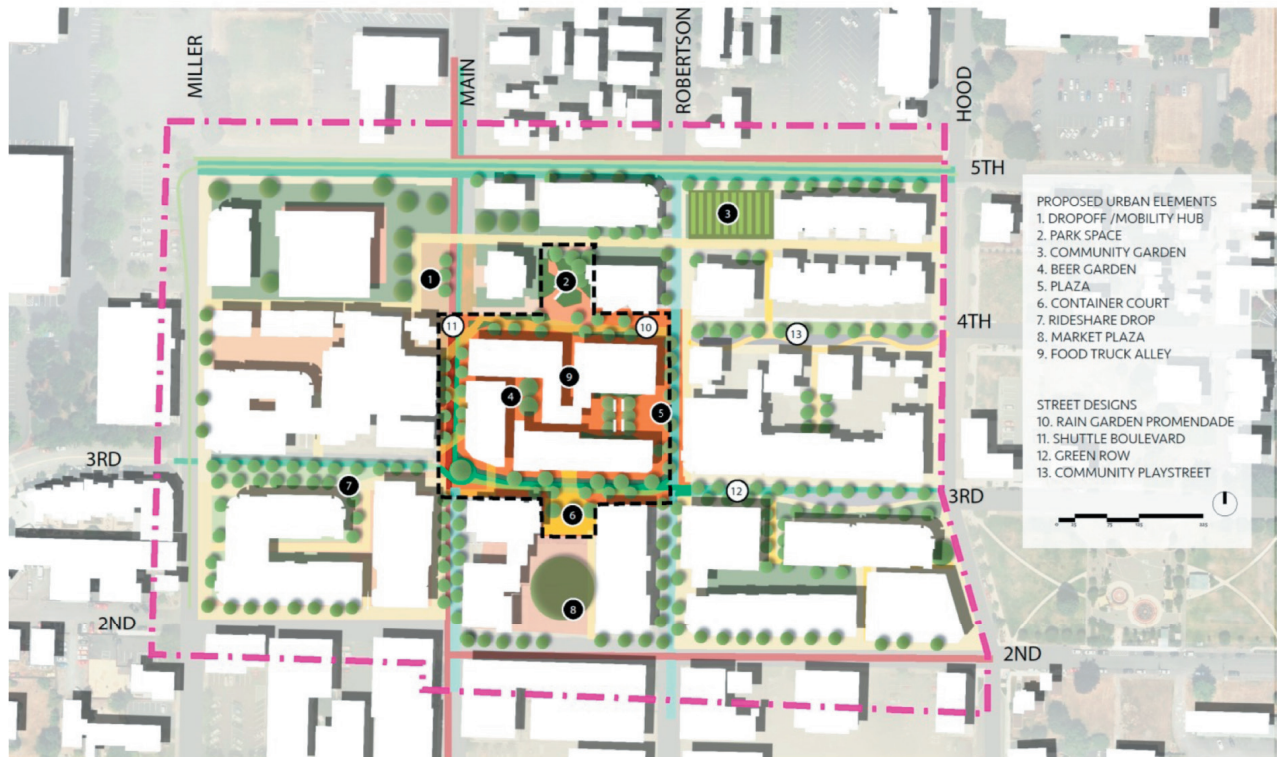


- PEDESTRIAN & MICROVEHICLES ONLY
- AV ONE WAYS
- JITNEY ROUTE
- MIX-USE RESIDENTIAL PODIUM BUILDINGS

*ALL ROADS CAN ACCOMMODATE EMERGENCY VEHICLES & AFTER HOUR FREIGHT TRUCKS

The site plan as seen in [Figure 28](#) illustrates the long-term design for downtown Gresham. The design proposes urban elements such as park spaces, community gardens, plazas, and food truck alleys. It also proposes the redesign of key streets, based on the vision established in the long-term design framework. These streets have their own distinct typologies and are defined by their pedestrian focus, curbless design, and frequent crossing opportunities. The proposed development at the center of the study area (as demarcated by a black dotted boundary in [Figure 28](#)) and the street design of N Main Avenue are discussed in the following pages.

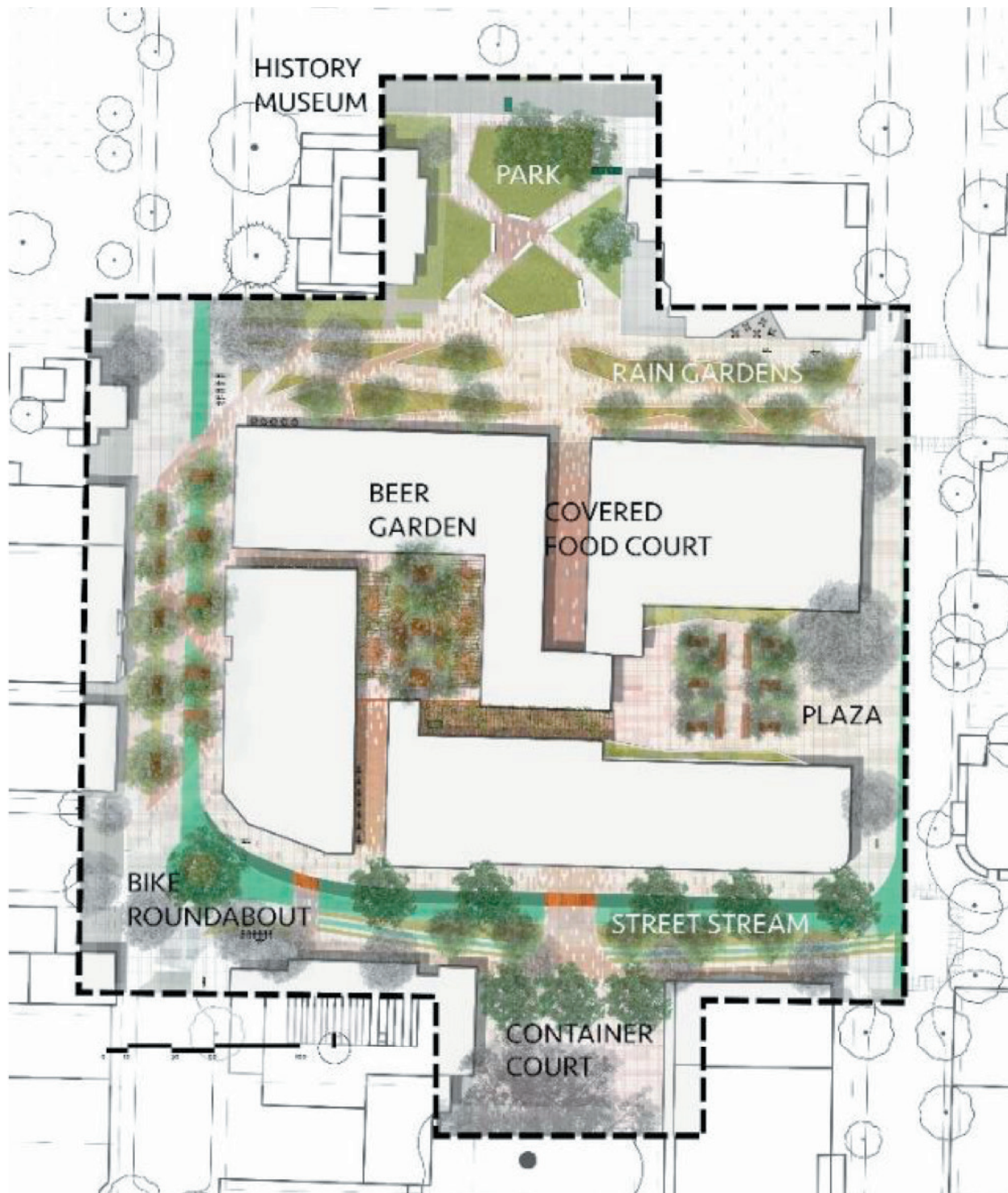
FIG. 28
Site plan of future illustrating proposed urban elements and street designs



FOCUS SITES

FIG. 29
Zoomed-in site plan of
proposed development
at the heart of
downtown Gresham

As seen in Figure 29, plazas are programmed and activated with different interventions at the center of downtown Gresham. These connecting public spaces add to the pedestrian experience; cafes and restaurants surrounded by these plazas enliven the center through art, nature, mobility, and social encounters.



N Main Avenue

N Main Avenue will be a major route into the heart of the historic core and will include a narrow e-shuttle lane, dedicated bike lane, and widened sidewalks. Paving patterns and colors, decorative tree and drain grates, and rows of trees and groundcover will all help delineate flexible pedestrian space from travel lanes while promoting fluidity, increased crossings, and more social gathering space.



FIG. 30
Site map showing the location of Main Avenue

FIG. 31
Main Avenue site plan,
Right—Main Avenue
section

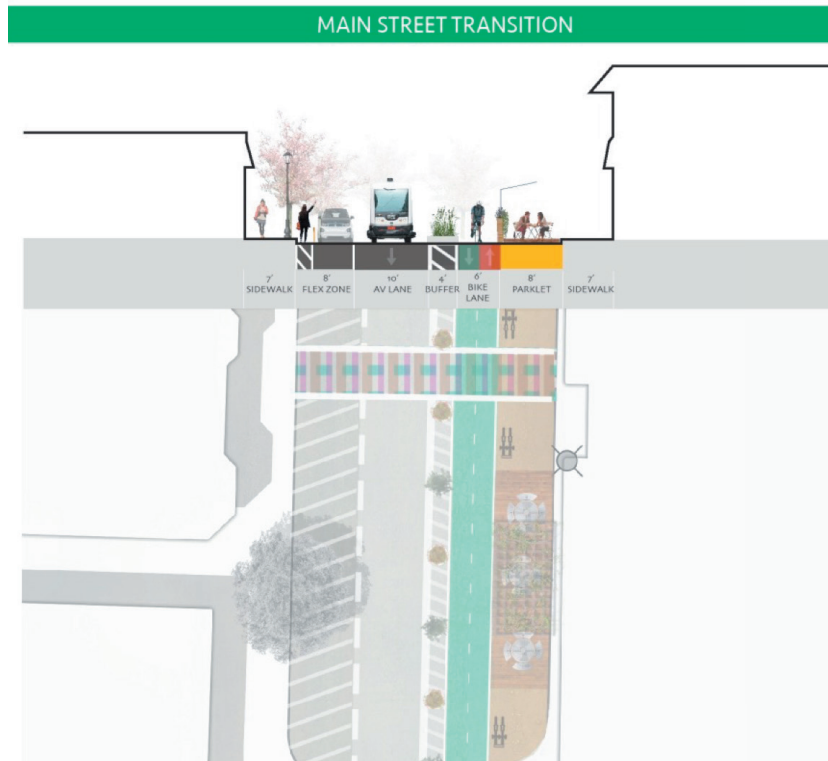
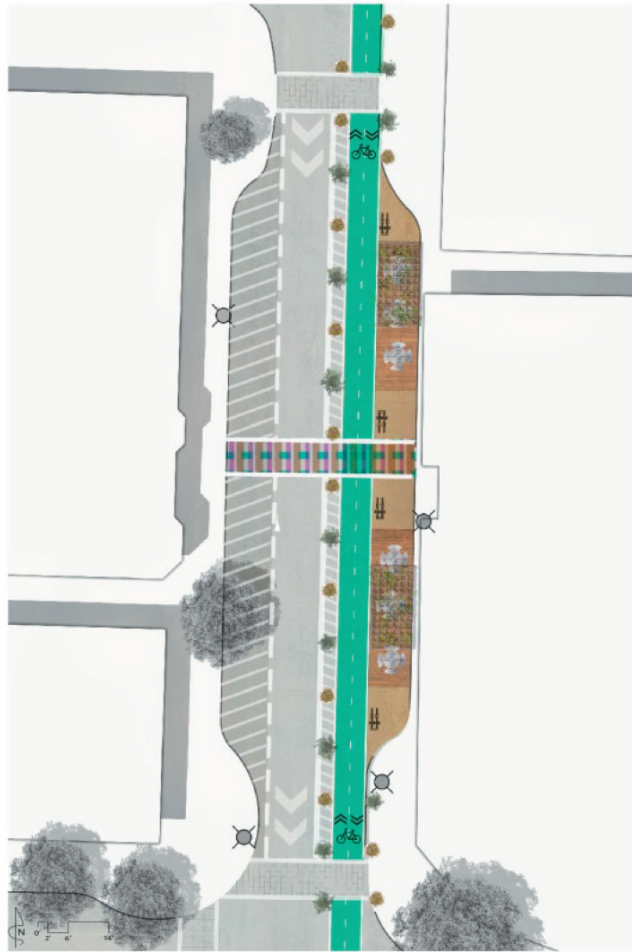
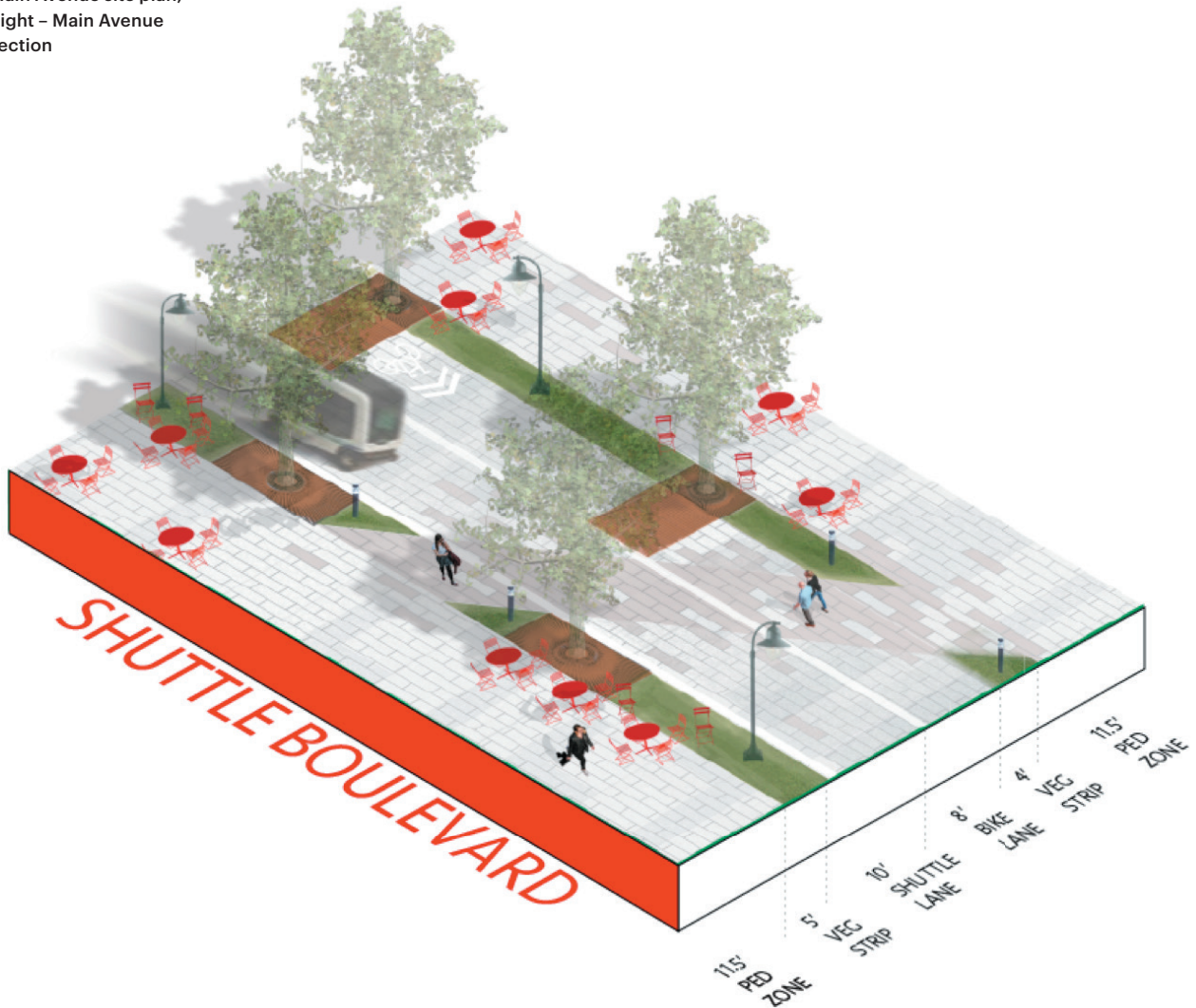


FIG. 32

Main Avenue site plan,
Right - Main Avenue
section



DESIGN SUMMARY

This design creates another strong vision for the historic downtown core, illustrated initially through an overall development framework, and then through a site design and detailed exploration of selected sites. This student also proposes that conventional vehicles be phased out of the core and that there be an increased emphasis on walkability and human-centered street design. This proposal also suggests establishing uniquely programmed and connected plazas such as beer gardens and container gardens, as a means of creating a socially vibrant and economically stimulating downtown. The street typologies also suggest ways to integrate green infrastructure into the urban fabric and develop a strong sense of place.

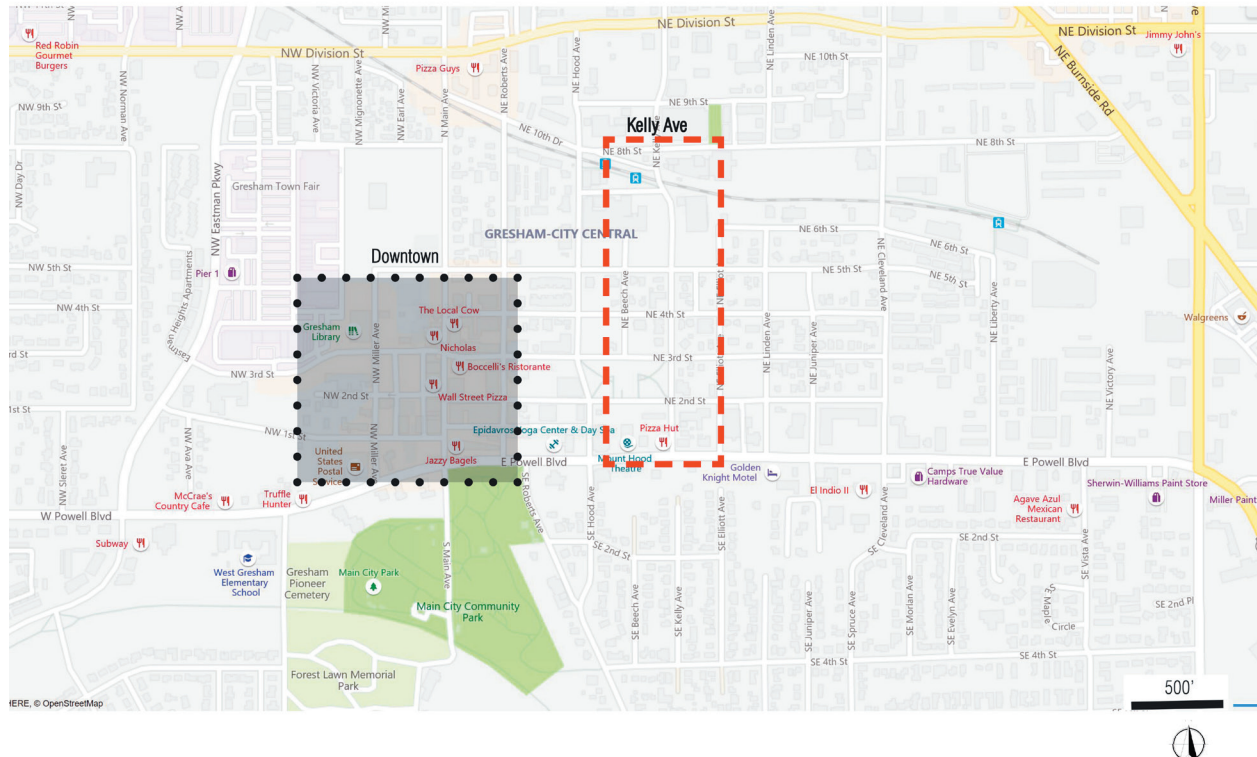
Street Study

The following chapters present student investigations of select streets in downtown Gresham.

NE Kelly Avenue Revitalization

ERICA ANDRUS AND REBECCA CRUZE

STUDY AREA



INITIAL DESIGN PARAMETERS

Concept: Lower volume last mile to and from light rail station. Three- to four-story residential podium buildings, with little or no parking, introduced in all adjacent parcels with current improvement-to-land-value ratios less than 2.0.

Transitional mixed vehicle type design:

- On-street parking reduced by 50 percent from current conditions
- One 20-foot-wide two-lane, two-way traffic way for conventional vehicles (CV), autonomous vehicles (AVs), micro-vehicles (MVs), autonomous jitneys (AJs), bicycles and other human-powered micro-vehicles (BY), and conventional freight and service trucks (CT)
- One or two four-to-ten-foot-wide pedestrian sidewalks
- Reclaimed space used for creative purposes: parklets, stormwater, planters, bike parking, etc.

Rationale: All traffic is slow and mixed in wide directional lanes in a smaller street.

FIG. 33

NE Kelly Avenue study area from E Powell Boulevard to 8th Street.

Long-term no conventional vehicle design:

- On-street parking reduced by 90 percent from current conditions
- One 11-foot-wide, two-direction traffic way for AV, CT and AJ with turnout passing turn outs
- Two six-foot-wide each-way traffic lanes for MV and BY
- One or two four-to-ten-foot-wide pedestrian sidewalks
- Reclaimed space used for creative purposes: parklets, stormwater, planters, bike parking, etc.

Rationale: Single “smart-passing” lane for AVs and separate safe lanes for many micro-vehicles

PROJECT DIVISION

The study area was divided into a northern portion of NE Kelly Avenue from NE 4th Street to NE 7th Street, and a southern portion of NE Kelly Avenue from E Powell Boulevard to NE 4th Street.

The street lengths are further subcategorized into different zones. Interventions in each zone are based on existing site conditions and look to create unique experiences while at the same time creating a strong, cohesive character for this stretch of NE Kelly Avenue.

FIG. 34

Division of the overall study area into North and South NE Kelly for design exploration



South NE Kelly: E Powell Boulevard to NE 4th Street

ERICA ANDRUS

South NE Kelly Avenue was divided into three zones: Gradual Approach, Restful Park, and Social Hub.

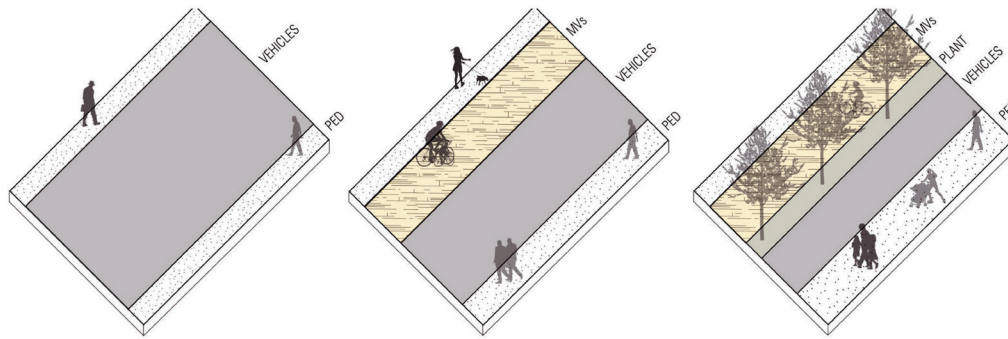


FIG. 35

Diagrams showing how existing streets could transition into a more pedestrian-focused street with AVs

“SOCIAL HUB”:
3RD AVE TO 4TH AVE



“RESTFUL PARK”:
2ND AVE TO 3RD AVE



“GRADUAL APPROACH”:
POWELL BLVD TO 2ND AVE

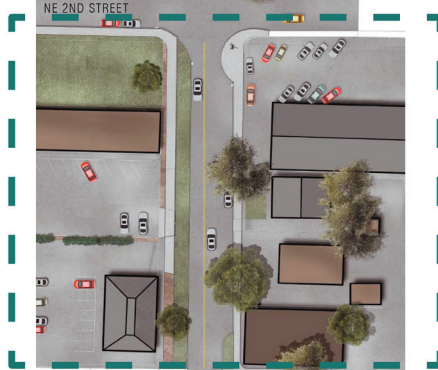


FIG. 36

Current site conditions of South Kelly and the three design zones.

DESIGN PRINCIPLES

The principles that guided design of south NE Kelly are as follows:

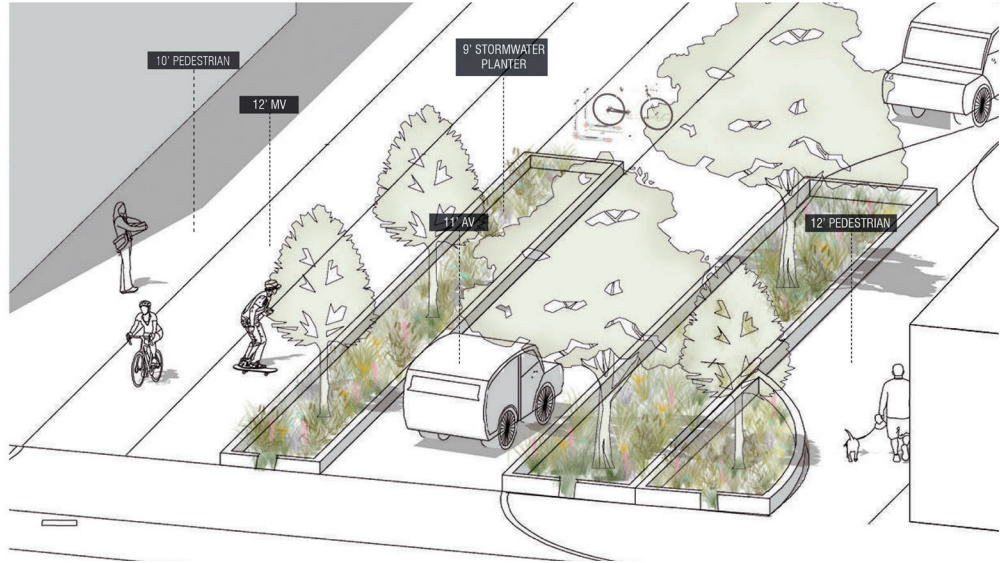


FIG. 37

Stormwater planters adjacent to the road provide stormwater services and act as physical barriers

Reduce Stormwater Runoff

Stormwater planters are placed adjacent to large areas of pervious surfaces to help slowly infiltrate rainwater and provide a safety barrier between AV lanes and MV and pedestrian lanes.

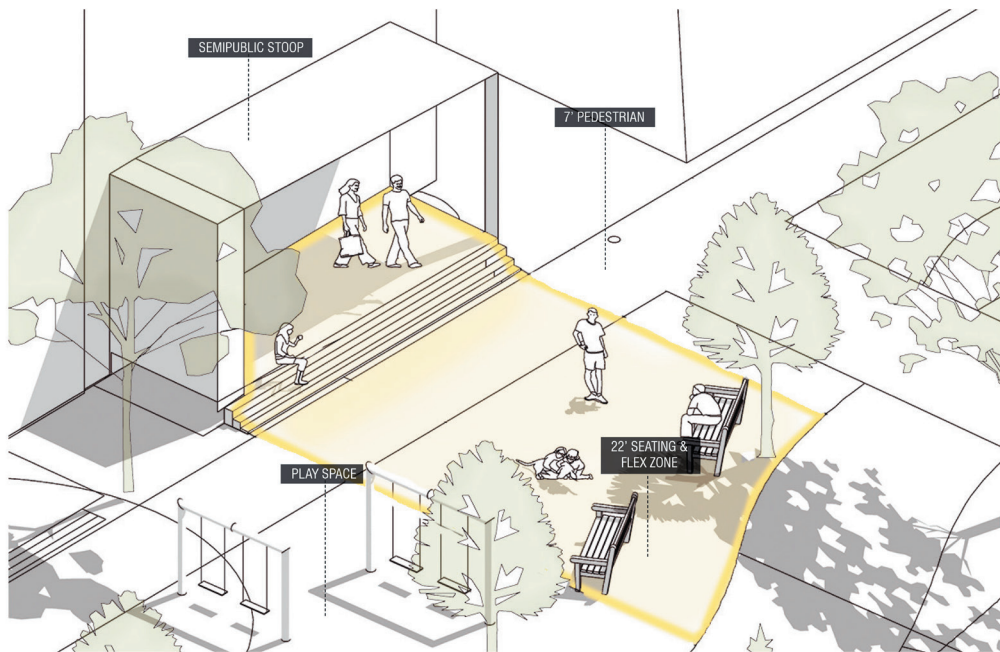


FIG. 38

Design interventions such as play spaces and flexible seating spaces provide social interaction opportunities

Increase Opportunities for Social Interactions

With the arrival of air conditioning, fewer people spend time on front porches socializing with neighbors. A semi-public stoop design can encourage a gradient between private homes and public right-of-way by being adjacent to pedestrian walkways, having short steps and no railings, and allowing customization by residents such as adding outdoor furniture.

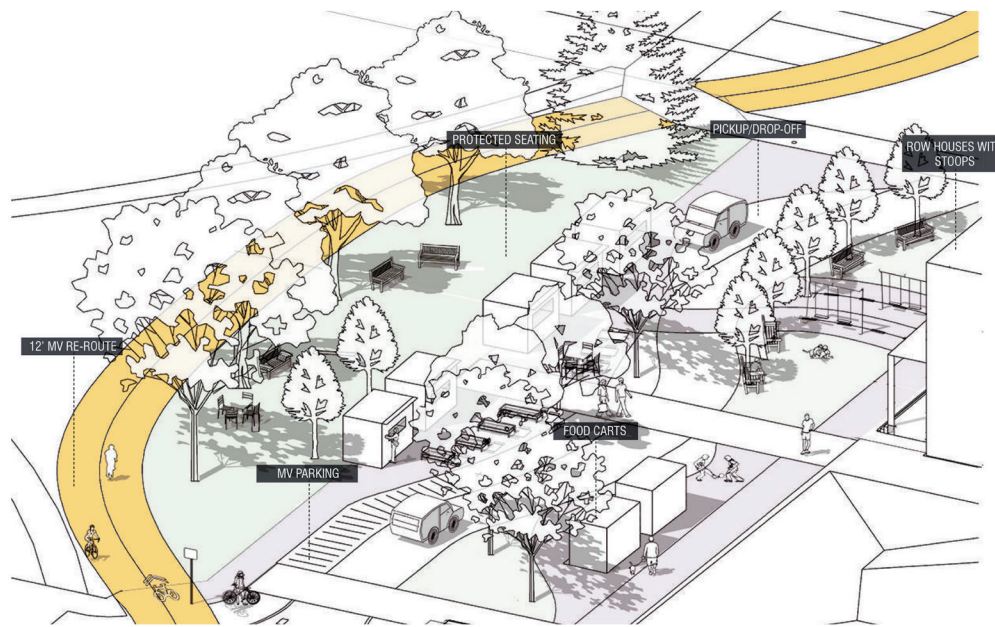


FIG. 39

Outdoor rooms and dedicated lanes for different modes of mobility increase safety and provide different experiences

Pedestrian Safety Priorities

Opportunities can be provided for different user types to have their own separate, special experience such as re-routing micro-vehicle lanes or creating outdoor rooms for community members to eat their lunch and rest.

DESIGN PROPOSAL

Transitional Design

Gradual Approach—E Powell Boulevard to NE 2nd Street

This block is meant to be a transition from busy E Powell Boulevard to the mixed residential and commercial street of NE Kelly Avenue. There is a dense canopy on either side of the micro-vehicle lane, unique seating opportunities, micro-vehicle parking/charging/renting, and areas for pick-up and drop-off. There is a chicane in the street to create pockets for parklets and to slow micro-vehicle speeds.

The proposed buildings on this block are on three tax lots that are likely to develop. Furthest south is a proposed three-over-one podium building, and the north corner on the block are row houses. Row houses are proposed in lots that are less than one-half acre. On the east side of the lot there is an existing car repair shop that could also be a podium building in the long-term design.

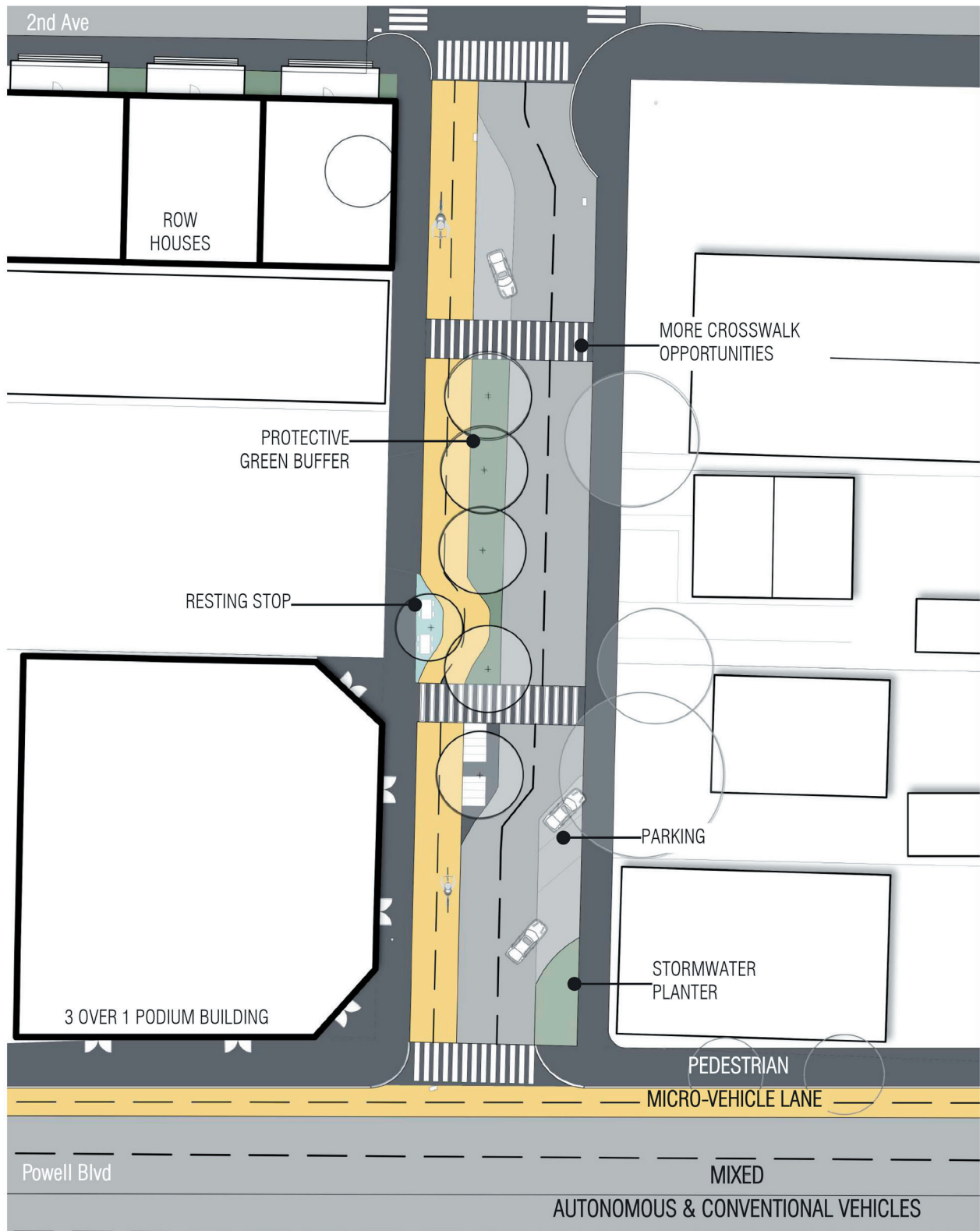


FIG. 40
Transitional design of the Gradual Approach zone

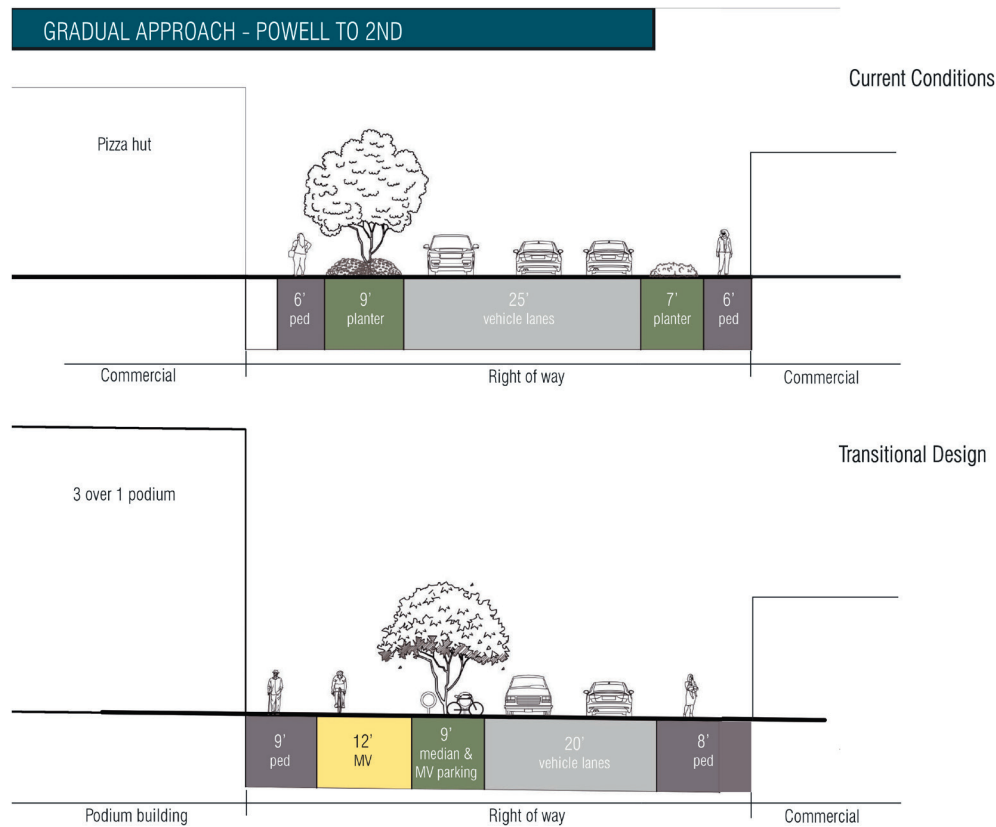


FIG. 41

A typical section of the Gradual Approach zone

This block is meant to be a transition from busy E Powell Boulevard to the mixed residential and commercial street of NE Kelly Avenue. There is a dense canopy on either side of the micro-vehicle lane, unique seating opportunities, micro-vehicle parking/charging/renting, and areas for pick-up and drop-off. There is a chicane in the street to create pockets for parklets and to slow micro-vehicle speeds.

The proposed buildings on this block are on three tax lots that are likely to develop. Furthest south is a proposed three-over-one podium building, and the north corner on the block are row houses. Row houses are proposed on lots that are less than one-half acre. On the east side of the lot there is an existing car-repair shop that could also be a podium building in the long-term design.

Restful Park—NE 2nd Street to NE 3rd Street

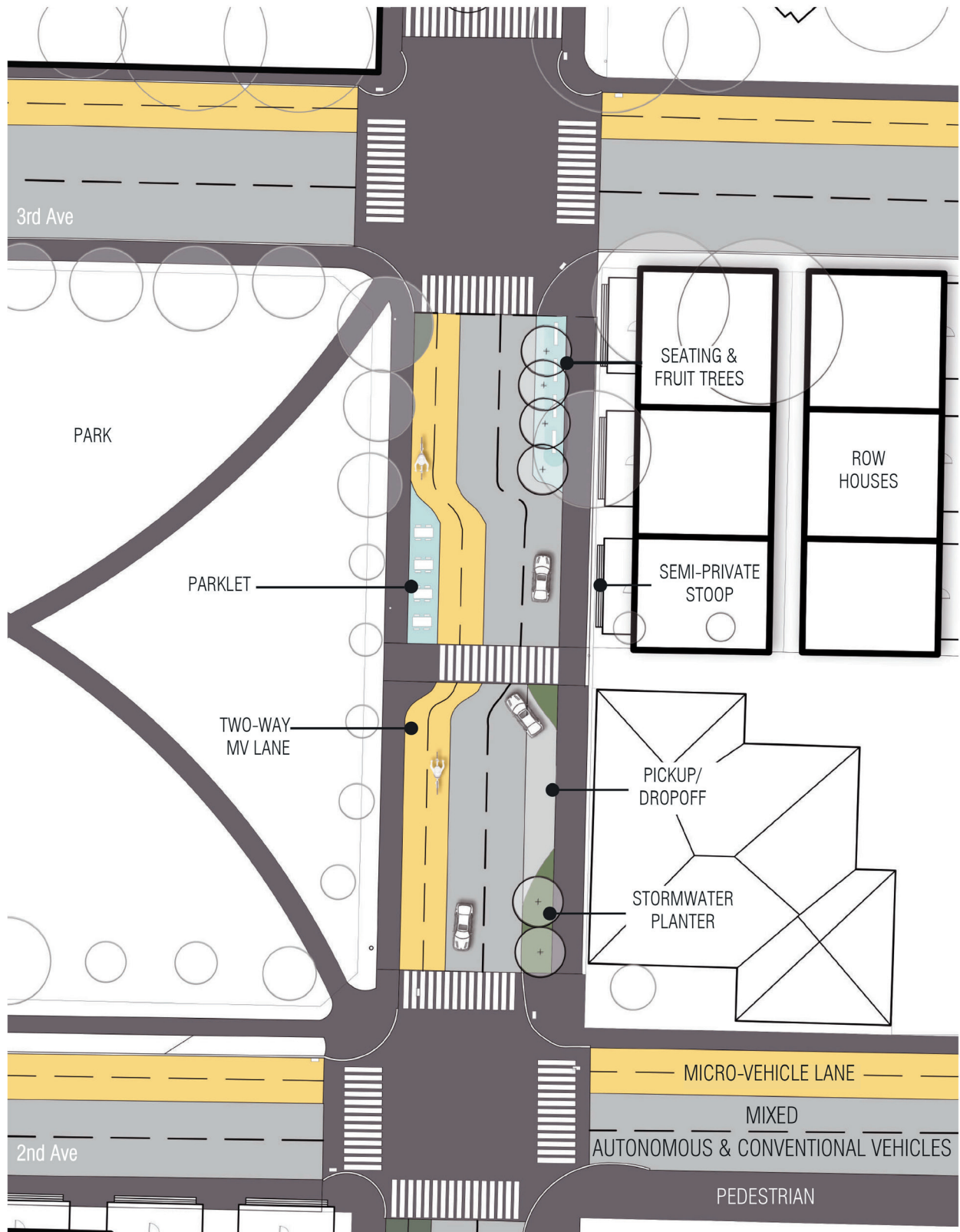
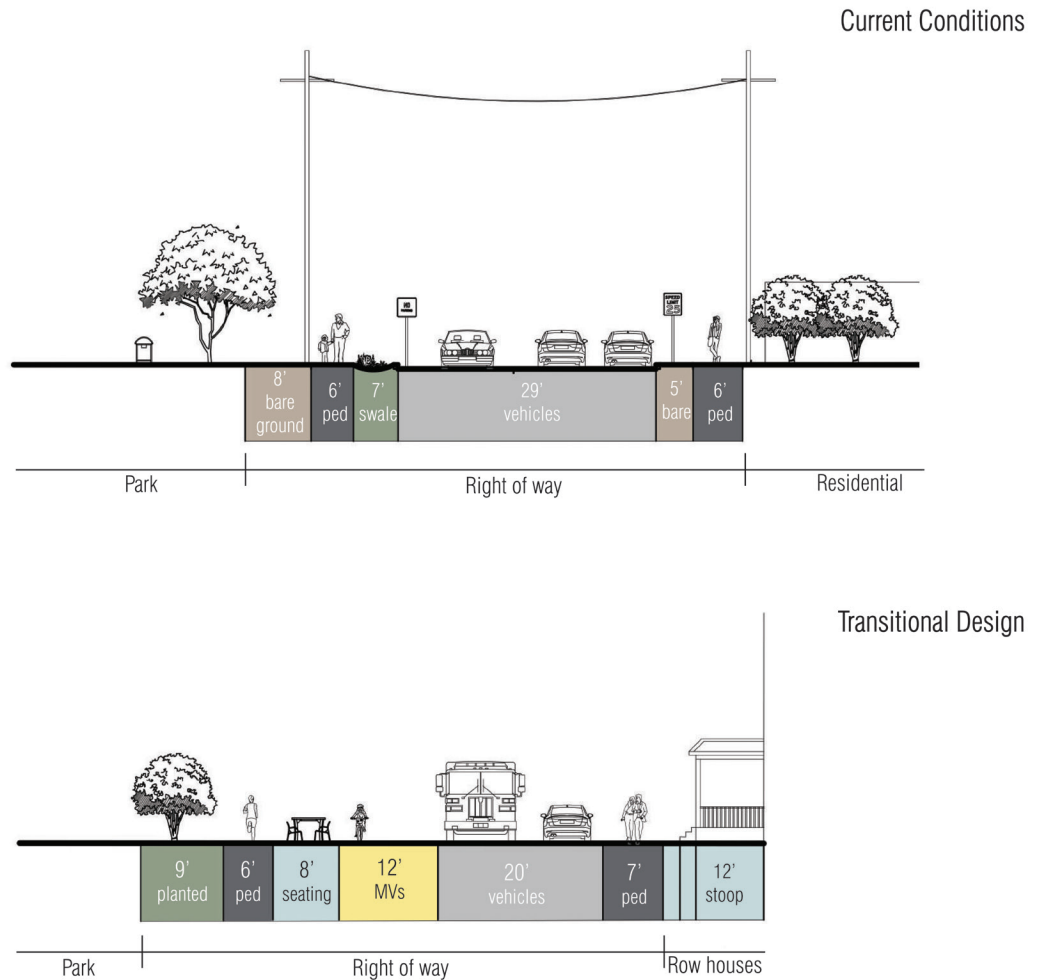


FIG. 42
Transitional design of the "Restful Park" zone

RESTFUL PARK - 2ND TO 3RD AVE



The focus of this block is the park, which can cater to pedestrian and micro-vehicle experience. Rerouting the micro-vehicle lane into the park creates a unique opportunity for people wanting to pass through to work. There is also MV parking for those who want to stay on the street. The reroute creates a seating area for food carts that line the street that can be shaded and set back from the street.

On the east end are proposed row houses that have semi-public front porches that face the park and a play space for kids. Though the AV lane is adjacent to public green space and seating, trees and shrubs can create a visual barrier.

FIG. 43

A typical section of the Restful Park zone

Social Hub— NE 3rd Street to NE 4th Street

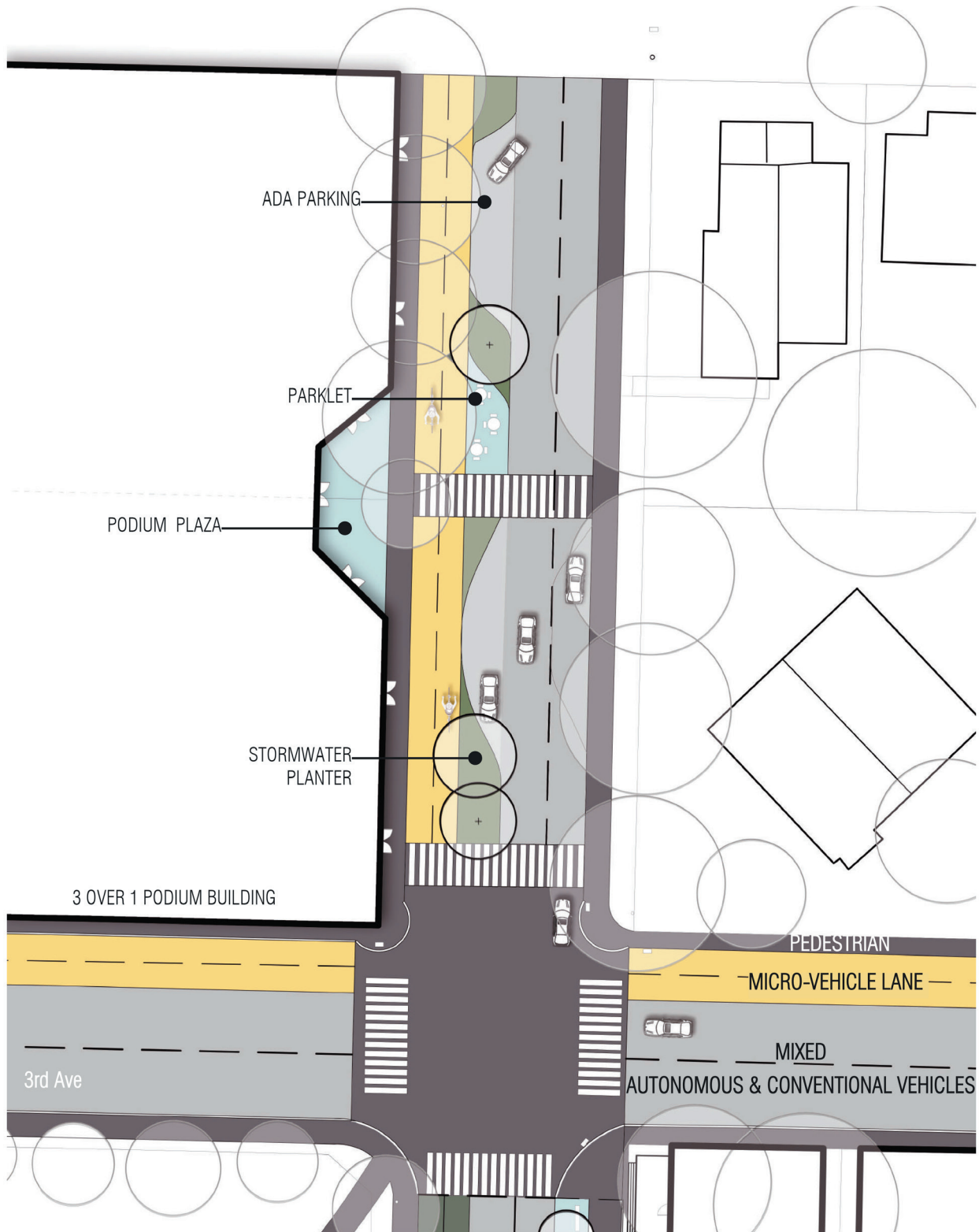
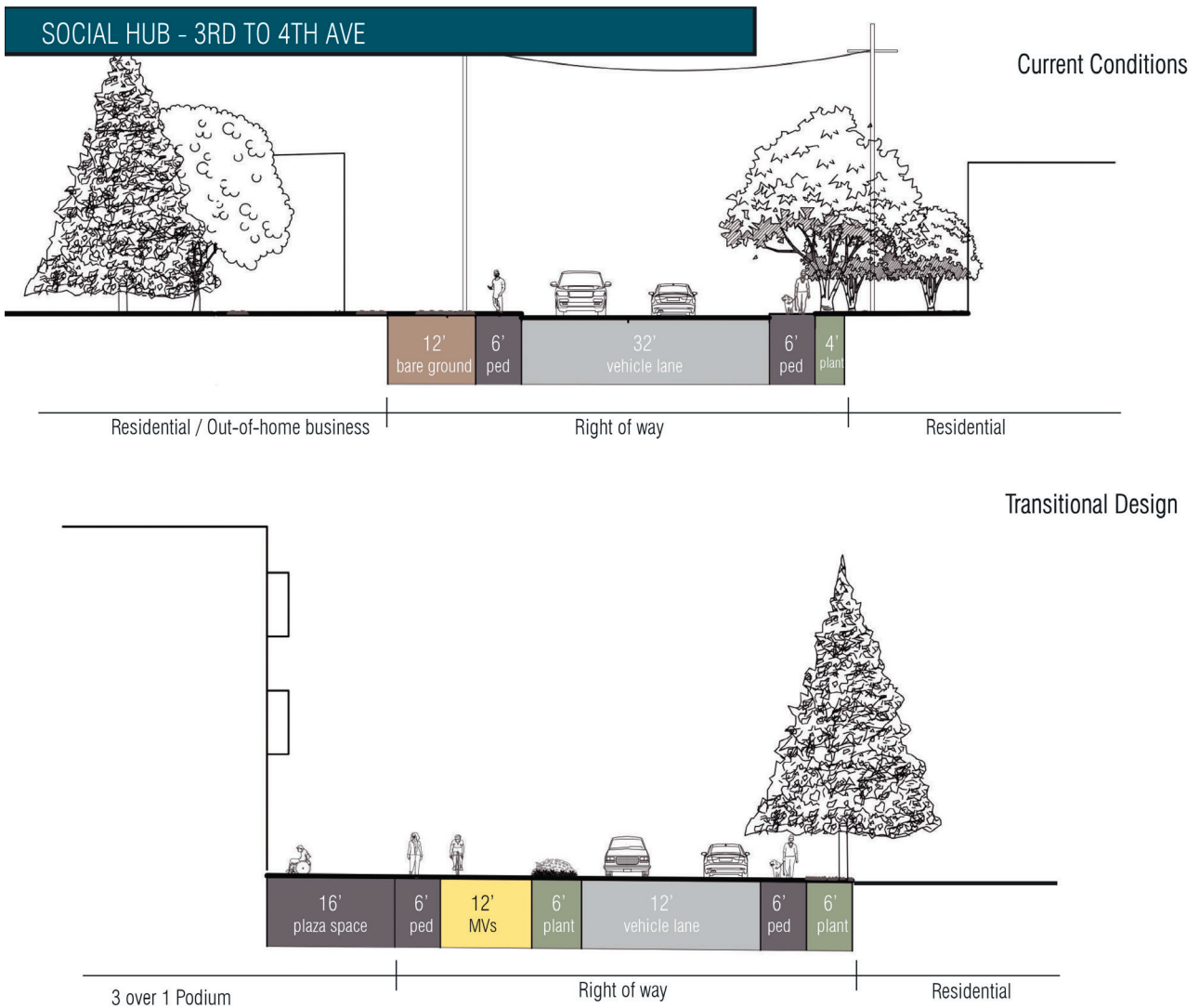


FIG. 44

Transitional design for the "Social Hub" zone



This block has the largest proposed three-over-one podium building. The main entrance is carved out and creates a hub/plaza area that is open to the public. Bar stools and round tables face the street. As this podium building will host many commercial shops and restaurants, there is a designated area for deliveries during certain times of the day, most likely late afternoon.

The MV lane is separated from the AV lane with a central green area that can provide shade and seating or a micro-vehicle parking/charging station. A mini library exchange frames the main crosswalk to the podium building and is a place for neighbors to leave books and borrow as desired.

FIG. 45
Sectional diagram of the Social Hub zone

Long-term Design

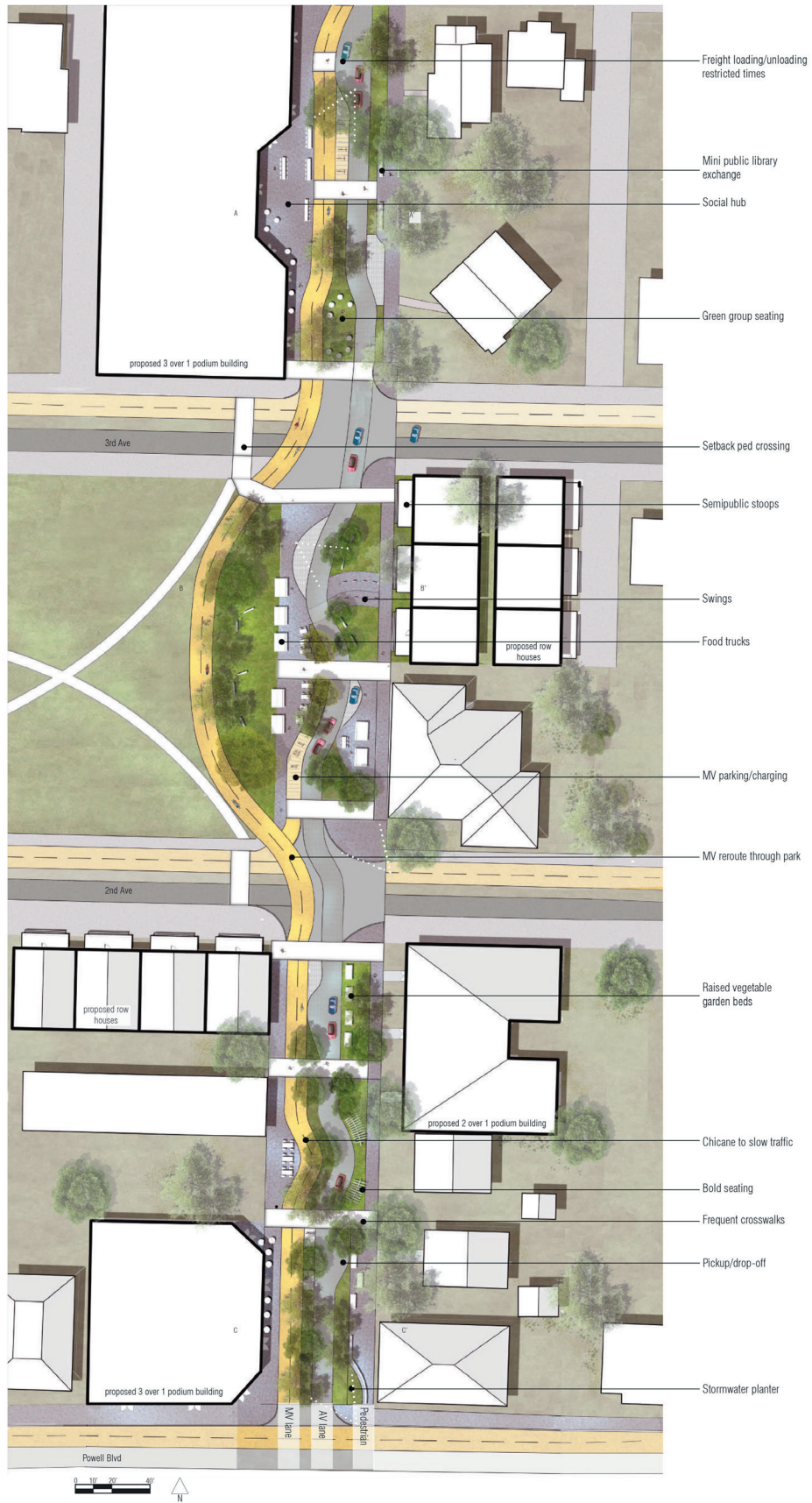
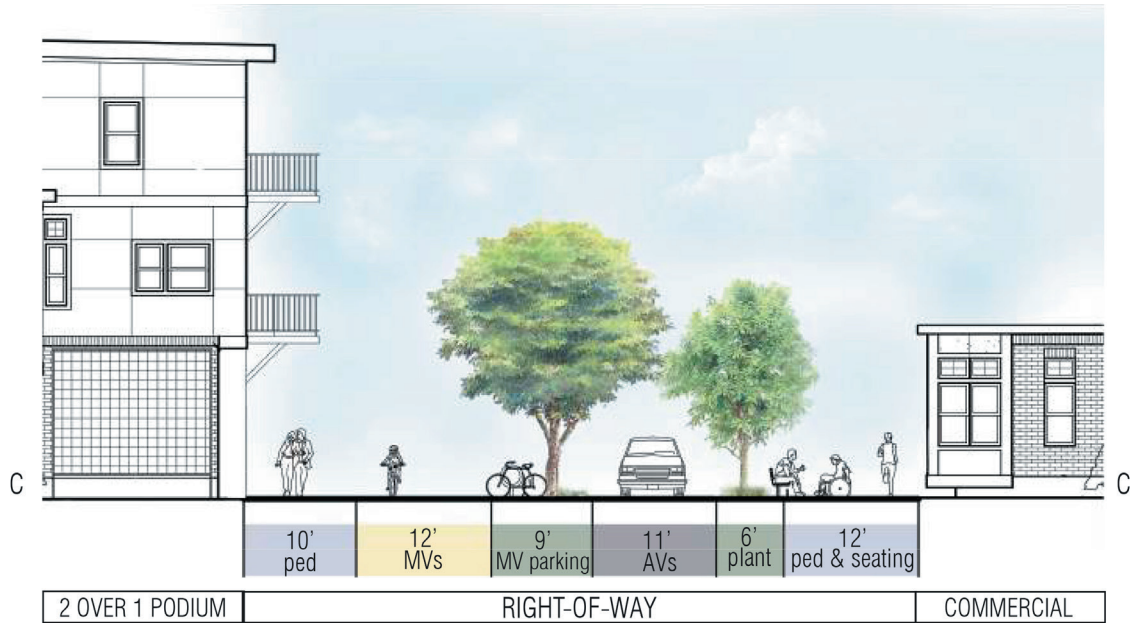


FIG. 46
Long-term design for
South NE Kelly Avenue
from E Powell Boulevard
to 4th Street

Following the transitional design, the long-term design (as illustrated in [Figure 46](#)) continues to explore the transformation of the streetscape based on the initial design parameters. Overall, the reclaimed space that is acquired from the narrowing of the road is utilized for additional seating, pedestrian space, and green infrastructure such as stormwater planting. The design also further articulates the form of the street through creative integration of chicanes, and rerouting of the micro-vehicle lane through the Gresham Arts Plaza. These interventions are discussed more in the following pages.

FIG. 47
Section view (top) and aerial view (bottom) of Gradual Approach zone



Turning onto NE Kelly Avenue from E Powell Boulevard is a slow entrance with a dense canopy cover. Podium buildings offer seating for resting and conversation. Micro-vehicle parking allows last mile connections for residents of the block commuting on public transportation. The wide walkway on the east side of the street has plenty of space for pedestrians to walk or sit, as well as passing space for self-driving robotic delivery of groceries or other packaged goods.

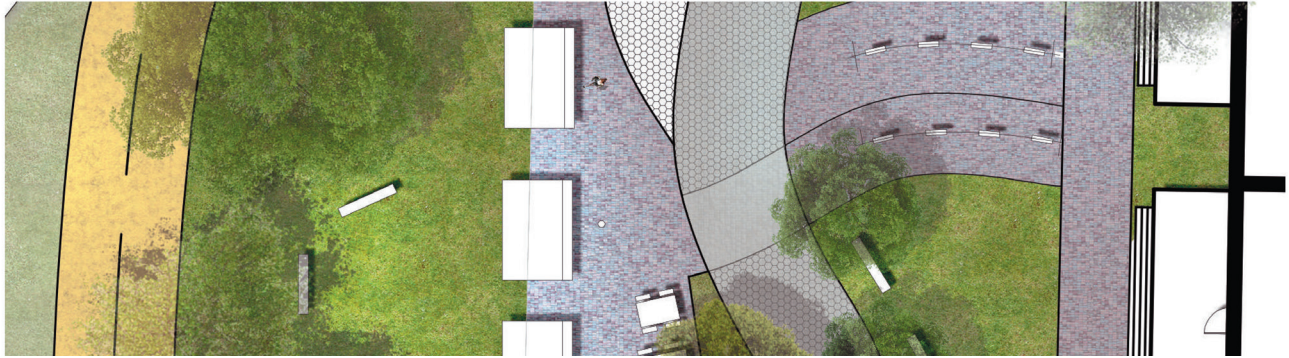
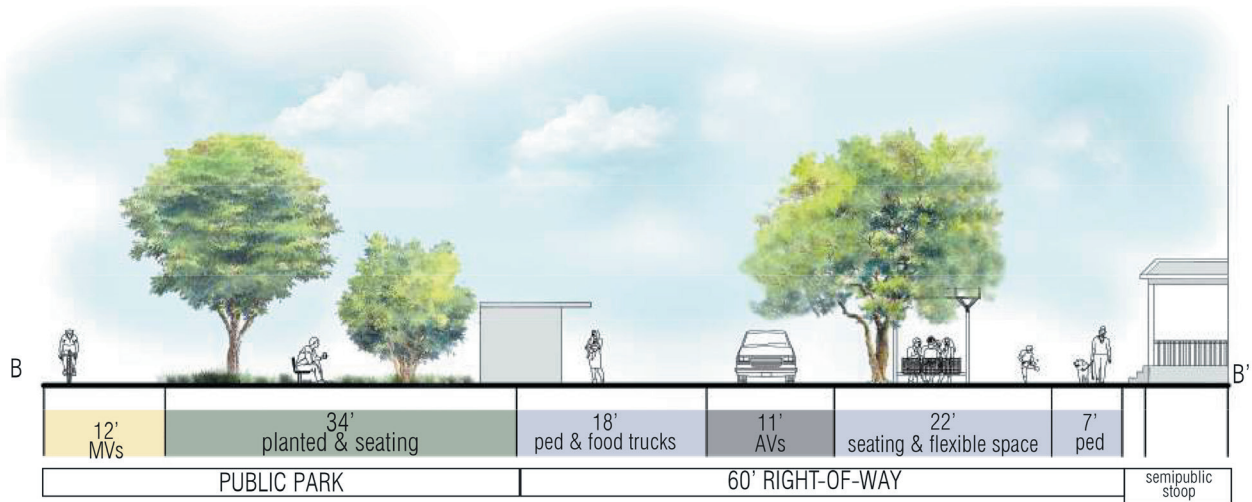


FIG. 48
Section (top) and aerial (bottom) views of the public park and the social space in the Restful Park zone

The park block reimagines the borders of the right-of-way with a dominance of social pedestrian interactions. The micro-vehicle lane has been rerouted off Kelly Avenue through the park for an enhanced, quick through-traffic experience. The right-of-way is lined with food trucks that have shaded seating area behind them as well as tables and chairs in front for a more bustling experience. A play area across the short crosswalk has swings and several places for parents and other to have eyes on children for safety. Benches and semipublic stoops face the swings, and AV lanes travel at a maximum 10 mph and can easily detect motion in the road.



This semi-public hub in front of a new proposed podium building is an expanded pedestrian space with plenty of places to sit and talk or watch others pass by. The space is owned by the podium building but encourages anyone to use the space. The adjacent two-way micro-vehicle lane is a flush, accessible surface that is clearly distinguished by its different color and texture. These lanes are protected by a green strip that allows a sense of independent travel for bicyclists, scooters, etc. and creates a permeable surface to slow rainwater runoff. The pedestrian walkway on the east side is bordered by a small library-share and seating area and is connected to the plaza space by a wide crosswalk with a clear change of texture and color.

FIG. 49
 Section (top) and plan (bottom) views of the proposed podium building and expanded pedestrian space in the Social Hub zone



FIG. 50
Rendering of the
streetscape in front of
the proposed podium
building

The proposed podium building has a host of restaurants and shops on the first floor and offers a covered semi-public plaza with tables, chairs, and bar stools to watch the day pass. The adjacent two-way micro-vehicle lane is flush with surrounding surfaces for accessibility, but it has a distinct color and texture. Both sides of the street crossing are lush with plants and trees that create a cool microclimate in the hot summer months. Autonomous vehicles slow far in advance, so pedestrians are not disturbed. On the other side of the street are shelves of a public library exchange on the way to the food carts down the street.

NE 4th Street to NE 7th Street

REBECCA CRUZE

CONCEPTS

The following initial concepts inform the design for North Kelly Avenue

Update technology for autonomous vehicles, stormwater management, and street accessibility

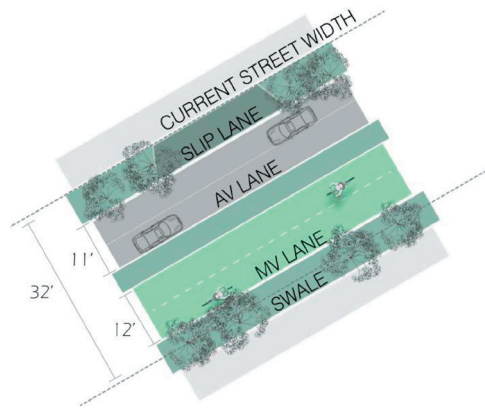


FIG. 51
Diagram of street interventions that would need to be made to facilitate future modes of transportation

Reorient edges of the private sector to welcome, engage, and incorporate street life

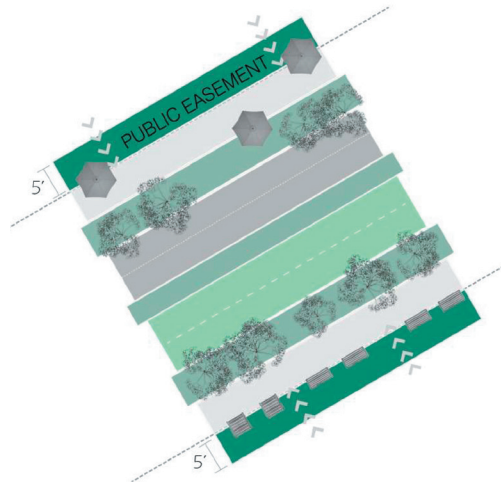


FIG. 52
Diagram showing potential interventions on public easements

Activate by providing activity hubs, comfortable resting spots, and community gathering.

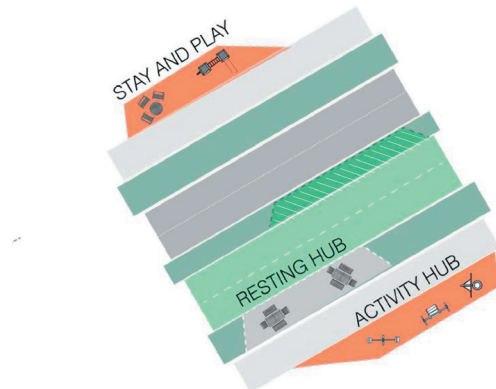


FIG. 53
Diagram of active and passive recreation hubs that could be provided along the street

Based on the concepts as illustrated above, the design for north NE Kelly Avenue from NE 4th Street to NE 7th Street aims to reimagine NE Kelly Avenue as an activated, vibrant, and social place. Paying attention to thresholds into the street, the design proposes creating key experiences along the streetscape in the form of social hubs and resting spots, integrating emerging technology and infrastructure technology into the street, and an increase in the permeability between public and private sectors to encourage people watching and social interaction.

These concepts are further elaborated as key design principles as follows:

DESIGN PRINCIPLES

The key principles that guided the design are as follows:

Provide a welcoming and distinctive gateway to Gresham to enhance tourism and community pride.

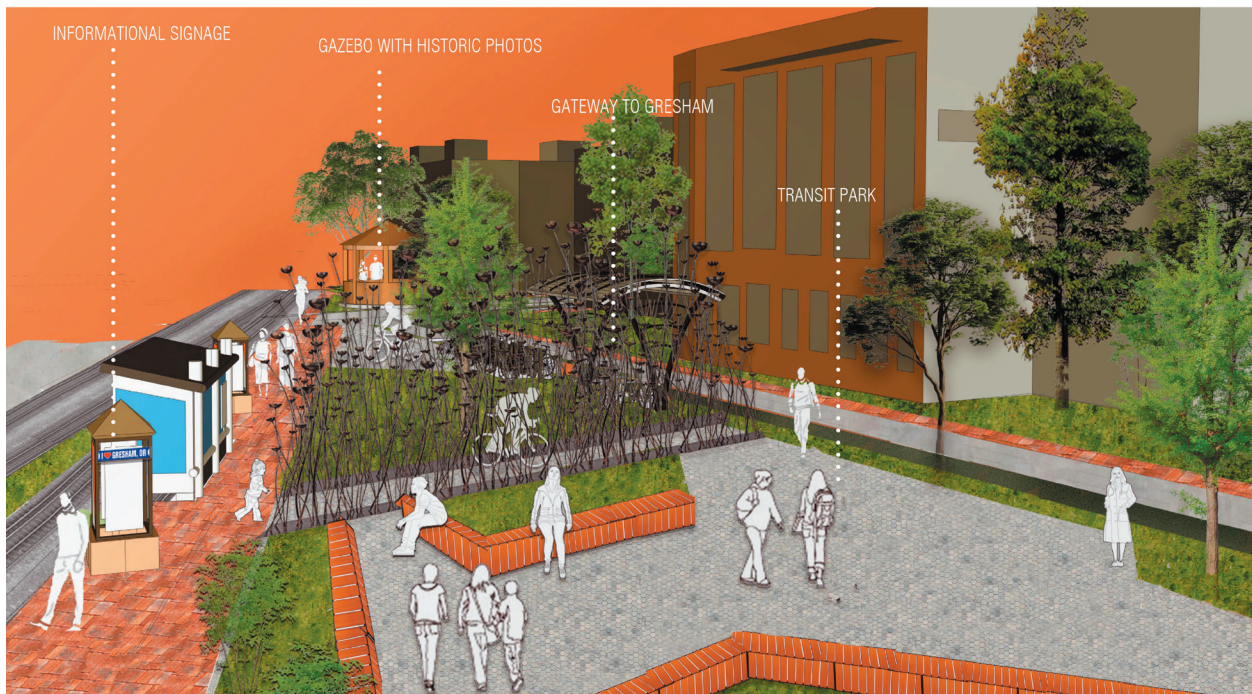


FIG. 54
Rendering of proposed interventions at NE Kelly Avenue and NE 7th Street near the Gresham Transit Center MAX Station

Gresham's gateway can include memorable structures such as a gathering gazebo covered space, iconic structures, information kiosks, transportation rentals, and social seating areas. This area can be built next to the transit rail.



Create hubs within reclaimed street space and intersections to enhance social activation through interactive installations and playful public amenities.

Voids of a minimum of 20 square feet can be carved out for planter beds, or public spaces such as outdoor gyms, seating areas, and local art exhibits. This space can act as a hub for the newest technology, iconic features of Gresham, and local culture.

FIG. 55

Perspective illustrating how reclaimed spaces can be used for public activities, landmarks, and emerging technology



FIG. 56

Perspective view illustrating the use of public easements for seating, play, and commercial purposes.

Establish a five-foot public easement to encourage permeability between the public and private sector, and provide public areas for people watching. Within residential zones, five feet of private land will be designated for seating, low plantings, or play space. Within commercial zones, five feet of private land will be designed for public engagement and can be utilized as an extension for commercial uses. No fences are authorized over three feet.

Design Proposal

North NE Kelly Avenue is divided into three zones: a community-oriented zone, a social media-oriented zone, and a transit-oriented zone.

FIG. 57

Aerial view of the three subzones along north NE Kelly Avenue



Each zone is briefly described below. These characteristics remain fairly similar moving from the transitional to the long-term design.

Community-Oriented Zone

This zone is comprised of residential development with two-story rowhouse units. Here, umbrella-shaded walks, public stoops, planters, and public play zones activate the streetscape and make it a vibrant and social community space.

Social Media-Oriented Zone

This zone features more commercial-centric developments. Some notable features include semi-public commercial plazas, eating spaces, and bump back spaces with seating amenities.

Transit-Oriented Zone

The transit-oriented zone would be developed as the gateway to Gresham, featuring memorable structures such as gazebos, information kiosks, and a park developed for transit users.

TRANSITIONAL DESIGN

The transitional design features a traditional two-way road on the east half of the avenue, and a two-way micro-vehicle lane on the west. Three-foot green medians divide the street into the lanes while also providing stormwater services. Rows of trees also provide environmental service as well as aesthetic benefits. Several drop-off zones are provided on each side of the street and on both ends of each block.

FIG. 58

Transitional design for NE Kelly Avenue from NE4th Street to NE 7th Street

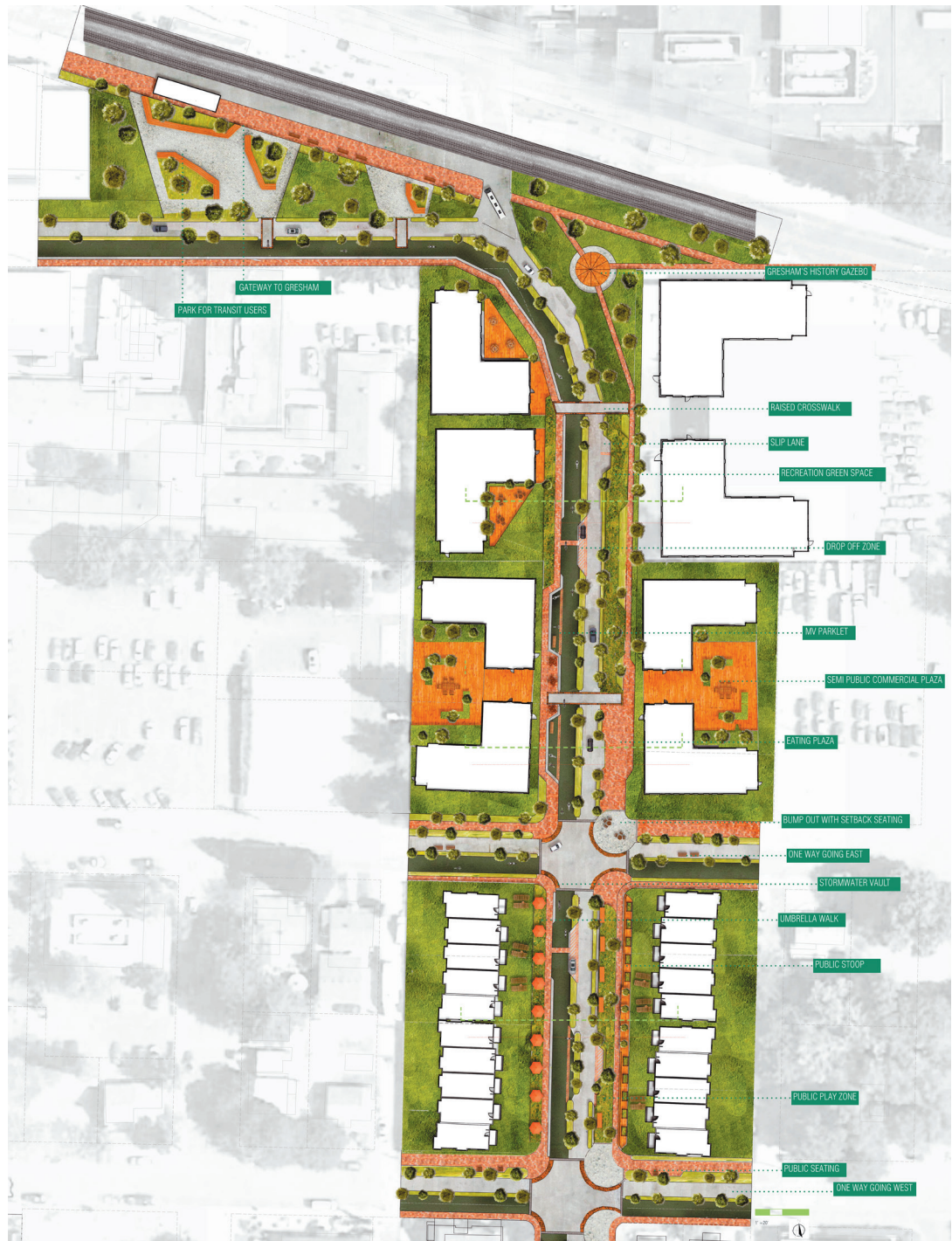


LONG-TERM DESIGN

The long-term design proposes further development on all remaining properties, residential development in the community-oriented zone, and more commercial development in the transit-oriented zone. The two-way traffic lane is narrowed down to a single, 11-foot-wide, two-direction traffic way for AV, CT, and AJ with passing siding. Reclaimed space is utilized for public recreational green space. This central park allows people waiting for transit or ride-hailed vehicles to enjoy a natural space while they wait. The development of Gateway to Gresham, a park for transit users, is another notable addition.

FIG. 59

Long-term design for NE Kelly Avenue from NE 4th Street to NE 7th Street

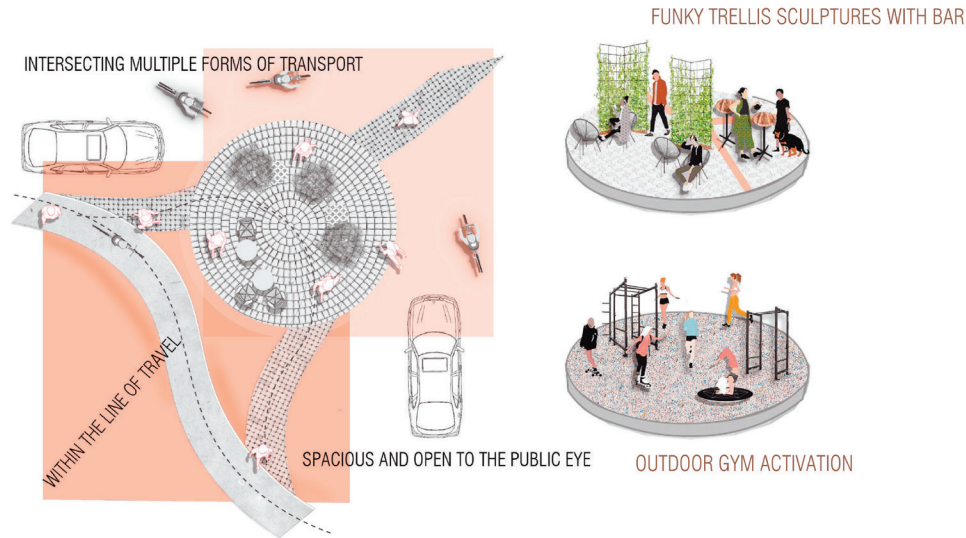


DESIGN DETAILS

Approach for public activation

Public space may be activated by opening up the street to multiple forms of transportation including pedestrian usage. Public amenities such as trellis sculptures, bar tables, and seating can further help to create a sense of place and provide opportunities for leisure. Outdoor gyms can help provide a social gathering space for active recreation and exercise.

FIG. 60
Various interventions activate the street as public space (top and bottom)



Approach for quiet borders

Protective walls or hedge plantings can help create a buffer between the road and the sidewalk. Shading devices, seating, and aesthetic planting can further activate borders and street thresholds.

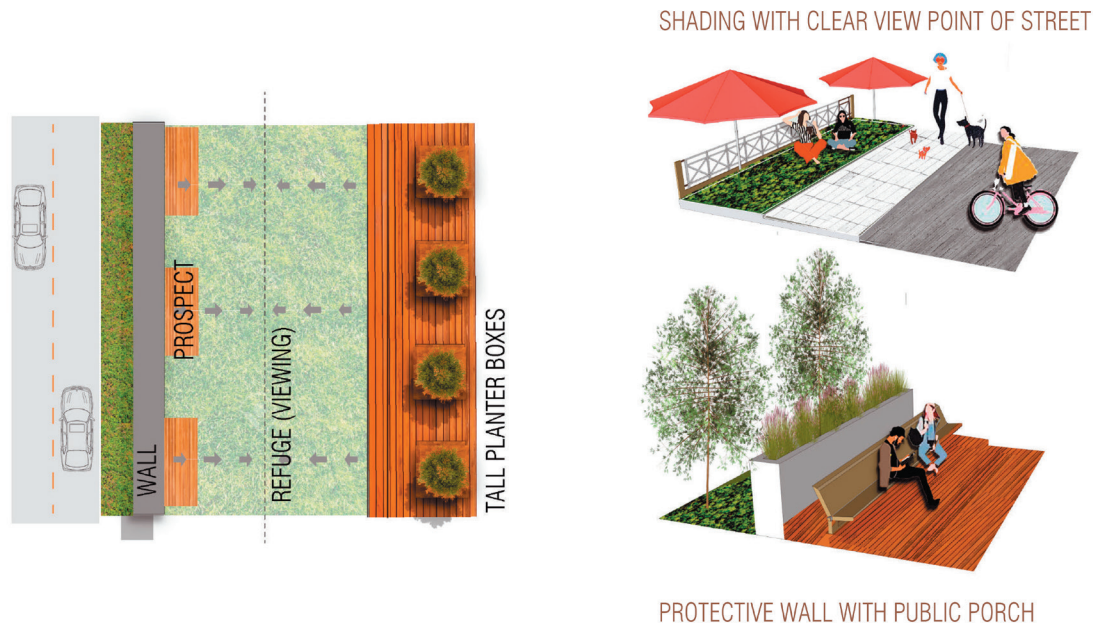


FIG. 61

Explorations of creating gathering spaces

Approach for gathering spaces

Smaller hubs with ample flexibility and accessibility help create a network of gathering spaces throughout the streetscape. Art installations, central water features, vibrant paving patterns, and outdoor heating can further anchor these places as community foci.



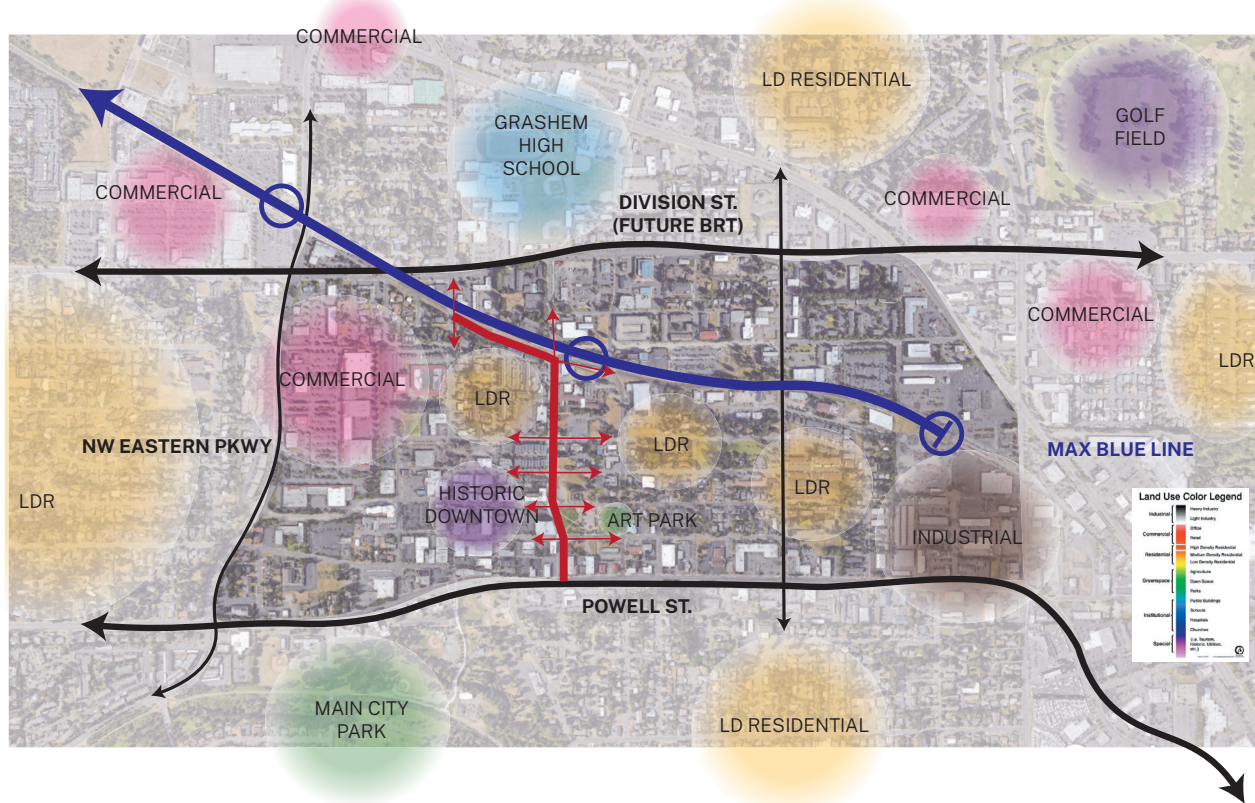
DESIGN SUMMARY

The two designs for north and south NE Kelly Avenue together create a strong vision for NE Kelly Avenue. While each design is unique, a common theme has been to focus on the transition into and from the study area, whether through creation of landmark structures or through street control mechanisms such as chicanes. The designs have also equally focused on creating unique experiences in this last-mile street, with subcategorized zones each having their own design qualities. Other recommendations are to increase opportunities for social interaction through semi-stoop developments and flexible social hubs with interactive installations along the street, and to increase permeability in between the public and private realm by establishing public easements and providing public areas for people watching.

Pathway to Hood

WILLIAM LIEN AND JESSE SERKIN

STUDY AREA



INITIAL DESIGN PARAMETERS

Concept: High volume last mile to and from light rail station. Three- to four-story residential podium buildings with little or no parking introduced in all adjacent parcels with current improvement to land value ratios less than 2.0.

Transitional, mixed vehicle type design:

- On-street parking reduced by 50 percent from current conditions
- One 20-foot-wide, two-lane, two-way traffic way for CV, AV, MV, AJ, BY, and CT
- One or two four- to 12-foot-wide pedestrian sidewalks
- Reclaimed space used for creative purposes: parklets, stormwater, planters, bike parking, etc.

Rationale: All traffic is slow and mixed in wide directional lanes in a smaller street.

Long-term, no conventional vehicle design:

- On-street parking reduced by 90 percent from current conditions
- One 16-foot-wide two-direction traffic way for AV, CT and AJ with turnout passing slip ways

FIG. 62

NE Hood Avenue study area from E Powell Boulevard to NE 10th Street

- Two 6-foot-wide each-way traffic lanes for MV and BY
- One or two four- to 12-foot-wide pedestrian sidewalks
- Reclaimed space used for creative purposes: parklets, stormwater, planters, bike parking, etc.

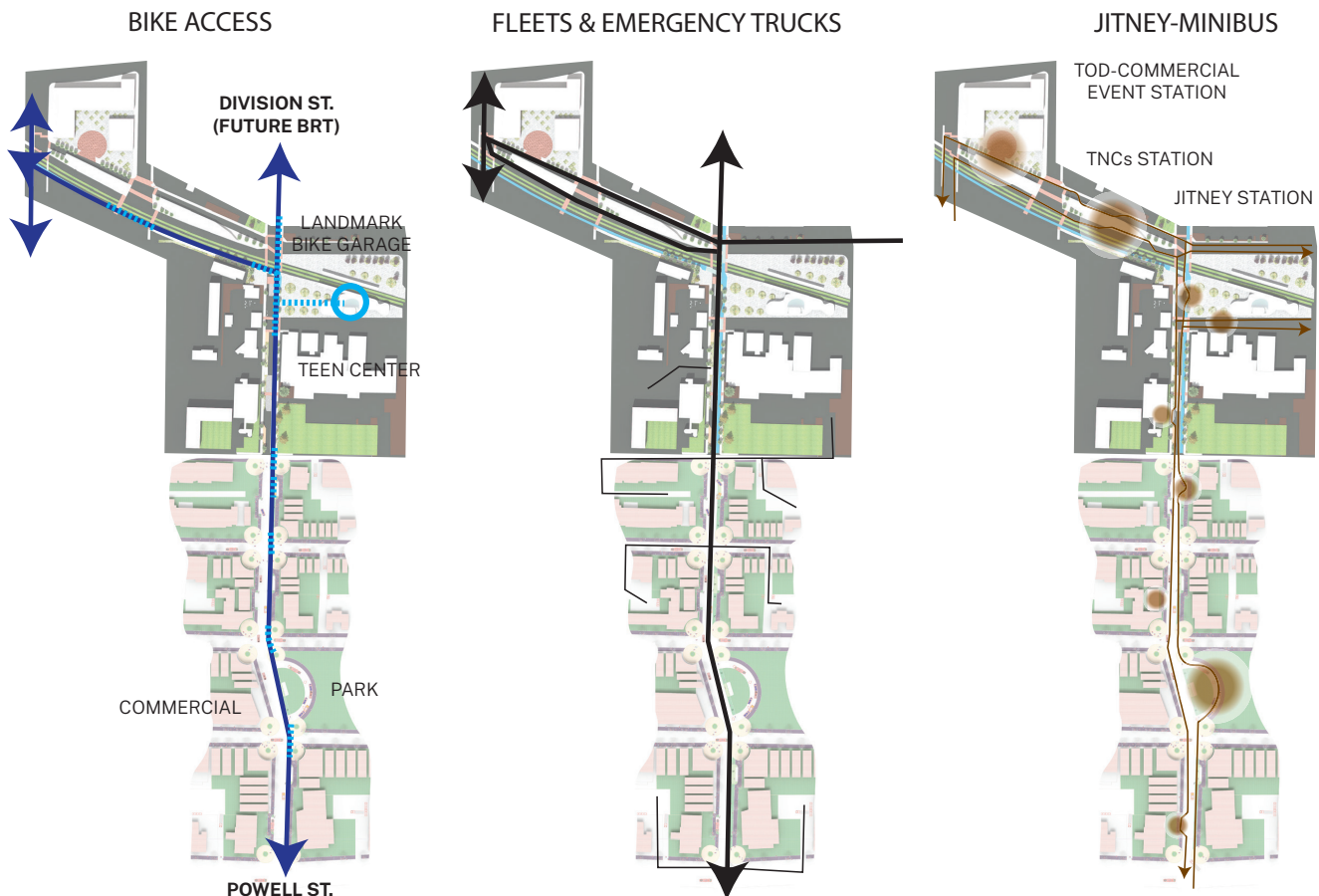
Rationale: Narrow “smart-passing” lanes for AV and separate safe lanes for slower micro-vehicles.

DESIGN PRINCIPLE

This design stays true to the original objective of creating a last mile to and from the light rail station. NE Hood Avenue is redesigned to create a cohesive connection from Powell Boulevard to a jitney, MAX, or similar future transportation station. Developments will include mixed density residences near Powell Boulevard and high density residences towards NE 10th Street. The design proposes more transit-oriented development towards NE 10th Street and housing-oriented development towards Powell Boulevard. The streetscape is redesigned to include integrated green infrastructure features, as well as other features such as chicanes, safe crosswalks, dedicated bike lanes, etc. Drop-off and pick-up points and transportation routes are developed across the stretch of the street.

FIG. 63

Routes and drop-off/pick-up points for different modes of mobility along the length of the study area



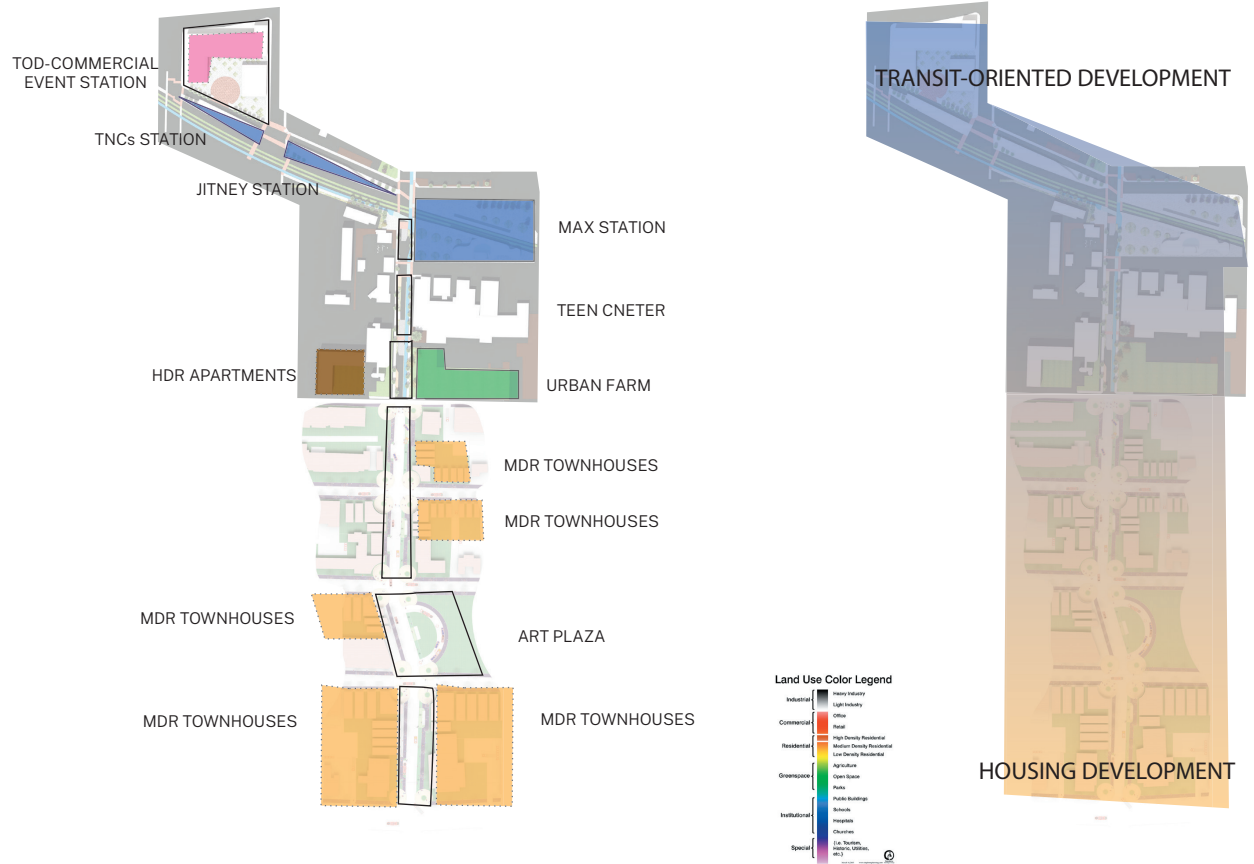


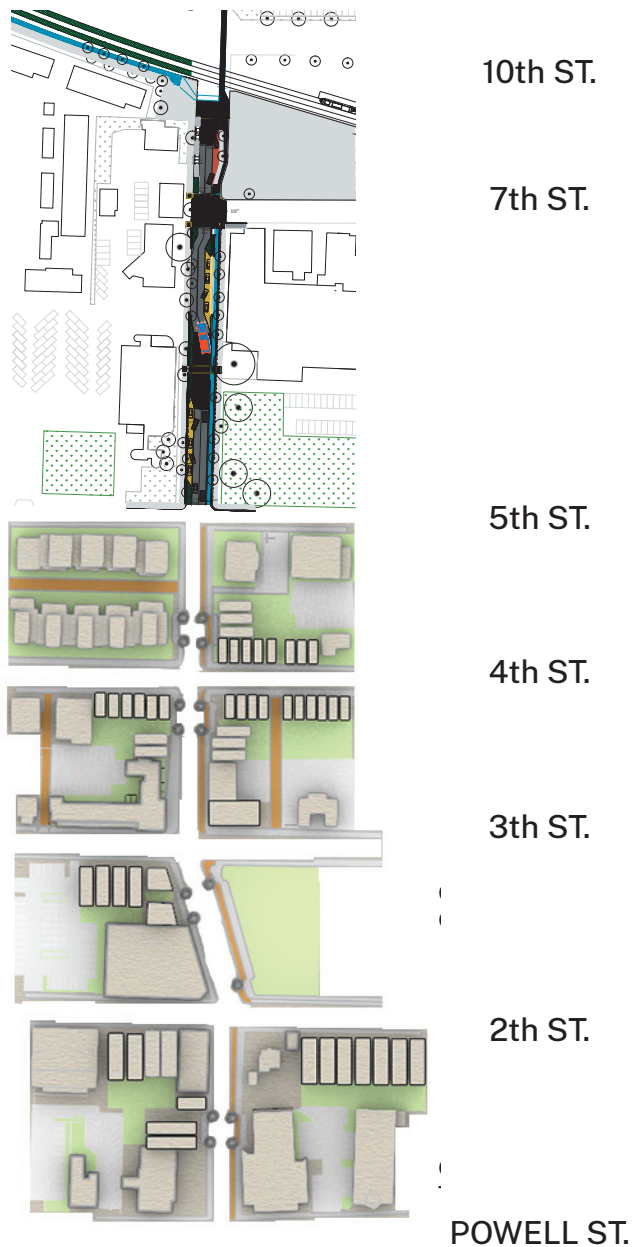
FIG. 64
Diagrams of proposed development across the study street

DESIGN PROPOSALS

Transitional design

The initial transitional design proposes development of townhouses near the south end of NE Hood Avenue, with accompanying development of parking spaces to cater to the increase in density. Similarly, more green space in the form of backyards and planter strips along the streetscape is proposed. In terms of the street and mobility, the transitional design proposes a six-foot dedicated micro-vehicle lane, a 20-foot-wide bi-directional lane, and eight-foot pedestrian paths on both sides. Slip lanes, cross-street connections, and street markings and distinguishing texture changes are provided across NE Hood Avenue.

FIG. 65
Hood Avenue study
area transitional design

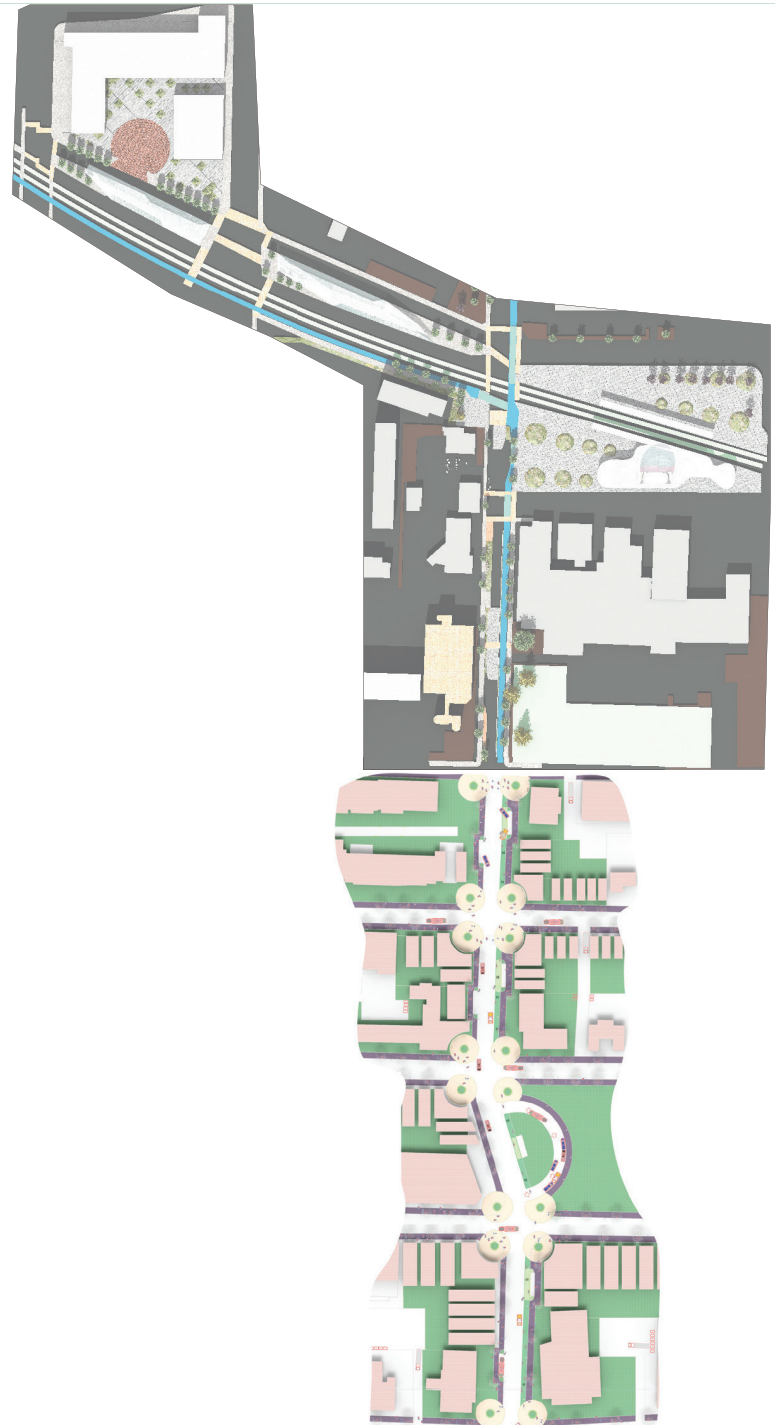


Long-Term Design

The long-term design proposes an overall increase in residential density with more development along NE Hood Avenue. Two eight-foot sidewalks provide pedestrian connection across NE Hood Avenue, while a 10-foot lane is proposed as a dedicated bike lane. This iteration is marked by an increase in the number of loading zones along the jitney routes and an increase in micro-vehicle parking. Similarly, curb extensions, art installations, and drop-off areas are further developed and integrated into the streetscape. Planters are situated near street intersections and provide a safety buffer from the main vehicle road as well as stormwater management functions.

FIG. 66

NE Hood Avenue study area long-term design

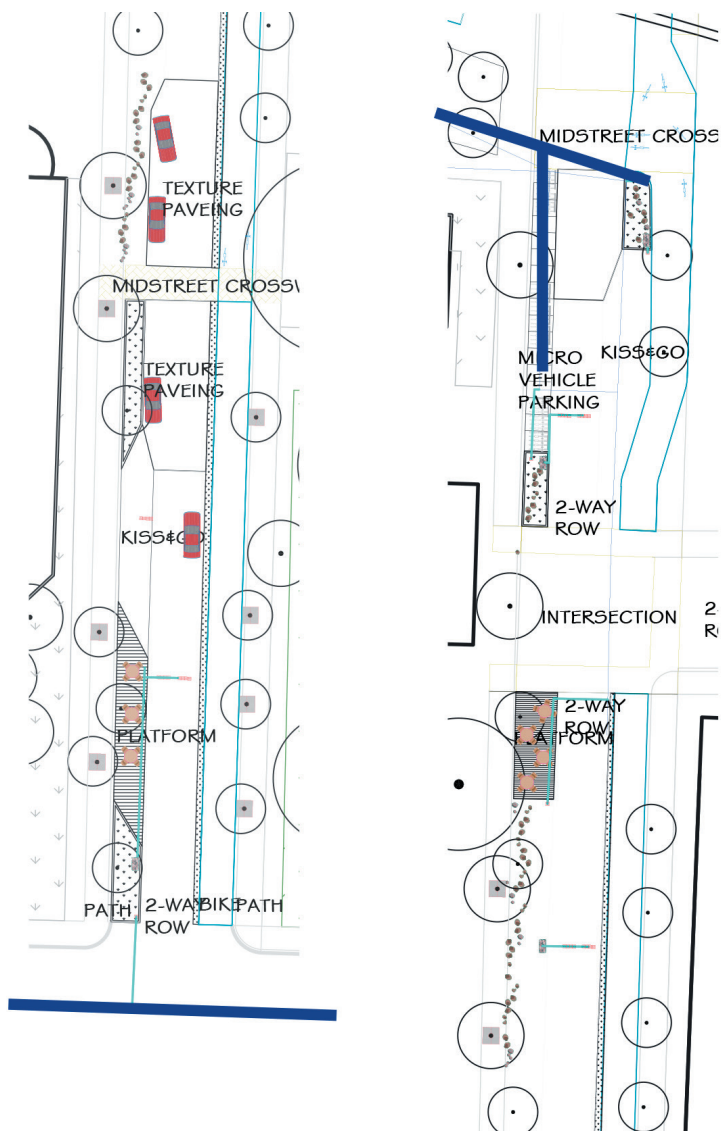


DESIGN DETAILS

Stormwater Strategy

Interventions in the form of added permeable green space and stormwater planters at strategic locations augment the existing stormwater management capabilities of NE Hood Avenue. Here, trench drains and road gradients are used to direct the surface runoff to designated stormwater planters. The outflow connects to existing drainage systems.

FIG. 67
Diagrams of stormwater management system in the study area



NATO: Table Crosswalk example

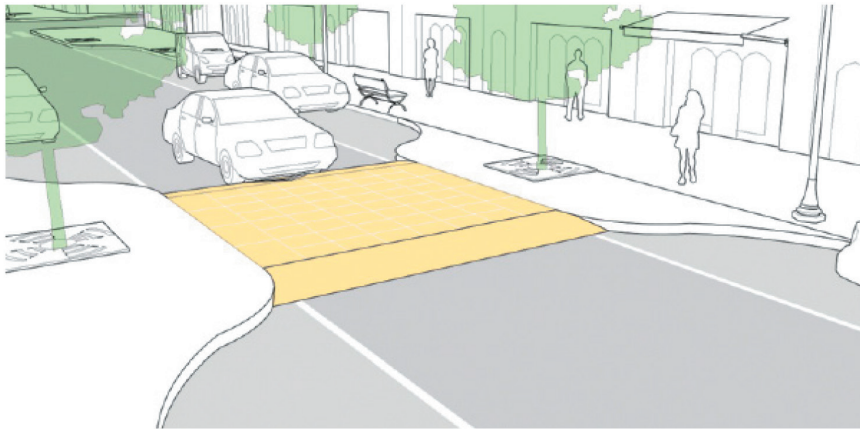
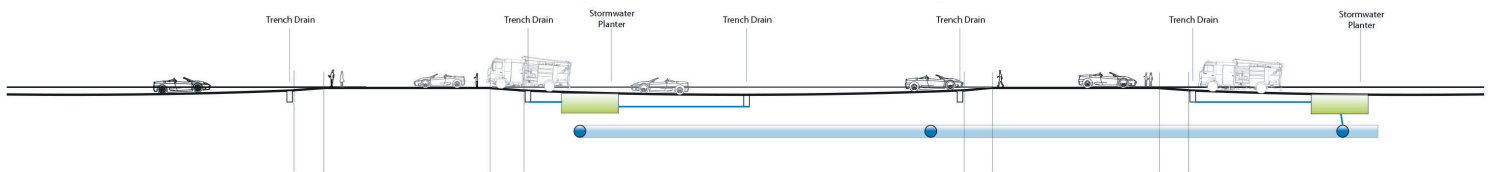


FIG. 68

Diagrams of stormwater management system in the study area

All crosswalk are tabled to slow down traffic flow

Drainage Cross-Section Diagram



DESIGN SUMMARY

This design follows through the initial design parameters of establishing a high-volume last mile street. The design proposes establishing drop-off/pick-up points and establishing dedicated lanes for different modes of mobility across the street to facilitate the high volume of traffic. Interventions such as art installations, parklets, and intersection treatments are encouraged to create places for social interaction and an active public life. The design places a strong focus on safety and accessibility. Here, the design proposes utilizing tabled crosswalks, distinct paving textures between different lane uses, planting buffers, and street dividers at appropriate locations.

The students propose residential development towards Powell Boulevard and transit-oriented development towards NE 10th Street. In the residential development, their design proposes townhouses with shared backyards, increased green spaces, and parking spaces. The transit-oriented development includes interventions such as bike garages, food stands, and public plazas.

The Future of NE 2nd Street: Redesigning for Autonomous Vehicles, Micro-Vehicles, and Ridesharing of the Future

NADIA DE LA TORRE AND REBECCA KIEFER

FIG. 69

Rendering of design interventions at block two between NE Kelly and NE Elliott Avenues.



FIG. 70 (BOTTOM)

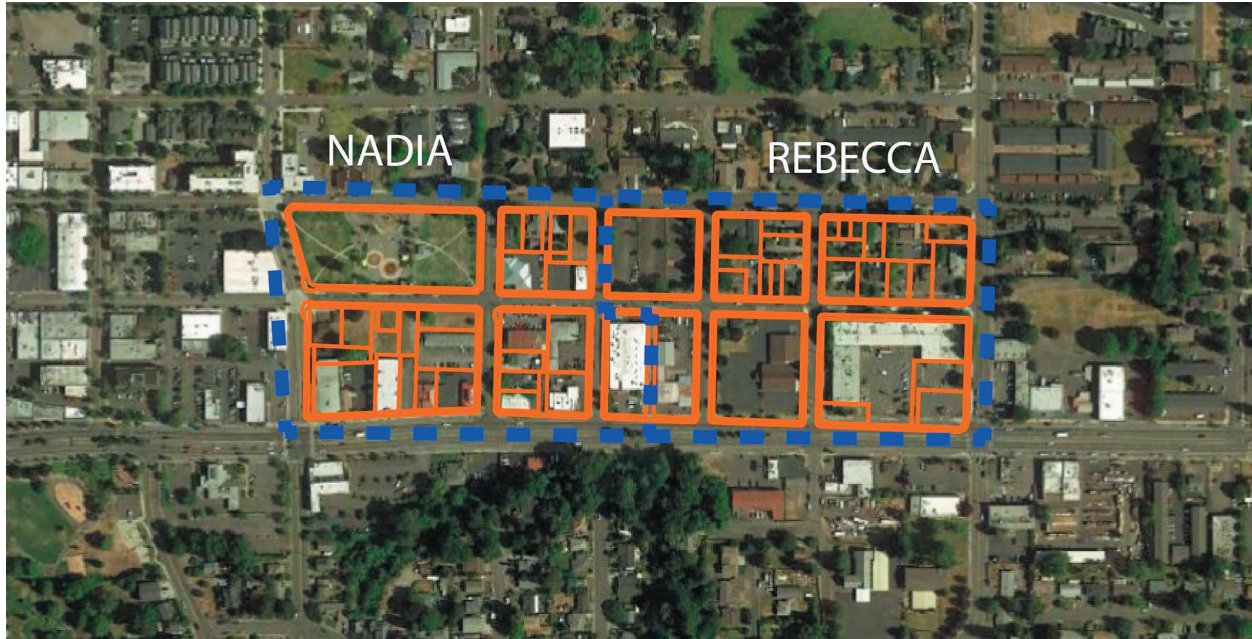
Aerial view of the NE 2nd Street study area

STUDY AREA



PROJECT DIVISION

The project was divided between two students as show below.



INITIAL DESIGN PARAMETERS

Concept: Alternative throughway for AV and MV paralleling conventional Powell Boulevard. Three- to four-story residential podium buildings, with little or no parking, introduced in all north-side parcels with current improvement to land value ratios less than 2.0. Mixed-use four- to six-story commercial/office/residential buildings with some parking introduced on all south-side parcels with current improvement to land value ratios less than 2.0.

FIG. 71

Division of the project between the two students

Transitional, mixed vehicle type design:

- On-street parking reduced by 50 percent from current conditions
- One 20-foot-wide, two-lane, two-way traffic way for CV, AV, MV, AJ, BY, and CT
- One or two four- to 10-foot-wide pedestrian sidewalks
- Reclaimed space used for creative purposes: parklets, stormwater, planters, bike parking, etc.

Rationale: All traffic is slow and mixed in wide directional lanes in a smaller street.

Long-term, no conventional vehicle design:

- On-street parking reduced by 70 percent from current conditions
- One 16-foot-wide, two-direction traffic way for AV, CT, and AJ
- Two four-foot-wide each-way traffic lanes for MV and BY
- One or two four-to ten-foot-wide pedestrian sidewalks
- Reclaimed space used for creative purposes: parklets, stormwater, planters, bike parking, etc.

Rationale: Wide flex lane for service vehicles and many AV with safe lanes for MV.

DESIGN PRINCIPLES

Key principles that guided the design for NE 2nd Street are as follows:

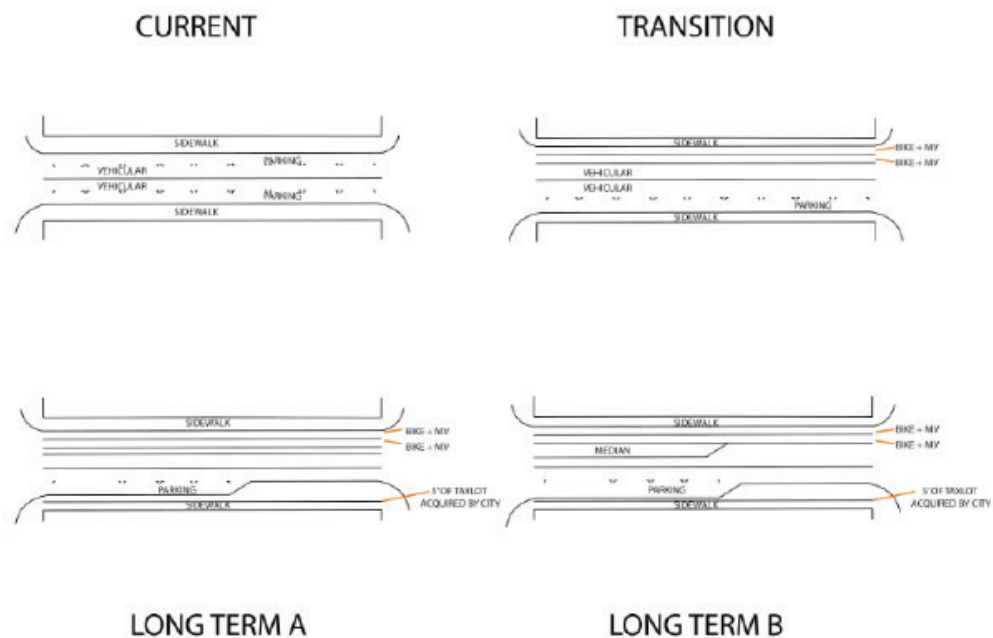
- Replace parking in front of residential and commercial lots with parklets, planters, and plaza space to activate the street and blend public and private space.
- In order to accommodate two-way autonomous vehicles, two-way micro-vehicles, passenger loading or parking, and pedestrian sidewalks, minimum right-of-way width must be 55 feet.
- Provide medians, curbs, and bollards between micro-vehicle and autonomous vehicle lanes to avoid collisions between the two modes. In the transitional design, install “Zebra” or “Armadillo” lane delineators for lane division as they are easy to remove for future development.
- Make material changes in intersections and where modes of transportation change. If pedestrian space and roadway overlap, create a change in pavement color and texture to signal a change in use.
- Provide waiting and turning space for micro-vehicles near intersections at the ends of medians to allow for safe merging into a micro-vehicle lane when traffic volume is high.

DESIGN TEMPLATE

A design template was developed to help guide the design exploration at each block level. Overall, lanes for bikes and micro-vehicles are provided at the north side of the street while the vehicular roadway is positioned at the center with on street parking to the south of the sidewalk.

FIG. 72

Diagram of the design templates that helped guide the design process



DESIGN PROPOSAL

Designs for three of the total five blocks are presented here and illustrate key elements of the overall design proposal for NE 2nd Street.



Transitional Design

The transitional design diverges from the initial design parameters to some extent. While proposing a similar reduction of total on-street parking, the design consists of a 40-foot, two-lane, two-way traffic way for conventional and autonomous vehicles, with separate lanes for micro-vehicles on the north side of the street instead of a single mixed road type. Development, primarily housing, is incremental and distributed throughout the length of the street.

FIG. 73

NE 2nd Street
transitional design



Long-Term Design

The long-term design for NE 2nd Street further explores the creative use of the street. Blocks one and two utilize the “Long Term A” template, while the remaining blocks utilize “Long Term B.” This iteration of the design follows the initial design parameters in the reduction of on-street parking. Here, stormwater planters and green medians are introduced into the streetscape, providing environmental services and aesthetic benefits. Reclaimed spaces are utilized for parklets, public seating, and rest spaces. In the long-term design, development is denser with development on almost all parcels across the street. These are mixed housing developments near NE Hood Avenue and more residential row housing toward NE Cleveland Avenue.

FIG. 74

NE 2nd Street
long-term design

Block One—NE Hood Avenue to NE Kelly Avenue

Objectives for block one include:

- Locate mixed-use podium building with residential above retail across from park to increase park activity and influence business via park visitors.
- Buffer the edge of the park from the street on the north side with seating for gathering and relaxation space.
- Buffer the south side of the street with seating for relaxing and eating in front of a mixed-use building.

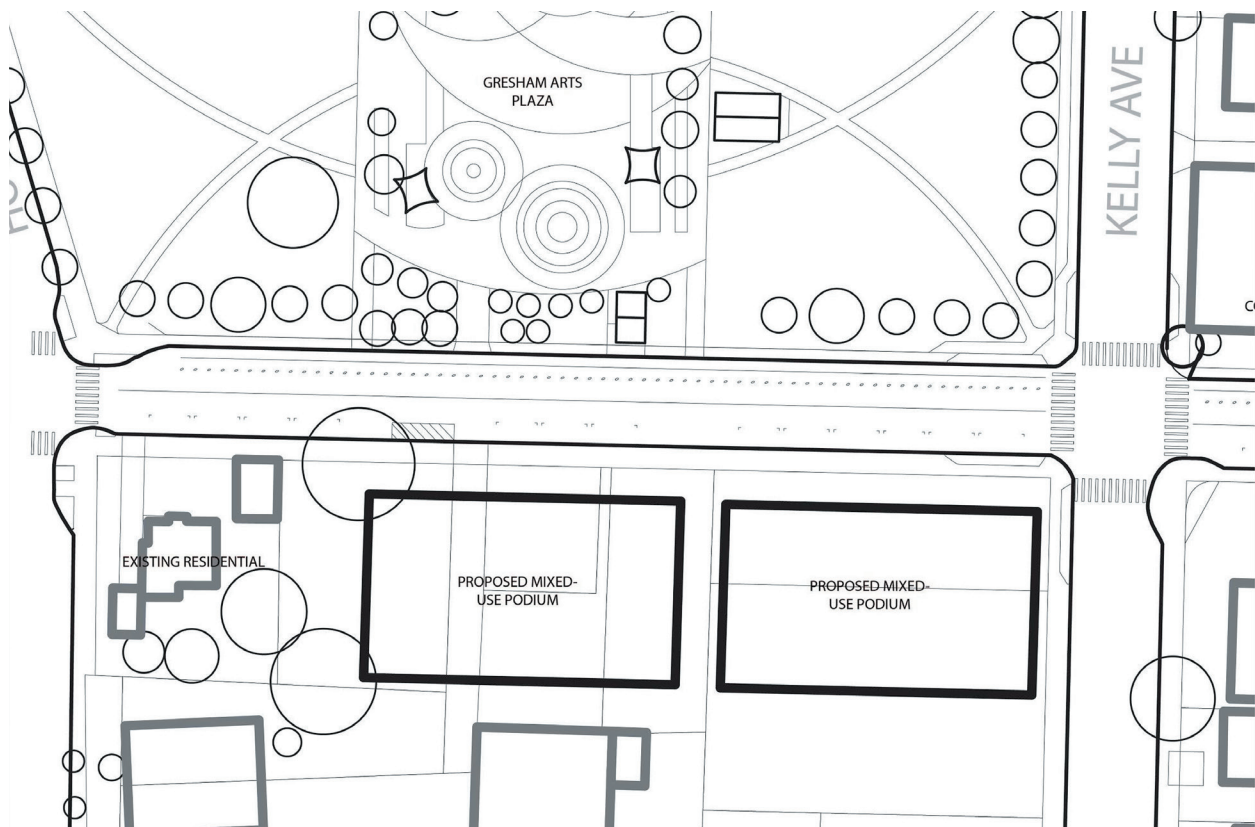


FIG. 75
Block one transitional
design

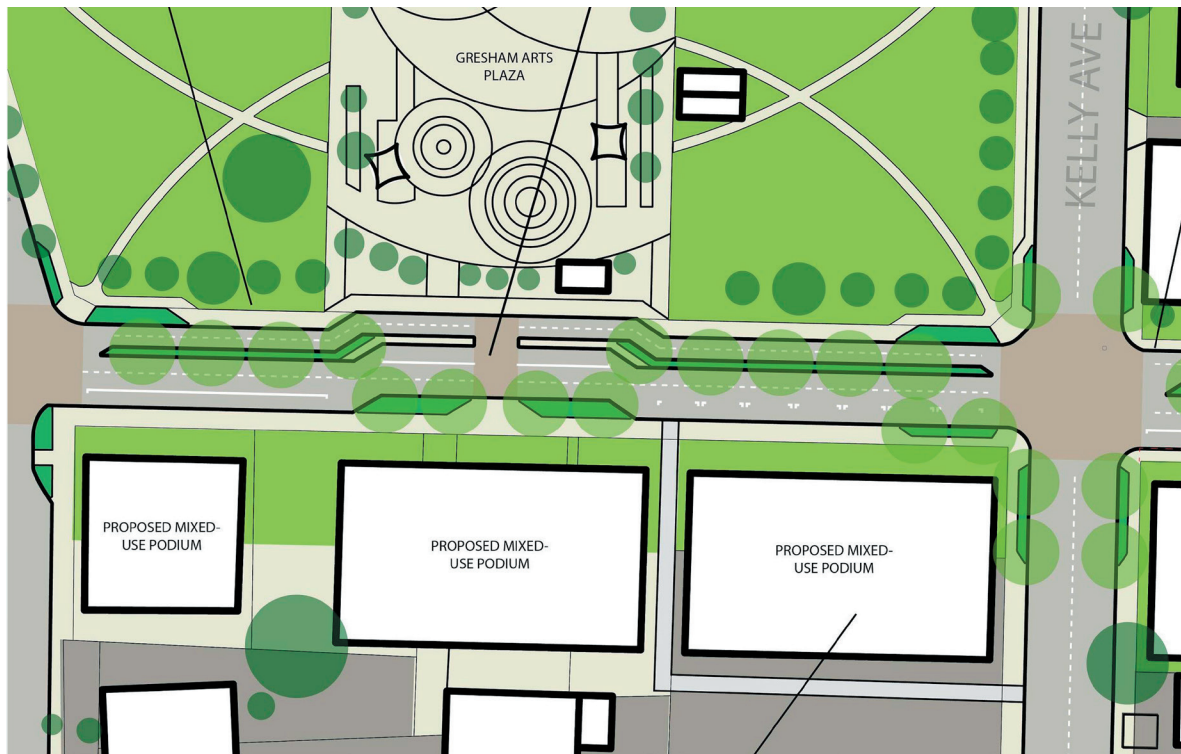


FIG. 76 (TOP)
Block one long-term design

FIG. 77 (BOTTOM)
Block one long-term design street section

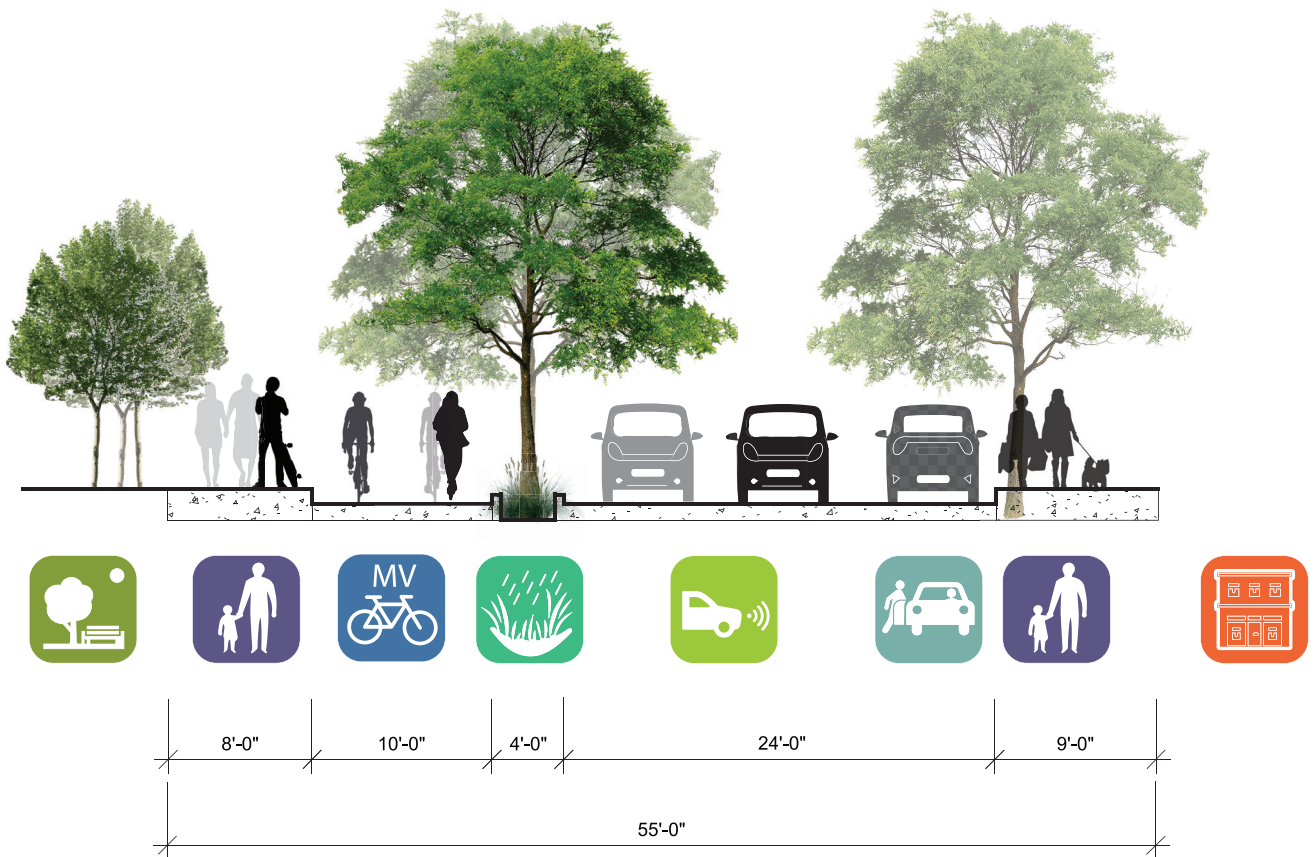




FIG. 78

Long-term design rendering of the crosswalk in front of the Arts Plaza

Block Two—NE Kelly Avenue to NE Elliott Avenue

Objectives for block two include:

- Develop mixed-use podium buildings on south side of street to replace auto-centric businesses within close proximity to block one’s mixed-use podium building and park.
- Provide parking and long-term pullover on south side of street.

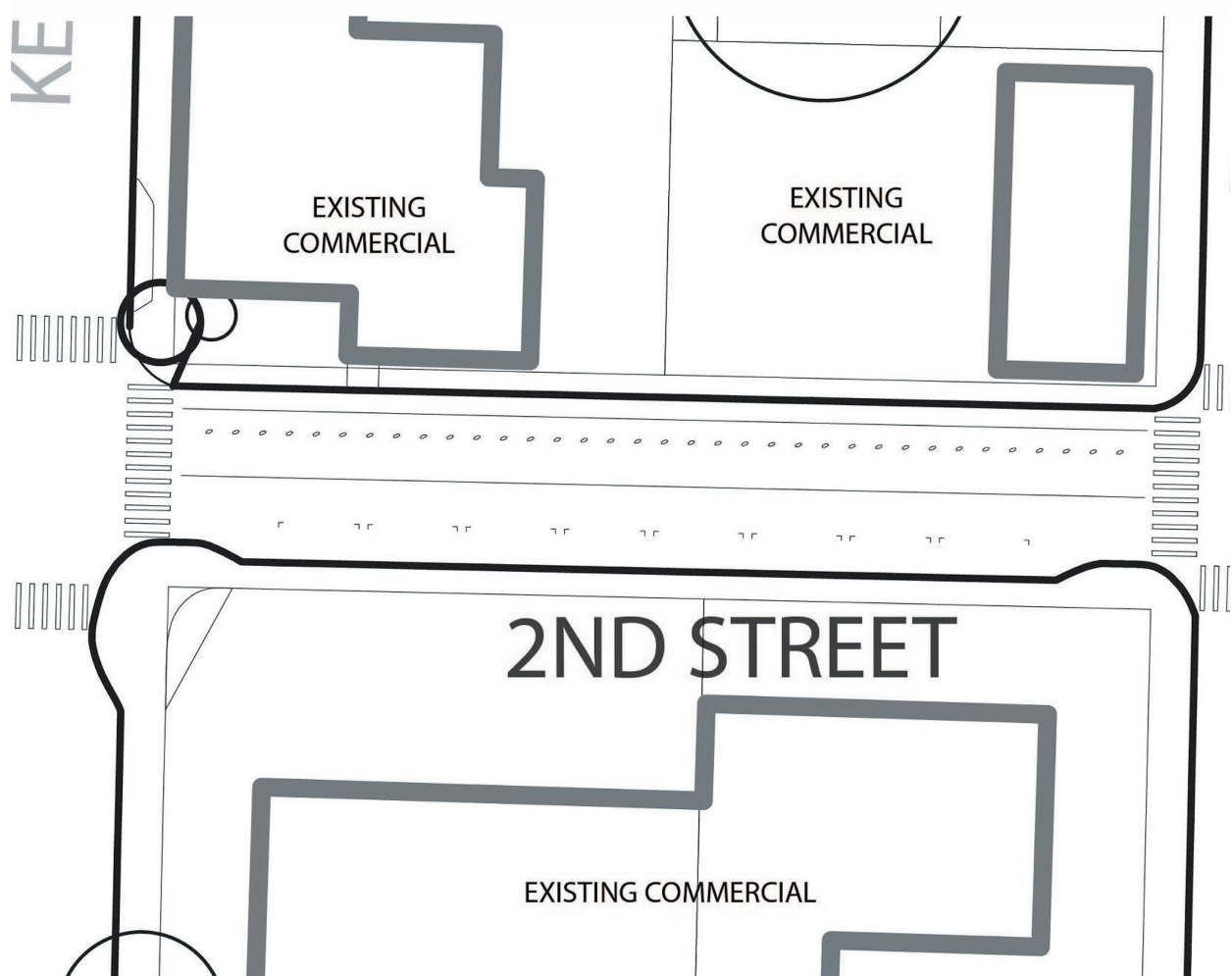


FIG. 79
Block two transitional design

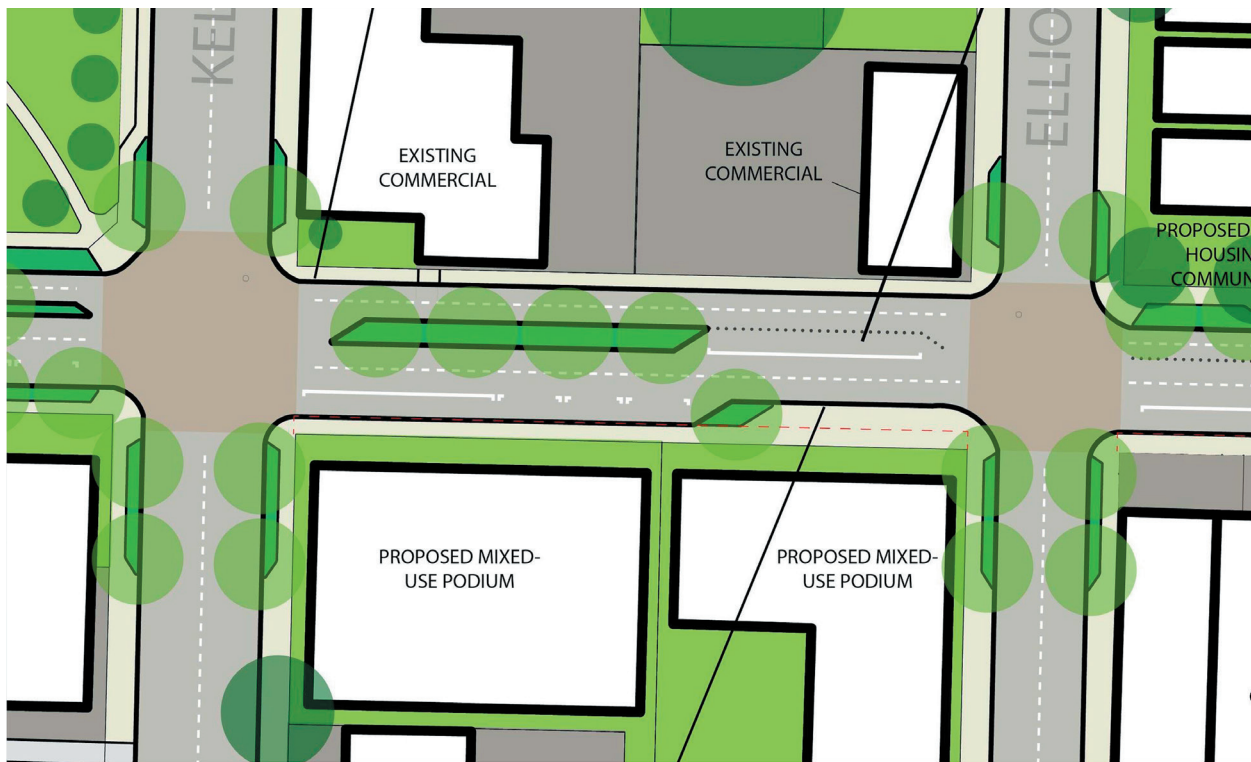


FIG. 80 (TOP)
Block two long-term design

FIG. 81 (BOTTOM)
Block two long-term design street section

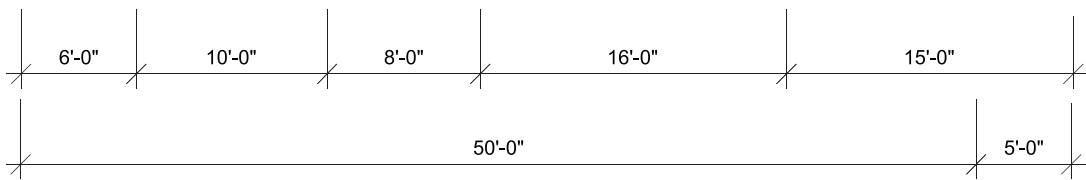




FIG. 82
**Block two long-term
design rendering**

Block Five—NE Juniper Avenue to NE Cleveland Avenue

Objectives for block five include:

- Locate mixed-use building with office or storage space above retail across from row housing to provide easy access to stores and amenities.
- Buffer the edge of the south mall/warehouse with pedestrian plaza space.
- Buffer the edge of the north residences with community-centric space (parklet and 25-foot setback).
- Provide parking and long-term pullover on south/commercial side of the street.

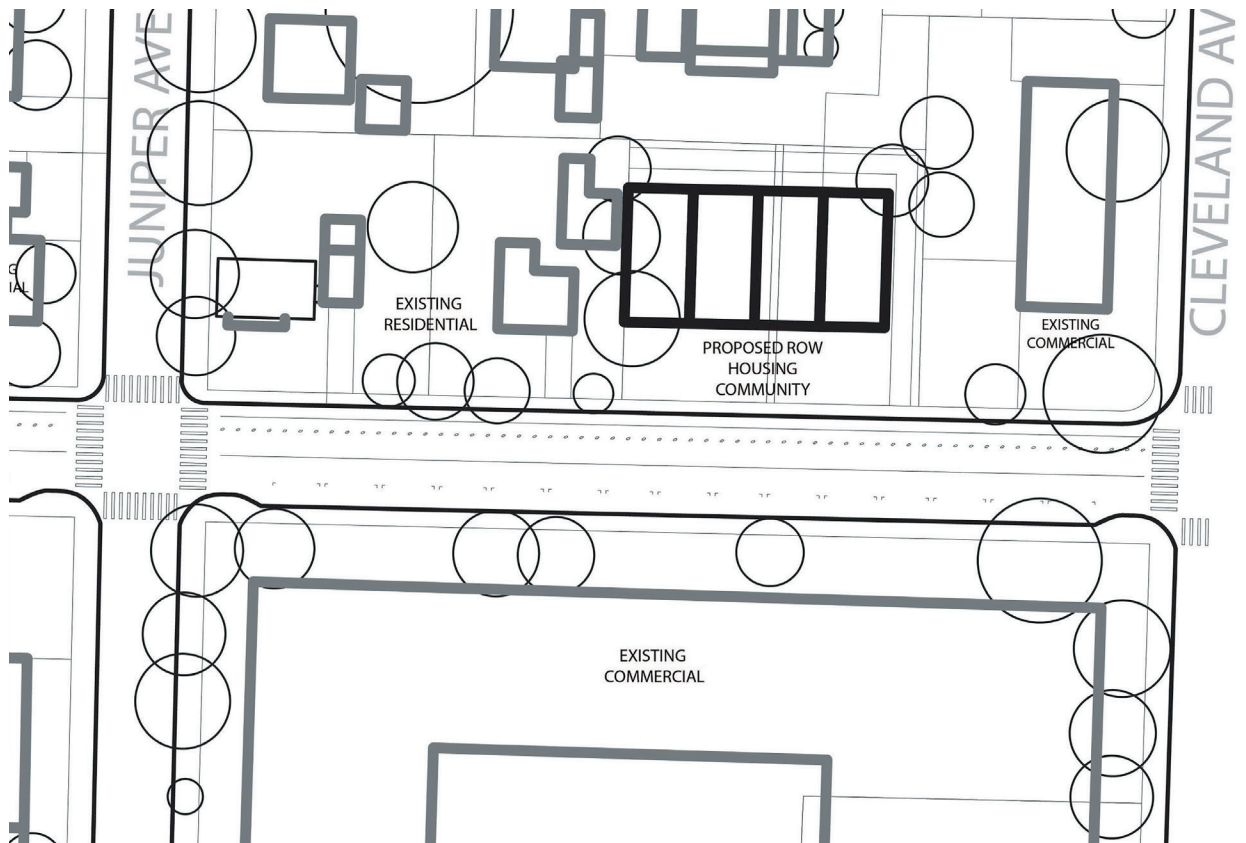


FIG. 83
Block five transitional design



FIG. 84
Block five long-term
design



FIG. 85
Rendering of the
long-term design for
block five showing the
plaza in front of the
roundabout

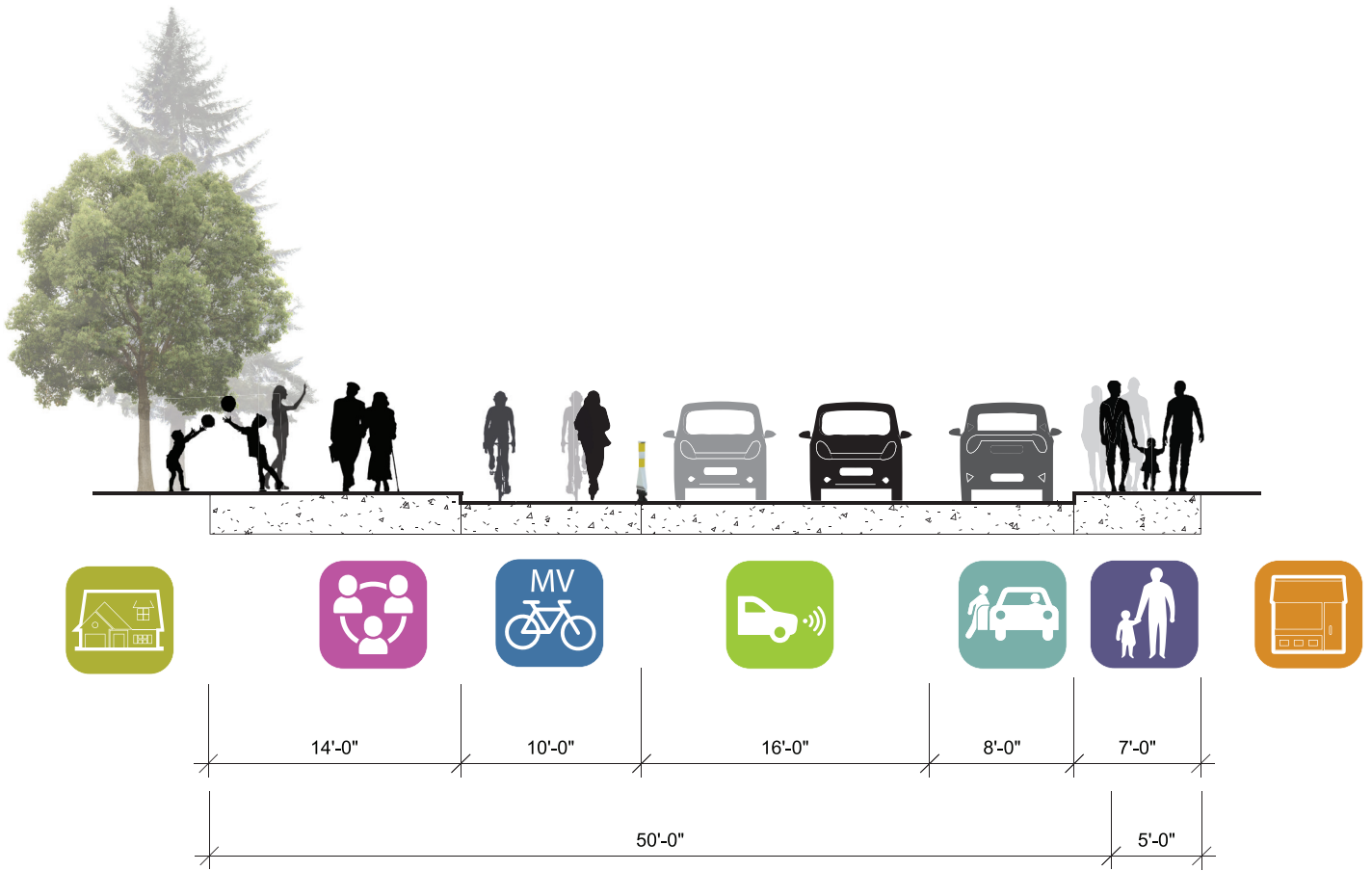
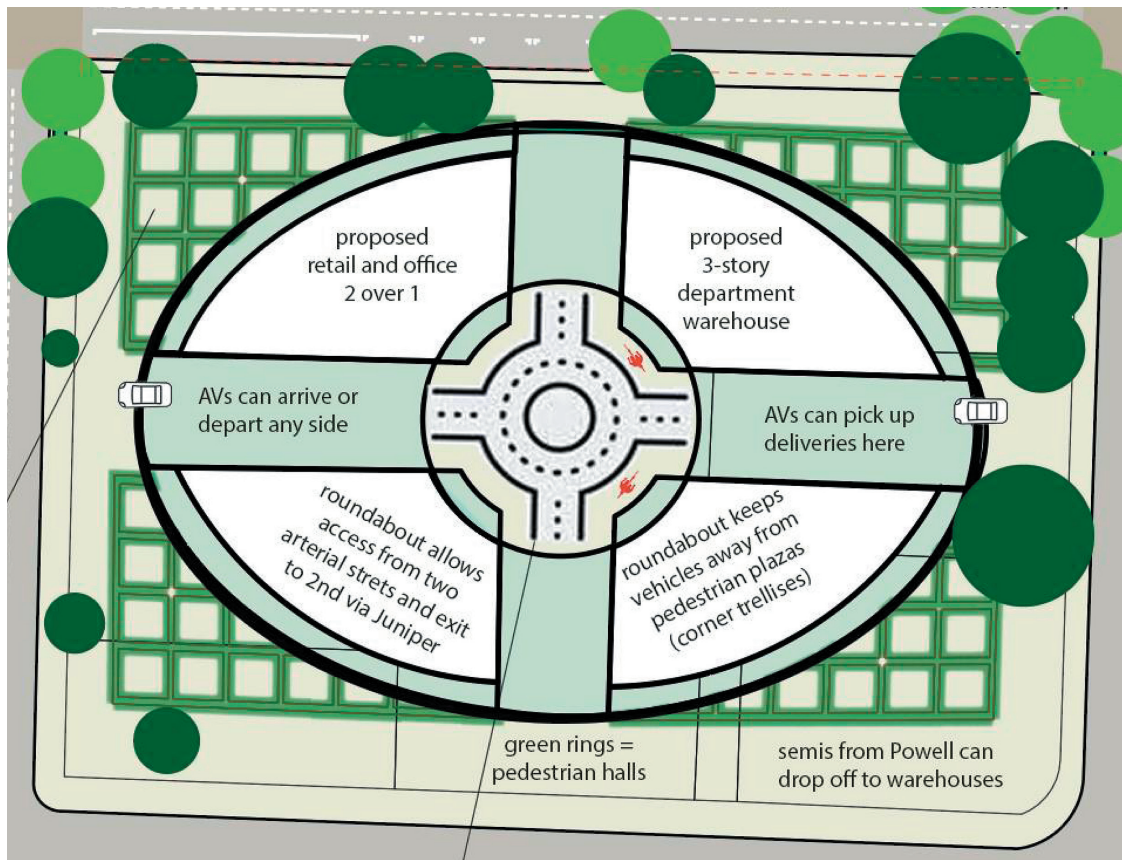


FIG. 86 (BOTTOM)
Block five long-term
design street section

FOCUS SITESMall / Roundabout

The roundabout allows access from two arterial streets and exit to NE 2nd Street via NE Juniper Avenue. There is access from Powell Boulevard for vehicles to enter the lot and drop off deliveries for businesses. Autonomous vehicles can enter and exit on all sides to drop-off/pick-up passengers and/or deliveries. The roundabout circulates traffic to bypass pedestrian plaza areas, absorbing former parking lot space.

FIG. 87

Site layout of the roundabout between NE Juniper Avenue and NE Cleveland Avenue.

DESIGN SUMMARY

This design reflects a detailed investigation of the future potential of NE 2nd Street, with thorough block-by-block study of the entire street. The students' proposals closely combine development of specific housing types with corresponding design interventions on the street. For example, on block one, they propose locating a mixed-use residential podium building with retail use on the first floor across from the park. They suggest that this would increase park activity and influence business through the increase of park visitors. The corresponding intervention on the street would buffer the edge of the park on the north side of the street with seating to create a place for gathering and relaxation.

Each block has its own set of design proposals. However, some commonalities include situating a mixed-use property on the block to anchor development, providing parking facilities, and creating buffers of plaza space and other community-centric spaces between the street and the property.

NE Third Street from NE Hood Avenue to NE Cleveland Avenue

MING ZHU AND TSHEWANG TAMANG

STUDY AREA



FIG. 88 (TOP)

Site map of the NE 3rd Street study area showing NE 3rd Street in relation to Powell Boulevard and NE Division Street.

FIG. 89 (BOTTOM)

Aerial view of NE 3rd Street area and the north-south avenues that intersect it

INITIAL DESIGN PARAMETERS

Concept: High density residential street. Three- to four-story residential podium buildings, with little or no parking, introduced in all adjacent parcels with current improvement to land value ratios less than 2.0.

Transitional mixed vehicle type design:

- On-street parking reduced by 50 percent from current conditions
- One 20-foot-wide, two-lane, two-way traffic way for CV, AV, MV, AJ, BY, and CT
- One or two four- to six-foot-wide pedestrian sidewalks
- Reclaimed space used for creative purposes: parklets, stormwater, planters, bike parking, etc.

Rationale: All traffic is slow and mixed in wide directional lanes in a smaller street.

Long-term no conventional vehicle design:

- On-street parking reduced by 80 percent from current conditions
- One 11-foot-wide, flex-direction traffic way for AV, CT and AJ with turnout passing sidings
- Two four-foot-wide, each-way traffic lanes for MV and BY
- One or two four- to six-foot-wide pedestrian sidewalks
- Reclaimed space used for creative purposes: parklets, stormwater, planters, bike parking, etc.

Rationale: Single “smart-passing” lane for AV and separate safe lanes for micro-vehicles.

Active Safe Lane NE 3rd Street

MING ZHU



FIG. 90

Multi-use planters that provide seating as well as green infrastructure services

DESIGN PRINCIPLES

“Active Safe Lane NE 3rd Street” envisions future NE 3rd Street as a high density residential street. Development will consist of three types of residential podium buildings in all adjacent parcels: four-story mixed-use; four-story affordable housing, and three-story townhouses.

Here, a safer public streetscape is proposed by providing more street lighting along sidewalks and near intersections. Streetscape improvements are focused near commercial business areas and serve to create an active and vibrant public space. Existing stormwater systems are augmented with sustainable best practices to create a well-functioning green infrastructure system along the whole streetscape.

Transitional Design

On-street parking is reduced by 50 percent from current conditions with a 20-foot-wide two-lane, two-way traffic way for multimodal transportation vehicles. Here, traffic is assumed to be slow-moving. Two six-foot-wide pedestrian sidewalks connect the entirety of the street, thereby increasing walkability across NE 3rd Street. On-street parking is provided on both ends of each block along with bike parking amenities near new residential development.



FIG. 91
Active Safe Lane NE
3rd Street transitional
design

Long-Term Design

On-street parking reduced by 80 percent from current conditions with a single 11-foot-wide, flex-direction traffic way with turnout passing sidings. Here, vehicles are assumed to be mainly autonomous vehicles. Two four-foot-wide, each-way traffic lanes for micro-vehicles and bicycles and two six-foot-wide pedestrian sidewalks are provided on both sides of the main roadway.

FIG. 92
Active Safe Lane NE 3rd Street long-term design



Design Details

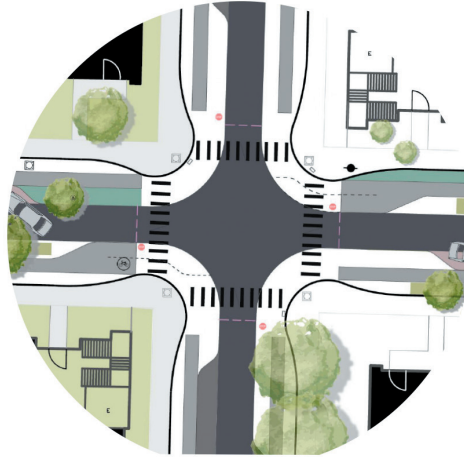
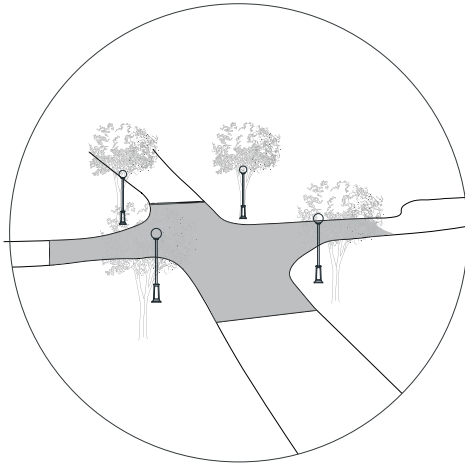


FIG. 93
Lighting is provided at the street intersection to increase safety

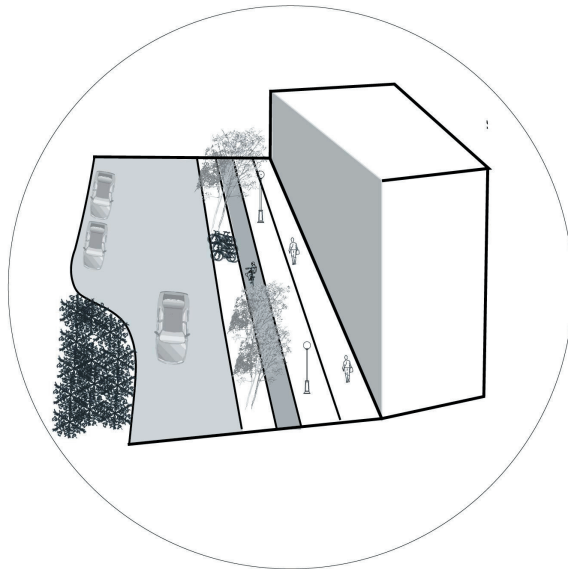


FIG. 94
Increase greenery and add beauty by adding trees along the street. This also creates a safe buffer from the road.

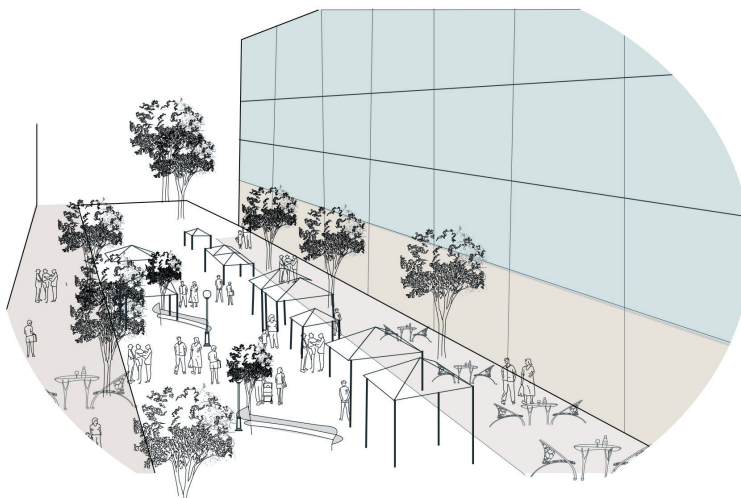


FIG. 95
An extension to the Gresham Arts Plaza creates an additional community gathering space between the park and future four-story mixed-use buildings

NE Third Street 3.0

TSHEWANG TAMANG



FIG. 96

Perspective view of NE
3rd Street and Linden
Avenue

DESIGN PRINCIPLES

At present, NE 3rd Street is mainly residential in character with some businesses on each end of the street. The right-of-way is approximately 50 feet with intermittent sidewalks and on-street parking. There is little to no public gathering space or green infrastructure elements. “NE Third Street 3.0” seeks to balance the changes that autonomous vehicles are expected to bring to the landscape of NE 3rd Street with an overall design that upholds the existing residential character of the street. It proposes interventions that will create vibrant street life, strengthen community character, integrate green infrastructure into the urban fabric, and create habitat for environmentally and culturally important species.

NE Third Street 3.0 proposes that the future NE 3rd Street can be a place with:

Vibrant Street Life

- Improve walkability by providing sidewalks buffered from road
- Provide places for people to meet, interact, and stay
 - Seats, shaded spaces, landscape rooms, parklets, plazas
- Increase safety and accessibility
 - Visual cross connections
 - Curb extensions and smaller curb radii
 - Lighting, signage, road markers

Community Character

- Use thematic design elements including color and patterns to create a cohesive aesthetic
- Reference key markers of historic downtown Gresham - Gresham Arts Plaza, historic downtown
- Support programs and design choices that speak to the residential character of NE 3rd Street
 - Raised planter beds, maker spaces, play street with recreational amenities

Green Infrastructure

- Increase planter width and soil volume to support larger tree growth and planting volume. This also aids in microclimate control by reducing the urban heat island effect.
- Provide stormwater facilities to receive and filter stormwater runoff
- Increase permeability, in addition to above interventions, by providing permeable paving where applicable
- Native Habitat
 - Create a place for historically and ecologically important native vegetation
 - Garry White Oak
 - Upland and wet meadows
 - Plant pollinator gardens and other native plant species

DESIGN PROPOSAL

Design interventions will follow existing zoning. Blocks from NE Hood Avenue to NE Elliott Avenue will be developed with greater focus on commerce with business and services on the first floor. Blocks from NE Elliott Avenue to NE Cleveland Avenue will be developed with a focus on residentially-oriented development.

The NE 3rd Street roadway will be narrowed and transformed through successive design iterations. This provides an opportunity for utilizing the reclaimed space for seating, play, and green infrastructure. The design assumes that the north-south avenues will retain their current functionality and will be utilized for on-street parking and waste bin placement.

FIG. 97
Diagram of current zoning on which the proposed interventions will be based



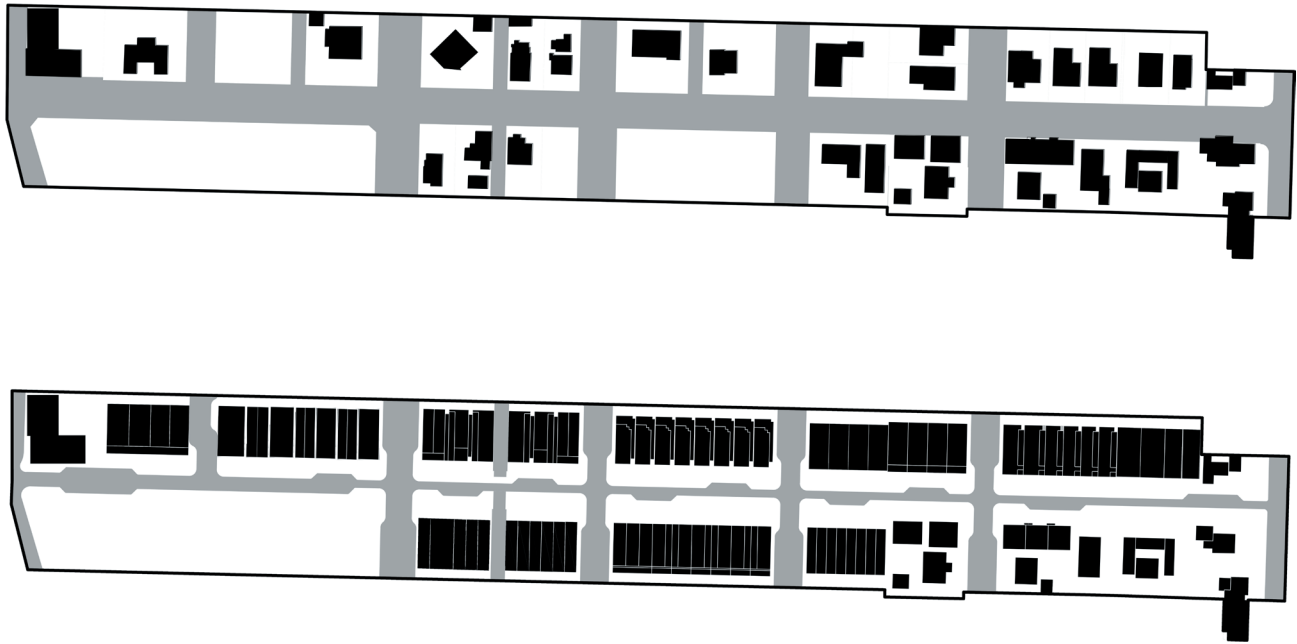


FIG. 98 (TOP)
Figure ground diagram of existing development

FIG. 99 (BOTTOM)
Figure ground of proposed changes to the housing and the road

The proposed changes will look as shown in [Figure 99](#). Here, townhouses will be the dominant building typology for NE 3rd Street.

The design proposal is classified into three zones, moving from west to east: NE Hood Avenue to NE Elliott Avenue, NE Elliott Avenue to NE Juniper Avenue, and NE Juniper Avenue to NE Cleveland Avenue.



FIG. 100
NE Third Street 3.0 transitional design

In the transitional design, the road is narrowed to a 20-foot, two-way shared traffic way for conventional, autonomous, and micro-vehicles. Here, the reclaimed space is utilized for sidewalks, tree planters, and stormwater infrastructure such as bioswales and stormwater planters. Curb extensions, 15-foot turning radii, and perpendicular crosswalks are other interventions that aim to improve walkability and safety across the street. Development is assumed for all properties with development value less than 2.0. In terms of planting, focus is on setting up the planters and the initial structure of the final planting scheme. Any planting conflicting with development will likely have to be removed.

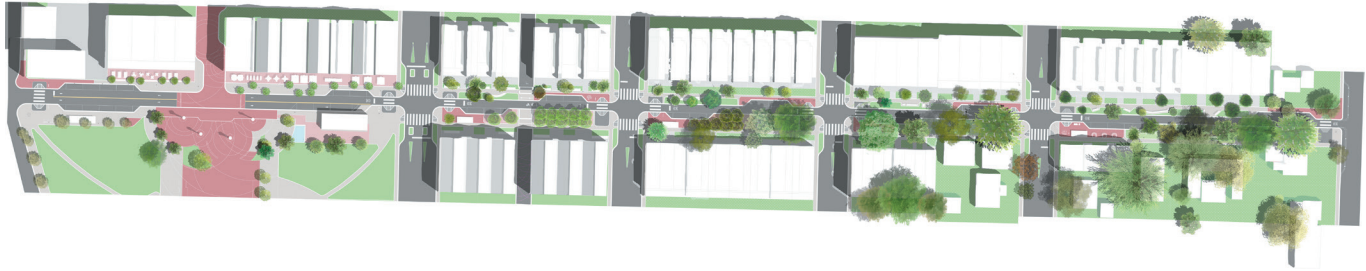


FIG. 101
NE Third Street 3.0
long-term design

In the long-term design, the road is further narrowed to a two-way, 11-foot shared traffic lane primarily focused on autonomous and micro-vehicles. This is on all blocks except between NE Hood and NE Kelly Avenues. Due to the assumed larger volume of people coming to the commercial businesses on this block, a 20-foot road is maintained as in the transitional design. Slip lanes and drop-off points on each block allow for uninterrupted movement.

All properties below a property value ratio of 2.0 are assumed for development. The reclaimed space is further articulated with seating spaces, play spaces, and community gathering venues. The narrowing of the road towards the north allows for a planting scheme with a larger volume of planting or of larger tree species. This allows for a greater diversity of planting and habitat and provides a greater magnitude of environmental services.

NE HOOD AVENUE TO NE ELLIOTT AVENUE

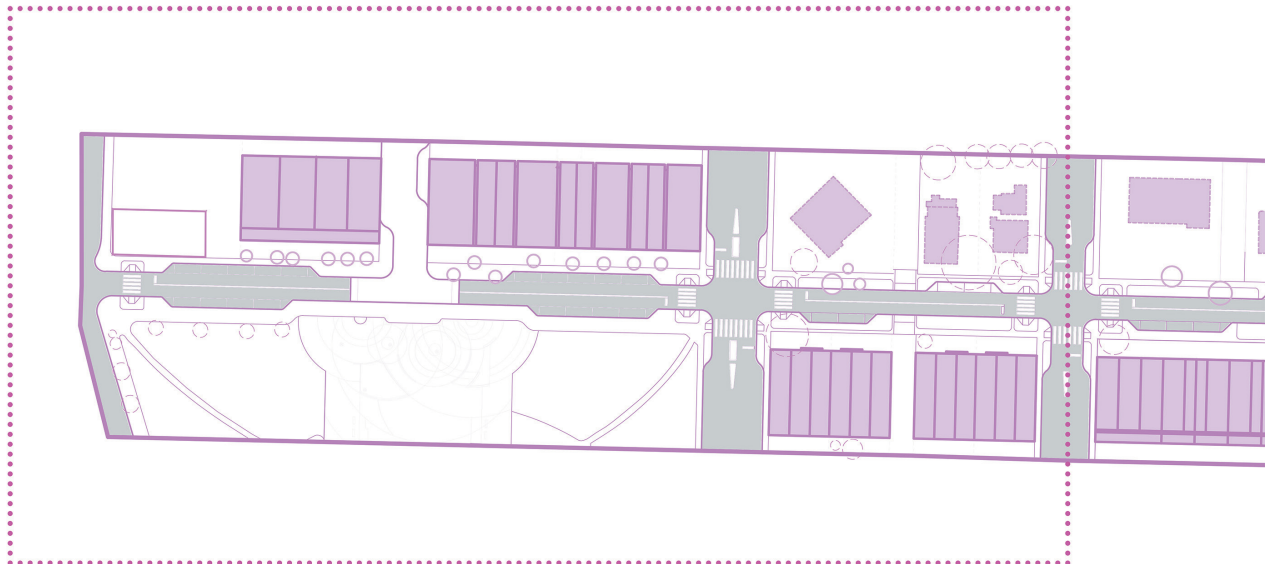


FIG. 102
Transitional design from
NE Hood Avenue to NE
Elliott Avenue

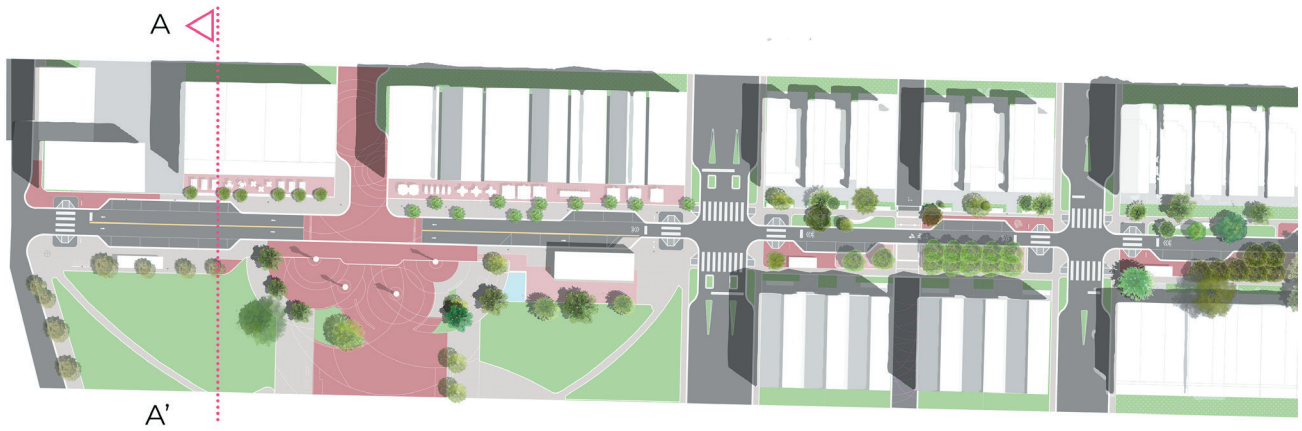
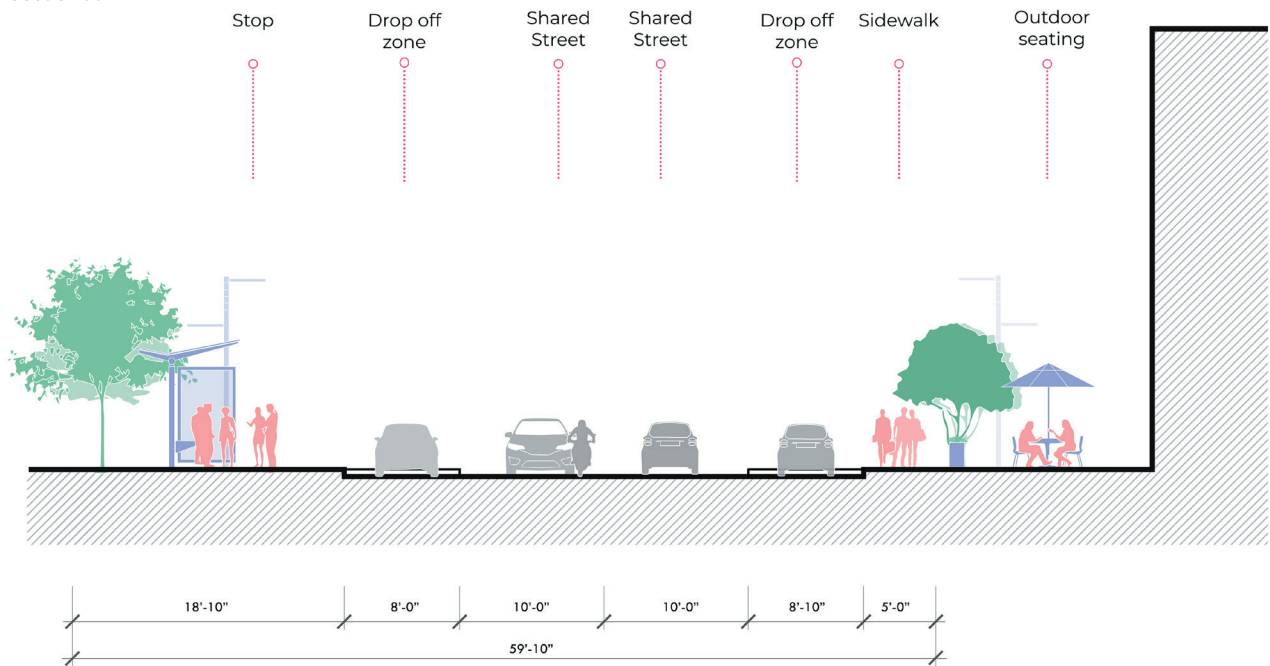


FIG. 103
 Long-term design from
 NE Hood Avenue to NE
 Elliott Avenue

FIG. 104
 Section at AA'



The area from NE Hood Avenue to NE Elliott Avenue will be developed with a commercial focus. The roadway will be a shared 20-foot, two-way lane from NE Hood Avenue to NE Kelly Avenue and a single flex-lane with passing sidings from NE Kelly Avenue to NE Elliott Avenue. Eight-foot-wide sidewalks will connect the blocks with curb extensions and appropriate street markings ensuring traffic safety. Here, a woonerf design will connect NE 2nd Street to the Gresham Arts Plaza, creating a living street that is shared for pedestrians and slow-moving micro-vehicles. The reclaimed space can be utilized for outdoor seating, a plaza pavillion, shaded groves, and stormwater planters.

NE ELLIOTT AVENUE TO NE JUNIPER AVENUE

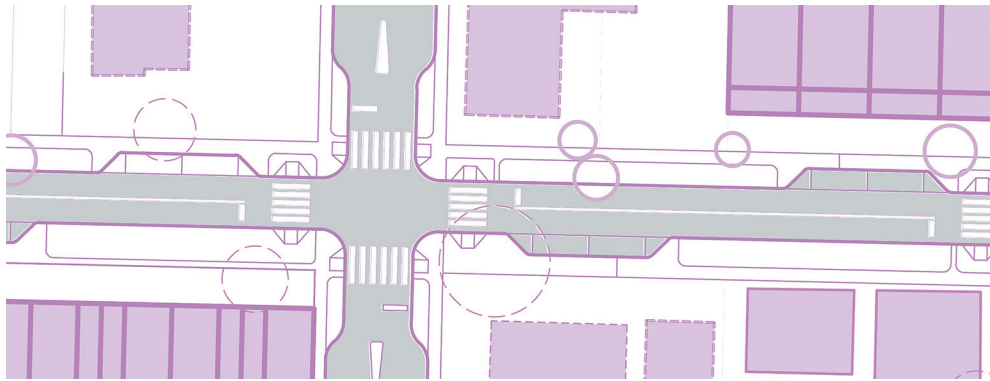


FIG. 105
Transitional design from
NE Elliott Avenue to NE
Juniper Avenue



FIG. 106
Long-term design from
NE Elliott Avenue to NE
Juniper Avenue

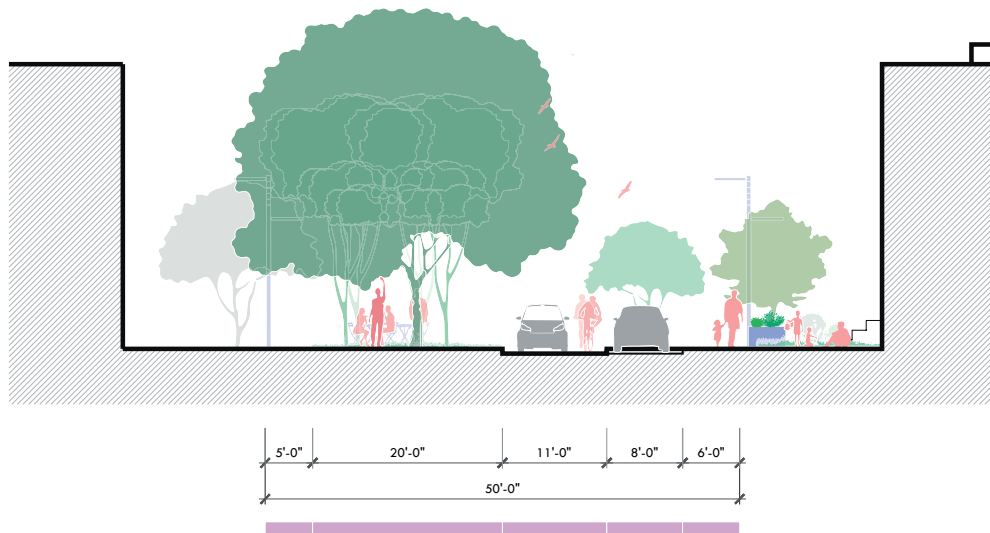


FIG. 107
Section at BB'

This zone will be developed similarly but with more mixed-use development. Here, a possible thematic scheme could be to plant fruit trees and place community gardening as a means to provide fresh produce and increase community cohesion. The planting plan transitions from a smaller, formal scheme to a more natural expression of an urban forest.

NE JUNIPER AVENUE TO NE CLEVELAND AVENUE

FIG. 108
 Transitional design from
 NE Juniper Avenue to
 NE Cleveland Avenue

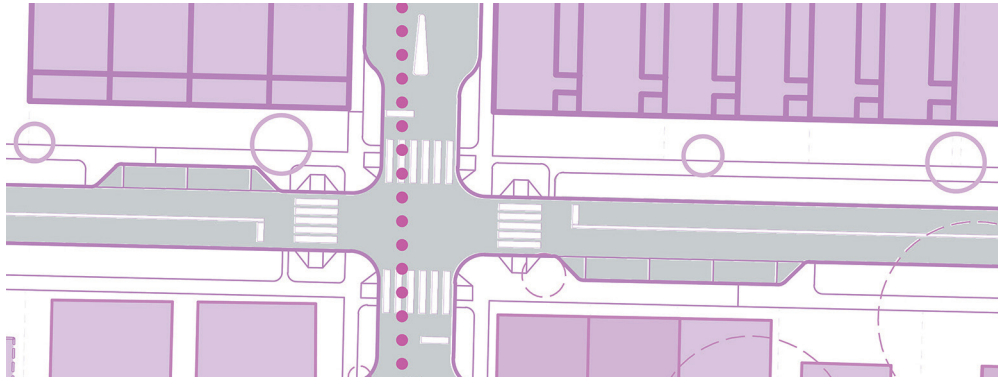
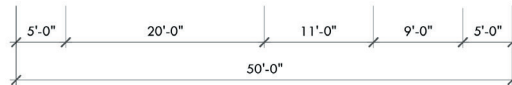
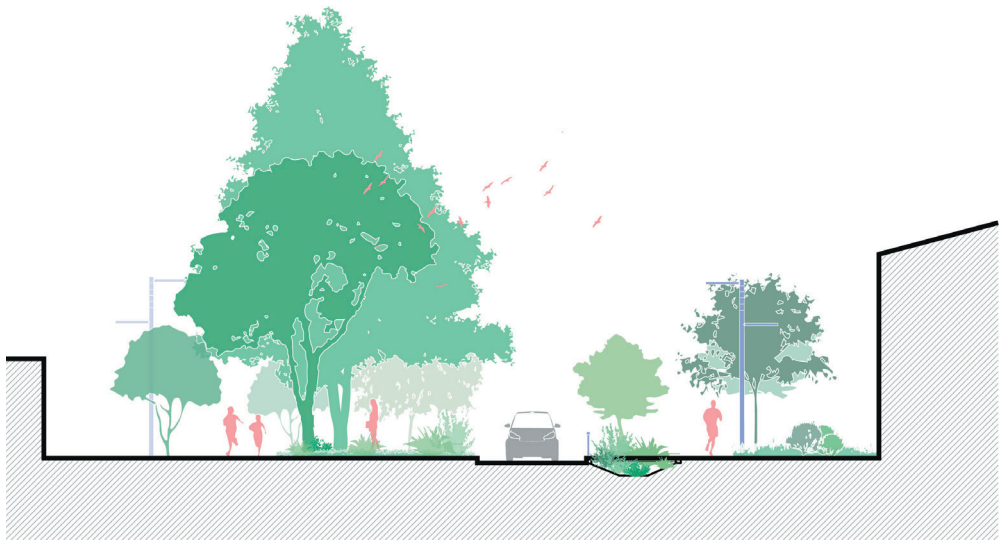


FIG. 109
 Long-term design from
 NE Juniper Avenue to
 NE Cleveland Avenue



FIG. 110
 Section at CC'



NE Juniper Avenue to NE Cleveland Avenue will be primarily focused on residential development. Here, placemaking amenities include seating on the sidewalk near prairie planting, a wooded walkway, and nature play. These will be at the human scale and draw in aesthetics from the rest of NE 3rd Street as well as from the Gresham Arts Plaza to create a cohesive design that fosters a strong sense of place.

DESIGN DETAILS



Raised-bed planters as an expression of urban agriculture can provide food for the community as well as health, economic, and ecological benefits.

FIG. 111
Sectional elevation of
raised-bed planters
between private
property and the
sidewalk

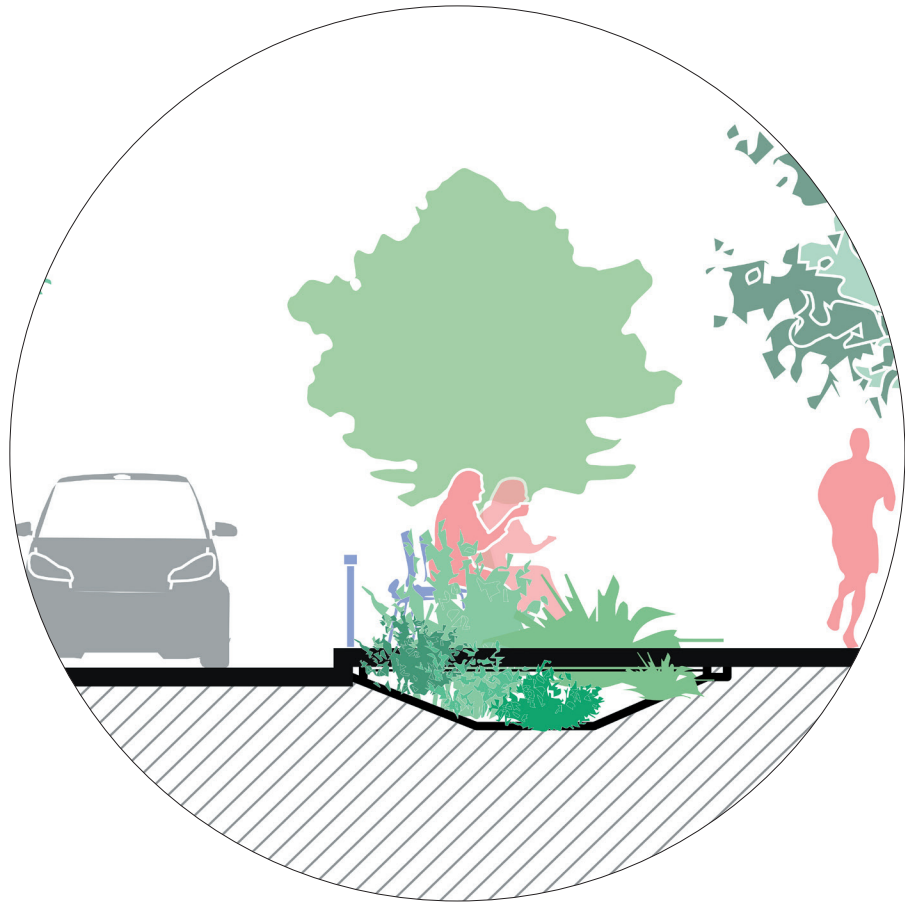


FIG. 112
Section of stormwater
planters along the road

A stormwater swale helps manage surface runoff and improve water quality. Here, seating on elevated platforms can create a pleasant place to stay and people watch.

DESIGN SUMMARY

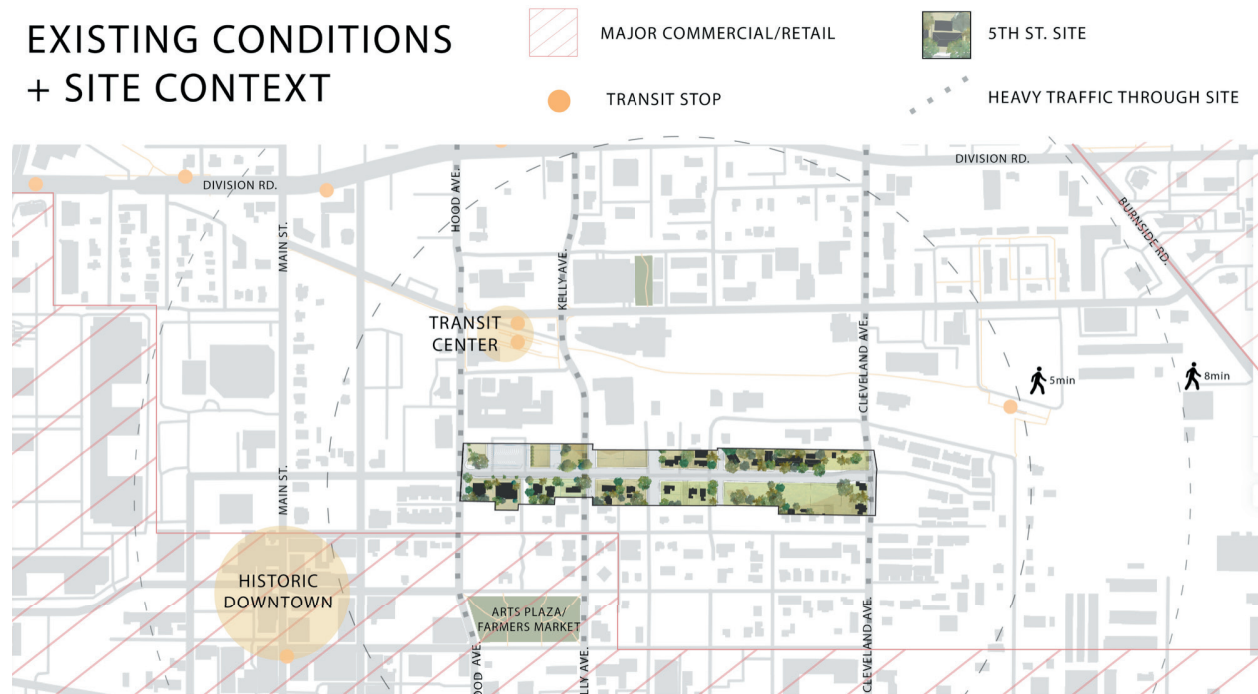
This design presents a potential future for NE 3rd Street that balances the forecasted growth in population density with the implications of a substantial shift in urban mobility modes and behaviors while attempting to uphold the inherent residential character of the street.

NE Third Street 3.0 proposes that because of low traffic density and potential autonomous technology, the roadway can be developed into a single two-way shared traffic lane with side lines and drop-off/pick-up points at locations across the street. A connected sidewalk with interventions such as curb extensions, buffer planting, crosswalks, lighting, and seating spaces could help promote walkability and reclaim the street for people. In terms of preserving and even building community character, the design sees opportunities to reference key historic markers from downtown Gresham, place art installations along the street, and use a cohesive aesthetic in the form of repeating textures, colors, and street furniture across NE 3rd Street. There is potential for green infrastructure to be integrated across NE 3rd Street through stormwater planters and increased permeability. Finally, narrowing the street towards the north creates a larger reclaimed space on the south. This would provide larger soil volume for different expressions of denser urban tree planting.

NE Fifth Street from NE Hood Avenue to NE Cleveland Avenue

GLORIA GAO, KELLI BARKER, AND NOURA ALHARIRI

STUDY AREA



INITIAL DESIGN PARAMETERS

Concept: Low density “village” residential street with some right-of-way privatized. One- to two-story village-style residential buildings with yard spaces, with little or no parking, introduced in all adjacent parcels with current improvement to land value ratios less than 2.0.

FIG. 113

NE 5th Street study area

Transitional mixed-vehicle type design:

- On-street parking reduced by 50 percent from current conditions
- One 20-foot-wide two-lane, two-way traffic way for CV, AV, MV, AJ, BY, and CT
- One or two four- to 12-foot-wide pedestrian sidewalks
- Reclaimed space used for creative purposes: parklets, stormwater, planters, bike parking, etc.

Long-term no conventional vehicle design one:

- On-street parking reduced by 80 percent from current conditions
- One eight-foot-wide, flex-direction traffic way for AV, CT, MV, BY and AJ with turnout passing
- One or two four- to six-foot-wide pedestrian sidewalks
- Reclaimed space given back to adjacent parcels for extended yards, home additions, or “mother-in-law” auxiliary housing units

Rationale: Minimum traffic space with more space for “village homes” of greater than single-family density.

Long-term no conventional vehicle design two:

- On-street parking reduced by 80 percent from current conditions
- One eight-foot-wide, flex-direction traffic way for AV, CT, MV, and AJ with turnout passing sidings
- One or two four- to six-foot-wide pedestrian sidewalks
- Reclaimed space for construction of new market-rate, micro-housing units within current street ROW

Rationale: Minimum traffic space with residential densification in former ROW.

Design Proposals

The students in this group each worked on and produced their own design for NE 5th Street individually, which are presented as follows:

Micro-Housing Community

GLORIA GAO



FIG. 114

Perspective of proposed micro-housing community adjacent to the redesigned street

DESIGN PRINCIPLES

This design explores how NE 5th Street can be reimagined to facilitate multimodal transportation including autonomous vehicles while creating a place for micro-housing (“tiny houses”) along the street. Here, the street is narrowed, and micro-houses are facilitated on the reclaimed space.

To address the challenge of providing space for the micro-houses within the current right-of-way while allowing for recommended traffic lane widths, the design proposes that micro-houses be situated on the south side of proposed traffic ways and that public gathering spaces be allocated between the micro-houses. There is opportunity for different planting schemes to be provided to create a buffer between the micro-housing and existing tax lots.

TRANSITIONAL DESIGN

In the transitional design, on-street parking is reduced by 50 percent from existing conditions. Here, a 20-foot wide two-way traffic lane is provided with a parking lane on the south that facilitates multimodal transportation including autonomous vehicles, traditional vehicles, and autonomous jitneys. Two four-foot bike lanes are situated on either of this with a four-foot sidewalk on the north side and a larger 16-foot sidewalk on the south as an incremental development towards future micro-housing.

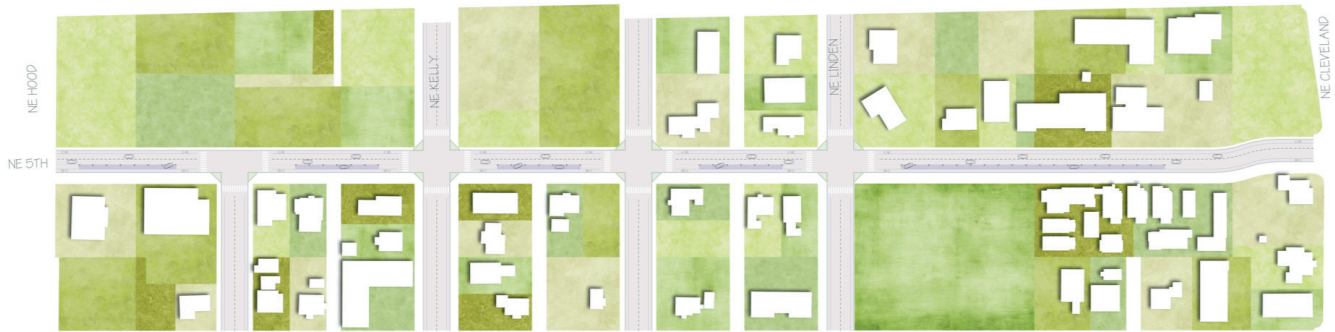


FIG. 115
Plan view of transitional design

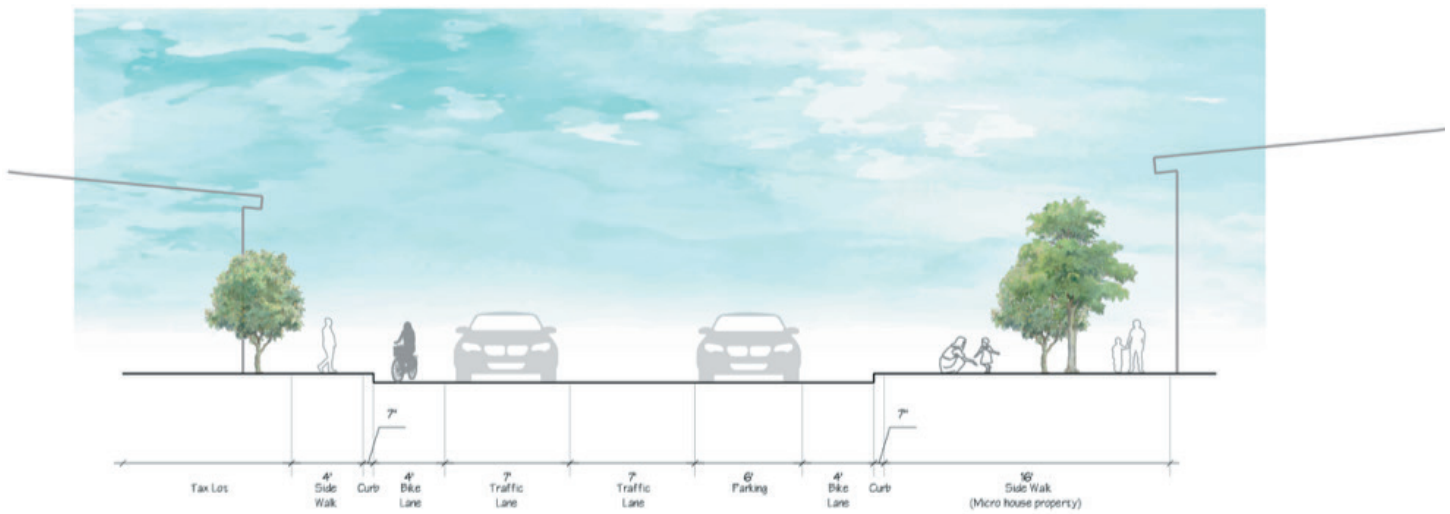


FIG. 116
Typical street section of the transitional design

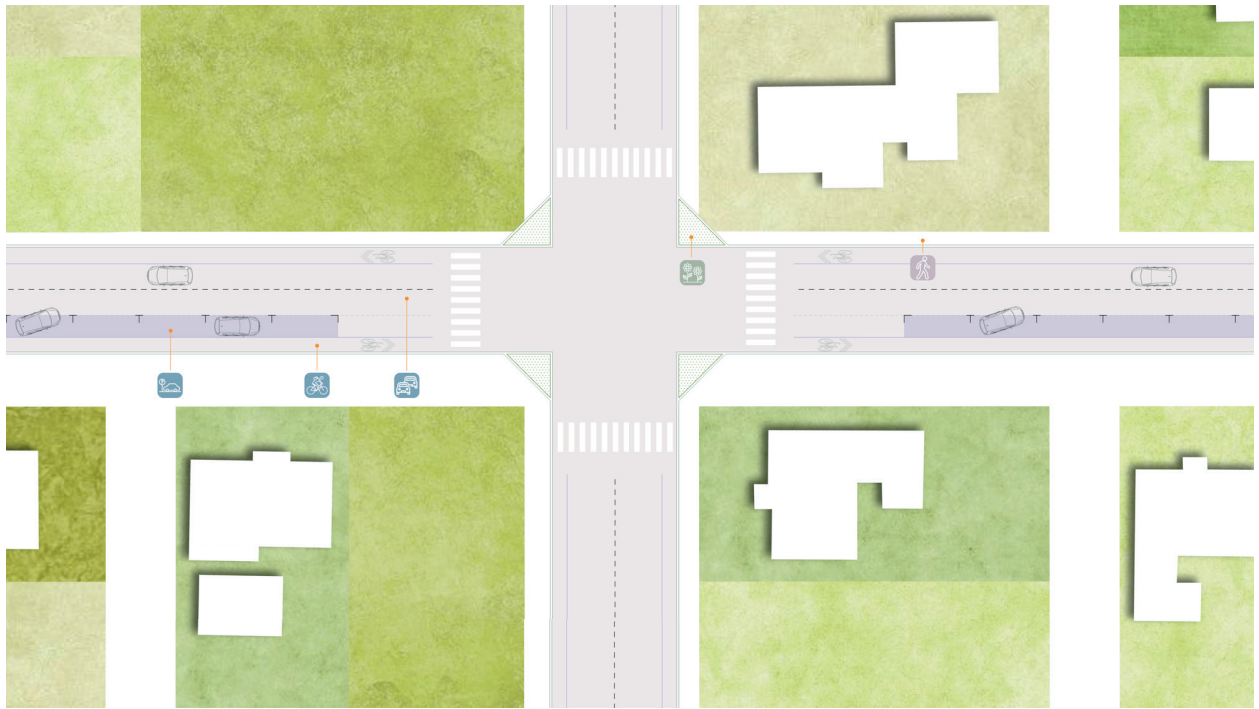


FIG. 117
Zoomed-in view of transitional design interventions at the intersection of NE Kelly Avenue and NE 5th Street

LONG-TERM DESIGN

In the long-term design, on-street parking is further reduced to 20 percent of the existing conditions. The roadway is further reduced to a two-way, eight-foot-wide traffic way. Two four-foot-wide pedestrian sidewalks are proposed on either side of this road. The reclaimed space on the south is adopted for new market-rate micro-housing units with parking facilitated at the ends of blocks.

FIG. 118
Plan view of long-term design



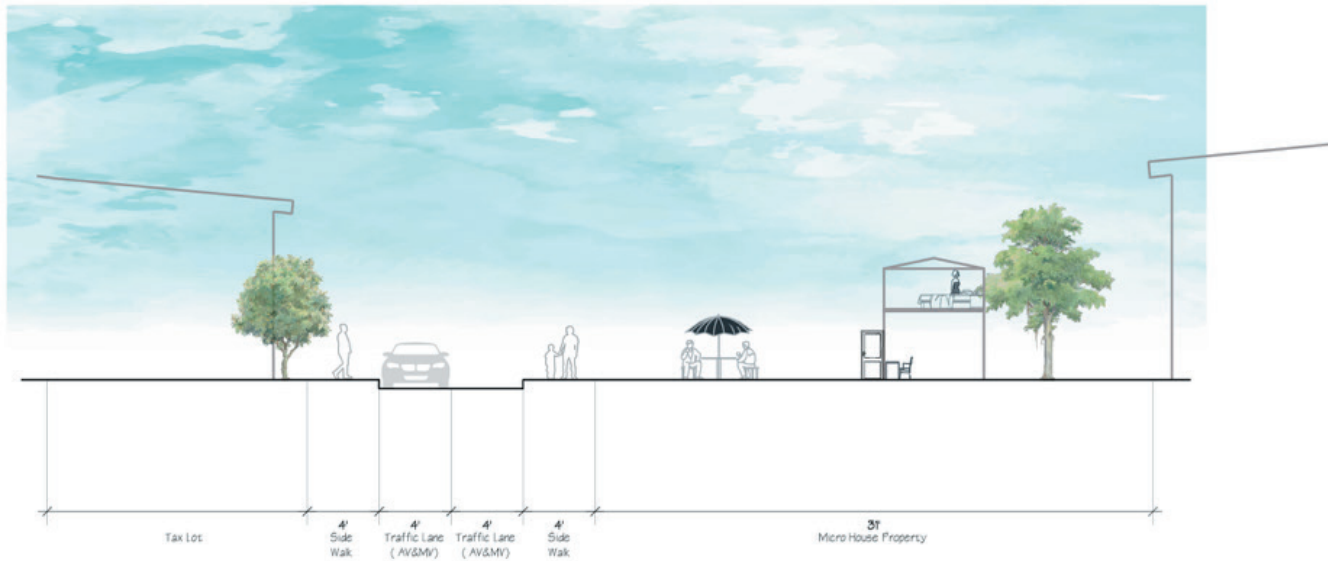


FIG. 119
Typical street section of the long-term design



FIG. 120
Zoomed in view of long-term design interventions at the intersection of NE Kelly Avenue and NE 5th Street

HOUSE PROTOTYPE

The following prototypes used in the design illustrate examples of different micro-house layouts that can be adopted in the reclaimed space of the design proposal.

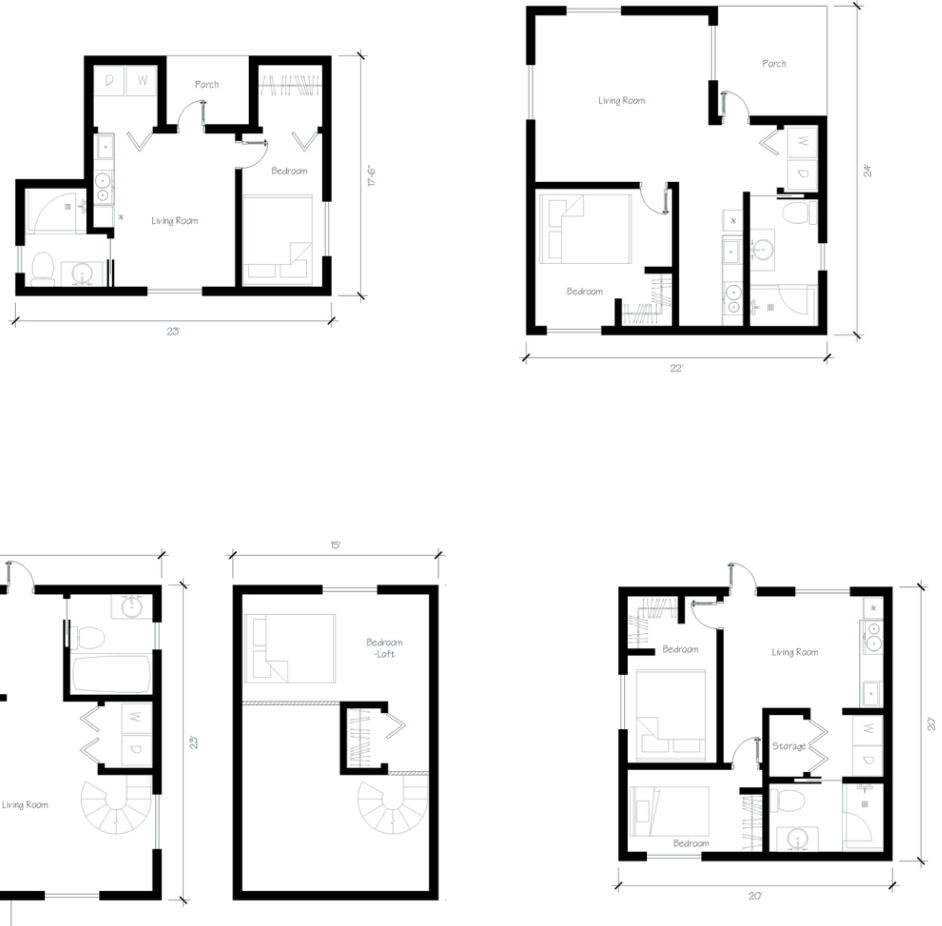


FIG. 121
Layout plans of proposed micro-houses

DESIGN SUMMARY

This design investigated the potential for micro-housing to be facilitated on NE 5th Street. The limited road width was a challenge for orienting and positioning the micro-houses and their parking facilities. Similarly, creating a sense of separation between the new micro-housing and existing residential properties was also challenging. The design choices propose a possible solution to these issues. By reducing the road width towards the north, enough space is created for the micro-housing. This also allows solar access for the properties on the north end. Parking facilities and gathering spaces are positioned together and at the ends of the block, and between houses, respectively, to conserve space and provide easy access. Finally, planting helps create a barrier between the micro-housing and existing residential development.

Designing Streets for Autonomous Vehicles and People

KELLI BARKER



DESIGN PRINCIPLES

This design envisions future NE 5th Street as a place for a transitional community, where a variety of housing options provide a home for people of all backgrounds. A particular focus is made on the public right-of-way, with various opportunities for play, urban agriculture, stormwater management, and pollinator habitat.

Some key principles that guided the design work are as follows:

- With existing low traffic speeds and minimal traffic flows, it is safe to allow bikes and micro-vehicles to travel in the same lane. To promote bicycle safety, green strips are placed at every major intersection (Hood Avenue and Kelly Avenue) to allow bicyclists to command space in the intersection and increase their visibility.
- Drop-off/pick-up locations are located at every other block, making it convenient for people to move things from their vehicle to their homes and reduce distance required to travel to individual stops.
- Public space is increased along the street by taking the right-of-way and repurposing it for community uses such as gardens, parkways, and children's play spaces.

FIG. 122

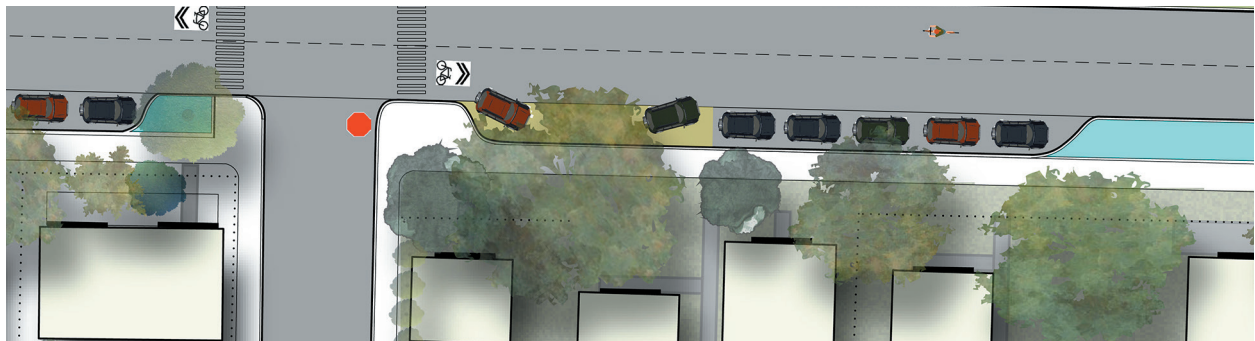
Collage of the existing condition and proposed street-side playground

- Stormwater facilities create visual buffers that allow for greater visibility of pedestrians at street crossings.
- New housing is modeled after the cottage homes that Gresham is currently looking to build on NE 5th Street. These homes will be similar in design and will create shared courtyard spaces when grouped together.
- Tiny homes, medium size housing, and larger single-family housing are dispersed along the entirety of NE 5th Street to create a transitional community space for people of all ages and families of all sizes.

TRANSITIONAL DESIGN

The transitional design consists of a 20-foot-wide, two-lane, two-way traffic roadway shared by traditional and autonomous vehicles as well as bikes and micro-vehicles. The assumption here is that vehicle traffic is low in volume with low speeds of travel. Pedestrian crosswalks are provided on the ends of every block with on-street parking on the south side of the street. On the north side, space reclaimed through the reduction of the road from existing width is utilized for situating stormwater facilities.

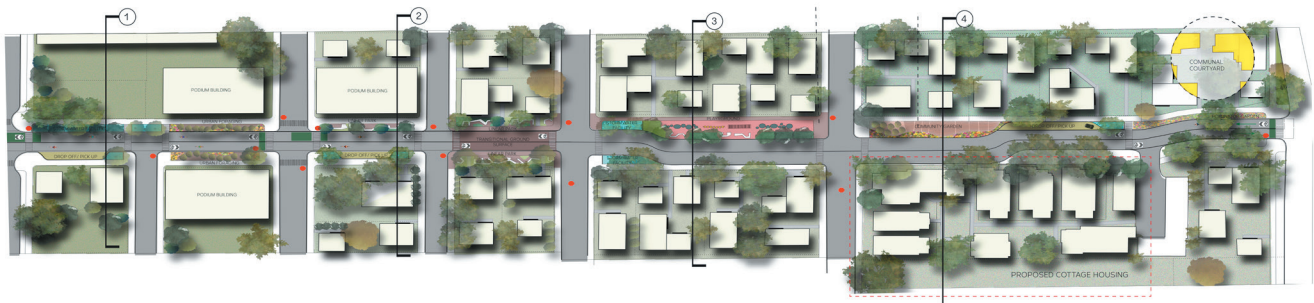
FIG. 123
Plan of the transitional design



LONG-TERM DESIGN

The long-term design consists of a 10-foot, two-way micro-vehicle and bike lane with no on-street parking along NE 5th Street. This further reduction in road width affords additional space that can be reclaimed. Here, potential uses include urban foraging garden, stormwater facilities, linear parks, and a streetside playground.

FIG. 124
Plan of the transitional design



SECTIONS

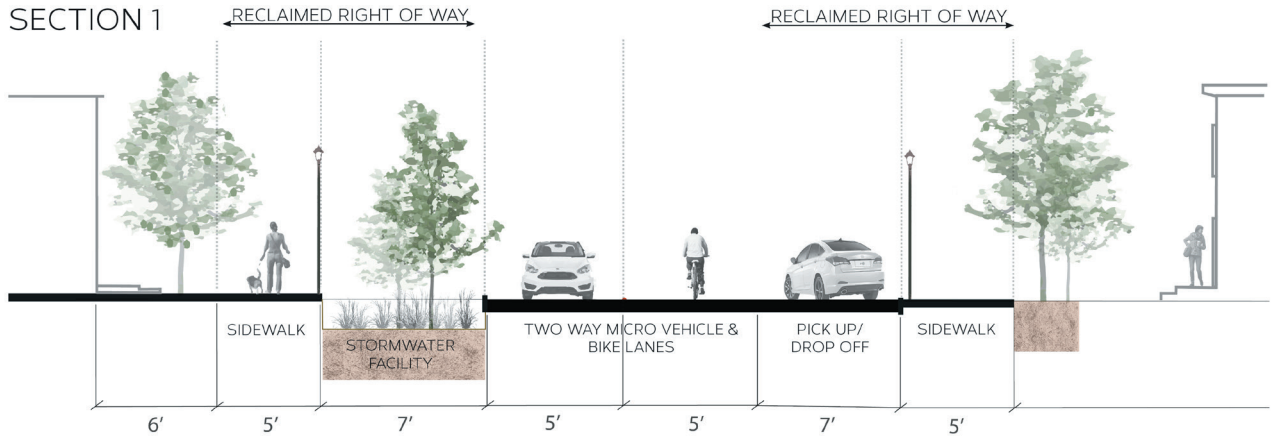


FIG. 125
Street sections of long-term designs at one

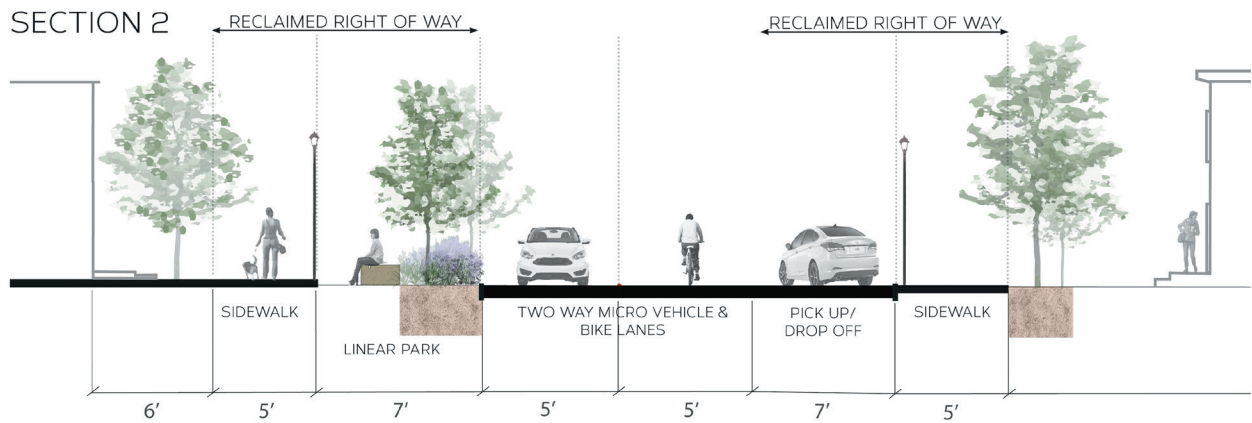


FIG. 126
Street sections of long-term designs at two

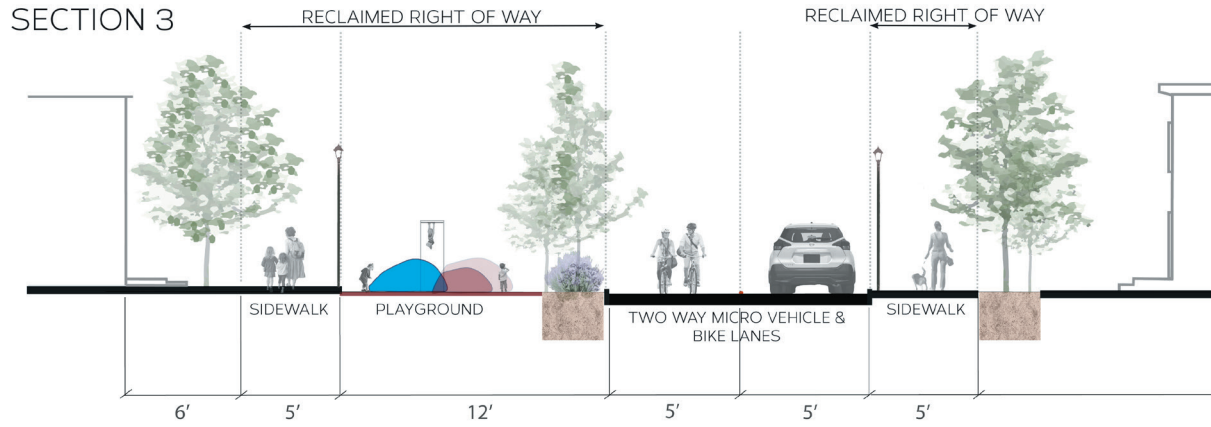


FIG. 127
Street sections of long-term designs at three

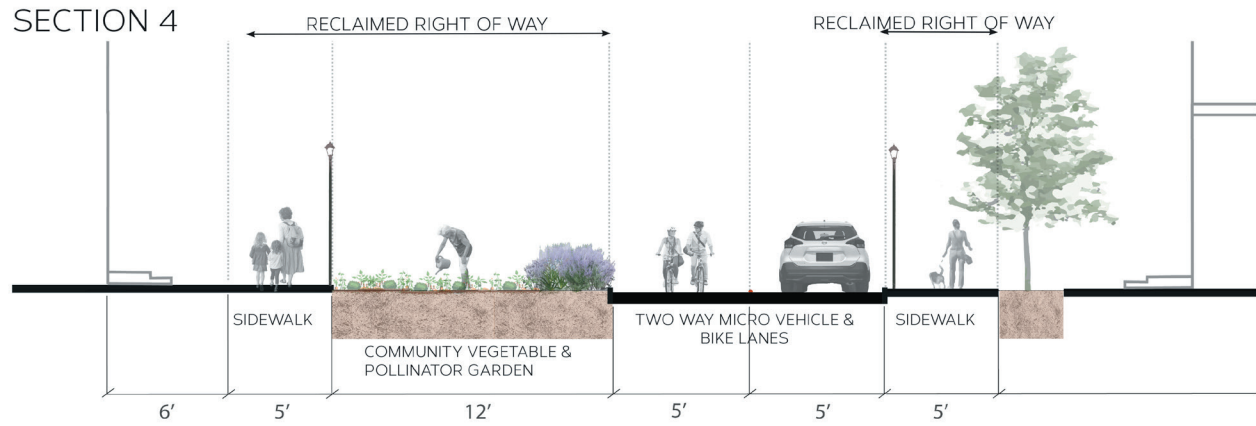
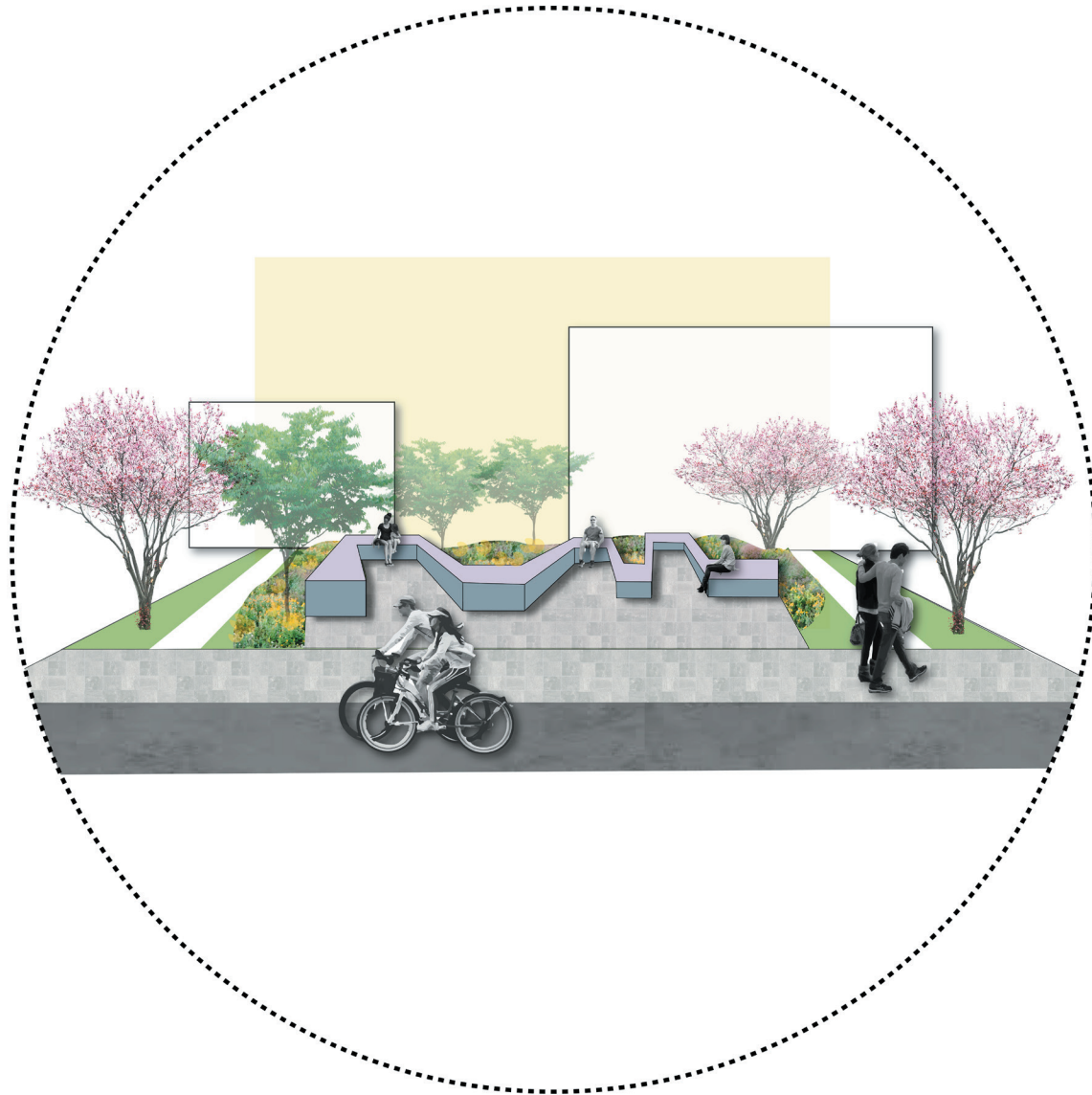


FIG. 128
Street sections of long-term designs at four

DESIGN DETAILS**Linear Park**

The sidewalk meanders in front of the linear park near NE Elliott Avenue to create a sense of prospect and refuge for park goers. They may sit and look out on passersby and the street homes. Home owners will still retain a section of yard space and a stoop behind the park. The linear park is placed on the north side of the street to create better sun access.

FIG. 129
Rendering of proposed
linear park

**DESIGN SUMMARY**

This design explored a future NE 5th Street with a variety of housing options and a socially activated streetscape. The housing options are modeled after cottage homes and include shared courtyard spaces. The design proposes increasing public space along the street by repurposing the right-of-way for community uses such as gardens, parkways, and play spaces.

Future Residential Streets: NE 5th Street

NOURA ALHARIRI



FIG. 130

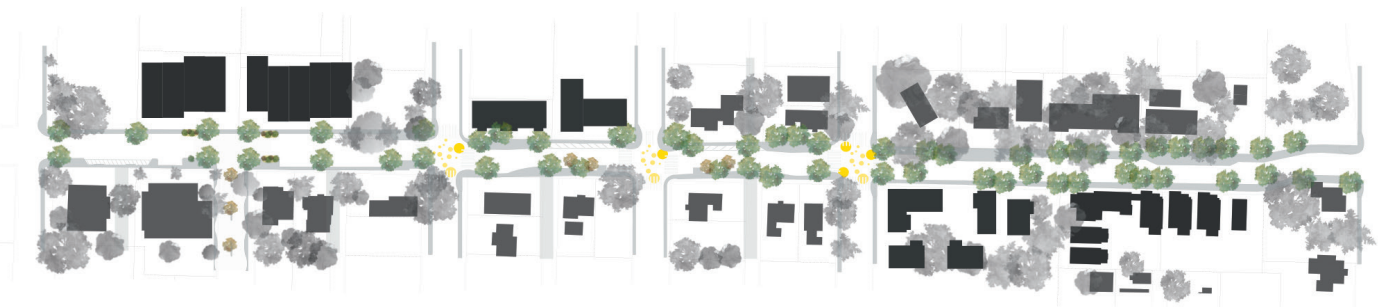
With wider sidewalks, vegetated chicanes, and Grasscrete paving, the roadway becomes reclaimed primarily for pedestrian usage

DESIGN PRINCIPLES

This design proposes a densification of NE 5th Street through housing and associated development. In the village housing development zone, densification will be achieved through development of low-rise, village-style housing of one- to two-story houses with shared yards. In the mid-rise zones, additional densification will occur through rowhouses, duplexes, etc. The design assumes that major north-south roadway functions will remain as they are in the current conditions. Ultimately, NE 5th Street will shrink from 36 feet to 18 feet, accompanied by reduction in on-street parking and shifts in vehicle type prioritization. The overall neighborhood character will be enhanced by creating transitions at intersections, making smaller blocks and creating urban foraging zones, public plazas, and other public amenities.



FIG. 131
The development zones, each with its own proposed residential density



TRANSITIONAL DESIGN

The transitional design consists of a 20-foot shared roadway with sidewalks on either side. Drop-off zones are located on each side at the end of the blocks. The road facilitates both autonomous and new modes of mobility as well as conventional vehicles. Comparatively, interventions in this stage are fairly incremental from the existing conditions. Major moves include intersection treatments, new tree plantings, and curb extensions. Residential development at this stage is concentrated at the two ends of NE 5th Street.

FIG. 132
Plan view of the transitional design

SECTIONS

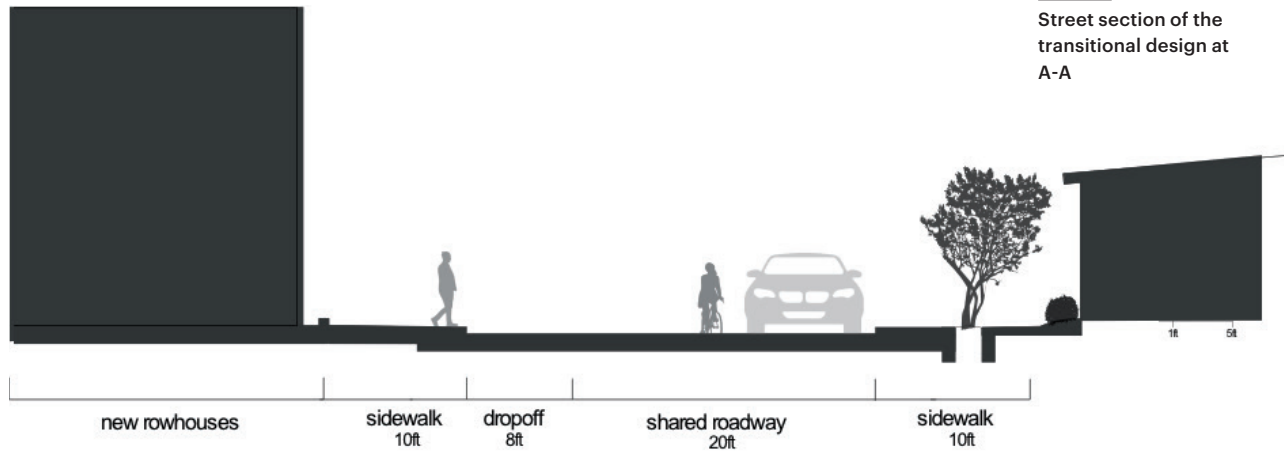


FIG. 133
Street section of the transitional design at A-A

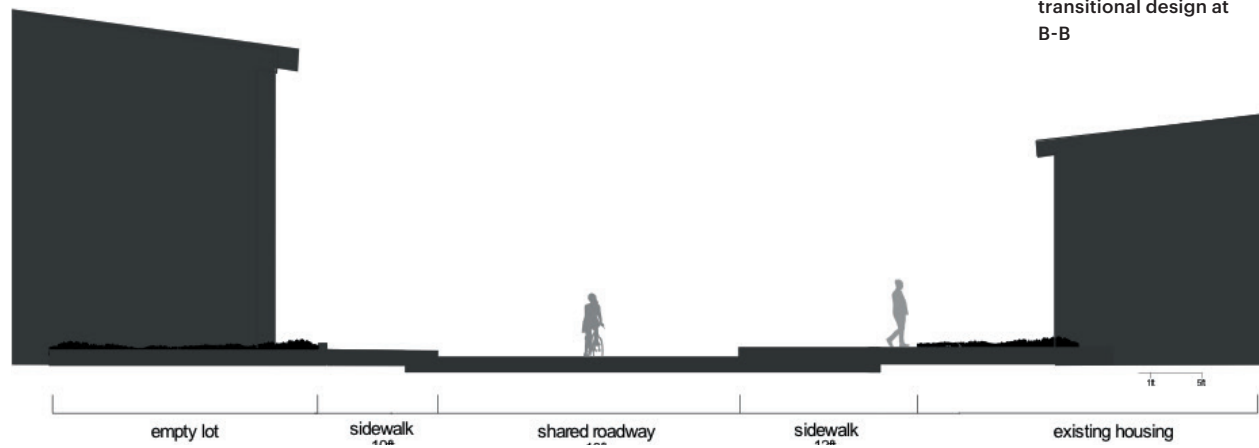


FIG. 134
Street section of the transitional design at B-B

LONG-TERM DESIGN

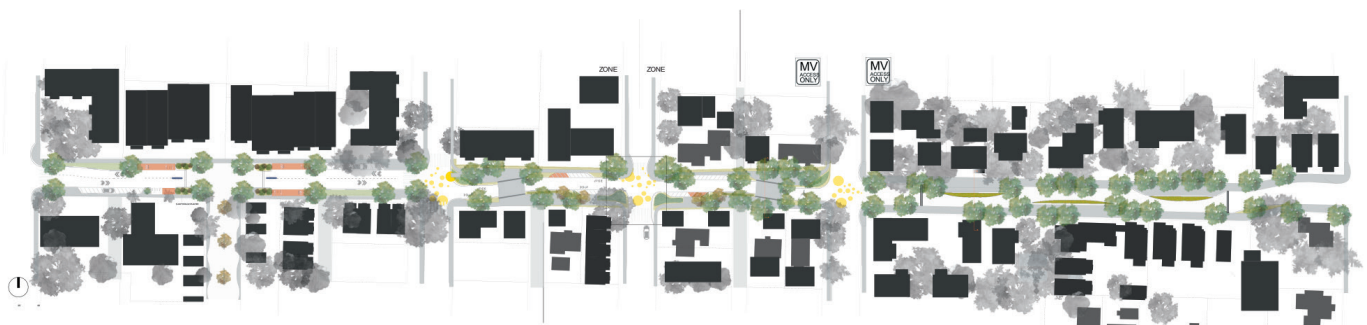


FIG. 135
Plan view of the long-term design

The long-term design features a 20-foot two-way street shrunk to a 16-foot-wide two-way micro-transit lane. Here, on-street parking is reduced 80 percent from current conditions and tax lots are enlarged for additions and new units. Drop-off zones for larger vehicles are included on the vertical housing development zone, as well as bike parking and micro-vehicle parking. Sidewalks are widened and green infrastructure, including urban forage zones and flow-through planters, are used to create buffers between pedestrian and traffic zones.

From NE Kelly Avenue eastward, NE 5th Street will be a micro-vehicle-only roadway. An oversized crosswalk/speed table slows micro-traffic and creates a social bridge between both sides of the neighborhood. Village-style or “bungalow court” densification is developed around existing trees and infrastructure, using trees to create perceived boundaries between shared public space and shared private space. The easternmost block adjacent to NE Cleveland Avenue is entirely repaved with a Grasscrete system. This reclaims the streetway entirely for pedestrians. Here, autonomous forms of transit will follow the chicane in the road. Human drivers of larger conventional vehicles will be able to judge their ability to drive on grass.

FIG. 136
Street section of the long-term design at A-A

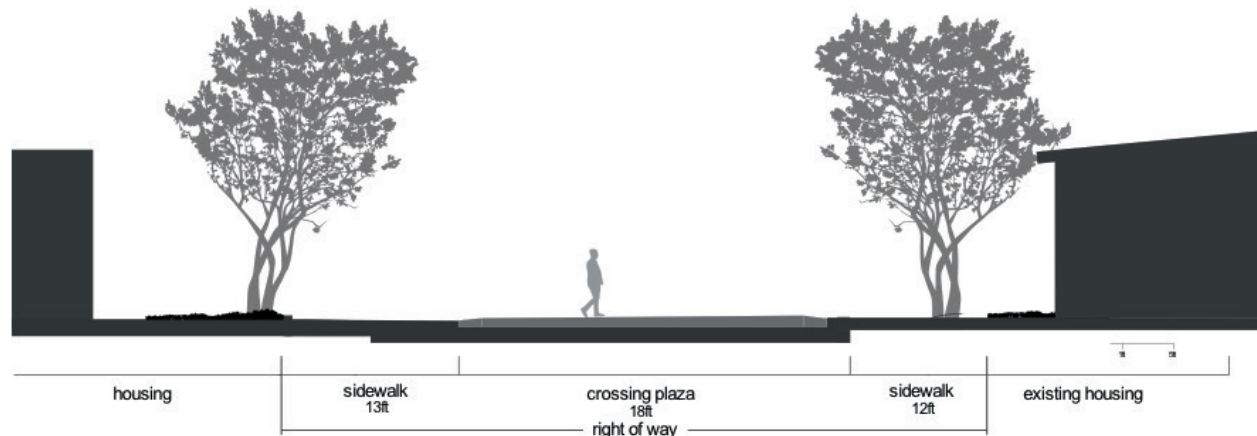
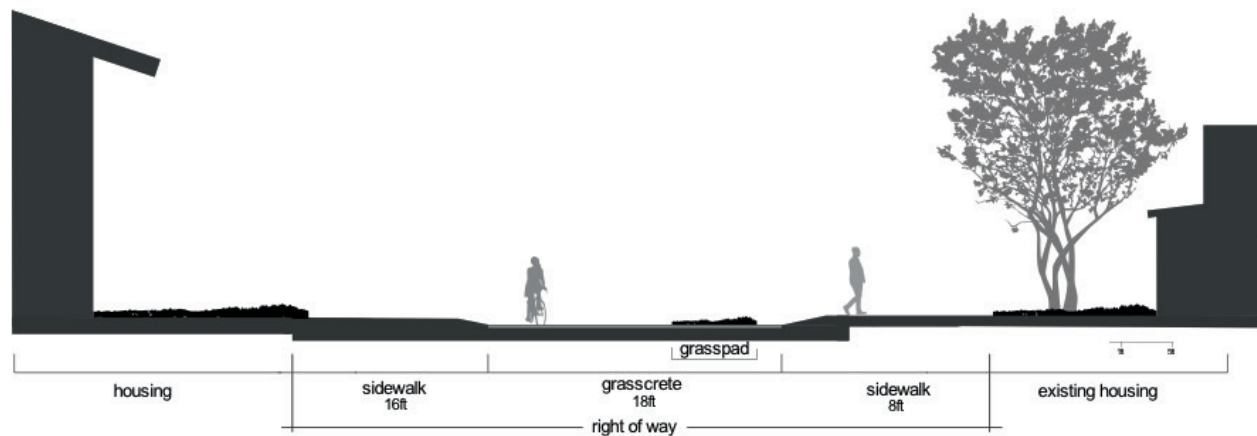


FIG. 137
Street section of the long-term design at B-B



DIAGRAMS

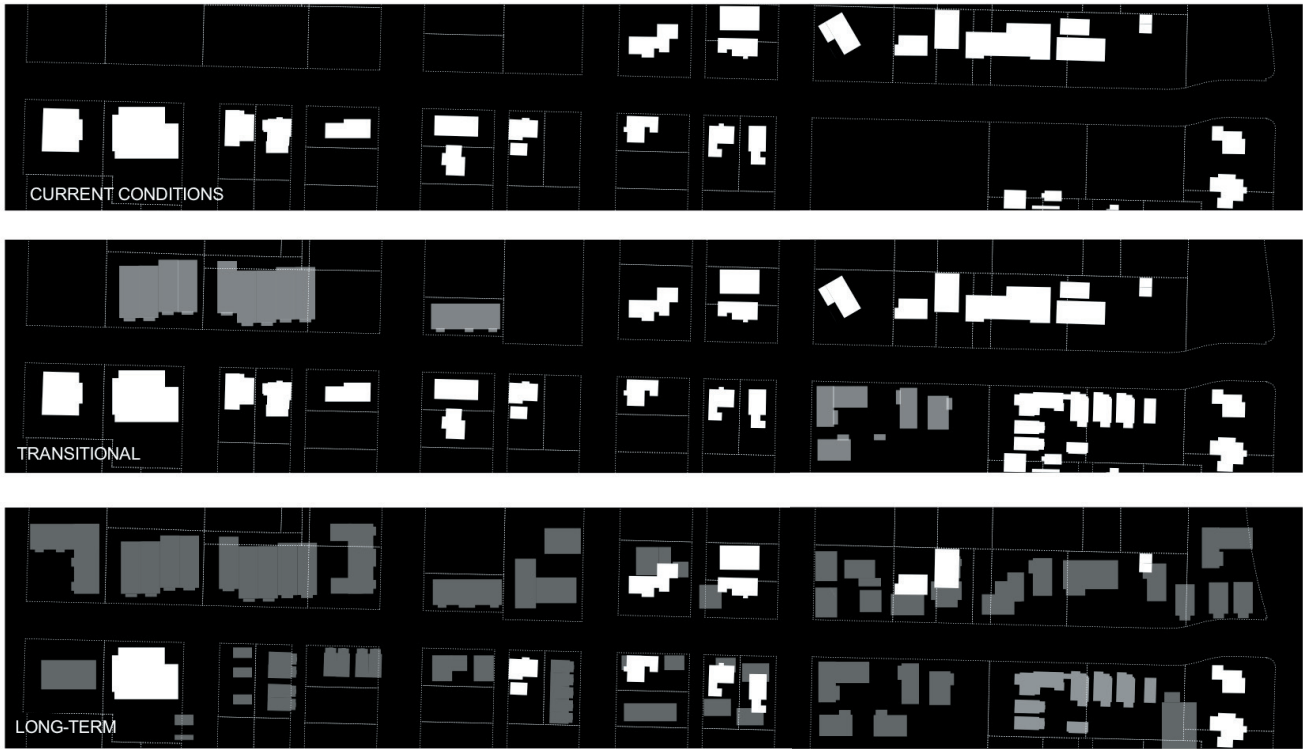


FIG. 138

Ground diagram showing densification of NE 5th Street from current conditions to long-term design including apartment buildings and row housing



FIG. 139

Proposed green infrastructure, including urban forage zones and stormwater planters

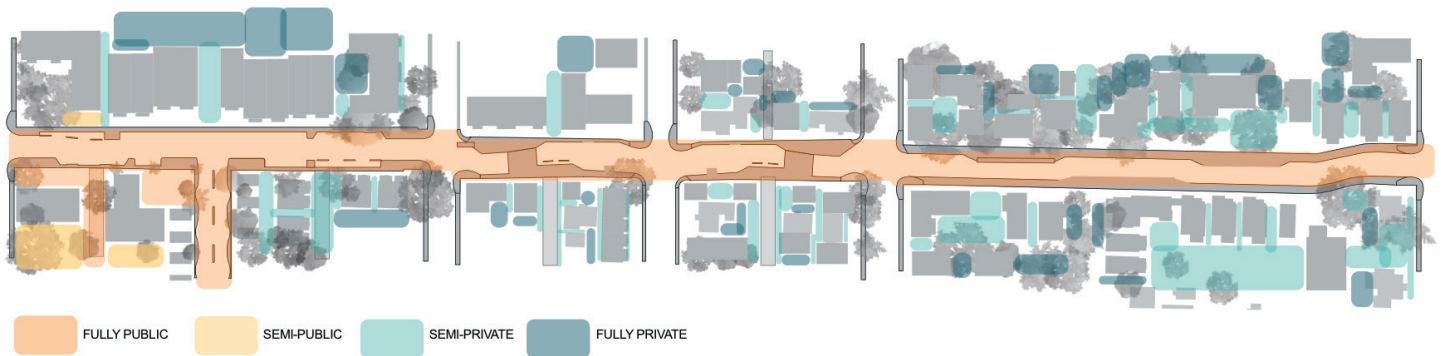


FIG. 2
New public and private realms created by village-style densification

DESIGN DETAILS

Proposed woonerf extension

The proposed extension of the woonerf between NE Hood Avenue and NE Kelly Avenue creates an important pedestrian zone connecting the Gresham Arts Plaza, a notable open-air community venue, and the residential neighborhood at NE 5th Street. Significantly, the extension of the woonerf also acts as a large urban foraging zone. Apple trees, hazelnut trees, native berries, and herbs line the walkway and are present in new medians. This gives cues for pedestrians to frequently visit and engage in this public space.

FIG. 140
Rendering showing a proposal for an extended woonerf that also acts as a large foraging zone



Play blocks and urban forage

As roadways decrease in size, the sidewalks expand and can act as important sites for play and leisure with features including podiums at different heights, neighborhood library stands with seating for reading groups, barbeque stands, and benches for people-watching. The length of the neighborhood acts as a linear park of urban foraging and sites of activity.

Raised oversized crosswalks connect the neighborhood across the roadway. The slight elevation of the crossings and their bumpy paving material (Grasscrete) cause cars to slow down. When only micro-transit vehicles are allowed on the street, these large crosswalks act as a plaza for play, block parties, and other communal activities.

FIG. 141

Expanded sidewalks become important community places that can support various activities



INTERSECTION TREATMENTS

Intersection painting slows cars, signals entry into the residential zone, and can define neighborhood/block character. Textured dark strips at the beginning of the crosswalk improve accessibility for the blind and signal entry into the roadway. Curb extensions maintain 40-foot turning radii for emergency vehicles, moving vans, and delivery services while simultaneously decreasing crossing distance between sidewalks.

In moving from the transitional design to the long-term design, some corners can be expanded using flow-through planters.

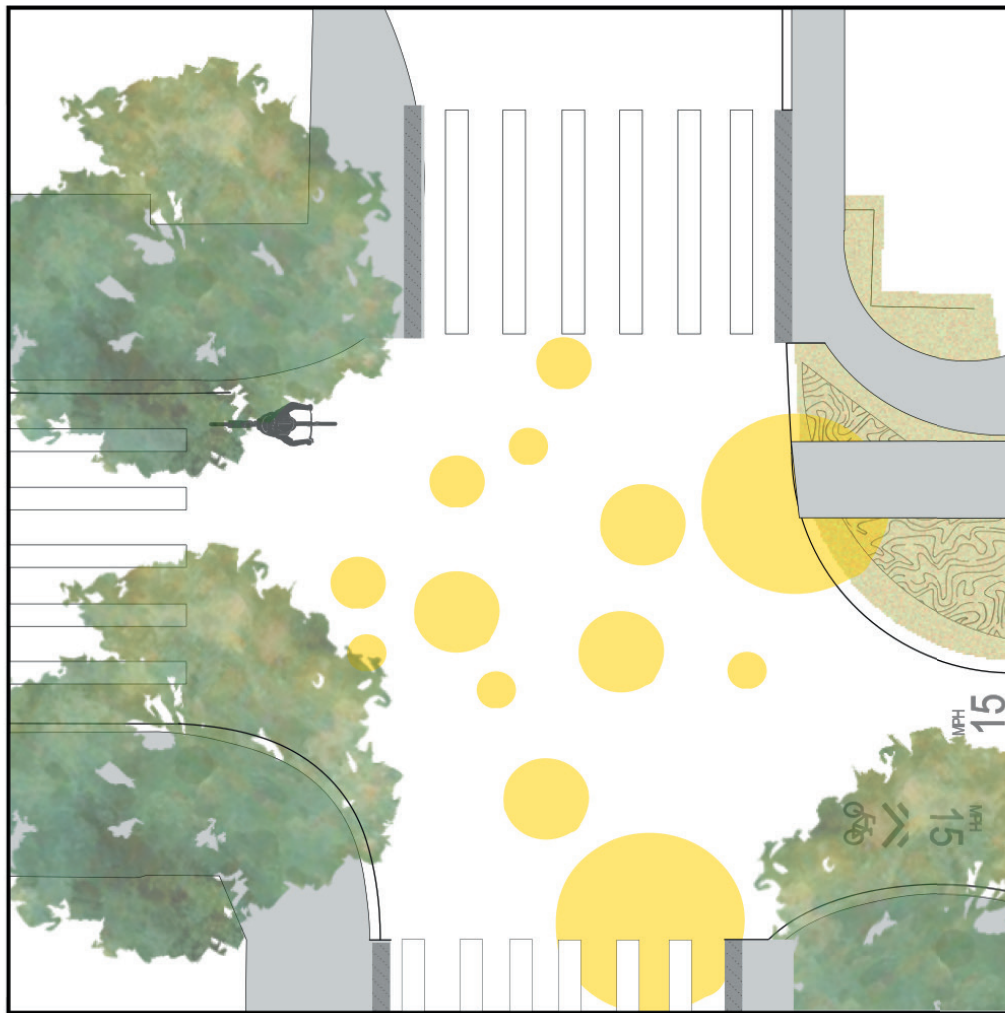


FIG. 142

Various intersection treatments provide safety, neighborhood character, and improved accessibility

DESIGN SUMMARY

This design focuses on mediating future densification of NE 5th Street while maintaining and developing neighborhood character. The design proposes a zoned development of the street with vertical housing with mixed-use streets in one zone and village-style housing with low-rise residential streets in another. This village style densification can lead to the creation of a diverse collection of public, semipublic, and private spaces, ultimately leading to a varied and rich suburban form.

The woonerf near the Gresham Arts Plaza could be extended to NE 5th Street and designed with fruit trees. This would create a walkable urban foraging experience. This design addresses an opportunity to expand the existing widths of sidewalks to create a roadside public space. Seating and podiums would create places for people to meet, interact, and people-watch. The design also proposes that future NE 5th Street integrate various intersection treatments to create safety, accessibility, beauty, and community character.

Conclusion

Advances in automated and shared transportation technology could mean a massive reduction in private car ownership in favor of these alternative means of transportation.

This has major implications for public transportation, streets, and on the larger fabric of cities. There are opportunities to ensure that future development promotes values of safety, equity, social cohesion, and sustainability.

The landscape architecture design studio partnered with the City of Gresham to investigate how streets can be redesigned to meet these challenges in the suburban city context of historic downtown Gresham. The student design proposals present individual concepts for the future streets of Gresham, each with an initial set of assumptions. These designs illustrate what changes could look like in a transitional phase as well as in the long-term, thereby showing possibilities for different points in time with different degrees of anticipated development.

Students working on the historic downtown core developed frameworks and focused site plans illustrating the potential of the historic downtown core to be developed as a social hub for the larger downtown Gresham.

Students working on specific streets developed a wide variety of proposals investigating different solutions of integrating new modes of mobility and increasing density. In general, the student proposals suggest solutions that support alternative modes of transportation, create hubs for social interaction and economic vitality, and integrate green infrastructure.

The proposals also highlight some of the challenges of addressing a very new phenomenon, such as the development of autonomous technology. These design experiments are speculative and based on assumptions such as the mass adoption of affordable autonomous vehicles, increased residential density in Gresham, and an absence of strong demand for parking. Furthermore, there is a lack of relevant existing precedent to inform the design work. As such, students hope that these investigations, designs, and suggestions contribute to the state of knowledge and can be helpful in supporting future design and planning decisions.

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