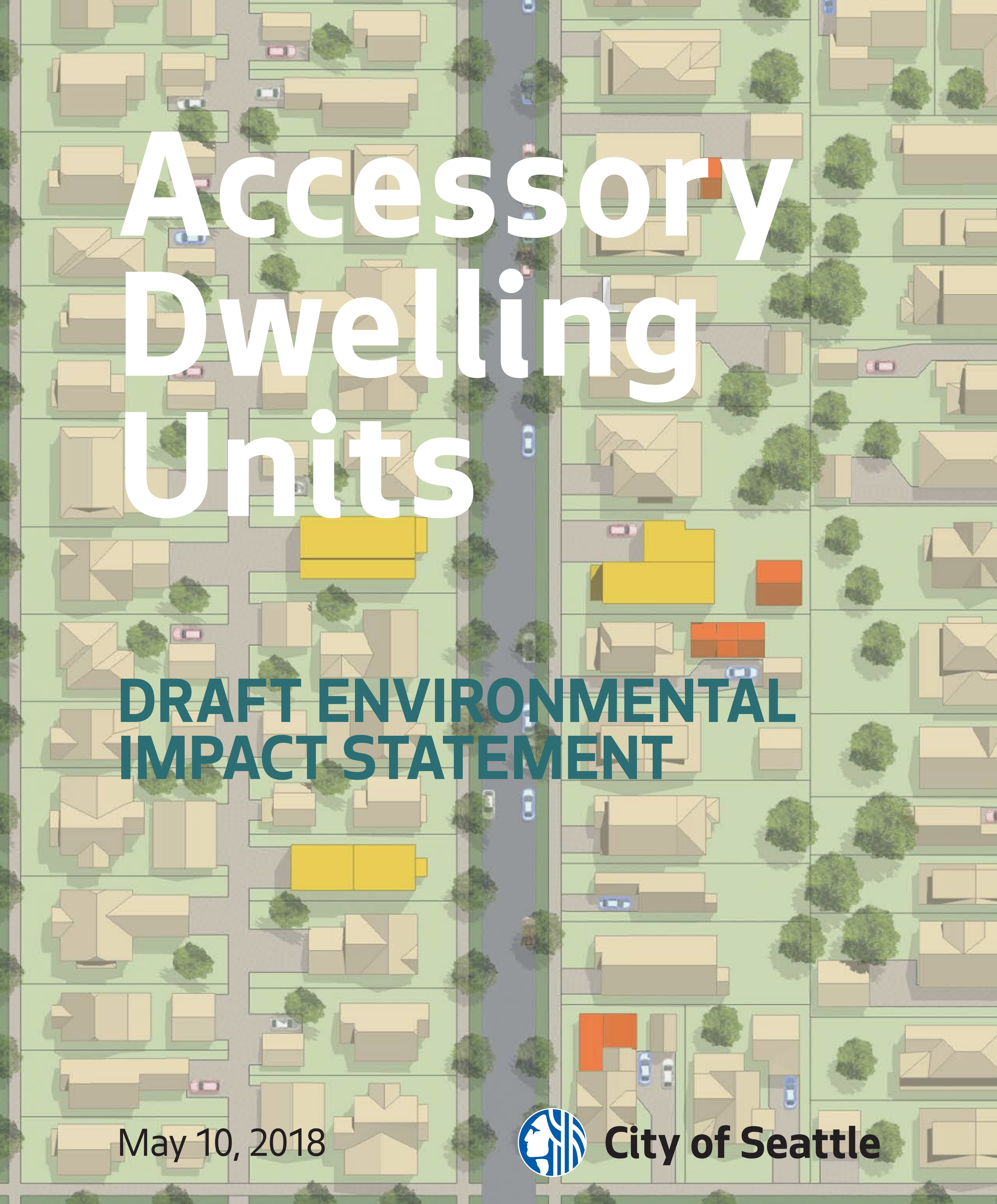

Accessory Dwelling Units

DRAFT ENVIRONMENTAL IMPACT STATEMENT

May 10, 2018

City of Seattle

Accessory Dwelling Units
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Date of Draft EIS Issuance

May 10, 2018

Date Comments Are Due on the Draft EIS

June 25, 2018

Date of Draft EIS Open House and Hearing

May 31, 2018

City of Seattle

City of Seattle

May 10, 2018

Dear Affected Agencies, Tribes, Organizations and Interested Parties,

The City of Seattle invites you to review and comment upon this Draft Environmental Impact Statement (EIS), which examines potential environmental impacts of proposed changes to the City's Land Use Code related to accessory dwelling units (ADUs) in single-family zones. The study area includes land zoned single-family residential outside existing urban centers, urban villages, and urban village expansion areas identified in the City's Mandatory Housing Affordability EIS.

ADUs are a key component of meeting our pressing housing needs. By removing regulatory barriers to make it easier for property owners to build both attached and detached ADUs, we can increase the number and variety of housing choices in Seattle's single-family zones.

The Draft EIS analyzes three alternatives. Alternative 1 (No Action) assumes that the City makes no changes to the Land Use Code related to ADUs. Alternatives 2 and 3 both assume implementation of Land Use Code changes that would increase the number of ADUs produced in Seattle's single-family zones. Both action alternatives address regulations and policies frequently cited as barriers to the creation of ADUs. Alternatives 2 and 3 differ in the scale and focus of the proposed changes. Alternative 2 represents the broadest range of changes to the Land Use Code. Alternative 3 considers more modest adjustments to the Land Use Code that emphasize maintaining the scale of existing development in single-family zones.

The public comment period for this Draft EIS extends through June 25, 2018. You can learn more about this proposal and provide feedback at seattle.gov/council/ADU-EIS. Following the Draft EIS comment period, we will prepare a Final EIS that includes responses to the comments received.

Sincerely,

Ketil Freeman, AICP
City Council Central Staff

Fact Sheet

PROJECT TITLE

City of Seattle Accessory Dwelling Units Environmental Impact Statement

PROPOSED ACTION AND ALTERNATIVES

The proposed action is to amend the City's Land Use Code to remove barriers to the construction of accessory dwelling units (ADUs) in single-family zones. The objectives of the proposal are to:

- Remove regulatory barriers to make it easier for property owners to permit and build attached and detached ADUs.
- Increase the number and variety of housing choices in single-family zones.

This EIS analyzes three alternatives. Alternative 1 (No Action) assumes that the City makes no changes to the Land Use Code related to ADUs. Alternatives 2 and 3 both assume implementation of Land Use Code changes that would increase the number of ADUs produced in Seattle's single-family zones. Both action alternatives address regulations and policies frequently cited as barriers to creation of ADUs. Alternatives 2 and 3 differ in the scale and focus of the proposed changes. Alternative 2 represents the broadest range of changes to the Land Use Code. Alternative 3 considers more modest adjustments to the Land Use Code that emphasize maintaining the scale of existing development in single-family zones.

LOCATION

The study area for this EIS includes land zoned single-family that is located outside of existing urban centers, urban villages, and urban village expansion areas identified in the Mandatory Housing Affordability EIS.

PROPONENT

City of Seattle

LEAD AGENCY

Seattle City Council

RESPONSIBLE SEPA OFFICIAL

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ADUEIS@seattle.gov

REQUIRED APPROVALS

After issuance of the Final EIS, the Seattle City Council will decide whether to adopt proposed changes to the Land Use Code related to ADUs.

APPROXIMATE DATE OF CITY COUNCIL DECISION

Fourth Quarter, 2018

TYPE AND TIMING OF SUBSEQUENT ENVRIONMENTAL REVIEW

Publication of the Final EIS will complete the environmental review process for the proposed action, unless the City Council considers substantial changes that are outside the range of alternatives previously considered.

PRINCIPAL EIS AUTHORS AND CONTRIBUTORS

This Draft EIS has been prepared under the direction of the Seattle City Council's Central Staff. The following consulting firms provided research and analysis associated with this EIS:

- **HDR:** Lead EIS consultant
- **ECONorthwest:** Environmental analysis of housing and socioeconomics
- **Toole Design Group:** Environmental analysis of transportation and parking; and public services and utilities
- **Broadview Planning:** Environmental analysis of land use; review and advise on the description of the proposal and alternatives
- **Scarlet Plume:** Technical editing

DATE OF DRAFT EIS ISSUANCE

May 10, 2018

DATE COMMENTS ARE DUE

June 25, 2018

Please submit comments using the online form on the project website at seattle.gov/council/ADU-EIS or via email to ADUEIS@seattle.gov.

Or submit written comments to:

Aly Pennucci, AICP
City of Seattle, Council Central Staff
600 4th Avenue, Floor 2
PO Box 34025
Seattle, WA 98124-4025

DATE AND LOCATION OF DRAFT EIS OPEN HOUSE AND HEARING

May 31, 2018, 5:30 p.m.
Seattle City Hall, 600 4th Ave, Bertha Knight Landes room

APPROXIMATE DATE OF FINAL EIS ISSUANCE

September 2018

LOCATION OF BACKGROUND DATA

Office of Seattle City Council
Central Staff

DRAFT EIS AVAILABILITY AND PURCHASE PRICE

Copies of this Draft EIS have been distributed to agencies, organizations, and individuals, as established in SMC 25.05.

Notice of Availability of the Draft EIS has been provided to organizations and individuals that requested to become parties of record.

A copy of the Draft EIS is also available for public review at the following branches of the Seattle Public Library:

- Central Library, 1000 4th Ave
- Capitol Hill Branch, 425 Harvard Ave E
- Columbia City Branch, 4721 Rainier Ave
- High Point Branch, 3411 SW Raymond St
- Ballard Branch, 5614 22nd Avenue NW
- Northeast Branch, 6801 35th Ave NE

A limited number of complimentary copies of this Draft EIS are available — while the supply lasts — as an electronic CD from the Seattle Department of Construction and Inspections (SDCI) Public Resource Center, located in Suite 2000, 700 5th Ave, in downtown Seattle. Additional copies may be purchased at the Public Resource Center for the cost of reproduction.

Contents

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Exhibits

2 Alternatives

3 History and Planning Context

4 Environmental Analysis

4.1 Housing & Socioeconomics

4.2 Land Use

4.3 Aesthetics

4.4 Parking and Transportation

4.5 Public Services & Utilities

Appendix A
Analysis of Housing and Socioeconomics Impacts

Appendix B
Parking Analysis Methods and Assumptions

Appendix C
Aesthetics Modeling Methods and Assumptions

1 Summary

The City of Seattle (City) has prepared this draft Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of proposed changes to the City's Land Use Code intended to remove barriers to the creation of accessory dwelling units (ADUs). This EIS has been prepared to meet requirements of the Washington State Environmental Policy Act (SEPA, Chapter 43.21C Revised Code of Washington [RCW]).

1.1 Proposal Overview

The City proposes to change regulations in the Land Use Code to remove regulatory barriers to the creation of ADUs in single-family zones. ADUs include backyard cottages, known as detached accessory dwelling units (DADUs), and in-law apartments, known as attached accessory dwelling units (AADUs). The proposal involves several Land Use Code changes, including allowing two ADUs on some lots, changing the existing off-street parking and owner-occupancy requirements, and changing some development standards that regulate the size and location of DADUs.

ADUs have been allowed citywide as part of a main house or in the backyard of lots in single-family zones since 1994 and 2010, respectively. The City's proposal would modify the rules that regulate when and where a property owner can create an ADU to make it easier for property owners to permit and build AADUs and DADUs. These policy changes would affect future development in Seattle's single-family zones.

Accessory dwelling units

A detached accessory dwelling unit (DADU) is a secondary unit located in a separate structure from the principal dwelling unit (i.e., the main house). DADUs are often called backyard cottages.

An attached accessory dwelling unit (AADU) is a secondary unit located within or connected to the main house. AADUs are often called in-law apartment units or granny flats.

We are using the EIS process to analyze potential changes to the Land Use Code to increase ADU production that will ultimately be proposed for action by the City Council. This EIS evaluates two action alternatives, Alternatives 2 and 3, containing a range of potential changes to the Land Use Code.The Final EIS may include modified alternatives or identify a preferred alternative. A modified or preferred alternative could combine elements of the Land Use Code changes proposed under Alternative 2 or Alternative 3. The study area for this EIS includes land zoned single-family outside existing urban villages and urban village expansion areas studied in the Mandatory Housing Affordability (MHA) EIS.

1.2 Proposal Objective

A proposal's objective plays a key role in determining the range of alternatives considered and analyzed in an EIS. The objective guides the lead agency in selecting a preferred alternative and eliminates some alternatives from further consideration. The historical and planning context described in Chapter 3 informed the development of the proposal and its objectives. The proposal evaluated in this EIS follows staff review requested in Council Resolution 31547 and builds on the work of the Housing Affordability and Livability Agenda (HALA) Advisory Committee, whose final recommendations identified measures to boost ADU production as one of several strategies for increasing housing choices in Seattle (HALA Advisory Committee 2015). Currently, about two percent of Seattle's roughly 135,000 lots in single-family zones have an ADU. Since their legalization citywide in 2010, about 579 DADUs have been constructed or permitted.

The objective of this proposal is to implement Seattle's Comprehensive Plan (Seattle 2016a) policies related to development of ADUs. The Comprehensive Plan, which is the 20-year roadmap for the city's future, contains goals and policies intended to support four core values: race and social equity, environmental stewardship, community, and economic security and opportunity. Under Washington's Growth Management Act (GMA), counties and large cities must create and regularly update comprehensive plans to identify where growth will unfold and to plan for housing, transportation, water, sewer, and other necessary facilities. Zoning and development standards are one way the City implements the policy direction outlined in the Comprehensive Plan. With this proposal, the City aims to implement Comprehensive Plan policies related to ADUs:

Land Use Policy 7.5 Encourage accessory dwelling units, family-sized units, and other housing types that are attractive and affordable, and that are compatible with the development pattern and building scale in single-family areas in order to make the opportunity in single-family areas more accessible to a broad range of households and incomes, including lower-income households.

Land Use Policy 7.12 Emphasize measures that can increase housing choices for low-income individuals and families when considering changes to development standards in single-family areas.

The objectives of this proposal of are to:

- Remove regulatory barriers to make it easier for property owners to permit and build AADUs and DADUs
- Increase the number and variety of housing choices in single-family zones

1.3 Planning Context

In September 2014, the City Council adopted Resolution 31547 (Seattle City Council 2014) directing Department of Planning and Development staff, now at the Office of Planning and Community Development (OPCD), to explore policy changes that would spur creation of both AADUs and DADUs. Council directed OPCD staff to examine regulatory changes, incentives, and marketing and promotion strategies to boost ADU production. In response to the Council Resolution, OPCD proposed Land Use Code changes similar to changes analyzed in this EIS.

In May 2016, OPCD prepared an environmental checklist evaluating the potential environmental impacts of the proposed changes to the Land Use Code, and issued a determination of non-significance. The determination of non-significance was appealed in June 2016. In December 2016, the Seattle Hearing Examiner determined that a more thorough review of the potential environmental impacts of the proposal was required (Tanner 2016). Based on the Hearing Examiner's decision, the Seattle City Council prepared this Environmental Impact Statement (EIS) in accordance with the Washington State Environmental Policy Act (SEPA).

Chapter 3 discusses the history of and context for the proposal in greater detail.

1.4 Environmental Impact Statement Process

In May 2016, we prepared an environmental checklist evaluating the potential environmental impacts of the proposed changes to the Land Use Code and made a determination of non-significance (Seattle 2016c). The determination made in the checklist was appealed in June 2016. In December 2016, the Seattle Hearing Examiner determined that a more thorough review of the potential environmental impacts of the proposal was required (Tanner 2016). Based on the Hearing Examiner's decision, the Seattle City Council, as the SEPA lead agency, has determined that this proposal may have significant adverse environmental impacts on the environment. An EIS is required under RCW 43.21C.030 (2)(c) and has been prepared in accordance with SEPA. The SEPA environmental review process includes the steps described below.

EIS SCOPING PROCESS

The first step in the development of an EIS is called scoping. During the scoping process, agencies, tribes, local communities, organizations, and the public are invited to comment on factors that the EIS should analyze and consider. Specifically, the process is intended to collect input on the following topics:

- Reasonable range of alternatives
- Potentially affected resources and the extent of analysis for those resources
- Measures to avoid, minimize, and mitigate impacts of the proposal
- Potential cumulative impacts

The scoping period was announced via the proposal website, published in the City's Land Use Information Bulletin and in the Daily Journal of Commerce, and posted to an email listserv that we maintain. The original scoping period for the proposal was scheduled for 30 days from October 2 to November 1, 2017. Based on comments received during the scoping period, it was extended by an additional 15 days to close on November 16, 2017. We also hosted two public scoping meetings on October 17, 2017, in West Seattle and October 26, 2017, in Ballard. We accepted comments through an online comment form on the proposal website, by email, and via written letters and comment forms. In total, we received 1,048 scoping comments. The Accessory Dwelling Units Environmental Impact Statement Scoping Report documents the scoping process (Seattle 2018).

As described below, we will seek further input during the Draft EIS public comment period.

DRAFT EIS PREPARATION, PUBLICATION, AND REVIEW

Following the completion of scoping, a Draft EIS is prepared. The purpose of an EIS is to provide an impartial discussion of the potential for significant environmental impacts and reasonable alternatives and mitigation measures that avoid or minimize adverse environmental impacts. The information in this Draft EIS is provided for review and comment by interested parties and will also help us evaluate the proposal.

We will seek comments from agencies, tribes, local communities, organizations, and the public during a 45-day comment period from May 10 to June 25, 2018. A public hearing will be held on May 31, 2018. The hearing will be held at Seattle City Hall (600 4th Avenue, 1st floor) in the Bertha Knight Landes room. We will accept comments by mail, an online comment form, email, and at the public meeting (orally and in writing). Comments received during the comment period will be addressed in the Final EIS.

FINAL EIS PUBLICATION

Following the Draft EIS comment period, we will issue the Final EIS. The Final EIS will address comments received during the comment period and may include additional information and input received from agencies, tribes, local communities, organizations, and the public regarding the proposal. We will use the Final EIS to inform the legislative process. The Final EIS may include modified alternatives or identify a preferred alternative.

1.5 Summary of Issues of Concern

The December 2016 Hearing Examiner decision identified several issues of concern for additional analysis in this EIS. These include evaluating and focusing the impacts discussion on:

- Housing and Socioeconomics (Section 4.1)
- Land Use (Section 4.2)
- Aesthetics (Section 4.3)
- Parking and Transportation and (Section 4.4)
- Public Services and Utilities (Section 4.5)

No additional elements of the environment were identified as a result of the City's subsequent EIS scoping process. In addition, in the scoping notice for this EIS, we presented two potential alternatives: Alternative 1 (No Action) and Alternative 2 (the proposed Land Use Code changes). However, based on comments received during the scoping period, we added a second action alternative for evaluation in this EIS (Alternative 3). Alternative 3 considers more modest adjustments to the Land Use Code that emphasize allowing a variety of housing types while maintaining a scale compatible with existing development in single-family zones. Based on the scoping comments received, the specific parameters considered under Alternative 3 include retaining the owner-occupancy requirement and eight-person maximum household size limit, adding MHA requirements, requiring an off-street parking space for lots with a second ADU, and incorporating maximum floor area ratio (FAR) limits. We outline each alternative further in Chapter 2.

1.6 Summary of Alternatives

This EIS analyzes three alternatives. Alternative 1 (No Action) assumes that the City makes no changes to the Land Use Code related to ADUs. Alternatives 2 and 3 both assume implementation of Land Use Code changes that would increase the number of ADUs produced in Seattle's single-family zones. Both action alternatives address regulations and policies frequently cited as barriers to creation of ADUs. Alternatives 2 and 3 differ in the scale and focus of the proposed changes. Alternative 2 represents the broadest range of changes to the Land Use Code, similar to the draft proposal analyzed in May 2016 prior to the Hearing Examiner's decision. Alternative 3 considers more modest adjustments to the Land Use Code that emphasize maintaining the scale of existing development in single-family zones.

1.7 Summary of Impacts and Mitigation

This section provides a brief overview of the analysis for each element of the environment and then summarizes the potential impacts and mitigation measures proposed (see Exhibit 1-1). The potential impacts from the proposed Land Use Code changes are detailed in Chapter 4 of this EIS. We encourage readers to review the more comprehensive discussion of issues in Chapter 4 to formulate the most accurate impression of impacts associated with the alternatives.

To evaluate the potential impacts of the proposed Land Use Code changes, the housing and socioeconomics analysis in Section 4.1 evaluated the number of ADUs that could be created given the proposed Land Use Code changes under each alternative. The results of this analysis indicate that both Alternatives 2 and 3 would increase the production of ADUs citywide compared to Alternative 1. Under Alternative 1 (No Action) we estimate that approximately 1,890 ADUs would be created between 2018 and 2027. In comparison, we estimate that Alternative 2 would result in approximately 3,330 ADUs over the same 10-year period, while Alternative 3 would result in approximately 3,100 ADUs. We also found that both Alternatives 2 and 3 are likely to reduce the number of teardowns of existing houses. We expect the overall number of teardowns to decrease from 2,610 under Alternative 1 (No Action) to 2,460 under Alternative 2, and 2,220 under Alternative 3, including fewer teardowns in lower-price neighborhoods specifically.

This rate of production of new ADUs and teardowns of existing houses was then applied to the analysis of the potential impacts to the elements of the environment evaluated in this EIS, including housing and socioeconomics; land use; aesthetics; parking and transportation; and public services and utilities. Exhibit 1-1 presents the approach to each analysis, potential impacts, and mitigation.

Exhibit 1-1 Summary of Approach, Impacts, and Mitigation

HOUSING AND SOCIOECONOMICS

	Alternative 1 (No Action)	Alternative 2	Alternative 3
Approach	The analysis of housing and socioeconomics considered how proposed Land Use Code changes could alter the underlying real-estate economics in single-family zones. We considered the impacts the proposal could have on housing affordability and displacement.		
Impacts	Housing affordability and displacement in the study area would continue to be a concern and burden for many Seattle residents. The creation of fewer ADUs under Alternative 1 (No Action) compared to both action alternatives would result in fewer housing options available in the study area, putting greater upward pressure on housing prices and resulting in greater potential for economic displacement. Alternative 1 (No Action) would result in marginally more teardowns than both action alternatives, resulting in greater potential for physical displacement.	While the affordability of housing would remain a concern and burden for many Seattle residents, the creation of additional ADUs under Alternative 2 would increase the number of housing choices available in the study area compared to Alternative 1 (No Action). This would have a positive impact on affordability and decrease the potential for economic displacement because the additional housing supply could marginally reduce upward pressure on rents and housing prices. Alternative 2 could result in fewer teardowns than Alternative 1 (No Action), which would reduce the potential for physical displacement.	The beneficial impacts on housing affordability under Alternative 3 would be similar to, but slightly less than, Alternative 2 since fewer ADUs would be created. Of the three alternatives, we estimate that Alternative 3 would result in the fewest teardowns, giving it the the greatest potential to reduce physical displacement impacts.
Mitigation	n/a	Based on the results of the analysis, the proposed Land Use Code changes would have marginal benefits on housing affordability and would not increase displacement impacts. Therefore, no mitigation measures are proposed.	

LAND USE

	Alternative 1 (No Action)	Alternative 2	Alternative 3
Approach	We evaluated the potential land use impacts by considering whether the proposed Land Use Code changes would result in changes to building density, population density, or scale that would be incompatible with existing development in Seattle's single-family zones.		
Impacts	We anticipate negligible impacts to building and population density from the ADUs constructed over time. There would be no change to the scale of ADUs allowed under existing Land Use Code regulations.	Minor impacts could occur from increases in building and population density. Likewise, Alternative 2 could result in minor changes in building scale from allowing slightly larger DADUs on smaller lots than currently allowed. Localized impacts could occur if ADU production is higher in a concentrated area, such as a particular block in the study area.	Minor impacts could occur increases in building density and population density. Like Alternative 2, minor changes in building scale could result from allowing slightly larger DADUs on smaller lots than currently allowed. These changes would be slightly less than Alternative 2, as Alternative 3 includes a floor area ratio (FAR) limit that would limit the size of detached single-family houses. Localized impacts could occur if ADU production is higher in a concentrated area, such as a particular block in the study area.
Mitigation	n/a	No significant adverse impacts to land use are anticipated; therefore, no mitigation measures are proposed.	

AESTHETICS

	Alternative 1 (No Action)	Alternative 2	Alternative 3
Approach	We consider aesthetic impacts by evaluating how the proposed Land Use Code changes would affect the visual character of single-family zones. We analyzed the potential aesthetic impacts using three-dimensional visual modeling to illustrate the potential changes to the scale and form of development in the study area.		
Impacts	Compared to Alternatives 2 and 3, Alternative 1 (No Action) would result in more teardowns, more lots with large new houses, and fewer ADUs overall. Ongoing changes in aesthetics resulting from tearing down existing houses and rebuilding new houses would continue.	We do not anticipate that the increase in construction of ADUs and the decrease in the number of houses torn down when compared to Alternative 1 (No Action) would result in aesthetic impacts. Alternative 2 is not expected to result in a fundamental change in visual character of neighborhoods where additional ADUs would be constructed as new ADUs would likely be dispersed throughout neighborhoods in the city. If a concentration of ADUs did arise in a particular neighborhood, localized aesthetic impacts could occur but would be minor. The reduction in the number of houses torn down would help retain the existing overall aesthetic character of neighborhoods in the study area since new single-family houses erected following teardowns are often visually distinct from existing structures due to differences in architectural style, scale, and proportions.	Alternative 3 represents more modest changes to the Land Use Code when compared to Alternative 2. The aesthetics impacts from Alternative 3 would be very similar to, but slightly less than, those described under Alternative 2 due to the introduction of the FAR limit.
Mitigation	n/a	No significant adverse impacts to aesthetics are anticipated; therefore, no mitigation measures are proposed.	

PARKING AND TRANSPORTATION

	Alternative 1 (No Action)	Alternative 2	Alternative 3
Approach	*Parking.* We compared the existing availability of on-street parking with the expected increase in demand for on-street parking under each alternative. We assumed that on-street parking utilization would not become an issue until parking utilization exceeded 85 percent. *Transportation.* We considered how the overall changes in population anticipated under each alternative would affect the service levels of existing transportation networks in the context of the growth and impacts considered in the Comprehensive Plan EIS (Seattle 2016b).		
Impacts	*Parking.* ADU production would not have a significant adverse impact on the availability of on-street parking throughout the study area. *Transportation.* The impacts to the transportation system would not differ from those described in the Comprehensive Plan EIS, which found that there would not be significant impacts to the transportation network.	*Parking.* We do not expect increased parking demand resulting from ADU production to exceed existing on-street parking availability under typical conditions. However, there may be some specific blocks within the study area where on-street parking utilization does, or will in the future, exceed parking supply. In those instances, some localized impacts on the availability of on-street parking may occur. *Transportation.* The impacts to the transportation system would not differ from those described in the Comprehensive Plan EIS, which found that there would not be significant impacts to the transportation network.	*Parking.* We do not expect increased parking demand resulting from ADU production to exceed existing on-street parking availability under typical conditions. However, there may be some specific blocks within the study area where on-street parking utilization does, or will in the future, exceed parking supply. In those instances, some localized impacts on the availability of on-street parking may occur. *Transportation.* The impacts to the transportation system would not differ from those described in the Comprehensive Plan EIS, which found that there would not be significant impacts to the transportation network
Mitigation	n/a	The parking analysis did not identify potential significant adverse impacts. No mitigation measures are required. However, the City will continue to respond to changes to parking supply in specific areas that currently have or are projected to have high parking utilization. If issues arise, the City will rely upon use of regulations in the municipal code. No mitigation for transportation impacts is under consideration.	

PUBLIC SERVICES AND UTILITIES

	Alternative 1 (No Action)	Alternative 2	Alternative 3
Approach	We evaluated potential impacts to public services and utilities by considering the overall changes in population anticipated under each alternative relative to the existing service levels for each public service and utility.		
Impacts	Development of ADUs would continue as under existing conditions. Overall demand for public services and utilities would continue to increase with population growth; however, Seattle Public Utilities, Seattle City Light, Seattle Public Schools, Seattle Police Department, and Seattle Fire Department, anticipate and continue to plan for this growth.	Alternative 2 could result in about 2,160 additional ADU residents over 10 years compared to Alternative 1 (No Action). Even if this resulted in a corresponding increase of 2,160 new Seattle residents, we do not anticipate this growth would result in impacts on the ability of Seattle Public Utilities, Seattle City Light, Seattle Public Schools, Seattle Police Department, and Seattle Fire Department to provide service.	Alternative 2 could result in about 1,815 additional ADU residents over 10 years compared to Alternative 1 (No Action). Even if this resulted in a corresponding increase of 1,815 new Seattle residents, we do not anticipate this growth would result in impacts on the ability of Seattle Public Utilities, Seattle City Light, Seattle Public Schools, Seattle Police Department, and Seattle Fire Department to provide service.
Mitigation	n/a	No significant adverse impacts are anticipated to public services and utilities; therefore, no mitigation measures are proposed.	

1.8 Cumulative Impacts

SEPA requires that the City consider the cumulative impacts of the proposal in this EIS (WAC 197-11-060). A cumulative impact is defined as the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions occurring during a determined timeframe. In this cumulative impact analysis, we consider the proposed Land Use Code changes in the context of the historical, continuing, and future development in single-family zones in the study area of the EIS. There are no other planned code or zoning changes to single-family zones in the study area that would change the present development conditions. Therefore, we did not consider any reasonably foreseeable future actions in this analysis. The effects analysis that follows in Chapter 4 considers the existing and continuing development environment in Seattle. The impacts reported in Chapter 4 would be negligible when considered in the context of changes occurring throughout the city. Therefore, we do not anticipate cumulative impacts due to the proposed Land Use Code changes.

1.9 Benefits and Disadvantages of Delaying Implementation

SEPA requires that an EIS discuss the benefits and disadvantages of delaying implementation of a proposal (WAC 197-11-440(5)(c)(vii)). The urgency of implementing the proposal can be compared with any benefits of delay. The EIS should also consider the foreclosure of other options, or whether implementation of the proposal would preclude implementation of another proposal in the future. If this proposal were postponed, the beneficial impacts on housing affordability and reduced economic and physical displacement would be delayed. Minor localized land use, aesthetics and parking impacts would also be delayed. Implementation of this proposal would not preclude implementation of another proposal in the future.

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2 Alternatives

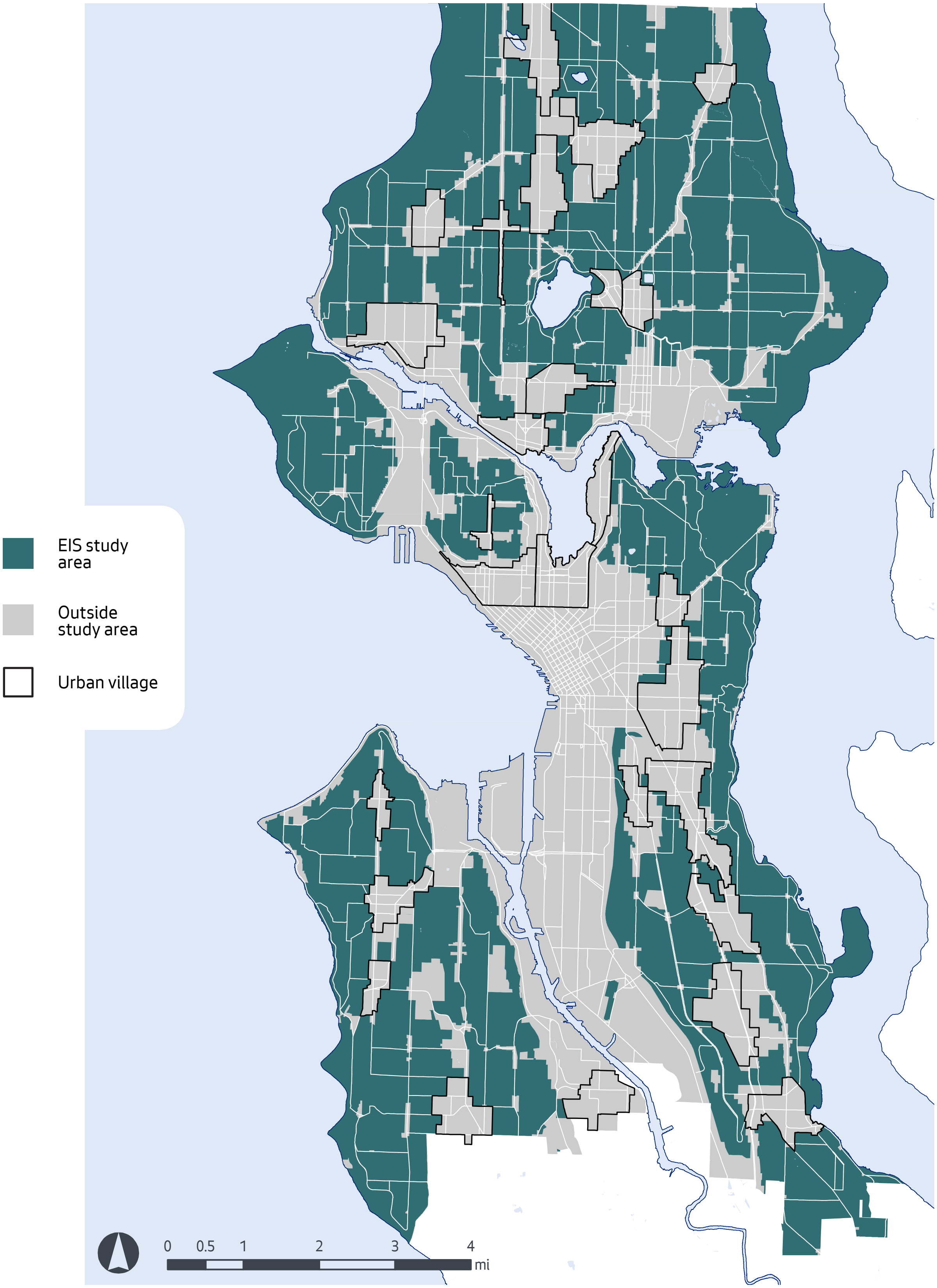
The City of Seattle (City) proposes to change regulations in the Land Use Code to remove barriers to the creation of ADUs in single-family zones. The objectives of the proposal evaluated in this EIS are to:

- Remove regulatory barriers to make it easier for property owners to permit and build AADUs and DADUs
- Increase the number and variety of housing choices in single-family zones

2.1 Study Area

The study area for this EIS includes land zoned single-family outside existing urban villages and urban village expansion areas studied in the Mandatory Housing Affordability (MHA) EIS (Exhibit 2-1).

Exhibit 2-1 Map of the EIS Study Area



2.2 Development of Alternatives

In the scoping notice (Seattle City Council 2017), we initially proposed to study two alternatives: Alternative 1 (No Action) and one action alternative that considered changes to the Land Use Code. During the scoping comment period, we received several comments encouraging us to add a second action alternative. Some comments suggested this third alternative should consider a more aggressive scenario that allows duplexes, triplexes, and small apartments in the study area and considers smaller minimum lot sizes for subdivision in single-family zones. Others requested that we study an alternative whose intensity is between the two alternatives we initially proposed by excluding certain changes intended to spur ADU production, or that we study an alternative that further restricts ADU production compared to current policies. However, the objective of the proposal is to increase the production of ADUs in single-family zones. Changes that would allow lots in single-family zones to be subdivided for separate ownership of principal units, or that would allow traditional duplexes or triplexes, are outside the scope of this proposal. Similarly, changes to zoning designations for land in the study area, such as rezoning areas to the Residential Small Lot (RSL) zone, are outside the scope of this proposal.

While some policies suggested during scoping do not meet the project's objectives, based on scoping comments we propose to evaluate three alternatives in this Draft EIS. Alternative 1 (No Action) assumes that the City makes no changes to the Land Use Code related to ADUs. Alternatives 2 and 3 both assume implementation of Land Use Code changes that would increase the number of ADUs produced in Seattle's single-family zones. Both action alternatives address regulations and policies frequently cited as barriers to creation of ADUs. Alternatives 2 and 3 differ in the scale and focus of the proposed changes. Alternative 2 represents the broadest range of changes to the Land Use Code, similar to the draft proposal analyzed in May 2016 prior to the Hearing Examiner's decision. Alternative 3 considers more modest adjustments to the Land Use Code that emphasize maintaining the scale of existing development in single-family zones.

PROPOSED ALTERNATIVES

This EIS analyzes three alternatives. Under Alternative 1 (No Action), no changes would be made to the existing ADU regulations. Alternatives 2 and 3 consider several Land Use Code changes to meet the objectives of the proposal. Exhibit 2-2 outlines the current regulations under Alternative 1 (No Action) and the proposed changes under Alternatives 2 and 3. We then describe the individual regulations and how they would apply under each alternative.

Exhibit 2-2 Existing and Proposed Land Use Code Regulations for ADUs

	Alternative 1 (No Action)	Alternative 2	Alternative 3
Number of ADUs allowed on lots in single-family zones	Lots in single-family zones can have one AADU or one DADU, but not both.	Lots in single-family zones can have an AADU and a DADU.	Lots in single-family zones can have an AADU and a DADU or two AADUs.
Off-street parking requirements	One off-street parking space is required for an AADU or a DADU unless the lot is in an urban village.	No off-street parking required.	No off-street parking required for lots with one ADU. One off-street parking space is required for lots adding a second ADU.
Owner-occupancy requirements	An owner must occupy either the main house or the AADU/DADU for six months of the year.	No requirement for an owner to occupy the house, AADU, or DADU.	No change from Alternative 1 (No Action).
Minimum lot size	4,000 square feet	3,200 square feet	
Maximum gross floor area	***AADU*** 1,000 square feet, including garage and storage areas. ***DADU*** 800 square feet, including garage and storage areas.	***AADU*** 1,000 square feet, excluding garage and storage areas. ***DADU*** 1,000 square feet, excluding garage and storage areas. An AADU or a DADU may exceed 1,000 square feet if the portion of the structure in which the ADU is located existed on December 31, 2017, and if the entire ADU is located on one level.	***AADU*** 1,000 square feet, including garage and storage areas. ***DADU*** 1,000 square feet, including garage and storage areas. An AADU may exceed 1,000 square feet if the portion of the structure in which the AADU is located existed on December 31, 2017, and if the entire AADU is located on one level.
Maximum height	No change from existing height limits, which vary by lot width and range from 15 to 23 feet.	Height limits are 1 to 3 feet higher than existing limits, depending on lot width. Allow 1 to 2 additional feet for a DADU that meets green roof standards.	Height limits are 1 to 3 feet higher than existing limits, depending on lot width.
Lot coverage	No change from current regulations. ***Lots greater than 5,000 square feet*** 35 percent of lot area. ***Lots less than 5,000 square feet*** 15 percent of lot area plus 1,000 square feet.		
Rear yard coverage	40 percent of a rear yard can be covered by a DADU and other accessory structures (like a garage). This limit applies in addition to the overall lot coverage limit.	60 percent of a rear yard can be covered by a DADU and other accessory structures, if the DADU is 15 feet or less in height. Rear yard coverage for structures other than a DADU cannot exceed 40 percent.	
Roof features	No exceptions for roof features on accessory structures are allowed.	Height limit exceptions are allowed for projections like dormers that add interior space, subject to the provisions applicable to single-family houses.	

	Alternative 1 (No Action)	Alternative 2	Alternative 3
Location of DADU entry	DADU entrances cannot face the nearest side or rear lot line unless that lot line abuts an alley or other public right-of-way.	DADU entrances can be on any façade if they are 10 feet from the lot line and if located on the façades facing the nearest side or rear lot line (unless abutting right-of-way).	
Maximum household size	Any number of related people, or up to eight unrelated people, can live on lots in single-family zones including in an AADU or a DADU.	Any number of related people, or up to eight unrelated people, can live on lots in single-family zones with an AADU or a DADU. If the lot has an AADU and a DADU, the limit is 12.	No change from Alternative 1 (No Action).
MHA requirements	Mandatory Housing Affordability (MHA) does not apply to creation of ADUs on lots in single-family zones.	No change from Alternative 1 (No Action).	MHA requirements apply when a property owner applies for a permit to construct a second ADU on a lot that already has one ADU. For development of a second ADU, the MHA requirements for zones with an (M) suffix would apply, as outlined in Section 23.58C of the Land Use Code. For purposes of analysis, this equates to an affordability contribution of $13 per square foot of gross floor area in the second ADU.
Predevelopment costs	No change.	Reduces predevelopment costs by 10 percent. This could result from reducing permitting costs by streamlining project review, reducing permitting and design costs by providing pre-approved plans, or other actions.	No change from Alternative 1 (No Action).
Maximum floor area ratio (FAR) limit	No FAR limit for single-family zones. The maximum size for the main house is effectively set by the yard requirements, height limit, and lot coverage limit. ADUs are subject to the maximum size limits described above.	No change from Alternative 1 (No Action).	***New construction*** FAR limits apply to development in single-family zones. New houses (i.e., principal structures) are subject to a FAR limit of 0.5 or 2,500 square feet, whichever is greater. Below-grade floor area and floor area in DADUs is exempt. ADU size limits apply. ***Existing houses*** Existing lots in single-family zones exceeding the FAR or 2,500-square-foot limits can convert existing space to an AADU and add a DADU subject to the size limit above.

EXISTING AND PROPOSED ADU REGULATIONS

Number of ADUs on Lots in Single-Family Zones

Alternative 1 (No Action). Under current regulations, lots in single-family zones can have one AADU or one DADU, but not both.

Alternative 2. The proposed code changes would allow lots in single-family zones to have both an AADU and a DADU. On its own, this change maintains the maximum building envelope currently allowed in single-family zones and modifies only the number of units allowed within that envelope. The maximum lot coverage limit would continue to regulate the footprint of structures on these lots, and other development standards would apply as described further below.

Alternative 3. The proposed code changes would allow lots in single-family zones to have both an AADU and a DADU or two AADUs. Like Alternative 2, this does not change the building envelope allowed currently on lots in single-family zones.

Off-Street Parking Requirements

Alternative 1 (No Action). Current regulations require property owners to provide an off-street parking space when establishing an accessory dwelling unit. This requirement can be waived only if the topography of or location of existing structures on the lot make providing the parking space infeasible. This requirement is in addition to the off-street parking space required for main houses on lots in single-family zones.

Alternative 2. The proposed Land Use Code changes under Alternative 2 would remove the off-street parking requirement for lots with one or two ADUs. This would not alter the existing provision that prohibits removal of an existing required parking space for the main house unless replaced elsewhere on the lot.

Alternative 3. Under Alternative 3, the proposed changes would remove the parking requirement for lots with one ADU but require parking when a second ADU is established on the same lot, in addition to the parking space required for the main house.

Owner-Occupancy Requirement

Alternative 1 (No Action). Current regulations require that a property owner occupy either the main house or the ADU for six months of the year.

Alternative 2. Alternative 2 would remove the owner-occupancy requirement. Property owners would not be required to occupy the main house, AADU, or DADU. This would allow property owners who no longer want or are able to live on their property to move and rent their house, AADU, and DADU. It would also allow property owners who currently rent out their house to create an AADU and/or a DADU on their lot.

Alternative 3. Under Alternative 3, the current requirement that a property owner occupy either the main house or ADU for six months of the year would remain.

Minimum Lot Size

Alternative 1 (No Action). Under current regulations, DADUs can be constructed only on lots 4,000 square feet and larger. Converting an existing accessory structure into a DADU is allowed on lots smaller than 4,000 square feet.

Alternatives 2 and 3. The proposed code changes under Alternatives 2 and 3 would reduce the minimum lot size for a DADU to 3,200 square feet. Approximately 7,300 lots in single-family zones that currently do not have but otherwise meet the criteria for a DADU would become eligible for one due to this change.

Maximum Gross Floor Area

Alternative 1 (No Action). Under current regulations, AADUs are limited to 1,000 square feet, including garage and storage space. An AADU located entirely on one level can exceed the 1,000-square-foot limit if the structure in which it is located existed on June 1, 1999. DADUs are limited to 800 square feet, including garage and storage space.

Alternative 2. Under Alternative 2, the maximum size limit would increase to 1,000 square feet for DADUs, and garage and storage space would no longer count toward the allowance for AADUs or DADUs. An AADU or a DADU may exceed the 1,000-square-foot limit if the portion of the structure in which the ADU is located existed on December 31, 2017, and if the entire ADU is located on one level.

Alternative 3. Under Alternative 3, the maximum size limit would be 1,000 square feet for both AADUs and DADUs, but garage and storage space would continue to count toward the allowance. An AADU may exceed the 1,000-square-foot limit if the portion of the structure in which the AADU is located existed on December 31, 2017, and if the entire AADU is located on one level.

Maximum Height

Alternative 1 (No Action). Currently, the maximum height of a DADU depends on the width of the lot and ranges from 12 to 23 feet (Exhibit 2-3).

Exhibit 2-3
Current Height Limits for DADUs

	Lot width				
	Less than 30 feet	30 to 35 feet	36 to 40 feet	41 to 50 feet	Greater than 50 feet
Maximum height limit (feet)	12	14	15	16	16
Additional height for a pitched roof (feet)	3	7	7	6	7
Additional height for a shed or butterfly roof (feet)	3	4	4	4	4

Alternative 2. As shown in Exhibit 2-4, Alternative 2 would create three lot width categories to calculate the height limit for a DADU: less than 30 feet, between 30 and 50 feet, and greater than 50 feet in width. The proposed changes would add, at most, three feet to the current height limits. On the narrowest lots, a DADU with a pitched roof could be up to 17 feet tall. On the widest lots — those more than 50 feet wide — a DADU with a pitched roof could be up to 25 feet tall. No change is proposed to the maximum height limit for principal dwellings in single-family zones, which is 30 feet plus five additional feet for a pitched roof.

The proposed Land Use Code changes would also allow two additional feet in height for all lots and roof types if the proposed roof meets the green roof standards that currently apply for main houses in single-family zones, outlined in Section 23.44.012.C.2. This additional height would be allowed to accommodate the structural requirements, roofing membranes, and soils required for a green roof.

Exhibit 2-4
Proposed Height Limits for DADUs under Alternatives 2 and 3

	Lot width		
	Less than 30 feet	30 to 50 feet	Greater than 50 feet
Maximum height limit (feet)	14	16	18
Additional height for a pitched roof (feet)	3	7	7
Additional height for a shed or butterfly roof (feet)	3	4	4

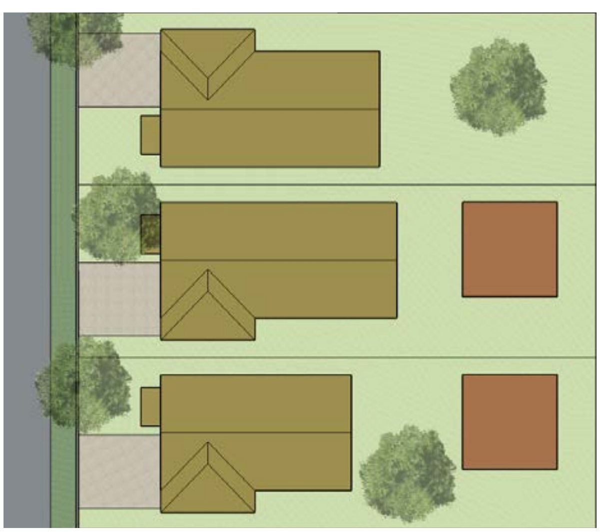
Under Alternative 2, up to two additional feet would be allowed for a DADU that meets green roof standards.

Alternative 3. Under Alternative 3, the proposed height limit changes would be the same as described for Alternative 2, but additional height for a green roof would not be included.

Lot Coverage

All Alternatives. Current regulations for lot coverage limits would not change. As illustrated in Exhibit 2-5, This existing standard limits the amount of a lot that all structures can cover:

- Lots less than 5,000 square feet: 1,000 square feet plus 15 percent of lot area
- Lots larger than 5,000 square feet: 35 percent of lot area



Footprint of House	1,250 sq. ft.
Footprint of DADU	n/a
Total lot coverage	**1,250 sq. ft. / 25%**
Footprint of House	1,350 sq. ft.
Footprint of DADU	400 sq. ft.
Total lot coverage	**1,750 sq. ft. / 35%**
Footprint of House	1,000 sq. ft.
Footprint of DADU	500 sq. ft.
Total lot coverage	**1,500 sq. ft. / 30%**

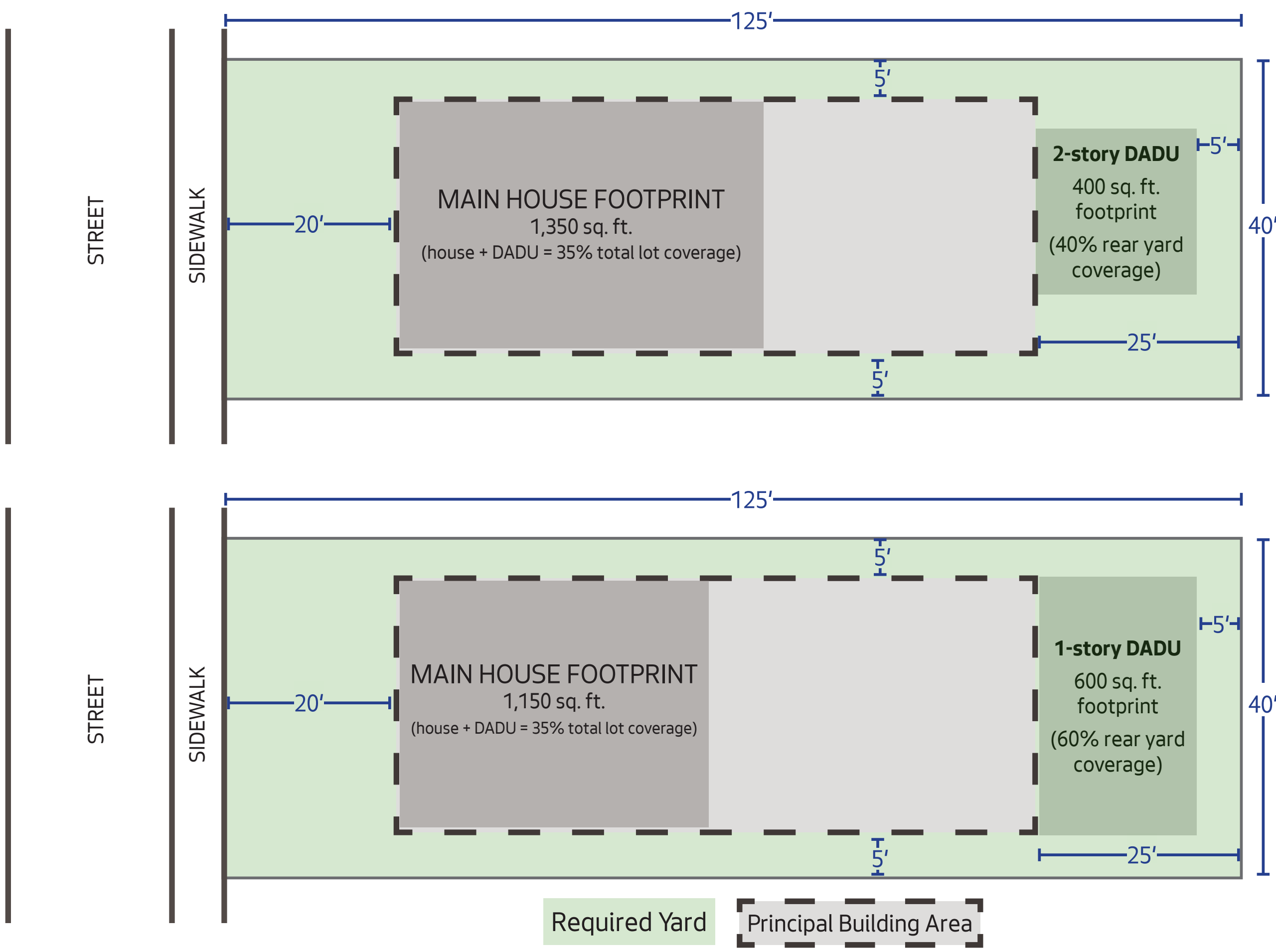
Exhibit 2-5
Illustration of Lot Coverage

Rear Yard Coverage

Alternative 1 (No Action). Current regulations allow up to 40 percent of a rear yard to be covered by a DADU and other accessory structures (like a garage). The rear yard is the area between the side lot lines extending from the rear lot line a distance of 25 feet or 20 percent of the lot depth. When the rear yard abuts an alley, the rear yard is calculated from the alley centerline.

Alternatives 2 and 3. As illustrated in Exhibit 2-6, the proposed code changes would allow a DADU with a height of up to 15 feet to cover 20 percent more of the rear yard, as long as rear yard coverage for all structures other than the DADU does not exceed 40 percent. This change would allow flexibility for the design of a DADU without stairs to accommodate occupants with limited mobility or disability. The rear yard coverage limit for DADUs taller than 15 feet would not change.

Exhibit 2-6 Illustration of required yards and rear yard coverage



Location of DADU Entry

Alternative 1 (No Action). Current regulations state that a DADU entrance cannot face the nearest side or rear lot line unless that lot line abuts an alley or other public right-of-way.

Alternatives 2 and 3. The proposed code changes would allow an entrance on any façade provided that the entrance is no closer than 10 feet to side or rear lot line, unless that lot line abuts a public right-of-way.

Roof Features

Alternative 1 (No Action). Current regulations do not allow DADUs to have roof features like dormers, clerestories, and skylights that accommodate windows and add interior space (Exhibit 2-7).

Alternatives 2 and 3. The proposed code changes would allow these roof features subject to the provisions applicable to single-family houses. None of these features can project above the ridge of a pitched roof. Similar provisions to what exist in the regulations for main houses in the standards for lots in single-family zones would limit the size and location of such roof features on DADUs. Features that project from a roof would be limited to 30 percent of the roof area, for example, and be subject to width and separation requirements.

Exhibit 2-7
Illustration of Roof Features

Alternative 1
Dormers and other roof features prohibited

Alternatives 2 and 3
Dormers and other roof features allowed on a DADU

Maximum Household Size

Alternative 1 (No Action). Current regulations allow any number of related people or up to eight unrelated people to live on a lot in a single-family zone, including occupants of an AADU or a DADU.

Alternative 2. Alternative 2 would allow any number of related people or up to eight unrelated people to live on a lot in a single-family zone, including those living in an AADU or a DADU. However, up to 12 unrelated people could live on a lot that has both an AADU and a DADU.

Alternative 3. Under Alternative 3, the current household size limit would remain in place.

Mandatory Housing Affordability

MHA requires multifamily and commercial development to support affordable housing. The City has implemented or is in the process of implementing MHA in certain zones using three levels of affordable housing requirements identified by an (M), (M1), or (M2) suffix added to the zone name. These levels correspond to the scale of zoning changes and the corresponding affordability contribution required. Alternative 3 contemplates applying MHA requirements for zones with an (M) suffix when a property owner establishes a second ADU on a lot in a single-family zone.

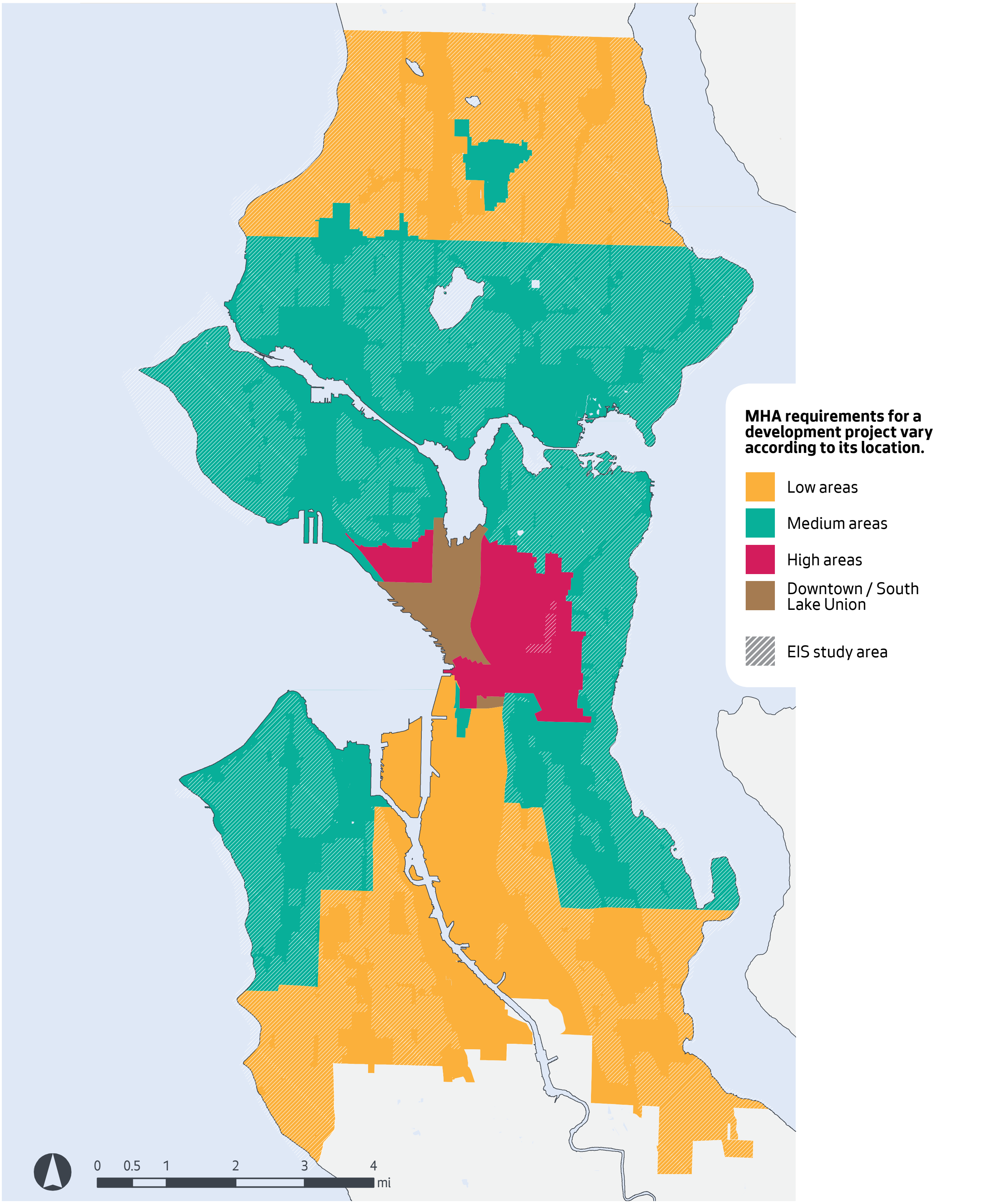
Mandatory Housing Affordability Requirements

Alternative 1 (No Action). MHA requirements do not apply to the creation of ADUs in single-family zones.

Alternative 2. Like Alternative 1 (No Action), MHA requirements would not apply to the creation of ADUs in single-family zones.

Alternative 3. Under Alternative 3, MHA requirements would apply when a property owner applies for a permit to construct a second ADU on a lot that already has one ADU. In this case, the MHA requirements for zones with an (M) suffix would apply, as outlined in Section 23.58C of the Land Use Code. Section 23.58C also establishes that MHA requirements vary geographically according to whether a development project is in a low, medium, or high area. As shown in Exhibit 2-8, the study area includes land in the low and medium areas. For purposes of analysis, Alternative 3 contemplates an affordability contribution of $13 per square foot of gross floor area in the second ADU, a requirement equivalent to a zone with an (M) suffix in a medium area. While some locations in the study area are in low areas and therefore would have lower required affordability contributions, applying a per-square-foot payment of $13 provides adequate analysis of the MHA requirement for ADU development in the study area.

Exhibit 2-8 MHA Areas



Predevelopment Costs

Alternative 1 (No Action). Under current regulations, the cost of obtaining permits, surveys, and utility hook-ups would not change.

Alternative 2. Alternative 2 considers a scenario wherein the City provides incentives to reduce predevelopment costs by 10 percent. This could include reducing permitting costs by streamlining the review process and/or providing pre-approved plans that would reduce permitting time and costs and would save money on developing the design.

Alternative 3. Alternative 3 analyzes predevelopment costs similar to current conditions, as evaluated under Alternative 1 (No Action).

Floor Area Ratio

FAR is the ratio of a building's total square footage (floor area) to the size of the piece of land on which it is constructed. For example, if a building is subject to an FAR limit of 0.5, then the total square footage of the constructed building must be no more than half the area of the parcel itself. In other words, if the lot is 5,000 square feet, then the square footage of the building cannot exceed 2,500 square feet. Exhibit 2-9 presents examples of FAR limits.

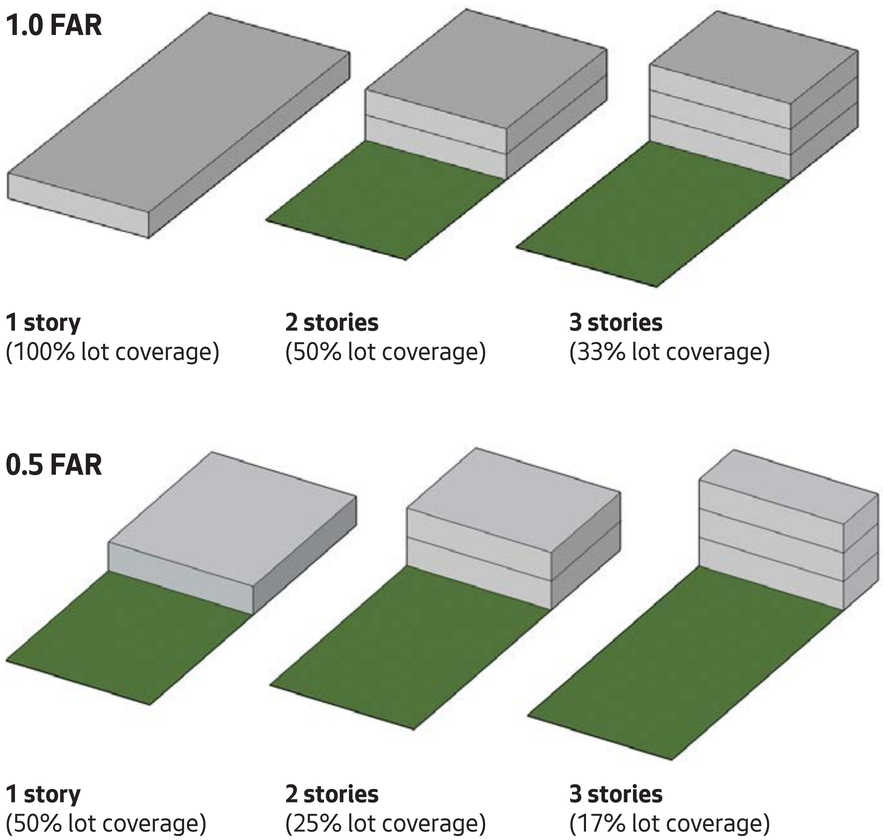
Maximum Floor Area Ratio Limit

Alternative 1 (No Action). Under current regulations, no maximum floor area ratio (FAR) limit applies to development in single-family zones. The maximum size of a principal structure (i.e., the main house) is effectively set by the yard requirements, height limit, and lot coverage limit.

Alternative 2. Like Alternative 1 (No Action), no FAR limit would apply in Alternative 2.

Alternative 3. The proposed code changes under Alternative 3 include a maximum FAR limit for development in single-family zones. Lots in single-family zones would be subject to a maximum floor area limit of 0.5 FAR or 2,500 square feet, whichever is greater. Below-grade floor area (e.g., basements) and floor area in a DADU would be exempt from the floor area calculations.

Exhibit 2-9
Illustrations of FAR Limits



On some lots, existing development exceeds these limits. On a lot exceeding the floor area limit (0.5 FAR or 2,500 square feet), existing floor area could be converted into an AADU or a DADU, and a DADU could be constructed in a new accessory structure, subject to the previously described size limits for ADUs.

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3 History and Planning Context

Throughout the 20th century, race- and class-based planning and housing policies and practices created disparities in the economic status of households and neighborhoods. These practices have often excluded lower-income households — disproportionately racial and ethnic minorities — from living in higher-cost neighborhoods. Because higher-density housing is generally more affordable than lower-density housing, areas restricted for lower-density housing contribute to, and reinforce, patterns of segregation. Reviewing historic practices that have contributed to racial, ethnic, and class segregation provides context for the subsequent discussion of current population and household characteristics.

This chapter (1) describes historical planning practices and housing policies that underlie race- and class-based housing patterns in the study area; and (2) describes the current planning context and the history of ADU legislation. The first section describes how the historical exclusion of less wealthy, typically non-white populations from single-family zones has informed the objectives for this EIS and summarizes pertinent demographic information that illustrates these patterns. The City of Seattle and Seattle Housing Authority's Joint Assessment of Fair Housing (Seattle 2017a) provides deeper discussion of factors that cause, increase, contribute to, maintain, or perpetuate segregation, racially or ethnically concentrated areas of poverty, significant disparities in access to opportunity, and disproportionate housing needs.

3.1 Historical Context

HISTORY OF RACIAL SEGREGATION

In the early 1900s, efforts began to control the type and intensity of land use in cities across the U.S. Los Angeles introduced the first citywide regulations on use to separate its expanding residential areas from industrial activities. In 1916, New York City adopted the nation's first citywide zoning code, a set of limits on coverage and required setbacks aimed primarily at preventing massive buildings from blocking light and air from reaching the streets below. Over the next two decades, cities across the country began regulating the height, area, location, and use of buildings.

In addition to regulating the physical characteristics of buildings and stabilizing land values, many cities used zoning to enforce systems of racial segregation. First Baltimore and then other cities adopted ordinances that explicitly enforced racial segregation by identifying separate living areas for black and white families (Rothstein 2017). This practice persisted until a 1917 Supreme Court decision found a Louisville, Kentucky, racial zoning ordinance unconstitutional.[1]

Following that decision, other race-based public policy interventions substituted for racial zoning.[2] For example, exclusionary zoning regulations prohibiting higher-density housing (like apartment buildings) in areas with primarily low-density, detached single-family homes tend to deepen economic segregation, thus reinforcing racial segregation since people of color have disproportionately lower incomes. These patterns are visible in the study area of this EIS. Despite these effects, zoning ordinances separating higher-density residential uses from single-family residential uses were ruled constitutional in *Euclid v. Ambler*, where the Supreme Court found that the "police power supports also, generally speaking, an ordinance forbidding the erection in designated residential districts, of business houses, retail stores and shops, and other like establishments, **also of apartment houses in detached-house sections** [emphasis added] — since such ordinances, apart from special applications, cannot be declared clearly arbitrary and unreasonable, and without substantial relation to the public health, safety, morals, or general welfare."[3]

Even absent explicit references to race, public housing, slum clearance, private deed restrictions or racial covenants, and redlining practices also perpetuated racial, ethnic, and class segregation. The practice of redlining, or "drawing lines on city maps delineating ideal geographic areas for bank investment and the sale of mortgages," was formalized in the National Housing Act of 1934 (Housing Act), which created the Federal Housing Administration (FHA) as part of the federal programs

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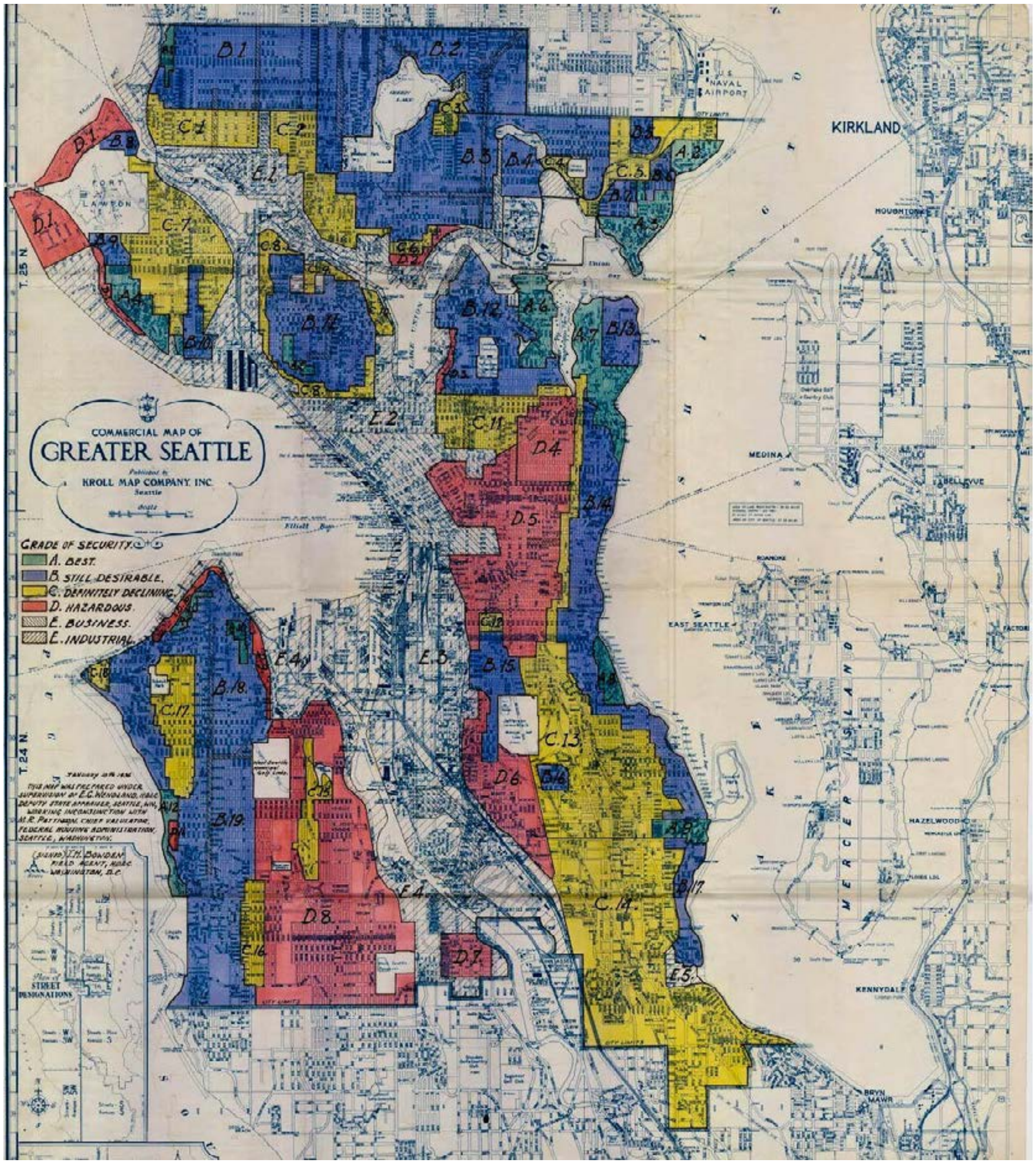
1 *Buchanan v. Warley*; 245 US 60 (1917).

2 In *The Color of Law*, Rothstein reveals the racial motivations of many regulators who devised zoning schemes to circumvent the 1917 *Buchanan* decision.

3 *Euclid v. Ambler*; 272 US 390 (1926).

and regulations known as the New Deal (Silva 2009). Adopted to increase housing stability and expand homeownership by underwriting and insuring home mortgages, the Housing Act endorsed the separation of land uses, including single-family houses and apartments, and facilitated the segregation of people by race and ethnicity through its insurance practices. To determine eligibility for government-backed home mortgages, the FHA conducted its own appraisal to ensure the loan had a low risk of default. As Rothstein writes in *The Color of Law*, "Because the FHA's appraisal standards included a whites-only requirement, racial segregation now became an official requirement of the federal mortgage insurance program" (Rothstein 2017). Through practices of denying mortgages based on race and ethnicity, the federal government played a significant role in the legalization and institutionalization of racism and segregation. Exhibit 3-1 is an example of a Seattle 1936 redlining map with areas deemed "hazardous" for mortgage investments shown in red. For years, these restrictions prevented people of color from buying, improving, and developing property and building wealth.

Exhibit 3-1 1936 City of Seattle Redlining Map



The use of racially restrictive covenants arose in reaction to *Buchanan v. Warley* in 1917, which outlawed municipal racial zoning, and it proliferated when upheld in the 1926 ruling in *Corrigan v. Buckley*. Covenants are legal contracts contained in the deed for a property and enforceable on its future owners. While *Buchanan v. Warley* dealt only with municipal laws, *Corrigan v. Buckley* found that the Fourteenth Amendment barred states from creating race-based zoning ordinances but did not extend to private deeds and developer plat maps. Racially restrictive covenants consequently superseded segregation ordinances as instruments to promote and establish residential racial segregation in U.S. cities.

Unlike many American cities, Seattle never had an explicitly racialized zoning ordinance. But zoning in Seattle nevertheless contributed to racial and ethnic segregation. Indeed, racial deed restrictions were applied to private property in many parts of the EIS study area. Found in neighborhoods across Seattle, these covenants made it difficult or impossible for people of color to find housing outside central neighborhoods (e.g., Central Area, Chinatown), reinforcing patterns of racial segregation that remain today. Efforts to establish and sustain racial covenants continued until ruled unenforceable in the 1948 case of *Shelley v. Kraemer*, though realtors continued the practice of refusing to sell to racial and ethnic minorities. Until the 1960s, racial restrictive covenants kept people of color from moving to residential neighborhoods throughout the city, where they still compose a small share of the population. Further, by limiting access to homeownership, these policies have contributed to the growing wealth disparities by race and ethnicity. Data collected nationally illustrates that householders of color have, on average, substantially less wealth than households with White householders. As shown in Exhibit 3-2, the median net worth in 2013 for households with non-Hispanic White householders was $132,483, compared to $9,211 for Black households and $12,458 for Hispanic (any origin) households (U.S. Census Bureau, 2014). Exhibit 3-3 shows that the share of households with Black householders whose net worth is zero or negative is more than twice that of White householders. Households with Asian householders have the smallest share in this category.

Exhibit 3-2 National Median Wealth by Race and Ethnicity

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2014 Panel, Wave 1

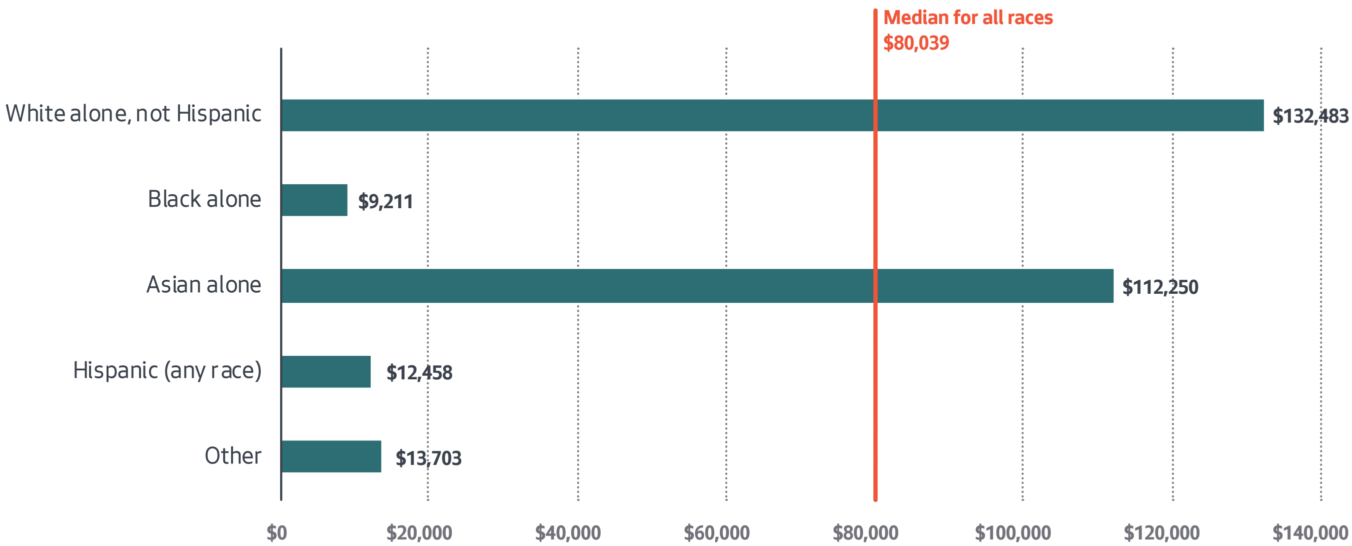
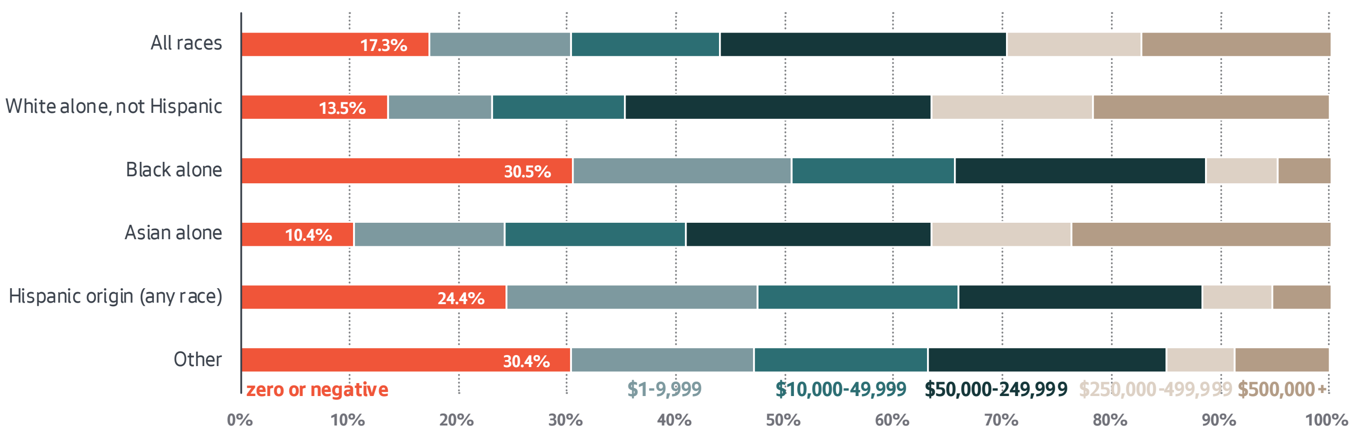


Exhibit 3-3 National Wealth Distribution by Race and Ethnicity

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2014 Panel, Wave 1



HISTORY OF ZONING IN THE EIS STUDY AREA

Before zoning existed in Seattle, the City's building code regulated land use, and dwellings containing up to two families and tenement houses of three or more families were allowed throughout the city (City of Seattle 1909). In 1923, Seattle's first zoning ordinance established several distinct districts according to use, height, and area (Seattle 1923). The ordinance created two districts for residential uses — First Residence District and Second Residence District — distinguished primarily by the number of dwellings allowed on a lot. The First Residence District allowed "Single

Family Dwellings," defined as detached buildings occupied by one family only, plus churches, schools, and parks. Second Residence Districts expanded the allowed uses to include "all dwellings, flats, apartment houses and boarding and lodging houses without stores." Maximum heights were a separate dimension of the zoning ordinance and varied across these use districts. (Business Districts also allowed all the uses of the Residence Districts, plus various commercial activities.) The 1923 zoning ordinance was amended continually over time and then replaced entirely, first in 1957, and then again in the 1980s, when the City Council adopted the Seattle Municipal Code and the general zoning framework still in place today.

This legislative timeline not only traces Seattle's history of separating higher- and lower-density residential uses but also identifies how zoning in the EIS study area has changed over time. Though it comprises only single-family zoning today, the study area includes land first zoned in 1923 as Second Residence District, where multifamily housing was legal. As an example of these areas, Exhibit 3-4 shows a plate from Seattle's 1923 zoning ordinance and Exhibit 3-5 a map of current zoning for the same geography. Blocks with diagonal hatching in Exhibit 3-4 were zoned in 1923 to allow multifamily housing. Several blocks in the study area for this EIS originally allowed multifamily housing and were later downzoned through subsequent legislation to limit residential development to detached single-family dwellings only. Two areas outlined in blue exemplify this pattern. Most of the area between NW 50th Street and NW 65th Street and between 14th Avenue NW and 5th Avenue NW was zoned Second Residence District in 1923, but nearly all this land has more restrictive single-family zoning today. The same is true for the area between N 46th Street and N 50th Street and between Aurora Avenue N and Stone Avenue N. Other examples exist throughout the EIS study area of areas that previously allowed multifamily housing types. In these locations, structures built during this period remain today as markers of prior zoning schemes — but could not legally be constructed under current rules (Exhibit 3-6). See Exhibit 4.2-6 for a map of multifamily uses in single-family zones.

Exhibit 3-4 1923 Seattle Zoning Ordinance

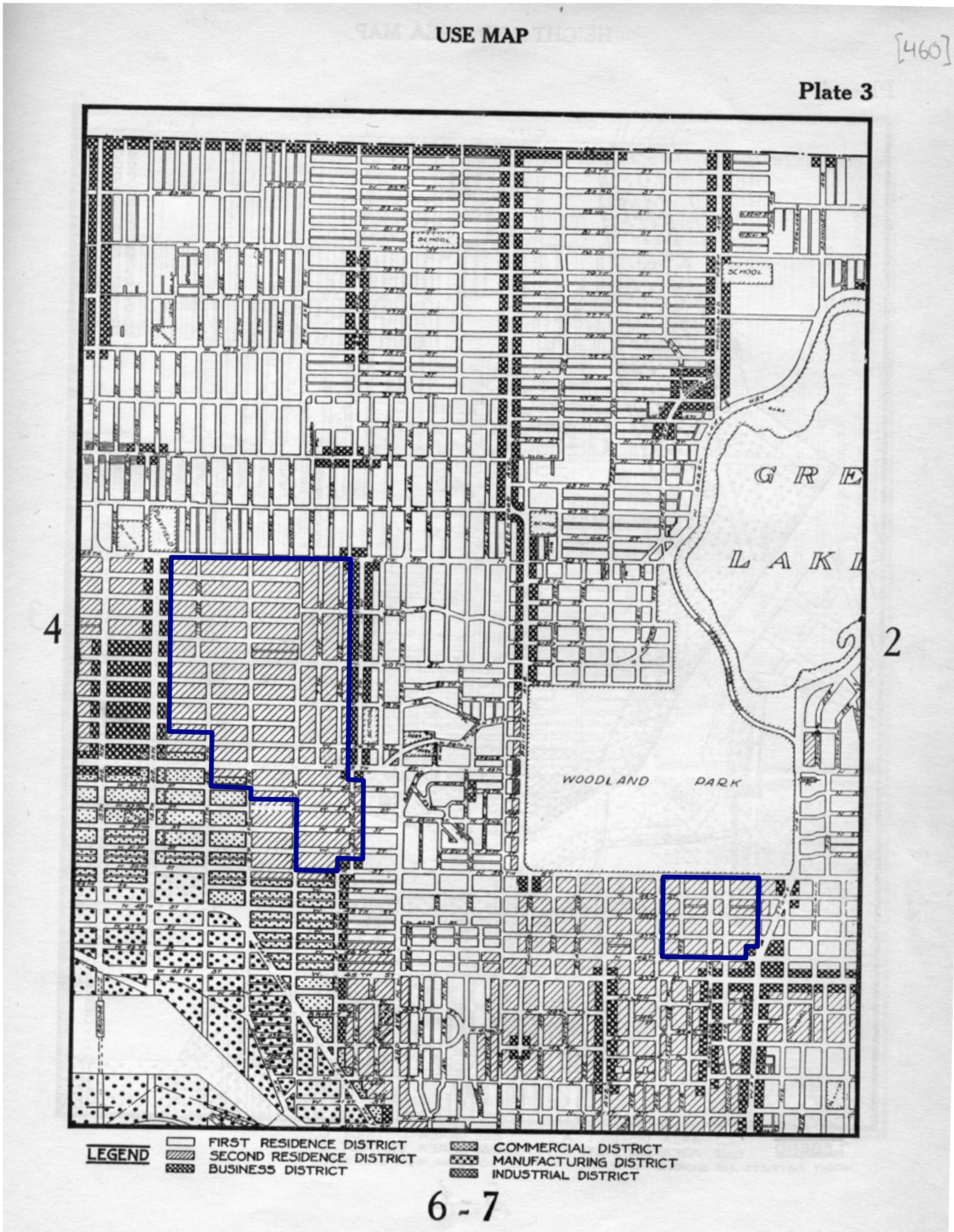


Exhibit 3-5 Current Seattle Zoning Ordinance

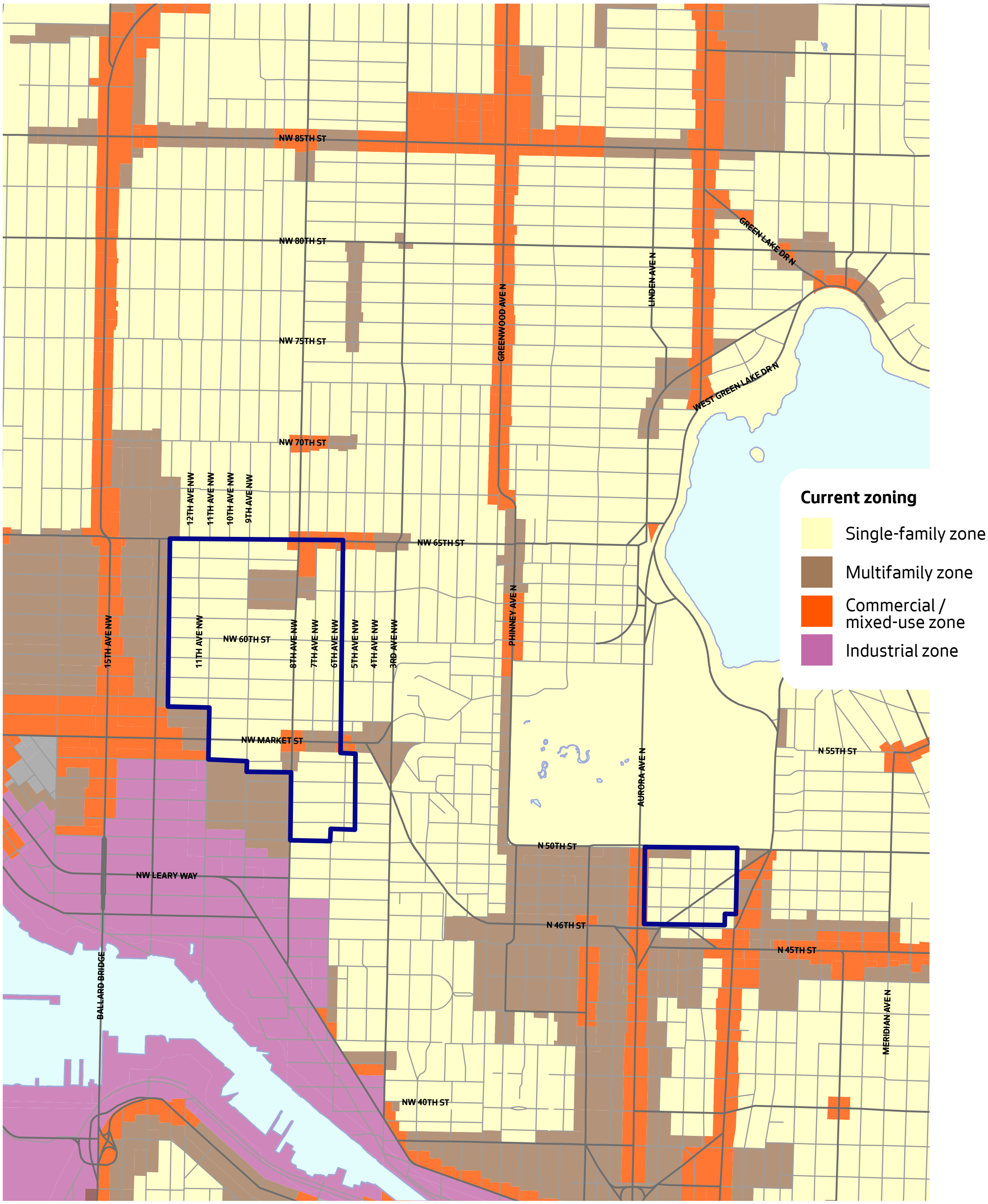


Exhibit 3-6
Example of Nonconforming Multifamily Housing in the Study Area

POPULATION AND HOUSEHOLD CHARACTERISTICS

Population and household patterns in the study area have changed substantially over time. In April 2017, the Washington State Office of Financial Management (OFM) estimated that Seattle had about 713,700 residents. Since 2010, the population of Seattle is estimated to have grown by some 105,000 people, an increase of about 17 percent (OFM 2017). Seattle has an estimated 304,157 households, with an average household size of 2.12 persons (U.S. Census Bureau 2016).

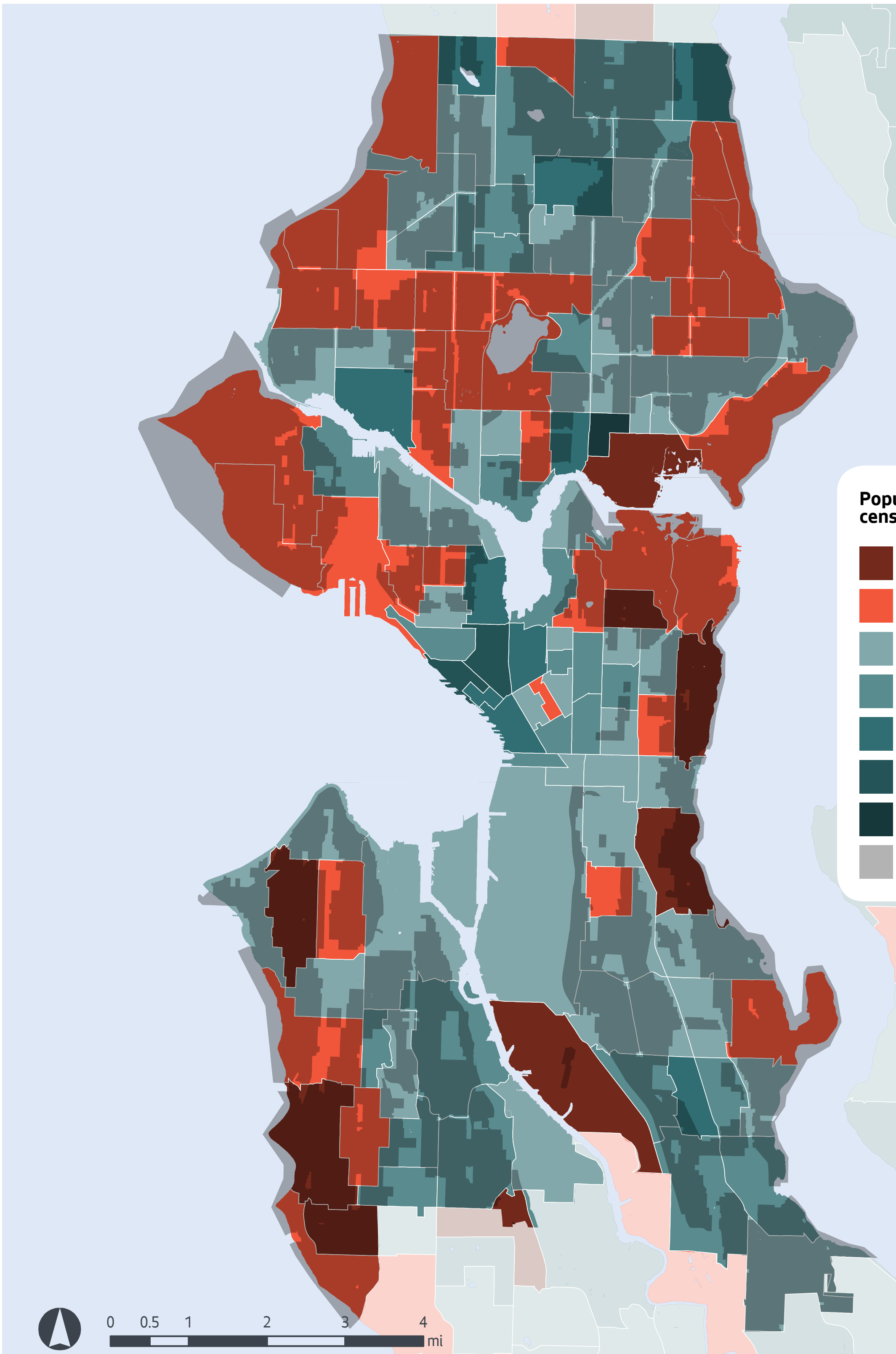
While the city's total population has grown, in certain areas the population has remained stable or declined. Exhibit 3-6 shows population growth from 2000 to 2010 at the census tract level. Unfortunately, census tracts in Seattle tend not to align well with zoning boundaries, making it difficult to identify specific tracts as inside or outside the study area. But we can examine the characteristics of areas that gained and lost population. Roughly one-third of Seattle's census tracts (45 of 131) had more people in 1970 than in 2010, and nearly all these tracts consist primarily of single-family zoning. In tracts that lost population, 81 percent of land area has single-family zoning, eight percent has industrial zoning, five percent has multifamily zoning, four percent has commercial and mixed-use zoning, and three percent has institutional zoning.

U.S. Census Terminology

For reporting purposes, the U.S. Census Bureau divides the country into different geographic areas. At the local level, counties are typically divided into smaller geographic units called Census Tracts. Census Blocks are a smaller subdivision found within Census Tracts.

Exhibit 3-7 Population Change by Census Tract, 1970-2010

Source: U.S. Census Bureau



Meanwhile, in census tracts that gained population between 1970 and 2010, single-family zoning comprises 31 percent less land area. Comparing zoning of gross land area in tracts that lost and gained population is not the only way to explore why population growth has historically varied across Seattle, but it indicates that many parts of the EIS study area likely have fewer residents today than decades ago.

We also see this pattern in data at the census block level. Due to their smaller geographic size, census blocks let us examine the study area more closely than with census tracts. Unfortunately, since census block geography has changed with each decennial census, it is not possible to study precise block-by-block population change over time. But we can approximate the study area by examining census blocks completely or substantially within the study area, even if some boundaries have changed over time. Based on this method, the population in the study area increased by about three percent from 1990 to 2010. During this same period, the total Seattle population increased 18 percent. While the study area comprises 60 percent of the city's land area, it accounted for about eight percent of Seattle's population growth from 1990 to 2010.

Exhibit 3-8 shows the city's population by race over time, highlighting a shifting geographic pattern of major racial groups following the period of redlining and racial covenants discussed above. In Exhibit 3-9, we see the composition of the city's population by race in each decade since 1960. Exhibit 3-10 shows the share of the population of color in each census block from the 2010 Census. The Joint Assessment of Fair Housing (Seattle 2017a) found that people of color disproportionately live closer to major arterials, state highways, and Interstate 5. Non-Hispanic White people are, by contrast, disproportionately likely to live in areas where single-family housing predominates, and in proximity to Puget Sound, Lake Washington, and other shorelines. In other words, people of color are disproportionately likely to live in multifamily zones outside the EIS study area with two exceptions — single-family zones in southeast Seattle and near the Central Area, Squire Park, and Madrona/Leschi neighborhoods — where people of color comprise a substantial share of the population.

Exhibit 3-8 Historical Geographic Distribution of Seattle Population by Race, 1970-2010

Source: U.S. Census Bureau

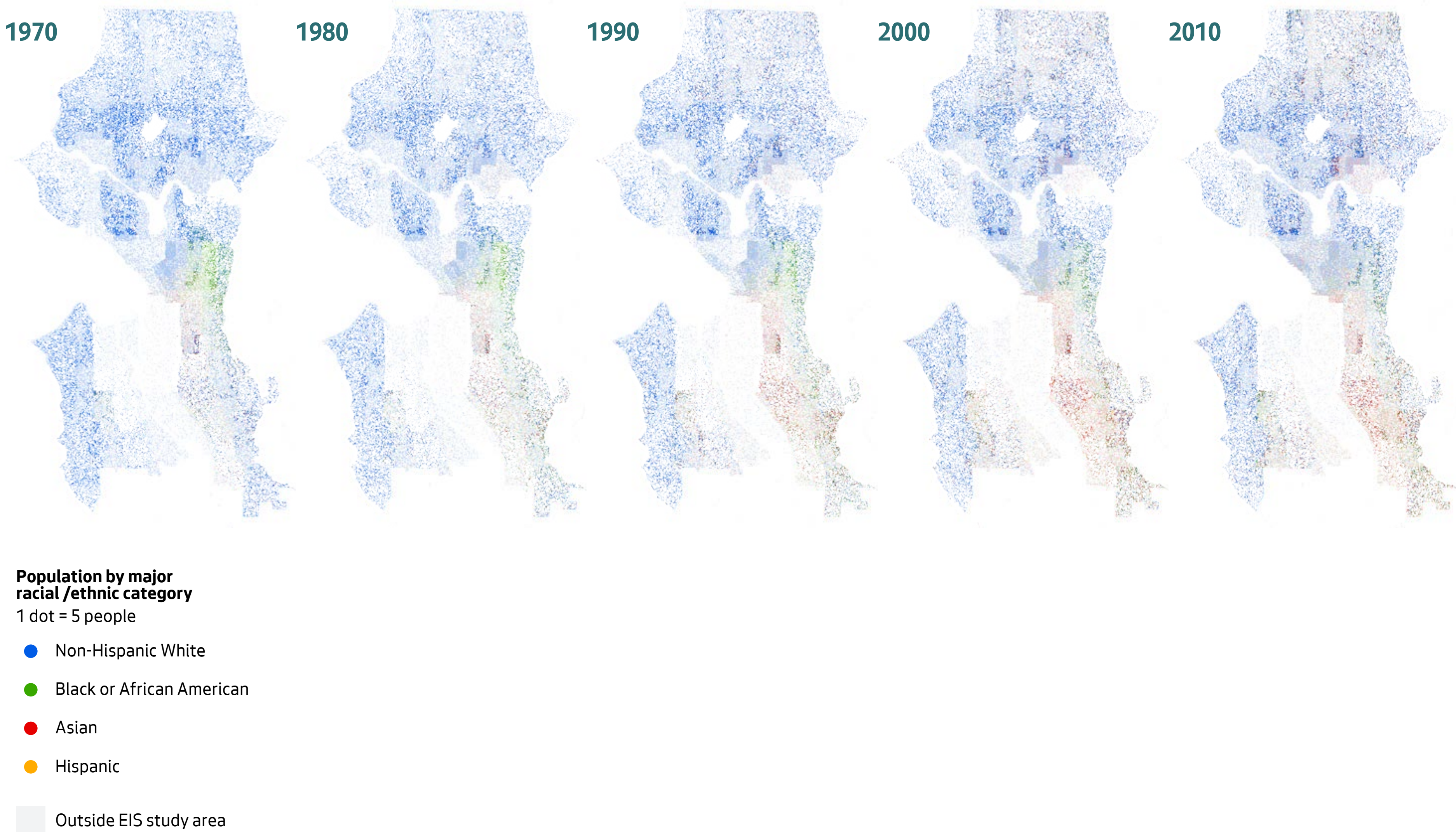


Exhibit 3-9 Historical Seattle Population by Major Racial and Ethnic Group, 1960-2010

Source: U.S. Census Bureau

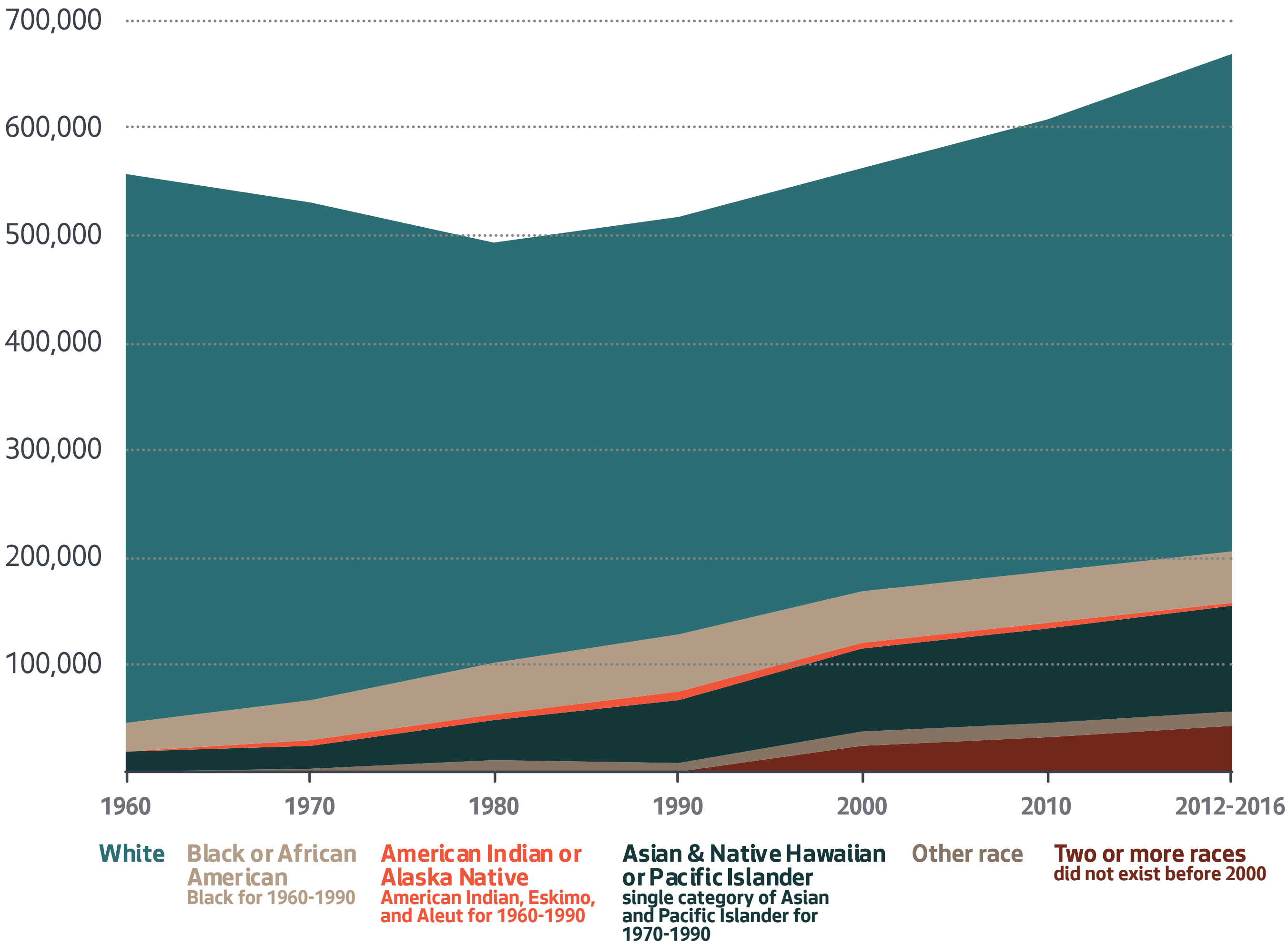
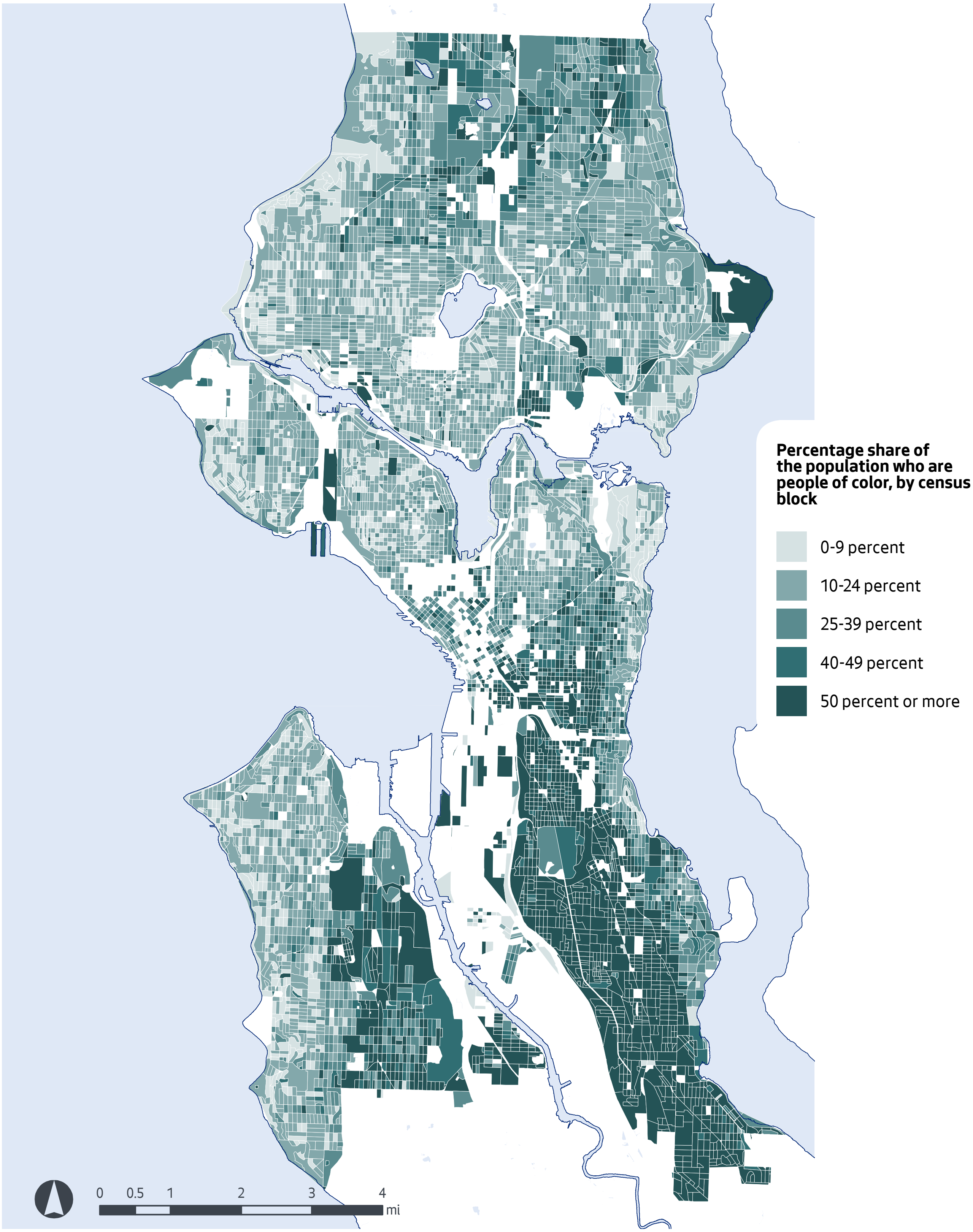


Exhibit 3-10 Population Change by Census Tract, 1970-2010

Source: U.S. Census Bureau



Census data describing the characteristics of households in one-unit structures gives us a picture of the population living in Seattle's single-family zones, where most homes consist of one detached unit:

- About 44 percent of all Seattle homes are detached one-unit structures.
- Another five percent are attached one-unit structures like townhouses.
- Three in five Seattle residents live in these one-unit structures (detached or attached), and more than three-quarters of them own their home.

Exhibit 3-11 shows housing tenure (owner- versus renter-occupied housing units) by housing unit type (i.e., single-family attached, single-family detached, or multifamily housing). Citywide, 53.8 percent of homes are renter occupied and 46.2 percent owner occupied. If we break this down further, there is clear variation by race in homeownership rates. Exhibit 3-12 shows the tenure of housing units by the racial or ethnic group of its householder. Renting is more common than homeownership for householders of every racial and ethnic group except non-Hispanic White. Non-Hispanic White householders are slightly more likely to own than rent their home, while Black or African American and Hispanic or Latino householders are about three times more likely to rent than own.

Exhibit 3-11 Housing Tenure by Housing Unit Type, Seattle

Source: 2016 5-Year American Community Survey

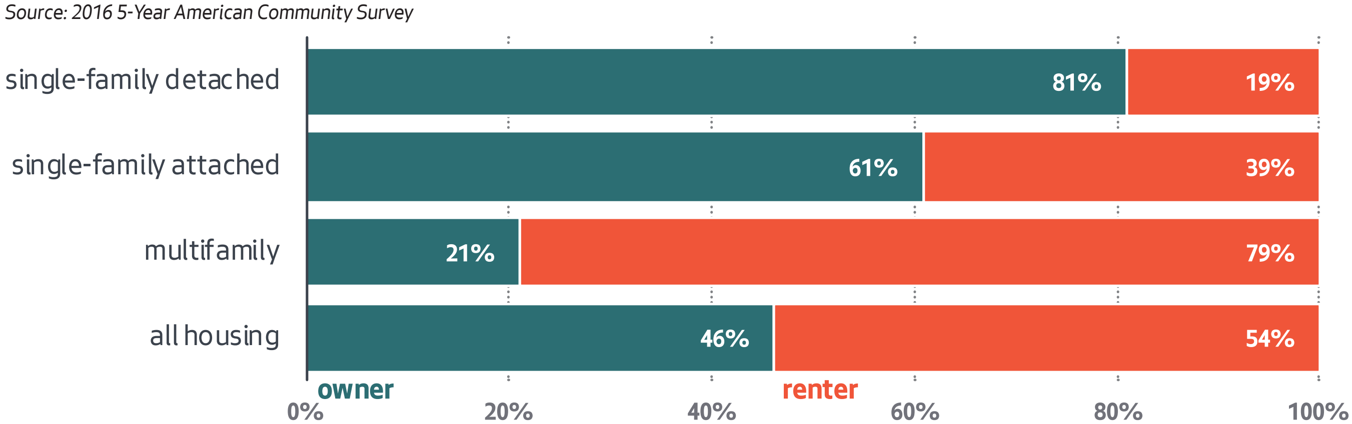
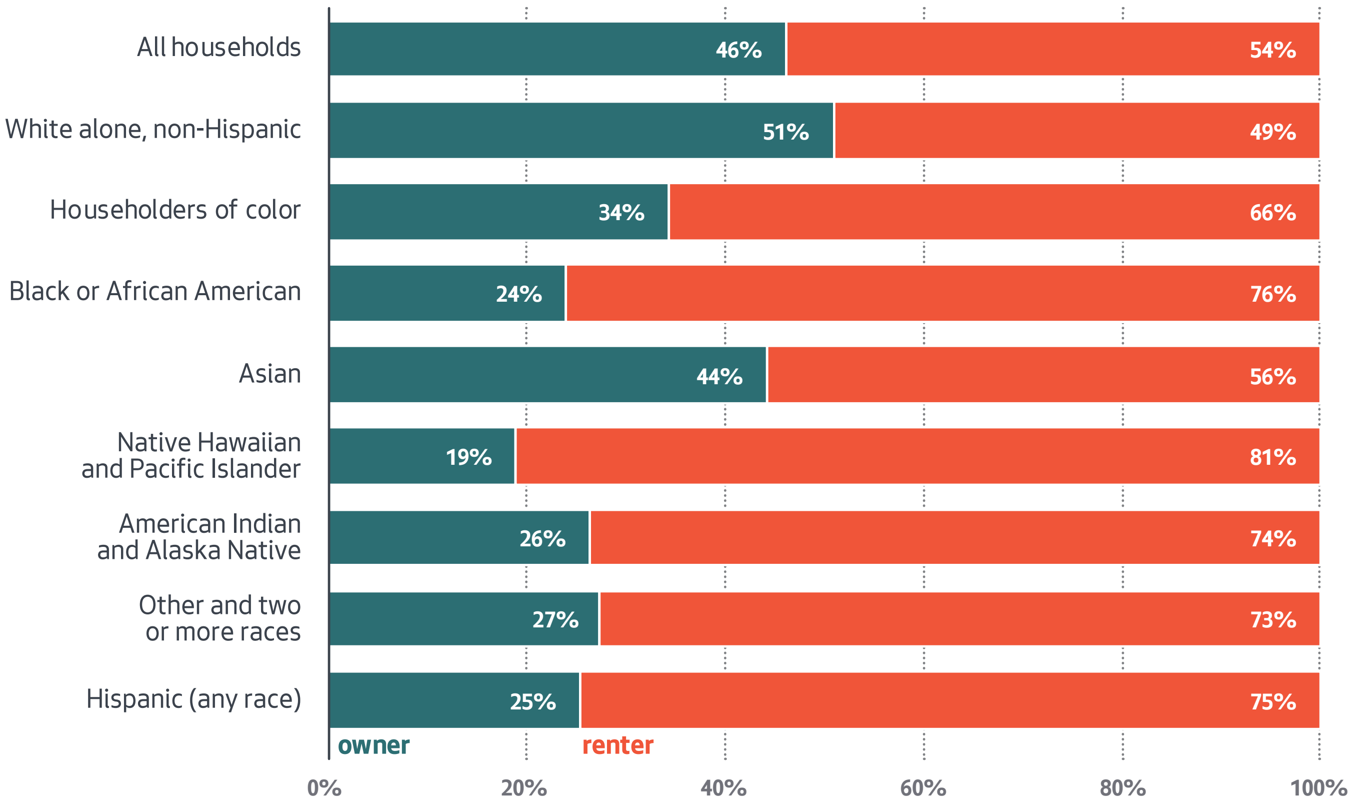


Exhibit 3-12 Housing Tenure by the Householder's Racial or Ethnic Group, Seattle

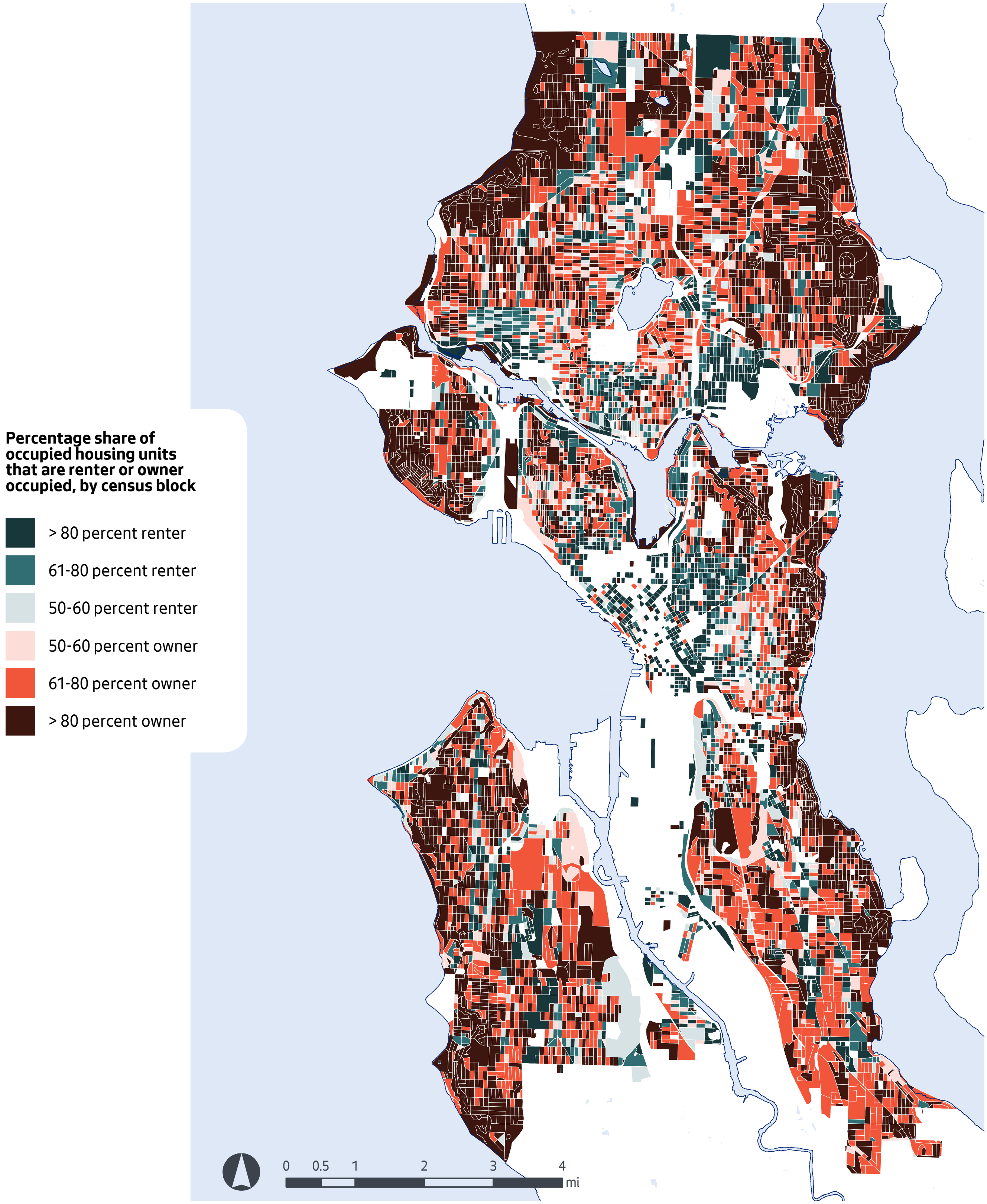
Source: 2016 5-Year American Community Survey



Homeownership also varies geographically. Exhibit 3-13 shows the percentage of households by census block who rent or own their home. According to the 2010 Census, 73.2 percent of housing units are owner occupied in the study area and 26.8 percent are renter occupied. Outside the study area, 27.0 percent of homes are owner occupied and 73.0 percent are renter occupied. Citywide, 54 percent of households are renters.

Exhibit 3-13 Housing Tenure by Census Block

Source: 2010 Census



Like homeownership, the type of housing a household occupies also varies by race. Exhibit 3-14 shows that almost 48 percent of non-Hispanic White households live in detached one-unit structures. No other racial group exceeds 40 percent on this measure. One-third of all households of color, and less than 30 percent each of Black or African American households and Hispanic or Latino households, live in detached one-unit structures. More non-Hispanic White householders live in detached one-unit structures than any other housing type, while more householders of color live in apartment buildings with 20 or more units than any other unit type. Exhibit 3-15 presents the same data but with race distributed across unit type. The disparity between households with non-Hispanic White householders and householders of color is greatest for homes in detached one-unit structures. Non-Hispanic White householders occupy more than three-quarters of homes in detached one-unit structures. While the race and ethnicity of a householder is an imperfect proxy for a home's total population, these citywide statistics illustrate that housing type varies along racial lines and are suggestive of patterns in single-family zones, where detached one-unit structures are the only housing type allowed.

Exhibit 3-14 Housing by the Number of Units in Structure and Race/Ethnicity of Householder, Seattle

Source: 2016 5-Year American Community Survey

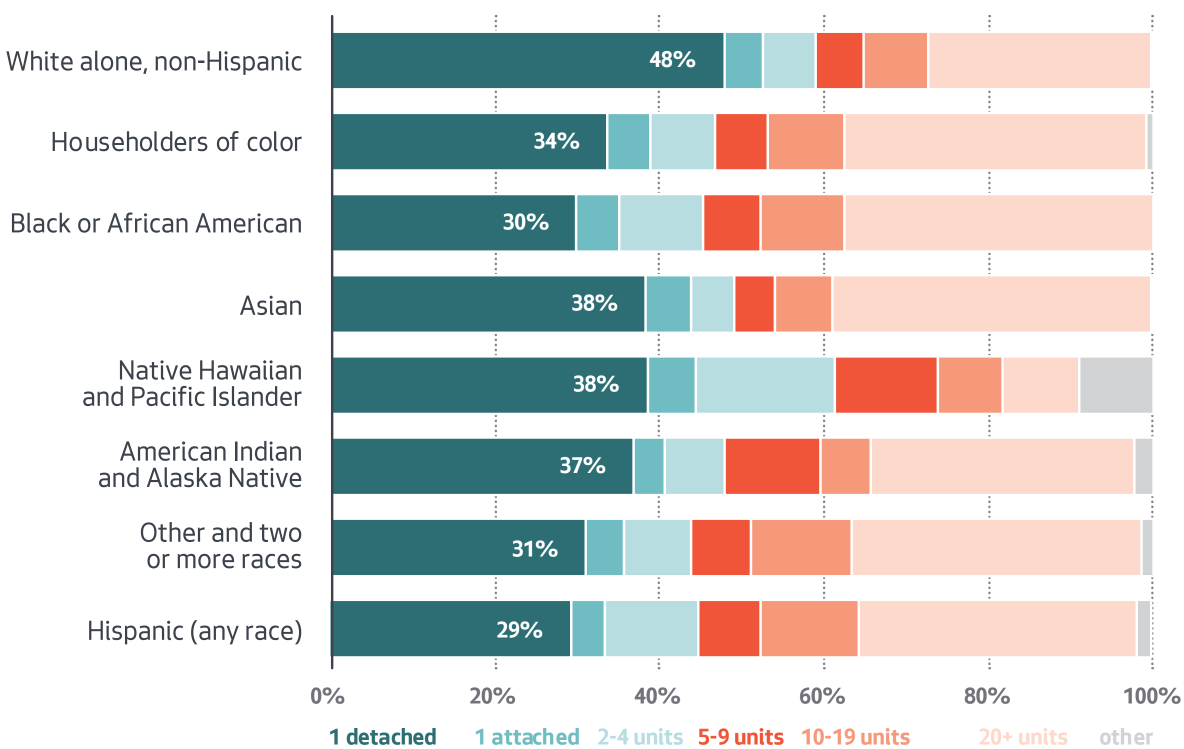
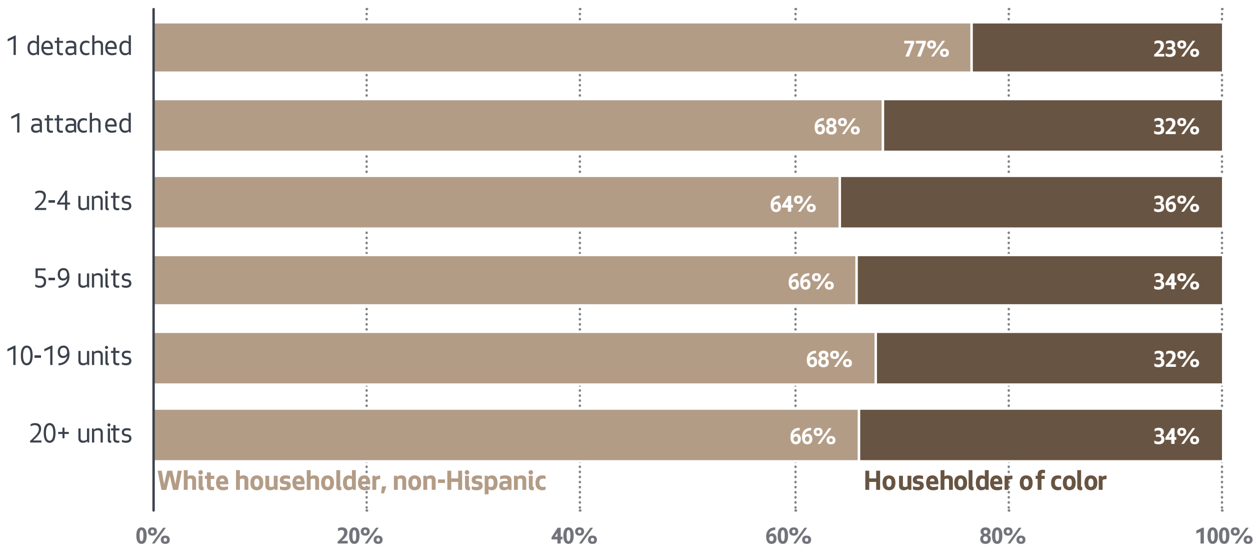


Exhibit 3-15 Housing by the Number of Units in Structure and Race/Ethnicity of Householder, Seattle

Source: 2016 5-Year American Community Survey



One likely reason for this pattern is the high cost of housing in single-family zones and disparities in household income according to race. Exhibit 3-16 shows that, across the Seattle metropolitan region, households living in detached one-unit structures tend to have high incomes. Median income for households in detached one-unit structures is $98,000. Only 22 percent of these households earn $50,000 or less, which is where the median income for Black or African American households falls in the Seattle metropolitan region (see Exhibit 3-17, which shows median income for Seattle households). For non-Hispanic White households, median income was $83,224, 12 percent above the city median, almost $35,000 above households of color, and more than two-and-a-half times the median income of Black or African American households. These disparities are slightly sharper if we look specifically at households living in detached one-unit structures that own their home: 42 percent of these households earn more than $120,000. Meanwhile, median income for households living in housing types other than detached one-unit structures is $47,233.

Exhibit 3-16 Median Household Income by Number of Units in Structure, Seattle Metropolitan Area

Source: 2015 American Housing Survey

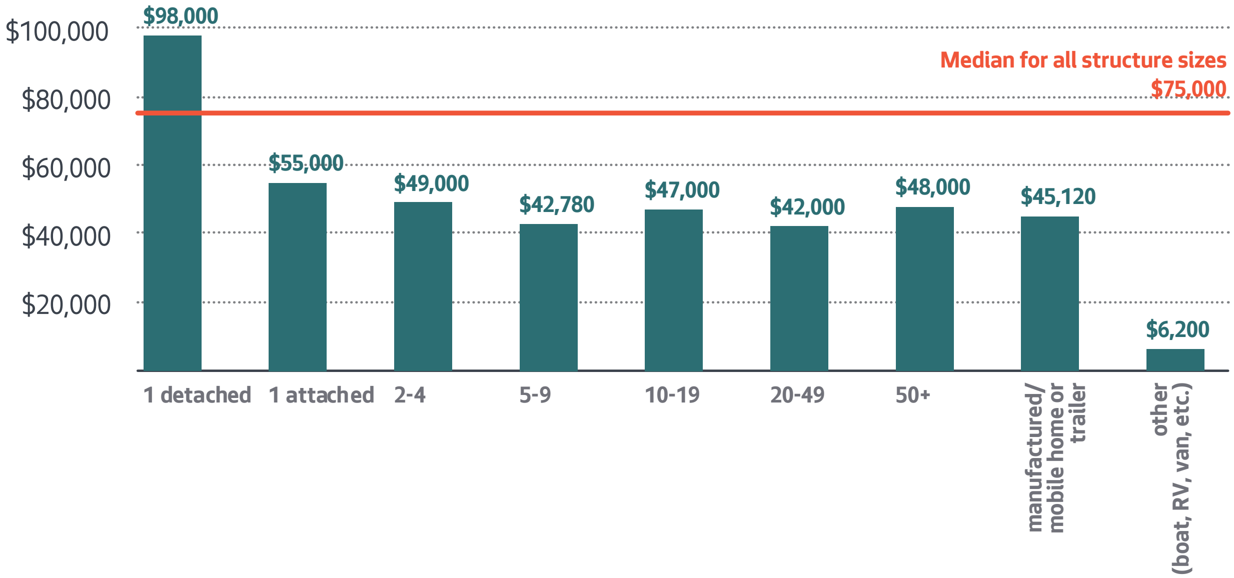
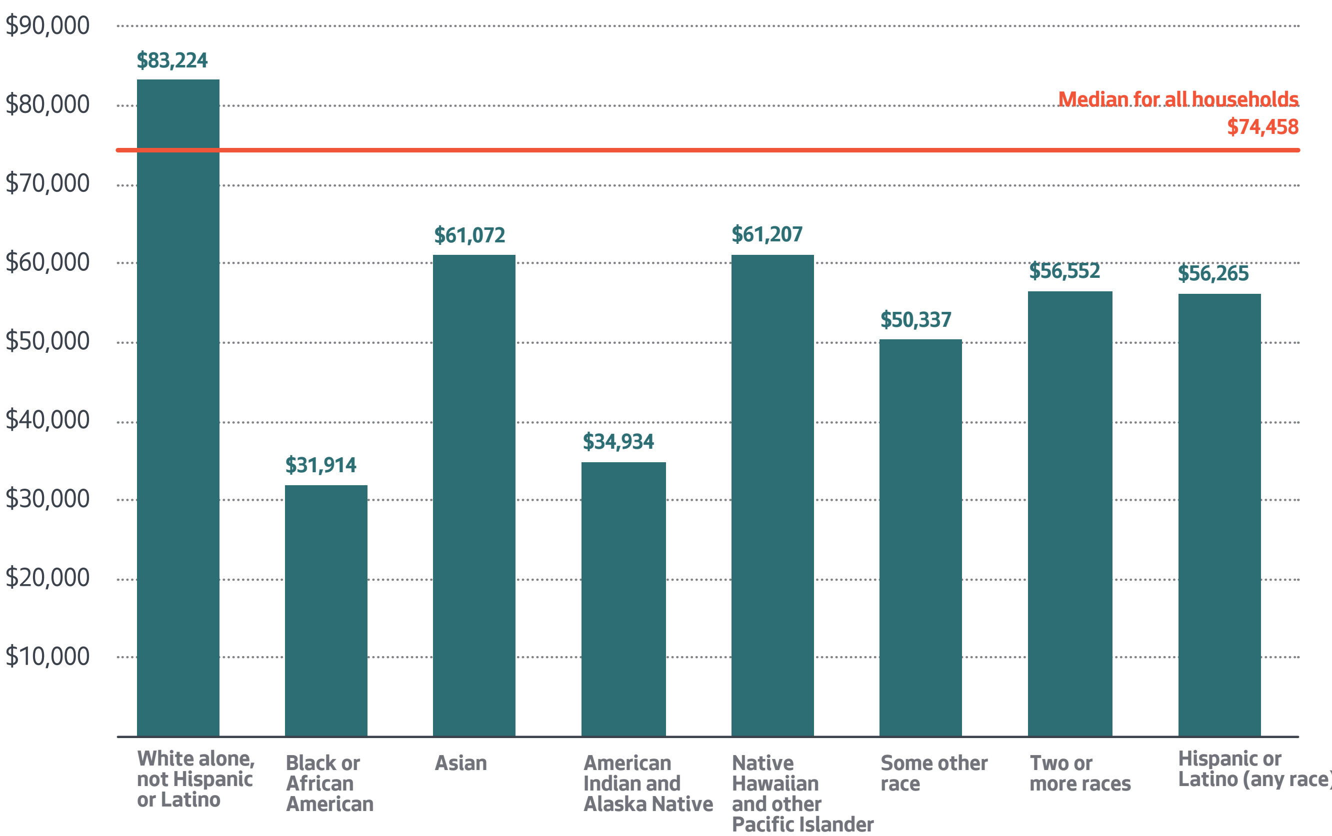


Exhibit 3-17 Median Household Income by Race, Seattle

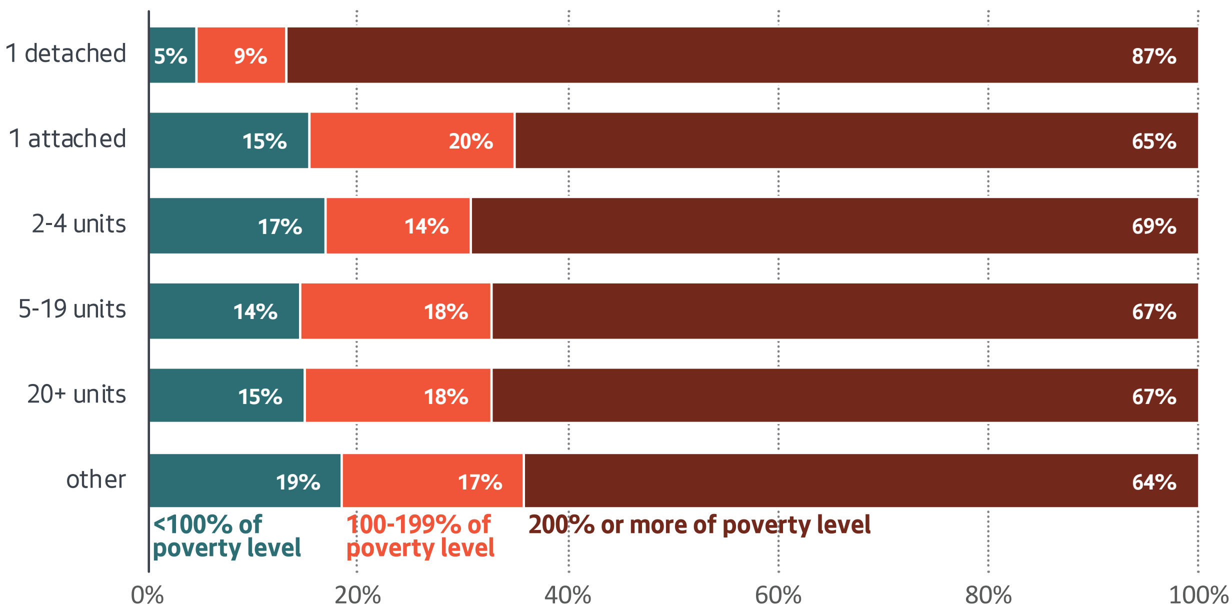
Source: 2016 5-Year American Community Survey



Another way to understand income disparity is examine household income relative to the poverty level. Exhibit 3-18 distributes households in the Seattle metropolitan area across three poverty categories according to units in structure. Relatively few households in detached one-unit structures are below the poverty level. The share of households below the poverty level is about three times higher for all household types other than detached one-unit structures. Only 14 percent of households in detached one-unit structures are below 200 percent of the poverty level, a common threshold to be eligible for certain assistance programs, while for most other housing types about one-third of households are below 200 percent of the poverty level.

Exhibit 3-18 Median Household Income by Number of Units in Structure, Seattle Metropolitan Area

Source: 2015 American Housing Survey



3.2 Planning Context

SEATTLE'S COMPREHENSIVE PLAN

Since 1994, the Comprehensive Plan has guided growth in Seattle in a manner that supports the City's core values. In October 2016, the City Council adopted the Seattle 2035 Comprehensive Plan (Seattle 2016a) and in October 2017, the Council adopted amendments to the plan (Seattle 2017b). The Seattle 2035 Comprehensive Plan was evaluated in an EIS finalized in May 2016 (Seattle 2016b). The Comprehensive Plan continues to emphasize the core values established in 1994, especially in the face of Seattle's continued population growth, housing shortage, and increasing income inequality.

The Seattle 2035 Comprehensive Plan EIS studied potential impacts of four different growth strategies. Each considered a different pattern of growth, but all anticipated growth of 70,000 housing units and 115,000 jobs in Seattle through 2035, the growth target allocated by the King County Countywide Planning Policies and the minimum that Seattle must plan to accommodate. The EIS also included a sensitivity analysis that analyzed the impacts of a hypothetical increase in housing growth greater than the City's adopted growth planning estimate. This sensitivity analysis evaluated growth of 100,000 new households through 2035.

A central feature of the Comprehensive Plan is the urban village strategy, an approach to growth management that concentrates most expected future growth in designated urban centers and villages. The Plan also anticipates that more modest growth will occur in various places outside urban villages, including long arterials where current zoning allows multifamily and commercial uses. While single-family zones outside urban villages are not assigned a specific share of the City's 20-year residential growth estimate, the Comprehensive Plan notes that "different housing types, such as accessory dwelling units or backyard cottages, could increase the opportunity for adding new housing units in these [single-family residential] areas."

Where this EIS considers the potential impacts of additional ADUs in the study area, we assume that any consequent household growth would not exceed the increment evaluated in the Comprehensive Plan EIS sensitivity analysis that considered growth of 100,000 households by 2035. Further, if Land Use Code changes contemplated in Alternatives 2 and 3 result in more ADU development than under Alternative 1 (No Action), we assume some new households living in the study area might have otherwise occupied housing elsewhere in the area outside urban villages, like apartments or townhouses in places zoned for multifamily housing. In other words, additional ADU production could result in a partial shift of housing growth from multifamily and commercial areas outside the study area to single-family zones inside the study area.

HOUSING AFFORDABILITY AND LIVABILITY AGENDA

Affordable Housing

Informally, the term affordable housing is used to describe a home where a household can afford and still have sufficient remaining income for basic needs like transportation, food, and healthcare. Formally, affordable housing is defined in the Land Use Code as "a housing unit for which the occupant is paying no more than 30 percent of household income for gross housing costs, including an allowance for utility costs paid by the occupant."

In recent years, addressing the critical need for housing, especially affordable housing for low-income households, has been a central feature of Seattle's planning context. In 2014, the City Council adopted Resolution 31546 (Seattle City Council 2014b), establishing the Housing Affordability and Livability Agenda (HALA). In July 2015, the HALA Advisory Committee identified 65 strategies to meet the City's ambitious goal of creating 50,000 homes, including preservation and production of 20,000 net new affordable homes, by 2025 (HALA Advisory Committee 2015). The committee's report discussed the history of housing in single-family zones, highlighting its contribution to Seattle's current land use patterns, where approximately 54 percent of Seattle's land is zoned single-family. Single-family zoning limits the variety of housing options available in parts of the city and access for households with lower incomes to live in areas zoned single-family. Accordingly, the HALA Advisory Committee issued several recommendations focused on increasing access, diversity, and inclusion in Seattle's single-family zones.

Among these strategies was the recommendation to increase the supply of ADUs. The report noted that although "both [attached and detached] accessory units are allowed, citywide production has been lower than expected…." The report also underscored that ADUs offer several benefits, such as providing options for extended family sharing of housing resources, allowing homeowners to earn additional income, and offering additional rental housing options in family-friendly areas at a similar scale as surrounding single-family development. The HALA committee recommended three specific strategies to increase the supply of ADUs:

- **SF.1a.** Remove code barriers to accessory dwelling units and backyard cottages
- **SF.1b.** Create pre-approved standard plans for backyard cottages
- **SF.1c.** Develop a clemency program to legalize undocumented ADUs (HALA Advisory Committee 2015)

Strategy SF.1a focuses on removing barriers to ADUs through the types of Land Use Code changes evaluated in this EIS.

Changes in single-family zones

In addition to increasing ADU production, another HALA recommendation was to allow a broader mix of lower-density housing types in single-family zones within the same building envelope allowed under current zoning. These housing types could include small lot dwellings, cottages or courtyard housing, rowhouses, duplexes, triplexes, and stacked flats.

Mandatory Housing Affordability

A key HALA recommendation was to ensure that Seattle's growth supports affordability. Accordingly, the City is implementing MHA, a new policy requiring commercial and multifamily residential development to contribute to affordable housing. MHA requirements take effect when the City Council adopts zoning changes that increase development capacity (i.e., allow taller buildings and/or more floor area). To comply with MHA, developers must include income-restricted affordable homes in the proposed development or make a payment to support affordable housing development throughout Seattle. In 2017, the City Council adopted legislation to put MHA into effect in six neighborhoods: the University District, Downtown, South Lake Union, certain nodes in the Central Area, Chinatown-International District, and Uptown. The City evaluated the potential environmental impacts of implementing MHA in other urban villages and multifamily and commercial zones in an EIS that was finalized in October 2017 (Seattle 2017c). As described in Chapter 2, this EIS considers the impacts of applying MHA requirements to the creation of ADUs.

Growth and Equity Analysis

In 2016, the City adopted the Growth and Equity Analysis as an appendix to the Seattle 2035 Comprehensive Plan (Seattle 2016a). This analysis informs elected officials and the public about potential future displacement impacts of the Comprehensive Plan's Growth Strategy on marginalized populations, like people of color and low-income households, and outlines potential tools for mitigating identified impacts and increasing access to opportunity for marginalized populations. The process involved developing the Displacement Risk Index and Access to Opportunity Index. These indices examine disparities in the benefits and burdens that marginalized populations experience as a result of growth. The Displacement Risk Index focuses on both the physical (direct) and economic (indirect) displacement pressures that marginalized populations face. The Access to Opportunity Index focuses on marginalized populations' access to key determinants of social, economic, and physical well-being. See Section 4.1 for additional discussion of displacement.

The Growth and Equity Analysis categorized Seattle's urban villages using a displacement–opportunity typology. It also shows the relative level of displacement risk and access to opportunity for areas outside urban villages, including the single-family zones in the study area for this EIS. Much of the area north of the Ship Canal and most land along the Puget Sound and Lake Washington shorelines have low displacement risk, along with Magnolia, Queen Anne, Madison Park, and the western portion of West Seattle. In contrast, displacement risk is relatively higher for single-family zones in Rainier Valley; Delridge south to Westwood–Highland Park and South Park; and some areas at the northern end of the city. Access to opportunity also varies across the study area. Many single-family zones have relatively low access to opportunity, primarily because that measure emphasizes transit access and other factors more prevalent in urban villages. But access to opportunity is relatively high in some parts of the study area, particularly neighborhoods close to and north of Downtown like Queen Anne, Montlake, Madison Park, Wallingford, Fremont, Ravenna, and Bryant, among others.

3.3 ADU Legislative History

Seattle's history with ADUs is one of gradual change dating back to the 1950s. Policies for AADUs and DADUs have evolved separately, each change reflecting lessons learned from previous iterations. Recurring themes in the City's ADU policy development include:

- Addressing a perceived housing shortage
- Limiting the construction of detached units
- Addressing concerns for impacts on scale and urban form

Between 1900 and the 1950s, ADUs were commonly allowed under single-family zoning provisions. Gradually, this type of housing fell out of favor, and ADUs were no longer allowed in single-family zones. In 1993, in response to widespread concern about the escalating cost and availability of housing, the Washington State legislature required cities to develop legislation for ADUs (RCW 43.63A.215). Under the Growth Management Act (GMA) (RCW Chapter 36.70A), cities with a population of at least 20,000 people were required to allow ADUs in any neighborhood, with regulations, conditions, and limitations left to the discretion of the local legislative authority. In response, Seattle passed Ordinance 117203 in 1994 (Seattle City Council 1994), allowing AADUs in all single-family zones.

In 1998, the City Council passed Ordinance 119241 (Seattle City Council 1998) and established the Demonstration Program for Innovative Housing Design to diversify Seattle's housing supply and provide alternatives to conventional detached single-family houses, condominiums, and apartments. Using a competitive selection process that required Design Review, the Demonstration Program tested innovative residential design concepts that created flexibility for small housing types not allowed under existing regulations, including DADUs. In its 2003 Seattle's Housing Choices Report (Seattle 2003), the Seattle Planning Commission discussed lessons from the Demonstration Program, summarized community feedback, and recommended allowing DADUs in single-family zones throughout the city.

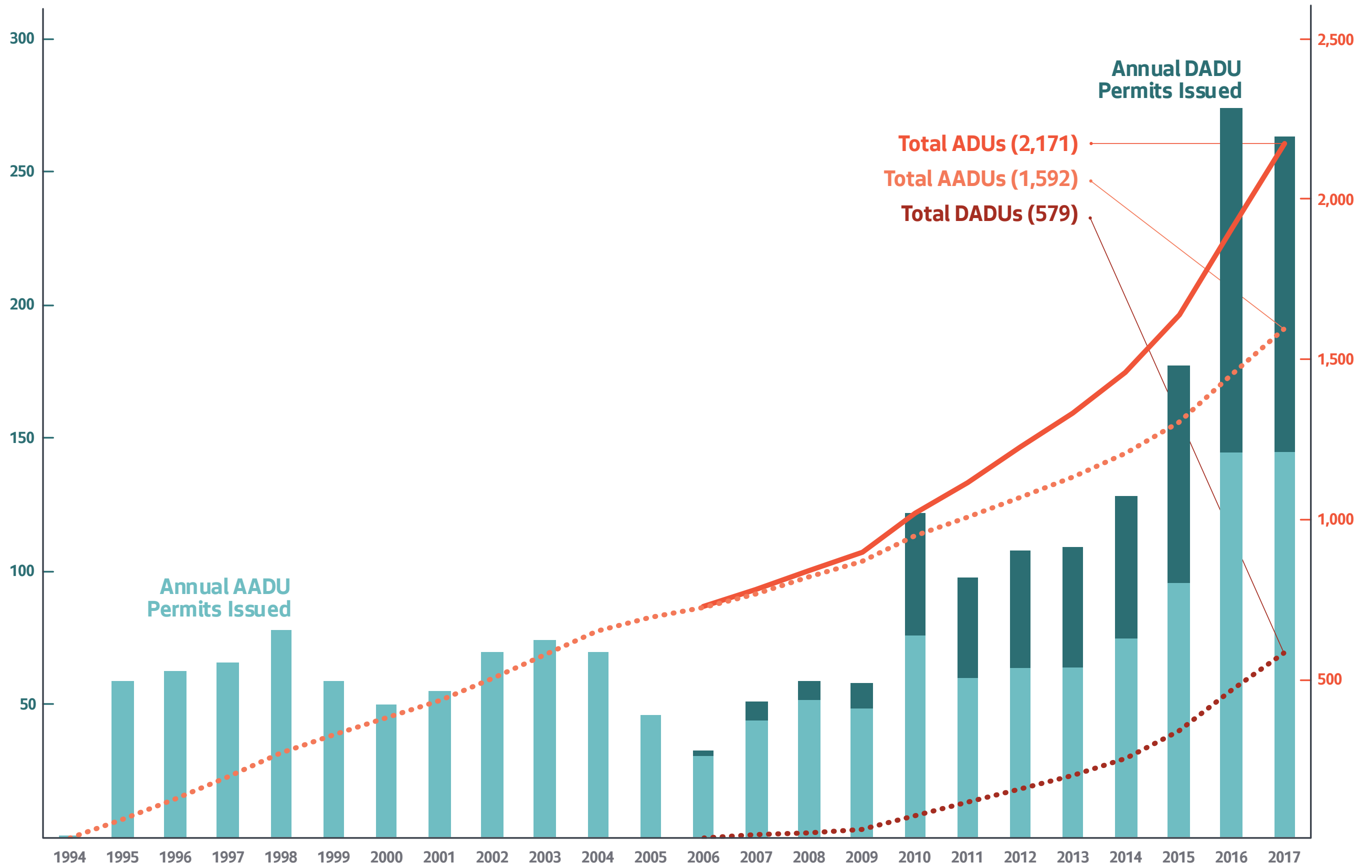
Building on the results of the Demonstration Program, in 2005 Mayor Greg Nickels proposed a DADU pilot program. In August 2006, the City Council adopted Ordinance 122190 (Seattle City Council 2006) allowing DADUs in southeast Seattle (south of Interstate 90 and east of Interstate 5). By 2009, 17 DADU permits had been issued and the Seattle Department of Planning and Development (DPD) proposed legislation to allow DADUs in single-family zones citywide. After extensive public engagement, the City Council unanimously passed and Mayor Nickels signed Ordinance 123141 (Seattle City Council 2009).

AADUs and DADUs have been allowed in Seattle's single-family zones since 1994 and 2009, respectively.

Following passage of Ordinance 123141, slightly more than 200 DADUs were permitted between 2010 and 2014, an average of about 45 per year (Exhibit 3-19). In response to the sluggish pace of construction, the City Council in September 2014 adopted Resolution 31547 (Seattle City Council 2014a) directing DPD staff, now at the Office of Planning and Community Development (OPCD), to explore policy changes that would spur creation of both AADUs and DADUs. Council directed OPCD staff to examine regulatory changes, incentives, and marketing and promotion strategies to boost ADU production. In response to the Council Resolution, OPCD proposed Land Use Code similar to the changes analyzed in this EIS.

In May 2016, the City prepared an environmental checklist evaluating the potential environmental impacts of the proposed changes to the Land Use Code, and issued a determination of non-significance. The determination of non-significance was appealed in June 2016. In December 2016, the Seattle Hearing Examiner determined that a more thorough review of the potential environmental impacts of the proposal was required (Tanner 2016). Based on the Hearing Examiner's decision, the Seattle City Council prepared this Environmental Impact Statement (EIS) in accordance with the Washington State Environmental Policy Act (SEPA).

Exhibit 3-19 ADUs Constructed between 1994 and 2017



ADU DEVELOPMENT IN PEER CITIES

Many other U.S. cities allow ADUs in their respective low-density residential neighborhoods. Most relevant for Seattle's planning context are Portland, Oregon, and Vancouver, British Columbia, two cities often regarded for their relatively high ADU production. Exhibit 3-20 characterizes key features of ADU regulations in those cities. In Portland, ADU production increased markedly in 2010 when the City decided to waive system development charges for ADUs, typically $10,000-20,000 per unit; in 2016 Portland extended the waiver through July 2018. In Vancouver, in 2016 approximately 30,125 houses had an AADU, called "secondary suites" (Census 2016, Statistics Canada), and through 2017 Vancouver had 3,317 constructed and permitted DADUs, called "laneway homes," first allowed in 2009 (City of Vancouver, 2018). In 2017, Vancouver issued permits for 692 one-family dwellings (i.e., single-family houses), of which 404 (58 percent) included a secondary suite (City of Vancouver, 2017). See Exhibit 3-21 for additional details.

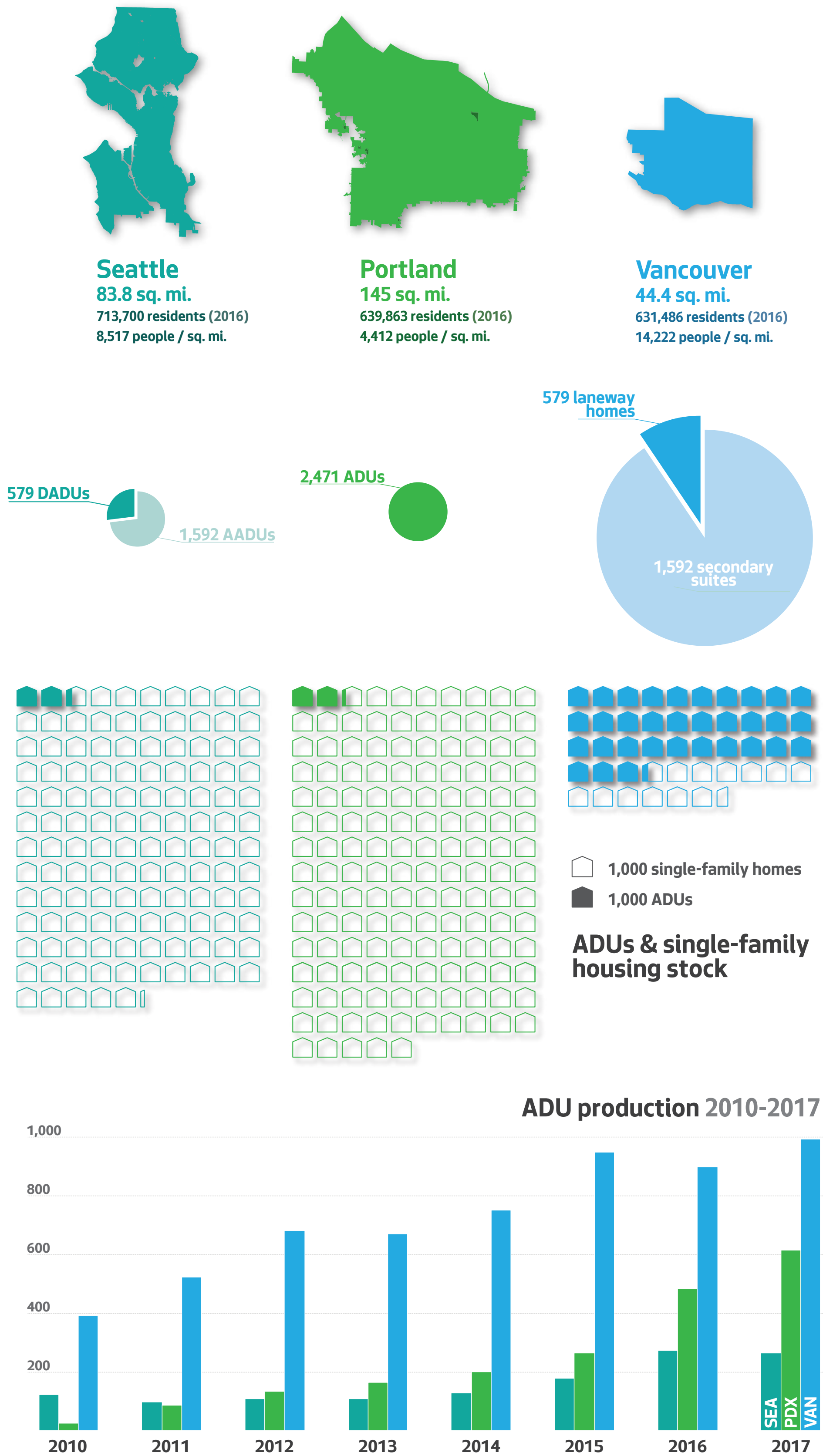
Exhibit 3-20 Key Features of ADU Regulations in Portland, Oregon, and Vancouver, British Columbia

	Portland, OR	Vancouver, BC
Number of ADUs allowed	1[1]	2
Off-street parking for ADU?	No	One space required for all units on the lot (including main house)
Owner-occupancy required	No	No
Minimum lot size for a DADU	n/a (minimum lot size for any new construction varies by zone)	32 feet wide
Maximum square footage	No more than 75% of the living area of the main house or 800 square feet, whichever is less.	AADU: ≥ 400 sq. ft. and ≤ area of main house DADU: Varies by lots size (16% of lot size) with absolute maximum of 900 sq. ft.
Maximum DADU height	20 feet outside required setbacks 15 feet within required setbacks	15 feet for 1 story 20 feet for 1.5 story
Maximum coverage	≤ principal unit and < 15% of lot	Site coverage must not exceed the permitted site coverage under the applicable district (~40%); allows for additional 5% of lot coverage for a one story DADU
Reduced predevelopment costs	Yes	No
Maximum FAR limit	n/a	0.6
Notes	Features on DADU like windows, roof pitch, trim, and finishes, must match the main house	Allowed only on sites with alley access, on corner lots served by an alley, or on a through lot. DADU must be located to preserve existing trees. Relaxations for location, massing, and parking standards may be allowed in order to retain significant trees.
Average number of ADUs permitted per year: 2010-2016[2]	278	696

1 The City of Portland is currently considering adoption of new standards, including applying FAR limits in certain zones and allowing two ADUs on one lot (see Residential Infill Project).

2 The average number of ADUs constructed per year in Seattle during this same period is 147.

Exhibit 3-21
Comparison of ADUs in Seattle, Portland, and Vancouver



4 Environmental Analysis

This chapter describes existing conditions in the EIS study area and potential environmental impacts of the proposed Land Use Code changes to the following elements of the environment.[1]

- 4.1 – Housing and Socioeconomics
- 4.2 – Land Use
- 4.3 – Aesthetics
- 4.4 – Parking and Transportation
- 4.5 – Public Services and Utilities

This list was developed based upon elements of the environment that were identified by the Seattle Hearing Examiner in her 2016 decision as requiring additional analysis, and no additional elements of the environment were identified as a result of the City's subsequent EIS scoping process.

To evaluate potential impacts to those elements of the environment we analyzed the current level of ADU production under Alternative 1 (No Action) and the level of ADU production anticipated from the Land Use Code changes proposed under Alternatives 2 and 3.

1 SEPA requires analysis of adverse impacts to the physical environment, which includes the natural or built environment (RCW 43.21C.110, WAC 197-11-440 (6) (e)). SEPA allows but does not require an EIS to consider other factors that may affect an agency decision, such as socio-economic impacts (WAC 197-11-448, WAC 197-11-440 (8)).

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4.1 Housing & Socioeconomics

This section considers the impacts of the proposed Land Use Code change on housing and socioeconomics. Specifically, we first evaluate the following questions:

- **Underlying Development Economics.** How might the proposed changes alter the underlying real-estate economics in single-family zones? Could the proposed changes make property in single-family zones more attractive as rental investments rather than as owner-occupied assets?
- **ADU Production.** How many ADUs could be created given the proposed policy changes in each alternative?

This analysis allows us to consider the following types of impacts resulting from the proposed alternatives:

- **Affordability.** What impacts could the proposed changes have on housing affordability?
- **Displacement.** How might the potential housing and socioeconomic impacts vary by neighborhood? What are the potential impacts on marginalized populations (low-income people, people of color, and non-native English speakers)?

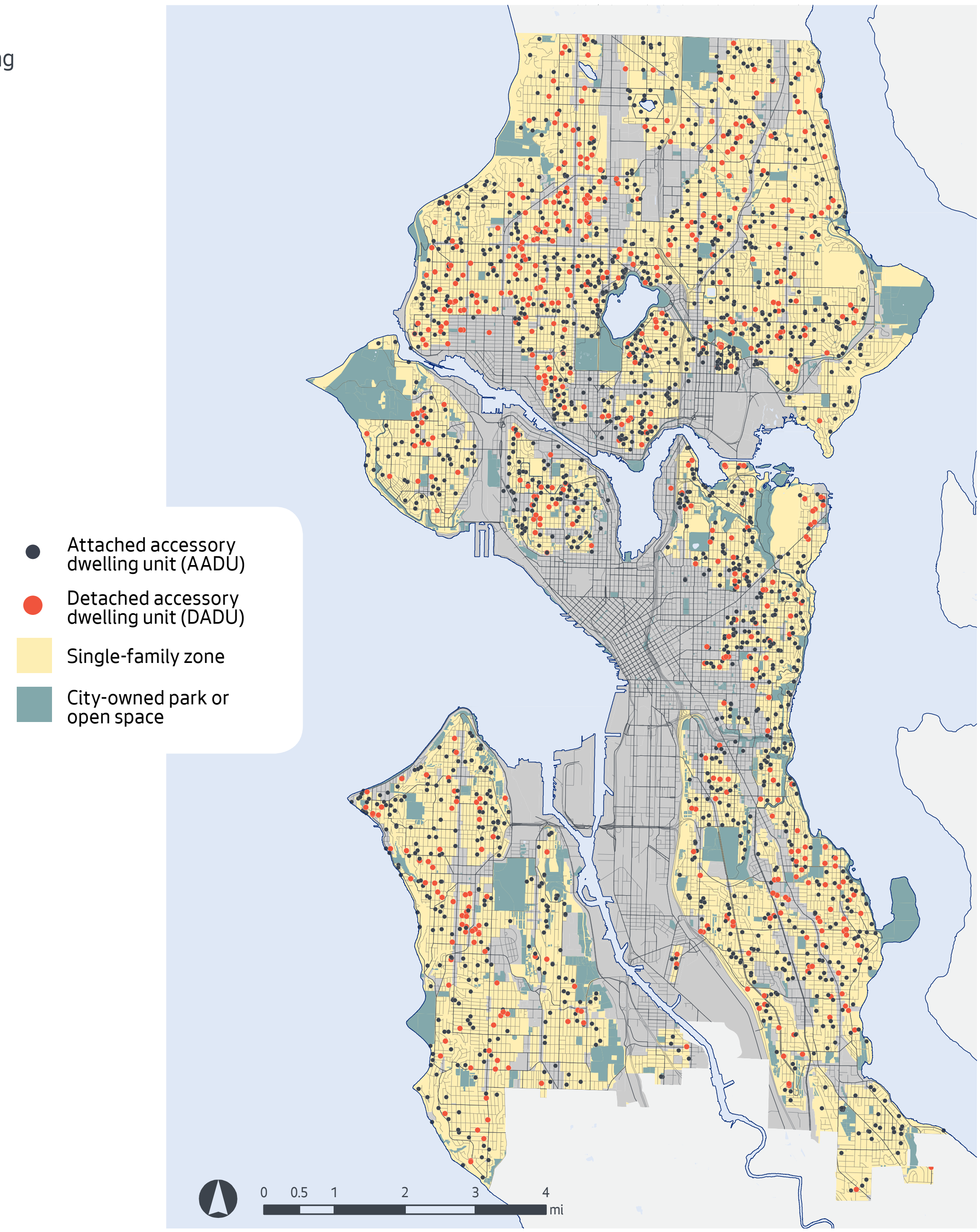
4.1.1 Affected Environment

HOUSING

Seattle has about 348,000 housing units. Between 2010 and 2017, the city gained about 40,000 new housing units. Based on ACS data, about 44 percent of homes in Seattle are located in one-unit detached structures, most, but not all, of which are in single-family zones.

Currently, less than two percent of Seattle's roughly 135,000 lots in single-family zones have an AADU. Since their legalization citywide in 2010, about 550 DADUs have been constructed or permitted. On average, 69 DADUs have been permitted annually since 2010, with the highest annual permit volumes in 2016 and 2017 (129 and 118 DADUs, respectively). Exhibit 4.1-1 shows the distribution of Seattle's ADUs.

Exhibit 4.1-1
Distribution of Existing ADUs in Seattle



HOUSING AFFORDABILITY

Housing affordability is typically expressed as a measure of housing costs in relation to household income. The standard for housing affordability is housing costs, including basic utilities, that amount to 30 percent or less of a household's gross income. Households paying more than 30 percent of their gross income for housing costs may have difficulty affording necessities such as food, clothing, transportation, and medical care. The U.S. Department of Housing and Urban Development (HUD) considers households paying more than 30 percent of their income for housing as "cost-burdened" with respect to housing. Households that pay more than 50 percent of their income for housing costs are considered "severely cost-burdened." Housing cost burden is a key measure of housing need.

HUD estimates that 37 percent of all Seattle households are either cost-burdened or severely cost- burdened. Renter households are significantly more likely to experience cost burden than owner-occupied households. And they are nearly twice as likely to be severely cost-burdened: 20 percent of renter households are severely cost-burdened compared to 11 percent of owner households. Lower-income households are most likely to experience cost burden. Sixty-eight percent of households with incomes less than 80 percent of area median income (AMI) spend more than 30 percent of their income on housing, while 37 percent spend more than half their income on housing. Exhibit 4.1-2 and Exhibit 4.1-3 show how cost burden varies among renter and owner households at various income levels.

Exhibit 4.1-2 Housing Cost Burden among Renter Households by Household Income

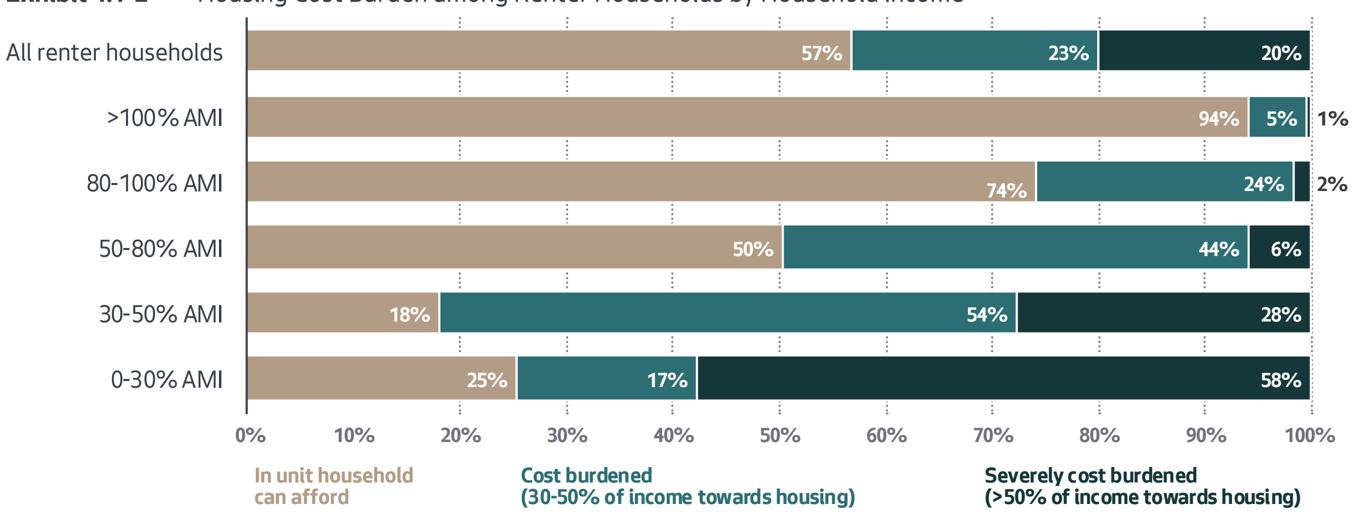
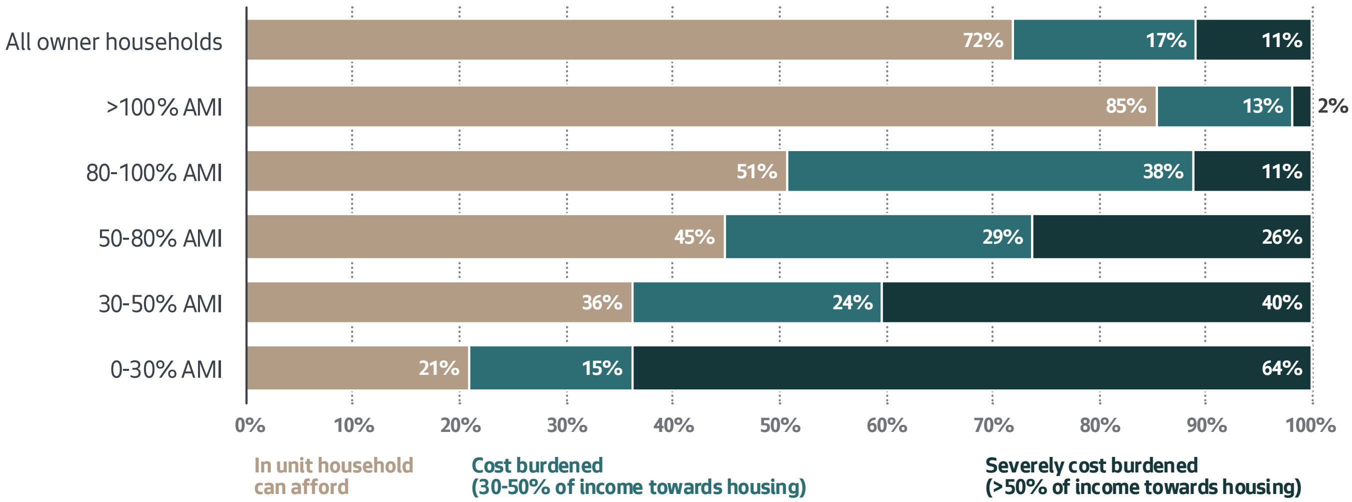
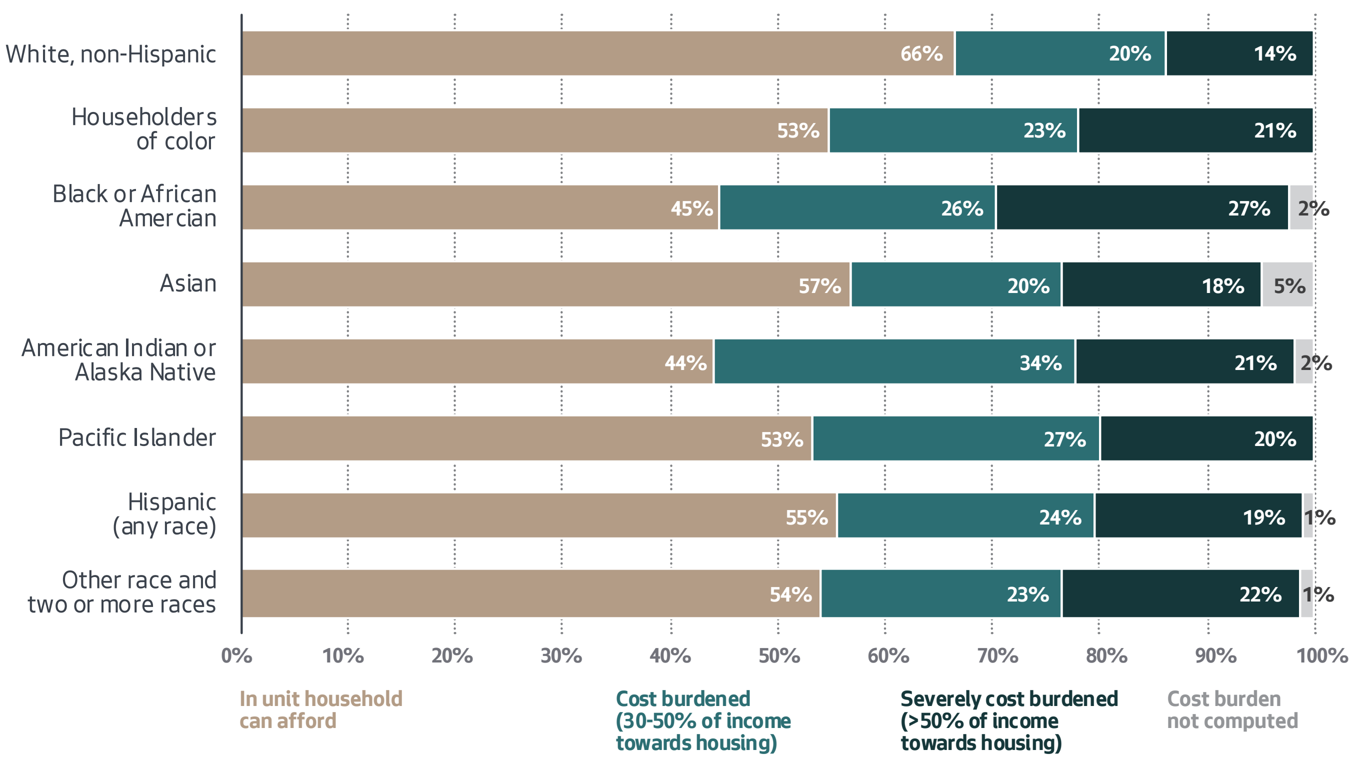


Exhibit 4.1-3 Housing Cost Burden among Owner Households by Household Income



We also see disparity in cost burden among households of different racial and ethnic backgrounds. As shown in Exhibit 4.1-4, two-thirds of households with a non-Hispanic White householder are not cost burdened and only 14 percent are severely cost burdened, the highest and lowest shares for any racial category, respectively. More than half of households with a Black or African American householder experience some level of housing cost burden.

Exhibit 4.1-4 Housing Cost Burden by Race and Ethnicity of Householder



Sales prices for homes in Seattle have risen substantially in recent years. According to the latest data from the Northwest Multiple Listing Service (NWMLS), the median closed sales price for residential units in King County in 2017 was $627,000. According to the 2012–2016 American Community Survey, 19 percent of detached one-unit structures are renter occupied (25,449 housing units). In 2016, the City analyzed the affordability of unsubsidized occupied rental housing based on surveys conducted by Dupre + Scott Apartment Advisors (Dupre and Scott Apartment Advisors, 2017). The analysis included data on detached single-family homes operated as rental units. Exhibit 4.1-5 summarizes gross rents for single-family rentals and the income levels needed to afford them. According to 2016 Dupre + Scott survey data, median rent for a three-bedroom single-family house was $2,892 per month, which would require a household income of at least 123 percent of area median income (AMI) to ensure affordability. The 2016 study found that affording a single-family rental at the 25th percentile market-rate rent requires a household income at the 100 percent of AMI level. For households with incomes of 80 percent of AMI, even two- or three-bedroom single-family homes with rents at the 25th percentile, a common marker of rent for the least expensive homes on the market, are out of reach. Exhibit 4.1-6 shows the share of single-family rentals by number of units at each affordability level.

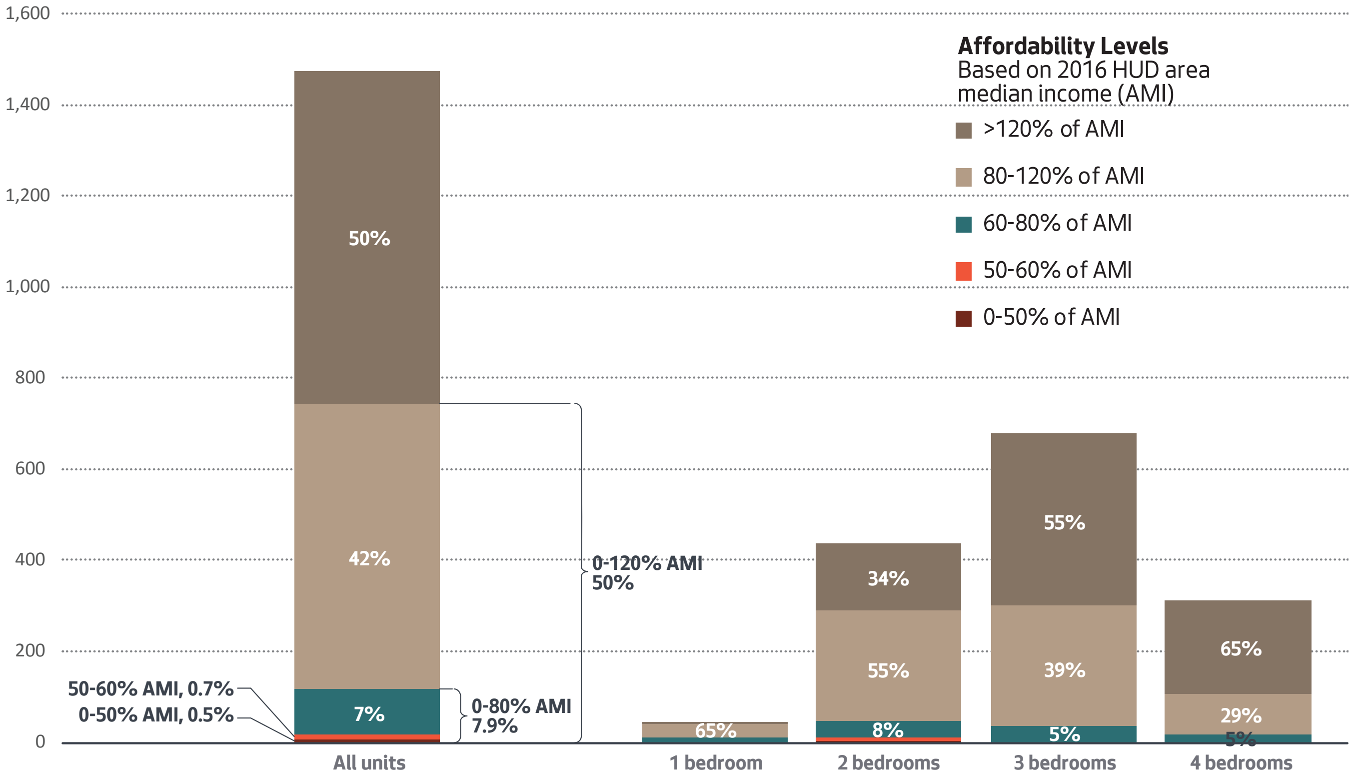
Exhibit 4.1-5 Cost of a Single-Family Rental and Required Income Levels.
Source: City of Seattle analysis of custom data tabulations from Dupre + Scott Apartment Advisors.

Single-family rentals	1 BR	2 BR	3 BR	4 BR	Weighted aggregate (all unit sizes)
Average rent	$1,607	$2,237	$2,975	$3,620	
	95% of AMI	110% of AMI	127% of AMI	138% of AMI	123% of AMI
Median rent	$1,588	$2,163	$2,892	$3,497	
	94% of AMI	106% of AMI	123% of AMI	133% of AMI	119% of AMI
25th percentile rent	$1,331	$1,749	$2,468	$2,925	
	79% of AMI	86% of AMI	105% of AMI	112% of AMI	100% of AMI

Based on Dupre + Scott 2016 rent survey data for market-rate rental units. Figures reflect rent plus estimated cost of tenant-paid utilities. Small numbers of studios in single-family rentals were omitted to streamline analysis.

Exhibit 4.1-6 Affordability of Unsubsidized Single-Family Rental Units, Overall and by Unit Size (Number of Bedrooms).

Source: City of Seattle analysis of custom data tabulations from Dupre + Scott Apartment Advisors.



DISPLACEMENT

In the context of housing, displacement refers to a process wherein households are compelled to move from their homes involuntarily due to the termination of their lease or rising housing costs or another factor. This is different than voluntarily choosing to move. There are three different kinds of displacement occurring in Seattle: physical, economic, and cultural. Physical displacement is the result of eviction, acquisition, rehabilitation, or demolition of property, or the expiration of covenants on rent- or income-restricted housing. Economic displacement occurs when residents can no longer afford rising rents or costs of homeownership like property taxes. Cultural displacement occurs when residents are compelled to move because the people and institutions that make up their cultural community have left the area.

Not all households are equally vulnerable to displacement. Renters are at higher risk of physical displacement than homeowners. Marginalized populations (including people of color, low-income people, immigrants and refugees, and English language learners) are also more vulnerable to displacement. To better understand which areas of Seattle are at higher risk of displacement, the Seattle 2035 Growth and Equity Analysis created a displacement risk index (Seattle 2016). This index combines data about vulnerability, development potential, and market conditions to illustrate variation in displacement risk across the city. We use the Seattle 2035 displacement risk index to contextualize the results of our analysis and how the alternatives may affect physical, economic, and cultural displacement.

Physical Displacement

Various circumstances can cause physical displacement, including demolition of existing buildings to enable the construction of new buildings on the same site. Another cause is rehabilitation of existing buildings; strong demand for housing can encourage property owners to renovate their buildings to attract higher-income tenants. Single-family houses that are rehabilitated, expanded, or demolished and replaced with larger houses tend to result in more expensive units and do not increase the supply of housing. To evaluate potential impacts on physical displacement, we consider whether the alternatives would change the likelihood of various development outcomes, particularly demolishing existing homes.

Economic Displacement

Regulatory changes that affect underlying real-estate economics in the study area can change the likelihood of economic displacement. For example, regulations limiting the number of housing units in a particular area can increase competition for homes and put upward pressure on the cost of housing, making it difficult for residents to continue to afford to live there. To evaluate economic displacement, we consider how the alternatives could affect the cost and availability of housing in the study area.

Cultural Displacement

Cultural displacement occurs when people choose to move because their neighbors and culturally related businesses and institutions have left the area. As described in Chapter 3, people of color, immigrants, and refugees have faced additional barriers to accessing housing in Seattle, particularly in parts of the study area. Challenges to accessing housing due to segregation and discrimination often mirror challenges to accessing other opportunities, such as job and educational opportunities for these communities. As a result, social networks within racial and ethnic communities may take on a greater importance than for other populations. For communities of color, immigrants, and refugees, social cohesion often plays a larger role in location decisions than it does for other populations. Since cultural anchors, gathering spaces, arts organizations, businesses, and religious institutions may not be widespread elsewhere in the region, the presence of these cultural assets can often have added importance to racial or ethnic minority households in their location decisions.

Measuring cultural displacement is difficult since no systematic survey of households exists that asks why they have chosen to relocate. Some indicators of cultural displacement can be measured at the neighborhood scale. Recall that Exhibit 3-8 shows that some neighborhoods, including Central Area, Beacon Hill, and Columbia City, experienced a substantial decline in the percentage share of racial and ethnic minorities between 1990 and 2010. Because the study area includes only single-family zoning, we do not anticipate direct adverse impacts on cultural institutions, organizations, or businesses, as the proposed Land Use Code changes would not affect those types of land uses. It is possible that policies increasing ADU production could allow more households to create ADUs for rental income or to accommodate changing household sizes and needs, though overall construction costs likely limit this effect.

4.1.2 Impacts

METHODOLOGY

Evaluating the potential housing and socioeconomic effects of the alternatives requires a holistic analysis of development options and housing choices in single-family zones. As described in detail in Appendix A, we used two distinct approaches to analyze the potential effects of the alternatives on housing and socioeconomic conditions in the study area. These two approaches analyze potential effects in different but complementary ways.

The owner of a single-family house in the study area has a number of choices for what to do with it. These choices include whether to sell, rent, or live in the house, as well as whether or not to rebuild, remodel, or add an ADU. The outcome for any given property in any given year depends on the owner's goals, financial resources, and preferences. A hypothetical profit-maximizing developer will seek to maximize return on investment, but that is not true for all property owners. Homeowners can (and do) make decisions that are unrelated to maximizing the value of their property. The highest and best use of a house might be to tear it down and rebuild a much larger house, but if the homeowner prefers the small house, no change in use would occur until they decide to sell. Building an ADU and renting it out may be most profitable for a homeowner but ruled out because of a preference for privacy or disinterest in becoming a landlord. Even when a property owner does wish to add an ADU or redevelop their site, they may lack the financial capital to do so.

Highest and Best Use Analysis

To analyze how alternatives might affect underlying development conditions in the study area, we used Highest and Best Use Analysis. This analysis considers how the potential Land Use Code changes could alter the highest-value use of a property. In other words, this approach evaluates how the proposed alternatives would affect underlying development economics for lots in Seattle's single-family zones. This analysis identifies the most economically productive use for a particular site, but it does not necessarily predict what will actually happen on a site. This is because it does not consider the motivation and preferences of individual property owners or market demand for a particular real estate product (e.g., an AADU or a single-family house). Thus, highest and best use can tell us how the alternatives could change the underlying real-estate economics in the study area, but it does not predict specific development outcomes for a given parcel or tell us how the alternatives could affect overall development rates in the study area.

Highest and Best use analysis

A highest and best use analysis evaluates the reasonable use of a property based on what is physically possible, is financially feasible, and results in the highest present value.

Therefore, to arrive at estimates of ADU production for each alternative, we also developed a forecast model that examines where ADU development has occurred in the past and estimates the effect of policy changes in each alternative.

Exhibit 4.1-7 shows how we use the two approaches together to analyze potential housing and socioeconomic effects. Appendix A provides more detail about the methodology used for each analytical approach.

Exhibit 4.1-7 Analytical Approach

Which analysis helps us answer each research question?	Highest and Best Use	Forecast
ADU production. How many ADUs could be created given the proposed policy changes in each alternative?		yes
Development economics. How might the proposed changes alter the underlying real-estate economics in single-family zones? Could the proposed changes make property in single-family zones more attractive as rental investments rather than as owner-occupied assets?	yes	

Highest and Best Use: Pro Forma Analysis

To analyze the potential impacts of the alternatives on highest and best use in the study area, we used pro forma analysis. Pro forma models are common decision-making tools used by real estate developers and policymakers. Our pro forma model used inputs and assumptions about current market conditions, parcel characteristics, and land use scenarios to calculate a residual land value for more than 6,000 possible development outcomes. By comparing residual land values, we can estimate the highest and best use. Ultimately, the pro forma model allows us to analyze the following questions:

1. What can you build on a lot in a single-family zone?
2. After it is built, what can you do with it? Sell it? Rent it?
3. Based on market conditions, how much rental or sales income can you expect?
4. Which combination of steps 1–3 maximizes the profitability of the project?

Although theoretically possible to use pro formas to analyze highest and best use for every parcel in the study area (by applying specific parcel characteristics and more localized rent data), we used instead a typology approach to facilitate interpretation of the results and to highlight some key differentiators related to ADU production. The typology approach — applying three different neighborhood profiles (higher, medium, and lower price) and four different parcel types — allowed us to analyze the relative profitability of various development outcomes on parcels of different sizes and in different parts of the city without analyzing every parcel individually.

Residual Land Value

Residual land value is a useful metric for comparing the relative feasibility of different development projects. Residual land value is the developer's land budget for a particular project, after taking into account expected costs (including developer profit) and revenues. A higher residual land value for a particular use indicates that the developer can afford to pay more for the land. Whichever developer has the highest residual land value will outbid the others.

To account for varying market conditions across the study area, we categorized every neighborhood in Seattle as either a higher-, medium-, or lower-price neighborhood. Neighborhoods were classified based on a combination of single-family rental rates and single-family for-sale housing prices. Note that these are comparative labels that simply reflect the relative cost of housing in Seattle neighborhoods. From a broader perspective, housing costs in all Seattle neighborhoods tend to be higher than other places in the county and region, and nationally Seattle's housing market is more expensive than most other U.S. cities. Further, housing costs in neighborhoods categorized here as "lower-price" may in fact be rising faster than elsewhere, over time making housing in those areas increasingly similar to medium- and higher-price neighborhoods. Exhibit 4.1-8 outlines the classifications for neighborhoods in Seattle.

Exhibit 4.1-8 Neighborhood Profile Classifications

Neighborhood	Sales price category	Rent category	Overall profile
Madison/Leschi	Higher	Higher	Higher
Queen Anne	Higher	Higher	Higher
Capitol Hill/Eastlake	Higher	Higher	Higher
Magnolia	Higher	Medium	Medium
University	Higher	Medium	Medium
Greenlake/Wallingford	Medium	Higher	Medium
Central	Medium	Higher	Medium
Ballard	Medium	Medium	Medium
Beacon Hill	Lower	Medium	Medium
West Seattle	Medium	Lower	Medium
North Seattle	Lower	Lower	Lower
Rainier Valley	Lower	Lower	Lower
White Center	Lower	Lower	Lower

The characteristics of each parcel set upper bounds on what can be built. Some characteristics are permanent (e.g., size and shape of the parcel) while others can change over time (e.g., size and shape of existing structures). To account for varying parcel characteristics, we developed four parcel types, each defined by lot size, lot shape, and size of current structures. Exhibit 4.1-9 outlines the assumptions for each parcel type.

Exhibit 4.1-9 Parcel Typology

	Parcel type			
	A	**B**	**C**	**D**
Lot size (square feet)	3,200	3,750	5,000	7,200
Lot width (feet)	32	31	50	60
Lot depth (feet)	100	120	100	120
Footprint of main house (square feet)	940	980	1,050	1,150
Living space in main house (square feet)	1,500	1,600	1,800	1,900
Footprint of accessory structures (square feet)	250	250	250	350
Size of daylight basement (if present) (square feet)	500	600	700	800
Number of parking spaces	2	2	2	2
Implications of assumptions				
Current lot coverage	37%	33%	26%	21%
Maximum DADU footprint when keeping existing main house	540	583	700	1,370
Under which alternatives are AADUs allowed?	All alternatives	All alternatives	All alternatives	All alternatives
Under which alternatives are DADUs allowed?	2, 3	2, 3	All alternatives	All alternatives

Owners of lots in single-family zones have several different options in terms of altering their property. They could tear down an existing structure and rebuild that structure (with or without an ADU). They could keep an existing house and do nothing, remodel, or add an ADU. To evaluate highest and best use in single-family zones, we analyzed the financial performance of 44 legally permissible development outcomes. These outcomes can be categorized into two main types: outcomes that demolish the existing house and outcomes that retain the existing house.

For each development outcome, there are options for what to do with the property — sell it or rent it? A house can be sold, rented to long-term tenants, or used as a short-term rental. Each option is associated with different revenues and costs that determine which use is ultimately most profitable. For a profit-maximizing owner, this decision will be influenced by the relative strengths of the rental and for-sale markets.

To analyze the relative profitability of the rental and for-sale markets in Seattle today, the model considered four valuation options for each development outcome:

- All units (including any ADUs) are valued based on total for-sale price
- All units are used as long-term rentals (including the main house)[1]
- The main house is valued based on its for-sale price, and ADUs are used as long-term rentals
- The main house is valued based on its for-sale price, and one ADU is used as a short-term rental

The pro forma model reflects the current Land Use Code regulations for development in single-family zones, as well as proposed changes under Alternatives 2 and 3. Zoning inputs included information about required setbacks, maximum lot and rear yard coverage, required parking spaces, allowed number of ADUs, allowed size of ADUs, and owner-occupancy requirements.

The pro forma model also considered development and operating costs, including the construction costs of building an AADU or a DADU, permitting fees, architectural and engineering fees, developer fees, and any investment returns associated with rental fees.

Finally, we put all the pieces together and modeled each combination of inputs (parcel typology, alternative, neighborhood profile, valuation) for each development outcome. This resulted in residual land value outputs that could be compared across valuation options and alternatives.

Forecast Model

Owners in the study area have multiple options for developing their properties. To arrive at a reasonable forecast of what is likely to happen in the future under each alternative, we needed a methodology that accounted for historical rates of ADU production and examined how policy changes could affect them. While the pro forma analysis helped us understand the most profitable outcomes, it did not necessarily reflect

1 For Alternatives 1 and 3, which would maintain the owner occupancy requirement, this option was used only to evaluate development outcomes that had a main house and no ADUs.

the real-world decisions that people make. People build ADUs for several reasons unrelated to profit, including to gain additional living space or to house a family member. Therefore, we developed a forecast model that allows us to analyze past decisions and trends to determine the factors that affect the likelihood that a parcel will add an ADU and to estimate the potential impact of specific policy changes. By adjusting the input variables in the model, we can forecast the potential impacts of Alternative 2 and 3 on the number of ADUs built. We also considered how many parcels would have no change, how many homes would be demolished and rebuilt under each alternative, and how these outcomes might vary by neighborhood and parcel size.

To forecast potential ADU production in each alternative, we used the following process:

1. Analyze historical data on single-family development outcomes.
2. Develop a baseline forecast of 2018-2027 ADU production in Alternative 1 (No Action).
3. Develop forecasts of 2018-2027 ADU production in Alternatives 2 and 3.
   - Update variables in baseline forecast model to account for changes to minimum lot size (Alternatives 2 and 3) and FAR (Alternative 3 only).
   - Evaluate potential number of parcels that would choose to add two ADUs.
   - Adjust estimates to account for proposed policy changes not reflected in parcel data.

1 Analyze historical data on single-family development outcomes.

First, we used an econometric model to analyze past development events and determine the factors that affect the likelihood that a parcel adds an ADU or is demolished.[2] We applied this model to all parcels in the study area. To estimate each parcel's development outcome in a given year, we analyzed King County Assessor's data and City of Seattle permit data for 2010–2017. These sources provided us with parcel characteristics, building characteristics, and information about when properties added ADUs or were redeveloped. We analyzed the effects of the following factors:

- Neighborhood

2 Specifically, we used a multinomial logit model to estimate ADU production. A multinomial logit model is a type of behavioral econometric model. For more information about the model specifications, see Appendix A

- Topography
- Square footage of total living space (before and after a teardown, if applicable)
- Age of the home
- Whether the home has a daylight basement
- Number of bedrooms
- Assessed condition of the home
- Whether the lot size allows for a legal DADU
- Total regional employment of the year (PSRC 2015)

The model results indicate that a tradeoff is occurring between adding an ADU and tearing down and rebuilding a house. This suggests that homeowners seeking to expand their living space are deciding between tearing down the home or adding an ADU.

2 Develop baseline forecast of ADU production in Alternative 1 (No Action).

Step 1 above evaluates all parcel-level decisions that occurred from 2010 through 2017. To estimate what decisions will be made over the next 10 years (from 2018 to 2027) under Alternative 1, we must forecast how the underlying variables will change during that period, including changes in the regional economy and the ages of individual homes. We implement this in the model by updating the variables for age of the home and regional total employment and recalculating parcel-level probabilities.

This results in estimates of the probability that each parcel in the study area will either add an AADU, add a DADU, be torn down, or have no change over the forecast period in Alternative 1.

3 Develop forecasts of ADU Production in Alternatives 2 and 3.

Estimating the potential effects of Alternatives 2 and 3 over 2018-2027 requires further adjustments to the parcel-level variables in the forecast model. Where a proposed policy change modifies a variable in the model, we update that value in the data to reflect the change and recalculate new probabilities for each alternative. Based on the proposed Land Use Code changes under consideration, we manipulate two elements in the behavioral model: 1) minimum lot size requirement for adding a DADU and 2) maximum FAR for new construction. Then we re-run the model with the adjusted inputs to estimate the probability of each development outcome.

However, the forecast model described above cannot predict the probability of events that do not appear in the historical dataset — namely, the construction of two ADUs on one lot. To estimate the number of lots that might have two ADUs under Alternatives 2 and 3, we use a different approach that estimates the total demand for ADUs, without constraining parcels to the variations that are currently legal. To do this, we use the same data and variables from the forecast model[3] used for Steps 1 and 2 above but instead apply a count data model. By combining the results of the two models, we estimate the probability that each parcel will add exactly one AADU, add exactly one DADU, add two ADUs, be torn down, or have no change for the 2018-2027 forecast period.

Finally, we adjust the modeled estimates of ADU production to account for the fact that some of the proposed changes in Alternatives 2 and 3 are not reflected in the available parcel-level data. These include changes to owner occupancy, maximum household size, parking requirements, maximum DADU size, and DADU construction cost. To the extent that any of these policy proposals affect the likelihood that a parcel has a particular development outcome, those effects are not captured in the forecast model. To compensate for this limitation and to establish a reasonable upper bound for the potential number of ADUs created, we adjust the modeled estimates based on the results from the pro forma analysis. This accounts for the potential impact of policy changes that we cannot model while still using best available information on the potential impact of those policy changes that we can model.

MODEL RESULTS

Pro Forma Results

The sections below summarize the results most pertinent to our analysis of impacts. Appendix A shows the full results of the pro forma analysis.

Highest and Best Use

Exhibit 4.1-10 presents the estimates of highest and best use for each combination of parcel type, neighborhood profile, and alternative. The highest residential land value for each combination indicates the development outcome where a developer can afford to pay the most for land — in other words, where the combination of costs and revenues

3 For more details about model specification, see Appendix A.

yields the greatest profit. In interpreting, it is important to note that these results do not account for the relative feasibility between different outcomes. In some cases, the second-most feasible option may have a residual land value very similar to the most feasible option, which should be taken into consideration when interpreting results. See Appendix A for additional discussion and more detailed results.

Alternative 1 (No Action). For smaller parcels (A, B, C) in higher- and medium-price neighborhoods, the highest residual land value would result from demolishing the existing structure and rebuilding the largest possible house (i.e., McMansion). For larger parcels (D), and for all parcel sizes in lower-price neighborhoods, the highest residual land value would result from keeping the existing house and adding an AADU.

Alternative 2. The most feasible outcomes in Alternative 2 would be mostly the same as in Alternative 1 (No Action), with a few exceptions. In higher-price neighborhoods, the highest and best uses for larger parcel sizes (C and D) could shift from demolishing the existing house and rebuilding the largest possible house to keeping the house and adding two ADUs. In addition, the highest and best use of large parcels (D) in medium-price neighborhoods might change from keeping the existing house and adding one ADU to keeping the house and adding two ADUs. A major policy change from Alternative 1 (No Action) to Alternative 2 is that a single lot could have two ADUs. Our analysis indicates that this outcome would be generally more feasible on larger parcels in higher- and medium-price neighborhoods. In lower-price neighborhoods, the residual land value of two-ADU outcomes would be about 22 percent less than the most feasible outcome overall.

Alternative 3. Compared to Alternative 1 (No Action), fewer parcel types would have a highest and best use of building a new, very large house.

Valuation Options

For any given development outcome, the property owner could decide to rent or sell the main house and any ADUs on the lot. For a profit-maximizing owner, this decision will be influenced by the relative strengths of the rental and for-sale markets.

Alternative 1 (No Action). For all neighborhoods and parcel sizes, a house with no ADUs operated as a long-term rental would be the least feasible option. Treating the property's entire floor area (including any ADUs) as one large, for-sale unit would result in the highest residual land value for most scenarios, except for small parcels in lower-price neighborhoods and large parcels in medium-price neighborhoods.

These results indicate that, in current market conditions, single-family houses and ADUs would be generally more valuable on the for-sale market than as rental properties. In other words, valuing an ADU as extra square footage on a house for sale may result in a higher residual land value than valuing the ADU based on its achievable rental income.

Alternative 2. Only one parcel size showed a change in the most profitable valuation option between Alternative 1 (No Action) and Alternative 2: Type D parcels in medium-price neighborhoods. Treating the entire property (including any ADUs) as one large, for-sale unit would continue to be the most profitable outcome for most scenarios, especially in higher-price neighborhoods. Like Alternative 1 (No Action), renting all units would be the least profitable valuation option for all combinations of neighborhood and parcel size. However, our analysis indicated that the relative feasibility of renting (as opposed to selling) may increase between Alternatives 1 and 2. In higher- and medium-price neighborhoods, the estimated residual land value of renting would increase 21–24 percent. In lower-price neighborhoods, the estimated increase would be 11–14 percent.

Alternative 3. Only one parcel size showed a change in the most profitable valuation option between Alternative 1 (No Action) and Alternative 3: Type D parcels in medium-price neighborhoods. Treating the entire property (including any ADUs) as one large, for-sale unit would continue to be the most profitable outcome for most scenarios, especially in higher-price neighborhoods. Like Alternatives 1 and 2, renting all units would be the least profitable valuation option for all combinations of neighborhood and parcel size. The estimated feasibility of renting under Alternative 3 would be similar to Alternative 1 (No Action) and lower than Alternative 2.

Remodel or Teardown and Rebuild?

For any given development outcome, the owner could decide to tear down and rebuild (new construction) or retain the existing house. The pro forma analysis lets us evaluate the relative feasibility of these two options.

Alternative 1 (No Action). In all neighborhood profiles, new construction would be relatively more feasible on small- and medium- sized parcels than on large parcels. In addition, new construction would be more feasible in higher- and medium-price neighborhoods than in lower-price neighborhoods.

Alternative 2. For higher- and medium-price neighborhoods, Alternative 2 could increase the feasibility of keeping the existing house compared to Alternative 1 (No Action). This change would be greatest for larger parcels. Lower-price neighborhoods would see only a minimal (<0.2 percent) change in the feasibility of keeping the existing house between Alternative 1 (No Action) and Alternative 2.

Alternative 3. Like Alternative 2, Alternative 3 could increase the feasibility of keeping the existing house compared to Alternative 1 (No Action). This change would be greatest in higher- and medium-price neighborhoods. Lower-price neighborhoods would see a minimal change between Alternative 1 (No Action) and Alternative 3.

Exhibit 4.1-10 Estimates of Highest and Best Use

Parcel type	Alternative	Neighborhood price		
		Higher	Medium	Lower
A	**Alternative 1**	Build new house, as large as possible, no ADUs	Build new house, as large as possible, no ADUs	Keep house, convert basement to AADU, long-term rental
A	**Alternative 2**	Build new house, as large as possible, no ADUs	Build new house, as large as possible, no ADUs	Keep house, convert basement to AADU, long-term rental
A	**Alternative 3**	Build new house, as large as possible, no ADUs	Build new house, as large as possible, no ADUs	Keep house, convert basement to AADU, long-term rental
B	**Alternative 1**	Build new house, as large as possible, no ADUs	Build new house, as large as possible, no ADUs	Keep house, convert basement to AADU, long-term rental
B	**Alternative 2**	Build new house, as large as possible, no ADUs	Build new house, as large as possible, no ADUs	Keep house, convert basement to AADU, long-term rental
B	**Alternative 3**	Build new house, as large as possible, no ADUs	Build new house, as large as possible, no ADUs	Keep house, convert basement to AADU, long-term rental
C	**Alternative 1**	Build new house, as large as possible, no ADUs	Build new house, as large as possible, no ADUs	Keep house, convert basement to AADU
C	**Alternative 2**	Keep house, convert basement to AADU, and add DADU	Build new house, as large as possible, no ADUs	Keep house, convert basement to AADU
C	**Alternative 3**	Keep house, convert basement to AADU and add DADU	Keep house, convert basement to AADU and add DADU	Keep house, convert basement to AADU
D	**Alternative 1**	Keep house, convert basement to AADU	Keep house, convert basement to AADU, long-term rental	Keep house, convert basement to AADU
D	**Alternative 2**	Keep house, convert basement to AADU, and add DADU	Keep house, convert basement to AADU, and add DADU	Keep house, convert basement to AADU
D	**Alternative 3**	Keep house, convert basement to AADU and add DADU	Keep house, convert basement to AADU and add DADU	Keep house, convert basement to AADU

Highest residual land value results from valuing the parcel based on the for-sale price of the house and long-term rental income from the ADU.
Highest residual land value results from valuing the parcel based on the combined for-sale price of the main house and ADU(s).

Forecast of ADU Production

Using the methods described above, we arrive at estimates of ADU production and single-family new construction for 2018-2027. As noted, the forecast model cannot account for all proposed policy changes. To account for those un-modeled policy changes and arrive at a reasonable upper-bounds estimate of ADU production, we apply the percent increases shown in Exhibit 4.1-11 to the modeled estimates as adjustment factors.

	Alternative 2	Alternative 3
One AADU	5%	2%
One DADU	15%	10%
Two ADUs	30%	25%
Teardown	0%	0%

Exhibit 4.1-11
Assumed Percent Increases in Modeled Number of Events Due to Policy Changes Not Accounted for in Model

We chose these adjustment factors based on review of the highest and best use analysis results. Appendix A provides more detail about the rationale for each adjustment. In general, we chose higher adjustments than indicated by the results of the highest and best use analysis alone in order to arrive at a reasonable upper-bounds estimate for ADU production.

Below we summarize the results most pertinent to the impacts analysis. Appendix A presents the full results of the forecast modeling. The results presented in Exhibit 4.1-12 indicate that both Alternatives 2 and 3 would increase the production of ADUs citywide. The results show that about 1,890 ADUs would be created under Alternative 1 (No Action) between 2018 and 2027. In comparison, we estimate that Alternative 2 would result in about 3,330 ADUs over the same 10-year period, and Alternative 3 would result in about 3,100 ADUs.

We also find that both Alternatives 2 and 3 are likely to reduce the number of teardowns. These results reflected the finding from the production model that, historically, households in Seattle have traded off between adding ADUs and demolishing and rebuilding. The model predicted that allowing DADUs on smaller lots (as proposed in Alternative 2 and 3) would increase ADU production on those lots and, at the same time, decrease teardowns. Alternative 3 would have the largest potential reduction in teardowns, with an estimated 16-percent decrease compared to Alternative 1 (No Action). The larger reduction in teardowns under Alternative 3 would be due to the proposed FAR limit for new construction.

Exhibit 4.1-12 Estimated Citywide Production of ADUs and New Homes, 2018–2027

	Alternative 1 (No Action)	Alternative 2	Alternative 3	Change from Alt 1 to Alt 2	Change from Alt 1 to Alt 3
Estimated number of ADUs built	1,890	3,330	3,100	76%	64%
Estimated number of parcels that build exactly one AADU	900	630	650	-30%	-28%
Estimated number of parcels that build exactly one DADU	990	940	960	-5%	-3%
Estimated number of parcels that build two ADUs	0	880	745	–	–
Estimated number of parcels that build at least one ADU	1,890	2,450	2,355	30%	25%
Percent of study area parcels that build at least one ADU	1.5%	2.0%	1.9%	30%	25%
Estimated number of existing homes torn down and redeveloped	2,610	2,460	2,200	-6%	-16%
Percent of study area parcels with tear downs	2.1%	2.0%	1.8%	-6%	-16%

Exhibit 4.1-13 presents the results of the forecast model broken out by neighborhood profile (higher-, medium-, or lower-price). Under Alternative 1 (No Action), baseline rates of ADU production and new construction would be highest in higher-price neighborhoods (where 1.9 percent of lots would add an ADU and 2.9 percent of lots would experience a teardown)

compared to ADU production in lower-price neighborhoods (1.4 percent and 1.8 percent, respectively). Medium-price neighborhoods would fall in the middle.

Exhibit 4.1-13 Estimated Production of ADUs and New Homes, 2018–2027, by Neighborhood Profile

	Alternative 1	Alternative 2	Alternative 3	Percent change from Alt 1 to Alt 2	Percent change from Alt 1 to Alt 3
Estimated number of ADUs built					
Higher	235	460	400	96%	70%
Medium	1,020	1,880	1,750	84%	72%
Lower	635	990	950	56%	50%
Estimated number of parcels that build at least one ADU					
Higher	235	330	320	40%	36%
Medium	1,020	1,365	1,310	34%	28%
Lower	635	755	725	19%	14%
Percent of study area parcels that build at least one ADU					
Higher	235	330	320	40%	36%
Medium	1,020	1,365	1,310	34%	28%
Lower	635	755	725	19%	14%
Percent of study area parcels with tear downs					
Higher	2.9%	2.7%	2.0%	-9%	-31%
Medium	2.2%	2.1%	1.9%	-7%	-18%
Lower	1.8%	1.7%	1.7%	-2%	-6%

This analysis also indicates that, in Alternatives 2 and 3, higher-price neighborhoods would see the largest potential changes in ADU production, followed by medium-price neighborhoods. Lower-price neighborhoods would see the smallest potential changes in ADU production under either action alternative. Alternative 2 would nearly double the number of ADUs produced in higher-price neighborhoods, a 96-percent increase relative to Alternative 1 (No Action), while lower-price neighborhoods would experience a more modest increase (56 percent).

Likewise, the effect of the FAR limit proposed in Alternative 3, which would limit the size of new houses and disincentivize teardowns, would also be greatest in higher-price neighborhoods. In Alternative 3, the estimated number of teardowns in higher-price neighborhoods would decrease 31 percent relative to Alternative 1 (No Action), but only six percent in lower-price neighborhoods.

IMPACTS ANALYSIS

This section discusses potential impacts of each alternative on housing affordability and displacement.

To evaluate impacts on affordability, we consider the estimated number of ADUs produced between 2018 and 2027 based on our production model. Currently, the number of housing units in Seattle's single-family zones is relatively stable. This is a result of having few development opportunities in areas that are already built out. People who want to live in these areas have limited options, in terms of both diversity of housing products available and the number of vacant or for-sale units. Expanding the supply of housing in these neighborhoods can reduce the upward bidding pressure for housing that results from product scarcity. Generally, increasing housing supply helps drive up vacancy rates and moderate increases in housing prices. We expect that greater ADU production has a positive effect on affordability by increasing the overall housing supply, and specifically the number of rental housing options available in single-family zones. More availability of rental housing options has a moderating effect on housing price increases.

Changes to size or characteristics of homes can also affect housing affordability in the study area. Larger units tend to be more expensive. Increasing the number of ADUs has the effect of providing smaller, less expensive units in single-family areas. The maximum size of an ADU is 1,000 square feet, compared to the historical average of 1,900 square feet for a detached house in a single-family zone or 3,130 square feet for a typical new detached house.[4] Since teardowns result in new houses, which tend to be large and expensive, higher estimates of teardowns also likely have an adverse impact on affordability.

Decreasing housing costs is the most commonly discussed method of increasing housing affordability, but increasing income can achieve the same effect. For example, a household with an income of $100,000 can afford to pay more for housing than a household with an income of

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4 3,130 square feet is the median total square footage of single-family houses built 2016-2017 in the study area.

$50,000. An ADU operated as a rental unit may provide a revenue stream that might help people stay in their homes. As of fall 2017, median rent for ADUs listed on Craigslist was $1,400 per month, which might increase a homeowner's annual income by more than $11,000 after accounting for operating expenses. Policies that make it easier or less expensive to build ADUs may also marginally improve affordability for homeowners by providing new income sources, though this may disproportionately benefit those homeowners who have access to credit or other resources available to finance the construction of ADUs.

To evaluate impacts on displacement, we examine the estimated number of homes that would be torn down and the number of expected number ADUs that would be produced under each under each alternative. While not every teardown means a household was physically displaced — an owner that voluntarily sells their property to capture an increase in value is a different outcome than a renter household forced to move due to rehabilitation or redevelopment — in general we expect more teardowns to indicate a higher likelihood of physical displacement. While economic displacement is more difficult to measure precisely, we expect that, by increasing rental housing options in the study, greater ADU production has a moderating effect on housing prices and thus has a positive effect on economic displacement. We also expect that, in general, greater ADU production could indicate that more households are able to benefit from a new revenue stream that provide stability. However, absent other actions to reduce costs, in all alternatives the overall cost of construction likely limits ADU development to relatively higher-income owners.

Under all alternatives, housing affordability and displacement in the study area would continue to be a concern. Ultimately, housing demand generated by Seattle's strong job market and attractive natural and cultural amenities would continue to lead to competition for a finite number of single-family homes. Seattle's limited land area would also likely continue to contribute to upward pressure on housing costs. Low vacancy rates and tight rental housing inventory would continue to contribute to high rents, especially when demand is fueled by a high-wage workforce.

Impacts of Alternative 1 (No Action)

Under Alternative 1 (No Action), current Land Use Code regulations for development in single-family zones would remain unchanged. We anticipate current trends in ADU production would generally continue. Based on our forecast model, we estimate 1,890 ADUs would be created between 2018 and 2027. Compared to Alternatives 2 and 3, Alternative 1 (No Action) would result in more teardowns, more lots with large new houses, and fewer ADUs overall. The creation of fewer ADUs under Alternative 1 (No Action) compared to both action alternatives would result in fewer housing options available in the study area and thus put greater upward pressure on housing prices. The larger number of teardowns under Alternative 1 compared to both action alternatives also suggests an increased number of larger, more expensive houses.

Impacts of Alternative 2

Affordability

Under Alternative 2, we estimate 3,330 ADUs would be created between 2018 and 2017. Compared to Alternative 1 (No Action), the creation of about 1,440 more ADUs in Alternative 2 relative would likely have a slight positive impact on housing affordability. While the affordability of housing would remain a concern and a burden for many Seattle residents, Alternative 2 would increase the number of housing choices available in the study area compared to Alternative 1 (No Action). Although not every new ADU would be renter-occupied (some would be used by the homeowner for additional space), Alternative 2 would likely increase housing supply relative to Alternative 1 (No Action). This would have a positive impact on affordability because the additional housing supply could marginally reduce upward pressure on rents and housing prices.

The forecast model also estimates that Alternative 2 would reduce the number of teardowns by about six percent relative to Alternative 1. The reduced number of teardowns would likely have a positive impact on housing affordability (because new houses tend to be larger and more expensive than the homes they replace).

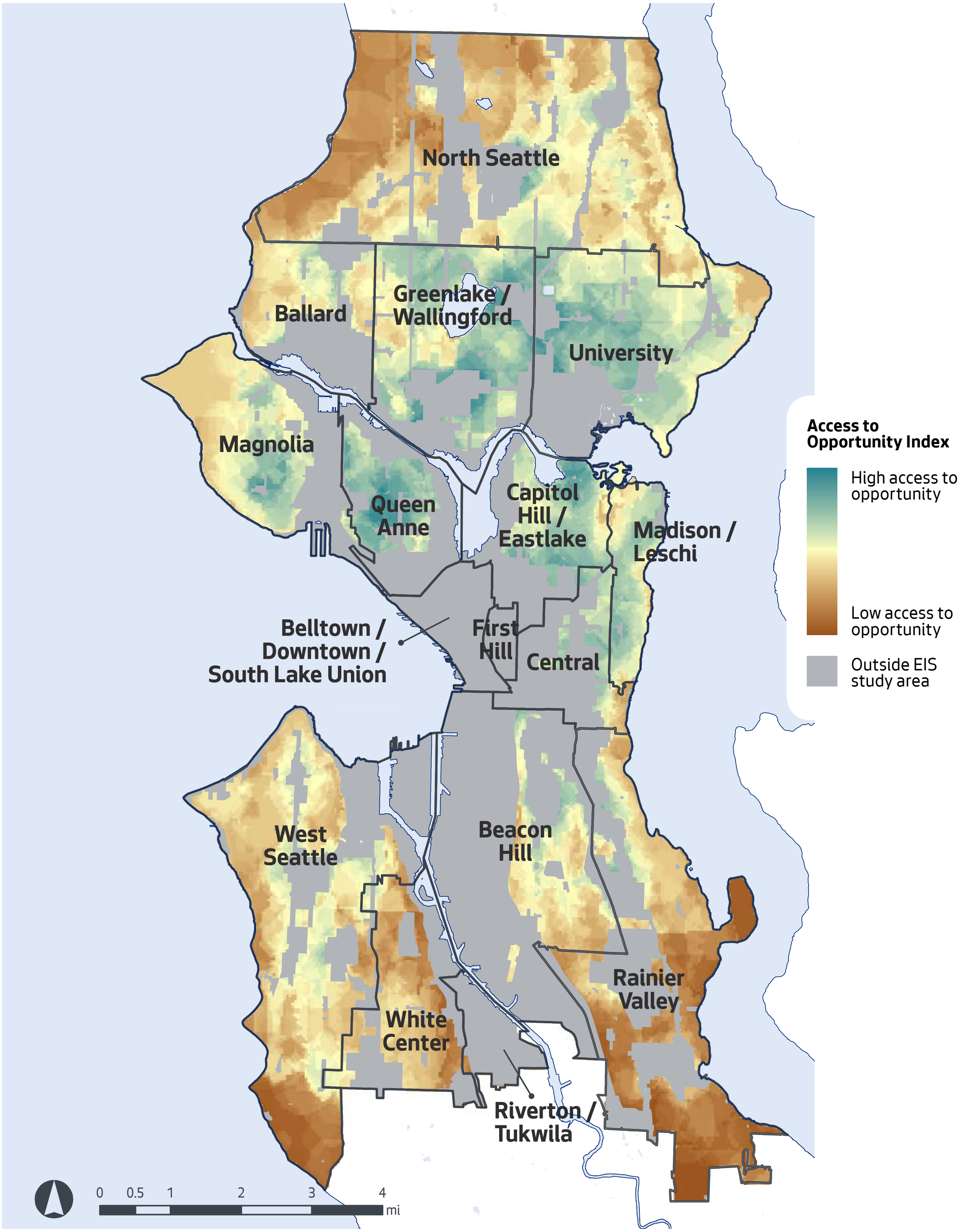
Access to Opportunity Index

The 2016 Seattle Growth and Equity Analysis evaluated disparities in the benefits and burdens that marginalized populations like people of color and low-income households tend to experience as a result of growth. The Access to Opportunity Index reflects data on employment, education, and proximity to services, transit, and community resources (Seattle 2016).

Both the pro forma analysis and the production model find that ADU production rates would likely vary by neighborhood profile, with higher rates of ADU production in more expensive neighborhoods. Further, in higher-price areas where housing is unaffordable to a large share of Seattle residents, Alternative 2 would result in the largest relative increase in ADU production over Alternative 1 (No Action). As shown in Exhibit 4.1-14, many higher-price neighborhoods are places that offer greater access to opportunity, a measure used in the Seattle 2035 Comprehensive Plan to identify factors that people and communities need to flourish.

Exhibit 4.1-14 Seattle 2035 Access to Opportunity Index

Source: Seattle 2016



A final way of looking at potential effects on the price of housing is to consider estimated changes to the maximum residual land value under each alternative. An increase in the residual land value suggests that developers could afford to pay more for land, and thus that land prices might increase, leading to an eventual increase in housing prices. As shown in Exhibit 4.1-15, the estimated changes in residual land value would vary by lot type and neighborhood cost. In all three neighborhood types (higher-, medium-, and lower-price), residual land value would remain relatively consistent between Alternatives 1 and 2. Some lot types in medium- and higher-price neighborhoods would experience minor increases in residual land value, but in lower-price neighborhoods residual land value would remain consistent between Alternatives 1 and 2. This indicates that, overall, land prices are unlikely to change substantially and that overall housing prices and rents would not be expected to increase in Alternative 2.

Exhibit 4.1-15 Estimated Changes to Maximum Residual Land Value

	Alternative 1	Alternative 2	Alternative 3
Higher			
A	$299	$299	$299
B	$291	$291	$277
C	$218	$227	$223
D	$151	$169	$166
Medium			
A	$225	$225	$225
B	$219	$219	$209
C	$164	$164	$159
D	$115	$122	$119
Lower			
A	$162	$162	$162
B	$148	$149	$148
C	$122	$123	$122
D	$91	$91	$91

In summary, Alternative 2 would result in more ADUs than Alternative 1 (No Action), increasing the supply of rental housing in the study area, especially in neighborhoods with high access to opportunity. ADUs tend to be smaller than the average detached single-family house. Residual land value would remain relatively consistent between Alternative 1 (No Action) and Alternative 2, including specifically in lower-price neighborhoods, suggesting land prices are not likely to increase due to changes in development feasibility. Additional ADUs could provide new income sources for some homeowners. The number of teardowns would decrease relative to Alternative 1 (which improves affordability because new homes tend to be more expensive than the homes they replace). Therefore, we do not anticipate adverse impacts on affordability under Alternative 2.

Displacement

Physical and economic displacement can occur anywhere. However, certain populations or communities can be at greater risk of displacement or face greater barriers to finding housing. The Displacement Risk Index is one way the City has evaluated the displacement pressures that marginalized populations experience (see sidebar). As shown in Exhibit 4.1-16, the neighborhoods in the study area with marginalized populations most vulnerable to displacement are Rainier Valley, White Center, Beacon Hill, and North Seattle. Except for Beacon Hill, these are all lower-price neighborhoods. All four neighborhoods also have relatively larger shares of people of color (Exhibit 4.1-17).

Displacement Risk Index

The 2016 Seattle Growth and Equity Analysis also evaluated the risk of displacement that marginalized populations face. The Displacement Risk Index combines data about demographic factors, like the share of an area's population who are people of color or have low incomes, with physical factors that can precipitate or contribute to displacement pressure, like proximity to frequent transit, services, and job opportunities (Seattle 2016).

Physical displacement impacts could occur if policy changes increase the feasibility of demolishing an existing house relative to other development outcomes, especially in areas at higher risk of displacement. The highest and best use analysis shows that fewer teardowns would occur in all neighborhood types in Alternative 2 compared to Alternative 1 (No Action). We expect the overall number of teardowns to decrease from 2,610 under Alternative 1 (No Action) to 2,460 under Alternative 2, including fewer teardowns specifically in lower-price neighborhoods, where displacement risk could be higher. Because fewer teardowns would occur under Alternative 2 compared to Alternative 1 (No Action), we do not anticipate adverse impacts on physical displacement.

Some people may be concerned that an overall increase in development feasibility could have an adverse impact on economic or cultural displacement by accelerating redevelopment generally, even if the resulting increase in rental housing supply has a positive impact on affordability. This could be a concern specifically for neighborhoods at greater risk of displacement or neighborhoods where current housing prices are relatively lower. Our analysis shows that, in Alternative 2, lower-price neighborhoods are likely to experience smaller changes in development feasibility across all lot sizes than medium- or higher-price neighborhoods. Likewise, the change in redevelopment rates (measured as teardowns or ADU construction) between Alternative 1 (No Action) and Alternative 2 would be smaller in lower-price neighborhoods than in medium- and higher-price neighborhoods. Specifically, the highest and best use analysis finds that property owners in lower-price neighborhoods would tend to keep the main house and add an ADU for rental purposes. Therefore, because changes in development feasibility would be smallest in lower-price neighborhoods, Alternative 2 would not be likely to have adverse impacts on economic displacement. Further, the additional ADUs occurring in Alternative 2 in lower-price neighborhoods would create new housing options and could alleviate some economic displacement impacts compared to Alternative 1 (No Action).

Exhibit 4.1-16 Seattle 2035 Displacement Risk Index

Source: Seattle 2016

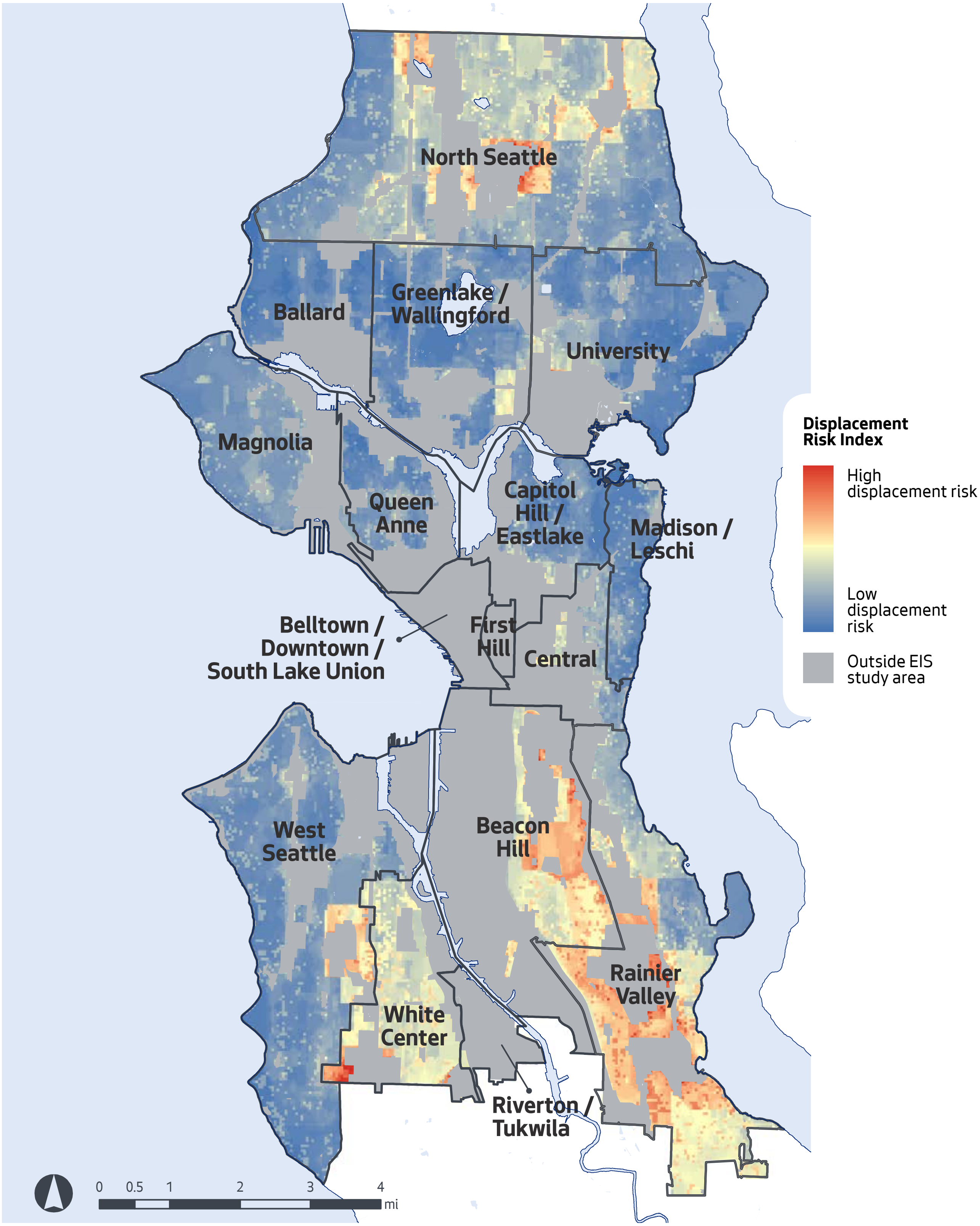
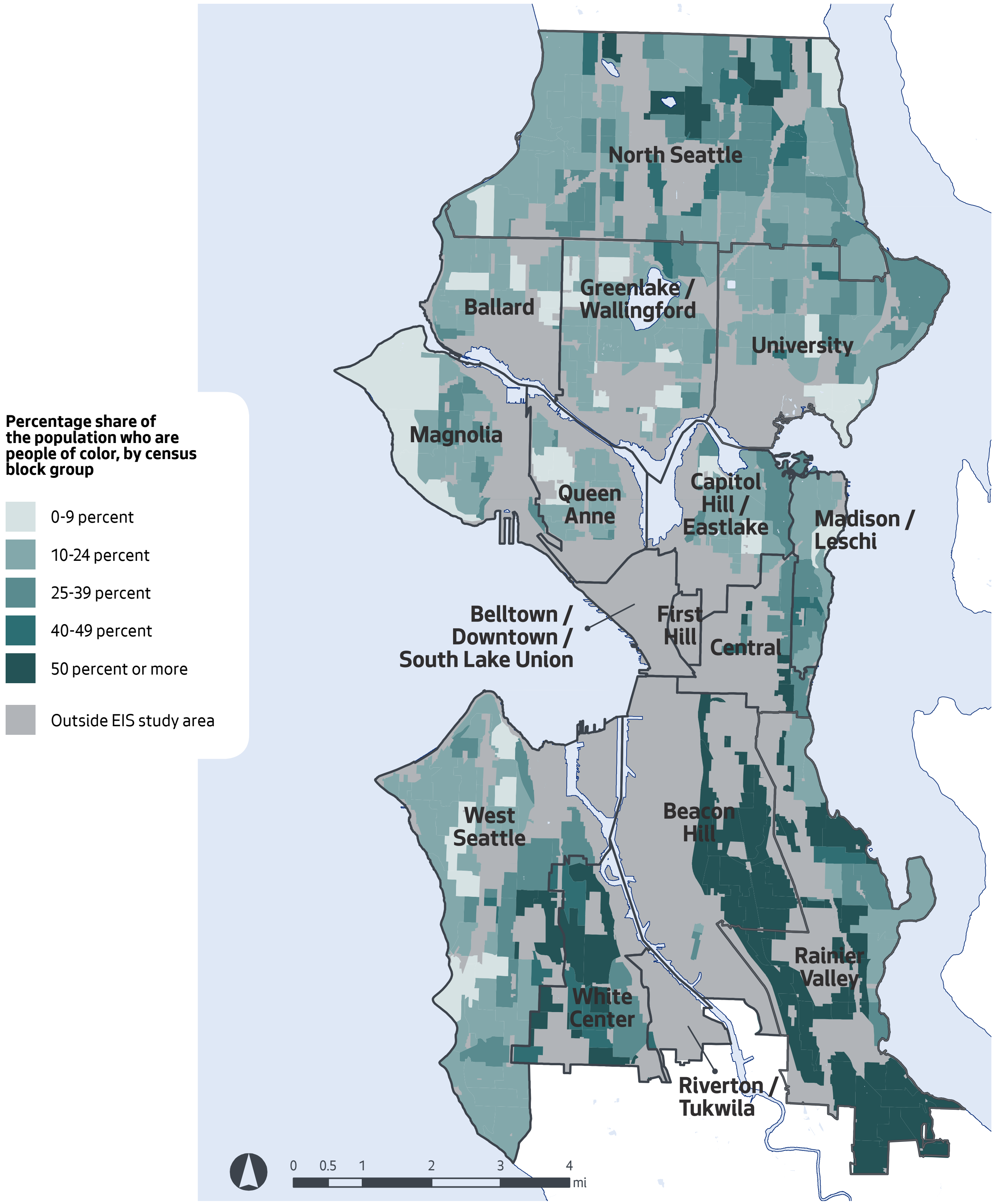


Exhibit 4.1-17 Share of Residents Who Are People of Color

Source: 2016 5-Year American Community Survey



Impacts of Alternative 3

Affordability

We expect 3,100 ADUs would be created between 2018 and 2027 under Alternative 3, less than Alternative 2 (3,330) but more than Alternative 1 (No Action) (1,890). Therefore, under Alternative 3, the positive impacts on affordability due to increased rental housing supply would be similar to, but marginally smaller than, Alternative 2. The addition of about 1,210 more ADUs compared to Alternative 1 (No Action) would have a positive impact on housing affordability, though not as much as the 1,440 additional ADUs estimated under Alternative 2. The creation of additional housing options would likely moderate increases in housing prices. In addition, ADUs operated as rentals could provide a new income stream, making housing somewhat more affordable for owners. Overall, we do not expect adverse impacts on affordability under Alternative 3.

Alternative 3 would include MHA requirements when a property owner adds a second ADU. Of the 3,100 ADUs created under Alternative 3 between 2018 and 2027, we estimate approximately 745 would occur on parcels with two ADUs, as shown in Exhibit 4.1-12. Based on an average ADU size of 500-800 square feet and an MHA payment requirement of $13 per gross square feet, we estimate that ADU production under Alternative 3 would generate $20-30 million in affordable housing contributions over the 10-year period. The added cost of the MHA requirement would also marginally decrease the number of parcels adding a second ADU compared to a scenario without MHA requirements, thereby somewhat reducing the supply of rental housing, an adverse impact on affordability.

Displacement

Under Alternative 3, the beneficial impacts to displacement would be similar to Alternative 2. We expect Alternative 3 would result in fewer teardowns (2,200) than both Alternative 1 (No Action) (2,610) and Alternative 2 (2,460). This would reduce the potential for physical displacement impacts even more than Alternative 2. We expect Alternative 3 would alleviate ongoing economic displacement compared to Alternative 1 (No Action), but somewhat less than Alternative 2 since slightly fewer ADUs, and therefore fewer new rental housing options, would be created under Alternative 3 than in Alternative 2.

4.1.3 Mitigation Measures

Based on the results of this analysis, the proposed Land Use Code changes would have marginal benefits on housing affordability and would not increase displacement impacts. Therefore, no mitigation measures are proposed.

4.1.4 Significant Unavoidable Adverse Impacts

Based on the results of this analysis, the proposed Land Use Code changes would have marginal benefits on housing affordability and would not increase displacement impacts. No significant unavoidable adverse impacts are anticipated to housing or socioeconomics from the proposed Land Use Code changes.

4.2 Land Use

This land use analysis reviews potential impacts on land use patterns and development in Seattle's single-family residential zones. This section analyzes increased residential and population density and whether the action alternatives would result in a fundamental change to land use form. We also review potential impacts on tree canopy, shorelines, and Environmentally Critical Areas (ECAs).

4.2.1 Affected Environment

The following sections describe current and future land use for single-family residential areas as envisioned in the Seattle 2035 Comprehensive Plan (Comprehensive Plan) (Seattle 2017a). This section draws from independent analysis as well as information from the Comprehensive Plan and the Mandatory Housing Affordability (MHA) Final EIS (Seattle 2017b). The visual impacts of general development standards (e.g., height limits and setbacks) are discussed in Section 4.3, Aesthetics. Off-street parking standards are discussed in Section 4.5, Parking and Transportation.

SEATTLE 2035 COMPREHENSIVE PLAN

The Comprehensive Plan describes Seattle's existing and future land use and policies. In 2016, the City completed a major update to its Comprehensive Plan, adopting a new 20-year plan to guide growth through the year 2035 (Seattle 2017a). Seattle's Comprehensive Plan has four core values:

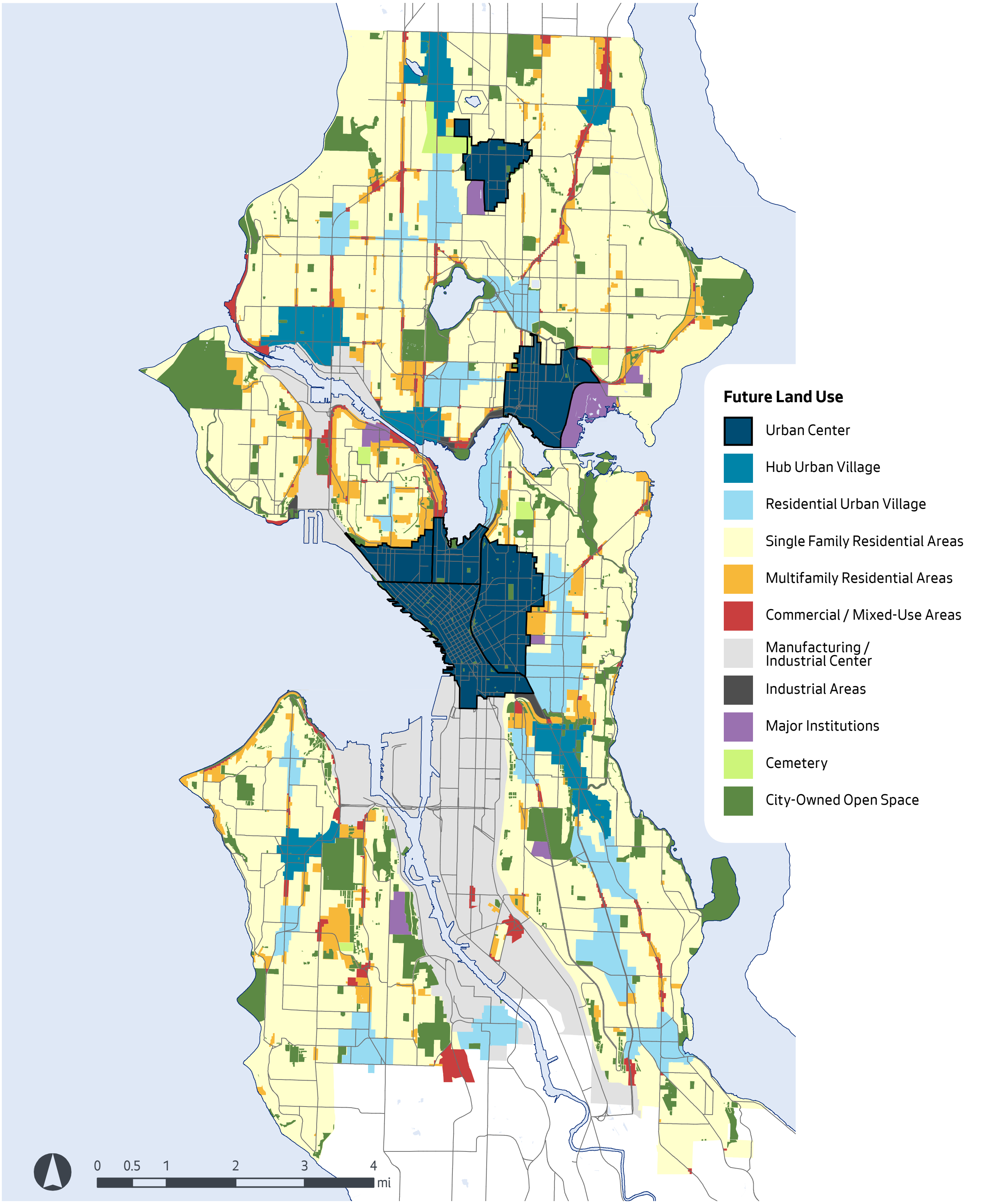
- **Community.** Developing strong connections between a diverse range of people and places.
- **Environmental Stewardship.** Protecting and improving the quality of our global and local natural environment.

- **Economic Opportunity and Security.** Maintaining a strong economy and a pathway to employment, which is fundamental to maintaining our quality of life.
- **Race and Social Equity.** Advocating that limited resources and opportunities must be shared; and that the inclusion of under-represented communities in decision-making processes is necessary.

One key element of the Comprehensive Plan, the Future Land Use Map (FLUM) (Exhibit 4.2-1), outlines the long-term vision of how and where the City will accommodate expected population and job growth over the next 20 years. The FLUM depicts distinct land use designations and types located throughout the city, and each designation specifies the appropriate uses for each area. Five of the land use designations — single-family residential, multifamily residential, commercial/mixed-use, Downtown, and industrial — suggest specific uses. The other designations, such as Urban Center or Hub Urban Village, are broader areas for which multiple uses can be located.

The FLUM also shows four types of urban village designations — urban centers, hub urban villages, residential urban villages, and manufacturing/industrial centers — that identify places where the City will focus new housing, jobs, and industrial activity. Areas designated on the FLUM as single-family residential contain Seattle's single-family zones. In addition to housing, these areas also contain institutional uses like schools and churches, as well as parklands and cemeteries. The proposed Land Use Code changes analyzed in this EIS would affect only single-family residential areas.

Exhibit 4.2-1 City of Seattle Future Land Use Map



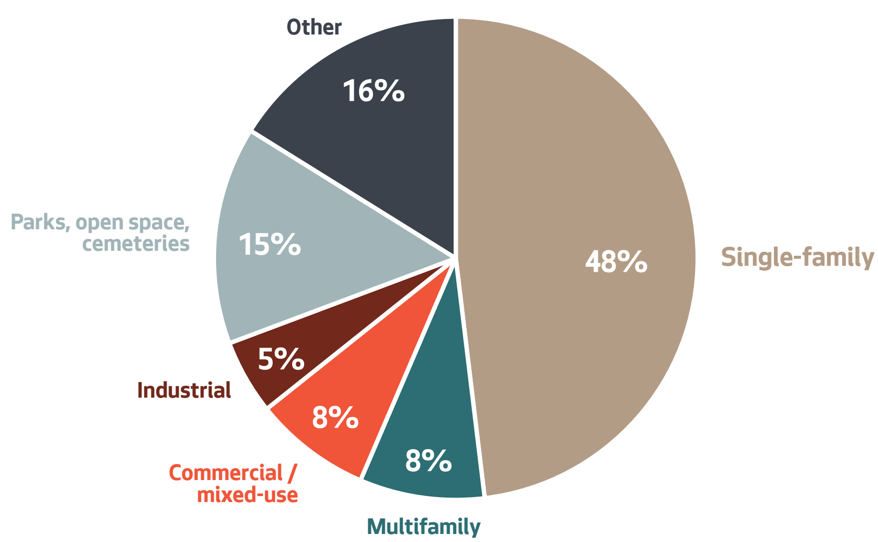
POPULATION DENSITY

In single-family zones, household size is defined as the sum of the people living in the main house and any ADUs on the lot. For example, a main house with two people and an ADU with two people yields a household size of four. In 2016, the average household size in Seattle was 2.12 people (U.S. Census Bureau 2016). But it varies by structure size. Average household size is 2.74 for households in one-unit structures (detached or attached), 2.06 for households in structures with two to four units, and 1.72 for households in structures with five or more units. Currently, the Land Use Code defines a household as any number of related people, or up to eight unrelated people, and establishes that only one household can live on a lot in a single-family zone.

CURRENT LAND USE AND ZONING

Seattle measures approximately 83 square miles (53,182 acres) in land area. Exhibit 4.2-2 and Exhibit 4.2-3 show the distribution of Seattle's land area by current use and by each zoning category, respectively. Sixty-six percent of Seattle's land area is zoned Single-family Residential. Multifamily Residential zones cover 10.9 percent of land area. Commercial/Mixed Use zones, some of which allow housing, account for 8.6 percent of land area.[1]

Exhibit 4.2-2
Current Land Use in Seattle



1 Excluding rights-of-way.

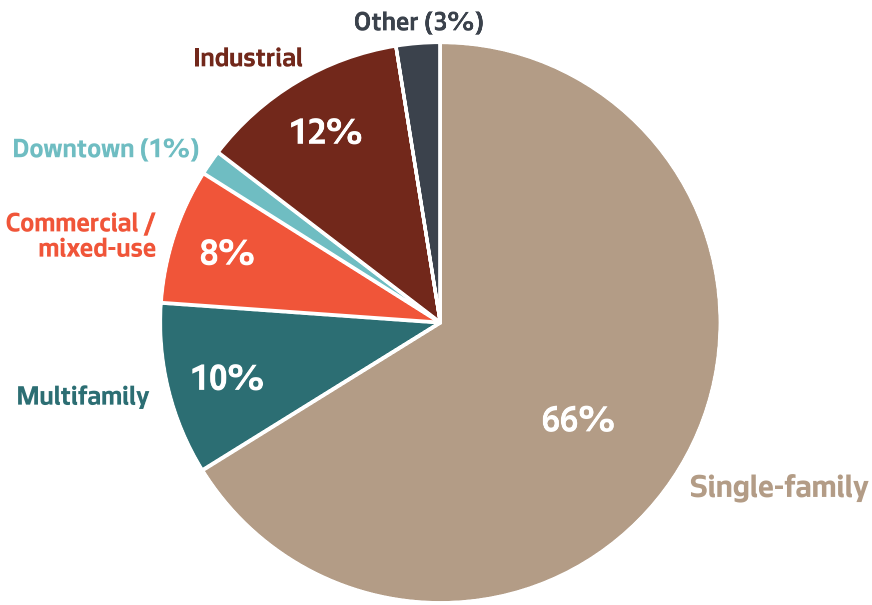


Exhibit 4.2-3
Current Zoning in Seattle

In addition to being the largest zoning category, single-family residential is also the largest land use category, comprising almost half (48.1 percent) of current land use. The difference between the amount of land *zoned* and land *used* as single-family is due to the parks, institutions, and other uses present in single-family zones other than detached single-family homes.

As shown in Exhibit 4.2-4, Seattle has three single-family residential zones — SF 9600, SF 7200, and SF 5000 — that vary by the minimum area required to create a new lot. Some areas of Seattle with single-family zoning were platted before current regulations were in place and therefore have lots smaller than what current minimum standards require. While a parcel's current use does not always match the characteristics of its zoning, single-family zones are typified by lots with detached one-unit structures, some with AADUs or DADUs.

Exhibit 4.2-4 City of Seattle Generalized Zoning Map

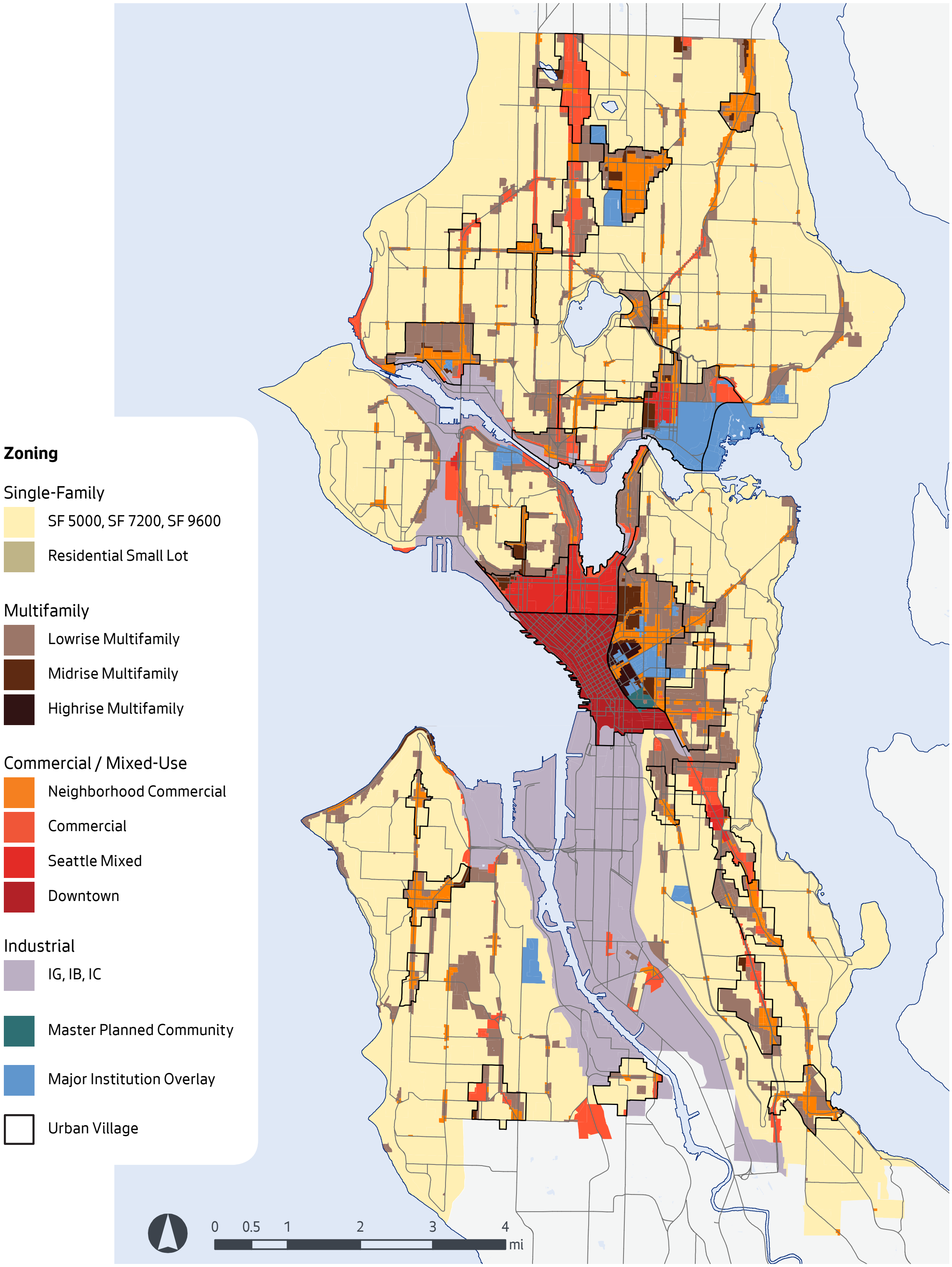


Exhibit 4.2-5 shows the distribution of parcels by lot size across Seattle's single-family zones. About 33 percent of all single-family lots are smaller than 5,000 square feet, the smallest lot size allowed under current zoning. About eight percent have at least twice the minimum area required by the zoning, meaning the lot could theoretically be subdivided into two lots.

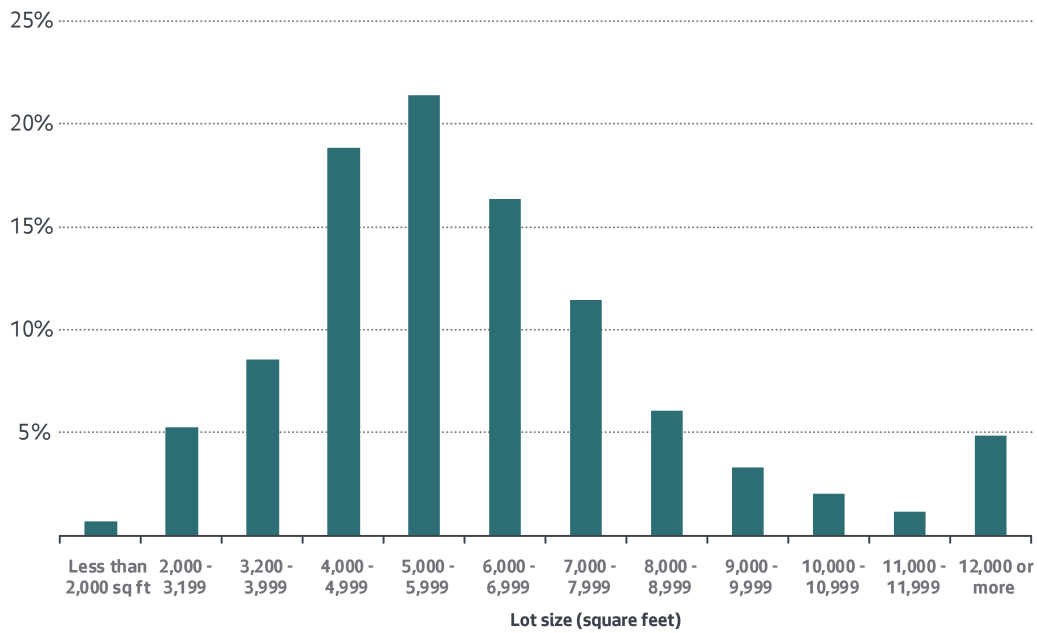
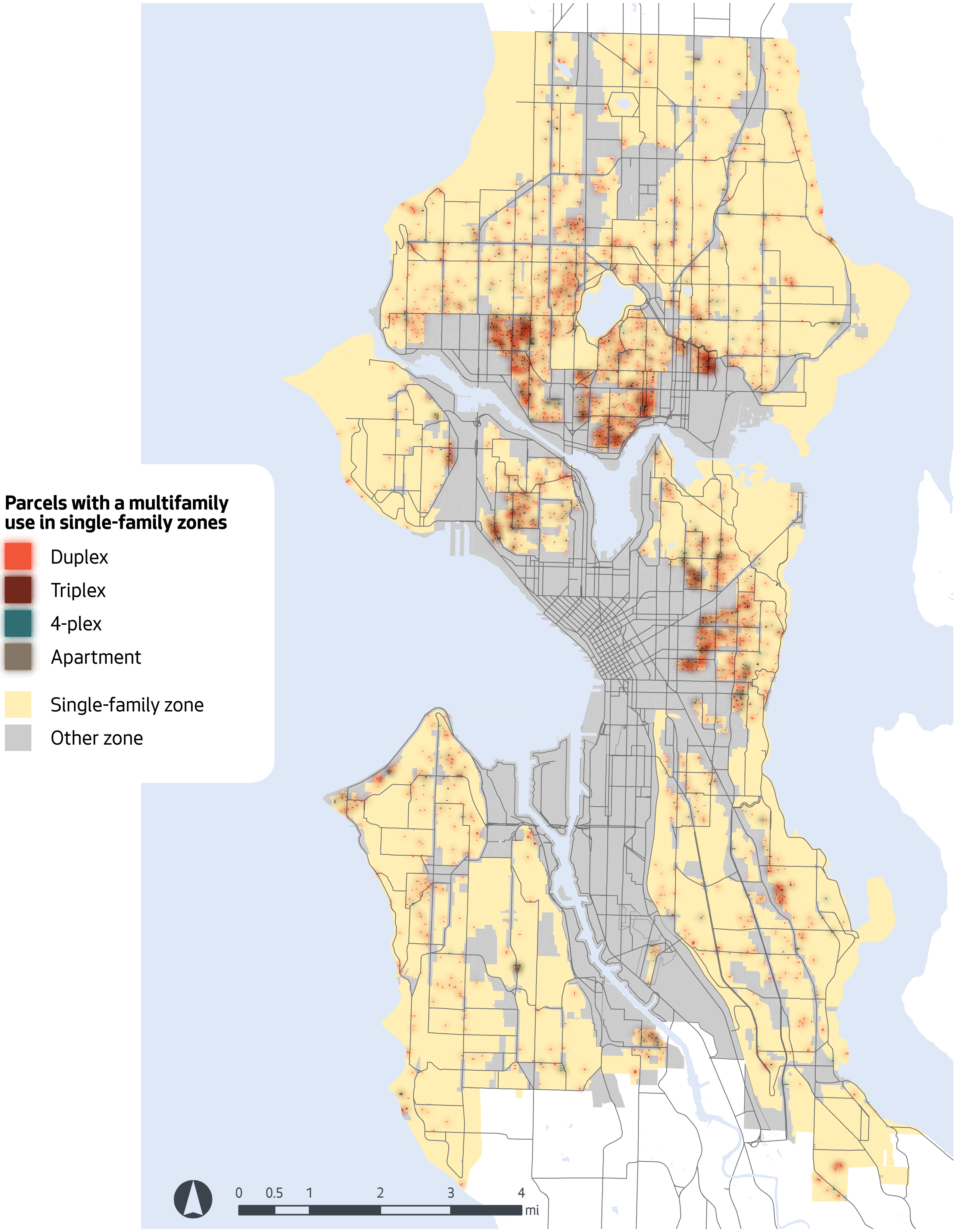


Exhibit 4.2-5
Distribution of Parcels by Lot Size in Single-Family Zones
Source: ECONorthwest analysis of King County Assessor Data.

Some lots in single-family zones have nonconforming multifamily structures built under previous zoning regimes. (See Section 4.1, Housing and Socioeconomics, for a discussion of Seattle's residential zoning history.) Exhibit 4.2-6 identifies parcels in single-family zones that have a multifamily use, typically a duplex, triplex, or apartment. About 2.3 percent of lots in single-family zones have a multifamily use.

Exhibit 4.2-6 Multifamily Uses in Single-Family Zones



Chapter 23.44 of the Seattle Municipal Code (SMC) regulates single-family zones. Attached ADUs (AADUs) are currently allowed inside or attached to the main house on all lots in single-family zones. Detached ADUs (DADUs) are currently allowed in all single-family zones on lots of at least 4,000 square feet in area and are subject to several other criteria.

AADUs have been allowed citywide as part of a single-family house since 1994. DADUs have been allowed citywide in the rear yard of a lot in a single-family zone since 2010. Through 2017, the City has issued permits for 1,592 AADUs and 579 DADUs. Approximately 1.8 percent of lots in single-family zones have an ADU (Exhibit 4.2-7).

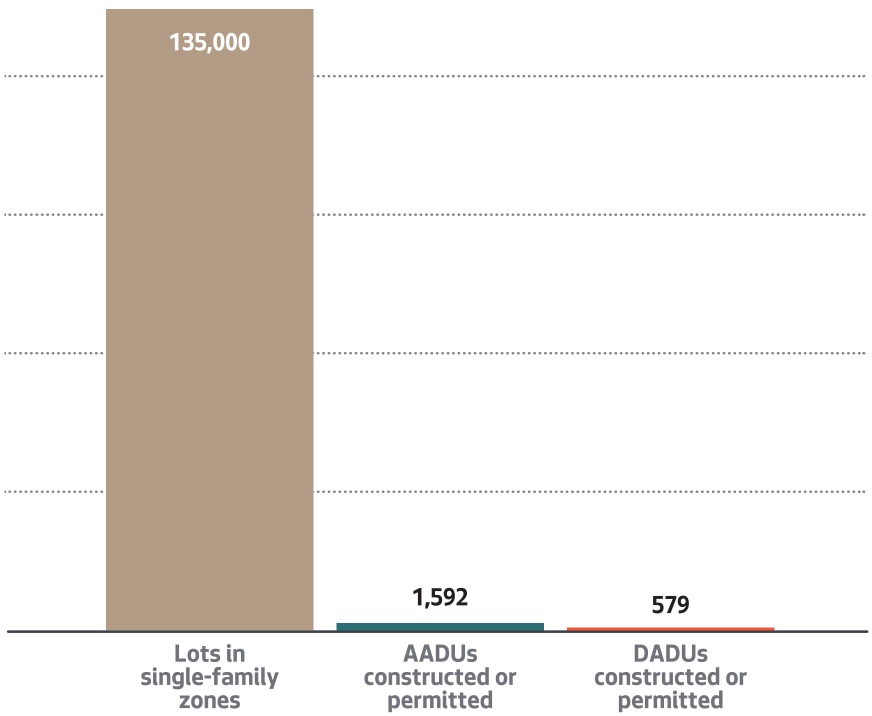


Exhibit 4.2-7
Lots and ADUs in Single-Family Zones

SHORELINES

Seattle's Shoreline District is defined as land within 200 feet of the city's major water bodies — Puget Sound, Lake Washington, Lake Union, and the Lake Washington Ship Canal — and is regulated by the Washington State Shoreline Management Act. The City has adopted the Seattle Shoreline Master Program (SMP) to regulate development in the Shoreline District through regulations in the City's Land Use Code (SMC 23.60A), maps of the locations of shoreline environments, and the Shoreline Restoration and Enhancement Plan.

The SMP divides the Shoreline District into 11 distinct shoreline environments. The Comprehensive Plan states that the Urban Residential (UR) Environment allows residential use in the Shoreline District when developed in a manner that protects shoreline ecological functions (Shoreline Areas G37). Within the UR Environment, ADUs are allowed only on upland (non-waterfront) lots per Table A for SMC 23.60A.540. DADUs are not allowed in the Shoreline District pursuant to SMC 23.60A.

TREE CANOPY AND VEGETATION

Tree Canopy Cover

Tree canopy cover is the layer of branches, stems, and leaves of a tree that cover the ground when viewed from above.

Canopy cover assessments tell us the extent of Seattle's trees and where they are located and inform urban forestry work planning, management, and investments.

Seattle has a long-standing commitment to its urban forest. Given their many social, environmental, and economic benefits, urban trees are essential to enhancing the community's quality of life. In many single-family zones, typical houses are one or two stories, surrounded by yards and open space that support the growth of large trees. This open space provides much of the city's tree canopy.

Comprehensive Plan policies encourage preservation and expansion of tree canopy throughout the city (Growth Strategy 3.8) and set a goal of increasing canopy coverage to 30 percent by 2037 and to 40 percent over time (Environment 1.2).

Adopted by the City Council in 2013, the Urban Forest Stewardship Plan (UFSP) outlines goals to achieve 30 percent tree canopy and a thriving urban forest that includes a healthy diversity of tree species and ages.

In 2016, the City obtained LiDAR (light detection and ranging) data to assess progress toward its 30- percent canopy cover goal. This study represents the most accurate accounting of Seattle's urban canopy to date and shows:

- Overall, Seattle has 28 percent tree canopy cover.
- Most of Seattle's urban trees are found in residential areas (representing 67 percent of land area with 72 percent of Seattle's tree canopy) and in rights-of-way throughout the city (representing 27 percent of land area and 22 percent of tree canopy).
- Single-family residential areas specifically account for 63 percent of Seattle's overall canopy cover.
- About 72 percent of Seattle's tree canopy is deciduous and 28 percent is coniferous. Most conifers are in single-family residential areas (52 percent).

The assessment report and presentation materials are available at www.seattle.gov/trees.

ENVIRONMENTALLY CRITICAL AREAS

Seattle's ECA Code governs development in areas that provide critical environmental functions. The goal of the City's ECA regulations (SMC Chapter 25.09) is to protect these areas effectively and assure public safety while allowing reasonable development.

Designated ECAs are defined in SMC 25.09.012 and generally include:

- Geologic hazard areas
- Flood-prone areas
- Wetlands
- Fish and Wildlife Habitat Conservation Areas
- Abandoned landfills

The City's ECA regulations have no special provisions for ADUs; rather, ADUs must meet current standards of SMC Chapter 25.09 in addition to the single-family zoning requirements in SMC Chapter 23.44.

Exhibit 4.2-8 summarizes the amount of each ECA type that exists in the EIS study area compared to the total citywide. Maps of ECAs are available on the website of the Seattle Department of Construction and Inspections (SDCI) at http://seattlecitygis.maps.arcgis.com/apps/webappviewer/index.html?id=f822b2c6498c4163b0cf908e2241e9c2.

Exhibit 4.2-8 Acreage of Environmentally Critical Areas in EIS Study Area

ECA Type	ECAs on Parcels in the Study Area (acres)	ECAs Citywide (acres)	Percentage Share of ECAs in the Study Area
Wildlife Habitat	595.7	5,538.5	11%
Wetland	85.8	546.9	16%
Steep Slope Area	1,706.6	4,379.5	39%
Riparian Corridor	452.0	1,496.5	30%
Potential Slide	1,756.3	4,471.4	39%
Potential Liquefaction Area	472.8	8,023.5	6%
Peat Settlement Prone Area	190.1	1,943.8	10%
Landfill	275.6	1,820.4	15%
Known Slide	172.4	380.9	45%
Flood-Prone Area	83.5	1,010.5	8%

4.2.2 Impacts

This section discusses the potential land use impacts from Alternatives 1, 2, and 3. Alternatives 2 and 3 differ in the scale and focus of the proposed changes. Alternative 2 represents the broadest range of changes to the Land Use Code and would allow the greatest flexibility for constructing ADUs. Alternative 3 considers more modest adjustments to the Land Use Code that would result in fewer ADUs constructed than under Alternative 2.

METHODOLOGY

Land use impacts can result from many factors, such as intensifying uses (rezoning a residential area to allow for commercial uses); incompatible uses (an industrial development near homes); or land use changes inconsistent with the Comprehensive Plan. Two types of land use impacts are relevant to the construction of ADUs and considered in this analysis:

- **Increased density.** Increased density occurs when there is an increased number of people or dwelling units on a single-family lot. Increased population density can cause impacts from more noise, pedestrian and vehicle traffic, and parking constraints. Increases in the density of dwelling units can result in impacts from vegetation and tree removal.
- **Change in building scale.** Land use impacts may occur from increasing the scale of buildings that can be built in an area. These impacts can result from constructing larger and/or taller buildings, increasing maximum height or floor area ratio (FAR) limits, or modifying required setbacks. Increased building scale can cause impacts from view blockage, decreased access to light and air at ground level, and reductions in privacy.

Impacts from increasing density and changes to building scale were evaluated by considering the potential for the change to constitute a fundamental change in land use form. Our threshold for impacts centered on whether newly constructed ADUs would be incompatible with existing development in the city's single-family zones. Given that single-family dwellings are the principal use permitted outright in these zones, the primary question was whether ADUs were compatible in scale and density with the existing land use pattern of single-family zones? Some examples of changes that might be considered a fundamental change in land use form include allowing subdivisions, duplexes, apartments, or rezoning to a denser zoning, such as Residential Small Lot, or multifamily.

To determine the potential changes in population density from constructing additional ADUs, we calculated the potential increase in population that could be expected on each single-family lot with an ADU. We anticipate the average number of people living in an ADU would be lower than the overall average household size in Seattle's single-family zones because ADUs tend to be smaller than single-family houses. As data was not available for the average number of people living in an ADU in Seattle, we used available data from Portland, Oregon, as a proxy (Horn et al 2013). The Portland data showed that an average of 1.36 people live in each ADU. For purposes of this analysis, we rounded up that number to assume an average of 1.5 people per ADU. On lots with two ADUs, this would equate to 3 people living in ADUs. Although not anticipated, we also considered the maximum number of ADU occupants based on the proposed Land Use Code changes. For Alternatives 1 and 2, this would result in 4 people per ADU; for Alternative 3, we assumed 4 people per ADU on a lot with one ADU and 2 people per ADU on a lot with two ADUs.

IMPACTS OF ALTERNATIVE 1 (NO ACTION)

Under Alternative 1 (No Action), no changes would be made to the Land Use Code. Population and housing growth would continue in accordance with the Seattle 2035 Comprehensive Plan and current zoning regulations. Real estate and housing market considerations aside, the current trajectory for the construction of ADUs would continue, and we anticipate that approximately 1,890 ADUs could be constructed between 2018 and 2027. Because existing regulatory barriers to ADU development would remain, fewer ADUs would be constructed under Alternative 1 (No Action) compared to Alternatives 2 and 3. Negligible impacts to building and population density would be anticipated from the ADUs constructed over time. There would be no change to the scale of ADUs allowed under existing Land Use Code regulations.

IMPACTS OF ALTERNATIVE 2

Land Use

Under Alternative 2, the proposed Land Use Code changes to encourage ADU development would be consistent with the Seattle 2035 Comprehensive Plan. No changes to existing zoning designations are proposed. Alternative 2 supports the Comprehensive Plan's vision for housing options that create a thriving, vibrant city. Specifically, the Land Use Code changes would:

- Support more housing development, consistent with the Seattle 2035 Comprehensive Plan's established growth strategy and Housing Affordability and Livability Agenda (HALA) recommendations.
- Maintain existing land use patterns in single-family zones by continuing to allow detached single-family housing as the principal use permitted outright and ADUs that are compatible in scale with single-family houses.
- Gradually increase density and building scale in single-family zones as development occurs that is consistent with existing land use patterns.
- Encourage greater variety of housing types in the city's residential areas.

As described in Section 4.1 Housing and Socioeconomics, compared to Alternative 1 (No Action), Alternative 2 could result in 1,440 additional ADUs (or 3,330 total ADUs) throughout Seattle between 2018 and 2027. This would include:

- 880 additional lots in single-family zones with both an AADU and DADU constructed, which is not allowed under Alternative 1 (No Action)
- 270 fewer lots in single-family zones with only one AADU constructed
- 50 fewer lots in single-family zones with only one DADU constructed

Alternative 2 would increase the likelihood of two ADUs constructed on the same lot but decrease the number of lots with only one ADU constructed. For analysis purposes, we assumed that every new ADU constructed would use the maximum available square footage and height. The 3,330 ADUs that could be constructed under Alternative 2 —1,400 ADUs more than in Alternative 1 (No Action) — could lead to minor changes to building scale.

Changes to scale would result from alterations to the development standards for DADUs, including:

- Decreasing the minimum lot size from 4,000 square feet to 3,200 square feet
- Increasing the maximum gross floor area limit for a DADU from 800 square feet to 1,000 square feet and excluding garage and storage areas from the gross floor area calculation

- Increasing the rear yard coverage limit for DADUs and other accessory structures from 40 to 60 percent, if the DADU is 15 feet or less in height [2]
- Increasing the maximum height limits 1-3 feet (with 1-2 additional feet for a DADU that meets green roof standards)
- Allowing height limit exceptions for projections like dormers that add interior space

Collectively, these changes would allow construction of slightly larger DADUs on smaller lots than currently allowed.

We anticipate the Land Use Code changes proposed under Alternative 2 could decrease the number of existing houses torn down and redeveloped from 2,610 under Alternative 1 (No Action) to 2,460. The highest and best use analysis discussed in Section 4.1, Housing and Socioeconomics, finds that Alternative 2 would tend to increase the feasibility of retaining an existing house and adding one or two ADUs (rather than demolishing) compared to Alternative 1 (No Action). Although a minor decrease, this reduction in teardowns would help preserve the existing land use form in single-family residential zones. For discussion of the aesthetic impacts, including how the proposed changes would impact the visual character of neighborhoods in the study area, please see Section 4.3 Aesthetics.

Changes to building density would result from the creation of additional ADUs. Relative to Seattle's 348,000 existing housing units and the 40,000 new units constructed between 2010 and 2017, the addition of approximately 1,440 ADUs more than Alternative 1 (No Action) would be a small change. These impacts would be minor as the density changes would unfold incrementally over 10 years and would likely continue to be distributed throughout the city.

Changes in population density would result from the creation of additional ADUs. On each lot where an ADU is constructed, we anticipate an increase in population density of an average of 1.5 people per ADU (or maximum of 4 people per ADU). This would correspond to about 2,160 more residents (or a maximum of 5,760 residents) than under Alternative 1 (No Action) over the 10-year study period. These impacts would be minor as the population changes would unfold incrementally over 10 years and would likely continue to be distributed throughout the city.

2 Rear yard coverage for structures other than a DADU cannot exceed 40 percent.

Localized impacts could occur if ADU production is higher in a concentrated area, such as a particular block in the study area. Impacts in areas with increases in population density could include greater noise, exposure to cooking smells, and changes in privacy due to the presence of more neighbors. These impacts are likely to be minor.

Overall, these impacts would be negligible to minor and would not constitute a fundamental change in the land use pattern of Seattle's single-family zones. Because they are either part of an existing house (AADU) or allocated in a detached "backyard cottage" structure with a familiar physical form and smaller scale than allowed for a principal house (DADU), ADUs would be associated and compatible with single-family residential zones. Since urban form varies across the study area, specific impacts of Alternative 2 to architectural character and design features like building setbacks and yards due to greater ADU production could vary depending on neighborhood context but are likely to be minor.

Shorelines

Alternative 2 would not alter existing regulations for ADU development on lots in the Shoreline District. DADUs would continue not to be allowed in the Shoreline District pursuant to SMC 23.60A. Any additional AADUs constructed in the Shoreline District would be subject to existing regulations. Therefore, impacts to shorelines would not occur.

Tree Canopy and Vegetation

The anticipated increase in DADU construction under Alternative 2 could result in more vegetation and tree removal than under Alternative 1 (No Action) as more property owners would use some of their rear yard for the footprint of a DADU. Compared to Alternative 1 (No Action) (990 DADUs), Alternative 2 (1,380 DADUs) could result in 390 additional DADUs. Allowing a one-story DADU to cover more of the rear yard by increasing the rear yard coverage limit from 40 percent to 60 percent could also result in a greater loss of vegetation or tree canopy.

While single-family zones account for a large share of the city's tree canopy, the specific percentage of canopy in the rear yard of a given lot varies widely. It would be speculative to predict an amount of tree canopy loss that could result from either the 390 additional DADUs in Alternative 2 or the proposed increase in the rear yard coverage limit. However, we can roughly estimate the scale of potential impact from Alternative 2 in the context of all land in Seattle's single-family zones and the canopy cover it provides. Single-family residential areas currently provide 9,574 acres of tree canopy cover. If all 390 additional DADUs maximize the size limit of 1,000 square feet, the total footprint of DADUs would be just under nine acres, or less than 0.1 percent of the total tree canopy in single-family residential areas. If these nine acres were entirely tree canopy today, removing them would have minor to negligible impact on the overall tree canopy in single-family residential areas. This upper-limit estimate also assumes that existing tree regulations would not require preservation of any trees in the DADU footprint area and that homeowners voluntarily would make no design or siting choices in order to preserve existing trees.

At the same time, removing the off-street parking requirement could reduce the amount of vegetation and tree removal otherwise needed to accommodate a parking space when creating an ADU.

Alternative 2 does not propose any revisions to existing tree regulations in Seattle's Tree Protection Ordinance (SMC 25.11). Under SMC 25.11, the City would review tree removal required for constructing a DADU as part of the permit application. Exceptional trees could be removed only if protecting the tree during construction would prevent use of the maximum allowed lot coverage.

Exceptional Trees

Defined in Director's Rule 16-2008, exceptional trees have important historic, ecological, or aesthetic value due to their size and species.

It would be speculative to estimate the net effect of Alternative 2 with respect to tree canopy and vegetation since potential impacts vary for every lot depending on the presence of existing trees and vegetation, the City's review of any potential tree removal, and whether the owner elects not to provide a parking space. Overall, the 390 additional DADUs constructed in Alternative 2 compared to Alternative 1 (No Action) could have a small impact on tree canopy and vegetation. In the context of the 135,000 lots in Seattle's single-family zones, impacts from 390 additional DADUs would likely be minor overall.

Environmentally Critical Areas

Alternative 2 would not alter the regulations for ECAs as described in SMC 25.09. Development of ADUs would continue to be subject to ECA regulations. Therefore, current trends regarding the types and degree of impact to ECAs are likely to continue under Alternative 2.

IMPACTS OF ALTERNATIVE 3

Land Use

Land Use Code changes to encourage ADU development under Alternative 3 would be consistent with the Seattle 2035 Comprehensive Plan, and no changes to existing zoning designations are proposed. Alternative 3 supports the Comprehensive Plan's vision for housing options that create a thriving, vibrant city. Specifically, the Land Use Code changes would:

- Support more housing development, consistent with the Seattle 2035 Comprehensive Plan's established growth strategy and Housing Affordability and Livability Agenda (HALA) recommendations.
- Maintain existing land use patterns in single-family zones by continuing to allow detached single-family housing as the principal use permitted outright and ADUs that are compatible in scale with single-family houses.
- Gradually increase density and building scale in single-family zones as development occurs that is consistent with existing land use patterns.
- Encourage greater variety of housing types in the city's residential areas.

Construction of additional ADUs in the study area as a result of the proposed Land Use Code changes under Alternative 3 could increase the density and scale of development. However, the impacts of these changes would be less than under Alternative 2, since we anticipate fewer ADUs would be constructed.

As described in Section 4.1 Housing and Socioeconomics, compared to Alternative 1 (No Action), Alternative 3 could result in 1,210 additional ADUs (or 3,100 ADUs total) throughout Seattle between 2018 and 2027. Alternative 3 could result in:

- 740 additional lots in single-family zones with both an AADU and a DADU constructed, which is not allowed under Alternative 1 (No Action)
- 250 fewer lots in single-family zones with only one AADU constructed
- 30 fewer lots in single-family zones with only one DADU constructed

Construction of 3,100 ADUs (1,210 more than Alternative 1) could lead to minor changes in population and residential density and to building scale.

Changes to building density would occur directly from the creation of ADUs. Relative to Seattle's 348,000 existing housing units and the 40,000 new units constructed between 2010 and 2017, the addition of approximately 1,210 ADUs would be a small change. These impacts would be minor as the density changes would occur incrementally over 10 years and be distributed throughout the city.

Changes in population density would result from the creation of additional ADUs. Unlike Alternative 2, no change to the maximum household size would occur in Alternative 3, so changes to population density would be the result only of additional ADU production and therefore would be somewhat smaller than Alternative 2. On each lot where an ADU is constructed, we anticipate an increase in population density of an average of 1.5 people per ADU (or maximum of 4 people per ADU). This would correspond to about 1,815 more residents (or a maximum of 1,860 residents) than under Alternative 1 (No Action) over the ten-year study period. These impacts would likely be minor as the population changes would unfold incrementally over 10 years and would likely continue to be distributed throughout the city.

Localized impacts could occur if ADU production is higher in a concentrated area, such as a particular block in the study area. Impacts in areas with increases in population density could include greater noise, exposure to cooking smells, and changes in privacy due to the presence of more neighbors. These impacts are likely to be minor.

Changes to scale would occur from alterations to the development standards for DADUs, including:

- Decreasing the minimum lot size from 4,000 square feet to 3,200 square feet
- Increasing the gross floor area limit from 800 square feet to 1,000 square feet, including garage and storage areas
- Increasing the rear yard coverage limit for DADUs and other accessory structures from 40 to 60 percent, if the DADU is 15 feet or less in height
- Increasing the maximum height limits by 1-3 feet
- Allowing height limit exceptions for projections like dormers that add interior space

Collectively, these changes would allow construction of slightly larger DADUs on smaller lots than currently allowed. The changes would be slightly less than described under Alternative 2. Alternative 3 also includes an FAR limit that would limit the size of detached single-family houses, moderating building scale impacts since new construction would be more similar in size to existing structures. The effect of the FAR limit would further lessen scale impacts compared to Alternative 2.

We anticipate the Land Use Code changes proposed under Alternative 3 would decrease the number of existing houses torn down and redeveloped compared to Alternative 1 (No Action). While Alternative 2 could also reduce demolitions from 2,610 under Alternative 1 (No Action) to 2,460, Alternative 3 could result in even fewer demolitions (2,200). Our analysis finds the feasibility of retaining an existing house and adding one or more ADUs would be higher under Alternative 3 than under Alternatives 1 and 2, primarily due to the maximum FAR limit for new construction.

Like Alternative 2, these density and scale impacts would be minor and would not constitute a fundamental change in the land use pattern of Seattle's single-family zones. Because they are either part of an existing house (AADU) or allocated in a detached "backyard cottage" structure with a familiar physical form and smaller scale than allowed for a principal house (DADU), ADUs would be associated and compatible with single-family residential zones. Since urban form varies across the study area, specific impacts of Alternative 3 to architectural character and design features like building setbacks and yards due to greater ADU production could vary depending on neighborhood context but are likely to be minor.

Shorelines

Alternative 3 would not alter existing regulations for ADU development in the Shoreline District. DADUs would continue not to be allowed in the Shoreline District pursuant to SMC 23.60A. Any additional AADUs constructed in the Shoreline District would be subject to existing regulations. Therefore, impacts to shorelines would not occur.

Tree Canopy and Vegetation

Impacts to tree canopy and vegetation would be less than those described under Alternative 2, both because fewer DADUs would be constructed and the FAR limits imposed. Compared to Alternative 1 (No Action) (990 DADUs), Alternative 3 (1,330 DADUs) could result in 340 additional DADUs. In addition, the proposed FAR limit would tend to reduce the footprint of new houses, which would also reduce the potential for impacts to tree canopy and vegetation.

Alternative 3 would require off-street parking for lots with two ADUs, reducing the positive impact on trees and vegetation compared to Alternative 2, where no off-street parking would be required. Still, it would be speculative to estimate the net effect of Alternative 3. While we estimate 50 fewer DADUs would be constructed compared to Alternative 2 (340 instead of 390), more lots would likely create off-street parking. Like Alternative 2, overall impacts on tree canopy and vegetation from Alternative 3 would likely be minor in the context of the 135,000 lots in single-family zones.

Environmentally Critical Areas

Alternative 3 would not alter the regulations for ECAs as described in SMC 25.09. Development of ADUs would continue to be subject to ECA regulations. Therefore, current trends regarding the types and degree of impact to ECAs are likely to continue under Alternative 3.

4.2.3 Mitigation Measures

No significant adverse impacts are anticipated to land use; therefore, no mitigation measures are proposed.

4.2.4 Significant Unavoidable Adverse impacts

Under all three alternatives, Seattle would continue to experience population growth that would increase housing development in neighborhoods throughout the city. Single-family zones would continue to see some existing structures renovated, enlarged, and demolished as new construction occurred to accommodate new households and respond to changing economic conditions. This is an outcome we expect in a dynamic, growing city. Some localized land use conflicts and compatibility issues in single-family zones could arise under any alternative as growth occurs. However, no significant unavoidable adverse impacts on land use are anticipated as a result of the proposed Land Use Code changes.

4.2.5 Regulatory Consistency Analysis

The Comprehensive Plan establishes policies that guide the development of the city in the context of regional growth management. The Plan aims to give all Seattle residents better access to jobs, education, affordable housing, parks, community centers, and healthy food. The City uses the Plan to help make decisions about proposed ordinances, capital budgets, policies, and programs. Each element of the Comprehensive Plan generally presents goals followed by policies related to those goals and may also include a discussion about the goals and policies. The goals and policies represent outcomes the City hopes to realize over the life of the Plan. This section identifies aspects of the Comprehensive Plan applicable to the proposed action. The proposed action is generally consistent with the goals and policies described below that guide the development of Land Use Code policy.

The Comprehensive Plan recognizes that in single-family residential areas "…different housing types, such as accessory dwelling units or backyard cottages, could increase the opportunity for adding new housing units in these areas." The Land Use Element of the Comprehensive Plan addresses how Seattle should change and grow in the coming years and provide specific guidance about the content and interpretation in the City's Land Use Code to meet each land use goal.

Land Use Goal 7 has associated policies that apply to ADUs:

> **Land Use Goal 7: Provide opportunities for detached single-family and other compatible housing options that have low height, bulk, and scale in order to serve a broad array of households and incomes and to maintain an intensity of development that is appropriate for areas with limited access to services, infrastructure constraints, fragile environmental conditions, or that are otherwise not conducive to more intensive development.**

The policies associated with Land Use Goal 7 that are pertinent to the proposed action include:

> **Land Use Policy 7.4 Allow detached single-family dwellings as the principal use permitted outright in single-family residential areas.**
>
> **Land Use Policy 7.5 Encourage accessory dwelling units, family-sized units, and other housing types that are attractive and affordable, and that are compatible with the development**

pattern and building scale in single-family areas in order to make the opportunity in single-family areas more accessible to a broad range of households and incomes, including lower-income households.

Land Use Policy 7.10 Reflect the character of existing low-density development through the regulation of scale, siting, structure orientation, and setbacks.

Land Use Policy 7.12 Emphasize measures that can increase housing choices for low-income individuals and families when considering changes to development standards in single-family areas.

The City uses development standards to ensure that new buildings fit in with the architectural character of a neighborhood or reflect the future vision for a certain area. Development standards also help builders care for the environment and consider the physical limits of certain areas. Land Use Goal 5 establishes the importance of using development standards to shape the look and feel of Seattle's neighborhoods; its associated policies focus on addressing the height, bulk, and scale of new buildings.

Land Use Goal 5 Establish development standards that guide building design to serve each zone's function and produce the scale and character desired, while addressing public health, and safety and welfare.

The policies associated with Land Use Goal 5 that are pertinent to the proposed action include:

Land Use Policy 5.3 Control the massing of structures to make them compatible with the area's planned scale, provide a reasonable ratio of open to occupied space on a site, and allow the building to receive adequate natural light.

Land Use Policy 5.4 Use maximum height limits to maintain the desired scale relationship between new structures, existing development, and the street environment; address varied topographic conditions; and limit public view blockage. In certain Downtown zones and in industrial zones, heights for certain types of development uniquely suited to those zones may be unlimited.

Land Use Policy 5.6 Establish setbacks in residential areas as needed to allow for adequate light, air, and ground-level open space; help provide privacy; promote compatibility with the existing development pattern; and separate residential uses from more intensive uses.

Land Use Policy 5.7 Employ development standards in residential zones that address the use of the ground level of new development sites to fit with existing patterns of landscaping, especially front yards in single-family residential areas, and to encourage permeable surfaces and vegetation.

Land Use Goal 6 provides specific guidance related to regulating off-street parking:

Land Use Goal 6 Regulate off-street parking to address parking demand in ways that reduce reliance on automobiles, improve public health and safety, reduce greenhouse gas emissions, lower construction costs, create attractive and walkable environments, and promote economic development throughout the city.

The policies associated with Land Use Goal 6 that are pertinent to the proposed action include:

Land Use Policy 6.1 Establish parking requirements where appropriate for both single-occupant vehicles and their alternatives at levels that further this Plan's goal to increase the use of public transit, car pools, walking, and bicycles as alternatives to the use of single-occupant vehicles.

Land Use Policy 6.2 Modify residential parking regulations, where parking is required, to recognize differences in the likely auto use and ownership of intended occupants of new developments, such as projects provided for low-income, elderly, or residents with disabilities.

Land Use Policy 6.6 Limit the off-street impacts on pedestrians and surrounding areas by restricting the number and size of automobile curb cuts, and by generally requiring alley access to parking when there is an accessible, surfaced alley.

Land Use Policy 6.9 Require parking in areas with limited transit access and set the requirements to discourage underused parking facilities, even if occasional spillover parking could result.

The Housing Element of the Comprehensive Plan establishes citywide goals and policies to guide the types of housing the City will encourage and the tools the City will use to make it possible for people who work in Seattle to live here as well. Addressing injustices and protecting marginalized populations is a primary focus of the Housing Element. Several goals and policies in the Housing Element are relevant to the proposed action to increase ADU production:

Housing Goal 1 Provide fair and equal access to housing for all people in Seattle.

Housing Goal 2 Help meet current and projected regional housing needs of all economic and demographic groups by increasing Seattle's housing supply.

Housing Goal 3 Achieve a mix of housing types that provide opportunity and choice throughout Seattle for people of various ages, races, ethnicities, and cultural backgrounds and for a variety of household sizes, types, and incomes.

Housing Goal 4 Achieve healthy, safe, and environmentally sustainable housing that is adaptable to changing demographic conditions.

Housing Goal 5 Make it possible for households of all income levels to live affordably in Seattle, and reduce over time the unmet housing needs of lower-income households in Seattle.

Housing policies relevant to the development of ADUs include:

Housing Policy 1.3 Work to overcome historical patterns of segregation, promote fair housing choices, and foster inclusive communities that are free from discrimination through actions, such as affirmative marketing and fair housing education and enforcement.

Housing Policy 2.5 Monitor the supply of housing and encourage the replacement of housing that is demolished or converted to nonresidential or higher-cost residential use.

Housing Policy 2.6 Seek to identify affordable housing at risk of demolition and work to mitigate the displacement of residents ahead of planned upzones.

Housing Policy 3.4 Promote use of customizable modular designs and other flexible housing concepts to allow for households' changing needs, including in areas zoned for single-family use.

Housing Policy 4.4 Increase housing opportunities for older adults and people with disabilities by promoting universal design features for new and renovated housing. [Note: this policy addresses universal design. The action alternatives would allow an increase in the rear yard coverage limit for a DADU that is at most 15 feet in height. This is one strategy to accommodate one-story designs intended for people with limited mobility.

Housing Policy 4.8 Explore ways to reduce housing development costs.

Housing Policy 5.18 Consider implementing programs that require affordable housing with new development, with or without rezones or changes to development standards that increase development capacity.

Housing Policy 5.20 Implement strategies and programs to help ensure a range of housing opportunities affordable for Seattle's workforce.

The Transportation Element guides transportation investments to serve the city's current residents and businesses equitably and to accommodate Seattle's future growth. Several goals and policies in the Transportation Element are relevant to the proposed action to increase ADU production:

Transportation Goal 2 Allocate space on Seattle's streets to safely and efficiently connect and move people and goods to their destinations while creating inviting spaces within the rights-of-way.

Transportation Goal 3 Meet people's mobility needs by providing equitable access to, and encouraging use of, multiple transportation options.

Transportation Goal 4 Promote healthy communities by providing a transportation system that protects and improves Seattle's environmental quality.

The policies associated with these Transportation Goals that are pertinent to the proposed action include:

Transportation Policy 2.3 Consider safety concerns, modal master plans, and adjacent land uses when prioritizing functions in the pedestrian, travelway, and flex zones of the right-of-way.

Transportation Policy 3.3 Consider the income, age, ability, and vehicle-ownership patterns of populations throughout the city in developing transportation systems and facilities so that all residents, especially those most in need, have access to a wide range of affordable travel options.

Transportation Policy 3.4 Develop a citywide transit system that includes a variety of transit modes to meet passenger capacity needs with frequent, reliable, accessible, and safe service to a wide variety of destinations throughout the day and week.

Transportation Policy 3.13 Prioritize bicycle and pedestrian investments on the basis of increasing use, safety, connectivity, equity, health, livability, and opportunities to leverage funding.

Transportation Policy 3.18 Implement curb-space management strategies such as parking time limits, on-street parking pricing, loading zones, and residential parking programs to promote transportation choices, encourage parking turnover, improve customer access, and provide for efficient allocation of parking among diverse users.

Transportation Policy 4.3 Reduce drive-alone vehicle trips, vehicle dependence, and vehicle-miles traveled in order to help meet the City's greenhouse gas reduction targets and reduce and mitigate air, water, and noise pollution.

The Utilities Element of the Comprehensive Plan notes that, "[a]s Seattle continues to grow over the coming years, the existing utilities infrastructure is well poised to accommodate new buildings, although some development strategies and construction modifications may be required to bring services to individual lots. With proper maintenance and strategic planning, the existing infrastructure will also be able to support this Plan's broader goals of sustainability, economic efficiency, and equitable service access for all Seattleites."

The Utilities Element has a goal and policy relevant to the proposed action to increase ADU production:

Utilities Goal 1 Provide safe, reliable, and affordable utility services that are consistent with the City's aims of environmental stewardship, race and social equity, economic opportunity, and the protection of public health.

Utilities Policy 1.5 Ensure that new private development provides adequate investments to maintain established utility service standards.

The Neighborhood Planning section of the Comprehensive Plan also contains goals and policies developed by and for specific areas. The following existing neighborhood plan policies are relevant to the proposed action:

Greenwood–Phinney Ridge Neighborhood Plan Policies:

G/PR-P11 Support the development of accessory dwelling units (ADUs) as a means to accommodate planned housing growth.

North Beacon Hill Neighborhood Plan Policies:

NBH-P9 Allow alternative housing types, such as cottage housing, in single-family zones to support affordable choices while preserving the single-family character.

Queen Anne (Uptown) Neighborhood Plan Policies:

Policy QA-P13 Accessory dwelling units (ADUs) in single-family zones, in the Queen Anne planning area, should continue to be limited to the principal residential structure, and consider requiring that they be subordinate in size and character in order to discourage the development of duplexes and other multifamily structures in these zones.

Note: This policy suggests that ADUs should continue to be limited to the principal structure. This policy was adopted in March 1999, prior to the 2009 adoption of regulations allowing DADUs in single-family zones citywide.

Wallingford Neighborhood Plan Policies:

W-P14 Encourage the development of accessory dwelling units in the community as a housing affordability strategy.

Westwood–Highland Park Neighborhood Plan Policies:

W/HP-P21 Encourage quality design in town houses, cottage houses, and accessory dwelling units.

4.3 Aesthetics

This section analyzes the scale and form of existing development in single-family zones in Seattle. We identify the potential aesthetic impacts to height, bulk, and scale that could occur under each alternative for the proposed action. Aesthetic impacts are defined by how the Land Use Code changes contemplated under Alternatives 2 and 3 would affect the visual character of single-family zones. We have prepared and analyzed three-dimensional visual simulations to illustrate potential impacts of continued development of ADUs under Alternative 1 (No Action) and the proposed Land Use Code changes under Alternatives 2 and 3.

4.3.1 Affected Environment

As described in Section 4.2 Land Use, zoning and development regulations govern development in Seattle. These regulations determine the allowed uses and physical form of new buildings, which together influence urban form. This section describes the existing urban form and regulations that currently govern development in single-family zones in the study area.

SEATTLE MUNICIPAL CODE

The City regulates the form of development to achieve several goals, including aesthetic quality, transitions in scale and intensity, and environmental protection. The City's SEPA policies for regulating the height, bulk, and scale of development are as follows (SMC 25.05.675.G.2.a):

> It is the City's policy that the height, bulk, and scale of development projects should be reasonably compatible with the general character of development anticipated by the goals and policies set forth in the Land Use Element, Growth Strategy Element, and Shoreline Element of the Seattle Comprehensive Plan; the procedures and locational criteria for shoreline

environment designations set forth in Sections 23.60A.060 and 23.60A.220; and the adopted land use regulations for the area in which they are located, and to provide for a reasonable transition between areas of less intensive zoning and more intensive zoning.

CURRENT URBAN FORM

The form of existing development varies widely across single-family zones in Seattle; therefore, a comprehensive summary is not possible. However, because the proposed Land Use Code changes would affect infill development in already developed neighborhoods, documenting common built form conditions provides a baseline for analyzing the aesthetic impacts of each alternative.

The study area consists of neighborhoods with homes of varying size and age. Generally, older homes are one- or two-story structures (Exhibit 4.3-1) and are smaller than the allowed three-dimensional space new single-family development can occupy (called the "zoning envelope"). Many recently built homes are three stories and fill the allowed zoning envelope (Exhibit 4.3-2). Most areas with single-family zoning in Seattle have an established pattern of development that spans several decades; a typical block has houses with an age of 50 years or older. Houses set back 10 to 15 feet from the street and front yards planted with grass or other ornamental landscaping characterize many single-family-zoned areas in Seattle.

Building Setbacks

Building setbacks are the minimum distance that zoning regulations require between two structures or between a structure and the property line.

Exhibit 4.3-1
Typical Existing Houses in Seattle (Seattle 2018)

Exhibit 4.3-2
Recently Constructed Houses in Seattle that Maximize the Allowed Zoning Envelope (Seattle 2018)

Incremental redevelopment in Seattle's single-family zones is ongoing and expected. Existing regulations allow construction of new detached single-family residences in single-family zones. New single-family residences that replace existing older ones typically maximize the size allowed under current Land Use Code regulations, which results in many new houses being larger than surrounding older residences. Newer houses often exhibit modern designs and different architectural characteristics than older structures. This type of development influences the aesthetic character of a neighborhood. The City does not require new development in single-family zones to go through Design Review.

By regulating the overall bulk of buildings through minimum setback requirements and limits on building height, density, floor area ratio (FAR), and lot coverage, the City can influence the overall aesthetic quality in a given location.

Maximum height and FAR limits both directly influence how intensive a development appears. We often describe this perceived intensity in terms of bulk and scale. Increases in FAR and height together create greater "bulk." For example, a tall, skinny building will occupy less of its building site and appear less "bulky" (although taller) than a relatively short building with the same FAR, even though both contain the same volume. Bulk is the qualitative visible composition and perceived shape of a structure's volume. Which form is preferable or perceived as more attractive is both subjective and dependent on the surrounding context. Visual scale, meanwhile, is the relationship of a building in terms of its size, height, and bulk to its surroundings. A building's scale is contextual in nature and affects how well it blends in with the neighborhood. Changes in scale can create aesthetic impacts if new development differs in bulk and scale from the surrounding neighborhood.

ADUs have been allowed citywide as part of a single-family residence or in the rear yard of a single-family-zoned lot since 1994 and 2010, respectively. ADUs exist throughout the study area and are compatible with the scale and urban form of Seattle's single-family zones. Exhibit 4.3-3 shows photographs of DADUs in Seattle. Exhibit 4.3-4 shows a visual representation of a typical existing single-family area, including detached single-family houses, ADUs, and other accessory structures.

Floor Area Ratio (FAR)

Floor Area Ratio (FAR) is the ratio of a building's total square footage (floor area) to the size of the piece of land on which it is constructed. For example, if a building must adhere to 0.5 FAR, then the total square footage of the constructed building must be no more than half the area of the parcel itself. In other words, if the lot is 5,000 square feet, then the square footage of the building cannot exceed 2,500 square feet.

Exhibit 4.3-3

DADUs in Seattle

Source: Sheri Newbold of live-work-play architecture (top). CAST Architecture (bottom).

Exhibit 4.3-4 Visual Representation of Existing Conditions in a Single-Family Zone

TREE CANOPY

Tree canopy provides aesthetic and health benefits to residents and contributes to the overall livability of communities. The Comprehensive Plan establishes goals and policies for the preservation and expansion of Seattle's tree canopy (Seattle 2017). See Section 4.2, Land Use, for a discussion of existing tree canopy cover and vegetation and potential impacts resulting from the alternatives.

4.3.2 Impacts

This section describes the potential aesthetic impacts from Alternatives 1, 2, and 3 in the study area. Given the large size of the study area, we primarily discuss aesthetic impacts qualitatively; however, we also developed and analyzed three-dimensional models to help visualize and evaluate the potential impacts of Land Use Code changes. We recognize that evaluating aesthetic impacts is subjective and can vary depending on an individual's perspectives and preferences. This section analyzes the potential visual impacts from changes to the form of new development under each alternative in terms of height, bulk, and scale.

Alternatives 2 and 3 differ in the degree and focus of the proposed changes. Alternative 2 represents the broadest range of Land Use Code changes, which would allow the greatest flexibility for constructing ADUs and potentially create more extensive aesthetic impacts. Compared to Alternative 2, Alternative 3 represents more modest Land Use Code changes that would result in fewer ADUs constructed and marginally fewer potential aesthetic impacts overall.

In general, the proposed Land Use Code changes would result in creation of more ADUs compared to Alternative 1 (No Action). As described in Section 4.1, Housing and Socioeconomics, when compared to Alternative 1 (No Action), Alternative 2 could add about 1,440 additional ADUs and Alternative 3 could add about 1,210 additional ADUs throughout the study area between 2018 and 2027. This additional ADU production would result in a minor increase in the scale and intensity of development.

Under any alternative, development of new buildings could contribute new sources of light and glare from additional night lighting, higher visibility of interior lighting through windows at night, and reflection from windows. Although these light sources would increase, none of these sources is expected to cause adverse aesthetic impacts because many of these types of lights already exist in the study area. As such, we do not discuss light and glare further in this document.

The specific elements of the proposed Land Use Code changes that would affect the aesthetic character of the study area include:

- Number of ADUs allowed on a lot
- Minimum lot size for a DADU
- Off-street parking requirements
- Maximum size
- Maximum height
- Rear yard coverage limit
- Location of entries
- Roof features
- Maximum FAR limits

We did not consider the following proposed Land Use Code changes in our analysis of aesthetic impacts because they do not affect the aesthetic character of the study area: owner-occupancy requirements, household size, MHA requirements, and predevelopment costs. No alternative contemplates a change to the overall lot coverage limit; therefore, we did not discuss it in this analysis.

METHODOLOGY

As described in more detail in Appendix C, we used three-dimensional visual modeling to illustrate the potential changes to the scale and form of development in the study area. The simulations provide representative views of potential development changes under Alternatives 1, 2, and 3 on lots in single-family zones. For each alternative, we included multiple viewpoints using one representative neighborhood type (see the following exhibits).

To illustrate a range of typical conditions found across the study area, we created a hypothetical two-block scene consisting of 60 lots with seven distinct lot types. These lot types are based on actual lots found in representative locations in the study area and illustrate various lot sizes (ranging from 3,200 to 6,000 square feet), lot widths (ranging from 28 to 60 feet), and lot depths (ranging from 86 to 120 feet). One block includes an alley, while the other does not, to illustrate varied frontage and vehicle access conditions. We also illustrate a corner lot condition where a rear yard abuts a side yard.

As a baseline for comparison, we illustrated the existing conditions in the model. While the two-block scene is hypothetical, the existing houses modeled are closely based on actual houses found in study area neighborhoods. We chose houses with a range of sizes and parking access conditions (e.g., detached and attached garages with alley access; detached and attached garages with front driveway access; driveway parking; or lots without off-street parking) to represent a realistic variety of conditions that are more or less conducive to adding ADUs. The baseline scenario shows ADUs at the approximate density they exist today.

For each alternative, we modeled two future scenarios: a 10-Year Scenario and a Full Build-Out Scenario. The 10-Year Scenario is based on the ADU production estimates described in Section 4.1, Housing and Socioeconomics, and is intended to illustrate realistic outcomes 10 years after implementing each alternative. The 10-Year Scenario consists of lots with no changes, lots with new ADUs and no change to the main house, lots where a house is torn down and rebuilt without an ADU, and lots with both a new house and new ADU(s). The number of redeveloped lots and/or ADUs varies by alternative. The Full Build-Out Scenario is hypothetical and depicts the complete redevelopment of all lots with the largest possible main house and the maximum number of ADUs allowed. We do not expect this scenario to occur but include it here to illustrate the maximum scale of development allowed under each alternative. See Appendix C for additional details.

We included parked vehicles in the visual representations to illustrate approximately how the availability of on-street parking could vary across alternatives in the 10-Year and Full Build-Out scenarios. The vehicles shown are representative and does not directly correspond to the results of the parking analysis in Section 4.4 Parking and Transportation.

MODEL RESULTS

Alternative 1 (No Action)

Under Alternative 1 (No Action), no Land Use Code changes would occur. Residential development would unfold over time that is consistent with the Seattle 2035 Comprehensive Plan and zoning regulations (as amended) (Seattle 2017). Existing houses on single-family lots would continue to be torn down and rebuilt and new ADUs would be constructed at their current rates.

However, Alternative 1 (No Action) would not result in significant aesthetic impacts beyond those analyzed in the Comprehensive Plan EIS (Seattle 2016). The current trajectory for the development of ADUs would continue, as would construction of new detached single-family houses under existing regulations. As described in Section 4.1 Housing and Socioeconomics, Alternative 1 (No Action) could result in about 1,890 ADUs constructed and 2,610 existing houses being torn down and rebuilt throughout the study area between 2018 and 2027. In our hypothetical two-block scene, this would result in the following development outcomes under the 10-Year Scenario:

- 2 lots with no ADUs where the main house is torn down and rebuilt
- 1 lot with a DADU where the main house is torn down and rebuilt
- 2 lots with an AADU where the main house is retained
- 1 lot with a DADU where the main house is retained
- 54 lots with no changes

Under the Full Build-Out Scenario, all lots in the two-block scene would redevelop based on the following assumptions:

- Maximized footprint of the main house on all lots based on allowed lot coverage while accommodating a DADU (where lot size allows) or an AADU and required off-street parking
- Maximized square footage of the main house on all lots, fully utilizing allowed building height
- Largest feasible DADU, where applicable

Exhibit 4.3-5 through Exhibit 4.3-7 show a plan view of development outcomes under Alternative 1 (No Action) under the Existing Conditions, 10-Year, and Full Built-Out scenarios. Exhibit 4.3-8 through Exhibit 4.3-13 are visual representations of Alternative 1 (No Action) under each scenario. Newly constructed ADUs are highlighted with orange roofs.

Exhibit 4.3-5 Plan View of Development of Alternative 1 (No Action) under Existing Conditions

Exhibit 4.3-6 Plan View of Development Outcomes of Alternative 1 (No Action) in the 10-Year Scenario

Exhibit 4.3-7 Plan View of Development Outcomes of Alternative 1 (No Action) in the Full Build-Out Scenario

Existing building

Main house torn down and rebuilt

Accessory dwelling unit

*** The Full Build-Out Scenario is included for illustrative purposes only and is not an expected outcome of any alternative analyzed in this EIS.**

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Exhibit 4.3-8 Visual Representation of Development Outcomes in Alternative 1 (No Action) under Existing Conditions

Exhibit 4.3-9 Visual Representation of Development Outcomes in Alternative 1 (No Action) in the 10-Year Scenario

Exhibit 4.3-10 Visual Representation of Development Outcomes in Alternative 1 (No Action) in the Full Build-Out Scenario*

*** The Full Build-Out Scenario is included for illustrative purposes only and is not an expected outcome of any alternative analyzed in this EIS.**

Exhibit 4.3-11 Visual Representation of Alternative 1 (No Action) under the Existing Conditions, 10-Year, and Full Build-Out Scenarios

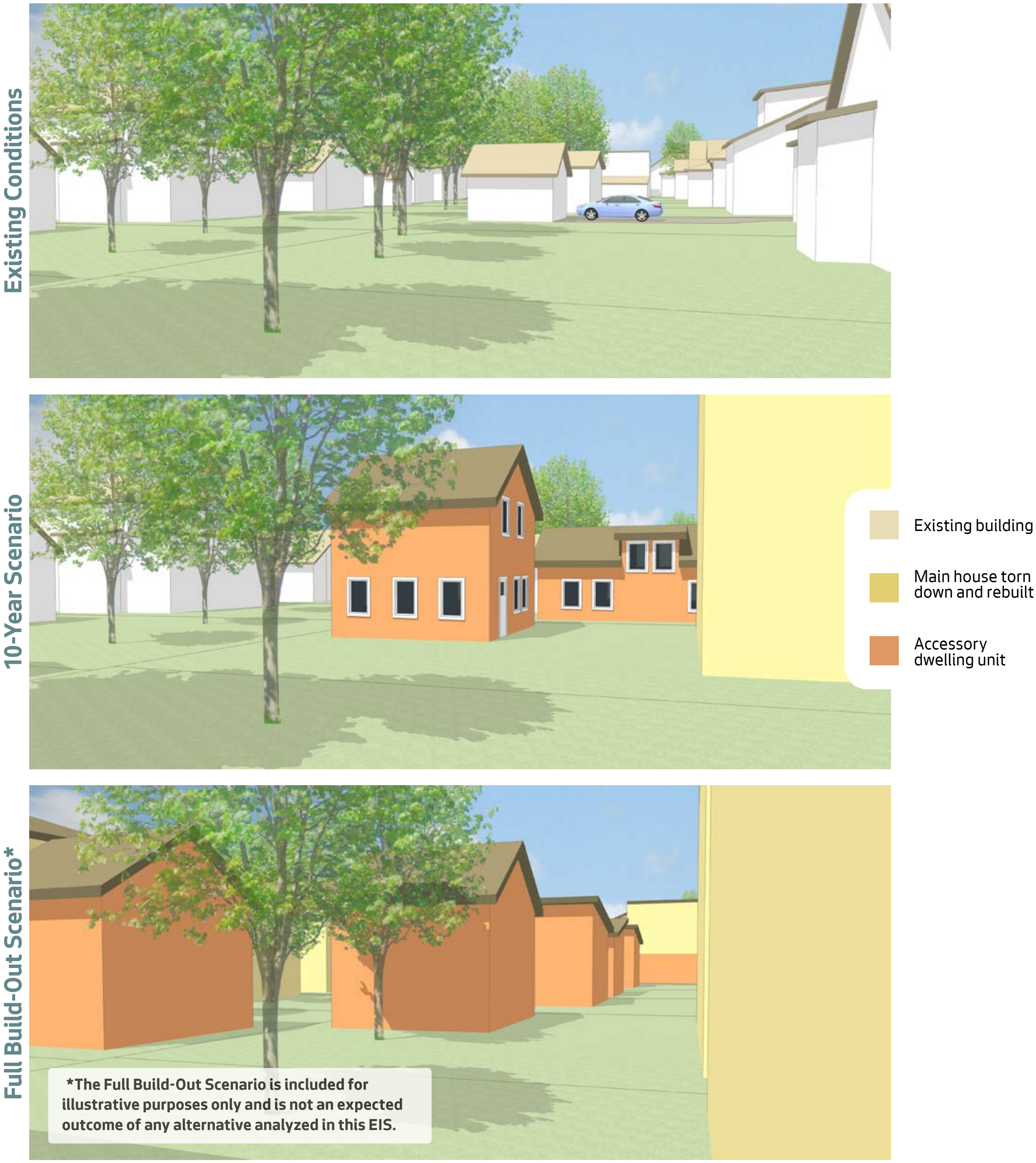
Exhibit 4.3-12 Visual Representation of Alternative 1 (No Action) under the Existing Conditions, 10-Year, and Full Build-Out Scenarios

Existing Conditions

10-Year Scenario

Full Build-Out Scenario*

Exhibit 4.3-13 Visual Representation of Alternative 1 (No Action) from a Rear Yard under the Existing Conditions, 10-Year, and Full Build-Out Scenarios



Alternative 2

As described in Section 4.1, Housing and Socioeconomics, Alternative 2 would result in about 3,330 ADUs constructed and 2,460 existing main houses torn down and rebuilt throughout the study area between 2018 and 2027. Compared to Alternative 1 (No Action), Alternative 2 could result in 1,440 additional ADUs constructed and 150 fewer houses torn down and rebuilt. In the two-block scene, Alternative 2 would result in the following development outcomes under the 10-Year Scenario:

- 2 lots with no ADUs where the main house is torn down and rebuilt
- 1 lot with a DADU where the main house is torn down and rebuilt
- 1 lot with an AADU where the main house is retained
- 1 lot with a DADU where the main house is retained
- 1 lot with an AADU and a DADU where the main house is retained
- 54 lots with no changes

Under the Full Build-Out Scenario, all lots in the two-block scene would redevelop based on the following assumptions:

- Maximized footprint of main house on all lots based on allowed lot coverage while accommodating a DADU
- Maximized square footage of the main house, with an AADU on its ground floor,[1] fully utilizing allowed building height
- Largest feasible DADU on all lots

Exhibit 4.3-14 through Exhibit 4.3-16 show a plan view of the development outcomes under Alternative 2 under the Existing Conditions, 10-Year, and Full Build-Out scenarios. Exhibit 4.3-17 through Exhibit 4.3-22 are visual representations of Alternative 2 under each scenario. Newly constructed ADUs are highlighted with orange roofs.

1 Although we concluded in the housing analysis that most AADUs would be constructed in the basements of existing houses, we assume in this aesthetics analysis that any AADU would be constructed as an addition to the main house. This allows us to consider scenarios with the highest level of anticipated change to the visual environment.

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Exhibit 4.3-14 Plan View of Development of Alternative 2 under Existing Conditions

Exhibit 4.3-15 Plan View of Development Outcomes of Alternative 2 in the 10-Year Scenario

Exhibit 4.3-16 Plan View of Development Outcomes of Alternative 2 in the Full Build-Out Scenario*

Existing building

Main house torn down and rebuilt

Accessory dwelling unit

*** The Full Build-Out Scenario is included for illustrative purposes only and is not an expected outcome of any alternative analyzed in this EIS.**

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Exhibit 4.3-17 Visual Representation of Development Outcomes in Alternative 2 under Existing Conditions

Exhibit 4.3-18 Visual Representation of Development Outcomes in Alternative 2 in the 10-Year Scenario

Exhibit 4.3-19 Visual Representation of Development Outcomes in Alternative 2 in the Full Build-Out Scenario*

Exhibit 4.3-20 Visual Representation of Alternative 2 under the Existing Conditions, 10-Year, and Full Build-Out Scenarios

Exhibit 4.3-21 Visual Representation of Alternative 2 under the Existing Conditions, 10-Year, and Full Build-Out Scenarios

Exhibit 4.3-22 Visual Representation of Alternative 2 from a Rear Yard under the Existing Conditions, 10-Year, and Full Build-Out Scenarios

Alternative 3

In general, Alternative 3 seeks to encourage various housing types, including ADUs and smaller principal structures similar in scale to many existing houses in the study area. As a result, Alternative 3 would have fewer aesthetic impacts overall than Alternative 2.

As described in Section 4.1, Housing and Socioeconomics, Alternative 3 could result in about 3,100 ADUs constructed and 2,200 existing houses torn down and rebuilt throughout the study area between 2018 and 2027. Compared to Alternative 1 (No Action), Alternative 3 could result in 1,210 additional ADUs constructed and 410 fewer houses torn down and rebuilt. In the two-block scene, this would result in the following development outcomes in the 10-Year Scenario:

- 1 lot with no ADUs where the main house is torn down and rebuilt
- 1 lot with a DADU where the main house is torn down and rebuilt
- 2 lots with AADUs where the main house is retained
- 2 lots with DADUs where the main house is retained
- 1 lot with both an AADU and a DADU where the main house is retained
- 53 lots with no changes[2]

Under the Full Build-Out Scenario, all lots in the two-block scene would redevelop based on the following assumptions:

- Maximized footprint of main house on all lots based on allowed lot coverage while accommodating a DADU and required off-street parking
- Maximized square footage of main house on all lots up to the maximum FAR limit, utilizing allowed building height as applicable
- Largest feasible AADU on the ground floor of the main house
- Largest feasible DADU on all lots

Exhibit 4.3-23 through Exhibit 4.3-25 shows a plan view of the development outcomes of Alternative 3 under the Existing Conditions, 10-Year, and Full Build-Out scenarios. Exhibit 4.3-26 through Exhibit 4.3-31 are visual representations of Alternative 3 under each scenario. Newly constructed ADUs are highlighted with orange roofs.

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2 When we apply our ADU production estimates to the two-block scene, Alternative 3 results in two additional lots with ADUs compared to Alternative 2 and one fewer teardown. This reflects changes in profitability of different development outcomes under Alternative 3, partly because of the FAR limit that would apply to new development.

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Exhibit 4.3-23 Plan View of Development of Alternative 3 under Existing Conditions

Exhibit 4.3-24 Plan View of Development Outcomes of Alternative 3 in the 10-Year Scenario

Exhibit 4.3-25 Plan View of Development Outcomes of Alternative 2 in the Full Build-Out Scenario*

Existing building

Main house torn down and rebuilt

Accessory dwelling unit

*** The Full Build-Out Scenario is included for illustrative purposes only and is not an expected outcome of any alternative analyzed in this EIS.**

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Exhibit 4.3-26 Visual Representation of Development Outcomes in Alternative 3 under Existing Conditions

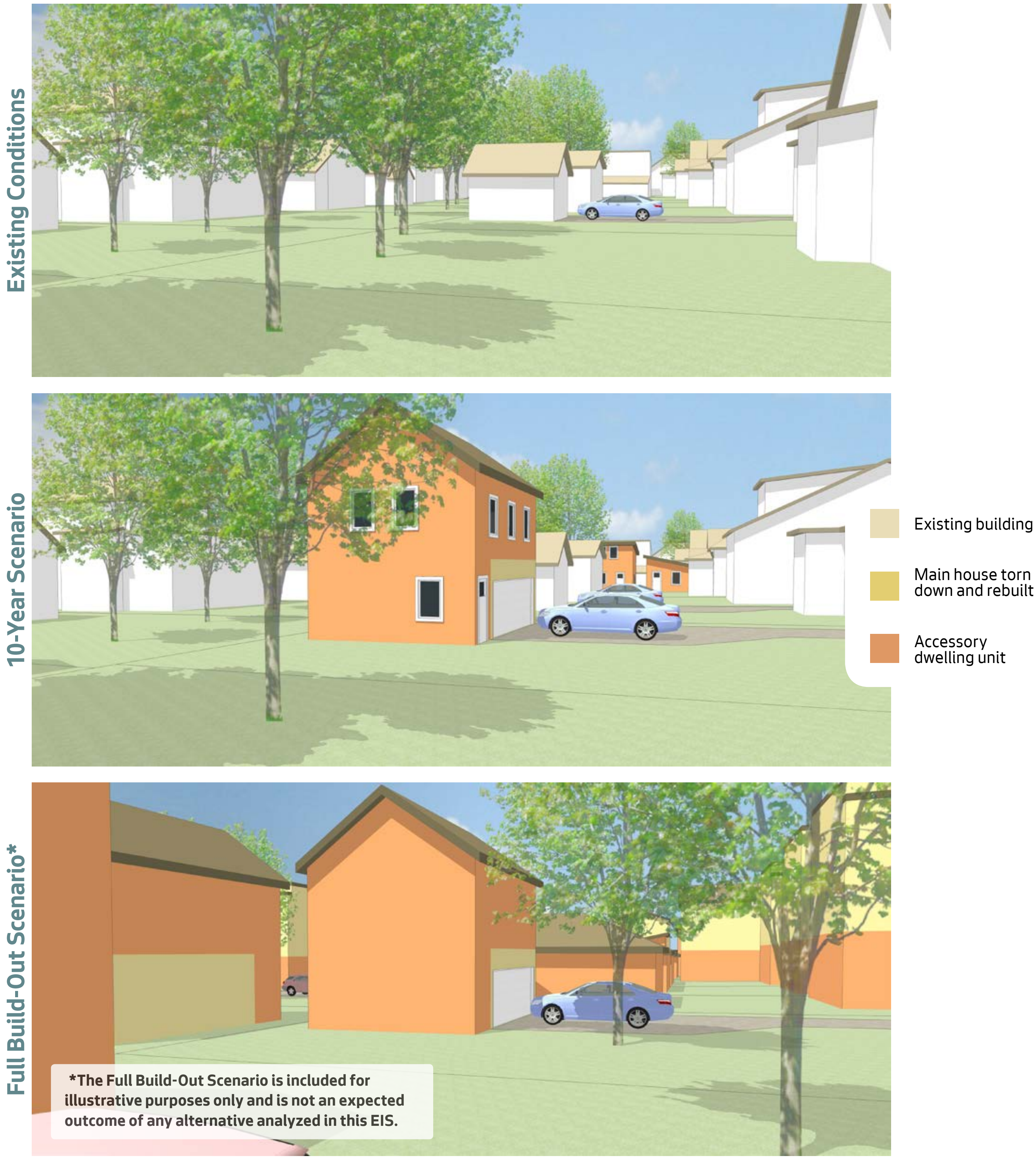
Exhibit 4.3-27 Visual Representation of Development Outcomes in Alternative 3 in the 10-Year Scenario

Exhibit 4.3-28 Visual Representation of Development Outcomes in Alternative 3 in the Full Build-Out Scenario*

Exhibit 4.3-29 Visual Representation of Alternative 3 under the Existing Conditions, 10-Year, and Full Build-Out Scenarios

Exhibit 4.3-30 Visual Representation of Alternative 3 under the Existing Conditions, 10-Year, and Full Build-Out Scenarios

Exhibit 4.3-31 Visual Representation of Alternative 3 from a Rear Yard under the Existing Conditions, 10-Year, and Full Build-Out scenarios



IMPACTS OF ALTERNATIVE 1 (NO ACTION)

Under Alternative 1 (No Action), current Land Use Code regulations for development in single-family zones would remain unchanged. We anticipate the current rate of ADU production would continue. Compared to Alternatives 2 and 3, Alternative 1 (No Action) would result in more teardowns, more lots with large new houses, and fewer ADUs overall. Changes in aesthetics resulting from tearing down existing houses and rebuilding new houses would continue.

IMPACTS OF ALTERNATIVE 2

Based on the results described in Section 4.1, Housing and Socioeconomics, we anticipate the following changes between 2018 and 2027:

- ***Alternative 1 (No Action).*** 1,890 newly constructed ADUs and 2,610 houses torn down and rebuilt
- ***Alternative 2.*** 3,330 newly constructed ADUs and 2,460 houses torn down and rebuilt

Compared to Alternative 1 (No Action), Alternative 2 would increase construction of ADUs and decrease the number of houses torn down and rebuilt throughout the city. Overall, we do not anticipate these changes would result in aesthetic impacts. In the hypothetical two-block scene, changes to lots due to teardowns or construction of new ADUs would be anticipated on nine percent of lots under Alternative 2. As shown in Exhibit 4.3-15, Exhibit 4.3-18, and the 10-year scenarios in Exhibit 4.3-20 through Exhibit 4.3-22, these development outcomes would not result in a fundamental change in visual character of neighborhoods where additional ADUs would be constructed. New ADUs would likely be dispersed throughout neighborhoods in the city and not be concentrated in large enough numbers to result in aesthetic impacts. If a concentration of ADUs did arise in a particularly area, localized aesthetic impacts could occur but would be minor. Further, Alternative 2 would decrease the number of teardowns of existing houses compared to Alternative 1 (No Action). This would help retain the overall aesthetic character of neighborhoods in the study area since new single-family houses erected following teardowns are often visually distinct from existing structures due to differences in architectural style, scale, and proportions.

Below we discuss the aesthetic impacts of Land Use Code changes in Alternative 2 at the level of an individual lot.

Aesthetic Impacts: Two ADUs on One Lot

Current land use regulations allow a lot in a single-family zone to have an AADU or a DADU, but not both. Alternative 2 would allow both an AADU and a DADU on the same lot. This would not change the current allowable building envelope in single-family zones; it would modify only the number of units allowed within that envelope. Although we assumed in the housing analysis that most AADUs would be constructed in the basements of existing houses, we assumed in this aesthetics analysis that AADUs would be constructed as an addition to the main house. This allowed us to consider scenarios in which there would be the highest level of anticipated change to the visual environment.

As illustrated in Exhibit 4.3-32, the addition of both an AADU and a DADU on the same lot would add visual "bulk" to the lot, which would result in smaller yards and decrease the relative sense of openness. These impacts would be minimal as construction would occur behind the main house, out of view of the street and most viewers. Some visual impacts could occur from private property on the subject lot or its neighbors, where more unobstructed views to the DADU might be possible. Nevertheless, the number of lots with both an AADU and a DADU would be minimal compared to the total number of study area lots experiencing no change. Therefore, this Land Use Code change would not have an impact on the overall aesthetic character of neighborhoods in the study area.

Exhibit 4.3-32 Visual Representation of a Lot with Both an AADU and a DADU

Existing Conditions

10-Year Scenario

Aesthetic Impacts: Development Standards

Alternative 2 contemplates several changes to the development standards that regulate the size and location of ADUs. This section illustrates and evaluates the potential aesthetic impacts of the following development standards under each alternative:

- Minimum lot size for DADUs
- Maximum size of AADUs and DADUs
- Maximum height for DADUs
- Maximum rear yard coverage limit
- Height limit exceptions for roof features

Minimum lot size

In Alternative 1 (No Action), only lots 4,000 square feet in area and larger can have a DADU.[3] Under Alternative 2, the minimum lot size on which an ADU could be constructed would be reduced to 3,200 square feet. The hypothetical two-block scene includes about 20 lots between 3,200 and 3,999 square feet. The primary aesthetic impact of lowering the minimum lot size would be an increase in visual bulk and scale on lots that cannot have a DADU under current regulations. Because houses on lots under 4,000 square feet tend to be smaller, it's also possible that DADUs on such lots would be more visible from the street when compared to larger lots. However, other development standards, such as maximum lot coverage limits, would continue to regulate the location and scale of DADUs. On lots under 4,000 square feet, the maximum lot area that could be covered (equal to 1,000 square feet plus 15 percent of the lot area) would limit the size of DADUs or, in some cases, preclude their construction altogether.

Maximum Gross Floor Area

Current regulations limit the size of AADUs to 1,000 gross square feet and DADUs to 800 gross square feet. In both cases, floor area in garage and storage areas counts against the floor area limits. Under Alternative 2, all ADUs would be subject the same gross floor area limit: 1,000 square feet, exclusive of garage and storage areas. As illustrated in Exhibit 4.3-33 Alternative 2 would therefore result in larger DADUs than allowed under Alternative 1 (No Action). The primary aesthetic impacts would result from the greater bulk and scale of DADUs on lots in a single-family zone. In areas with a regular pattern of garages and other accessory structures in rear yards, larger DADUs allowed under Alternative 2

3 Conversion of an existing accessory structure to a DADU is allowed on lots under 4,000 square feet.

could stand out as less consistent with the established context. Other impacts could include a decrease in the amount of open space and landscaped areas on a lot and elimination of off-street parking if those portions of a lot previous used for parking are used to construct a larger DADU.[4]

Exhibit 4.3-33
Visualization of the Largest Allowed DADU on a 5,200-Square-Foot Lot under Alternatives 1, 2, and 3

Alternative 1 (No Action)

Alternative 2

Alternative 3

4 Under all alternatives, off-street parking would continue to be required for the principal dwelling unit, and this required parking space cannot be eliminated to construct an ADU.

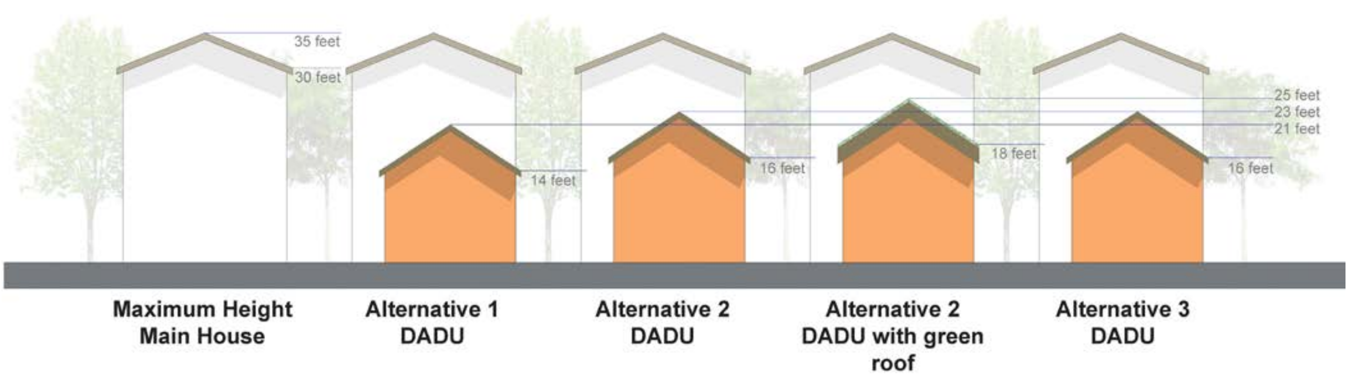
Maximum Height

The aesthetic impact of taller buildings would vary depending on an area's existing urban form and the magnitude of change compared to existing limits. Under current regulations, the maximum height limit for DADUs varies by the width of its lot and ranges from between 15 to 23 feet (Exhibit 4.3-34). Alternative 2 would add a few feet to these height limits. The most pronounced contrast of these changes would be for lots that are 50 feet wide or more. The height limit for a DADU with a pitched roof on these lots would be 25 feet. On lots less than 30 feet wide, DADUs with pitched roofs would be subject to a height limit of 17 feet. On all but the narrowest lots, DADUs with shed or butterfly roofs would be subject to lower maximum height limits than those with pitched roofs.

Minor aesthetic impacts would result from taller DADUs. Combined with an increase in the maximum gross floor area limit, taller DADUs under Alternative 2 would create an increase in bulk and scale. However, because building heights would increase by 3 feet at most, we anticipate aesthetic impacts would be minimal.

Development of taller structures could increase the potential for shade and shadows on adjacent properties and rights-of-way. However, due to the slight increases in height limits under Alternative 2, impacts from shading would be minimal. In addition, building setbacks would still apply, alleviating shadowing of adjacent properties.

Exhibit 4.3-34 Illustration of Maximum Height Allowed under Each Alternative



Note: Lot sizes are not drawn to scale.

Rear Yard Coverage

Current regulations limit coverage of a rear yard to no more than 40 percent. The rear yard coverage limit applies to DADUs and other accessory structures, like a garage or shed.

Alternative 2 would allow 20-percent more coverage of a rear yard for a one-story DADU. (Accessory structures other than the DADU would remain limited to 40-percent coverage.) The aesthetic impacts would translate to less open space in rear yards and greater visual bulk. By limiting the additional coverage to DADUs less than 15 feet tall, the increase in rear yard coverage could result in more DADUs that are relatively shorter and wider than under Alternative 1 (No Action). Vegetation and tree canopy could decrease if property owners choose to eliminate landscape features to construct DADUs.

Roof Features

Currently, no exceptions to the maximum height limit for DADUs are allowed for roof features. Alternative 2 would allow height limit exceptions for dormers, skylights, and other projections that add additional interior space. These roof features would be subject to the provisions applicable to single-family houses, such as size limits and location. For example, features that project from a roof would be limited to 30 percent of the roof area and subject to width and separation requirements. Impacts to aesthetics would be minimal as the increase in height allowed for roof features would be minor.

Maximum Floor Area Ratio

Currently, development in single-family zones is not subject to a FAR limit. Instead, the scale and location of new houses in single-family zones are governed by yard requirements, a maximum height limit, and an overall lot coverage limit. Under Alternatives 1 and 2, these development standards would continue to determine the size of the allowed building envelope on a lot. No impacts on aesthetics are anticipated.

IMPACTS OF ALTERNATIVE 3

The aesthetics impacts from Alternative 3 would be very similar, but slightly less than, those described under Alternative 2. As described above, under the 10-Year Scenario, the following changes could be anticipated:

- ***Alternative 1 (No Action).*** 1,890 newly constructed ADUs and 2,610 houses torn down and rebuilt
- ***Alternative 3.*** 3,100 newly constructed ADUs and 2,200 houses torn down and rebuilt

When compared to Alternative 1 (No Action), Alternative 3 would increase construction of ADUs and decrease teardowns throughout the city; however, this is not anticipated to result in aesthetic impacts. In the hypothetical two-block scene, changes would be anticipated on 12 percent of lots. As shown for the 10-year scenario on Exhibits 4.3-16 to 4.3.20, these changes would not result in a fundamental variation of the land use form of neighborhoods in which additional ADUs would be constructed. New ADUs would be dispersed throughout neighborhoods in the city and would not be concentrated in large enough numbers to result in aesthetic impacts. Further, Alternatives 3 would decrease the number of teardowns of existing houses, which would help retain the overall aesthetic character of neighborhoods in the study area.

Below we discuss the aesthetic impacts of Land Use Code changes in Alternative 3 at the level of an individual lot.

Aesthetic Impacts: Two ADUs on One Lot

Under Alternative 3, an AADU and a DADU would be allowed on the same lot or a lot could have two AADUs. The aesthetic impacts of constructing additional ADUs under Alternative 3 would be very similar to, but slightly less than, Alternative 2. Relative to Alternative 2, Alternative 3 would result in reduced aesthetic impacts because fewer ADUs would be constructed. Alternative 3 would allow a lot to have two AADUs within the same building envelope, which would not result in aesthetic impacts.

Aesthetic Impacts: Development Standards

The action alternatives contemplate several changes to the development standards that regulate the size and location of ADUs. This section illustrates and evaluates the potential aesthetic impacts of the following development standards under each alternative:

- Minimum lot size for DADUs
- Maximum size of AADUs and DADUs
- Maximum height for DADUs
- Maximum rear yard coverage limit
- Height limit exceptions for roof features

Minimum Lot Size

As both Alternative 2 and 3 would reduce the minimum lot size to 3,200 square feet, the impacts under Alternative 3 would be the same as those described under Alternative 2.

Maximum Gross Floor Area

Current regulations limit the size of AADUs to 1,000 gross square feet and DADUs to 800 gross square feet. In both cases, floor area in garage and storage areas counts against the floor area limits. Like Alternative 2, AADUs and DADUs would be subject to the same gross floor area limit under Alternative 3 (1,000 square feet), but garage and storage areas would count toward this limit. For AADUs, this would be the same as current regulations, but slightly smaller than Alternative 2, where the floor area limit excludes garage and storage areas. As illustrated in Exhibit 4.3-21, for DADUs, Alternative 3 would represent an increase over the current 800-square-foot limit but be a slight reduction from Alternative 2 because garage and storage areas would be counted toward the limit. Alternative 3 would therefore result in slightly greater bulk and scale impacts than Alternative 1 (No Action) and slightly lesser bulk and scale impacts than Alternative 2.

Maximum Height

Like Alternative 2, Alternative 3 would also increase the maximum height limits for DADUs. However, Alternative 3 would not allow 1 to 2 additional feet of height for DADUs that met green roof standards. Therefore, the impacts would be marginally less than those described under Alternative 2.

Rear Yard Coverage

Since both Alternative 2 and 3 would allow 20-percent more coverage of a rear yard for a one-story DADU, the impacts under Alternative 3 would be the same as those described under Alternative 2.

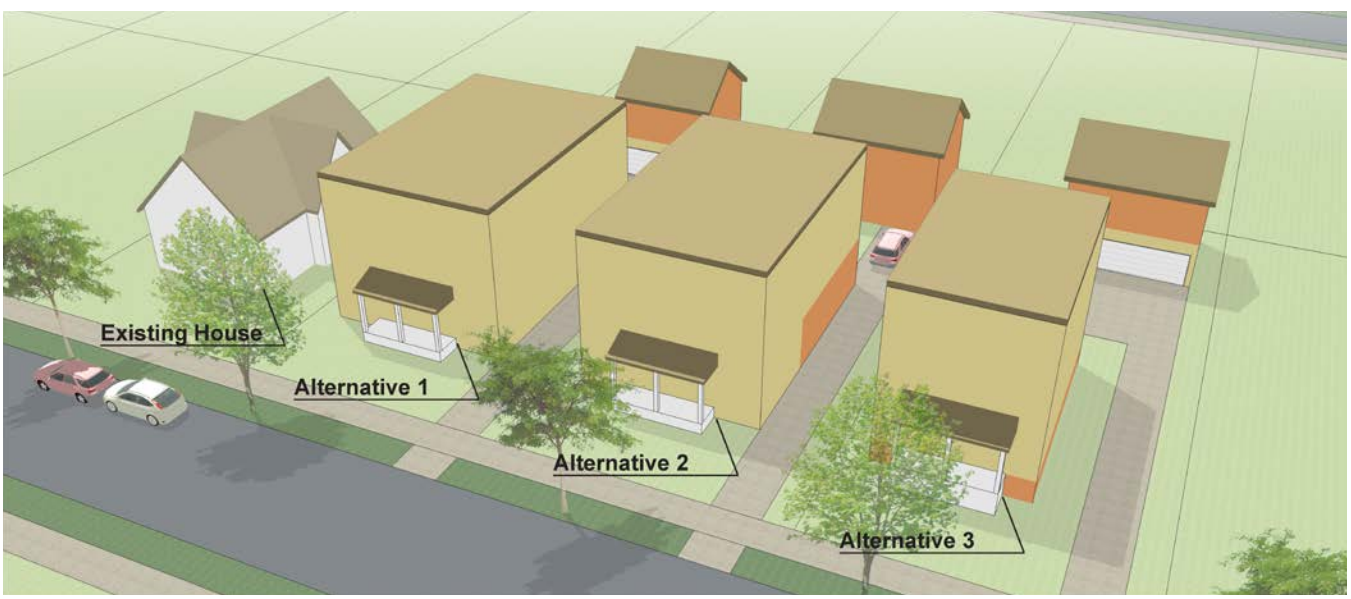
Roof Features

Since both Alternative 2 and 3 would allow height limit exceptions for roof features, the impacts under Alternative 3 would be the same as those described under Alternative 2.

Maximum Floor Area Ratio

Currently, development in single-family zones is not subject to a FAR limit. Instead, the scale and location of new houses in single-family zones are governed by yard requirements, a maximum height limit, and an overall lot coverage limit. Under Alternative 3, a FAR limit would apply to development in single-family zones. New residences (main houses) would be subject to a FAR limit of 0.5 or 2,500 square feet (whichever is greater). On a 6,000-square-foot lot, for example, this would limit the size of a new house to 3,000 square feet; on lots under 5,000 square feet, the size limit of 2,500 square feet would apply. Below-grade floor area and floor area in a DADU would not count toward the FAR limit. On lots where existing development exceeded the FAR or 2,500-square-foot limits, a property owner would be able to convert existing space to an AADU and add a DADU subject to the size and owner-occupancy standards above.

Exhibit 4.3-35 Illustration of How the Maximum FAR Limit Affects House Size under Each Alternative



As illustrated in Exhibit 4.3-35, in general, implementing a FAR limit would tend to reduce the size of new houses and reduce their aesthetic impacts to bulk and scale compared to both Alternative 1 (No Action) and Alternative 2. The analysis described in Section 4.1, Housing and Socioeconomics, suggests that limiting FAR might encourage creation of ADUs because below-grade and DADU floor area would be exempt from FAR calculations. While our estimate of ADU production was lower under Alternative 3 than under Alternative 2, to the extent the FAR limit would encourage marginally more DADUs specifically, there could be impacts on bulk and scale on single-family-zoned lots compared to Alternative 2, which would allow larger residences and have no FAR limit. However, our analysis also found that fewer teardowns would occur under Alternative 3 compared to Alternative 1 (No Action) and Alternative 2. This would reduce the aesthetic impacts of Alternative 3 relative to Alternatives 1 and 2 because more existing houses would be preserved rather than torn down and rebuilt as larger structures.

4.3.3 Mitigation Measures

No significant adverse impacts on land use are anticipated; therefore, no mitigation measures are proposed.

4.3.4 Significant Unavoidable Adverse Impacts

Under all alternatives, increased development on lots in single-family zones would occur in the study area, leading to a general increase in building heights and development intensity over time. This transition is an unavoidable and expected characteristic of urban populations and employment growth. Alternatives 2 and 3 would further this trend by creating additional development capacity and incentives that could accelerate the development of taller, more intense ADUs in the study area. Alternatives 2 and 3 would also result in a minor decrease in the rate of main houses being torn down and rebuilt. And, Alternative 3 would specifically reduce the size of the main house that could be constructed through the implementation of FAR limits. However, no significant unavoidable adverse impacts on aesthetics are anticipated as a result of the proposed Land Use Code changes.

4.4 Parking and Transportation

This section considers the impacts of the proposed Land Use Code changes on parking and transportation. We evaluated the potential parking impacts associated with the proposed Land Use Code changes by considering the existing availability of on-street parking relative to the expected increase in demand for on-street parking under each alternative.

The analysis of the potential impacts to transportation in the EIS for the Seattle 2035 Comprehensive Plan (City of Seattle 2015 and Seattle 2016) is incorporated by reference into this EIS. Section 3.7 of the Comprehensive Plan EIS thoroughly analyzed the potential impacts to transportation, including circulation and transit, from a projected growth of 70,000 households in the city through 2035, including approximately 8,400 households in areas outside of designated urban villages. Since the study area, potentially affected resources, and timeframe for this EIS all fall within what was considered in the Comprehensive Plan EIS, we considered the potential impacts to the transportation network in the context of the changes analyzed in the Comprehensive Plan EIS.

4.4.1 Affected Environment

The following sections describe the existing transportation network and parking conditions in the study area.

PARKING

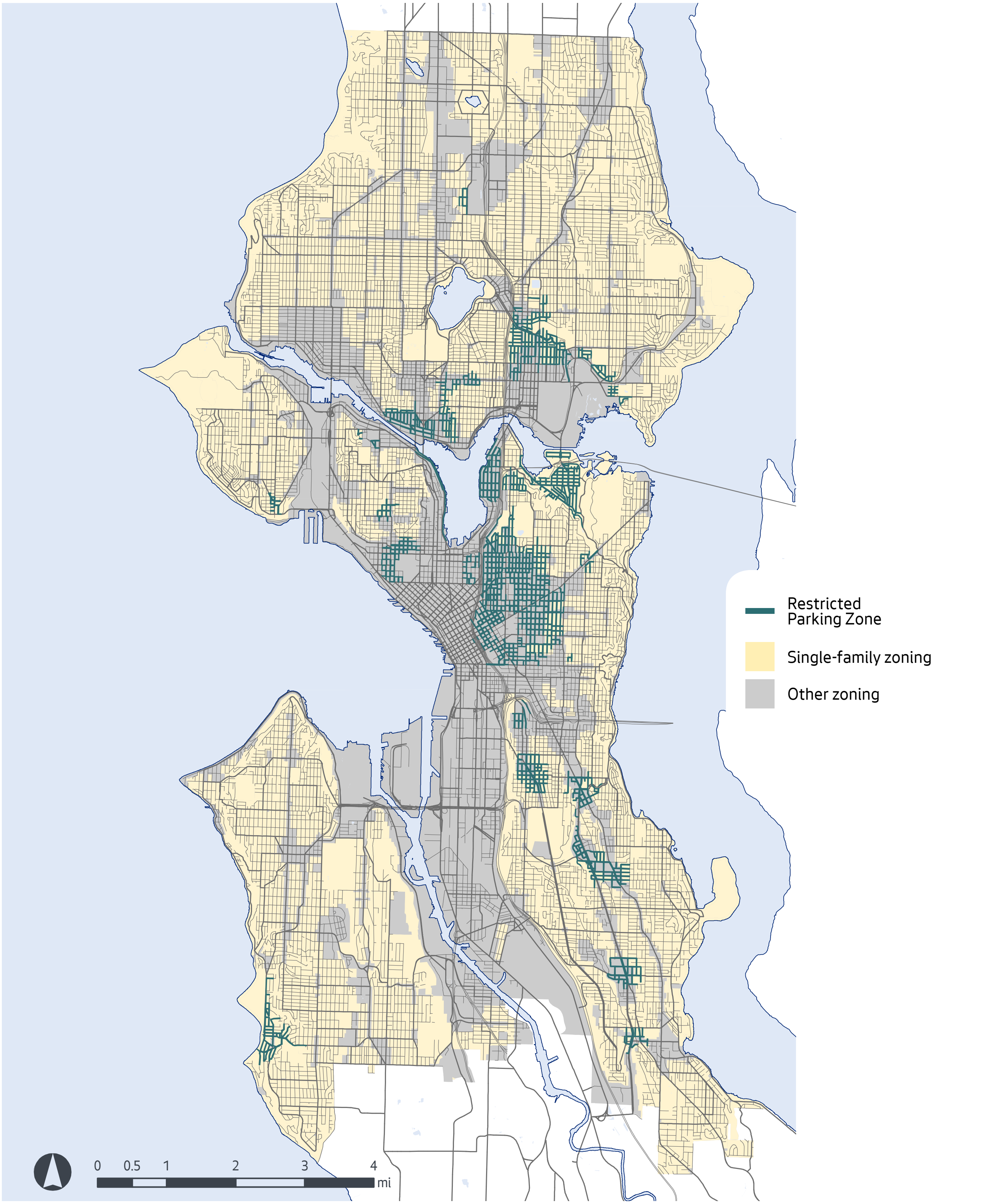
The City regulates both on-street and off-street parking. We regulate off-street parking by setting parking minimums and parking maximums in the Land Use Code that vary by land use and geography. We regulate on-street parking within the right-of-way by issuing on-street permits, charging by the hour, setting time limits, and defining load zones. Seattle's target for on-street parking occupancy is 70-85 percent utilization. The primary way we manage parking in single-family zones is to designate Restricted Parking Zones (RPZ).

RPZs have time-limited parking available to the public. Residents with eligible addresses can apply for a permit to use the curb parking in their neighborhood without time limits. The RPZ program was created to help ease parking congestion in residential neighborhoods around significant demand generators, while balancing the needs of all people to be able to use the public streets. Exhibit 4.4-1 identifies RPZs in the study area. A new RPZ may be considered if an area meets the following criteria:

- There must be a significant degree of parking by non-residents:
    - » 75 percent of parking spaces must be occupied
    - » at least 35 percent of the occupied spaces must be occupied by vehicles not belonging to residents
- A "traffic generator" needs to be identified. This means a large institution (such as a hospital or university), a business district, or high capacity transit stop that creates significant demand for long-term parking which spills onto nearby residential streets.
- At least 10 contiguous blocks (or 20 blockfaces) must be affected by the traffic generator

SDOT also considers other strategies, such as adding parking on both sides of a street where possible, or utilizing transportation demand management programs to manage parking.

Exhibit 4.4-1 Restricted Parking Zones in the Study Area



Parking Analysis Area

To understand the affected environment related to parking, and to inform the analysis of potential impacts from the proposed changes to the Land Use Code, we selected four study locations that provide a representative sample of neighborhoods where ADUs could be constructed. (See Appendix B for more details on the study locations.) We identified these four study locations by their general geographic location in the city: northeast, northwest, southeast, and southwest. The study locations represent a range of conditions found in single-family zones and include areas that vary by lot size; the presence of alleys, driveways, and sidewalks; and proximity to transit. We identified blocks with unrestricted parking, restricted parking, and no parking allowed. Since these areas represent a range of conditions and geography within Seattle, they provide a representative sample for the overall parking conditions throughout the study area. Our analysis focused on unrestricted parking spaces and their utilization. In residential areas, peak parking demand usually occurs overnight on a weeknight. As a result, we used weeknight overnight parking data to estimate parking utilization. For residential areas near neighborhood retail centers, peak on-street parking demand usually occurs on weekend afternoons.

On-Street Parking Types

Blocks with restricted parking impose limits on the amount of time that a vehicle can be parked in a space. Blocks with unrestricted parking do not have any imposed time limits. Blocks with no parking allowed do not allow parking for any vehicles.

This analysis relies on parking data previously collected by the Seattle Department of Transportation (SDOT) and data collected specifically for this project. For the northeast and northwest study locations, we collected data on parking supply and utilization for each block face using the methodology for data collection described in Tip 117 (SDOT 2011). SDOT collected parking supply and utilization data for the southeast and southwest study locations. While the study locations are not near large retail areas, we measured parking utilization on Saturdays to confirm that weekday overnight parking demand was the peak. The data we used for each of these geographic study locations included the following:

- ***Northeast and Northwest.*** We collected weekend overnight parking data on a Saturday.
- ***Southeast.*** We used parking data collected for a 2016 SDOT parking analysis that did not include weekend parking data (SDOT 2016).
- ***Southwest.*** We used SDOT data collected in September 2017 (SDOT 2017b).

Parking Supply

Parking supply is defined as the number of unrestricted on-street parking spaces. Exhibit 4.4-2 shows the number of blocks in each study location, the total supply of unrestricted on-street parking in the study location, and the average number of on-street parking spaces per block. Block length, driveways per block, and parking restrictions vary throughout the city. The average number of on-street parking spaces per block across all study locations is 22, ranging from 18 in the northwest study location to 27 in the southwest study location.

Parking Terminology

Parking supply is the number of unrestricted on-street parking spaces.

Parking utilization is the number of parked vehicles observed, divided by the number of unrestricted on-street parking spaces.

Parking availability is the total number of parking spaces available per block.

Exhibit 4.4-2 Parking Supply in Each Study Location

Study location	Blocks	Total on-street parking spaces	Average number of on-street parking spaces per block
Northeast	108	2,403	22
Northwest	118	2,115	18
Southeast	14	327	23
Southwest	99	2,682	27
Total	**339**	**7,527**	**22**

Parking Utilization

Parking utilization is defined as the number of parked vehicles, divided by the number of unrestricted on-street parking spaces. We calculated parking utilization per block by dividing the number of parked vehicles observed per block by the total number of spaces per block. We assumed that existing and future ADU residents park-on street, and that there is some amount of parking utilized by visitors to the area. Exhibit 4.4-3 shows parking utilization rates in each study location for weekday and weekend observations. Weekend parking utilization data was not available for the southeast location. Where both datasets were available, weekday and weekend utilization rates in each study location were similar and varied by three to seven percentage points. Weekday utilization rates were higher in the northeast, northwest, and southeast study locations and lower in the southwest study location.

Exhibit 4.4-3 Existing Parking Utilization

Study location	Weekday utilization	Weekend utilization
Northeast	53%	46%
Northwest	63%	57%
Southeast	78%	n/a[1]
Southwest	51%	54%
Overall	**56%**	**52%**[2]

1 Weekend parking data was not collected.
2 Total excludes southeast study location.

Exhibit 4.4-4 shows weekday parking utilization rates per block for each study location. Overall, 57 percent of blocks across the study locations had utilization rates above 50 percent. Compared to others, the southeast study location had a higher share of blocks with utilization rates of at least 75 percent.

Exhibit 4.4-4 Distribution of Parking Utilization Rates by Block during the Weekday

	Utilization			
Study locatoin	**Less than 50%**	**50-75%**	**75-90%**	**More than 90%**
Northeast	53%	37%	7%	3%
Northwest	31%	44%	17%	8%
Southeast	14%	36%	21%	29%
Southwest	49%	28%	13%	10%
Overall	**42%**	**37%**	**13%**	**8%**

Parking Availability

Parking availability is defined as the total number of parking spaces available per block. We calculated parking availability by subtracting the estimated future parking demand from total on-street parking supply. The result represented the existing capacity for additional on-street parking per block. While parking utilization rates generally suggest the number of parking spaces available, calculating parking availability is necessary to determine the potential impact of additional on-street parking demand. Exhibit 4.4-5 shows the percentage share of blocks in each study location by the number of available on-street parking spaces. Twenty-one percent of blocks in the southeast study location showed over capacity in our analysis, meaning that existing parking demand exceeds supply, the most of any study location. Across all study locations, 9.8 parking spaces are available per block on average (including blocks at or over capacity).

Exhibit 4.4-5 Percentage Share of Blocks by Number of Available Parking Spaces and Study Location

		Parking spaces available by block						
Study location	**Average parking availability per block**	**Fewer than zero[1]**	**0**	**1-5**	**6-10**	**11-15**	**15-25**	**> 25**
Northeast	10.6%	0%	2%	20%	30%	27%	20%	1%
Northwest	6.7%	1%	4%	46%	24%	20%	4%	1%
Southeast	5.1%	21%	7%	36%	21%	0%	7%	7%
Southwest	13.2%	4%	4%	25%	16%	10%	24%	16%
Overall	9.8%	**2%**	**4%**	**31%**	**23%**	**18%**	**15%**	**6%**

1 Parking capacity on a block is estimated based on an assumed vehicle length and assumed buffers around fire hydrants, driveways, and at intersections. Occasionally, vehicle owners are able to fit more vehicles into a block than the estimated capacity, either legally or illegally. This demonstrates strong demand for parking on that block.

TRANSPORTATION

The Transportation Element of the City's Comprehensive Plan guides transportation investments to equitably serve the City. The Comprehensive Plan EIS describes existing transportation systems for automobiles, transit, bicycles and pedestrians in Seattle. Because the proposed Land Use Code changes evaluated in this EIS would affect an area included in the study area for the Comprehensive Plan EIS, we incorporate that information by reference in this EIS and summarize the pertinent details below. See Section 3.7 — Transportation, of the Comprehensive Plan EIS for details.

The City has also adopted plans for individual travel modes that include strategies and identify projects to improve transportation choices in the city. These include the Pedestrian Master Plan, the Bicycle Master Plan, and the Transit Master Plan. This section describes the existing transportation bicycle, transit, and vehicle network and describes transit services in Seattle.

Pedestrian Network

The City's pedestrian network is composed of sidewalks, crosswalks, staircases, pedestrian bridges, curb ramps and trails. The 2017 Pedestrian Master Plan (PMP) is a 20-year blueprint to achieve the City's vision of Seattle as the most walkable and accessible city in the nation. The PMP states that Seattle has approximately 5,500 marked crosswalks, 33,600 blockfaces of sidewalks, and 27,300 curb ramps (SDOT 2014). The study area contains approximately 1,000 marked crosswalks, 9,700 blockfaces of sidewalks, and 10,000 curb ramps.

Across the study area, about 30 percent of blockfaces have unimproved sidewalks. These locations tend to be in northwest and northeast Seattle north of NE 85th Street, near the southwest city boundaries in the West Seattle Sector, in sections of the Duwamish Sector and the edges of the Southeast Seattle Sector. Exhibit 4.4-6 identifies blockfaces within the study area that have unimproved sidewalks and highlights those areas that are included in the Priority Investment Network described below.

The PMP designates a Priority Investment Network to prioritize the City's pedestrian improvement investments, with a focus on connections to schools and frequent transit stops. The prioritization identifies areas most in need based on areas with high potential pedestrian demand, equity, and corridor function. Exhibit 4.4-7 shows the Priority Investment Network throughout the study area. The portions of the Priority Investment Network located outside the study area also benefit people walking to and from areas in single-family zones (the study area) by connecting those neighborhoods to local business districts, schools, transit stops, and bicycle facilities.

Exhibit 4.4-6 Unimproved Sidewalks in the Study Area

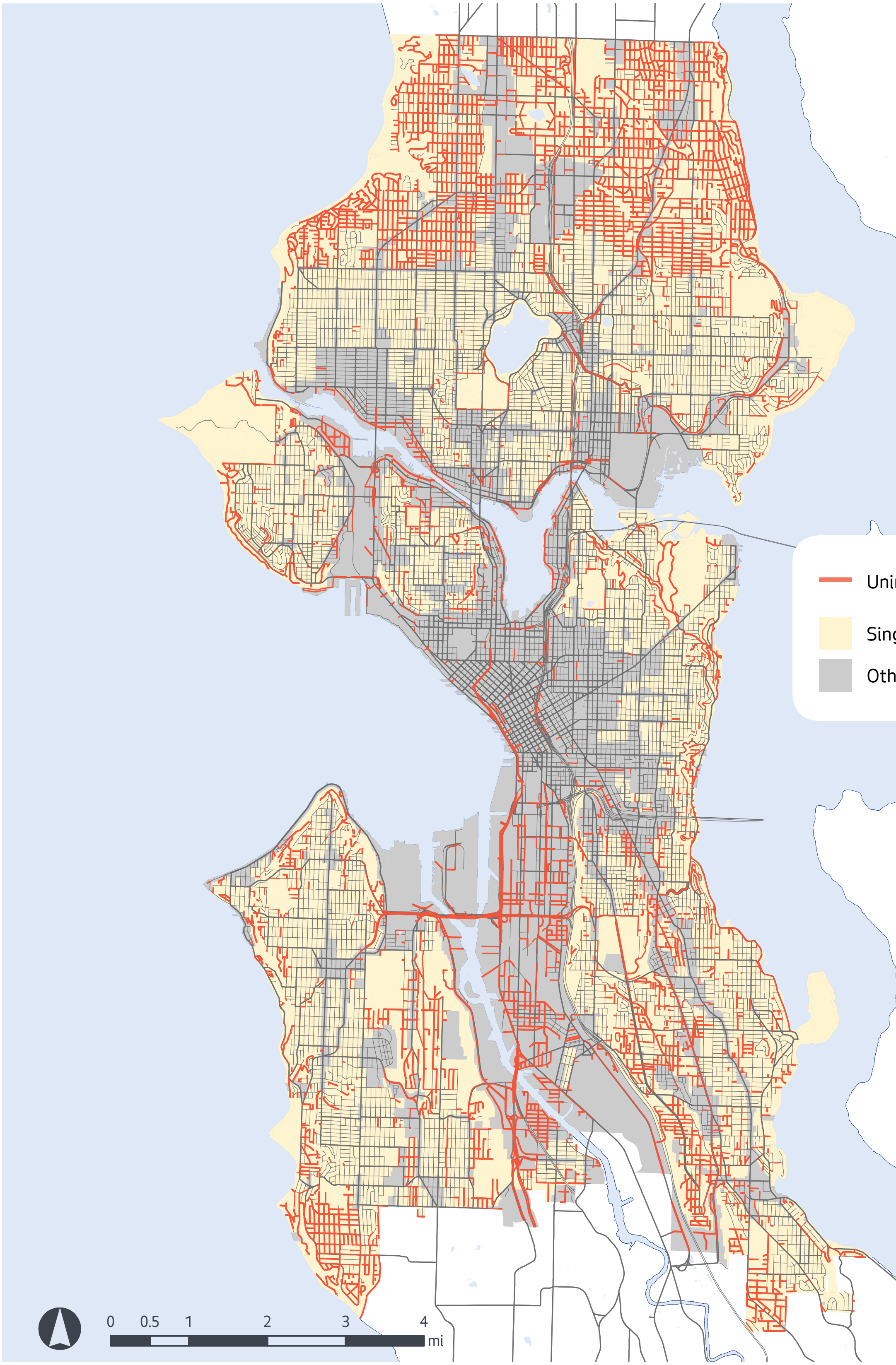
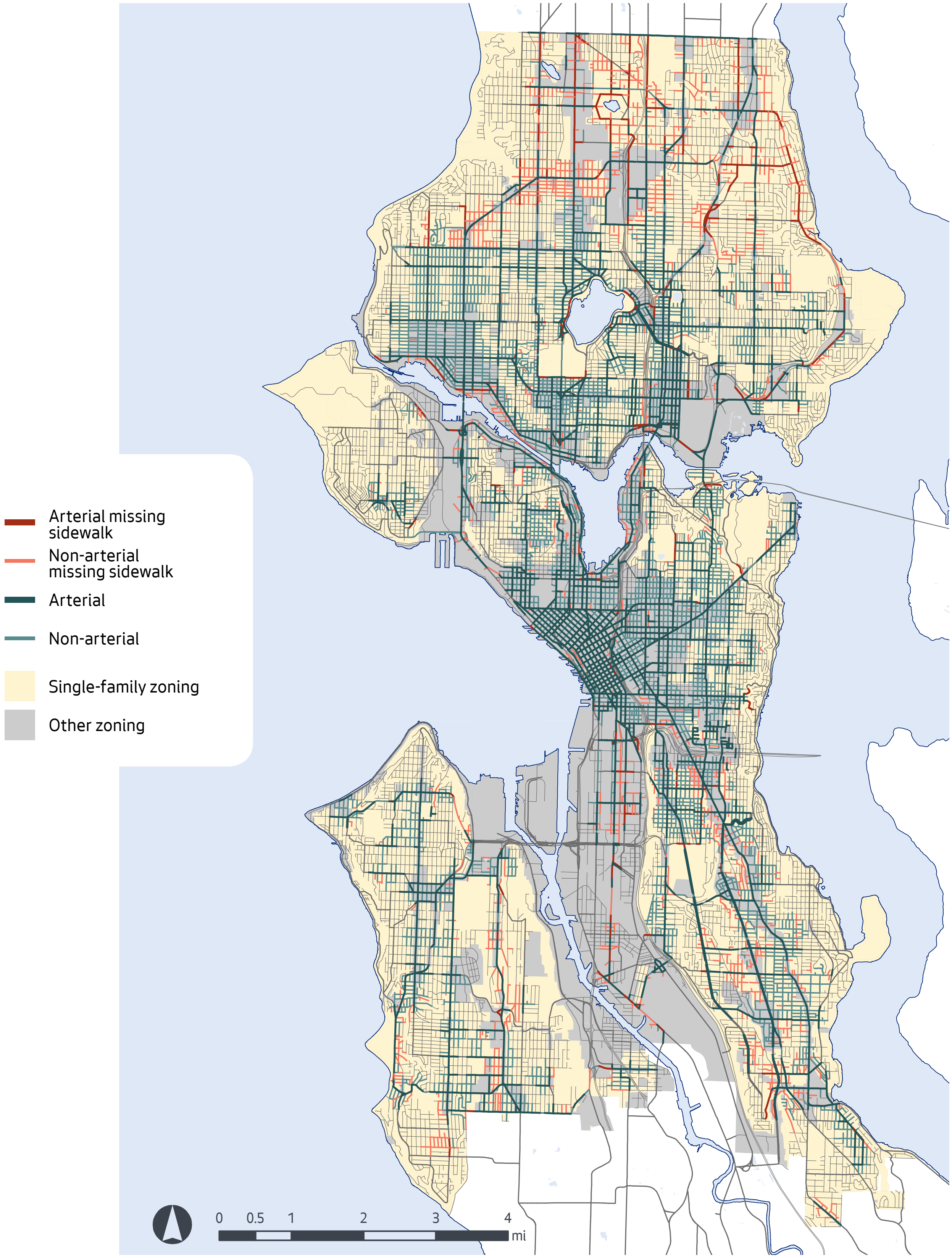


Exhibit 4.4-7 PMP Priority Investment Areas in the Study Area



Bicycle Network

The City has more than 300 miles of bicycle facilities, including off-street facilities, protected bike lanes, neighborhood greenways, and shared street bicycle facilities ("sharrows"), and signed routes. Bicycle facilities exist throughout the city, of which approximately 100 miles are located within the study area (see Exhibit 4.4-8). The Seattle Bicycle Master Plan (BMP) identifies projects and programs to be implemented from 2014 to 2033 to achieve the vision that riding is a bicycle a comfortable and integral part of daily life in Seattle for people of all ages and abilities (SDOT 2017b). Exhibit 4.4-9 identifies planned bicycle facilities, with approximately 100 miles of protected bicycle lanes and nearly 250 miles of neighborhood greenways planned for throughout the city.

Exhibit 4.4-8 Existing Bicycle Network

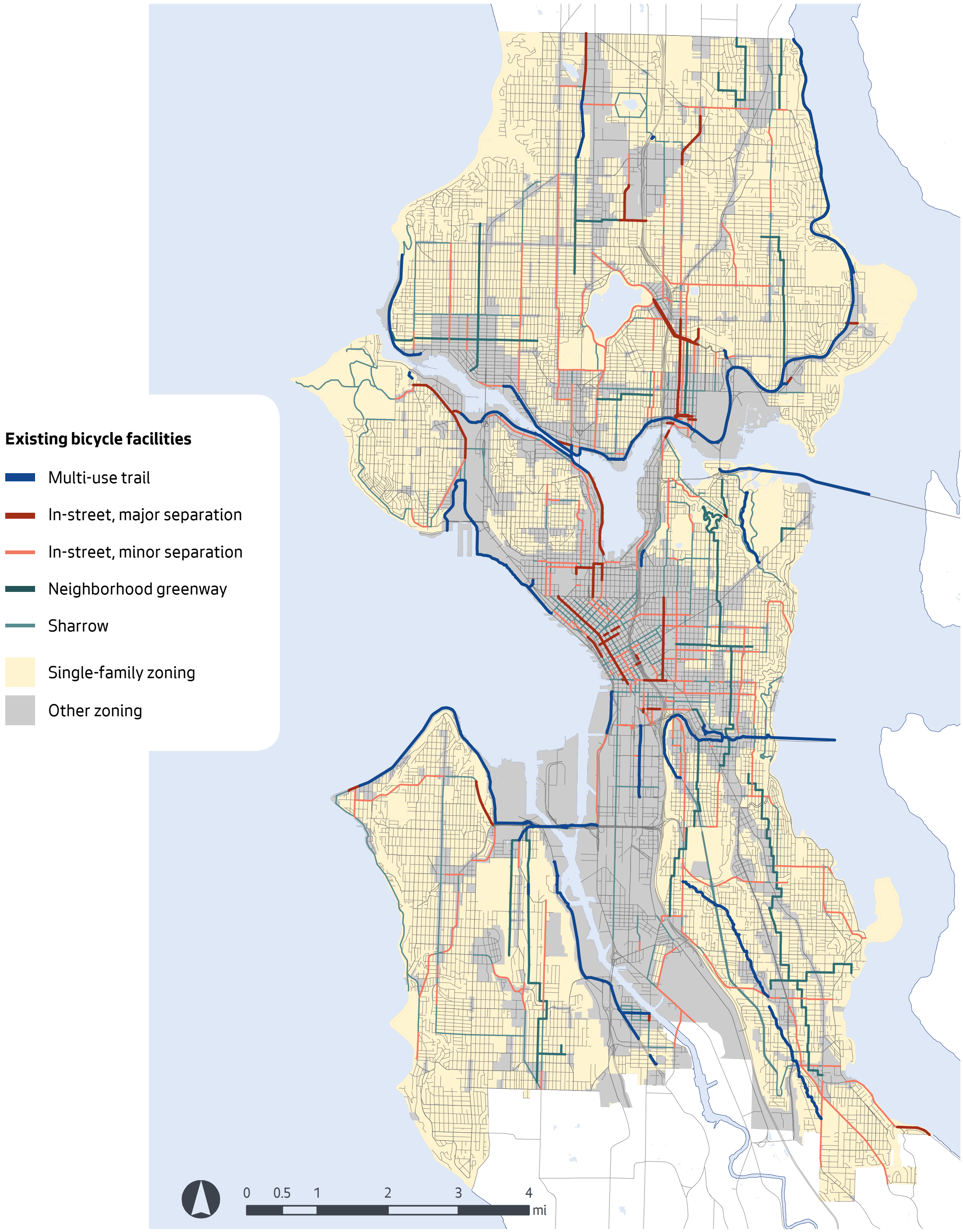
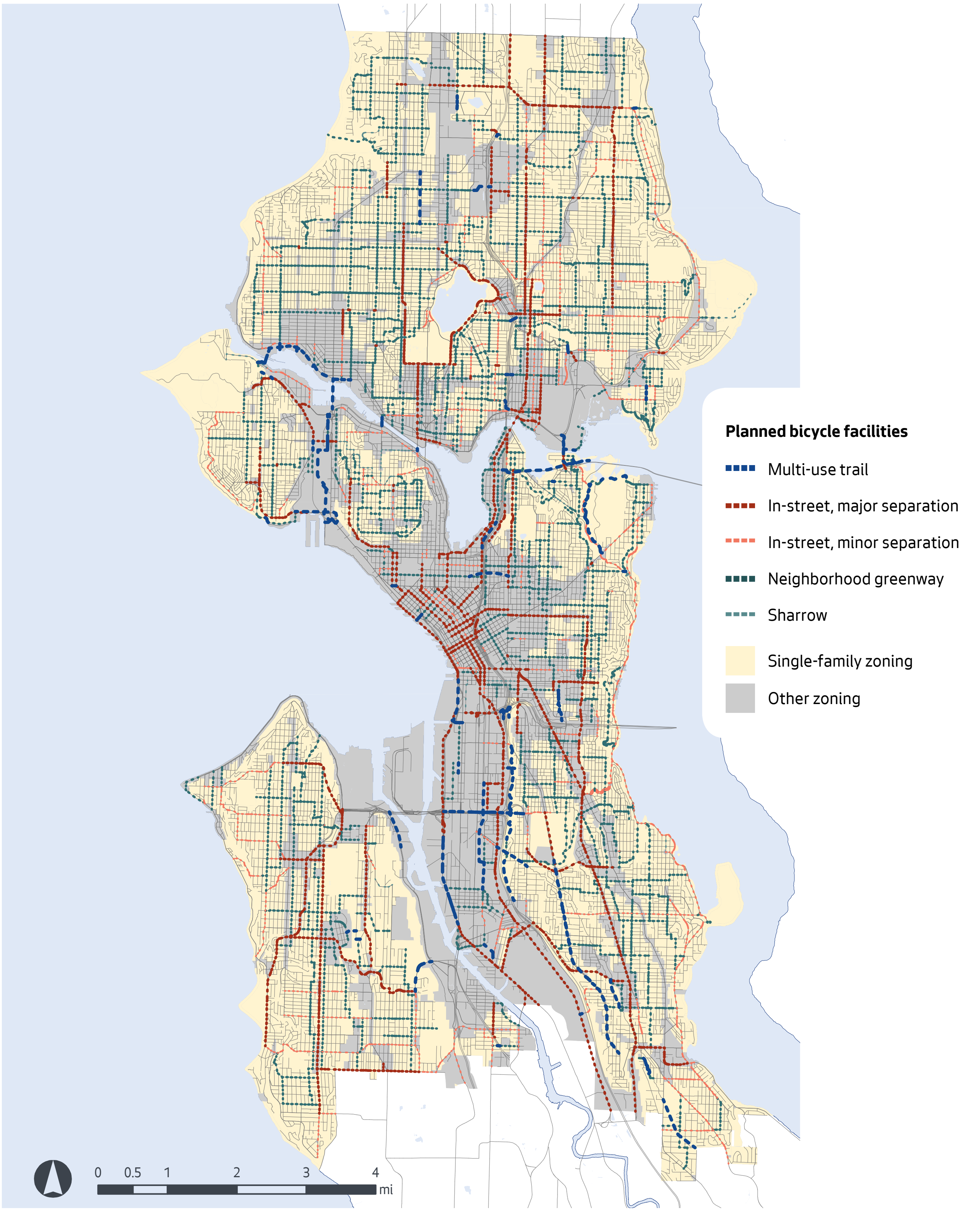


Exhibit 4.4-9 Planned Bicycle Network



Transit Services

Seattle receives public transit services from King County Metro, Sound Transit, Community Transit, and the City of Seattle. Exhibit 4.4-10 shows the existing transit network. The Transit Master Plan (TMP) is a 20-year plan that outlines the investments needed to meet Seattle's transit demand through 2030 (SDOT 2016a). The City has designated 10 High Capacity Transit (HCT) Corridors and eight Priority Bus Corridors, along with Link light rail and the streetcar system. These corridors are prioritized for capital investments to ensure mobility within Seattle, one of the objectives outlined in the TMP.

SDOT identifies transit service that meets certain levels of frequency:

- 10-minute or "very frequent" service: at least one route serves this stop with an average of six trips per hour in each direction between 6:00 a.m. and 7:00 p.m. and no individual hour with fewer than four trips
- 15-minute or "frequent" service: at least one route serves this stop with an average of four trips per hour in each direction between 6:00 a.m. and 7:00 p.m. and no individual hour with fewer than three trips[1]
- Other stops throughout the city provide some level of transit service, ranging from frequency slightly less than described above to only a few trips per day

SDOT considers light rail stations to provide 10-minute service and streetcar stations to provide 15-minute service.

1 If a stop meets the 10-minute definition, it also meets the 15-minute definition.

Exhibit 4.4-10 Existing Transit Network

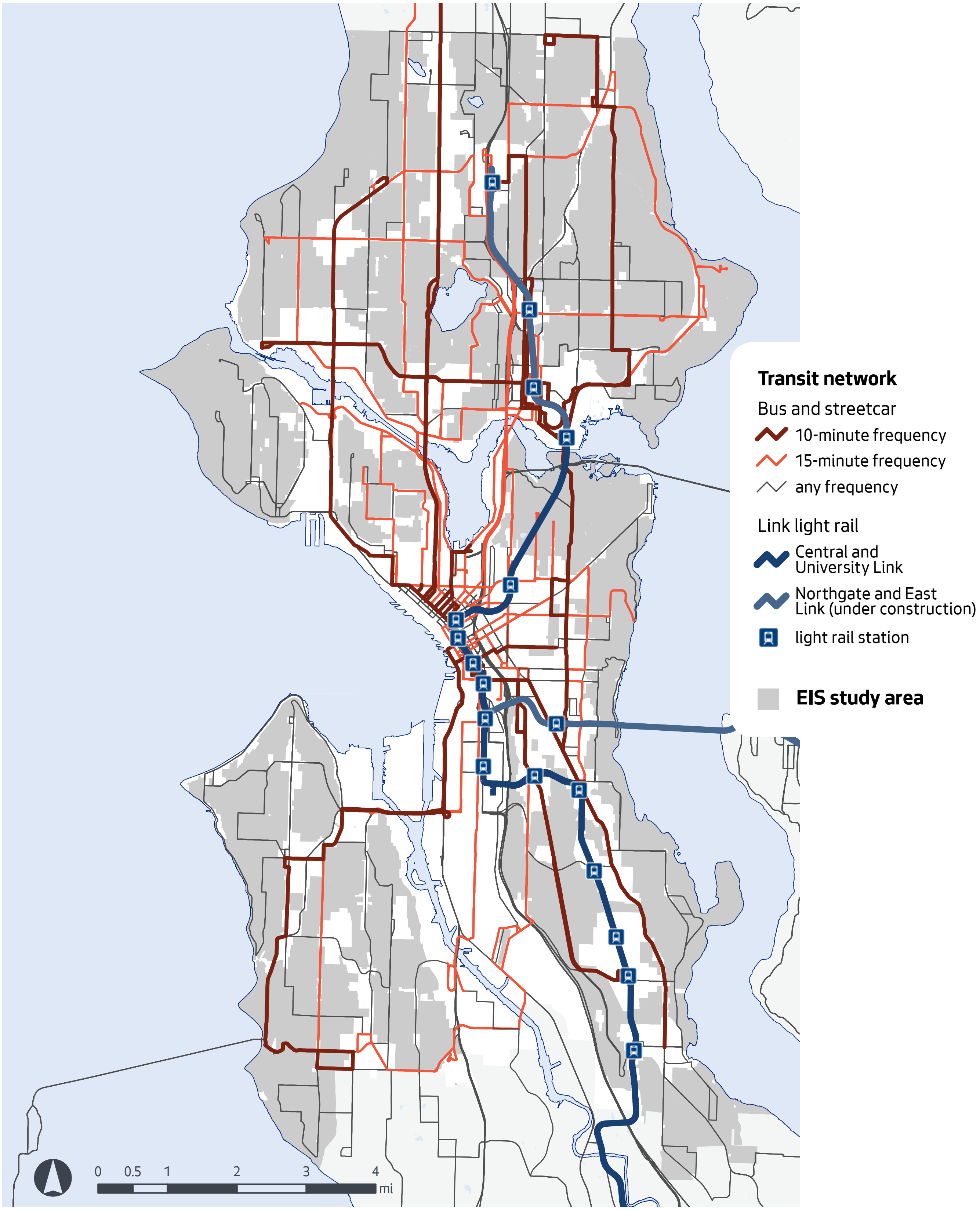
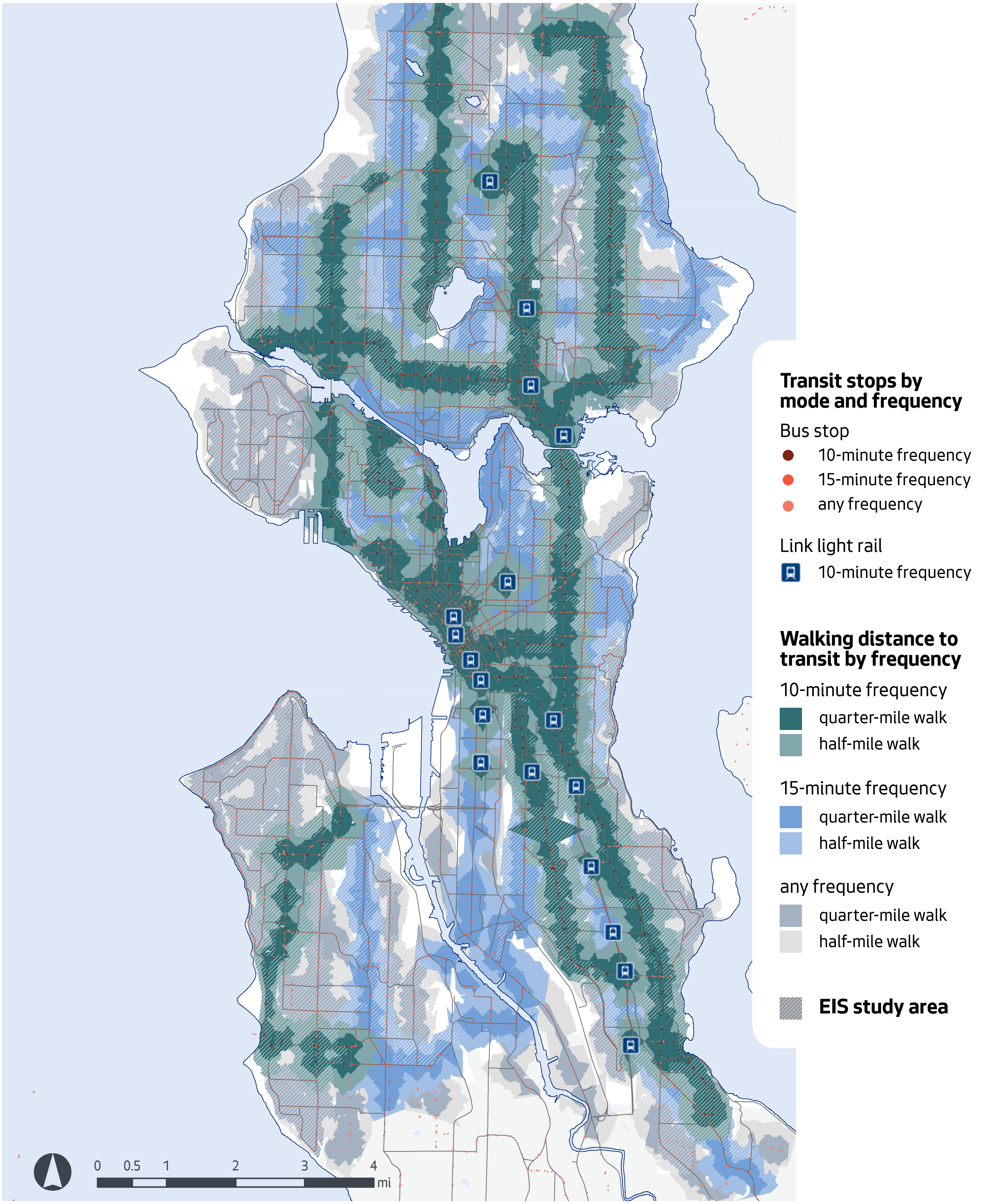


Exhibit 4.4-11 lists the percentage of study area parcels in single-family residential use within quarter- and half-mile walking distances of transit stops according to their frequency. Almost half of the households in the study area are within a half-mile walk of very frequent service, where transit comes on average every 10 minutes throughout the day. Likewise, almost half of households are even closer (within a quarter-mile walk) of transit service with 15-minute frequency. Overall, nearly the entire study area is within a short walk of a bus stop, though frequency at some stops could range from a few buses an hour to a just a few buses total in a day. Exhibit 4.4-12 shows areas within quarter- and half-mile walking distances of transit according to frequency.

Exhibit 4.4-11 Study Area Parcels by Proximity to Transit

	Number of parcels	% of study area parcels
In study area and in single-family residential use	138,531	100%
Very frequent transit service		
Within a quarter-mile walk of transit with 10-minute service	30,496	22%
Within a half-mile walk of transit with 10-minute service	68,608	50%
Frequent transit service		
Within a quarter-mile walk of transit with 15-minute service	65,947	48%
Within a half-mile walk of transit with 15-minute service	100,880	73%
Any transit service		
Within a quarter-mile walk of any transit stop	116,126	84%
Within a half-mile walk of any transit stop	135,949	98%

Exhibit 4.4-12 Walking Distance to Transit



Roadway Network

Seattle has about 1,540 lane-miles of arterial streets, 2,410 lane-miles of non-arterial streets, 122 bridges, and 1,070 signalized intersections. Much of Seattle's transportation network is constrained by the waterways in and around the city. The Ship Canal divides north Seattle from the rest of the city and has only six crossing points: the Ballard Bridge, the Fremont Bridge, State Route (SR) 99, Interstate 5 (I-5), the University Bridge, and the Montlake Bridge. Likewise, West Seattle is separated by the Duwamish Waterway and accessible via the West Seattle Bridge, Spokane Street Bridge, the 1st Ave S Bridge, and the South Park Bridge.

I-5 runs north-south throughout the city, serving both local and regional travelers. SR 99 also runs north-south through the city and tends to serve more locally focused trips. To the east, there are two bridges across Lake Washington: SR 520 and Interstate 90 (I-90). Other key state routes within the city include SR 522 connecting to the northeast and SR 509 connecting south to Sea-Tac Airport. City arterials generally follow a grid pattern. The City has designated a major truck street network throughout Seattle that carries a substantial amount of freight traffic. The state routes, interstates, and major arterials linking freight destinations are part of this network.

4.4.2 Impacts

Parking Analysis Methodology

We evaluated the potential parking impacts associated with the proposed Land Use Code changes by comparing the existing availability of on-street parking with the expected increase in demand for on-street parking under each alternative. To evaluate the change in demand, we first estimated the vehicle ownership rates for residents in ADUs. Next, we used the results of the housing analysis in Section 4.1, Housing and Socioeconomics, to determine the expected number of new ADUs in the study locations. We then applied the vehicle ownership rates, assumed each vehicle would park on the street, and evaluated the resulting change in parking availability. Our analysis focused on the expected outcomes in each study location and then evaluated the results in the context of the entire EIS study area.

Vehicle Ownership for ADU Residents

Data about the demographics and travel characteristics for current ADU residents in Seattle was not available; therefore, to estimate the characteristics of Seattle's ADU residents, we reviewed:

- A 2013 survey that Portland State University (PSU) conducted of ADU owners in three Oregon communities (Portland, Eugene, and Ashland) that provided details about the characteristics of their ADU residents (Horn et al. 2013). For this analysis, we utilized only the results from Portland, because Portland's land use and transportation characteristics resemble Seattle's more closely than those of Eugene or Ashland.
- The 2012–2016 American Community Survey (ACS) for Portland and Seattle.

These reports provided details about vehicle ownership levels and household characteristics. The complete methodology for estimating vehicle ownership levels for ADU residents is outlined in detail in Appendix B. Based on this analysis, we determined that each additional ADU would generate between 1.0 and 1.3 additional vehicles using on-street parking under all alternatives. For purposes of analysis, we assumed that all ADU residents would park on the street even though Alternatives 1 and 3 would require off-street parking for new ADUs.

Number of Anticipated ADUs in the Study Locations

Based on the parcel typology described in Section 4.1, Housing and Socioeconomics, we classified parcels in each study location according to their ADU eligibility status. This classification reflects Land Use Code regulations for development in single-family zones, requirements for vehicle access, and lot size and configuration. We considered any parcel of type A, B, C, or D to be "eligible" to have an ADU and any parcel of type Z to be "ineligible." To estimate parking demand for each alternative, we drew on the 2018–2027 ADU production estimates generated using the pro forma analysis and behavioral models described in Appendix A. Those estimates indicated that between 1.5 and 3.0 percent of parcels in each study location could have an ADU, depending on the characteristics of each parcel type. In our parking analysis, we applied the higher end of this range of ADU production rates (3.0 percent) for all eligible parcels. Because several development standards would vary across alternatives, including the number of ADUs allowed on a lot, we made the following assumptions about the number of lots that would have ADUs under each alternative:

- Alternative 1 (No Action): 3 percent of eligible parcels would have 1 ADU.
- Alternative 2: 3 percent of eligible parcels would have 2 ADUs.
- Alternative 3: 1.5 percent of all eligible parcels would develop 1 ADU and 1.5 percent would develop 2 ADUs.

These rates let us estimate how many new ADUs would be created in our study locations under each alternative. Exhibit 4.4-13 shows the estimated number of parcels in each study location eligible for an ADU based on the parcel typology. The northeast study location would have the most eligible parcels (1,141) and the southeast study location the fewest (127). Exhibit 4.4-13 also shows the number of ADUs anticipated under each alternative.

Exhibit 4.4-13 ADU-Eligible Parcels in Each Study Location

		Anticipated number of ADUs produced		
Study location	**Number of ADU-eligible parcels**	**Alternative 1 (No Action)**	**Alternative 2**	**Alternative 3**
Northeast	1,141	34	68	51
Northwest	952	29	58	42
Southeast	127	4	8	6
Southwest	787	24	48	36
Total	3,007	**91**	**182**	**135**

Parking Analysis Results

We calculated the expected change in parking availability in each study location using the number of ADUs anticipated under each alternative and the anticipated rate of vehicle ownership per ADU. We then compared this increase in parking availability to the existing parking supply in each study location, as shown in Exhibit 4.4-14.

Exhibit 4.4-14 Results by Study Location

			Existing conditions		After ADU production	
	ADUs produced	Vehicles added	Spaces available	Parking utilization	Spaces available	Parking utilization
Northeast Study Location						
Alternative 1	34	39	1,140	53%	1,101	53%
Alternative 2	68	78	1,140	53%	1,062	56%
Alternative 3	51	59	1,140	53%	1,081	55%
Northwest Study Location						
Alternative 1	29	35	793	63%	758	64%
Alternative 2	58	70	793	63%	723	66%
Alternative 3	42	51	793	63%	742	65%
Southeast Study Location						
Alternative 1	4	5	72	78%	67	80%
Alternative 2	8	10	72	78%	62	81%
Alternative 3	6	8	72	78%	64	80%
Southwest Study Location						
Alternative 1	24	24	1,311	51%	1,287	52%
Alternative 2	48	49	1,311	51%	1,262	53%
Alternative 3	36	37	1,311	51%	1,274	52%

Transportation Analysis Methodology

Our methodology for evaluating potential impacts to transportation considered how overall population changes anticipated under each alternative would affect the service levels of the existing transportation networks. Generally, we anticipate an impact if a transportation network would not be able to accommodate an increase in demand or if development were to displace established transportation routes. We determined impacts by comparing expected population changes and impacts relative to those considered in the Comprehensive Plan EIS. The Comprehensive Plan EIS thoroughly analyzed the potential impacts to the road, bicycle, pedestrian, and transit networks from a projected growth of 70,000 households in the city through 2035, including approximately 8,400 households in areas outside designated urban villages. Any population change associated with ADU production under all three alternatives in this EIS would fall within the growth considered in the Comprehensive Plan EIS. In other words, the proposed Land Use Code changes are not anticipated to induce new growth in the city, but rather increased ADU production would help meet existing and future demand for housing. The proposed Land Use Code changes would not result in development outside single-family zones; therefore, no displacement of established transportation routes would occur, and we do not discuss it further in this analysis.

Impacts of Alternative 1 (No Action)

Parking

Assuming three percent of eligible parcels would have one ADU constructed under Alternative 1 (No Action), 91 ADUs would be created and 104 new vehicles added across all four study locations. In the southeast study location, we estimated that four new ADUs would generate five new vehicles that would occupy six percent of the available parking spaces. This would reduce the parking supply from 72 to 67 available spaces. Due to their size, we expect the northeast, northwest, and southwest study locations to have more total parcels with ADUs, but new vehicles from ADU residents would occupy a smaller percentage of available parking spaces than in the southeast study location (four percent for the northeast and northwest locations; two percent for the southwest). Under Alternative 1 (No Action), increased parking demand resulting from ADU production in the four study locations would not exceed or approach existing on-street parking availability.

For purposes of analysis, we assumed that on-street parking utilization would not become an issue until parking utilization exceeded 85 percent. None of the four study locations would exceed the 85-percent threshold under Alternative 1 (No Action). As described above, the four study locations provide a representative sample with which to compare the potential impacts to the larger study area for this EIS. Since none of the study locations exceed the 85 percent threshold, we conclude that ADU production would not have an adverse impact on the availability of on-street parking throughout the study area.

Although none of the four study locations exceed the 85 percent threshold, there are likely some specific blocks within the study area where on-street parking utilization currently exceeds parking supply and would be more sensitive to changes in local population. The degree of the deficiency and impacts experienced in any given neighborhood depends on many factors including the choices an individual makes about parking on- or off- the street when there are existing off-street parking spaces provided (i.e., in a driveway or a garage that are required or provided by choice). The city will continue to respond to changes to parking supply in specific areas that currently have or are projected to have high parking utilization.

Transportation

As described previously, the study area, potentially affected resources, and timeframe for this EIS all fall within what was considered in the Comprehensive Plan EIS. Therefore, the impacts to the transportation system would not differ from those described in the Comprehensive Plan EIS, which found that there would not be significant impacts to the transportation network. Further, the City has identified plans to improve the transit, pedestrian, and bicycle network through its Move Seattle, Pedestrian Master Plan, Bicycle Master Plan, Transit Master Plan, and other planning efforts. These plans are being implemented and are expected to continue to be implemented under all alternatives.

Impacts of Alternative 2

Parking

In Alternative 2, we assumed that three percent of eligible parcels would have two ADUs, yielding 182 ADUs and 207 new vehicles across all study locations. Like Alternative 1 (No Action), we estimate that the share of available parking used to satisfy the increase in parking demand that new

ADU residents would generate would be highest in the southeast study location (14 percent). The overall utilization of available parking spaces under Alternative 2 would range from four to 14 percent across all four study locations. Under Alternative 2, increased parking demand resulting from ADU production in the four study locations would not exceed existing on-street parking availability.

For purposes of analysis, we assumed that on-street parking utilization would not become an issue until parking utilization exceeded 85 percent. None of the four study locations would exceed the 85-percent threshold under Alternative 2. As described above, the four study locations provide a representative sample with which to compare the potential impacts to the larger study area for this EIS. Since none of the study locations exceed the 85 percent threshold, we conclude that ADU production would not have an adverse impact on the availability of on-street parking throughout the study area.

Although none of the four study locations exceed the 85 percent threshold, there are likely some specific blocks within the study area where on-street parking utilization currently exceeds parking supply and would be more sensitive to changes in local population. The degree of the deficiency and impacts experienced in any given neighborhood depends on many factors including the choices an individual makes about parking on- or off- the street when there are existing off-street parking spaces provided (i.e., in a driveway or a garage that are required or provided by choice). The city will continue to respond to changes to parking supply in specific areas that currently have or are projected to have high parking utilization.

Transportation

As described previously, the study area, potentially affected resources, and timeframe for this EIS all fall within what was considered in the Comprehensive Plan EIS. Therefore, the impacts to the transportation system would not differ from those described in the Comprehensive Plan EIS, which found that there would not be significant impacts to the transportation network. Further, the City has identified plans to improve the transit, pedestrian, and bicycle network through its Move Seattle, Pedestrian Master Plan, Bicycle Master Plan, Transit Master Plan, and other planning efforts. These plans are being implemented and are expected to continue to be implemented under all alternatives.

Impacts of Alternative 3

Parking

In Alternative 3, we assumed that 1.5 percent of eligible parcels would have at least one ADU and 1.5 percent of eligible parcels would develop two ADUs. This would yield a total of 135 ADUs and 155 new vehicles across all study locations. The results under Alternative 3 were nearly identical to Alternative 1 (No Action). The share of available parking spaces used to satisfy new parking demand from ADU residents would range from three percent in the southwest study location to 11 percent in the southeast study location. Under Alternative 3, the increased parking demand resulting from ADU production in the four study locations would not exceed the existing on-street parking availability.

For purposes of analysis, we assumed that on-street parking utilization would not become an issue until parking utilization exceeded 85 percent. None of the four study locations would exceed the 85-percent threshold under Alternative 3. As described above, the four study locations provide a representative sample with which to evaluate the potential impacts to the larger study area for this EIS. Since none of the study locations exceed the 85 percent threshold, we conclude that ADU production would not have an adverse impact on the availability of on-street parking throughout the study area.

Although none of the four study locations do not exceed the 85 percent threshold, there are likely some specific blocks within the study area where on-street parking utilization currently exceeds parking supply and would be more sensitive to changes in local population. The degree of the deficiency and impacts experienced in any given neighborhood depends on many factors including the choices an individual makes about parking on- or off- the street when there are existing off-street parking spaces provided (i.e., in a driveway or a garage that are required or provided by choice). The city will continue to respond to changes to parking supply in specific areas that currently have or are projected to have high parking utilization.

Transportation

As described previously, the study area, potentially affected resources, and timeframe for this EIS all fall within what was considered in the Comprehensive Plan EIS. Therefore, the impacts to the transportation system would not differ from those described in the Comprehensive

Plan EIS, which found that there would not be significant impacts to the transportation network. Further, the City has identified plans to improve the transit, pedestrian, and bicycle network through its Move Seattle, Pedestrian Master Plan, Bicycle Master Plan, Transit Master Plan, and other planning efforts. These plans are being implemented and are expected to continue to be implemented under all alternatives.

4.4.3 Mitigation Measures

The analysis in this section identifies minor adverse impacts that may occur on specific blocks within the study area where on-street parking demand exceeds supply, but it does not identify these as potential significant adverse impacts, meaning no mitigation measures are required. However, the City will continue to monitor for any changes to parking supply in specific areas that are currently or projected to exceed available supply. If issues are identified, the City will rely upon use of regulations in its municipal code, including Vehicles and Traffic (Title 11) and Land Use Code (Title 23), and continued implementation of RPZs in areas that meet the eligibility requirements. Further, the City will continue to implement plans to improve the transit, pedestrian, and bicycle network.

4.4.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts are anticipated from any of the alternatives considered in this EIS.

4.5 Public Services & Utilities

This section analyzes the potential impacts to public services and utilities from the Land Use Code changes under each alternative of the proposed action. The analysis of the potential impacts to public services and utilities in the EIS for the Seattle 2035 Comprehensive Plan (Seattle 2015 and Seattle 2016) is incorporated by reference into this EIS. The Comprehensive Plan EIS and this EIS both consider the same question: How does projected growth in the city affect the ability of public services and utilities to provide adequate service? The Comprehensive Plan EIS thoroughly analyzed the potential impacts to public services and utilities from a projected growth of 70,000 households in the city through 2035, including approximately 8,400 households in areas outside designated urban villages. Since the study area, potentially affected resources, and timeframe for this EIS all fall within what was considered in the Comprehensive Plan EIS, we considered the estimated increase in households from the proposed Land Use Code changes and evaluated the impacts in the context of the changes analyzed in the Comprehensive Plan EIS

4.5.1 Affected Environment

The Comprehensive Plan EIS describes the existing service providers and service levels for police, fire and emergency medical, public schools, water, sewer, stormwater, and electricity in Seattle. Because the proposed Land Use Code changes evaluated in this EIS would affect an area included in the study area for the Comprehensive Plan EIS, we incorporate that information by reference in this EIS and summarize the pertinent details below. For details, see Section 3.8 – Public Services and Section 3.9 – Utilities of the Comprehensive Plan EIS.

FIRE AND EMERGENCY MEDICAL SERVICES

Demand for fire and emergency medical services (EMS) is generally estimated to increase proportionally with population growth. The City has an existing network of neighborhood fire stations that serve the current population. The Seattle Fire Department (SFD) has plans in place to accommodate the anticipated growth of 70,000 households outlined in the Comprehensive Plan EIS. See Section 3.8 – Public Services of the Comprehensive Plan EIS for additional details. Exhibit 4.5-1 shows the locations of SFD fire stations throughout Seattle.

POLICE SERVICES

Demand for police service is not based solely on changes in population. Geographic characteristics of the city and the types of service calls received affect the demand for police services, including patrols on foot, on bikes, and in cars. The Seattle Police Department (SPD) has plans in place to accommodate the anticipated growth of 70,000 households outlined in the Comprehensive Plan EIS. See Section 3.8 – Public Services of the Comprehensive Plan EIS for additional details. Exhibit 4.5-2 shows how SPD provides police services to precincts, sectors, and beats

Exhibit 4.5-1 Seattle Fire Department Stations

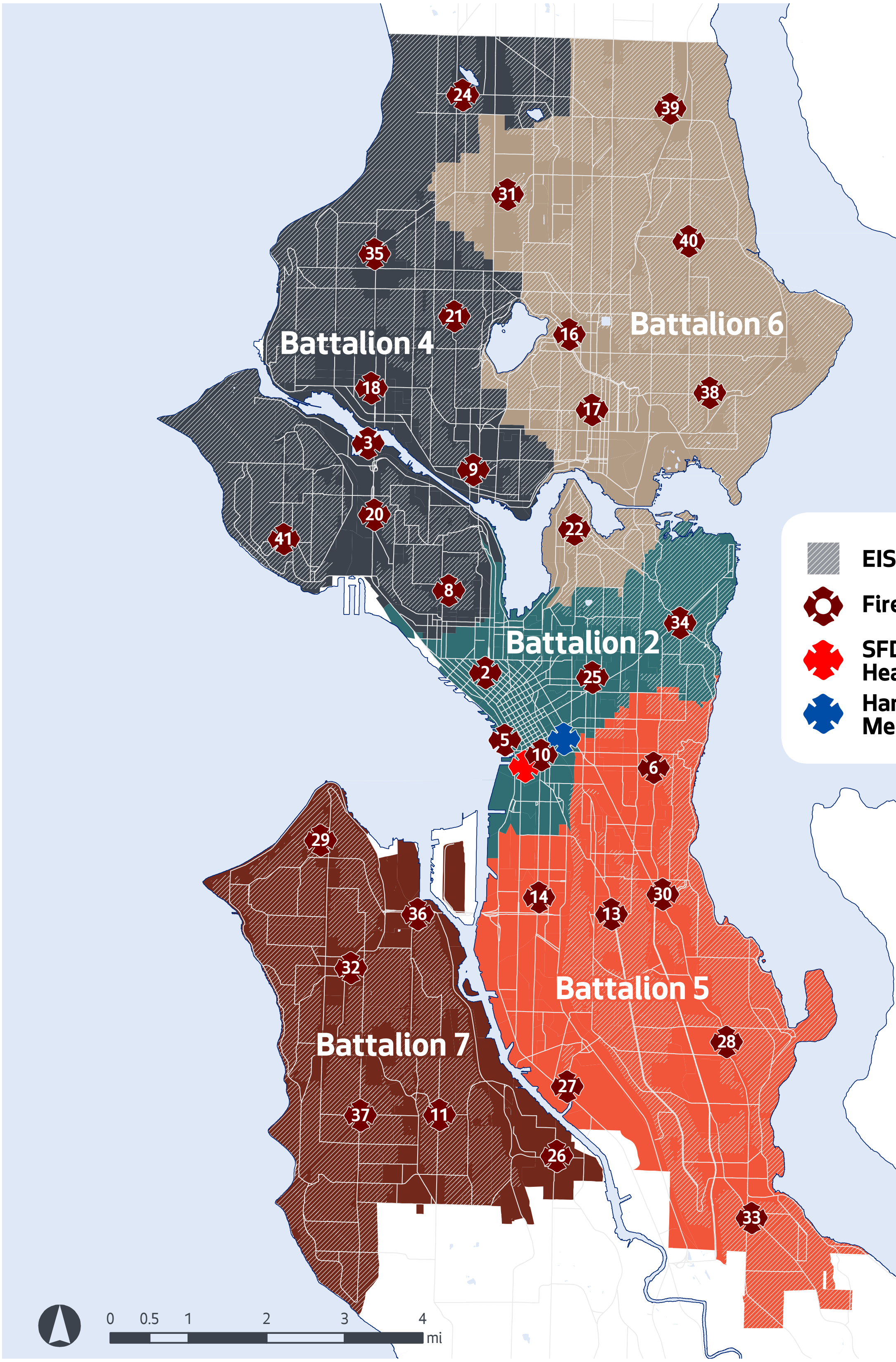
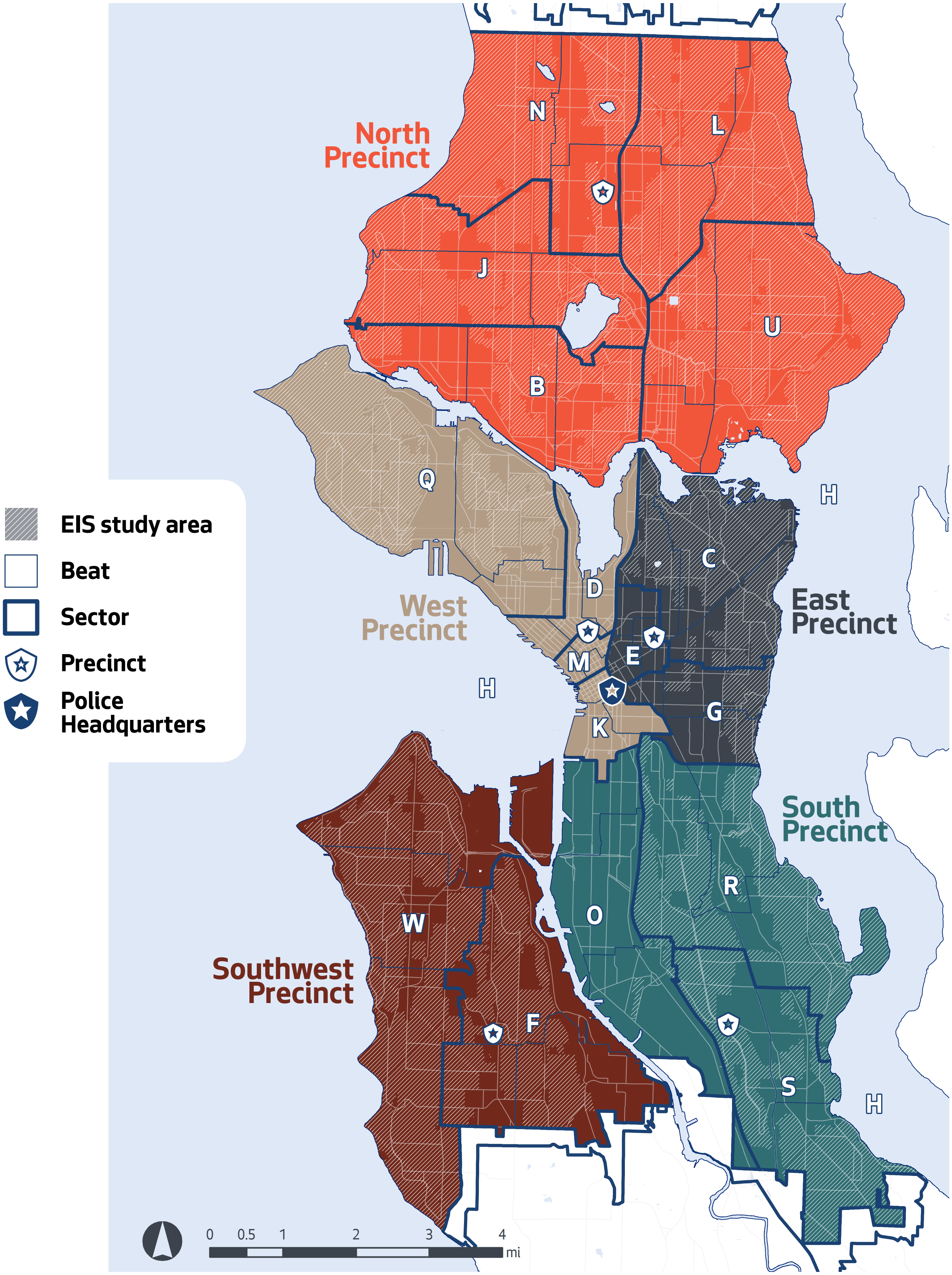


Exhibit 4.5-2 Seattle Police Department Precincts



PUBLIC SCHOOLS

Total student enrollment in Seattle Public Schools (SPS) has steadily increased since 2007 and that trend is expected to continue in the near future. As outlined in the Comprehensive Plan EIS, SPS is continually planning for changes in student enrollment and is actively planning for future growth through their Facilities Master Plan. To plan for future enrollment, SPS uses the cohort survival model, which calculates a "survival rate" for each grade based on the proportion of students who historically continue from one grade to the next. To project kindergarten enrollment, SPS estimates a birth-to-kindergarten ratio based on the proportion of children born in Seattle who historically enroll in Seattle Public Schools five years later. SPS then applies that ratio to the annual number of live births five years prior to a given school year to generate an overall 10-year enrollment projection. SPS updates these projections annually to reflect the latest data on known live births.

SEATTLE PUBLIC UTILITIES — WATER

To plan for Seattle's water supply needs, Seattle Public Utilities (SPU) estimates demand on the current system based on population projections. Despite recent population growth, total water system usage in Seattle is declining. This is partially due to conservation efforts, like encouraging low-flow fixtures for both residential and commercial uses. Generally, SPU maintains, improves, and repairs the water system as needed. SPU uses growth forecasts from the Puget Sound Regional Council (PSRC) and the Washington State Office of Financial Management (OFM) to develop long-range (i.e., at least 20 years) water demand forecasts and to determine if new supplies or additional system capacity are necessary. SPU updates these water demand forecasts, supply analyses, and capacity analyses with each new water system plan or, more frequently, if substantial changes in supply or demand warrant consideration. See Section 3.9 – Utilities of the Comprehensive Plan EIS for additional details.

SEATTLE PUBLIC UTILITIES — SEWER AND STORMWATER

Sanitary sewer demand estimates are based on population density and correlate with water system usage. Over time, redevelopment can reduce per-capita sewer demand, as newer, low- or no-flow plumbing fixtures and equipment replace older, less efficient installations. As described above for the water system, these conservation practices have reduced the overall demand on the wastewater system.

Stormwater runoff calculations are based on rainfall intensity and land use surface types. SPU plans stormwater drainage needs based on zoning standards, including the maximum lot coverage limit for development in single-family zones.

KING COUNTY WASTEWATER TREATMENT DIVISION AND SEATTLE PUBLIC UTILITIES — COMBINED SEWER SYSTEM

King County Wastewater Treatment Division (KC) and SPU own and operate combined sewer systems that serve about one-third of the city. Each combined sewer system is a piped network carrying both sanitary wastewater and stormwater runoff to a King County wastewater treatment plant (WWTP). Some portions of the drainage system have been identified as capacity constrained. In these areas development is required to limit the peak discharges of stormwater. Any area that discharges to an informal ditch and culvert system is considered capacity constrained.

SEATTLE CITY LIGHT — ELECTRIC POWER

To estimate demand for electricity, Seattle City Light (SCL) considers growth projections and land use patterns (e.g., residential vs. manufacturing). Despite recent population and economic growth, SCL's load is relatively stable because its service territory is well established and SCL has administered an aggressive energy conservation program for nearly 40 years.

4.5.2 Impacts

METHODOLOGY

Our methodology for evaluating potential impacts to public services and utilities considered the overall changes in population anticipated under each alternative relative to the existing service levels for each public service and utility. For stormwater impacts, the analysis considers the potential change in lot coverage as increased lot coverage is correlated with increased stormwater runoff. Generally, we anticipate an impact if a public service or utility would not be able to accommodate an increase in demand. Specifically, in this analysis we considered the number of ADUs created under each alternative, the resulting change in population, and whether that change would result in adverse impacts on public services or utilities. We determined impacts by comparing expected population changes relative to those considered in the Comprehensive Plan EIS and the resulting impacts.

While other sections of this EIS have referred to estimates of households that would occupy new ADUs, in this analysis we focused on the populations living in ADUs as demand for public services and utilities tends to increase in proportion to the number of people living and working in an area.

RESULTS

New ADUs

As described in Section 4.1, Housing and Socioeconomics, we expect all three alternatives to result in more ADUs constructed in Seattle. Exhibit 4.5-3 shows the estimated number of new ADUs that could be created between 2018 and 2027 under each alternative.

Exhibit 4.5-3 ADUs Produced by Alternative and Type

	Alternative 1 (No Action)	Alternative 2	Alternative 3
Estimated number of parcels that build exactly one AADU	900	630	650
Estimated number of parcels that build exactly one DADU	990	940	960
Estimated number of parcels that build two ADUs	—	880	745
Total ADUs	**1,890**	**3,330**	**3,090**
Additional ADUs compared to Alternative 1 (No Action)	—	1,440	1,210

Population Change

In single-family zones, household size is defined as the sum of the people living in the main house and any ADUs on the lot. For example, a main house with two people and an ADU with two people yields a household size of four. In 2016, the average household size in Seattle was 2.12

people (U.S. Census Bureau 2016). American Community Survey data from 2016 reports an average size of 2.74 people for households in one-unit structures (detached or attached). Currently, the Land Use Code defines a household as any number of related people, or up to eight unrelated people, and establishes that only one household can live on a lot in a single-family zone.

The maximum household size limit varies across the alternatives. Under Alternatives 1 and 3, the maximum household size would remain at eight unrelated people, including occupants of any ADUs on the lot. Under Alternative 2, the maximum household size would be eight unrelated people for lots with up to one ADU and 12 unrelated people for lots with an AADU and a DADU.

While the Land Use Code specifies the maximum number of people who can live on a lot, potential impacts on public services and utilities depend specifically on the additional people who would occupy new ADUs under each alternative. We anticipate the average number of people living in an ADU would be lower than the overall average household size in Seattle's single-family zones because ADUs tend to be smaller than single-family houses. As data was not available for the average number of people living in an ADU in Seattle, we used available data from Portland, Oregon, as a proxy (Horn et al 2013). The Portland data showed that an average of 1.36 people were living in each ADU. For purposes of this analysis, we rounded up that number to assume an average of 1.5 people per ADU.

We then analyzed the population change that would result from increased ADU production based on this assumption of average occupants per ADU. For all alternatives, we assumed an average household size for lots with one ADU of 3.5 people; in Alternatives 2 and 3, on lots with two ADUs, we assumed an average household size of 5.0 people. In considering potential impacts, we excluded the population living in the main house because we expect that, across all alternatives, any increase in the number of people living on a lot would result from adding one or two ADUs, not from a change to the number of people living in the main house. Exhibit 4.5-4 summarizes our household size assumptions.

We also considered a scenario where every lot reaches the maximum household size. In this case, we assumed that half of a lot's residents would occupy the main house and the other half would occupy the ADUs. For Alternatives 1 and 2, this would result in four people per ADU; for Alternative 3, we assumed four people per ADU on a lot with one ADU and two people per ADU on a lot with two ADUs. presents the changes in household size resulting from ADU production based on the average number of people anticipated in each ADU. Exhibit 4.5-6 presents the anticipated changes based on the maximum household size.

Exhibit 4.5-4 Average and Maximum Household Size Assumptions

		Alternative 1 (No Action)			Alternative 2			Alternative 3		
		House	ADUs	Total	House	ADUs	Total	House	ADUs	Total
Average household size assumptions	**Lots with one AADU**	2	1.5	3.5	2	1.5	3.5	2	1.5	3.5
	Lots with one DADU	2	1.5	3.5	2	1.5	3.5	2	1.5	3.5
	Lots with two ADUs	—	—	—	2	3	5	2	3	5
Maximum household size assumptions	**Lots with one AADU**	4	4	8	4	4	8	4	4	8
	Lots with one DADU	4	4	8	4	4	8	4	4	8
	Lots with two ADUs	—	—	—	4	8	12	4	4	8

Exhibit 4.5-5 Anticipated Population Based on Average Household Size

	Alternative 1 (No Action)	Alternative 2	Alternative 3
ADU population on lots with one AADU	1,350	945	975
ADU population on lots with one DADU	1,485	1,410	1,440
ADU population on lots with two ADUs	—	2,640	2,235
Total ADU population	**2,835**	**4,995**	**4,650**
Additional population compared to Alternative 1 (No Action)	—	2,160	1,815

Exhibit 4.5-6 Anticipated Population Based on Maximum Household Size

	Alternative 1 (No Action)	Alternative 2	Alternative 3
ADU population on lots with one AADU	3,600	2,520	2,600
ADU population on lots with one DADU	3,960	3,760	3,840
ADU population on lots with two ADUs	—	7,040	2,980
Total ADU population	**7,560**	**13,320**	**9,420**
Additional population compared to Alternative 1 (No Action)	—	5,760	1,860

Lot Coverage

In all alternatives, the maximum lot coverage limit would remain the same as under the current Land Use Code. On lots greater than 5,000 square feet, 35 percent of the lot area could be covered; on lots less than 5,000 square feet, 15 percent of the lot area plus 1,000 square feet could be covered.

IMPACTS OF ALTERNATIVE 1 (NO ACTION)

Under Alternative 1 (No Action), current Land Use Code regulations for development in single-family zones would remain unchanged. We anticipate the current rate of ADU production would continue. We do not expect this trend to result in impacts to public services and utilities. Overall demand for public services and utilities would continue to increase with population growth; however, Seattle Public Utilities, Seattle City Light, Seattle Public Schools, Seattle Police Department, and Seattle Fire Department, anticipate and continue to plan for this growth.

IMPACTS OF ALTERNATIVE 2

Alternative 2 could result in about 1,440 additional ADUs between 2018 and 2027 compared to Alternative 1 (No Action). We anticipate that the increase in ADU production could result in about 2,160 additional residents (and a theoretical maximum of 5,760 additional residents) on lots with ADUs in single-family zones compared to Alternative 1 (No Action). Any population change associated with ADU production under Alternative 2 would fall within the growth considered in the Comprehensive Plan EIS. The Comprehensive Plan EIS considered the potential impacts of 8,400 new households by 2035 in areas outside urban villages, or 16,800 new residents based on an average household size of two, and concluded that there would be no impacts to public services or utilities. The conclusions drawn in this EIS concur with that analysis. Even if ADU production under Alternative 2 resulted in about 2,160 new residents (or a maximum of 5,760 new residents) in Seattle, we do not anticipate impacts on the ability of Seattle Public Utilities, Seattle City Light, Seattle Public Schools, Seattle Police Department, or Seattle Fire Department to provide service.

Since 2015, Seattle's population has risen an average of 25,650 per year. The Comprehensive Plan anticipates that Seattle will need to accommodate 120,000 new residents by 2035. If Alternative 2 results in 2,160 additional ADU residents over 10 years compared to Alternative

1 (No Action), about four percent of citywide population growth would occur across about two-thirds of the city's land area. It is likely that, absent additional ADU production expected under Alternative 2, some of these residents would otherwise live elsewhere in Seattle.

Fire and EMS

The City's existing network of neighborhood fire stations serves the current population. Compared to overall population growth in Seattle, the additional demand associated with new ADU development would be well within the Seattle Fire Department's ability to respond to and anticipate the changing needs of the city.

Police Services

Under Alternative 2, we do not anticipate that the addition of at most 5,760 residents between 2018 and 2027 would have an adverse impact on SPD's ability to anticipate and respond to changing needs in the city. Population growth does not directly correlate to an increased demand for police services. Therefore, Alternative 2 would not necessarily result in proportional increases in call volumes or the frequency of major crimes. Nevertheless, SPD will continue to analyze where best to focus its resources to respond to changes in demand.

Public Schools

Under Alternative 2, we do not anticipate that the addition of up to 5,760 residents between 2018 and 2027 would have an adverse impact on the enrollment capacity of SPS. As described above, SPS plans for student population changes in their facility planning and is actively planning for future growth. If student enrollment did exceed capacity, SPS would typically respond by using one or a combination of the approaches listed below:

- Adjusting school boundaries to address capacity needs
- Adjusting geographic zones for option schools
- Adding or removing portables
- Adding or renovating buildings
- Opening closed buildings or schools
- Pursuing future capital programs

These typical responses to changes in enrollment would ensure that any localized changes in capacity associated with the proposed Land Use Code changes would not impact SPS.

Seattle Public Utilities — Water

As described above, total water system usage in Seattle has declined in recent years. As a result, the City's water system currently has excess capacity. As outlined in the Comprehensive Plan EIS, new development, such as increased ADU production under Alternative 2, could increase demand on localized areas of the water supply and distribution systems. However, the water supply and distribution systems have sufficient excess capacity to handle any changes.

Seattle Public Utilities — Sewer and Stormwater

Under Alternative 2, increased ADU production could increase demands on the local sewer collection system, downstream conveyance, and treatment facilities. Increased sewer flow is a product of increased water consumption. Greater population in the study area could increase the overall need for sewage capacity, but we do not anticipate any significant adverse location-specific impacts.

None of the alternatives contemplates a change to the existing maximum lot coverage limit, which is currently 35 percent for lots 5,000 square feet and larger, and 1,000 square feet plus 15 percent for lots under 5,000 square feet. Drainage review would be required for any project that would propose to disturb more than 750 square feet of land or to add or replace 750 square feet of building footprint. The Seattle Stormwater Code (SMC Chapters 22.800-22.808) and 2016 Seattle Stormwater Manual have both adopted best management practices to address potential impacts. During the scoping period, SPU reported that the proposed Land Use Code changes would not likely lead to increased amounts of impervious surfaces beyond what is currently allowed and, therefore, would not have a measurable impact on the drainage system.

King County Wastewater Treatment Division and SPU — Combined Sewer System

The impacts to the Combined Sewer System would be the same as described under SPU – Sewer and Stormwater.

Seattle City Light — Electric Power

Despite population growth, SCL's overall electrical load has been stable over the last 40 years because of successful energy conservation efforts and implementation of energy use requirements outlined in the Land Use Code. The increase in population anticipated under Alternative 2 would not impact the ability of SCL to meet changes in demand.

IMPACTS OF ALTERNATIVE 3

Alternative 3 could result in about 1,210 additional ADUs compared to Alternative 1 (No Action). We anticipate that the increase in ADU production could result in about 1,815 additional residents (and a theoretical maximum of 1,860 additional residents) on lots with ADUs in single-family zones compared to Alternative 1 As described for Alternative 2, even if this resulted in a corresponding increase in 1,860 additional residents in Seattle, we do not anticipate impacts on the ability of Seattle Public Utilities, Seattle City Light, Seattle Public Schools, Seattle Police Department, or Seattle Fire Department to provide service

4.5.3 Mitigation Measures

No significant adverse impacts are anticipated to public services and utilities; therefore, no mitigation measures are proposed.

4.5.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts are anticipated to public services and utilities from any of the alternatives considered in this EIS.

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6 Distribution List

The Draft EIS has been issued with a notice of availability and methods of publication required in SMC 25.05.510 Public Notice.

TRIBAL AND FEDERAL AGENCIES

Duwamish Tribe

Muckleshoot Indian Tribe

Suquamish Tribe

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United Indians of all Tribes Foundation

National Oceanic & Atmospheric Administration Fisheries, National Marine Fisheries Service

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U.S. Department of Agriculture, Wildlife Services Division

U.S. Department of Ecology, Northwest Regional Office

U.S. Department of Fish & Wildlife Services

U.S. Department of Fish & Wildlife Services, EIS Reviews

U.S. Department of Housing & Urban Development

U.S. Environmental Protection Agency

REGIONAL AND COUNTY AGENCIES

King County Department of Design & Environmental Services

King County Department of Natural Resources, Parks Division

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King County Department of Transportation

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King County Land Use Services Division

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King County Regional Water Quality Committee

King County Wastewater Treatment Division

Port of Seattle Environmental Management

Public Health — Seattle & King County

Puget Sound Clean Air Agency

Puget Sound Regional Council of Governments

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Department of Commerce, Growth Management Services

Department of Community Development

Department of Ecology

Department of Ecology, SEPA Unit

Department of Fish & Wildlife

Department of Health

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Department of Social & Health Services

Department of Transportation

CITY OF SEATTLE AND SEATTLE SERVICE PROVIDERS

City of Seattle Department of Education & Early Learning

City of Seattle Department of Neighborhoods

City of Seattle Department of Neighborhoods,
Historic Preservation Program

City of Seattle Department of Parks & Recreation

City of Seattle Department of Transportation

City of Seattle Landmarks Preservation Board

City of Seattle Office of Emergency Management

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City of Seattle Police Department

City of Seattle School District

Seattle City Council

Seattle City Light

Seattle Housing Authority

Seattle Indian Services Commission

Seattle Public Library, Public Review Documents

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APPENDIX A
Analysis of Housing and Socioeconomics Impacts

A.1 Introduction

BACKGROUND

The City of Seattle proposes to change regulations in the Land Use Code to remove barriers to the creation of ADUs in single-family zones. ADUs include backyard cottages, known as detached accessory dwelling units (DADUs), and in-law apartments, known as attached accessory dwelling units (AADUs). The proposal involves several Land Use Code changes, including allowing two ADUs on some lots, changing the existing off-street parking and owner-occupancy requirements, and changing some development standards that regulate the size and location of DADUs.

The Draft EIS analyzes three alternatives. (For a full list of the proposed changes in each alternative, see Chapter 2 of the EIS, Exhibit 2-2.)

- ***Alternative 1 (No Action).*** Under Alternative 1, no changes would be made to the existing ADU regulations.
- ***Alternative 2.*** Alternative 2 considers the broadest range of changes to the Land Use Code changes to promote the production of ADUs. These changes include: allowing lots in single-family zones to have both an AADU and a DADU; removing the owner-occupancy requirement; removing the off-street parking requirement for ADUs; reducing predevelopment costs for DADUs; and allowing lots between 3,200 and 3,999 square feet to add a DADU.
- ***Alternative 3.*** Alternative 3 considers more modest adjustments to the Land Use Code that emphasize maintaining a scale compatible with existing development in single-family zones. These changes include allowing single-family-zoned lots to have both an AADU and a DADU; removing the off-street parking requirement for the first (but not second) ADU; allowing lots between 3,200 and 3,999 square

feet to add a DADU; requiring Mandatory Housing Affordability (MHA) for creation of a second ADU; and adding a maximum floor area ratio (FAR) limit for new development.

Many of these proposed changes could affect housing and socioeconomic conditions in the study area. For example, allowing two ADUs on a single lot would legalize a new housing product in single-family zones, while changing the owner-occupancy requirement for ADUs could potentially cause a shift from owner-occupancy to renter-occupancy. This appendix summarizes the methodology and results of the technical analysis conducted by ECONorthwest to analyze housing and socioeconomic impacts of the proposed alternatives.

ANALYTICAL QUESTION AND APPROACH

This appendix considers the impacts of the proposed Land Use Code changes on housing and socioeconomics. Specifically, we first evaluate the following questions:

- ***Underlying Development Economics.*** How might the proposed changes alter the underlying real-estate economics in single-family zones? Could the proposed changes make property in single-family zones more attractive as rental investments rather than as owner-occupied assets?
- ***ADU Production.*** How many ADUs could be created given the proposed policy changes in each alternative?

This analysis allows us to consider the following types of impacts resulting from the proposed alternatives:

- ***Affordability.*** What impacts could the proposed changes have on housing affordability?
- ***Displacement.*** How might the potential housing and socioeconomic impacts vary by neighborhood? What are the potential impacts on marginalized populations (low-income people, people of color, and non-native English speakers)?

Our approach was constructed to analyze these issues. This appendix is organized as follows:

- **Framework for the Evaluation** describes our conceptual model for analyzing potential housing and socioeconomic impacts.
- **Methods** describes the steps used in our analysis and documents the key assumptions used.
- **Findings** presents the analysis results and discusses how potential impacts vary across the three alternatives.

A.2 Evaluation Framework

ESTIMATING CHANGE IN ECONOMIC ENVIRONMENT THROUGH EVALUATION OF HIGHEST AND BEST USE

To understand how the alternatives could affect underlying real-estate economics in single-family zones, we can analyze the proposed changes from the viewpoint of a profit-maximizing developer. If the proposed alternatives change the most profitable development outcome, then that indicates a potential change to the underlying real estate economics that can influence housing and socioeconomic conditions. The degree of potential impacts depends on the magnitude, characteristics, and geographic dispersal of any changes to profitability.

From this perspective, the potential effects of alternatives can be classified into three categories:

- Potential effects on the number of ADUs produced:
  - Two ADUs on a single lot (Alternative 2, Alternative 3)
  - Reduction in minimum lot size for DADU (Alternative 2, Alternative 3)
- Potential effects on the marginal cost of building an ADU:
  - Reduced off-street parking for ADUs (Alternative 2, Alternative 3)
  - Reduced predevelopment costs for ADUs (Alternative 2)
  - MHA requirements for a second ADU (Alternative 3)
- Potential effects on the marginal revenue potential of an ADU or main house:
  - Increased maximum allowed size of DADU (Alternative 2, Alternative 3)
  - Removal of the requirement that either the ADU or the main house be owner-occupied (Alternative 2)
  - FAR limit for new construction (Alternative 3)

Note that the choice to add an ADU does not occur in isolation. A profit-maximizing developer could instead choose to remodel and flip, or to tear down and build a larger home. These options do not create new ADUs but nevertheless affect housing affordability or urban form. Thus, evaluating the potential housing and socioeconomic effects of the alternatives requires a holistic analysis of development options in single-family zones.

Highest and best use provides a useful framework for evaluating how the alternatives could affect underlying real-estate economic conditions in the study area. The 14th edition of The Appraisal of Real Estate defines highest and best use as: "The reasonably probable use of property that results in the highest value" (Appraisal Institute 2013). To be reasonably probable, a use must meet three conditions:

1. ***Physically possible.*** The use must be possible given the physical characteristics of the land, including size, shape, topography, and soils. A large, flat site with good draining offers more possibilities than a steep site with an irregular shape.
2. ***Legally permissible.*** The use must be allowed under the land's current zoning and conform to all relevant regulations and building codes.
3. ***Financially feasible.*** The final test requires analysis of the economic feasibility of potential options. If a developer would lose money on the project, it is not reasonably probable.

Of the remaining 'reasonably probable' candidates, the highest and best use is the one with the highest financial return. This financial return determines the property's value to a potential profit-maximizing purchaser. Imagine two developers evaluating the development potential of a residential property: Developer A builds only small houses, and Developer B builds only large houses. Both uses might be physically possible, legally permissible, and financially feasible on the same lot, but only one can prevail.

A useful metric for comparing the relative value of multiple possible uses is through ***residual land value***. Residual land value (RLV) is a measure of the developer's land budget for a particular project, after taking into account expected costs (including developer profit) and revenues. A higher residual land value for a particular use indicates that the developer can afford to pay more for the land. In the example above, whichever developer has the higher residual land value will outbid the other.

This framework for determining highest and best use lets us analyze how the proposed alternatives could affect the economic environment for development in single-family zones. Thus, our research question is: do the proposed alternatives change the highest and best use in single-family zones?

Current zoning restricts the legally permissible options in the study area to two main residential uses: single-family residential and single-family residential with one accessory dwelling unit.[1] Various options exist within these uses, however, defined by the size of the house and/or ADU, the quality of finishes, the architectural style, and many other factors.

Observations of recent trends suggest that, for most lots in single-family zones, the highest and best use is an owner-occupied single-family home. Citywide, 81 percent of detached single-family homes are owner-occupied. Though legal since 1994, AADUs are present on less than 1.2 percent of single-family lots in the study area.[2] Evidence also suggests that large homes generate higher financial returns than smaller ones. The average size of a new single-family home in the study area has increased over time, from about 1,850 square feet for homes built in the 1950s to nearly 3,000 square feet for homes built 2010-2017.[3]

HIGHEST AND BEST USE IS NOT A FORECAST

Highest and best use analysis tells us the most economically productive use for a particular lot, but it does not necessarily predict what will actually happen, for several reasons.

First, highest and best use does not consider the motivation and preferences of individual property owners. Any change in use requires the cooperation of the owner, either to sell the site or to redevelop it herself. The highest and best use of my house might be to tear it down and rebuild a much larger house, but if I prefer my small house, no change in use would occur until I decide to sell. Building an ADU and renting it out may be most profitable for a homeowner but ruled out because of a preference for privacy or disinterest in becoming a landlord. Even when a property owner does wish to add an ADU or redevelop their site, they may lack the financial capital to do so.

Second, market demand is not infinite. There is limited demand for each particular use given current market conditions. Even though a site may have a willing seller and a particular highest and best use, it may not achieve that use if other better-suited sites satisfy market demand. There is also limited demand for various types of owner- and renter-occupied products. Not every prospective homebuyer can afford a 3,000-square-

1 In addition to residential uses, Seattle's single-family zones also allow parks, nursing homes, and some institutional uses (including schools and churches).

2 Anecdotal evidence suggests that illegal, unpermitted ADUs exist in Seattle. As we have no way of knowing how many illegal ADUs may exist, or where they are located, they are not included in our analysis.

3 Large new houses on relatively small lots are sometimes referred to as "McMansions."

foot house. Not every renter wants to live in someone's backyard or basement.

Thus, while highest and best use can tell us how the alternatives could change the underlying real-estate economics in single-family zones, it cannot predict what might happen or how the alternatives could affect development rates in the study area. To arrive at estimates of future single-family and ADU production for each alternative, we need a methodology that considers what is actually most likely to happen given market conditions, parcel characteristics, and individual preferences.

Nearly all forecasts start with an analysis of past trends. By looking at what actually happened, we can arrive at estimates of what might happen going forward. There are two primary approaches:

- **Use past growth rates of new single-family homes, AADUs, and DADUs to project into the future.** This "continuation of the trend line" approach is the simplest way to establish a baseline of future conditions in Alternative 1. However, it has no quantitative connection to the underlying factors that explain why and where development will occur. It also does not offer a way to forecast how development rates might change from the baseline in Alternatives 2 and 3.
- **Develop a model that connects historic rates of home and ADU production to underlying factors.** By developing a deterministic model that links past development decisions to parcel characteristics and other important variables (such as regional macroeconomic conditions), we can develop a more sophisticated forecast of baseline conditions over the next 10 years. This approach also allows us to forecast the potential impacts of Alternatives 2 and 3 by adjusting input variables in the model.

This latter approach is better suited to evaluating the potential impacts of the proposed alternatives because it provides insight into which factors make a lot more or less likely to add an ADU, and because it allows us to quantitatively estimate the potential impact of specific policy changes. For this analysis, we use an econometric model to estimate how many ADUs might be created in Alternatives 1, 2, and 3 and to observe how the potential impacts might vary by neighborhood.

Finally, it is important to note that all forecasting requires making assumptions about the future. Regardless of the method used, (1) forecasting growth requires consideration of many variables that interact in complicated ways, and (2) any forecast of a single future is more than likely to be wrong in any absolute sense — there are many possible futures that are more or less likely depending on one's assessment of the likelihood of the assumptions. However, ours is a reasonable approach to give policymakers a reference point for the scale of ADU production over the analysis time frame.

A.3 Methods and Assumptions

The two different core research questions — 1) how could the alternatives affect highest and best use, and 2) how could the alternatives affect future production of single-family homes and ADUs — call for different methodological approaches.

Below we describe how we address the first question of highest and best use. Then we explain our methodology for estimating future production of ADUs.

HIGHEST AND BEST USE: PRO FORMA ANALYSIS

To analyze the potential impacts of the alternatives on highest and best use in the study area, we use pro forma analysis. Pro forma models are common decision-making tools used by real estate developers and policymakers. Our pro forma model uses inputs and assumptions about current market conditions, parcel characteristics, and possible development outcomes to calculate a residual land value for each development possibility. By comparing residual land values, we can estimate the highest and best use.

In the framework of highest and best use analysis, the pro forma model allows us to analyze what is:

- ***Physically possible.*** Using King County Assessor data on parcels in the study area, we created a parcel typology to examine and screen for what might be physically possible given a range of parcel sizes and existing conditions.
- ***Legally permissible: The model includes relevant information from the Land Use Code about what can currently be built on a lot.*** It also reflects proposed changes under Alternatives 2 and 3. These inputs determine which development prototypes can exist on each lot and how big they can be.
- ***Financially feasible.*** We compiled information on current market conditions, including single-family sales prices, rental rates, and construction costs, in order to test the financial feasibility of possible

uses. To account for variable market conditions across the study area, we developed three generalized profiles of rent and housing price and categorized each neighborhood into one of the three profiles. Then, we created financial pro formas for 44 different development outcomes that encompass a wide range of legally permissible variations. (Note that some development outcomes are legally permissible only under certain alternatives.) For each of these 44 development outcomes, we then analyze four different valuation options based on different possible uses (e.g., for sale, for rent). Finally, we test the financial performance for each combination of alternative, parcel typology, neighborhood profile, development outcome, and valuation — 6,336 scenarios in all.

- ***Maximally productive.*** For a given parcel type in a given neighborhood, we then compare the residual land values of the legally and physically possible development outcomes. The development outcome with the highest residual land value is the highest and best use.

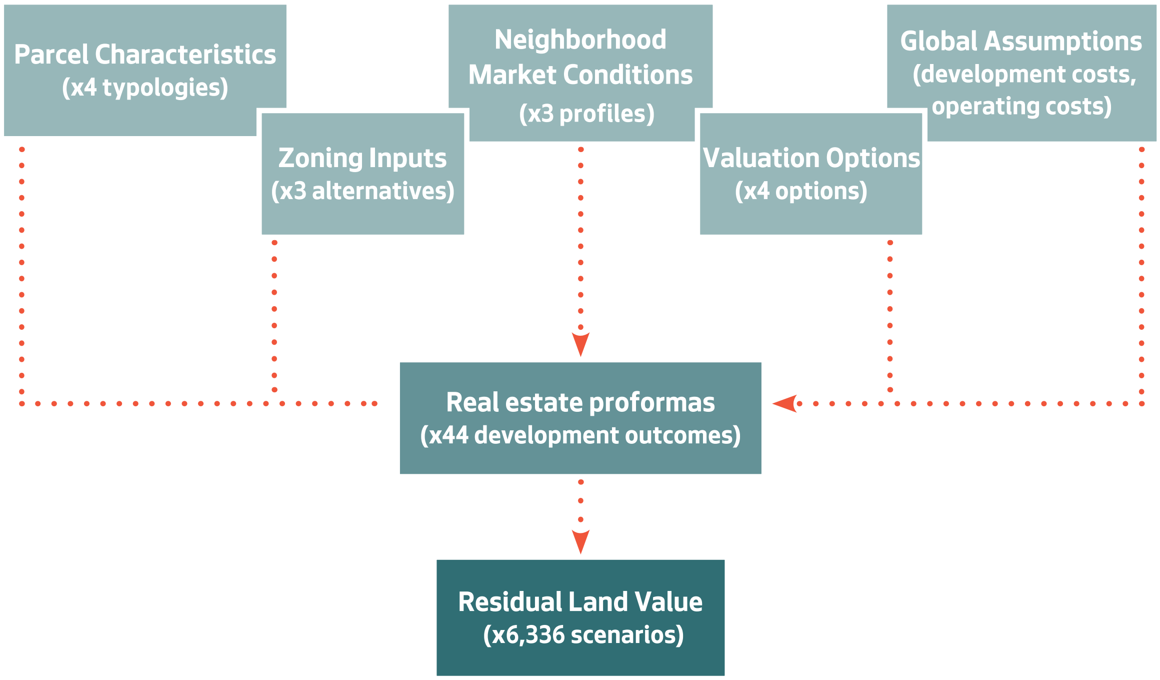
Though theoretically possible to use pro formas to analyze highest and best use for every parcel in the study area (using specific parcel characteristics and more localized rent data), we used a typology approach to facilitate interpretation of the results and highlight key differentiators related to ADU production. The typology approach — using three different neighborhood profiles and four different parcel types — allows us to analyze the relative profitability of various development outcomes on parcels of different sizes and in different parts of the city without analyzing every parcel individually.

To simplify, the key elements of the pro forma analysis are:

1. What can you build on a lot in a single-family zone?
2. Once built, what can you do with your property? Sell it? Rent it?
3. Based on market conditions, how much rental or sales income can you expect?
4. Which combination of steps 1-3 maximizes the profitability of the project?

The rest of this section provides more detail on the specific methods, inputs, and assumptions used for each step.

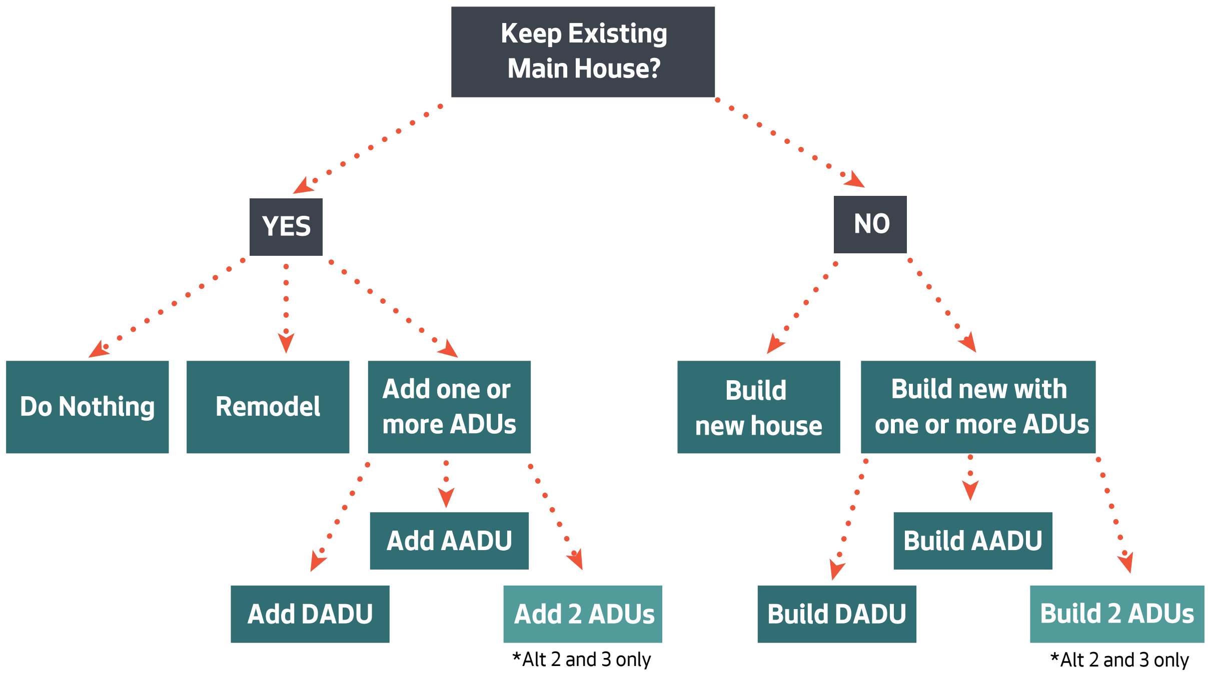
Exhibit A-1 Diagram of Inputs and Assumptions Used in Pro Forma Analysis



Development outcomes

As shown in Exhibit A-2, the owner of a single-family-zoned lot could do several different things with the lot. They could tear it down and rebuild (with or without ADU). They could keep the existing house and do nothing, remodel, or add an ADU.

Exhibit A-2 Decision tree of single-family development outcomes



To evaluate highest and best use in single-family zones, we analyzed the financial performance of 44 legally permissible development outcomes. Each outcome either demolishes or retains the existing house. Additional variations consider the number of ADUs (0, 1, or 2), size of ADUs, size of main house, and placement of parking. Outcomes marked with an asterisk (*) are not possible under Alternative 1.

Keep Existing Main House

1. No nothing
2. Remodel
3. Add 300-square-foot ADU
4. Add largest possible 1-story DADU
5. Add largest possible 2-story DADU
6. Add largest possible 1-bedroom, 2-story DADU
7. Add largest possible 1-story DADU and convert basement to AADU*
8. Add largest possible 2-story DADU and convert basement to AADU*
9. Convert existing basement to AADU

Demolish Existing Main House

10 Maximize house size, attached garage, no ADUs

11 Maximize house size, attached garage, 300-square-foot DADU

12 Maximize house size, attached garage, largest possible 1-story DADU

13 Maximize house size, attached garage, largest possible 2-story DADU

14 Maximize house size, attached garage, basement AADU and largest possible 1-story DADU*

15 Maximize house size, attached garage, basement AADU and largest possible 2-story DADU*

16 Maximize house size, attached garage, with basement AADU

17 Maximize house size, tandem parking alongside house, no ADUs

18 Maximize house size, tandem parking alongside house, 300-square-foot DADU

19 Maximize house size, tandem parking alongside house, largest possible 1-story DADU

20 Maximize house size, tandem parking alongside house, largest possible 2-story DADU

21 Maximize house size, tandem parking alongside house, basement AADU and largest possible 1-story DADU*

22 Maximize house size, tandem parking alongside house, basement AADU and largest possible 2-story DADU*

23 Maximize house size, tandem parking alongside house, with basement AADU

24 1,900-square-foot house, tandem parking alongside house, no ADUs

25 1,900-square-foot house, tandem parking alongside house, 300-square-foot DADU

26 1,900-square-foot house, tandem parking alongside house, largest possible 1-story DADU

27 1,900-square-foot house, tandem parking alongside house, largest possible 2-story DADU

28 1,900-square-foot house, tandem parking alongside house, basement AADU and largest possible 1-story DADU*

29 1,900-square-foot house, tandem parking alongside house, basement AADU and largest possible 2-story DADU*

30 1,900-square-foot house, tandem parking alongside house, with basement AADU

31 2,400-square-foot house, tandem parking alongside house, no ADUs

32 2,400-square-foot house, tandem parking alongside house, 300-square-foot DADU

33 2,400-square-foot house, tandem parking alongside house, largest possible 1-story DADU

34 2,400-square-foot house, tandem parking alongside house, largest possible 2-story DADU

35 2,400-square-foot house, tandem parking alongside house, basement AADU and largest possible 1-story DADU*

36 2,400-square-foot house, tandem parking alongside house, basement AADU and largest possible 2-story DADU*

37 2,400-square-foot house, tandem parking alongside house, with basement AADU

38 2,900-square-foot house, tandem parking alongside house, no ADUs

39 2,900-square-foot house, tandem parking alongside house, 300-square-foot DADU

40 2,900-square-foot house, tandem parking alongside house, largest possible 1-story DADU

41 2,900-square-foot house, tandem parking alongside house, largest possible 2-story DADU

42 2,900-square-foot house, tandem parking alongside house, basement AADU and largest possible 1-story DADU*

43 2,900-square-foot house, tandem parking alongside house, basement AADU and largest possible 2-story DADU*

44 2,900-square-foot house, tandem parking alongside house, with basement AADU

We chose these 44 development outcomes to illustrate a broad range of common development options in single-family zones. They are not exhaustive of every development possibility. Additional possible variations include: DADU on top of a garage, parking access from an alley, above-ground AADUs, AADUs within the main house envelope, and houses and ADUs of other various sizes. Although we did not explicitly model these development outcomes, their financial performance is likely to behave similarly to the outcomes we did model. For example, from a cost perspective, building a new garage with a DADU on the second floor is a slightly more expensive variation of building a single-story DADU.

Valuation options

For each development outcome, there are options for what to do with the property — sell it or rent it? The same house can be sold, rented to long-term tenants, or used as a short-term rental. Each option is associated with different revenues and costs that determine which use is ultimately most profitable.

Exhibit A-3 Valuation options

All units for rent*	Main house for sale, ADUs rented	Main house for sale, ADU as short-term rental	Entire property for sale

*For Alternatives 1 and 3, this option is only used to evaluate a main house with no ADUs.

For each development outcome, we analyzed four possible ways to value the property.

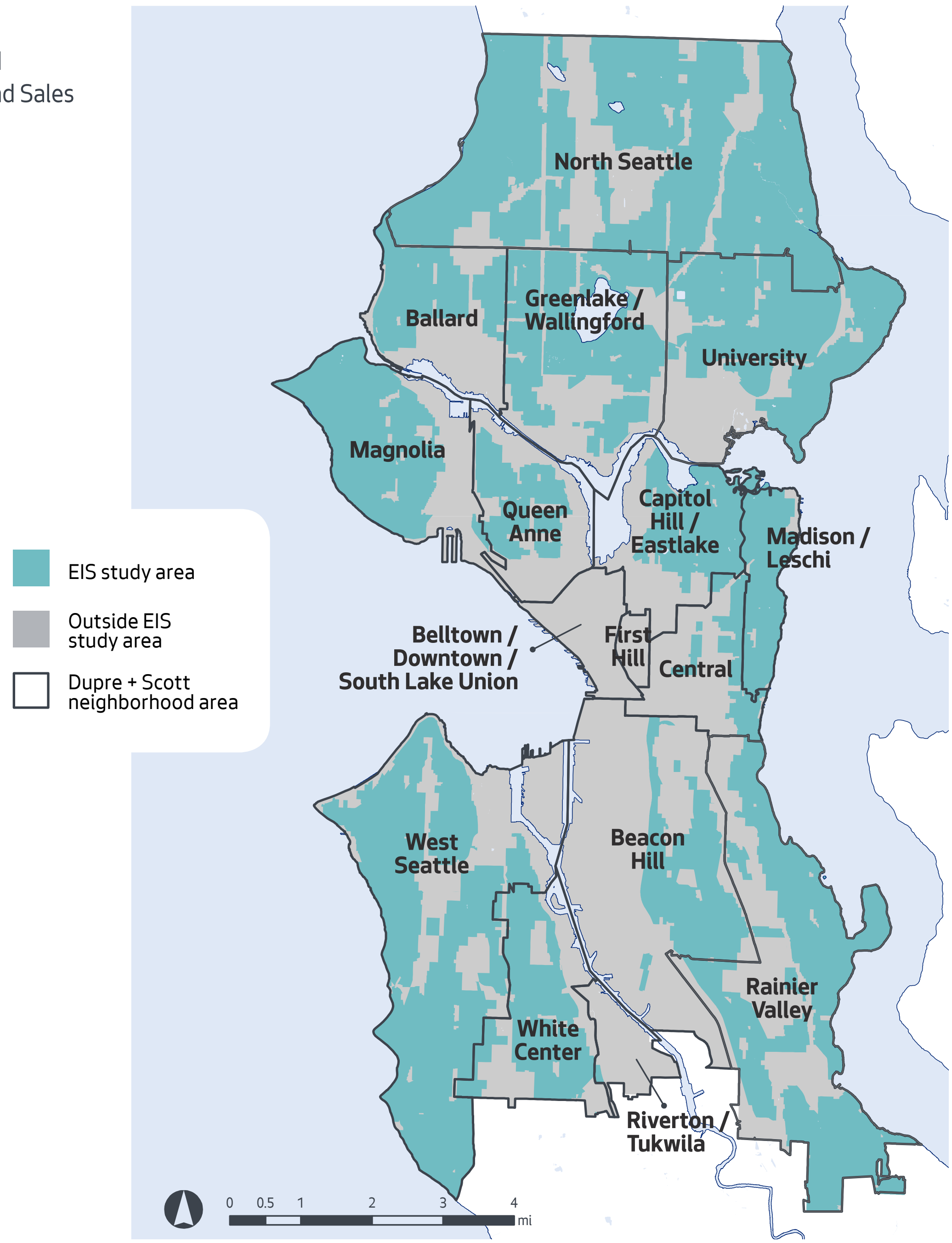
1. **All units as long-term rentals.** Every unit (including the main house) is rented out separately. The lot is valued based on the net operating income from all units.
2. **Main house valued based on for-sale price; ADU(s) as long-term rentals.** The lot is valued in two pieces: based on price per square foot of the main house and on the net operating income from the ADUs. Together, the resulting residual land values represent the total value for the lot.
3. **Main house valued based on for-sale price; one ADU as short-term rental.** Under regulations passed in December 2017, properties owners may list one short-term rental unit other than the unit where they live. This revenue scenario assumes that the main house is valued based on its sales price per square foot, one ADU is operated as a short-term rental, and the second ADU (if present) is operated as long-term rental. Similar to option 2, the main house is valued based on price per square foot and the ADUs based on net operating income from short- or long-term rental.
4. **All units valued based on for-sale price**. The lot is valued based on sales price per square foot of all units, including any ADUs.

These valuation options illustrate the relative profitability of the rental and for-sale markets in Seattle today, but they are not intended to represent the literal options for what can be done with a parcel. For example, options 2 and 3 are not possible for most single-family-zoned parcels because they require subdivision.

Development of neighborhood rent / price profiles

The revenue potential of the valuation options listed above depend on local market conditions, which vary by neighborhood. The same home costs more to buy or to rent in Queen Anne than in White Center. Throughout this report, we use Dupre + Scott neighborhoods (as shown in Exhibit A-4) when talking about neighborhood boundaries.

Exhibit A-4
Dupre + Scott Neighborhood Boundaries Used for Rent and Sales Data



To account for varying market conditions across the study area, we categorized every neighborhood in Seattle as either a "higher-," "medium-," or "lower-" price neighborhood. Neighborhoods were classified based on a combination of single-family rental rates and single-family sales prices.

To rank neighborhoods by for-sale prices, we used a hedonic price regression to control for differing house characteristics among neighborhoods.[4] We used King County Assessor's housing transactions data for lots in the study area with single-family residential use.[5] The result is an index of housing price for each neighborhood. We ranked neighborhoods based on sales price index and divided them so one-third are considered lower price, one-third medium price, and one-third higher price.

For rental rates, neighborhoods were similarly classified so that one-third are considered lower rent, one-third medium rent, and one-third higher rent. For this classification, we used Dupre + Scott data on rent per square foot for one-bedroom units in small buildings (defined as those with 1 to 19 units).[6]

Next, we combined the sales price score and the rent score into an overall index of housing price. If a neighborhood is "Lower Rent" and "Lower Sales Price," we classified it as "Lower" overall. If a neighborhood is "Higher Rent" and "Higher Sales Price", we classified it as "Higher" overall. All other neighborhoods (combinations of "Lower" and "Medium" or "Medium" and "Higher") are classified as "Medium" overall. Exhibit A-5 and Exhibit A-6 show the final neighborhood classifications.

4 The regression included housing characteristics (number of bedrooms, number of bathrooms, size of house, size of lot) and a dummy variable for each neighborhood. Each neighborhood dummy variable accounts for the portion of sales prices that is due to the specific neighborhood rather than to structure or parcel characteristics.

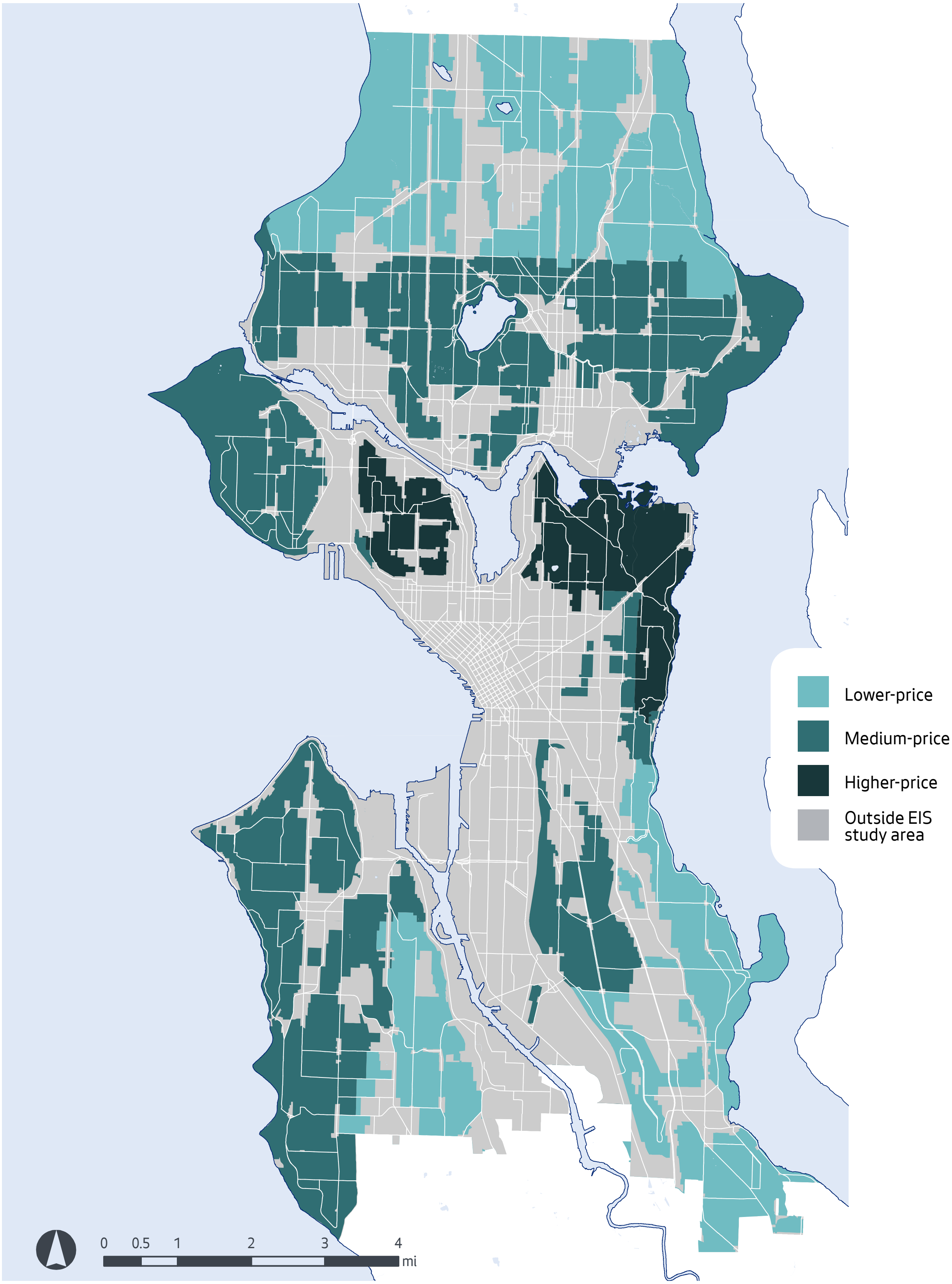
5 For this exercise, we filtered on properties that were sold in 2016 or 2017 for more than $50,000 and did not have indicators of distressed sales or non-arms-length transactions.

6 Depending on the specific rent measure used, the rent classification varies slightly, but the results are generally consistent. We achieve the same results using two-bedroom rents in small buildings, two-bedroom rents in single-family buildings, or four-bedroom rents in single-family buildings.

Exhibit A-5 Neighborhood Profile Classifications

Neighborhood	Sales price category	Rent category	Overall profile
Madison/Leschi	Higher	Higher	Higher
Queen Anne	Higher	Higher	Higher
Capitol Hill/Eastlake	Higher	Higher	Higher
Magnolia	Higher	Medium	Medium
University	Higher	Medium	Medium
Greenlake/Wallingford	Medium	Higher	Medium
Central	Medium	Higher	Medium
Ballard	Medium	Medium	Medium
Beacon Hill	Lower	Medium	Medium
West Seattle	Medium	Lower	Medium
North Seattle	Lower	Lower	Lower
Rainier Valley	Lower	Lower	Lower
White Center	Lower	Lower	Lower

Exhibit A-6 Map of Neighborhood Profiles



Neighborhood market inputs

For each neighborhood profile — Higher, Medium, and Lower — we then assigned data about expected sales price and rental rates for each valuation option.

Single-family home sales price

To ensure that our market inputs match the range of development outcomes, we calculated the sales price per square foot for each neighborhood profile three different ways: for all properties, for recently built properties, and for recently renovated properties.

Although total price increases as the homes get larger, the price per square foot generally decreases with size. To reflect this dynamic, we calculated price per square foot for different home size categories.

For the "all properties" calculation, we calculated the median price per square foot of 2016-2017 property sales within each neighborhood profile and for each size category. For the "new properties" calculation, we calculated the median sales price per square foot for properties built 2012-2017. For the "renovated properties," we calculated median sales price for properties that were renovated during or after 2010. Exhibit A-7 shows the sales prices per square foot used in our analysis.

Exhibit A-7 Single-Family Sales Price per Square Foot, by Home Size and Neighborhood Profile

Source: ECONorthwest analysis of King County Assessor's sales data

	Lower	Medium	Higher
All homes			
1,400-1,699 square feet	$356	$444	$543
1,700-1,999 square feet	$330	$404	$520
2,000 -2,499 square feet	$299	$376	$492
2,500-2,999 square feet	$308	$366	$483
3,000+ square feet	$310	$404	$504
New homes			
1,400-1,699 square feet	$296	$437	$518
1,700-1,999 square feet	$394	$402	$505
2,000 -2,499 square feet	$331	$393	$543
2,500-2,999 square feet	$336	$387	$462
3,000+ square feet	$339	$426	$496
Recently remodeled homes			
1,400-1,699 square feet	$301	$439	$665*
1,700-1,999 square feet	$376	$404	$503
2,000 -2,499 square feet	$328	$376	$557
2,500-2,999 square feet	$298	$392	$484
New homes, >3000 square feet	$322	$374	$496

*Due to insufficient observations, price per square foot was imputed using the average difference between Medium and Higher for recently remodeled homes of other sizes.

Long-term rental rates

For information about long-term rental rates for main houses, we used Dupre + Scott data for single-family rentals. To determine values for each neighborhood profile, we took the median of the composite neighborhoods. As with single-family home sales, rent per square foot typically declines as unit size increases, so we estimated the number of bedrooms for each house and used the corresponding Dupre + Scott rental rate.

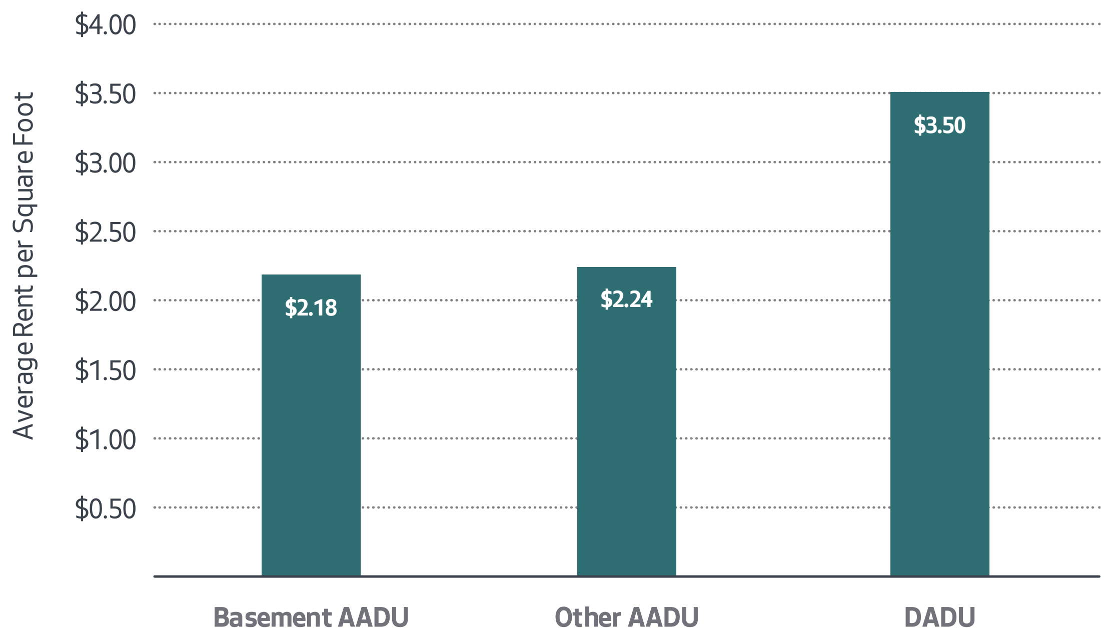
Determining rental rates for ADUs was more complex, as detailed data on AADU and DADU rents in Seattle by neighborhood does not exist.

To better understand Seattle's rental market for ADUs, we surveyed Craigslist rental postings in October and November 2017.[7] We found 83 unique listings for ADU rentals in Seattle, of which 59 (71 percent) were basement AADUs, 14 (17 percent) were other types of AADUs, and 10 (12 percent) were DADUs.

Because of the limited number of observations, we were unable to use the Craigslist rent survey data as the source for AADU and DADU rent. However, the Craigslist survey did provide information about how rent differs between AADUs and DADUs. The data indicate that DADUs command higher rents than AADUs. This finding makes intuitive sense; for most people, living in a small detached house is more desirable than living in a basement.

Exhibit A-8 Average Asking Rent Per Square Foot for ADUs in Seattle

Source: ECONorthwest survey of Craigslist postings, October–November 2017.



To reflect the observed rent differential between AADUs and DADUs, we used Dupre + Scott rent data from two- to four-unit buildings for AADUs, and single-family rent data for DADUs. This allows us to account for the observed "detachment" premium for DADUs over AADUs. Note that,

7 To conduct the survey, we searched Seattle Craigslist listings of apartments for rent (https://seattle.craigslist.org/search/see/apa). We used the following search terms: mother in law, MIL, ADU, cottage, basement apartment, carriage. Each result was manually reviewed to determine if it was actually an ADU and, if so, what type.

although we used the same rent data source (Dupre + Scott, single-family units) for both DADUs and main houses, DADUs typically have fewer bedrooms and thus typically higher rents per square foot.

Exhibit A-9 Long-Term Rental Rates Used in Analysis

Source: ECONorthwest analysis of data from Dupre + Scott 1-19 Unit Apartment Report (April 2017).

	Lower	Medium	Higher
Main house and DADU			
1 bedroom	$2.14	$2.35	$2.47
2 bedrooms	$1.78	$1.92	$2.10
3 bedrooms	$1.45	$1.66	$1.76
4 bedrooms	$1.24	$1.45	$1.62
5 bedrooms	$1.18	$1.58	$1.23
AADU			
1 bedroom	$1.32	$2.03	$2.12
2 bedrooms	$1.47	$1.67	$1.85

Notes Main house and DADU rent comes from single-family properties. AADU rent comes from 2-4 unit properties. To determine rent values for each neighborhood profile, we took the median value of the composite neighborhoods. For some neighborhoods, Dupre + Scott did not provide rents for 1 bedroom single-family units. For these cases, we calculated the "Detached premium" for two-bedroom units by looking at the ratio of single-family two-bedroom rents to two- to four-unit two-bedroom rents in those neighborhoods. We then applied this ratio to the observed two- to four- unit one-bedroom rent to impute what the single-family one-bedroom rent would be. This was necessary in Ballard, Madison, Central, Magnolia, and Queen Anne.

Exhibit A-10 shows the crosswalk we used for estimating the number of bedrooms for a unit of a given size and determining the appropriate rental rate per square foot.

Exhibit A-10 Bedroom Assumptions

Source: ECONorthwest analysis of existing single-family homes in study area.

Unit size	Number of bedrooms
<900 square feet	1
900-1,399 square feet	2
1,400-1,999 square feet	3
2,000–2,699 square feet	4
2,700+ square feet	5

We used Dupre + Scott data to determine a long-term rental vacancy rate for each neighborhood profile. We used the 1-19 unit vacancy rate and took the median value of the composite neighborhoods.

Exhibit A-11 Long-Term Rental Vacancy Rate Used in Analysis

Source: ECONorthwest analysis of Airbnb data for March 2016–March 2017.

	Lower	Medium	Higher
Vacancy rate	3.0%	2.9%	3.4%

Short-term rental expected income

To determine expected rental income from using an ADU as a short-term rental, we analyzed data on Airbnb properties. The Airbnb data was provided by the City of Seattle and includes 12-month revenue and occupancy rate for each Airbnb listing for March 2016-March 2017 to estimate the expected rental income for an ADU used as a short-term rental unit, we filtered the data to include only listings with the following characteristics:

- **Located in the study area.** This isolates results in single-family zones in Seattle.
- **"Entire Home/Apt."** This excludes listings for shared rooms or private rooms in a larger housing unit.
- **Available for at least 180 days in the last 12 months.** This removes listings that may be owner-occupied part of the year and listings where the owner is posting on Airbnb only occasionally.
- **At least six bookings in the past 12 months.** This removes listings that were unrepresentative or unpopular.
- **Fewer than three bedrooms.** This removes large houses and other properties dissimilar from ADUs.
- **Described as "Houses" or "Townhomes."** This removes units described as condos and apartments.

With the filtered dataset, we calculated average monthly revenue as the annual revenue in the last 12 months divided by 12. Based on each's property latitude and longitude, we categorized it into Higher, Medium, or Lower neighborhood and then calculated the median monthly revenue for each neighborhood profile.

Exhibit A-12 Expected Monthly Income for ADUs used as Short-Term Rentals

	Lower	Medium	Higher
Expected monthly income	$1,143	$1,080	$1,386

Development of a parcel typology

The characteristics of each parcel set an upper bound on what can be built. Some characteristics are permanent (e.g., size and shape of the parcel) while others can change over time (e.g., size and shape of existing structures). To account for varying parcel characteristics, we developed four parcel types, each defined by lot size, shape, and size of current structures. Exhibit A-13 shows the parcel typology we used. The parcel types are important for this analysis because they determine what can physically fit on the lot.

Exhibit A-13 Parcel Typology

	Parcel type			
	A	B	C	D
Lot size (square feet)	3,200	3,750	5,000	7,200
Lot width (feet)	32	31	50	60
Lot depth (feet)	100	120	100	120
Footprint of main house (square feet)	940	980	1,050	1,150
Living space in main house (square feet)	1,500	1,600	1,800	1,900
Footprint of accessory structures (square feet)	250	250	250	350
Size of daylight basement (if present) (square feet)	500	600	700	800
Number of parking spaces	2	2	2	2
Implications of assumptions				
Current lot coverage	37%	33%	26%	21%
Maximum DADU footprint when keeping existing main house	540	583	700	1,370
Under which alternatives are AADUs allowed?	All alternatives	All alternatives	All alternatives	All alternatives
Under which alternatives are DADUs allowed?	2, 3	2, 3	All alternatives	All alternatives

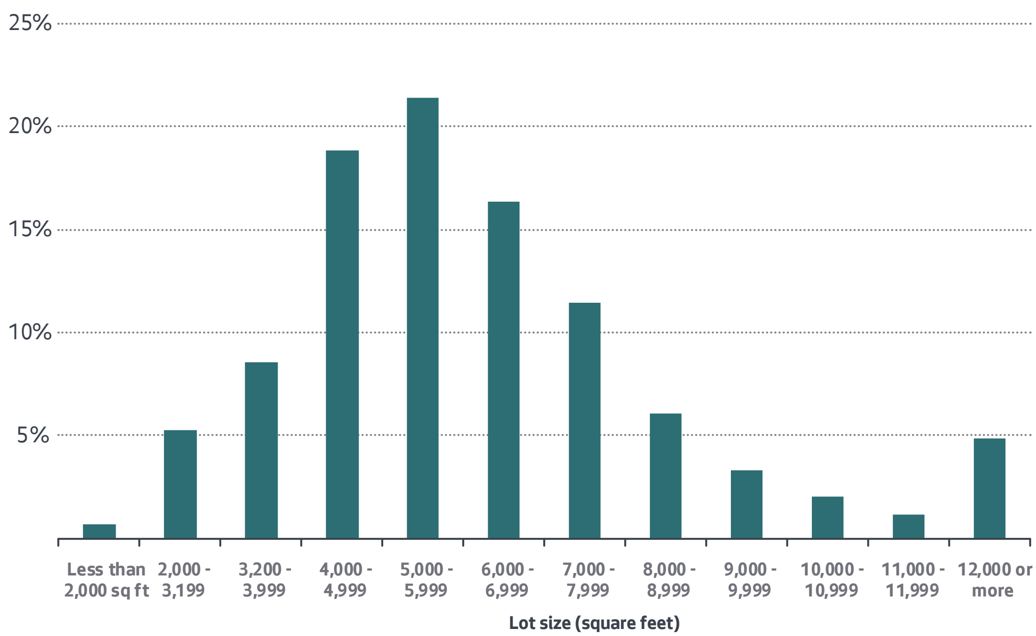
The parcel typology was developed by ECONorthwest and the City of Seattle based on analysis of current parcel conditions. In choosing the parcel types, we had several competing goals:

- Represent the most common parcel characteristics across the study area.
- Represent those parcel sizes that might be most affected by the proposed Land Use Code changes. (Parcels between 3,200 and 3,999 square feet do not allow DADUs currently but would under Alternatives 2 and 3.)
- Represent a range of parcel conditions across the city.

Lot size

Lot size determines the maximum allowed lot coverage. To select the lot sizes used for the typology, we reviewed the distribution of parcel sizes in the study area. The most common lot size in single-family zones in Seattle is 5,000 square feet. Although lots between 3,200 and 3,999 square feet comprise a relatively small share of single-family-zoned lots (nine percent), we chose to use two types in this size range to fully explore the potential impacts of the proposed alternatives on this size category.

Exhibit A-14
Distribution of Parcels by Lot Size in Single-Family Zones
Source: ECONorthwest analysis of King County Assessor Data.



Lot depth and width

Lot depth and width determine how much buildable land is available given required setbacks. Lot width also determines maximum allowed height. Based on review of GIS parcel data, we determined that the two most common lot depths in the study area are 100 feet and 120 feet. Lot depths are similar throughout a neighborhood based on original platting.

Lots less than 30 feet wide have a lower allowed height than other single-family-zoned lots. We considered including a parcel type less than 30 feet wide but decided not to because these lots are extremely uncommon in Seattle. We could not locate any single-family neighborhoods where such narrow lots exist in substantial concentrations. Lot width was determined by dividing lot size by lot depth for each parcel type.

Footprint of main house

The footprint of the main house determines the maximum DADU footprint possible while keeping the main house. To determine footprints, we analyzed mean, median, and mode footprints for each parcel type.

Living space of the house

The current built square footage of the house determines what sales price or rent is achievable for the current house. We determined living space for each parcel type by reviewing data on mean, median, and mode for parcels of a similar size.

Footprint of accessory structures

The footprint of existing accessory structures determines the square footage available for adding a DADU on a lot when preserving all structures. We determined the footprint of accessory structures for each parcel type by reviewing data on mean, median, and mode for parcels of a similar size. Our development prototypes assume that any existing accessory structures would be demolished to make room for a DADU, so the footprint determines the demolition cost.

Size of daylight basement, if present

A survey of Craigslist rental postings conducted in October-November 2017 found that most AADUs in Seattle are basement units. For this analysis, we assumed that AADUs added to existing houses would be conversions of daylight basements. Thus, the assumed size of the daylight basement determines the maximum AADU size for development outcomes in which the current structure is retained. To determine basement sizes, we analyzed mean, median, and mode values for each parcel type.

Number of parking spaces

The King County Assessor does not track information on the number of legal parking spaces available on parcels. However, this is an important input that determines the feasibility of adding one ADU to an existing house in Alternative 1, or two ADUs in Alternative 3. Our assumption — two parking spaces available for each parcel type — means that the determination of the highest and best use will not be constrained by lack of parking.

On the whole, this assumption may result in an overestimate of the feasibility of adding ADUs. In reality, some parcels likely would be constrained from adding ADUs by lack of parking or the cost of adding an additional parking space. However, parking waivers are available in cases where adding a parking space is physically infeasible due to steep topography or the location of existing structures.

Zoning inputs

The pro forma model reflects the current Land Use Code regulations for development in single-family zones, as well as proposed changes under Alternatives 2 and 3. Zoning inputs include information about required setbacks, maximum lot and rear yard coverage, required parking spaces, allowed number of ADUs, allowed size of ADUs, and ADU owner-occupancy requirements.

The zoning inputs were compiled by ECONorthwest from the Land Use Code and the proposed alternatives and reviewed for accuracy by the City of Seattle.

Development and operating cost inputs

These inputs broadly illustrate single-family market conditions as they existed in Seattle as of Fall 2017. Each variable could change over time and vary for any particular project.

Construction costs

To develop construction cost assumptions, we conducted interviews in November 2017 with builders, architects, and developers who work in single-family neighborhoods in Seattle. We spoke with professionals who build AADUs, DADUs, and single-family homes and who renovate single-family homes.

A major finding from the interviews was that DADU construction costs per square foot are much higher than for larger houses. This is because a DADU includes all the expensive components of building a house (e.g., foundation, framing, plumbing, electrical) without any of the inexpensive components (e.g., hallway space). Several interviewees noted that it is difficult to estimate total DADU price based solely on costs per square foot. Based on that feedback, we use a base cost per DADU and an additional construction cost per square foot.

Exhibit A-15 Construction Costs Used in Pro Forma

Input	Assumption
Single-family home new construction ($/square foot)	$125
Single-family home remodel ($/ square foot)	$90
Garage ($/square foot)	$100
Surface parking and driveways ($/square foot)	$25
New below-grade AADU as part of new construction ($/square foot)	$125
Basement AADU conversion ($/square foot)	$90
DADU new construction ($/square foot)	$125
DADU base cost ($ per unit)	$125,000
Demolition ($/square foot of existing structures)	$5
Construction cost premium of for-sale housing over rental housing	5%

Other development costs and assumptions

In addition to construction costs, several other “soft” costs go into a development project. These include permitting fees, architectural and engineering fees, developer fees, and investment return.

Permitting fees are standardized costs that can be calculated for a proposed project. To estimate the cost of City permits for a particular project, we used the rates in the 2018 Fee Estimator tool (City of Seattle). For residential construction that requires a new connection to the sanitary sewer system, King County charges a sewer capacity charge (King County 2018). This fee applies to DADU construction and to new construction that includes an AADU. We used the 2018 sewer capacity charge rates and assumed that the total amount would be paid at time of construction, rather than spread over time. This charge amounts to $11,268 for a DADU or $6,760.80 for an AADU.

Other assumptions about development costs and investment metrics came from interviews with developers, architects, and builders and from ECONorthwest's experience on other recent projects in the Puget Sound region.

Exhibit A-16
Development Costs and Investment Metrics Used in Pro Forma Modeling

Input	Assumption
Architecture / engineering fees (percent of total hard costs)	6.0%
Sales tax (percent of total hard costs)	9.6%
Developer fee (percent of hard and soft costs)	4.0%
Sales costs including commission and excise tax (percent of sales price)	8.0%
Capitalization rate for rental projects (percent)	4.6%
Return on cost requirement for rental projects (percent)	20%

Alternative 2 includes a 10 percent reduction in predevelopment costs for DADUs. To reflect this in the model, we applied a 10 percent overall reduction to sum of the King County sewer capacity charge, City permit fees, and architecture/engineering fees. In reality, the predevelopment cost reduction could be implemented through other mechanisms, such as through streamlined project review, reduced permit and design costs due to pre-approved plans, or other actions.

In Alternative 3, MHA requirements apply when a property owner creates a second ADU. For development outcomes with two ADUs, we applied an affordability contribution of $13 per square foot for the larger of the two ADUs.

Operating costs

Rental properties have ongoing operating expenses. These vary based on whether the property is a short-term or long-term rental.

Exhibit A-17 Operating Cost Assumptions Used in Pro Forma Modeling

Input	Assumption
Long-term rental	
Operating cost (percent of rent)	30%
Short-term rental	
Operating cost (percent of rent)	50%
Annual City of Seattle operator fee (dollars per year)	$75
Sales tax (percent of rent)	9.6%
Airbnb service fee (percent of rent)	3.0%

Building assumptions

To avoid modeling development outcomes that are impossible or occur infrequently in the real world — such as five-foot wide DADUs or 10,000-square-foot houses — we include practical building assumptions that constrain the modeling results. We developed these assumptions based on review of building characteristics, consultation with the City of Seattle, conversations with architects, and professional judgement.

Exhibit A-18 Building Assumptions Used in Pro Forma Modeling

Input	Assumption
Building efficiency for new construction after articulation / architectural features (100 percent would be a perfect box)	90%
Floor height (feet) in principal structures	15
Minimum size of main house footprint (square feet)	600
Maximum size of main house footprint (square feet)	1,500
Minimum width of main house (feet)	15
Minimum size of DADU footprint (square feet)	250
Minimum unit size (square feet)	300
Percent of AADU above grade (for new construction)	10%
For new construction, maximum percent of total allowed building footprint that can be used for DADU	50%
If adding DADU to existing building, percent of spare lot coverage assumed to be available for DADU	80%

Pro forma modeling

Finally, we put all the pieces together and model each combination of inputs (parcel typology, alternative, neighborhood profile, valuation) for each development outcome. This results in residual land value outputs that we can compare across valuation options and alternatives.

ESTIMATING FUTURE ADU PRODUCTION: FORECAST MODEL

Model design

Owners in the study area have multiple options for developing their properties. To arrive at a reasonable forecast of future development given the proposed alternatives, we need a methodology that accounts for historic rates of ADU production. While the pro forma analysis helps us understand the most profitable outcomes, it does not necessarily reflect the real-world decisions that people make. People build ADUs for various reasons unrelated to profit, including to gain additional living space or to house a family member.

A multinomial logit model is a type of behavioral econometric model that allows us to analyze past decisions and trends to determine the factors that make a parcel more or less likely to add an ADU. By incorporating information on parcels, neighborhoods, and macroeconomic trends, this model predicts the likelihood (as a probability) that every parcel in the study area in single-family use will be modified to incorporate an AADU or DADU or be torn down. This type of model is well suited to evaluating the potential impacts of the proposed alternatives because it accounts for historic rates and characteristics of ADU production. It also allows us to quantitatively estimate the potential impact of specific policy changes. For this analysis, we use a multinomial logit model to estimate how many ADUs might be created in each alternative and to observe how the potential impacts might vary by neighborhood and parcel size.[8]

The multinomial logit model is applied to existing data to estimate the parcel-year probability of four key outcomes: 1) adding an AADU, 2) adding a DADU, 3) demolishing the home and rebuilding, or 4) doing nothing.[9] Since options 1 and 2 are mutually exclusive under the existing policy and, in application, generally not reversible, we model them as a permanent change in the property characteristics, while option 3 is an annual dichotomous event.

We applied this model to all parcels in single-family use in the study area. To estimate each parcel's outcome in a given year, we analyzed King County Assessor's data and City of Seattle permit data for 2010-2017. These sources provided us with parcel characteristics, building characteristics, and information about when properties added ADUs or were redeveloped. We analyzed the effect of:

- Neighborhood
- Topography
- Square footage of total living space (before a teardown, if applicable)

8 The multinomial logit is a very powerful choice model used in a wide variety of applications. As with any modeling approach, however, underlying assumptions and availability of data limit the ability to interpret the results. We discuss limitations and caveats throughout this section, as appropriate.

9 The probability of an individual property choosing one of these outcomes is calculated relative to a reference category (in this analysis, the no-action alternative), and is:

$$ln\left(\frac{\pi_{ij}}{\pi_{iJ}}\right) = \alpha_j + \beta_j x_i',$$

where α_j is the intercept term and β_j is a vector of regression coefficients for alternatives *j = AADU,DADU,teardown*. Due to data limitations, we are unable to model the full suite of choice alternatives represented in Exhibit A-2.

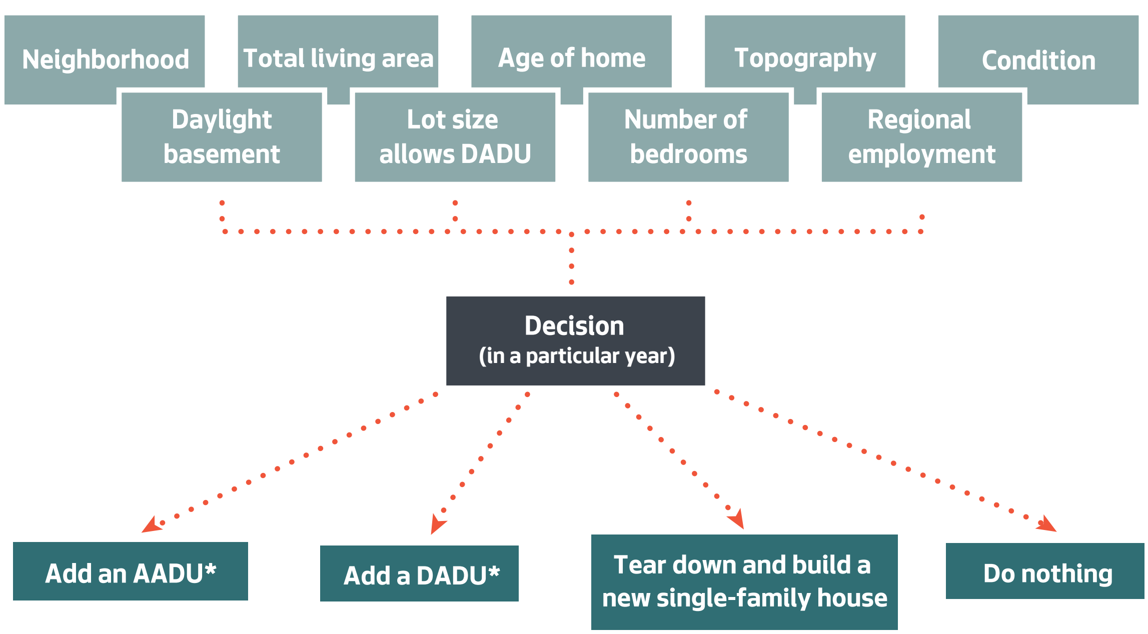
- Square footage of total living space after a teardown (if applicable)[10]
- Age of the home (before a teardown, if applicable)
- Whether the home has a daylight basement
- Number of bedrooms
- Assessed condition of the home
- Whether the lot size allows for a legal DADU
- Total regional employment of the year (PSRC 2015)

To focus on the relevant policies in question, we excluded properties with a lot size greater than one-half acre and properties where the total living area is less than 180 square feet, resulting in a total of 112,104 parcels. Our historical analysis covered 2010 (the first year the City allowed DADUs citywide) through 2017. During that period, 515 properties in the study area added AADUs, 449 properties added DADUs, and 1,803 homes were torn down and rebuilt.

Baseline model results: what characteristics Influence the likelihood of adding an ADU?

The multinomial logit model analyzes the relative effect of each variable on each outcome (AADU, DADU, teardown, or no action).

Exhibit A-19 Decision Path for Multinomial Logit Model



*Only possible if there are no existing ADUs

10 For estimation, both measures of square feet of total living areas were logged to limit the impact of a small number of very large homes.

Exhibit A-20 shows the baseline model results for 2010-2017. The coefficients for each variable can be interpreted by their sign (positive or negative) and magnitude relative to other coefficients within each alternative. Neighborhoods are treated as fixed effects, so their coefficients should be compared to other neighborhoods within the same alternative. A negative coefficient for any variable indicates that it reduces the likelihood of that outcome.

Exhibit A-20 Baseline Multinomial Logit Model Results

	AADU		DADU		Teardown	
	Coefficient	Std. Err.	Coefficient	Std. Err.	Coefficient	Std. Err.
Ballard	0.12	0.52	14.89	783.42	-0.44	0.40
Beacon Hill	0.80	0.52	14.54	783.42	-0.53	0.41
Capitol Hill/Eastlake	0.14	0.51	15.15	783.42	**-1.26**	**0.41**
Central	**1.21**	**0.51**	14.73	783.42	-0.28	0.41
Greenlake/Wallingford	**1.00**	**0.51**	14.66	783.42	-0.59	0.39
Madison/Leschi	0.15	0.51	15.10	783.42	-0.52	0.40
Magnolia	0.01	0.51	14.42	783.42	-0.47	0.39
North Seattle	0.39	0.50	14.74	783.42	-0.10	0.39
Queen Anne	0.41	0.51	14.96	783.42	**-0.95**	**0.40**
Rainier Valley	0.60	0.51	14.23	783.42	-0.64	0.39
University	0.44	0.51	14.71	783.42	-0.36	0.39
West Seattle	0.28	0.51	14.28	783.42	-0.18	0.39
White Center	0.96	0.52	13.23	783.42	-0.01	0.42
Topography	0.10	0.07	**-0.36**	**0.12**	0.00	0.08
Ln of square feet of total living area	**1.76**	**0.77**	0.63	0.51	**-2.43**	**0.07**
Ln of square feet of total living area (new)	**-0.10**	**0.77**	**-1.46**	**0.50**	**4.75**	**0.07**
Age of home (before teardown)	**0.01**	**0.00**	**0.02**	**0.00**	**0.02**	**0.00**
Daylight basement	**0.51**	**0.05**	**-0.41**	**0.09**	**-0.44**	**0.07**
Number of bedrooms	**0.21**	**0.02**	**-0.47**	**0.04**	**-0.20**	**0.03**
Assessed condition	**0.27**	**0.03**	**0.11**	**0.04**	**-0.89**	**0.05**
Lot size allows legal DADU	0.00	0.07	**1.75**	**0.11**	**-0.52**	**0.07**
Regional total employment	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Intercept	**-31.63**	**0.84**	-27.81	783.42	**-23.32**	**0.82**

Note Estimates significant at the 95% level are in **bold**. Values are rounded to two decimal points.

Every variable has a coefficient, but not all variables have a predictive effect on the outcome. We measure this using the standard error associated with each coefficient. Interpret the coefficient as the average effect of the variable. A small standard error relative to the coefficient indicates that the variable has strong predictive power. To interpret results, it is common to define a threshold of "statistical significance" to determine whether a variable has an effect. We use the common (and fairly restrictive) 95 percent confidence level, indicated in bold in the tables below. Any coefficient in bold can be interpreted as having an effect on the probability of the outcome, while any coefficient not in bold can be interpreted as having an effect that is not different than zero.

For example, homes in Capitol Hill/Eastlake are less likely to be torn down than similar homes in other neighborhoods, while homes in the Central Area are more likely than similar homes in other neighborhoods to add an AADU.

The results broadly match our understanding of past ADU production in Seattle. The neighborhood covariates indicate that AADUs are relatively more likely to occur in the Central and Greenlake/Wallingford neighborhoods, while teardowns are relatively less likely to occur in the Capital Hill/Eastlake and Queen Anne neighborhoods. Most neighborhoods do not have a significant effect on the likelihood of an AADU, DADU, or teardown, indicating that structural and lot-specific characteristics have a greater impact than unobservable neighborhood characteristics.

If a property has been identified by the assessor as not being flat (i.e., topography), it is relatively less likely to have a DADU built upon it. Older homes are more likely add an ADU or be torn down than newer homes. Homes with more bedrooms and with a daylight basement are more likely to get an AADU, while smaller homes and those without a daylight basement are more likely either to get a DADU or to be torn down. Homes in better condition are more likely to have an AADU or DADU added, while homes in worse condition are more likely to be torn down.

Several of these results indicate that a tradeoff is occurring between DADUs and teardowns. The presence of a lot over 4,000 square feet (on which adding a DADU is legal) makes a DADU more likely and a teardown less likely (with no effect on AADUs). Additionally, the total square footage variables indicate that larger homes are more likely to get an AADU, while smaller homes are more likely to be torn down. This indicates that homeowners seeking to expand their living space are deciding between tearing down the home or adding an ADU.

Forecasting future ADU production in Alternative 1 (baseline)

The above analysis evaluates all parcel-level decisions that occurred from 2010 through 2017. To estimate what decisions will be made over the next 10 years (from 2018 to 2027), we must forecast how the underlying variables will change during that period, including changes in the regional economy and the ages of individual homes. We implement this in the model by updating the variables for age of the home and regional total employment and recalculating parcel-level probabilities.

To predict the share of homes in 2027 that will have added an ADU or been torn down and rebuilt in the preceding 10 years, we update the age of the home to reflect the age of the home in 2027. For regional total employment over the forecast period, we use PSRC's 2015 Regional Macroeconomic Forecast for that year. Due to the positive effect of both age of the home and regional total employment on AADUs, DADUs, and teardowns, we see an increase in all three outcomes, at an increasing rate, by 2027.

Evaluating the potential Impacts of Alternatives 2 and 3 on ADU production

We also use the multinomial logit model to estimate the potential effects of each action alternative. Where a proposed policy change modifies a variable in the model, we update that value in the data to reflect the change and recalculate new probabilities for each alternative. (This resembles the approach used to predict changes over time.) Based on the proposed Land Use Code changes under consideration, we manipulate two elements in the forecast model:

- **Change in the minimum lot size requirement for adding a DADU.** In Alternatives 2 and 3, we modify the "Legal DADU" variable from zero to one for all properties with a minimum lot size of 3,200 square feet (as opposed to 4,000 square feet in Alternative 1).
- **Change in the maximum floor area ratio for new construction.** In Alternative 3, the "square footage total living area (for new construction)" variable is capped to a FAR limit of 0.5 or 2,500 square feet, whichever is greater.

We evaluate the impacts of these changes for the 10-year forecast period (2018-2027). Since these policy scenarios affect variables relevant only for the DADU and teardown options, we see the largest changes in those outcomes.

Note that some of the proposed changes in Alternatives 2 and 3 are not reflected in the available parcel-level data. These include changes to owner occupancy, maximum household size, parking requirements, maximum DADU size, and DADU construction cost. To the extent that any of these policy proposals affect the likelihood that a parcel has a particular development outcome, those effects are not captured in the forecast model. To compensate for this limitation and establish a reasonable upper bound for the potential number of ADUs created, we adjust these estimates based on the results from the pro forma analysis. This accounts for the potential impact of policy changes that we cannot model while still using best available information on the potential impact of those policy changes that we can model.

Estimating the number of lots in single-family zones choosing to add two ADUs

The multinomial logit model cannot predict the probability of events that do not appear in the historical dataset — namely, the construction of two ADUs on one lot. To estimate the number of lots that might have two ADUs under Alternatives 2 and 3, we use a different approach that estimates the total demand for ADUs, without constraining parcels to the variations that are currently legal.

To estimate the total demand for ADUs, we use the same data and variables[11] from the multinomial logit choice model but instead apply a count data model. For each year in the historical data (2010-2017), we predict the number of ADUs constructed in the study area. Although each parcel in the data only has one ADU, the count data model allows us to relax this constraint and assume that each parcel could have multiple ADUs.[12] Each variable now predicts the likelihood that any given parcel will have one or more ADUs. When applied to the 2010-2017 data, this model predicts the same number of ADUs that were actually built over that period. However, when modified to evaluate the impact of the different policy alternatives, the model predicts the unconstrained total number of ADUs added in a given year.

11 Although specifications with different sets of variables might provide a better fit to the data for the count data model, we chose to use an identical specification to the multinomial logit model to simplify comparison.

12 Although only one event, Y, occurs for each parcel, we assume that the number of ADUs per parcel is an integer value y = 0, 1, 2… and has a Poisson distribution with probability:

$$\Pr\{Y = y\}_i = \frac{e^{-\beta_j x_i'}(\beta_j x_i')^y}{y!}.$$

Because lots with multiple ADUs do not exist in the historical data, this modeling approach depends more on underlying assumptions. Of the several different modeling approaches available, we opted to use the common Poisson distribution because it applies a simplified set of underlying assumptions that match what we know about ADU production.[13] The Poisson distribution assumes the following characteristics:

- **The event can be counted in whole numbers (e.g.,** 0, 1, 2). This assumption is appropriate because it is not possible to build fractional ADUs.
- **Each event occurs independently of other events.** Adding an ADU on one parcel does not affect the probability of adding an ADU on any other parcel.
- **The probability that an event will occur is relatively small.** This assumption is consistent with historic data on rates of ADU production.

Exhibit A-21 shows the results of the ADU count model for 2010-2017.

13 Other count data models include negative binomial and zero inflated Poisson. Although each model carries a slightly different set of underlying assumptions, it is unlikely that using a different model would change the overall scale of results or our conclusions.

Exhibit A-21 Baseline Poisson Model Results

	Coefficient	Standard Error
Ballard	1.38	1.01
Beacon Hill	1.06	1.02
Capitol Hill/Eastlake	1.71	1.01
Central	1.86	1.01
Greenlake/Wallingford	1.62	1.00
Madison/Leschi	1.33	1.02
Magnolia	0.82	1.01
North Seattle	0.89	1.00
Queen Anne	1.77	1.01
Rainier Valley	0.85	1.01
University	1.11	1.01
West Seattle	0.82	1.00
White Center	0.26	1.03
Topography	0.04	0.11
Ln of square feet of total living area	**-2.04**	**0.16**
Ln of square feet of total living area (new)	**1.74**	**0.15**
Age of home (before teardown)	**-0.01**	**0.00**
Daylight basement	-0.02	0.08
Number of bedrooms	0.06	0.04
Assessed condition	**0.29**	**0.05**
Lot size allows legal DADU	**0.82**	**0.11**
Regional total employment	**0.00**	**0.00**
Intercept	**-12.92**	**1.34**

Note Estimates significant at the 95% level are in **bold**. Values are rounded to two decimal points.

The magnitude, sign, and significance of coefficients can be interpreted similarly to the multinomial logit model above. Because this model does not fully represent all the choice alternatives (i.e., it does not include teardowns), some of these results are somewhat less intuitive than the forecast model results. However, consistent with the multinomial logit estimates, the assessed condition, the legality of a DADU, and regional total employment all positively affect the number of ADUs demanded on a parcel. The coefficients on total living area mirror the sign and magnitude of the coefficients on teardowns in the previous model, but they contrast with the ADU coefficients. This likely reflects the effect of not including teardowns in the model.

To estimate the latent demand for ADUs, we calculate the probability that an additional ADU (of any type) is added to a particular parcel for each year. The cumulative probability for the 2018-2027 period reflects the total number of ADUs demanded. Since the multinomial logit model predicts whether an ADU will be added at the parcel level, we subtract the number of AADUs and DADUs the multinomial logit model predicts from the total demand for ADUs to generate an estimate of the number of ADUs that would exist without the single ADU constraint present in Alternative 1 and in the existing data.

	Unconstrained total demand for ADUs (Poisson probability model)-
–	*Predicted number of parcels with one AADU or one DADU (multinomial logit model)*
=	*Predicted number of additional ADUs in Alternatives where two ADUs are legal*

Using these results, we then estimate for each alternative from 2018 to 2027:

- The total number of ADUs built in each alternative
- The number of parcels that build at least one ADU
- The number of parcels that build exactly one AADU
- The number of parcels that build exactly one DADU
- The number of parcels that build two ADUs

The approach relies on a number of assumptions, including the same caveats described above in modeling different policy scenarios. Because two ADUs are not currently legal, we have no historical information to use in predicting future production. We can also interpret (and if necessary adjust) the resulting estimates in the context of our real estate pro forma analysis of highest and best use.

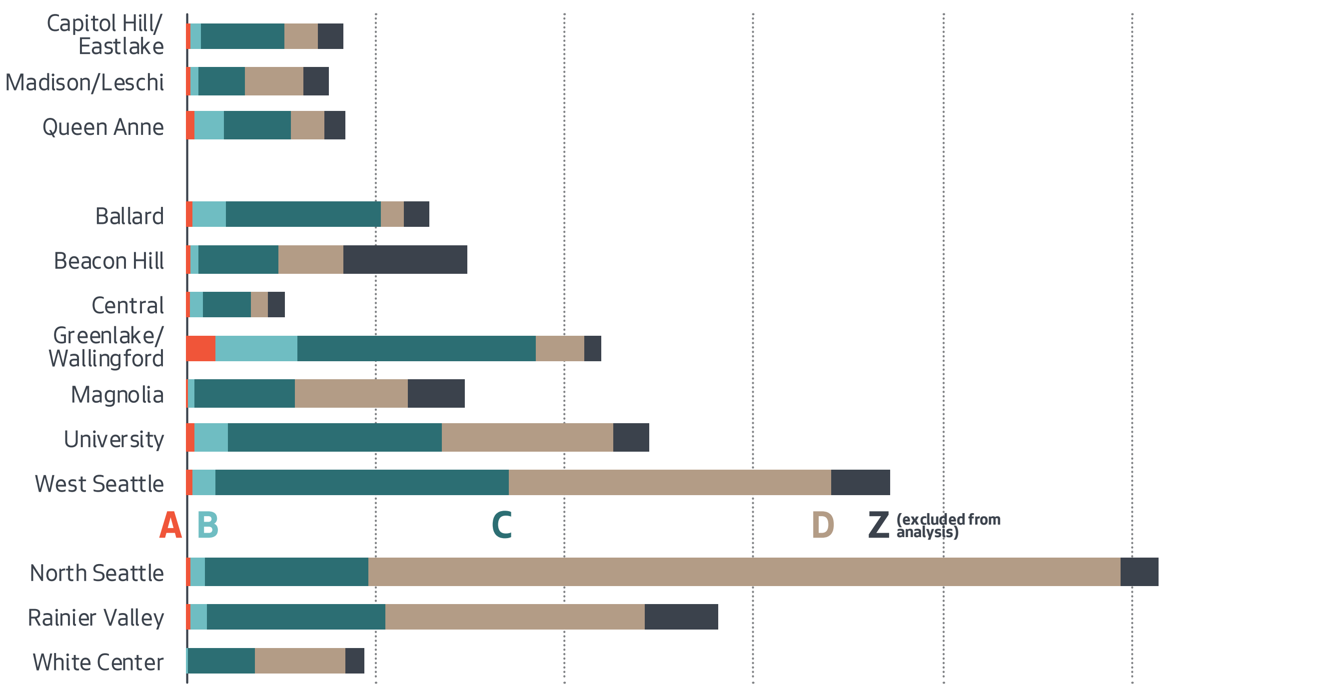
A.4 Findings and Discussion

PARCEL TYPOLOGY BY NEIGHBORHOOD

We present the analysis results in this section by parcel typology and neighborhood cost profile. To interpret the results of the financial pro-forma analysis and the econometric forecast model for specific neighborhoods, we need to know how common each parcel type is in each neighborhood. Exhibit 22 and Exhibit 23 show the number and percentage of each parcel type by neighborhood.

Exhibit A-22 Frequency of Parcel Types by Neighborhood

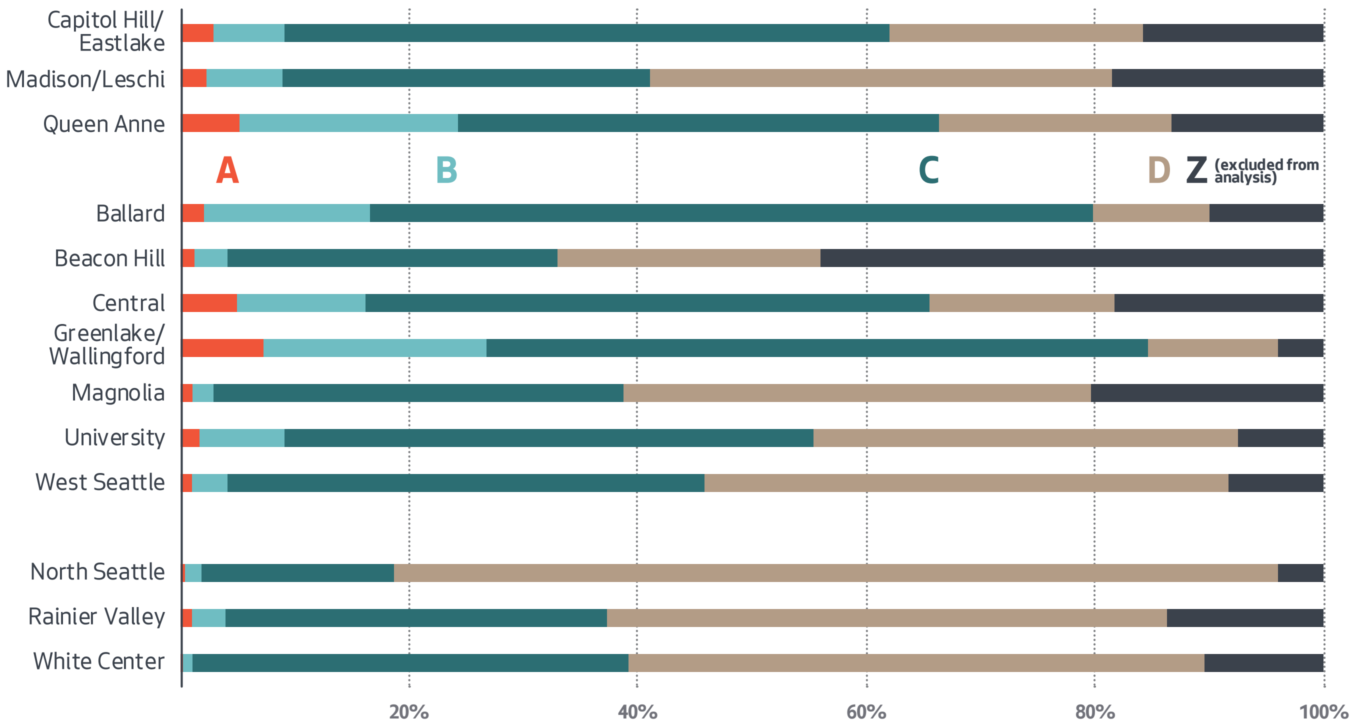
Source: ECONorthwest analysis of King County Assessor data.



Notes This exhibit shows all parcels in the study area. Type A consists of parcels between 3,200 and 3,499 square feet. Type B consists of parcels between 3,500 and 3,999 square feet. Type C consists of parcels between 4,000 and 5,999 square feet. Type D consists of parcels larger than 6,000 square feet. Parcels that are smaller than 3,200 square feet, have a restrictive size or shape, have restricted access, or do not have a single-family use are considered Type Z and were excluded from the analysis.

Exhibit A-23 Share of Parcel Types by Neighborhood

Source: ECONorthwest analysis of King County Assessor data.



Note See Exhibit A-22.

HIGHEST AND BEST USE ANALYSIS

The highest and best use analysis described earlier results in estimates of residual land value for each development outcome for every combination of neighborhood profile, parcel type, and alternative. Higher relative residual land values indicate that a developer could afford to spend more for the land while still covering costs and making a profit. The development outcome and valuation option with the highest residual land value is considered the highest and best use.

Overall, the estimates of highest and best use vary depending on the size of the parcel, the neighborhood, and the alternative. The following section summarizes results for each alternative. For each alternative, we summarize the residual land value results in several ways:

- Estimate of highest and best use (i.e., most feasible outcome)
- Relative feasibility of keeping house with no ADUs, keeping house and adding ADU(s), tearing down house and rebuilding without ADUs, and tearing down house and rebuilding with ADU(s)

- Relative feasibility of outcomes with one AADU, one DADU, two ADUs, or no ADUs
- Relative feasibility of different valuation options
- Relative feasibility of teardowns compared to keeping the existing house

The results presented here should not be interpreted as a determination of what will happen on any given parcel. Instead, this is an analysis of relative feasibility in cases where profit maximization is the only goal and where parcel and market conditions match our prototypes. The outcome for any specific parcel might differ for the reasons we stated previously.

Alternative 1 (No Action)

Alternative 1 represents existing conditions. Exhibit 24 summarizes pro forma results for Alternative 1.

Exhibit A-24 Alternative 1 Estimates of Highest and Best Use

Parcel type	Higher	Medium	Lower
A	**Build new house, as large as possible, no ADUs**	**Build new house, as large as possible, no ADUs**	*Keep house, convert basement to AADU, long-term rental*
B	**Build new house, as large as possible, no ADUs**	**Build new house, as large as possible, no ADUs**	*Keep house, convert basement to AADU, long-term rental*
C	**Build new house, as large as possible, no ADUs**	**Build new house, as large as possible, no ADUs**	*Keep house, convert basement to AADU*
D	*Keep house, convert basement to AADU*	*Keep house, convert basement to AADU, long-term rental*	*Keep house, convert basement to AADU*

Bold text indicates teardown and new construction.

Italicized text indicates keeping the existing house.

Gold highlight indicates that the highest residual land value results from valuing the parcel based on the for-sale price of the main house and the long-term rental income from the ADU.

No highlight indicates the highest residual land value results from valuing the parcel based on the combined for-sale price of the main house and ADU(s).

For small- and medium-sized parcels (A, B, C) in higher- and medium-price neighborhoods, the highest residual land value results from demolishing the existing structure and rebuilding the largest possible house (i.e., McMansion).[14] For larger parcels (D) and for all parcel sizes in lower-price neighborhoods, the highest residual land value results from keeping the existing house and adding an AADU.

However, these top-line results do not account for the relative feasibility among different outcomes. In some cases, the second-most feasible option may have a residual land value very similar to the most feasible option, which should be taken into consideration when interpreting results. Exhibit 25 shows the maximum residual land value of four key categories of outcomes.

By comparing the residual land values in Exhibit 25, we can evaluate the relative feasibility of the major categories of outcomes. Similar residual land values indicate that those outcomes are similarly feasible. For example, for type D parcels in medium-price neighborhoods, the maximum residual land value is $115 for outcomes with one AADU and $114 for teardown outcomes with no ADUs. Although Exhibit 24 indicates that one AADU is the highest and best use, the values in Exhibit 25 suggest that the two outcomes have similar feasibility.

The results shown in Exhibit A-25 indicate that tearing down and rebuilding with an AADU and/or DADU is the least feasible option for all parcel sizes and neighborhoods. For all parcel types, the two most feasible options are building a new house with no ADUs and keeping the house and adding an ADU. In general, teardown scenarios are relatively more feasible in higher- and medium-price neighborhoods.

14 This section uses the following descriptions of parcel sizes:
Small parcel types A and B
Medium parcel type C
Large parcel type D

Exhibit A-25 Relative Feasibility of Key Development Outcomes for Alternative 1

	Keep house, no ADUs	Keep house, add ADU(s)	Tear down, rebuild with no ADUs	Tear down ,rebuild with ADU(s)
Higher				
A	$234	$261	**$299**	$214
B	$213	$243	**$291**	$206
C	$172	$203	**$218**	$159
D	$126	**$151**	$151	$110
Medium				
A	$191	$216	**$225**	$147
B	$174	$199	**$219**	$143
C	$134	$156	**$164**	$110
D	$98	**$115**	$114	$76
Lower				
A	$154	**$162**	$133	$63
B	$140	**$148**	$130	$64
C	$109	**$122**	$97	$48
D	$80	**$91**	$67	$33

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Exhibit A-26 presents the residual land value results differently, by showing the number and type of ADUs added. For all neighborhoods and parcel sizes, development outcomes that add exactly one DADU is the least feasible outcome. On average, the maximum residual land value for an outcome of one DADU is 25 percent less than the most profitable outcomes. In general, outcomes with only a main house (whether new or preserved) and outcomes with one AADU are closer in feasibility. AADUs are generally more feasible on large parcels (type D) and in lower-price neighborhoods.

Exhibit A-26 Relative Feasibility of Different ADU Configurations for Alternative 1

	Max RLV of outcomes with 1 DADU	Max RLV of outcomes with 1 AADU	Max RLV of outcomes with 2 ADUs	Max RLV of outcomes with main house only
Higher				
A	n/a	$261	n/a	**$299**
B	n/a	$243	n/a	**$291**
C	$160	$203	n/a	**$218**
D	$117	**$151**	n/a	$151
Medium				
A	n/a	$216	n/a	**$225**
B	n/a	$199	n/a	**$219**
C	$118	$156	n/a	**$164**
D	$87	**$115**	n/a	$114
Lower				
A	n/a	**$162**	n/a	$154
B	n/a	**$148**	n/a	$140
C	$88	**$122**	n/a	$109
D	$65	**$91**	n/a	$80

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

For any given development outcome, the property owner could decide to rent or sell. For a profit-maximizing owner, this decision will be influenced by the relative strengths of the rental and for-sale markets. Exhibit A-27 shows the relative feasibility of different valuation options. For all neighborhoods and parcel sizes, a house with no ADUs operated as a long-term rental is the least feasible option. On average, the maximum residual land value for an all-rental development outcome is 49 percent less than the most profitable outcome. This suggests that single-family homes are more valuable as for-sale products than as rental products. Treating the entire property (including any ADUs) as one large, for-sale unit is the most profitable outcome for most combinations of parcel type and neighborhood, except for small parcels in lower-price neighborhoods and large parcels in medium-price neighborhoods. In other words, the estimated rental income stream from the ADU less valuable than the additional sales price that comes from having more square footage.

Exhibit A-27 Relative Feasibility of Valuation Options for Alternative 1

	Main unit as long-term rental (no ADUs)	Main unit for sale, ADU as long-term rental	Main unit for sale, ADU as short-term rental	Entire property for sale
Higher				
A	$120	$260	$247	**$299**
B	$109	$240	$220	**$291**
C	$92	$196	$175	**$218**
D	$67	$145	$126	**$151**
Medium				
A	$114	$216	$197	**$225**
B	$103	$199	$175	**$219**
C	$87	$156	$134	**$164**
D	$64	**$115**	$98	$114
Lower				
A	$99	**$162**	$161	$154
B	$90	**$148**	$142	$140
C	$76	$117	$109	**$122**
D	$56	$86	$80	**$91**

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Exhibit 28 shows the relative feasibility of outcomes with a new house compared to outcomes that retain the existing house. In all neighborhood profiles, new construction is relatively more feasible on small and medium parcel sizes. These results indicate that new construction is more feasible in higher- and medium-price neighborhoods than in lower-price neighborhoods.

Exhibit A-28 Relative Feasibility of New Construction for Alternative 1

	Tear down and rebuild	Keep existing house
Higher		
A	**$299**	$261
B	**$291**	$243
C	**$218**	$203
D	$151	**$151**
Medium		
A	**$225**	$216
B	**$219**	$199
C	**$164**	$156
D	$114	**$115**
Lower		
A	$133	**$162**
B	$130	**$148**
C	$97	**$122**
D	$67	**$91**

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Alternative 2

Alternative 2 considers the broadest range of Land Use Code changes to promote housing construction. These changes include allowing lots in single-family zones to have both an AADU and a DADU; removing the owner-occupancy requirement; removing the off-street parking requirement for ADUs; reducing predevelopment costs for DADUs; and allowing DADUs on lots between 3,200 and 3,999 square feet.

Exhibit A-29 summarizes pro forma results for Alternative 2. The most feasible outcomes in Alternative 2 resemble Alternative 1 (No Action), with a few exceptions. In higher-price neighborhoods, the highest and best uses for medium and large parcel sizes shifts to keeping the house and adding two ADUs. In addition, the highest and best use of large parcels (D) in medium-price neighborhoods changes from keeping the existing house and adding one ADU to keeping the house and adding two ADUs.

Exhibit A-29 Alternative 2 Estimates of Highest and Best Use

Parcel type	Higher	Medium	Lower
A	**Build new house, as large as possible, no ADUs**	**Build new house, as large as possible, no ADUs**	*Keep house, convert basement to AADU, long-term rental*
B	**Build new house, as large as possible, no ADUs**	**Build new house, as large as possible, no ADUs**	*Keep house, convert basement to AADU, long-term rental*
C	*Keep house, convert basement to AADU, and add DADU*	**Build new house, as large as possible, no ADUs**	*Keep house, convert basement to AADU*
D	*Keep house, convert basement to AADU, and add DADU*	*Keep house, convert basement to AADU, and add DADU*	*Keep house, convert basement to AADU*

Bold text indicates teardown and new construction.

Italicized text indicates keeping the existing house.

Gold highlight indicates that the highest residual land value results from valuing the parcel based on the for-sale price of the main house and the long-term rental income from the ADU.

No highlight indicates the highest residual land value results from valuing the parcel based on the combined for-sale price of the main house and ADU(s).

Exhibit A-30 shows the maximum residual land value of four key categories of outcomes. Consistent with Alternative 1, outcomes that tear down the house and rebuild with one or more ADUs have the lowest residual land value. In higher- and medium-price neighborhoods, the analysis shows that Alternative 2 increases the relative feasibility of keeping the house and adding one or more ADUs (compared to Alternative 1). For larger parcels in higher-price neighborhoods, the maximum residual land value of adding ADUs to an existing house increases by approximately 10 percent. Medium-price neighborhoods see a smaller increase (approximately five percent for parcel types C and D) while lower-price neighborhoods see essentially no change.

Exhibit A-30 Relative Feasibility of Key Development Outcomes for Alternative 2

	Keep house, no ADUs	Keep house, add ADU(s)	Tear down, rebuild with no ADUs	Tear down ,rebuild with ADU(s)
Higher				
A	$234	$262	**$299**	$216
B	$213	$265	**$291**	$207
C	$172	**$227**	$218	$157
D	$126	**$169**	$151	$109
Medium				
A	$191	$216	**$225**	$149
B	$174	$199	**$219**	$144
C	$134	$163	**$164**	$108
D	$98	**$122**	$114	$75
Lower				
A	$154	**$162**	$133	$65
B	$140	**$149**	$130	$65
C	$109	**$123**	$97	$49
D	$80	**$91**	$67	$34

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Exhibit A-31 shows the estimated maximum residual land value by number and location of ADUs for Alternative 2.

As in Alternative 1, outcomes with one DADU generally have lower residual land values than outcomes that result in one AADU, two ADUs, or a main house only. However, our analysis shows that the feasibility of DADU outcomes (as measured by absolute residual land value) increases in Alternative 2 relative to the no action alternative. Higher-price neighborhoods show the largest potential increase in DADU residual land value (about six percent increase between Alternative 1 and Alternative 2). Parcels in medium- and lower-price neighborhoods show more moderate changes in feasibility of approximately 2.3-2.7 percent.

Outcomes with one AADU and outcomes with only a main house show very small changes in feasibility (<0.2 percent) between Alternative 1 and Alternative 2 for all parcel sizes and neighborhoods.

Similar to Alternative 1, outcomes with one AADU or outcomes with only a main house tend to have the highest feasibility. On average across all parcel types and neighborhoods, the residual land value of the best main house outcomes is only five percent less than the most feasible outcome overall. Compared to the most feasible outcome, residual land values for outcomes with one AADU are six percent less, outcomes with two ADUs 10 percent less, and outcomes with a DADU 26 percent less.

One major policy change from Alternative 1 to Alternative 2 is that a single lot can have two ADUs. Our analysis indicates that this outcome is generally more feasible on larger parcels in higher- and medium-price neighborhoods. In lower-price neighborhoods, residual land value of two-ADU outcomes averages 18 percent less than the most feasible outcome overall.

Exhibit A-31 Relative Feasibility of Different ADU Configurations for Alternative 2

	Max RLV of outcomes with 1 DADU	Max RLV of outcomes with 1 AADU	Max RLV of outcomes with 2 ADUs	Max RLV of outcomes with main house only
Higher				
A	$223	$261	$262	**$299**
B	$202	$244	$265	**$291**
C	$170	$203	**$227**	$218
D	$124	$151	**$169**	$151
Medium				
A	$171	$216	$194	**$225**
B	$157	$199	$188	**$219**
C	$121	$156	$163	**$164**
D	$89	$116	**$122**	$114
Lower				
A	$125	**$162**	$132	$154
B	$115	**$149**	$115	$140
C	$91	**$123**	$102	$109
D	$67	**$91**	$77	$80

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Exhibit A-32 shows the estimated relative feasibility of different valuation options in Alternative 2. For only one parcel type does the most profitable valuation change between Alternative 1 and Alternative 2: type D parcels in medium-price neighborhoods. Treating the entire property (including any ADUs) as one large, for-sale unit continues to the most profitable outcome for most variations, especially in higher-price neighborhoods.

Like Alternative 1, renting all units is the least profitable valuation option for all combinations of neighborhood and parcel type in Alternative 2. However, our analysis indicates that the relative feasibility of renting (as opposed to selling) increases between Alternatives 1 and 2. In higher- and medium-price neighborhoods, the estimated residual land value of renting increases by 21-24 percent. In lower-price neighborhoods, the estimated increase is 11-14 percent.

Exhibit A-32 Relative Feasibility of Valuation Options for Alternative 2

	All units as long-term rental	Main unit for sale, ADUs as long-term rental	Main unit for sale, one ADU as short-term rental	Entire property for sale
Higher				
A	$155	$260	$247	**$299**
B	$140	$240	$221	**$291**
C	$119	$196	$175	**$227**
D	$89	$145	$126	**$169**
Medium				
A	$144	$216	$197	**$225**
B	$133	$199	$175	**$219**
C	$113	$156	$134	**$164**
D	$85	$116	$98	**$122**
Lower				
A	$111	**$162**	$161	$154
B	$103	**$149**	$142	$140
C	$87	$117	$109	**$123**
D	$65	$86	$80	**$91**

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Exhibit A-33 shows the estimated relative feasibility of new construction in Alternative 2. For higher- and medium-price neighborhoods, the feasibility of keeping the existing house is higher in Alternative 2 than in Alternative 1. This change is largest for larger parcel sizes. Lower-price neighborhoods see only a minimal (<0.2 percent) change between Alternative 1 and Alternative 2.

Exhibit A-33 Relative Feasibility of New Construction for Alternative 2

	Tear down and rebuild	Keep existing house
Higher		
A	**$299**	$262
B	**$291**	$265
C	$218	**$227**
D	$151	**$169**
Medium		
A	**$225**	$216
B	**$219**	$199
C	**$164**	$163
D	$114	**$122**
Lower		
A	$133	**$162**
B	$130	**$148**
C	$97	**$122**
D	$67	**$91**

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Alternative 3

Alternative 3 considers more modest adjustments to the Land Use Code that emphasize encouraging a variety of housing types at a similar scale as existing development in single-family zones. The ADU-related changes include allowing lots in single-family zones to have both an AADU and a DADU; removing the off-street parking requirement for the first (but not second) ADU; allowing lots between 3,200 and 3,999 square feet to add a DADU; and applying MHA affordable housing requirements for the second

ADU. Alternative 3 also adds a maximum floor area ratio (FAR) limit for new development.

Exhibit A-34 summarizes pro forma results for Alternative 3. Compared to Alternative 1, fewer parcel types have a highest and best use of building a new very large house.

Exhibit A-34 Alternative 3 Estimates of Highest and Best Use

Parcel type	Higher	Medium	Lower
A	**Build new house, as large as possible, no ADUs**	**Build new house, as large as possible, no ADUs,**	*Keep house, convert basement to AADU, long-term rental*
B	**Build new house, as large as possible, no ADUs**	**Build new house, as large as possible, no ADUs**	*Keep house, convert basement to AADU, long-term rental*
C	*Keep house, convert basement to AADU and add DADU*	*Keep house, convert basement to AADU and add DADU*	*Keep house, convert basement to AADU*
D	*Keep house, convert basement to AADU and add DADU*	*Keep house, convert basement to AADU and add DADU*	*Keep house, convert basement to AADU*

Bold text indicates teardown and new construction.

Italicized text indicates keeping the existing house.

Gold highlight indicates that the highest residual land value results from valuing the parcel based on the for-sale price of the main house and the long-term rental income from the ADU.

No highlight indicates the highest residual land value results from valuing the parcel based on the combined for-sale price of the main house and ADU(s).

Exhibit A-35 shows the maximum residual land value of four key categories of outcomes. Consistent with Alternative 1 and Alternative 2, outcomes that tear down the house and rebuild with one or more ADUs have the lowest residual land value for all combinations of neighborhood and parcel type. In higher- and medium-price neighborhoods, Alternative 3 increases the relative feasibility of keeping the house and adding one or more ADUs (compared to Alternative 1). However, this increase is smaller in Alternative 3 than in Alternative 2. In higher- and medium-price neighborhoods, the maximum residual land value for keeping the house and adding one or more ADUs increased by four percent between Alternative 1 and Alternative 3, and five percent between Alternative 1 and Alternative 2. For larger parcels in higher-price neighborhoods, the maximum residual land value of adding ADUs to an existing house increases by approximately nine percent. Medium-price neighborhoods see a smaller increase (approximately two percent for parcel types C and D) while lower-price neighborhoods see essentially no change.

Exhibit A-35 Relative Feasibility of Key Development Outcomes for Alternative 3

	Keep house, no ADUs	Keep house, add ADU(s)	Tear down, rebuild with no ADUs	Tear down ,rebuild with ADU(s)
Higher				
A	$234	$261	**$299**	$216
B	$213	$259	**$277**	$198
C	$172	**$223**	$207	$156
D	$126	**$166**	$151	$108
Medium				
A	$191	$216	**$225**	$149
B	$174	$199	**$219**	$144
C	$134	**$163**	$164	$108
D	$98	**$122**	$114	$75
Lower				
A	$154	**$162**	$133	$65
B	$140	**$148**	$123	$59
C	$109	**$122**	$92	$47
D	$80	**$91**	$67	$34

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Exhibit A-36 shows the estimated maximum residual land value by number and location of ADUs for Alternative 3.

The results suggest that DADU feasibility in Alternative 3 would be similar to Alternative 2 (and higher than Alternative 1). DADU outcomes in Alternative 3 show slightly lower residual land values than in Alternative 2 due to policy differences that affect DADU cost. (Alternative 2 includes a predevelopment cost reduction for DADUs.)

Outcomes with one AADU show no change in feasibility between Alternative 1 and Alternative 3 for all parcel sizes and neighborhoods.

For some parcels, Alternative 3 may reduce feasibility for outcomes with only one unit. Parcel types B and C in higher- and medium-price neighborhoods show a five percent decrease in the maximum residual land value of outcomes with only a main house. Other parcel types show no change in feasibility.

As in Alternative 2, our analysis indicates that building two ADUs is more feasible on larger parcels in higher- and medium-price neighborhoods. However, the feasibility of building two ADUs is slightly lower in Alternative 3 relative to Alternative 2. Consistent with Alternative 2, building two ADUs is relatively less feasible in lower-price neighborhoods. Average residual land value of two-ADU outcomes is about 22 percent less than the most feasible outcome overall in lower-price neighborhoods, seven percent less in medium-price neighborhoods, and five percent less in high-price neighborhoods.

Exhibit A-36 Relative Feasibility of Different ADU Configurations for Alternative 3

	Max RLV of outcomes with 1 DADU	Max RLV of outcomes with 1 AADU	Max RLV of outcomes with 2 ADUs	Max RLV of outcomes with main house only
Higher				
A	$222	$261	$256	**$299**
B	$201	$243	$259	**$277**
C	$169	$203	**$223**	$207
D	$124	$151	**$166**	$151
Medium				
A	$170	$216	$189	**$225**
B	$156	$199	$183	**$209**
C	$120	$156	**$159**	$156
D	$88	$115	**$119**	$114
Lower				
A	$124	**$162**	$126	$154
B	$114	**$148**	$110	$140
C	$90	**$122**	$98	$109
D	$66	**$91**	$74	$80

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Exhibit A-37 shows the estimated relative feasibility of different valuation options in Alternative 3. Only one parcel size shows a change in the most profitable valuation between Alternative 1 and Alternative 3: type D parcels in medium-price neighborhoods. Treating the entire property (including any ADUs) as one large, for-sale unit remains the most profitable outcome for most combinations of parcel type and neighborhood, especially in higher-price neighborhoods.

As with Alternatives 1 and 2, renting all units is the least profitable valuation option for all combinations of neighborhood and parcel size. The estimated feasibility of renting in Alternative 3 is similar to Alternative 1 (and lower than in Alternative 2).

Exhibit A-37 Relative Feasibility of Valuation Options for Alternative 3

	All units as long-term rental	Main unit for sale, ADUs as long-term rental	Main unit for sale, one ADU as short-term rental	Entire property for sale
Higher				
A	$120	$260	$247	**$299**
B	$109	$240	$220	**$277**
C	$92	$196	$175	**$223**
D	$67	$145	$126	**$166**
Medium				
A	$114	$216	$197	**$225**
B	$103	$199	$175	**$209**
C	$87	$156	$134	**$159**
D	$64	$115	$98	**$119**
Lower				
A	$99	**$162**	$161	$154
B	$90	**$148**	$142	$140
C	$76	$117	$109	**$122**
D	$56	$86	$80	**$91**

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

Exhibit A-38 shows the estimated relative feasibility of new construction in Alternative 3. For all neighborhoods, Alternative 3 appears to decrease the feasibility of teardowns. This effect is strongest for parcels types B and C. In higher- and medium-price neighborhoods, Alternative 3 also increase the financial incentive of keeping the existing house compared to Alternative 1. This change is largest for larger parcel sizes.

Exhibit A-38 Relative Feasibility of New Construction for Alternative 2

	Tear down and rebuild	Keep existing house
Higher		
A	**$299**	$261
B	**$277**	$259
C	$207	**$223**
D	$151	**$166**
Medium		
A	**$225**	$216
B	**$209**	$199
C	$156	**$159**
D	$114	**$119**
Lower		
A	$133	**$162**
B	$123	**$148**
C	$92	**$122**
D	$67	**$91**

The highest residual land value for each combination of neighborhood and parcel is **bolded**.

ESTIMATES OF FUTURE ADU PRODUCTION

Results

Using the methods described earlier, we arrive at estimates of ADU production and single-family new construction for 2018-2027.

The econometric forecast model cannot account for all proposed policy changes. To account for those un-modeled policy changes and arrive at a reasonable upper-bounds estimate of ADU production, we apply the percent increases shown in Exhibit A-39 to the modeled estimates as adjustment factors.

Exhibit A-39
Assumed Percent Increases in Modeled Number of Events Due to Policy Changes Not Accounted for in Model

	Alternative 2	Alternative 3
One AADU	5%	2%
One DADU	15%	10%
Two ADUs	30%	25%
Tear down	0%	0%

- **One AADU.** The adjustment factors reflect the potential effect of modifying the parking requirement. The difference between Alternatives 2 and 3 reflects policy differences in the owner-occupancy requirement. These adjustments are higher than would be indicated by the pro forma analysis alone, which estimated that the feasibility of building an AADU would increase by less than one percent. To arrive at a reasonable upper-bounds estimate for AADU production, we are using a larger adjustment than indicated by the results of the pro forma analysis to account for the potential effect of changing the parking requirement.
- **One DADU.** The adjustment factors reflect an upper-bounds estimate of the potential effect of relaxing the parking requirement, allowing larger DADUs, and increasing the rear yard coverage limit. The difference between Alternatives 2 and 3 reflects policy differences in the cost of DADU construction and owner-occupancy requirement. (Again, these adjustments are higher than indicated by the results of the pro forma analysis. The pro forma results indicate that feasibility of DADUs would increase at most six percent in Alternative 2, and only for some combinations of parcel type and neighborhood.)
- **Two ADUs.** The count data model uses historical data to predict the total unconstrained number of ADUs added (without the current policy of one ADU per lot). Even with this approach, there is still underlying uncertainty due to the lack of data on potential demand. We used relatively high adjustment factors (30 percent for Alternative 2 and 25 percent for Alternative 3) in order to arrive at reasonable upper-bounds estimates. These adjustment factors are higher than indicated by the pro forma analysis, which found that the feasibility of building two ADUs would be at most 10 percent more feasible than the next best option, to account for this underlying

uncertainty. The difference between Alternatives 2 and 3 reflects policy differences in the proposed parking, MHA, and owner-occupancy requirements.

Exhibit A-40 presents our estimates for ADU production and new construction after applying these adjustments. These results indicate that Alternatives 2 and 3 would both have the intended effect of increasing the production of ADUs citywide. The results show that about 1,890 ADUs would be created under Alternative 1 from 2018 to 2017. In comparison, we estimate that Alternative 2 would result in about 1,440 additional ADUs over the 10-year period, while Alternative 3 would result in about 1,210 additional ADUs.

Exhibit A-40 Estimated Citywide Production of ADUs and New Homes, 2018-2027

	Alternative 1	Alternative 2	Alternative 3	Percent change from Alt 1 to Alt 2	Percent change from Alt 1 to Alt 3
Estimated number of ADUs built	1,890	3,330	3,100	76%	64%
Estimated number of parcels that build exactly one AADU	900	630	650	-30%	-28%
Estimated number of parcels that build exactly one DADU	990	940	960	-5%	-3%
Estimated number of parcels that build two ADUs	—	880	745	n/a	n/a
Estimated number of parcels that build at least one ADU	1,890	2,450	2,355	30%	25%
Percent of study area parcels that build at least one ADU	1.5%	2.0%	1.9%	30%	25%
Estimated number of existing homes torn down and redeveloped	2,610	2,460	2,200	-6%	-16%
Percent of study area parcels with tear downs	2.1%	2.0%	1.8%	-6%	-16%

Both Alternatives 2 and 3 could reduce the number of teardowns. These results reflect the finding from the forecast model that, historically, households in Seattle have traded off between adding ADUs and demolishing and rebuilding. The model predicts that allowing DADUs on smaller lots (as proposed in Alternative 2 and 3) would increase ADU production on those lots and, at the same time, decrease teardowns.

Alternative 3 would have the largest potential reduction in teardowns, with an estimated 16 percent decrease over Alternative 1. The larger reduction in teardowns under Alternative 3 is due to the proposed FAR limit.

Exhibit A-41 shows the same results broken out by neighborhood profile (higher, medium, or lower price). In Alternative 1, baseline rates of ADU production and new construction are highest in higher-price neighborhoods (where 1.9 percent of lots would add an ADU and 2.9 percent of lots would experience a teardown) than in lower-price neighborhoods (1.4 percent and 1.8 percent, respectively). Medium-price neighborhoods fall in the middle.

Exhibit A-41 Estimated Citywide Production of ADUs and New Homes, 2018-2027, by Neighborhood Profile

	Alternative 1	Alternative 2	Alternative 3	Percent change from Alt 1 to Alt 2	Percent change from Alt 1 to Alt 3
Estimated number of ADUs built					
Higher	235	460	400	96%	70%
Medium	1,020	1,880	1,750	84%	72%
Lower	635	990	950	56%	50%
Estimated number of parcels that build at least one ADU					
Higher	235	330	320	40%	36%
Medium	1,020	1,365	1,310	34%	28%
Lower	635	755	725	19%	14%
Percent of study area parcels that build at least one ADU					
Higher	1.9%	2.7%	2.6%	40%	36%
Medium	1.6%	2.1%	2.0%	34%	28%
Lower	1.4%	1.7%	1.6%	19%	14%
Percent of study area parcels with tear downs					
Higher	2.9%	2.7%	2.0%	-9%	-31%
Medium	2.2%	2.1%	1.9%	-7%	-18%
Lower	1.8%	1.7%	1.7%	-2%	-6%

Note Estimates have been rounded to the nearest 10.

This analysis also indicates that higher-price neighborhoods would see the largest potential changes under the action alternatives, followed by medium-price neighborhoods. Lower-price neighborhoods would see the smallest potential changes from either action alternative. Alternative 2 would nearly double the number of ADUs produced in higher-price neighborhoods (96 percent increase relative to Alternative 1) and lower the number of teardowns nine percent, while lower-price neighborhoods would experience a more modest increase in ADUs (56 percent) and decrease in teardowns (two percent).

Likewise, policies in Alternative 3 that limit the maximum size of new construction would have the largest potential effects in higher-price neighborhoods. In Alternative 3, the estimated number of teardowns in higher-price neighborhoods would decrease by 31 percent relative to Alternative 1, but by only six percent in lower-price neighborhoods.

The likelihood of an ADU or new single-family home varies by neighborhood and parcel type. Exhibit A-42 shows the share of lots estimated to add an ADU or tear down and build a new single-family house over the 2018-2027 forecast period for each combination of neighborhood profile and parcel type.

Exhibit A-42 Percent of Lots Estimated to Add an ADU or redevelop, by Parcel Type and Neighborhood Price Profile

Neighborhood profile	Parcel type	Percent of parcels that add 1 AADU			Percent of parcels that add 1 DADU			Percent of parcels that add 2 ADUs			Percent of parcels with tear-downs		
		Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
High	**A**	0.7%	0.5%	0.5%	0.0%	1.0%	1.1%	0.0%	1.1%	0.8%	2.8%	1.9%	1.6%
High	**B**	0.8%	0.5%	0.6%	0.0%	1.5%	1.7%	0.0%	1.2%	0.8%	3.1%	1.8%	1.4%
High	**C**	0.9%	0.6%	0.7%	1.2%	1.0%	1.3%	0.0%	1.3%	0.8%	2.3%	2.0%	1.4%
High	**D**	1.8%	1.5%	1.7%	0.9%	0.8%	0.9%	0.0%	0.7%	0.3%	4.3%	4.3%	3.2%
High	**Z**	0.6%	0.3%	0.3%	0.4%	0.2%	0.2%	0.0%	0.7%	0.7%	2.3%	2.3%	2.1%
Medium	**A**	0.8%	0.6%	0.6%	0.0%	1.3%	1.3%	0.0%	0.8%	0.7%	2.6%	1.6%	1.5%
Medium	**B**	0.7%	0.6%	0.6%	0.0%	1.4%	1.4%	0.0%	0.8%	0.7%	3.0%	1.8%	1.5%
Medium	**C**	0.7%	0.5%	0.5%	1.1%	1.0%	1.0%	0.0%	0.8%	0.7%	2.0%	1.9%	1.6%
Medium	**D**	0.8%	0.6%	0.6%	0.8%	0.6%	0.6%	0.0%	0.7%	0.7%	2.4%	2.4%	2.2%
Medium	**Z**	0.6%	0.3%	0.3%	0.4%	0.2%	0.2%	0.0%	0.7%	0.7%	2.1%	2.1%	2.0%
Low	**A**	0.5%	0.3%	0.3%	0.0%	0.7%	0.7%	0.0%	0.7%	0.6%	2.0%	1.2%	1.2%
Low	**B**	0.5%	0.4%	0.4%	0.0%	1.5%	1.4%	0.0%	0.2%	0.1%	2.0%	1.2%	1.1%
Low	**C**	0.5%	0.4%	0.4%	0.9%	0.8%	0.8%	0.0%	0.5%	0.4%	1.5%	1.4%	1.3%
Low	**D**	0.7%	0.5%	0.5%	0.8%	0.7%	0.7%	0.0%	0.6%	0.5%	1.9%	1.9%	1.8%
Low	**Z**	0.4%	0.1%	0.1%	0.2%	0.1%	0.1%	0.0%	0.6%	0.6%	1.8%	1.8%	1.8%

DISCUSSION

Taken together, the results of the highest and best use analysis indicate that Alternative 2 and Alternative 3 could increase the relative financial feasibility of different development outcomes and valuation choices, but that these shifts would likely be small compared to overall size of the single-family housing stock. Meanwhile, the forecast model indicates that Alternative 2 and Alternative 3 could increase ADU production and decrease teardowns of single-family homes, with the largest potential changes in ADU production occurring in Alternative 2.

Potential changes to owner-occupancy

The pro forma results indicate that Alternative 2 could potentially increase the profitability of treating lots in single-family zones as rental properties, but that renting would remain the least profitable valuation option. Across all alternatives, the most profitable outcome is likely to be either entirely for-sale or a for-sale main house with ADU(s) as long-term rentals. This is because in current market conditions, single-family houses and ADUs are generally more valuable on the for-sale market than as rental properties. In other words, valuing an ADU as extra square footage on a house for sale results in a higher residual land value than valuing the ADU based on its achievable rental income.

Potential changes to scale and urban form

The pro forma results suggest that both Alternative 2 and Alternative 3 may increase the relative feasibility of retaining the existing home (as opposed to demolishing and building new). In no cases did the pro forma analysis indicate a greater shift towards demolition of existing houses.

Similarly, the decision model estimates that the number of houses torn down and redeveloped would be highest in Alternative 1 and lowest in Alternative 3. Relative to Alternative 1, Alternative 2 could potentially result in six percent fewer houses demolished over the 10-year forecast period, while Alternative 3 could potentially result in 16 percent fewer houses demolished.

Alternatives 2 and 3 both legalize two ADUs on lots in single-family zones. For lots where this outcome is most likely to occur, our analysis suggests that the two ADUs would be added to the existing house (rather than built as part of new construction) as an investor weighs the trade-offs of achieving more square footage relative to the cost to develop the product.

Potential impacts to housing affordability

Housing affordability refers to housing cost relative to income. Changes to housing affordability can occur through two primary mechanisms: 1) changing the price of housing and 2) changing income.

Potential changes to housing price

The proposed alternatives could affect housing prices in two main ways: by changing supply (i.e., the number of housing units) or by changing the size and/or characteristics of units.

Our results indicate that Alternatives 2 and 3 may increase the supply of housing units in single-family zones by increasing the production of two- and three-unit outcomes relative to single-unit outcomes. This effect, which is larger for Alternative 2 than for Alternative 3, may marginally improve housing affordability.[15] Currently, the number of housing units in Seattle's single-family zones is relatively stable. This is a result of having few development opportunities in areas that are already built out. People who want to live in these areas have limited options (both in terms of diversity of housing products available and the number of vacant or for-sale units). Expanding the supply of housing in these neighborhoods can reduce the upward bidding pressure for housing that results from product scarcity. Generally, increasing housing supply helps drive up vacancy rates and eventually puts downward pressure on prices, although in the short-run there is a limit to this dynamic.

Both the pro forma analysis and the decision model found that ADU production rates are likely to vary by neighborhood profile, with higher rates of ADU production in more expensive neighborhoods. As shown in Exhibit A-43, these also tend to be places with greater access to opportunity.

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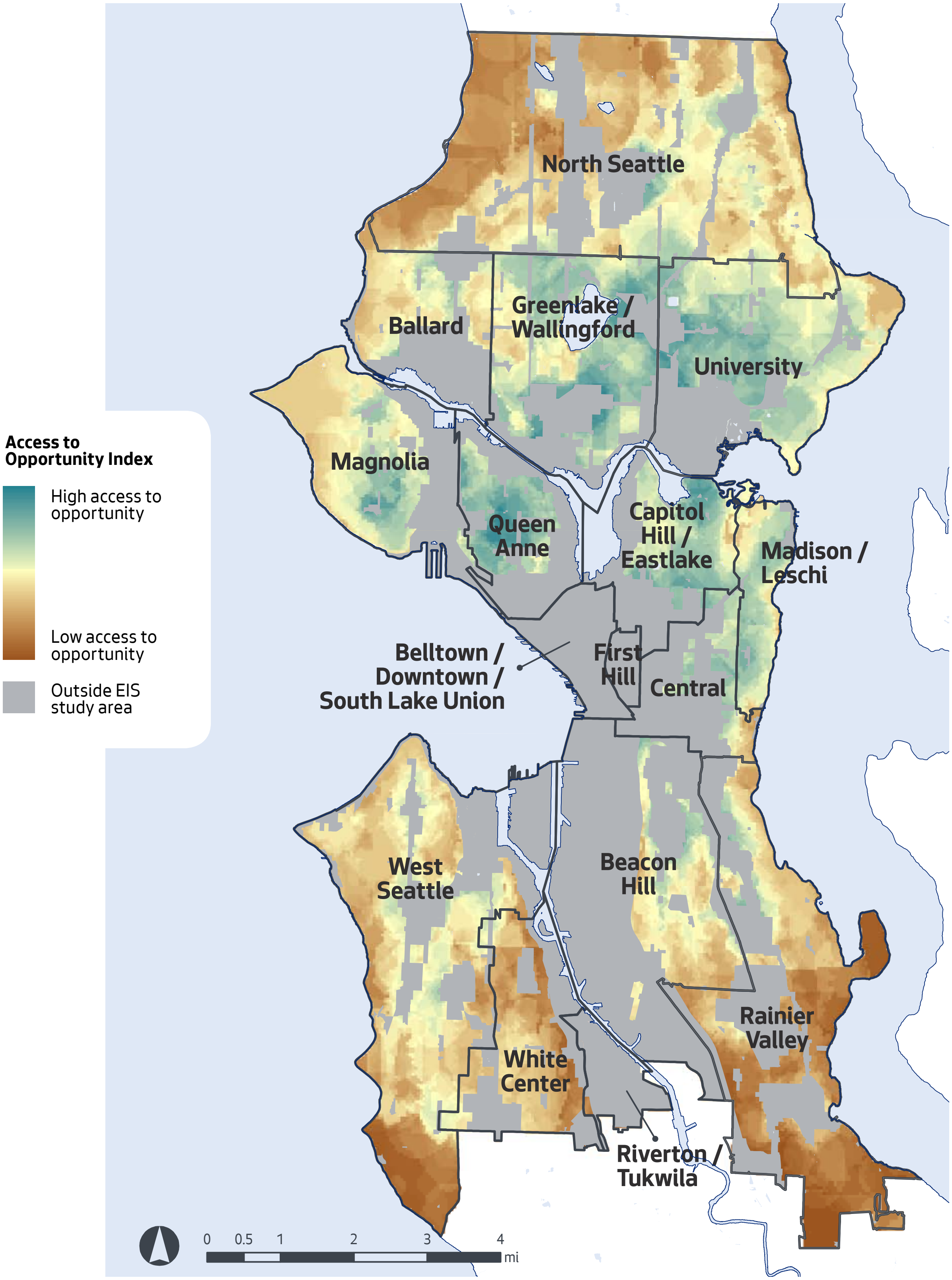
15 For a literature review of the links between housing supply and housing costs, see Appendix I of the MHA EIS "Housing Production and Cost: A Review of the Research Literatures." http://www.seattle.gov/Documents/Departments/HALA/Policy/MHA_FEIS/AppI_MHA_FEIS_2017.pdf.

Exhibit A-43 Seattle 2035 Access to Opportunity Index

Source: Seattle 2016



Changing the size or characteristics of units can also affect the price of housing. Larger units tend to be more expensive. Increasing the number of ADUs (as we estimate may occur in Alternatives 2 and 3) has the effect of providing smaller, less expensive units in single-family areas. (The maximum size of an ADU is 1,000 square feet, compared with 3,130 square feet for the typical new single-family home.)[16]

Alternatives 2 and 3 both allow the construction of larger DADUs than are allowed in Alternative 1, which would tend to be more expensive than smaller DADUs. However, the pro forma results indicate that property owners may not build to the maximum DADU size allowed.

A final way of looking at potential effects on the price of housing is to look at estimated changes to the maximum residual land value under each alternative. An increase in the residual land value suggests developers can afford to pay more for land, and thus that land prices might increase. As shown in Exhibit A-44, estimated changes to maximum residual land value vary by alternative, neighborhood, and parcel type. In high-price neighborhoods, the amount a developer could afford to pay for land increases for parcel types C and D, suggesting that land prices could increase for those properties. In medium-price neighborhoods, the largest parcels (type D) experience an increase in residual land values, while smaller parcels show no change or a decrease. In lower-price neighborhoods, the amount a developer could afford to pay is consistent across the three alternatives, suggesting no change in land prices.

16 3,130 square feet is the median total square footage of single-family houses built 2016-2017 in the study area.

Our results indicate that Alternative 3 could decrease residual land value for certain parcel types in high- and medium-price neighborhoods relative to the no action alternative. This reflects the FAR limit on new construction included in Alternative 3.

Exhibit A-44 Estimated Changes to Maximum Residual Land Value

	Alternative 1	Alternative 2	Alternative 3	Percent change from Alt 1 to Alt 2	Percent change from Alt 1 to Alt 3
Higher					
A	$299	$299	$299	0%	0%
B	$291	$291	$277	0%	-5%
C	$218	$227	$223	4%	2%
D	$151	$169	$166	12%	10%
Medium					
A	$225	$225	$225	0%	0%
B	$219	$219	$209	0%	-5%
C	$164	$164	$159	0%	-3%
D	$115	$122	$119	5%	3%
Lower					
A	$162	$162	$162	0%	0%
B	$148	$149	$148	0%	0%
C	$122	$123	$122	0%	0%
D	$91	$91	$91	0%	0%

Potential changes to income

Decreasing housing costs is the most commonly discussed method of increasing housing affordability, but increasing income can achieve the same effect. A household with an income of $100,000 can afford to pay more for housing than a household with an income of $50,000. An ADU operated as a rental unit can provide an additional revenue stream for homeowners. Policies that make it easier or less expensive to build ADUs may improve affordability for some homeowners by providing new income sources.

Potential impacts to residential displacement, marginalized communities, and people of color

As shown in Exhibit A-45, the neighborhoods in our study area most vulnerable to displacement are Rainier Valley, White Center, Beacon Hill, and North Seattle. Except for Beacon Hill, these are all lower-price neighborhoods. Those four neighborhoods also have larger shares of people of color (Exhibit A-46).

Our analysis finds that lower-price neighborhoods would experience the smallest potential changes in development feasibility across all lot sizes. Consistent with the analysis of highest and best use, the estimate of future production also finds that lower-price neighborhoods would generally experience the smallest increases in ADU production and smallest decreases in teardowns.

Exhibit A-45 Seattle 2035 Displacement Risk Index

Source: Seattle 2016

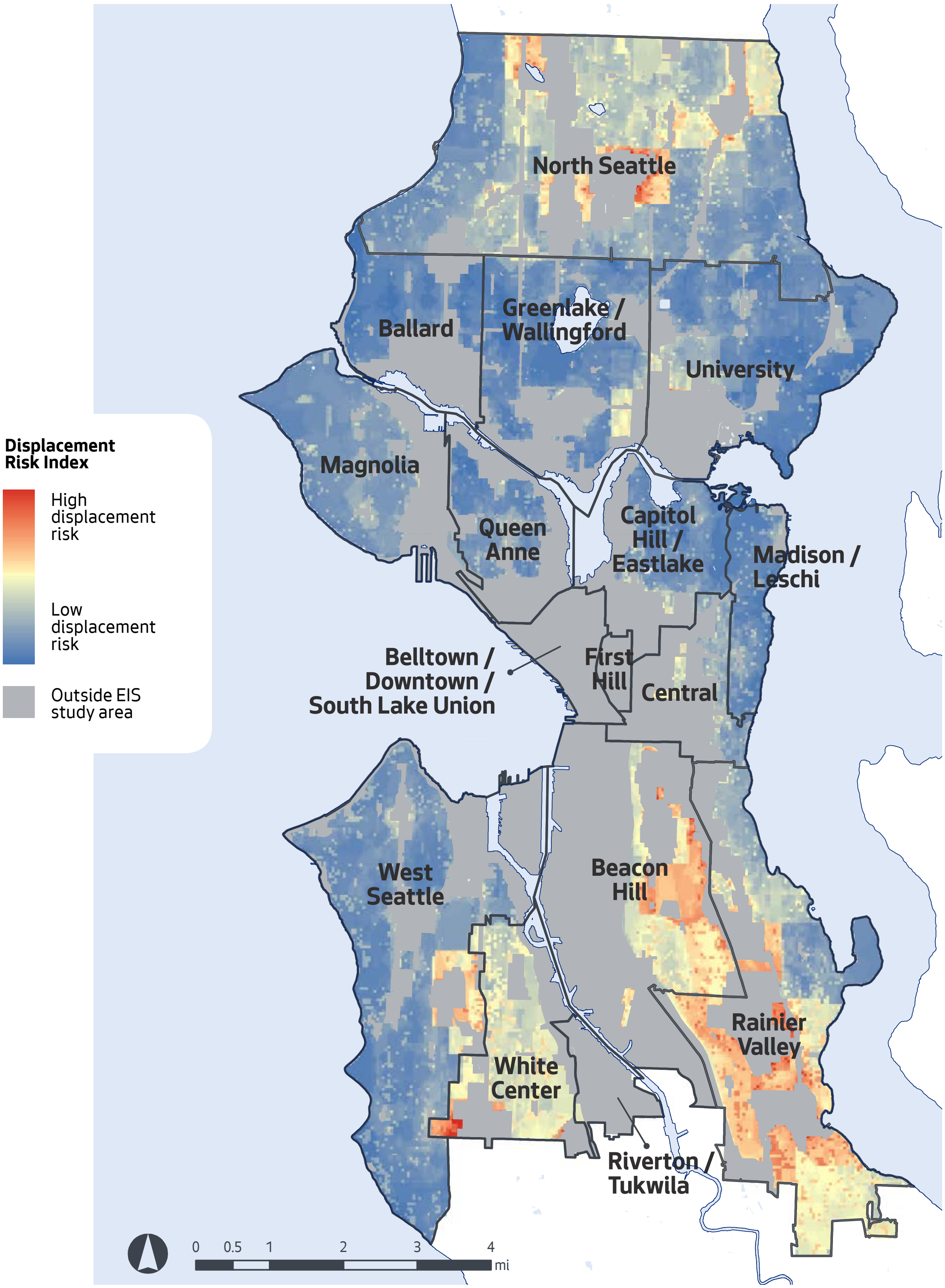
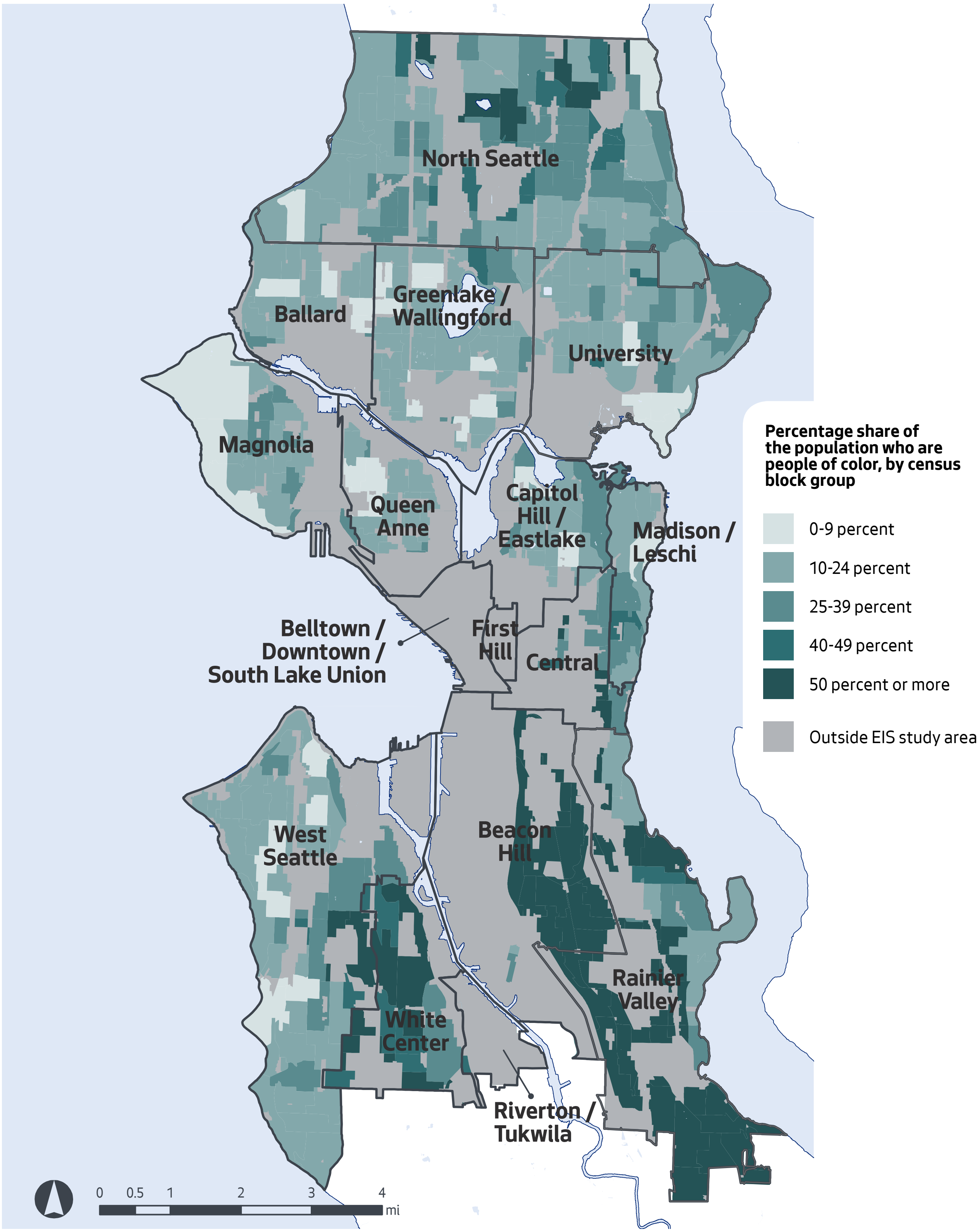


Exhibit A-46 Share of Residents Who Are People of Color

Source: 2016 5-Year American Community Survey



Potential changes to ADU production

Both Alternatives 2 and 3 are estimated to increase the number of ADUs created relative to Alternative 1 (No Action). Compared to Alternative 1, we estimate the potential for a 76 percent increase in ADUs in Alternative 2 (1,440 additional ADUs) and a 64 percent increase in Alternative 3 (1,210 additional ADUs). The results of the analysis show that additional ADUs created in Alternatives 2 and 3 would be distributed across all neighborhoods and lot sizes, but with the largest increases in higher-price neighborhoods.

APPENDIX B
Parking Analysis Methods and Assumptions

B.1 Background

The City of Seattle proposes to change regulations in the Land Use Code to remove barriers to the creation of ADUs in single-family zones. ADUs include backyard cottages, known as detached accessory dwelling units (DADUs), and in-law apartments, known as attached accessory dwelling units (AADUs). The proposal involves several Land Use Code changes, including allowing two ADUs on some lots, changing the existing off-street parking and owner-occupancy requirements, and changing some development standards that regulate the size and location of DADUs.

In May 2016, the City prepared an environmental checklist evaluating the potential environmental impacts of the proposed changes to the Land Use Code, and made a determination of non-significance. The determination made in the checklist was appealed in June 2016. In December 2016, the Seattle Hearing Examiner determined that a more thorough review of the potential environmental impacts of the proposal was required (Tanner 2016). This requested review included impacts to on-street parking. Based on the Hearing Examiner's decision, the Seattle City Council prepared an Environmental Impact Statement (EIS) in accordance with the Washington State Environmental Policy Act (SEPA).

The EIS analyzes three alternatives. (For a full list of the proposed changes in each alternative, see Chapter 2 of the EIS, Exhibit 2.2).

- **Alternative 1 – No Action.** Under Alternative 1, no changes would be made to the existing ADU regulations.
- **Alternative 2.** Alternative 2 considers the broadest range of changes to the Land Use Code to promote the production of ADUs. These changes include: allowing lots in single-family zones to have both an AADU and a DADU; removing the owner-occupancy requirement; removing the off-street

parking requirement for ADUs; reducing predevelopment costs for DADUs; and allowing lots between 3,200 and 3,999 square feet to add a DADU.

- **Alternative 3.** Alternative 3 considers more modest adjustments to the Land Use Code that emphasize maintaining a scale compatible with existing development in single-family zones. These changes include: allowing single-family-zoned lots to have both an AADU and a DADU; removing the off-street parking requirement for the first (but not second) ADU; allowing lots between 3,200 and 3,999 square feet to add a DADU; requiring MHA affordability contributions for the second ADU; and adding a maximum floor area ratio (FAR) for new development.

These proposed changes could affect parking availability in the study area. This appendix summarizes the methodology used to estimate parking demand for ADU residents and the impacts of that demand on parking in Seattle's single-family zones.

STUDY LOCATIONS

A study of on-street parking in the entire EIS study area (as shown in Chapter 2, Exhibit 2-1) would be infeasible. Therefore, we identified four smaller study locations that provide a representative sample of neighborhoods in the study area (Exhibit B-1 through Exhibit B-5). These four study locations are located across the northwest, northeast, southwest and southeast areas of the city. In each study location, we selected a set of block faces to collect data on existing conditions and estimate parking impact. The study locations represent a range of conditions found in single-family zones and include areas that vary by lot size; the presence of alleys, driveways, and sidewalks; and proximity to transit. Not all block faces in the southeast and southwest study locations are included in this analysis. Some streets have one block face included in this analysis, and other streets have both block faces. This variation is due to the repurposing of data collected for a separate parking study conducted by the Seattle Department of Transportation (see Section 4.4, Parking and Transportation).

Exhibit B-1 Overview of Study Locations

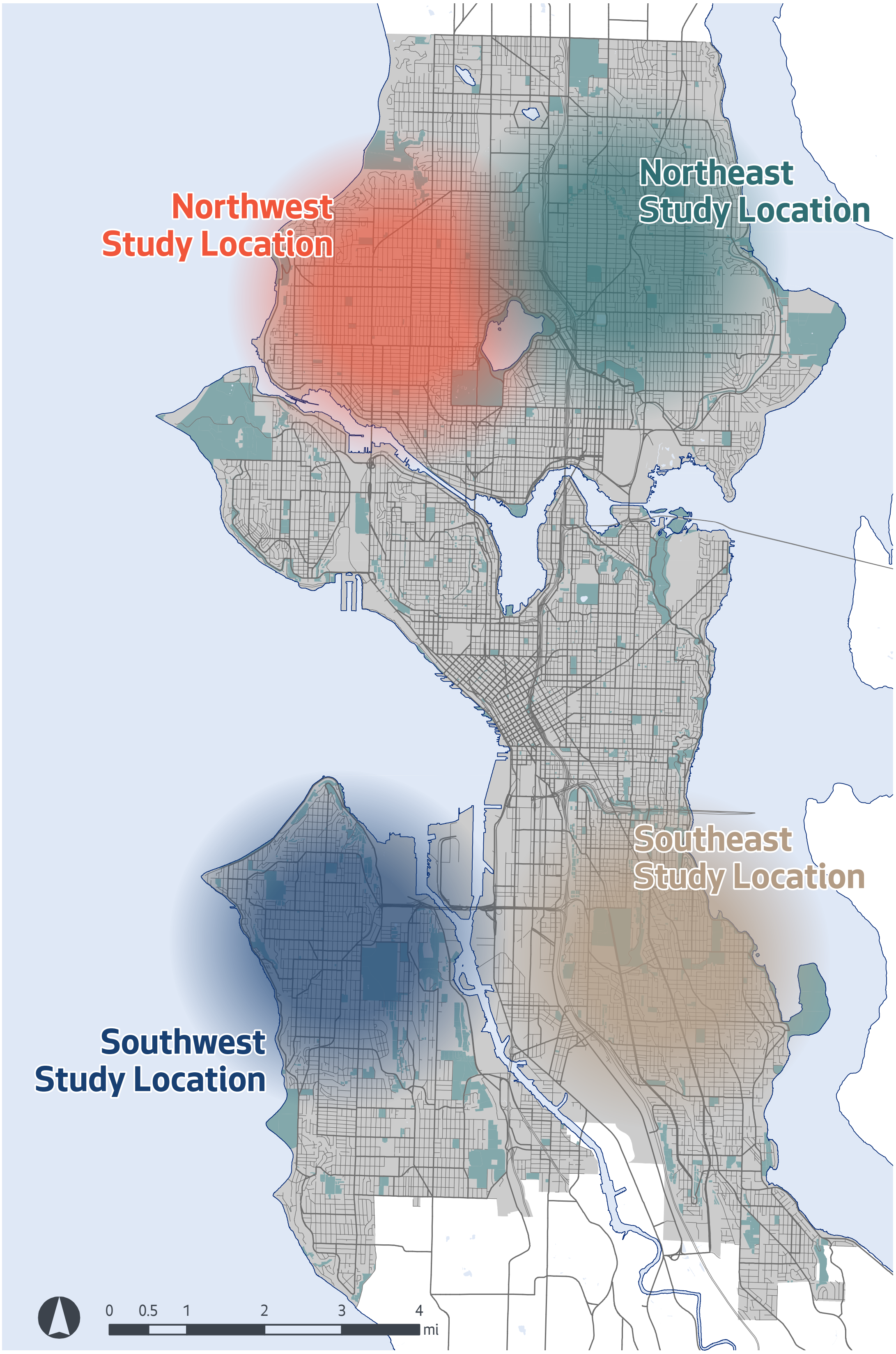


Exhibit B-2 Southeast Study Location

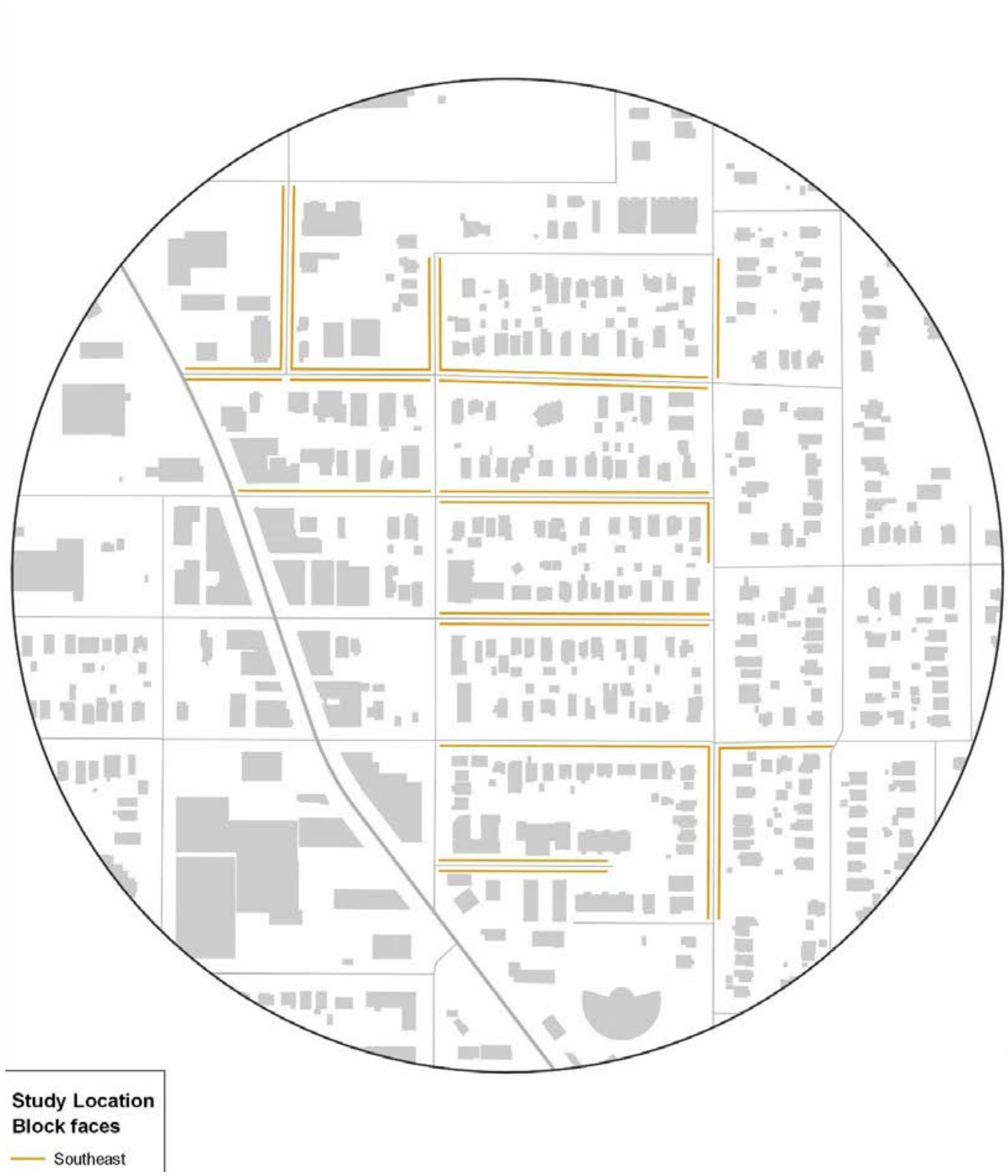


Exhibit B-3 Northeast Study Location

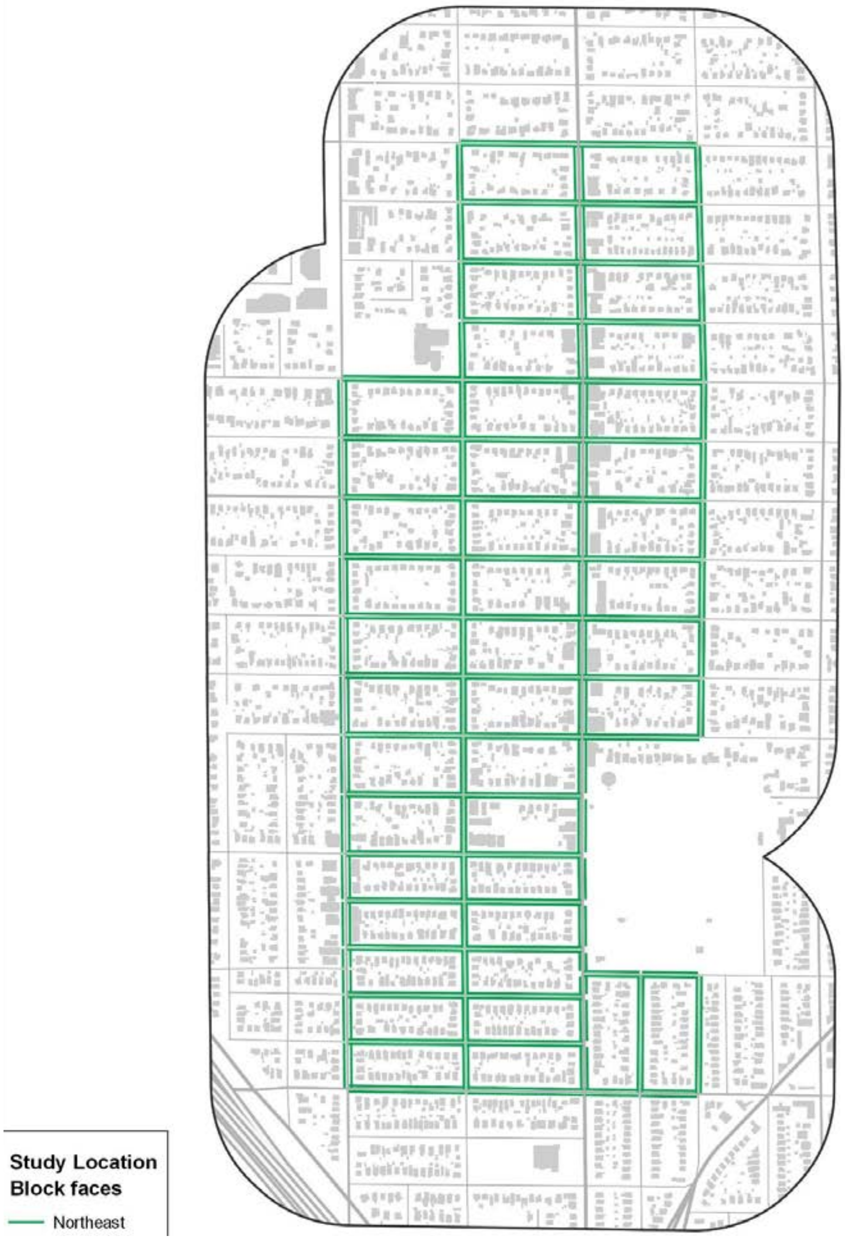
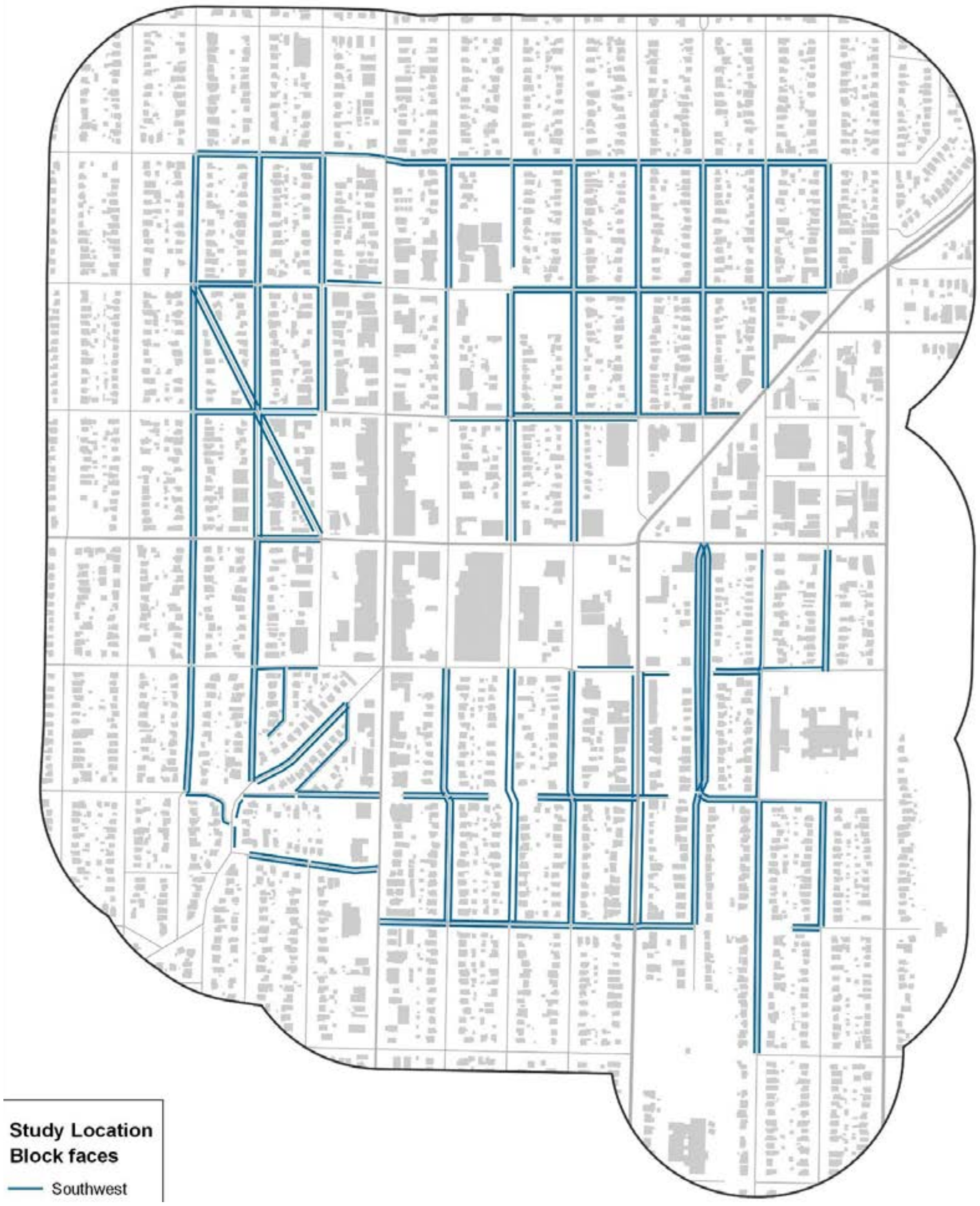


Exhibit B-4 Northwest Study Location

Exhibit B-5 Southwest Study Location



B.2 Data Sources

ON-STREET PARKING SUPPLY AND UTILIZATION DATA

We collected data on parking supply and utilization for each block face in each study location. We identified blocks with unrestricted parking, restricted parking, and no parking allowed. This report focuses on unrestricted parking spaces and their utilization in these locations. Throughout the city there are about 46,000 block faces, most of which have unrestricted parking. In residential areas, peak parking demand usually occurs overnight on a weeknight. As a result, we used weeknight overnight parking supply and utilization to estimate residential parking usage. Data collection for this analysis followed the methodology outlined in the Seattle Department of Construction and Inspection's Parking Waivers for Accessory Dwelling Units document (TIP 17).[1] We used overnight parking data collected on the following days:

- Southeast: Wednesday, October 12, 2016
- Northeast: Friday, December 15, 2017
- Northwest: Friday, December 15, 2017
- Southwest: Thursday, September 21, 2017, and Tuesday, September 26, 2017

For residential areas near neighborhood business districts, peak on-street parking demand usually occurs on weekend afternoons. While the study locations are not near large retail areas, we measured parking utilization on Saturdays to confirm that weekday overnight parking demand was the peak. For the southeast study location, we used parking data collected in 2016 for a different SDOT parking analysis that did not include weekend parking data. For the other study locations, we collected weekday overnight parking data on the following Saturdays:

- Northeast: December 9, 2017
- Northwest: December 9, 2017
- Southwest: September 23 and September 30, 2017

1 Seattle Department of Construction and Inspections. (2011). Parking Waivers for Accessory Dwelling Units. Seattle, Washington. Retrieved from http://www.seattle.gov/DPD/Publications/CAM/cam117.pdf

ADU SURVEY FOR PORTLAND, EUGENE, AND ASHLAND, OREGON

Data about the demographics and travel characteristics for current ADU residents in Seattle was not available. To estimate the characteristics of Seattle's ADU residents, we reviewed a survey that Portland State University (PSU) conducted of ADU owners in three Oregon communities in 2013 that provides valuable details about the characteristics of ADU residents.[2] Researchers at PSU's Survey Research Lab sent surveys to 839 ADU owners in Portland, Eugene, and Ashland that asked questions about ADU use, resident and owner demographics, construction, and energy use. Because Portland's land use and transportation characteristics resemble Seattle's more closely than those of Eugene or Ashland, we used data only from ADU owners in Portland. Researchers received 290 responses from Portland ADU owners out of 673 sent surveys, a response rate of 43.2 percent. For this EIS, the most relevant data collected in the PSU survey was vehicle ownership for ADU residents; the number of adult residents in each ADU; the number of bedrooms in each ADU; and the average square footage of each ADU. We estimated the average rate of vehicle ownership for ADU residents in Seattle using both data from this survey and estimates from the U.S. Census Bureau. Section 3 of this appendix describes our methodology.

AMERICAN COMMUNITY SURVEY 2012-2016

We also used data from Demographic and Housing Estimates in the 2012-2016 American Community Survey (ACS) for Portland and Seattle. Relevant data included:

- number of vehicles available per renter-occupied and owner-occupied household
- number of adults per renter-occupied household
- number of bedrooms per renter-occupied household

We collected ACS data at the census tract level to develop specific estimates for each study location. We averaged data from census tracts containing study location block faces to create these estimates. The estimate for the northeast location reflects an average of five census tracts, the northwest location six tracts, and the southwest location three tracts; all block faces in the southeast location are located in the same census tract.

2 Horn, T., Elliott, D., & Johnson, A. (2013). Accessory Dwelling Unit Survey for Portland, Eugene, and Ashland, Oregon. Retrieved from https://accessorydwellings.files.wordpress.com/2013/10/adureportfrev.pdf.

B.3 Assumptions and Methodology

ASSUMPTIONS

We made several assumptions about the characteristics of ADU residents to estimate their parking needs:

- We assumed 100 percent of ADU residents are renters. In cases where an owner builds an ADU, moves into the ADU and rents out the main house, the additional residents that arise from the creation of an ADU are also renters.
- We assumed the demographics of ADU resident match overall demographics of renters for each study location.
- While off-street parking is required only for Alternatives 1 and 3, we assumed for all alternatives that 100 percent of ADU residents who own a vehicle use on-street parking.
- We assumed that, on average, an ADU in Portland is the same size and has the same number of adult residents as an ADU in Seattle.
- We assumed the ratio of vehicle ownership among ADU households and among renter-households overall is the same in Portland and Seattle.
- We assumed that residents are willing to park on either side of the street, as long as the parking space is on the same block as their home.

METHODOLOGY

Estimating vehicle ownership for ADU residents

Characteristics of ADU residents in Portland

We used data from the PSU survey on the number of adult ADU occupants to estimate the average number of adult occupants and bedrooms per ADU in Seattle. These estimates are presented in Exhibit B-6 and Exhibit B-7. Data from the U.S. Census Bureau on age demographics indicates that age ranges in Seattle and Portland are similar overall; therefore, it is appropriate to apply the data from Portland ADUs to Seattle ADUs.

Exhibit B-6 Estimate of Adult Occupants per ADU in Portland

Adult occupants[1]	% of ADUs	Average number of adults per ADU
1	64.7%	1.36
2	34.3%	
3	1.0%	

1 Accessory Dwelling Unit Survey for Portland, Eugene, and Ashland, Oregon, 2013. Survey Research Lab, Portland State University.

Exhibit B-7 Number of Bedrooms per ADU in Portland

Bedrooms[1]	% of ADUs	Average number of bedrooms per ADU
0 (studio)[2]	26.7%	1.25
1	50.0%	
2	21.9%	
3+	1.4%	

1 Accessory Dwelling Unit Survey for Portland, Eugene, and Ashland, Oregon, 2013. Survey Research Lab, Portland State University.
2 Calculated as one bedroom.

The average size of ADUs in Portland is approximately 665 square feet, with individual ADU sizes ranging from 200 square feet to 1,500 square feet.[3]

3 Horn, T., Elliott, D., & Johnson, A. (2013). Accessory Dwelling Unit Survey for Portland, Eugene, and Ashland, Oregon. Retrieved from https://accessorydwellings.files.wordpress.com/2013/10/adureportfrev.pdf

Estimating ADU vehicle ownership in Seattle study locations

We applied data from both the PSU survey and U.S. Census Bureau to estimate vehicle ownership among ADU households in Seattle. We assumed the same ratio of vehicle ownership among ADU households and all renter-occupied households in Portland and Seattle, as shown in Equation 1.

Equation 1:

$$\frac{CarOwn_{ADU,PDX}}{CarOwn_{Rent,PDX}} = \frac{CarOwn_{ADU,SEA}}{CarOwn_{Rent,SEA}}$$

where:

$CarOwn_{ADU,\ PDX}$ = Average number of vehicles per ADU household in Portland

$CarOwn_{Rent,\ PDX}$ = Average number of vehicles per renter-occupied household in Portland

$CarOwn_{ADU,\ SEA}$ = Average number of vehicles per ADU household in Seattle

$CarOwn_{Rent,\ SEA}$ = Average number of vehicles per renter-occupied household in Seattle

To estimate an average car ownership rate for ADU occupants in Seattle, Equation 1 can be written as Equation 2. In Equation 2, average vehicle ownership for renter-occupied households in Seattle is adjusted based on the ratio of average vehicle ownership for ADU households to average vehicle ownership for renter-occupied households in Portland.

Equation 2:

$$CarOwn_{ADU,SEA} = CarOwn_{Rent,SEA} * \frac{CarOwn_{ADU,PDX}}{CarOwn_{Rent,SEA}}$$

Exhibit B-8 presents weighted averages for number of vehicles per household for ADU households and renter-occupied households in Portland.

Exhibit B-8 Portland Vehicle Ownership Estimates

Number of vehicles	% of households	Average number of vehicles per household
Portland ADU households[1]		
0	19.9%	$CarOwn_{ADU,PDX}$ **0.954**
1	66.3%	
2	12.2%	
3+	1.5%	
Portland renter households[2]		
0	25.9%	$CarOwn_{Rent,PDX}$ **1.08**
1	46.5%	
2	21.3%	
3+	6.3%	

1 Accessory Dwelling Unit Survey for Portland, Eugene, and Ashland, Oregon, 2013. Survey Research Lab, Portland State University.
2 United States Census Bureau 2012-2016 Demographic and Housing Estimates for Portland city, Oregon

Equation 2 assumes that the average renter-occupied households in Seattle and Portland have the same number of adults. To adjust for differences in household size, we compared the average number of bedrooms in renter-occupied housing units in Portland and in each of the Seattle study locations. We then used these ratios to adjust Equation 2, resulting in Equation 3:

Equation 3:

$$CarOwn_{ADU,SEA\ ADJUSTED} = CarOwn_{Rent,SEA} * \frac{CarOwn_{ADU,PDX}}{CarOwn_{Rent,PDX} * \frac{BR_{SEA}}{BR_{PDX}}}$$

where:

BR_{SEA} *= Average number of bedrooms per renter-occupied housing unit in Seattle*

BR_{PDX} *= Average number of bedrooms per renter-occupied housing unit in Portland*

Using information from the Census Bureau, we calculated weighted averages of the number of vehicles per renter household for Seattle overall and for each study location. Exhibit B-9 provides the average number of bedrooms per housing unit in Portland or Seattle, the ratio of average bedrooms per unit in Seattle compared to Portland, and the adjusted ratio of vehicle ownership.

We applied this adjusted ratio of vehicle ownership vehicle ownership estimates for Seattle and the four study locations to estimate the car ownership rates per ADU using Equation 3. Exhibit B-10 presents these vehicle ownership estimates. Since the four study locations are in predominantly single-family residential neighborhoods, average vehicles ownership rates above the overall average for renter households are logical based on allowable ADU unit size. The parking analysis estimated that each additional ADU would generate between 1.03 and 1.29 additional vehicles that use on-street parking throughout the study locations.

Exhibit B-9 Ratio of Vehicle Ownership Based on Number of Bedrooms

Number of bedrooms	% of households					
	Portland Renters[1]	Seattle Renters[4]	Northeast Renters[5]	Northwest Renters[5]	Southeast Renters[5]	Southwest Renters[5]
Studio	12.4%	15.6%	15.3%	8.0%	5.0%	10.6%
1	30.0%	40.1%	33.6%	33.5%	44.3%	43.6%
2[2]	26.1%	29.9%	32.4%	38.2%	35.8%	28.6%
3[2]	26.1%	9.4%	9.1%	13.7%	13.1%	8.2%
4[3]	5.4%	3.2%	7.0%	5.5%	1.9%	7.9%
5+	–	1.7%	2.6%	1.1%	0.0%	1.1%
	Portland Renters	**Seattle Renters**	**Northeast Renters**	**Northwest Renters**	**Southeast Renters**	**Southwest Renters**
Average number of bedrooms per household **BR_{SEA} or BR_{PDX}**	1.945	1.651	1.82	1.864	1.677	1.729
Ratio of bedrooms **BR_{SEA} / BR_{PDX}**	—	0.849	0.936	0.958	0.862	0.889
Adjusted ratio of vehicle ownership **(see Equation 3)**	—	1.041	0.944	0.922	1.025	0.944

1 U.S. Census Bureau 2012-2016 estimates of Number of Bedrooms (table B25042) for all of Portland city, Oregon.
2 Number of households with two or three bedrooms presented as one percentage (52.2%); study assumed an even distribution between two- and three-bedroom households.
3 Information for number of bedrooms in Portland renter-occupied households given in increments of 0, 1, 2, 3, and 4+ bedroom only.
4 U.S. Census Bureau 2012-2016 estimates of number of bedrooms (table B25042) for all of Seattle city, Washington.
5 U.S. Census Bureau 2012-2016 estimates of number of bedrooms (table B25042) for census tracts in Seattle city, Washington.

Exhibit B-10 Vehicle Ownership Estimates for Seattle ADU Residents

Number of vehicles	% of households				
	Seattle Renters[1]	Northeast Renters[2]	Northwest Renters[2]	Southeast Renters[2]	Southwest Renters[2]
0	27.3%	18.8%	11.4%	26.3%	16.0%
1	49.2%	48.8%	50.6%	45.7%	51.2%
2[2]	18.4%	23.7%	26.3%	23.2%	27.7%
3[2]	3.5%	6.1%	8.5%	4.3%	3.9%
4[3]	0.9%	1.7%	1.9%	0.0%	0.6%
5+	0.7%	1.0%	1.2%	0.5%	0.6%
	Seattle Renters	**Northeast Renters**	**Northwest Renters**	**Southeast Renters**	**Southwest Renters**
Average number of vehicles per household **$CarOwn_{Rent,SEA}$**	1.651	1.82	1.864	1.677	1.729
Adjusted ratio of vehicle ownership **(see Equation 3)**	1.041	0.944	0.922	1.025	0.944
Estimated number of vehicles per ADU	**1.08**	**1.15**	**1.21**	**1.29**	**1.03**

1 U.S. Census Bureau 2012-2016 estimates of tenure by vehicles available (table B25044) for all of Seattle city, Washington.
2 U.S. Census Bureau 2012-2016 estimates of tenure by vehicles available (table B25044) for census tracts in Seattle city, Washington.

Estimating ADU parking impacts

Based on the parcel typology described in Section 4.1, Housing and Socioeconomics, we classified parcels in each study location according to their eligibility to have an ADU. This classification reflects Land Use Code regulations for development in single-family zones, requirements for vehicle access, and lot size and configuration. We consider any parcel of type A, B, C, or D to be "eligible" and any parcel of type Z to be "ineligible." To estimate parking demand for each alternative, we drew on the 2018-2027 ADU production estimates generated using the pro forma analysis and behavioral models described in Appendix A. Those estimates indicate that between 1.48 and 3.05 percent of parcels would have an ADU, depending on the characteristics of each parcel type. In our parking analysis, we apply the highest estimated ADU production rate at the nearest whole number (3 percent) for all eligible parcels. Since various development standards vary across alternatives, including the number of ADUs allowed on a lot, we made the following assumptions about the number of lots with ADUs in each alternative:

- ***Alternative 1.*** 3 percent of eligible parcels will have 1 ADU.
- ***Alternative 2.*** 3 percent of eligible parcels will have 2 ADUs.
- ***Alternative 3.*** 1.5 percent of all eligible parcels will develop 1 ADU and 1.5 percent will develop 2 ADUs.

These rates let us estimate how many new ADUs would be created in our study locations under each alternative. We applied the vehicle ownership rates for ADU residents to estimate the total number of new vehicles (rounded to the nearest whole vehicle). Based on the number of new vehicles, we estimated demand for on-street parking in each study location.

B.4 Analysis and Results

EXISTING CONDITIONS

In this analysis, we refer to three measures of parking conditions:

- **Parking supply:** the number of unrestricted on-street parking spaces
- **Parking utilization:** the number of parked vehicles observed divided by the number of unrestricted on-street parking spaces
- **Parking availability:** the difference between total parking supply and parking demand divided by the total number of allowed unrestricted on-street parking spaces

We collected data on parking supply and parking utilization for block faces in the study locations. To visualize current parking conditions, we converted this data into GIS shapefiles and consolidated block-face data into a single centerline shapefile to show total parking supply and parking utilization along each roadway segment. This better represents the availability of parking for residents looking for parking near their home.

Existing parking supply

Exhibit B-11 shows the number of blocks (consolidated block faces) in each study location, the supply of unrestricted on-street parking, and the average number of on-street parking spaces per block. Block length, driveways per block, and parking restrictions vary throughout the city. The average number of on-street parking spaces per block in the study locations is 22, ranging from 18 in the northwest study location to 27 in the southwest study location.

Exhibit B-11 Parking Supply by Study Location

Study location	Blocks	Total on-street parking spaces	Average number of on-street parking spaces per block
Southeast	14	327	23
Northeast	108	2,403	22
Northwest	118	2,115	18
Southwest	99	2,682	27
Total	339	7,527	22

Exhibit B-12 through Exhibit B-15 show the number of unrestricted on-street parking spaces in each study location. Streets with no parking on one side are represented with a red line on the associated block face. In the southeast study location, three blocks provide nearly half the study location's unrestricted on-street parking supply while remaining streets have many fewer parking spaces per block. Parking supply is well distributed throughout the northeast study location, though block size and parking restrictions constrain parking supply in the southeast side of the study location. In the northwest study location, parking supply is lowest in the easternmost portion due to parking restrictions on one side of every east-west street. Parking is also restricted on one side of two major east-west streets in the study location. Parking supply is consistent throughout the southwest study location except for two north–south streets in the northern portion of the study location with below-average parking supply due to a school loading zone, parking restrictions adjacent to a school, and driveways.

Exhibit B-12 Parking Supply in the Southeast Study Location

Exhibit B-13 Parking Supply in the Northeast Study Location

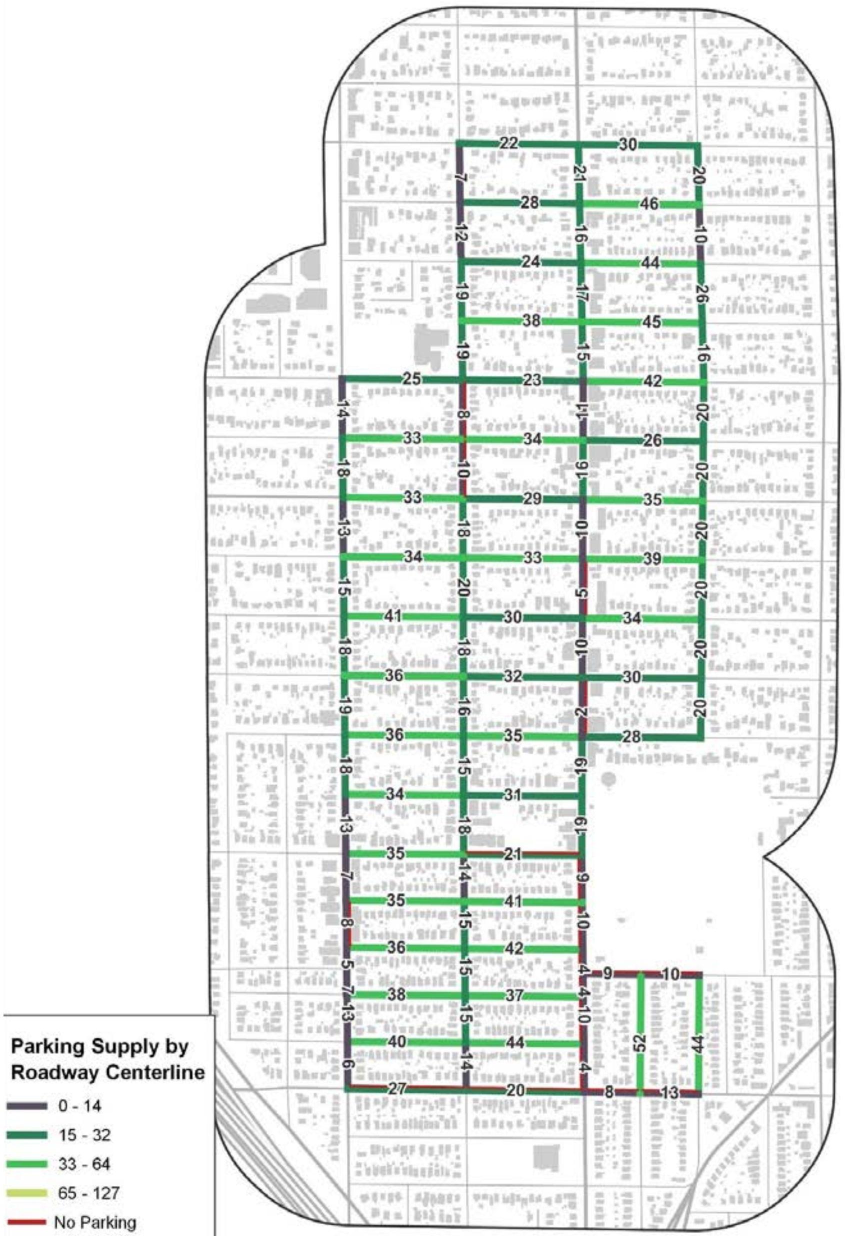
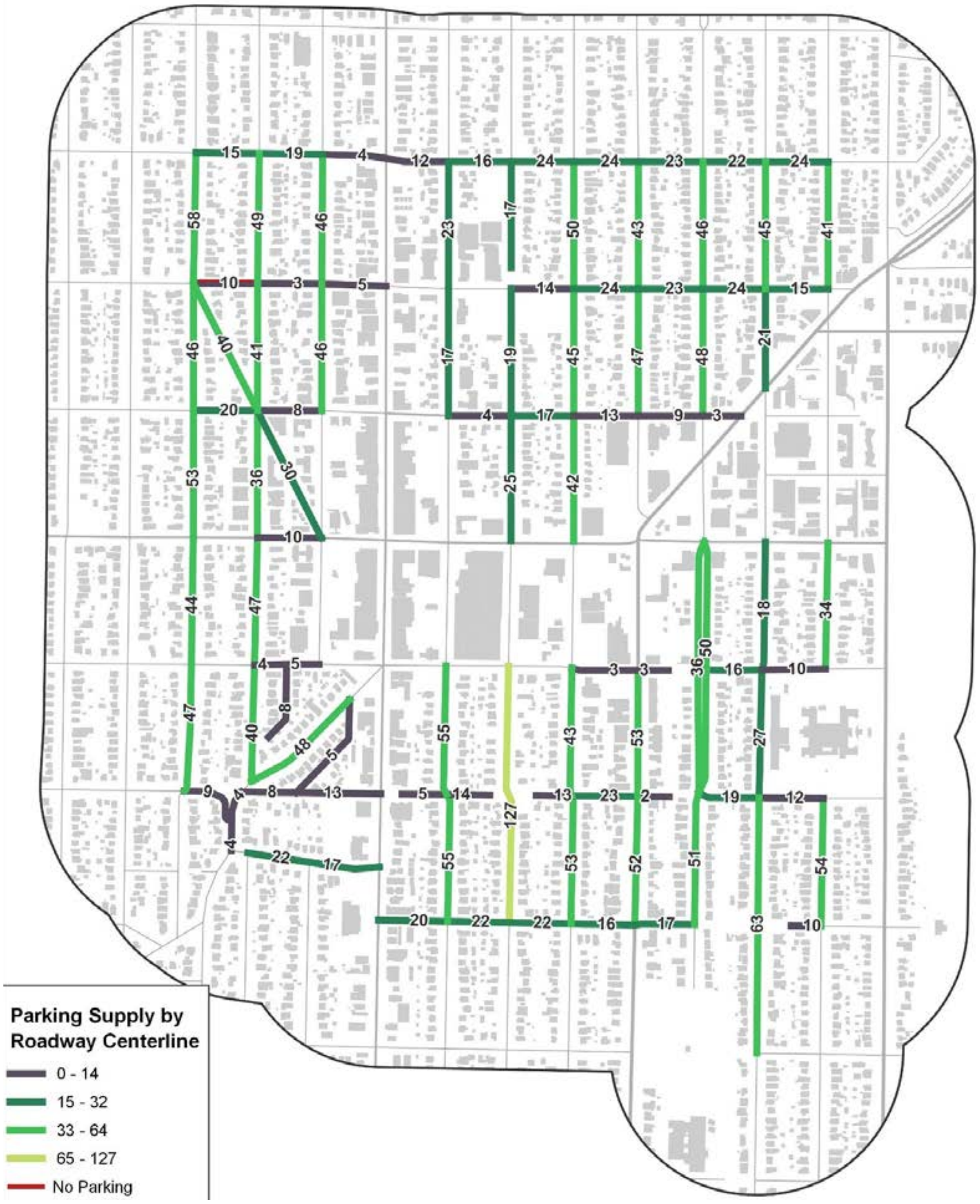


Exhibit B-14 Parking Supply in the Northwest Study Location

Exhibit B-15 Parking Supply in the Southwest Study Location



Existing parking utilization

We calculated parking utilization per block by dividing the number of parked vehicles observed per block by the total number of spaces per block. Exhibit B-16 shows parking utilization rates for each study location for weekday and weekend observations. Weekend parking utilization data was not available for the southeast location. Weekday and weekend utilization rates in each study location tend to be similar and vary by three to seven percentage points. Weekday utilization rates are higher in the northeast and northwest study locations and lower in the southwest study location. Since weekday and weekend parking utilization rates are similar, weekday utilization is higher than weekend utilization in two study locations, and weekend utilization data is unavailable for the southeast study location, the remainder of this report focuses on weekday parking observations as a the more potentially impactful scenario.

Exhibit B-16 Parking Utilization by Study Location

Study location	Weekday utilization	Weekend utilization
Southeast	78%	n/a[1]
Northeast	53%	46%
Northwest	63%	57%
Southwest	51%	54%
Total	56%	52%[2]

1 Weekend parking data was not collected.
2 Total excludes southeast study location.

Exhibit B-17 shows weekday parking utilization rates per block for each study location. Overall, 57 percent of blocks across the study locations have utilization rates above 50 percent. Compared to others, the southeast study location has a higher share of blocks with utilization rates of at least 75 percent.

Exhibit B-17
Percentage Share of Blocks by Study Location and Parking Utilization

Study location	Parking utilization rate			
	Less than 50%	50-75%	75-90%	More than 90%
Southeast	14%	36%	21%	29%
Northeast	53%	37%	7%	3%
Northwest	31%	44%	17%	8%
Southwest	49%	28%	13%	10%
Overall	42%	37%	13%	8%

Exhibit B-18 through Exhibit B-21 show block-by-block weekday parking utilization rates for each study location using the categories shown in Exhibit B-17. Occasionally, parking demand exceeds the available parking supply, resulting in utilization rates above 100 percent. This could indicate illegal parking or vehicles parked more closely together than supply calculations estimated for those specific blocks. Utilization rates in the northeast study location are highest towards the northern and southern edges of the study location. The northwest study location has a more even distribution (i.e., less clustering) of parking utilization rates, and on many segments with rates above 75 percent parking is restricted on one side of the street. In the southwest study location, blocks with the highest utilization rates are predominantly located immediately adjacent to or surrounded by multifamily and commercial land uses.

Exhibit B-18 Weekday Parking Utilization in the Southeast Study Location

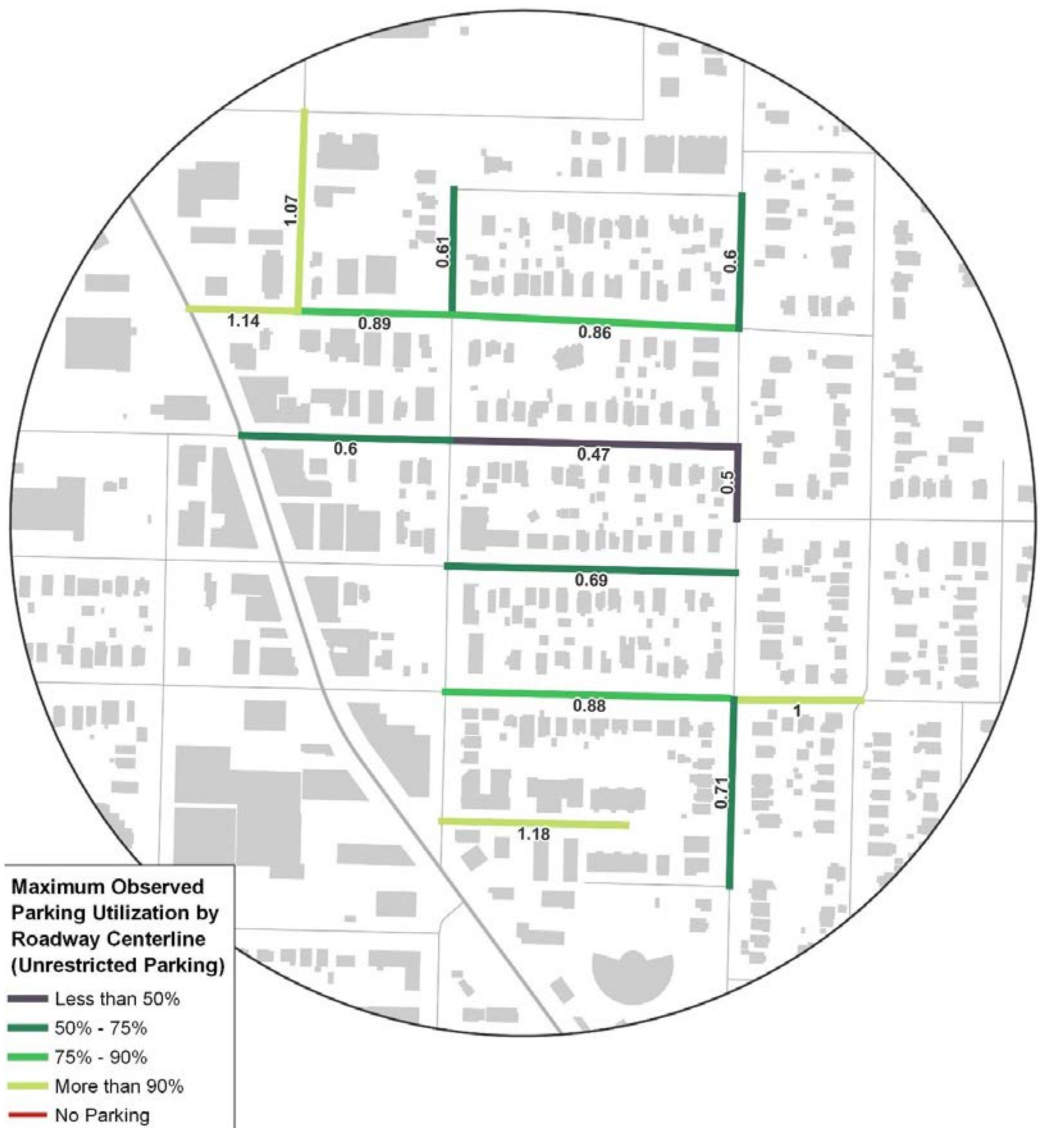


Exhibit B-19 Weekday Parking Utilization in the Northeast Study Location

Exhibit B-20 Weekday Parking Utilization in the Northwest Study Location

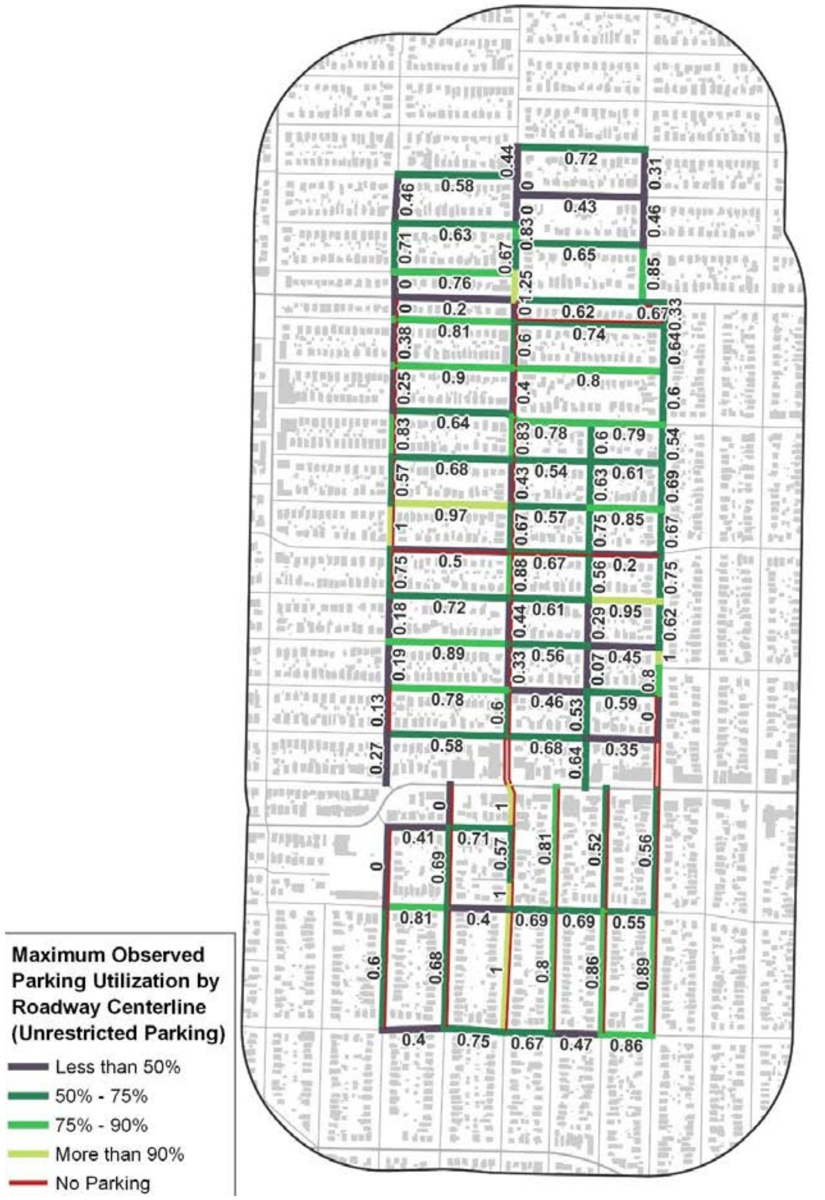
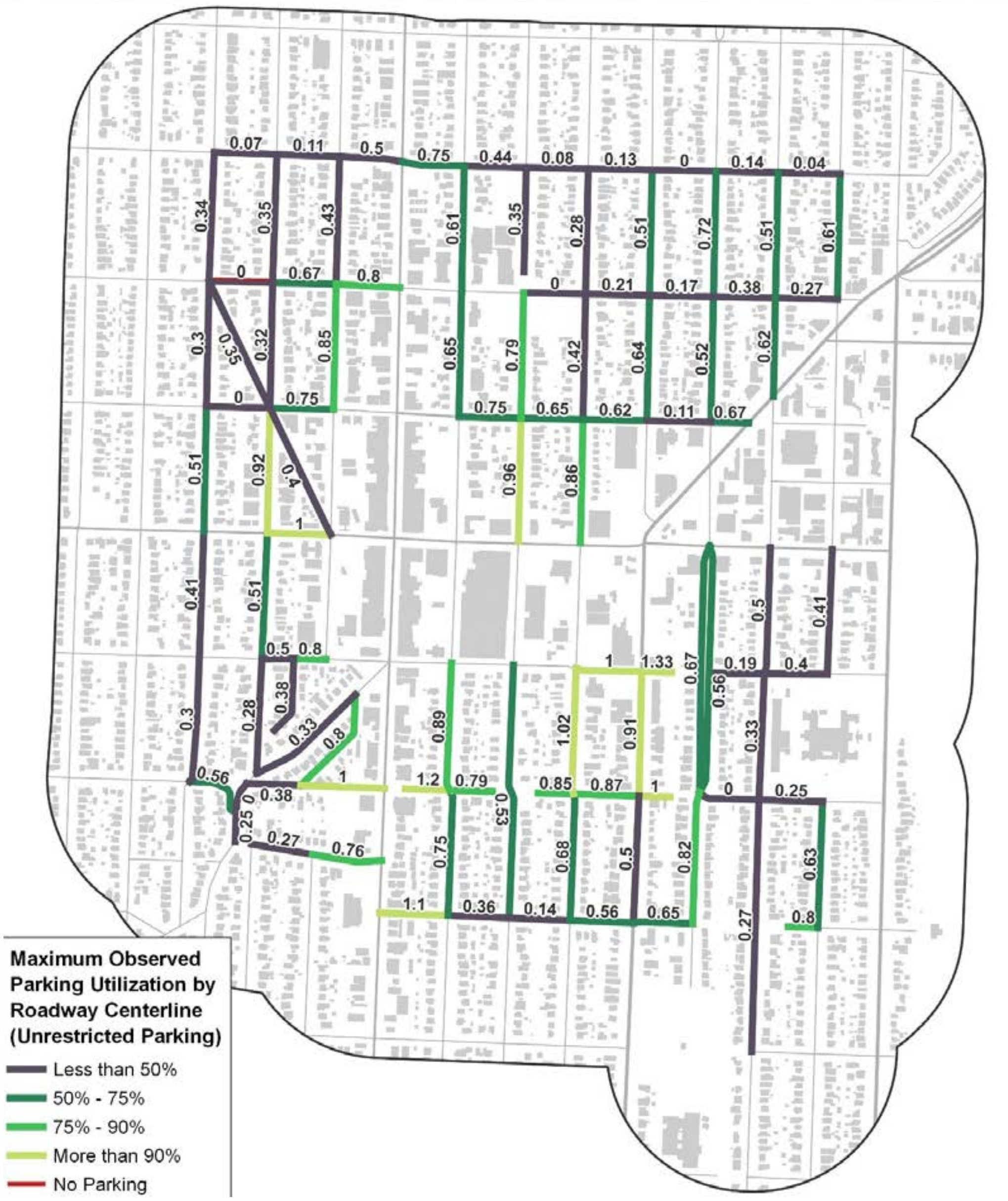


Exhibit B-21 Weekday Parking Utilization in the Southwest Study Location



Existing parking availability

Parking availability is the total number of parking spaces available per block. We calculate parking availability by subtracting the estimated future parking demand from total on-street parking supply. The result represents the existing capacity for additional on-street parking per block. While parking utilization rates generally indicate the number of parking spaces available, calculating parking availability is necessary to determine the potential impact of additional on-street parking demand. In the southeast study location, all but one of the blocks with insufficient parking supply to meet demand are where parcels are ineligible for any type of ADU. Blocks with parking restrictions on one side of the street typically have the fewest parking spaces available due to lower overall supply.

Exhibit B-22 shows the percentage share of blocks in each study location by the number of available on-street parking spaces. Twenty-one percent of blocks in the southeast study location are over capacity, meaning existing parking demand exceeds supply, the most of any study location. Across all study locations, 9.78 parking spaces are available per block on average (including blocks at or over capacity). The parking availability maps and table suggest that most blocks in each study location could accommodate increased parking demand. The southeast study location has the lowest average number of parking spaces available per block (5.14), the study location could accommodate additional on-street parking demand resulting from ADU development. Exhibit B-23 through Exhibit B-26 show existing parking availability for blocks in each study location and identify parcels by their eligibility for an ADU.

Exhibit B-22 Percentage Share of Blocks by Number of Available Parking Spaces and Study Location

		Parking Spaces Available by Block						
Study Location	**Average Parking Availability per Block**	**Fewer than zero[1]**	**0**	**1-5**	**6-10**	**11-15**	**15-25**	**> 25**
Northeast	10.6%	0%	2%	20%	30%	27%	20%	1%
Northwest	6.7%	1%	4%	46%	24%	20%	4%	1%
Southeast	5.1%	21%	7%	36%	21%	0%	7%	7%
Southwest	13.2%	4%	4%	25%	16%	10%	24%	16%
Overall	9.8%	**2%**	**4%**	**31%**	**23%**	**18%**	**15%**	**6%**

Exhibit B-23 Existing Parking Availability and Parcel Type in Southeast Study Location

Numbers on map refer to the number of on-street parking spaces available.

Exhibit B-24 Existing Parking Availability and Parcel Type in Northeast Study Location

Numbers on map refer to the number of on-street parking spaces available.

Exhibit B-25 Existing Parking Availability and Parcel Type in Northwest Study Location

Numbers on map refer to the number of on-street parking spaces available.

Exhibit B-26 Existing Parking Availability and Parcel Type in Southwest Study Location

Numbers on map refer to the number of on-street parking spaces available.

ESTIMATING INCREASED PARKING DEMAND

Exhibit B-27 shows the estimated number of parcels in each study location eligible for an ADU based on the parcel typology described in Section 3.2. The northeast study location has the most eligible parcels (1,141) and the southeast study location the fewest (127). Exhibit B-28 through Exhibit B-30 show the estimated number of ADUs created in each study location under each alternative. Alternative 1 has the fewest ADUs developed (90), followed by Alternative 3 (94), and Alternative 2 (182). We applied the vehicle ownership rates shown in Table 5 to estimate how each new ADU would contribute to future on-street parking demand in each study location. Exhibit B-28 through Exhibit B-30 also show the number of available on-street parking spaces as an indication of existing capacity for new parking demand. Across all alternatives and study locations, the total increase in on-street parking demand ranges from approximately 2 percent to -14 percent of the parking supply, with the greatest increase in demand occurring under Alternative 2.

Exhibit B-27 Existing ADU-eligible parcels

Study location	Existing ADU-eligible parcels
Southeast	127
Northeast	1,141
Northwest	952
Southwest	787
Total	**3,007**

ALTERNATIVE 1 (NO ACTION)

Assuming 3 percent of eligible parcels have one ADU in Alternative 1, 91 ADUs would be created and 104 new vehicles added across all four study locations (Exhibit B-29). We estimate four ADUs created in the southeast study location that would generate five new vehicles that would occupy 6 percent of the available parking spaces. This would reduce the parking supply from 72 to 67 available parking spaces. We expect more total parcels with ADUs in northeast, northwest, and southwest study locations simply due to the size of these study locations, but new vehicles from ADU residents would occupy a smaller percentage of available parking spaces than in the southeast study location: 4 percent for the northeast and northwest locations and 2 percent for the southwest. Under Alternative

1, increased parking demand resulting from ADU production in the four study locations does not exceed existing on-street parking availability.

Exhibit B-28 Parking Availability after ADU Production under Alternative 1 (No Action)

Study location	ADUs produced	Vehicle ownership rate per ADU[1]		Existing on-street spaces available	Available spaces used by new vehicles	Spaces available after ADU production
		Ratio	Total			
Southeast	4	1.29	5	72	6%	67
Northeast	34	1.15	39	1,140	4%	1,101
Northwest	29	1.21	35	793	4%	758
Southwest	24	1.03	24	1,311	2%	1,287
Total	**91**	**—**	**104**	**3,316**	**3%**	**3,212**

[1] See Exhibit B-9 for detailed estimated vehicle ownership rates.

ALTERNATIVE 2

In Alternative 2, we assume that 3 percent of eligible parcels have two ADUs, yielding 182 ADUs and 207 new vehicles across all study locations (see Exhibit B-29). Like Alternative 1, we estimate that share of available parking used to satisfy the increase in parking demand that new ADU residents generate would be highest in the southeast study location (14 percent). The overall utilization of available parking spaces under Alternative 2 ranges from 4 to 14 percent across all four study locations. Under Alternative 2, increased parking demand resulting from ADU production in the four study locations does not exceed the existing on-street parking availability.

Exhibit B-29 Parking Availability after ADU Production under Alternative 2

Study location	ADUs produced	Vehicle ownership rate per ADU[1]		Existing on-street spaces available	Available spaces used by new vehicles	Spaces available after ADU production
		Ratio	Total			
Southeast	8	1.29	10	72	14%	62
Northeast	68	1.15	78	1,140	7%	1,062
Northwest	58	1.21	70	793	9%	723
Southwest	48	1.03	49	1,311	4%	1,262
Total	**182**	**—**	**207**	**3,316**	**6%**	**3,109**

[1] See Exhibit B-9 for detailed estimated vehicle ownership rates.

ALTERNATIVE 3

In Alternative 3, we assume that 1.5 percent of eligible parcels have at least one ADU, and 1.5 percent of eligible parcels develop two ADUs. This yields a total of 135 ADUs whose residents bring 155 new vehicles to the study locations (see Exhibit B-30). The results for Alternative 3 are nearly identical to Alternative 1. The share of available parking spaces used to satisfy new parking demand from ADU residents ranges from 3 percent in the southwest study location to 11 percent in the southeast study location. Under Alternative 3, the increased parking demand resulting from ADU production in the four study locations does not exceed the existing on-street parking availability.

Exhibit B-30 Parking Availability after ADU Production under Alternative 3

Study location	ADUs produced	Vehicle ownership rate per ADU[1]		Existing on-street spaces available	Available spaces used by new vehicles	Spaces available after ADU production
		Ratio	Total			
Southeast	6	1.29	8	72	11%	64
Northeast	51	1.15	59	1,140	5%	1,081
Northwest	42	1.21	51	793	6%	742
Southwest	36	1.03	37	1,311	3%	1,274
Total	**135**	**—**	**155**	**3,316**	**3%**	**3,161**

1 See Exhibit B-9 for detailed estimated vehicle ownership rates.

SENSITIVITY ANALYSIS

We also conducted a sensitivity analysis to estimate how many ADUs would have to be produced to result in on-street parking utilization rates of 85 percent in each study location using Equation 4. The sensitivity analysis compares the parking impacts we estimated for each alternative to a level of impact considered to be a potential issue. In this sensitivity analysis, we use an on-street parking utilization rate of 85 percent.

Equation 4:

$$\frac{ParkingSupply_{Existing} - ParkingDemand_{Existing}}{CarOwn_{ADU,SEA}} = ADU_{MAX}$$

Where:

$ParkingSupply_{Existing}$ = Existing number of on-street parking spaces

$ParkingDemand_{Existing}$ = Existing number of vehicles using on-street parking

$CarOwn_{ADU,\ SEA}$ = Average number of cars per household in Seattle ADUs

ADU_{MAX} = Number of ADUs needed to be produced to result in 85 percent on-street parking utilization rates

Exhibit B-31 Sensitivity Analysis Testing for 85 Percent On-Street Parking Utilization

Study location	Existing utilization rates	Existing parking demand	Existing parking suppy	Vehicle ownership rate per ADU[1]	Vehicles needed for 85% utilization	ADUs needed for 85% utilization	Estimated Number of ADUs Produced per Alternative		
							Alt 1	Alt 2	Alt 3
Southeast	78%	255	327	1.29	23	18	4	8	6
Northeast	53%	1,263	2,403	1.15	780	678	34	68	51
Northwest	63%	1,322	2,115	1.21	476	393	29	58	42
Southwest	51%	1,371	2,682	1.03	909	883	24	48	36
Total	**56%**	**4,211**	**7,527**	**—**	**2,188**	**1,972**	**91**	**182**	**135**

1 See Exhibit B-9 for detailed estimated vehicle ownership rates.

Exhibit B-31 shows the results of the sensitivity analysis that estimates how many ADUs need to be produced to result in 85 percent on-street parking utilization rates. For all four study locations, between 10 to 835 additional ADUs would be necessary to result in 85 percent parking utilization compared to the highest estimate of ADU production in each alternative, or 1,790 additional ADUs for all study locations combined. The southeast study location, which has the lowest supply of parking spaces and highest utilization rates, would require 10 additional ADUs (18 total) for parking utilization to reach 85 percent.

B.5 Conclusion and Findings

Based on our analysis of unrestricted on-street parking supply, observations of current parking utilization, and estimates of future on-street parking demand resulting from ADU development, we find that ADU production would not have an adverse impact on the availability of on-street parking under any alternative. Because the four study locations represent the range of lot sizes, presence of alleys and driveways, sidewalk completeness, and other conditions commonly found in single-family zones, we can extrapolate these to other land with single-family zoning in EIS study area.

Alternatives 1 and 3 have very similar impacts. On average, three percent of available parking supply across all study locations would be occupied with vehicles from new ADU residents based on ADU production estimates for 2018-2027. Compared to Alternatives 1 and 3, we estimate Alternative 2 would result in twice as many ADUs and vehicles across the four study locations, but nevertheless we find the existing parking supply sufficient to satisfy new parking demand from ADU residents. This analysis reflects conservative assumptions about ADU household sizes and vehicle ownership rates. In addition, we assumed that 100 percent of new vehicles would park on street, even though Alternatives 1 and 3 require off-street parking to be provided. Therefore, the increase in demand for on-street parking could be lower than we estimate. Exhibit B-32 shows the estimated utilization rates for existing conditions and all three alternatives. The total increase in on-street parking utilization rates ranges from 1 percent to 3 percent across all alternatives and study locations.

Exhibit B-32 Estimated Future Parking Utilization

Study location	Existing	Alternative 1 (No Action)	Alternative 2	Alternative 3
Southeast	78%	80%	81%	80%
Northeast	53%	53%	56%	55%
Northwest	63%	64%	66%	65%
Southwest	51%	52%	53%	52%
Total	**56%**	**57%**	**59%**	**58%**

APPENDIX C
Aesthetics Modeling Methods and Assumptions

C.1 Introduction

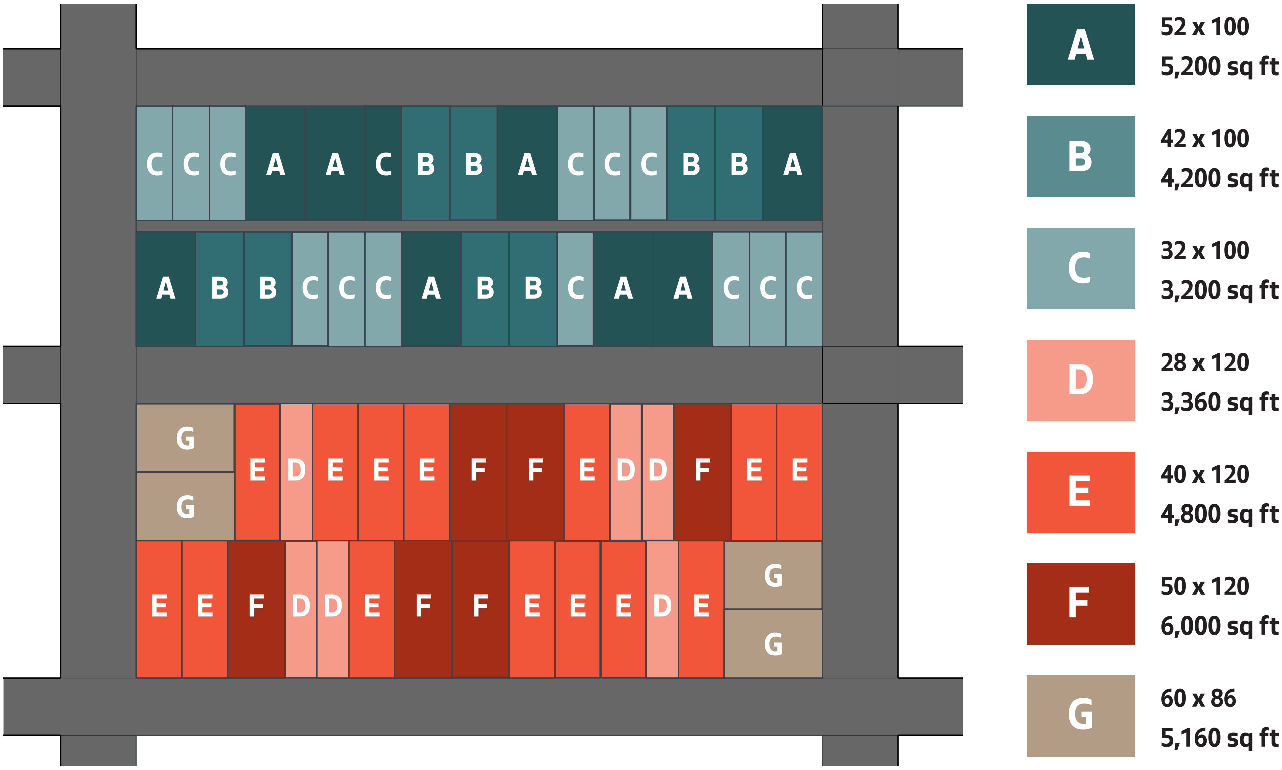
To illustrate a range of typical conditions representative of Seattle neighborhoods where the development of ADUs could occur, we assembled two hypothetical blocks consisting of 60 lots with seven distinct lot types. These lot types reflect actual lots found in representative locations in Seattle neighborhoods and illustrate various lot sizes (ranging from 3,200 to 6,000 square feet), lot widths (ranging from 28 to 60 feet), and lot depths (ranging from 86 to 120 feet). To illustrate varied frontage conditions, one block includes an alley and the other does not. The hypothetical blocks also include a corner lot in which a rear yard abuts a side yard.

Exhibit 1 depicts the configuration of the hypothetical blocks and the distribution of the seven distinct lot types (A through G). We use this configuration and lot type distribution across all alternatives and scenarios as a basis for comparison.

EXISTING CONDITIONS

We modeled "existing" conditions to illustrate a baseline for comparing the potential effects of each alternative. While the block assemblage is hypothetical, the houses modeled are closely based on actual houses found in two representative locations in Seattle neighborhoods. In addition to the various lot sizes and frontage conditions, the houses shown in the existing conditions scenario include vary in size and parking access and location in order to mimic a realistic range of conditions that are more or less favorable to adding ADUs. The scenario includes detached and attached garages with alley access; detached and attached garage with front driveway access; driveway parking; lots without off-street parking)

Exhibit C-1 Distribution of Lot Types in Hypothetical Blocks



ALTERNATIVES DEVELOPMENT

For each alternative, we modeled two scenarios:

- **Full Build-Out Scenario.** This hypothetical scenario shows complete redevelopment of all lots with the largest possible principal unit and the maximum number of ADUs allowed. We do not anticipate this scenario to occur. Instead, the model illustrates the upper limit of allowed development under each alternative.
- **10-Year Scenario.** Based on projected market conditions and trends, this scenario illustrates a realistic anticipated condition over 10 years. This scenario consists of existing houses, fully redeveloped lots, and ADUs added to existing houses. The number of redeveloped lots and added ADUs varies in each alternative, as the proposed code requirements affect the likelihood of different development outcomes. The lot selection and development action are based on the economic forecasting conducted as part of this EIS and described in Appendix A.

We included parked vehicles to approximate how each alternative and scenario could affect the availability of on- and off-street parking.

The amount and location of parking we illustrated do not specifically reflect the off-street parking requirements for each alternative but reflects anticipated real-world parking conditions based on the following assumptions:

- 2 vehicles per principal unit.
- 1 vehicle per ADU.
- No vehicle parked in front yard portion of driveway.
- No more than 1 vehicle parked in front driveway. The assumption is that some negotiation among residents is acceptable but complete blocking of the primary unit's garage by an ADU resident's vehicle is unrealistic.
- Every garage is used to store a vehicle.
- All vehicles not accommodated off-street are shown parked on the street.

Alternative 1 (No Action)

In addition to the general guidance described above, we modeled Alternative 1 (No Action) using the following assumptions:

Full Build-Out Scenario

- Maximized footprint of principal building on all lots based on allowed lot coverage while accommodating a DADU or AADU and all required off-street parking
- Maximized square footage of principal unit on all lots, fully using allowed building height
- Largest feasible DADU, where applicable

10-Year Scenario

- Development outcomes based on projected market trends as follows:
  - » 2 existing houses with added AADU
  - » 1 existing house with added DADU
  - » 2 redeveloped houses with no ADUs
  - » 1 redeveloped house with added DADU
- Remaining lots remain in existing condition

Alternative 2

In addition to the general guidance described above, we modeled Alternative 2 using the following assumptions:

Full Build-Out Scenario

- Maximized footprint of principal building on all lots based on allowed lot coverage while accommodating a DADU and all required off-street parking
- Maximized square footage of principal unit and an AADU on the ground floor of the principal building on all lots, fully using allowed building height
- Largest feasible DADU on all lots

10-Year Scenario

- Development outcomes based on projected market trends as follows:
  - 1 existing house with added AADU
  - 1 existing house with added DADU
  - 1 existing house with added AADU and DADU
  - 2 redeveloped houses with no ADUs
  - 1 redeveloped house with added DADU
- Remaining lots remain in existing condition

Alternative 3

In addition to the general guidance described above, we modeled Alternative 3 using the following assumptions:

Full Build-Out Scenario

- Maximized footprint of principal building on all lots, based on allowed lot coverage while accommodating a DADU and all required off-street parking
- Maximized square footage of principal unit on all lots or maximum allowed FAR, using allowed building height as applicable
- Largest feasible AADU in the basement or half basement of the principal building on all lots
- Largest feasible DADU on all lots

10-Year Scenario

- Development outcomes based on projected market trends as follows:
  - 2 existing houses with added AADU
  - 2 existing houses with added DADU
  - 1 existing house with added AADU and DADU
  - 1 redeveloped house with no ADUs
  - 1 redeveloped house with added DADU
- Remaining lots remain in existing condition