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~~ four 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.

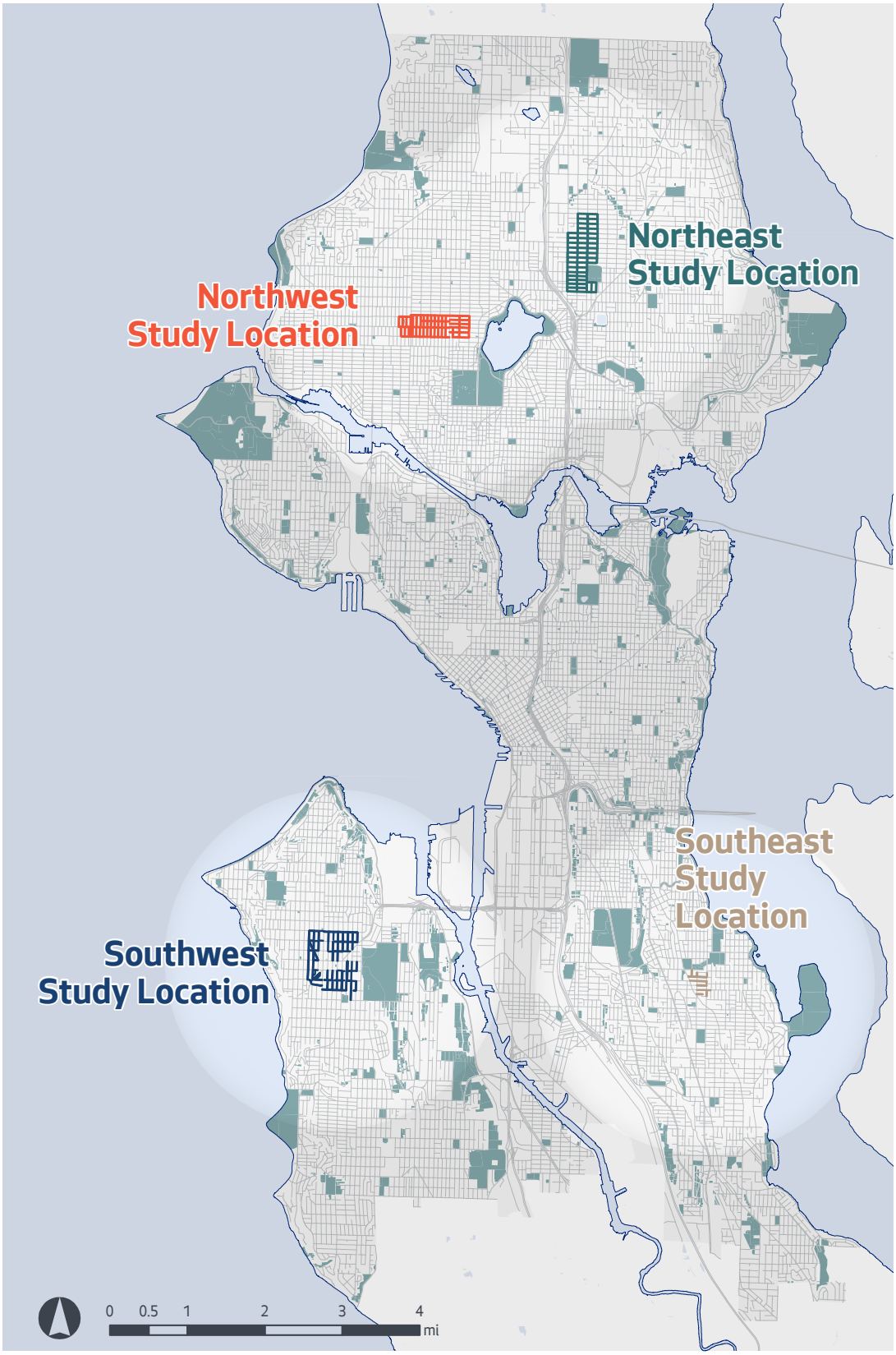
- **Alternative 3.** Alternative 3 considers more modest adjustments to the Land Use Code that emphasize maintaining a scale compatible with existing development in single-family zones. These changes include: allowing single-family-zoned lots to have both an AADU and a DADU; removing the off-street parking 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~~ adding an incentive for affordable housing for the second ADU; and adding a maximum floor area ratio (FAR) limit for new development.
- **Preferred Alternative.** The Preferred Alternative combines elements of the action alternatives considered in the Draft EIS (Alternative 2 and Alternative 3). This includes removing the off-street parking and owner-occupancy requirements; allowing an AADU and a DADU, or two AADUs, on a single lot; allowing lots between 3,200 and 3,999 square feet to add a DADU, and adding a maximum FAR limit 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 (see Exhibit B-1 through ~~Exhibit B-5~~ Exhibit B-14). 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

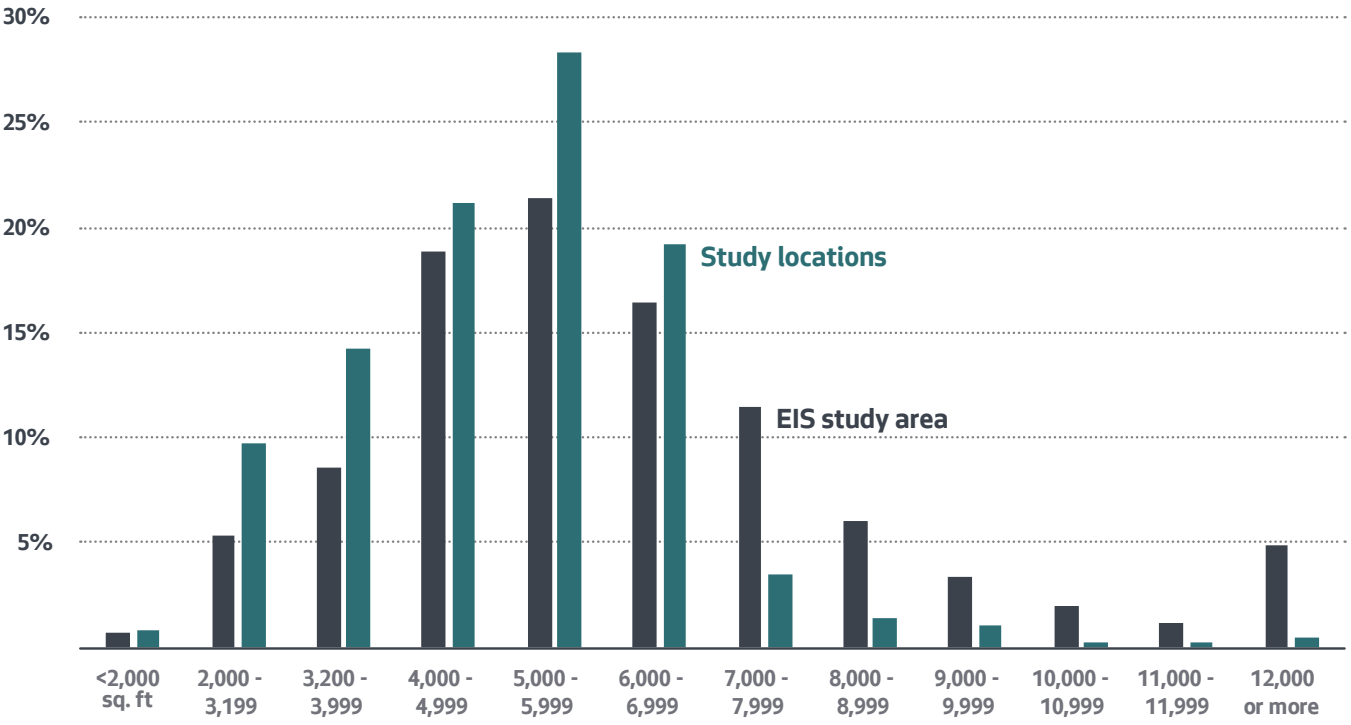


New in the FEIS

Exhibit B-1 is updated in the Final EIS.

Exhibit B-2 compares the distribution of lot sizes in the EIS study area to lot sizes in the four parking study locations. Exhibit B-3 through Exhibit B-14 provide maps of streets studied in each parking study location; maps illustrating the distribution of lot sizes and parcel types[1] in each study location; and charts comparing lot sizes in each study location to the EIS study area. In general, the parking study locations represent a range of lot sizes found similar to the EIS study area overall. The parking study locations slightly overrepresent relatively smaller lots compared to the EIS study area overall. Areas with relatively smaller lots typically are denser (i.e., have more houses per block), which may result in more vehicles parked on the street. In addition, street widths in the parking study locations (27 feet average) resemble street widths throughout the EIS study area (26 feet average).

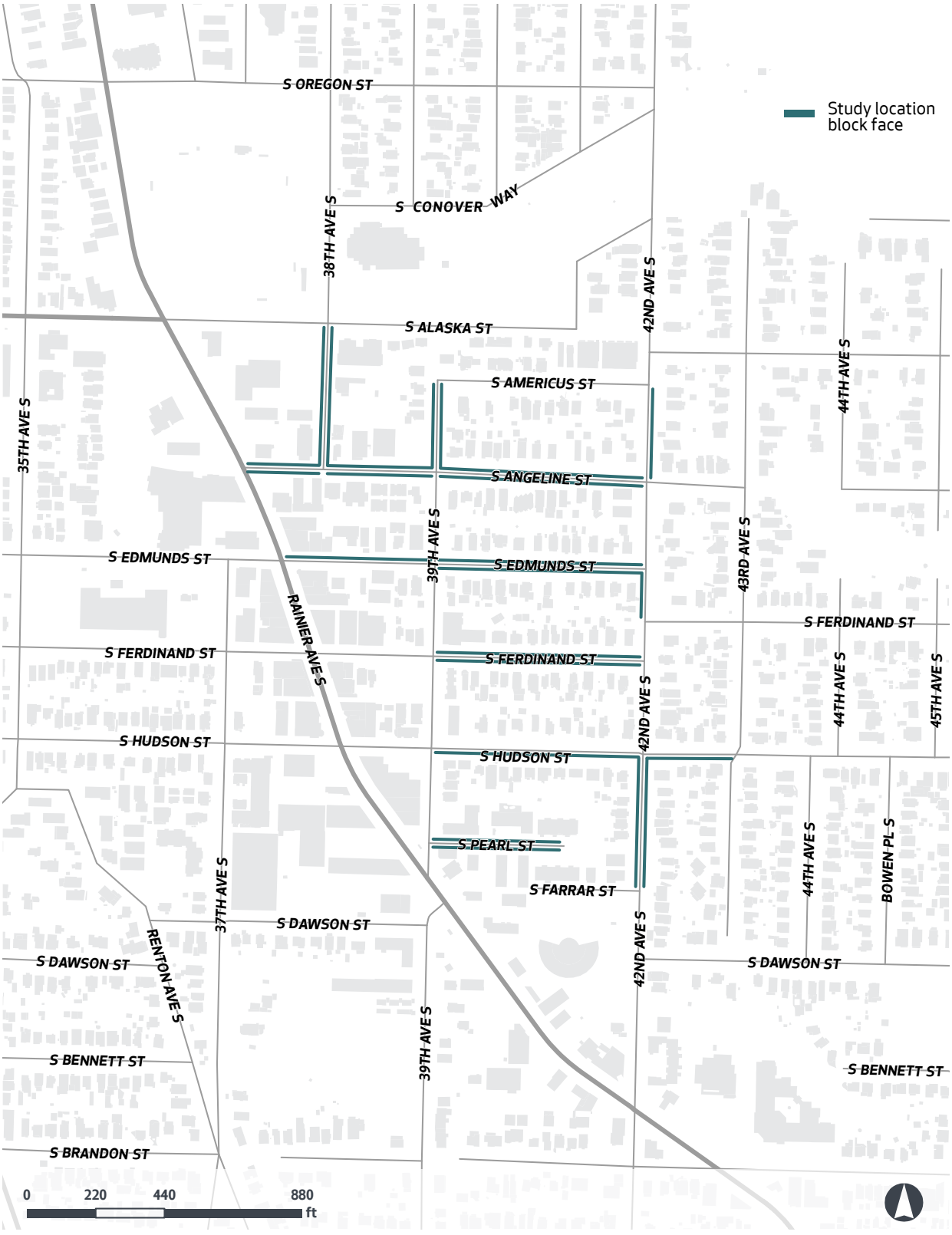
Exhibit B-2 Distribution of Lot Sizes across all Study Locations Combined



New in the FEIS Exhibit B-2 is a new exhibit in the Final EIS.

1 See Exhibit 4.1-11 for characteristics of each parcel type.

Exhibit B-3 Southeast Study Location

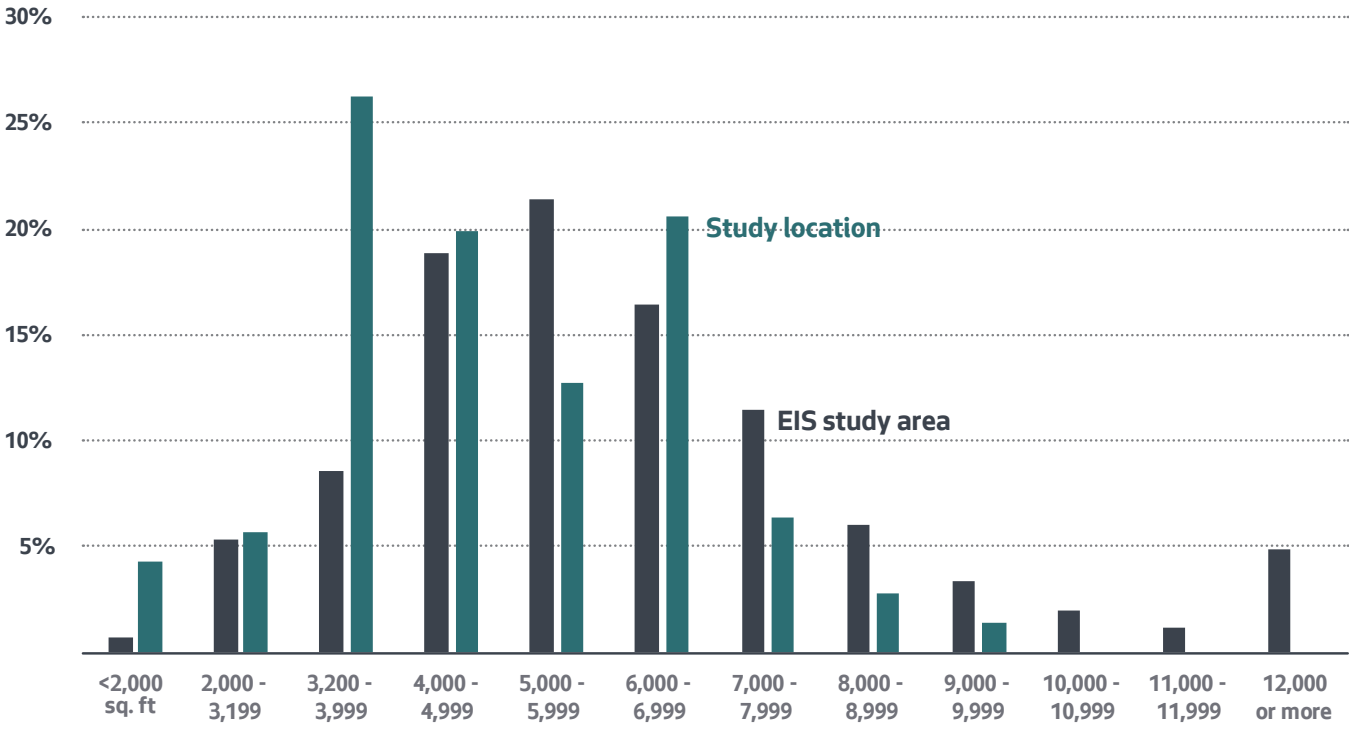


New in the FEIS Exhibit B-3 is updated in the Final EIS.

Exhibit B-4 Distribution of Parcel Types in the Southeast Study Location

New in the FEIS Exhibit B-4 is a new exhibit in the Final EIS.

Exhibit B-5 Distribution of Lot Sizes in the Southeast Study Location

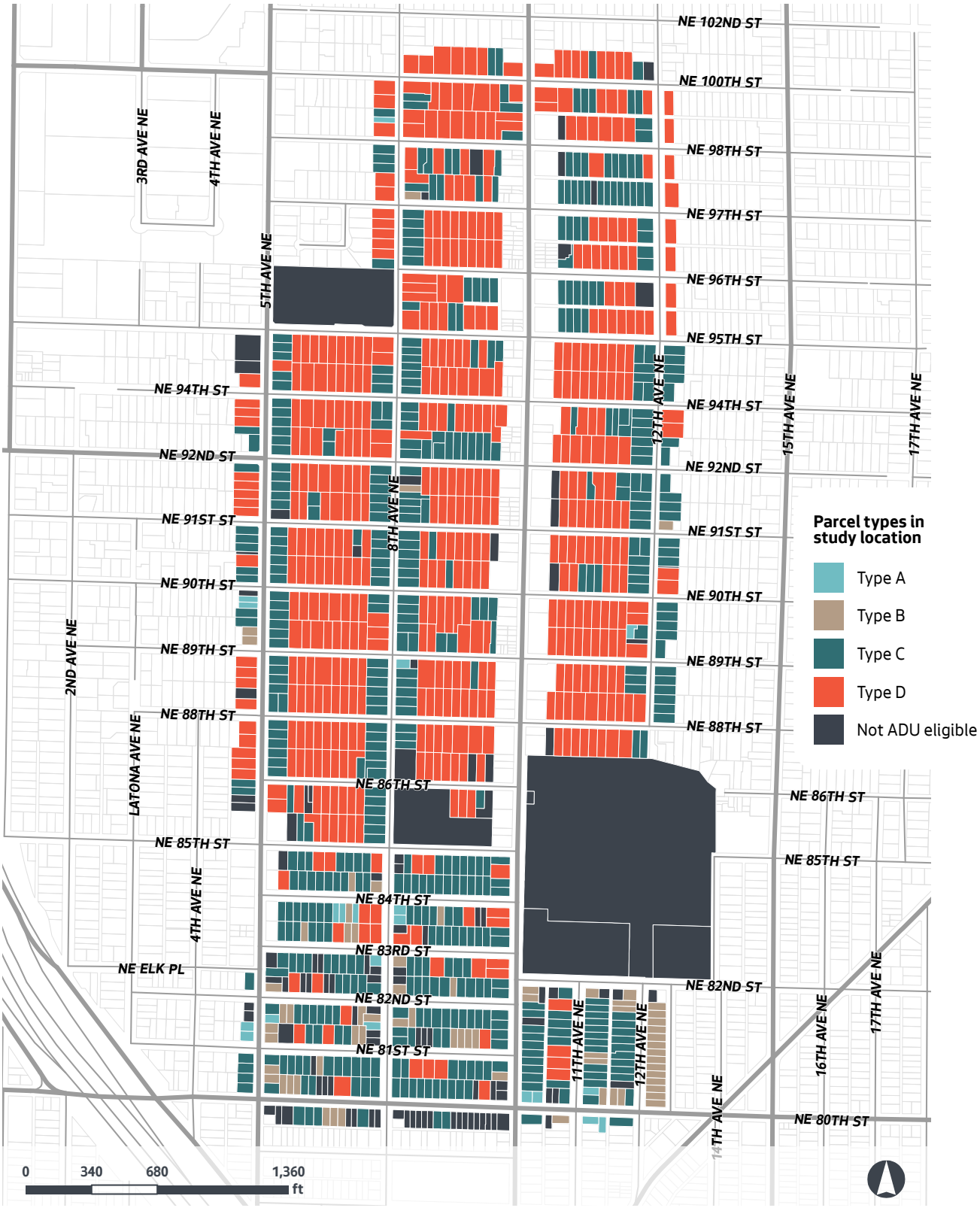


New in the FEIS Exhibit B-5 is a new exhibit in the Final EIS.

Exhibit B-6 Northeast Study Location

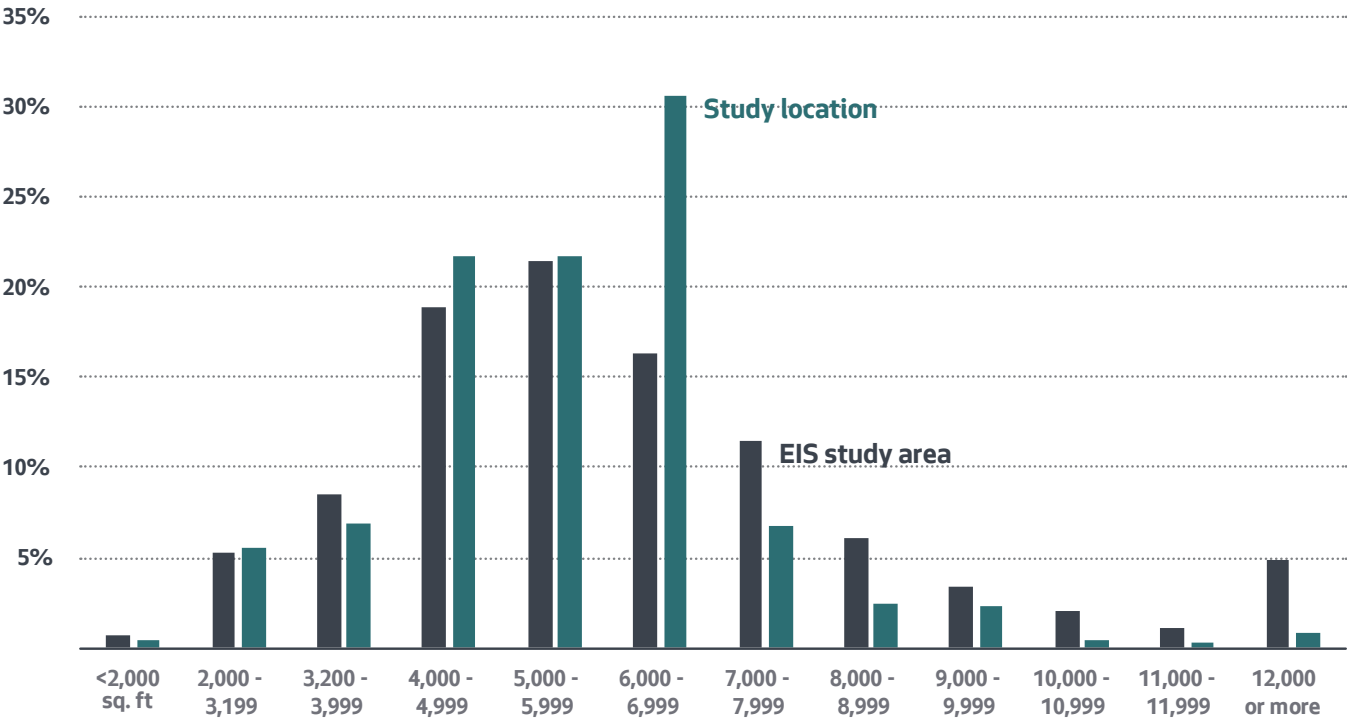
New in the FEIS Exhibit B-6 is updated in the Final EIS.

Exhibit B-7 Distribution of Parcel Types in the Northeast Study Location



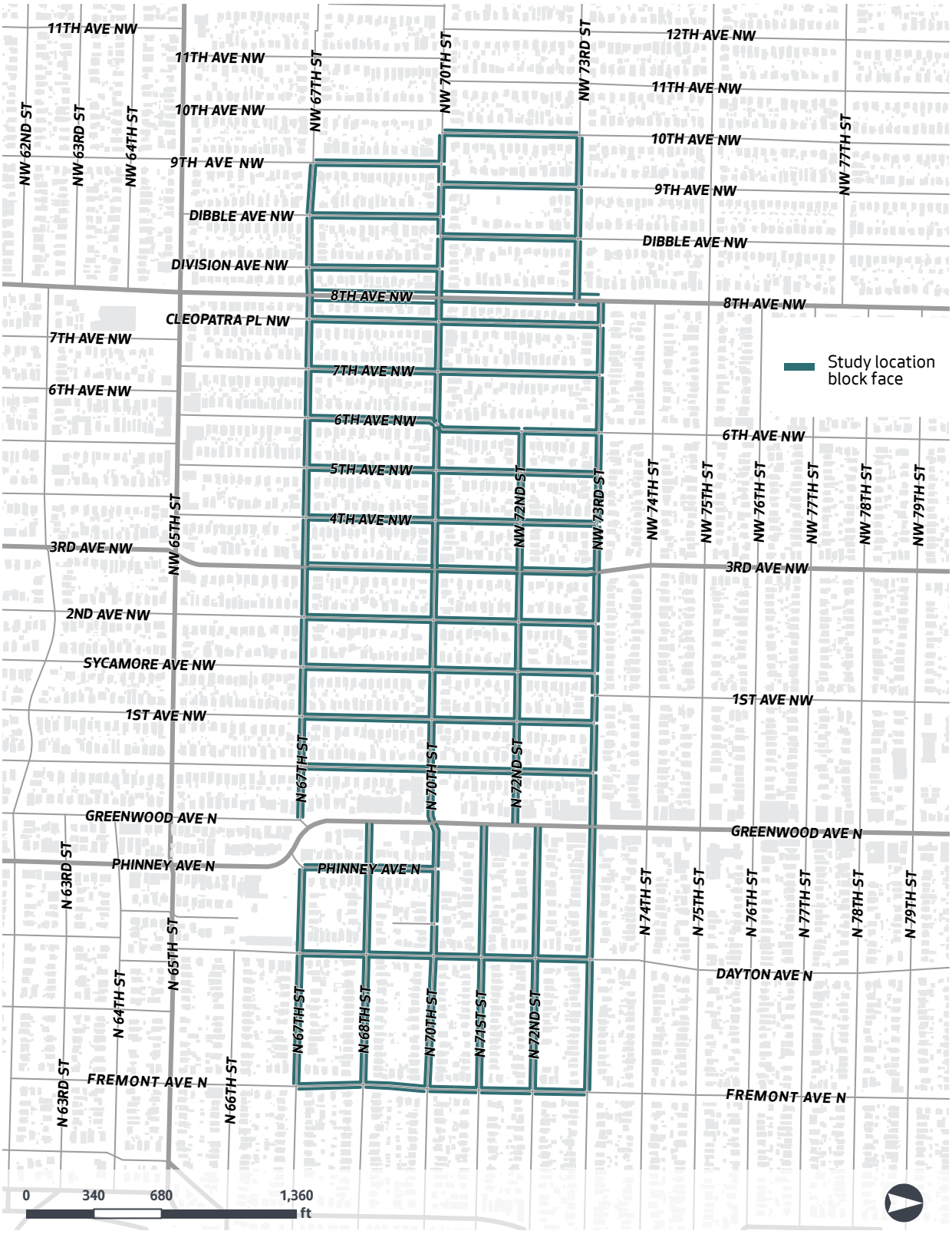
New in the FEIS Exhibit B-7 is a new exhibit in the Final EIS.

Exhibit B-8 Distribution of Lot Sizes in the Northeast Study Location



New in the FEIS Exhibit B-8 is a new exhibit in the Final EIS.

Exhibit B-9 Northwest Study Location

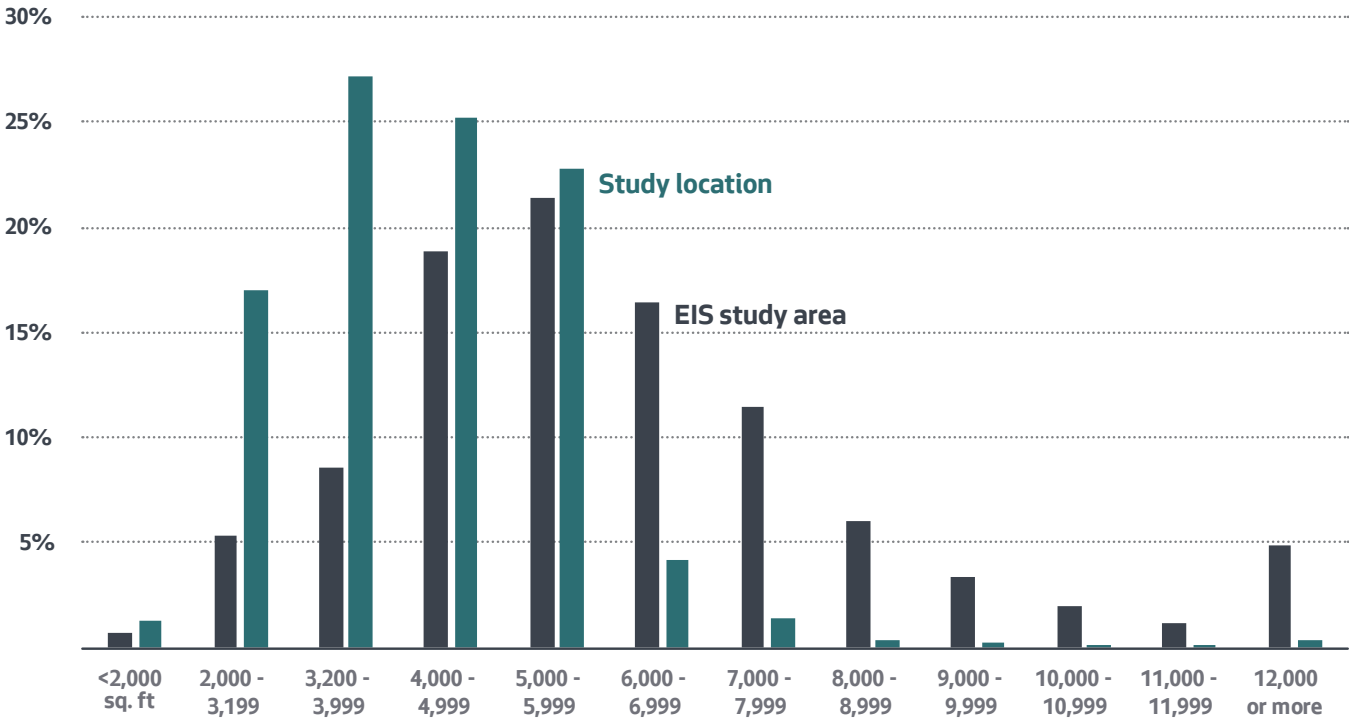


New in the FEIS Exhibit B-9 is updated in the Final EIS.

Exhibit B-10 Distribution of Parcel Types in the Northwest Study Location

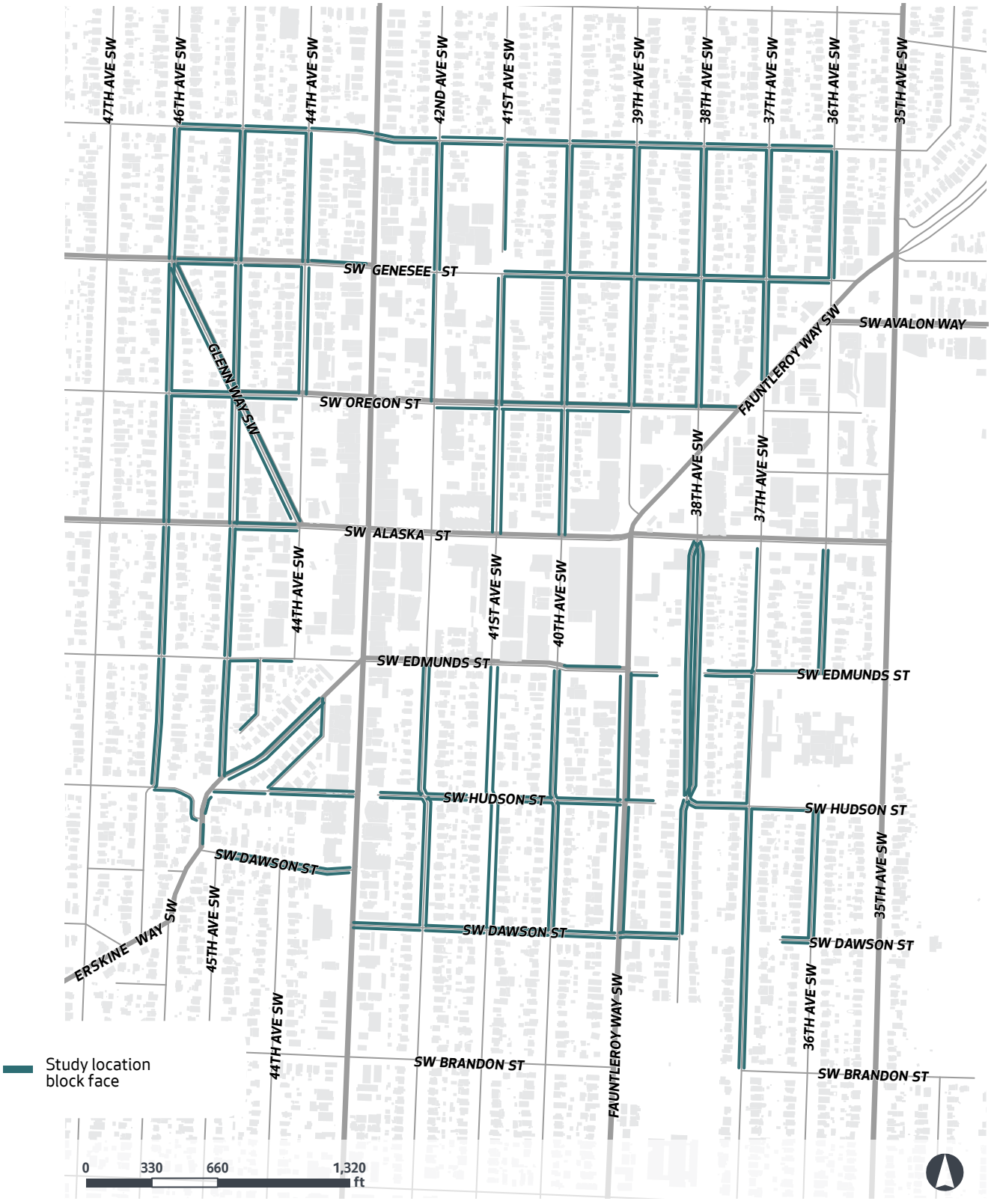
New in the FEIS Exhibit B-10 is a new exhibit in the Final EIS.

Exhibit B-11 Distribution of Lot Sizes in the Northwest Study Location



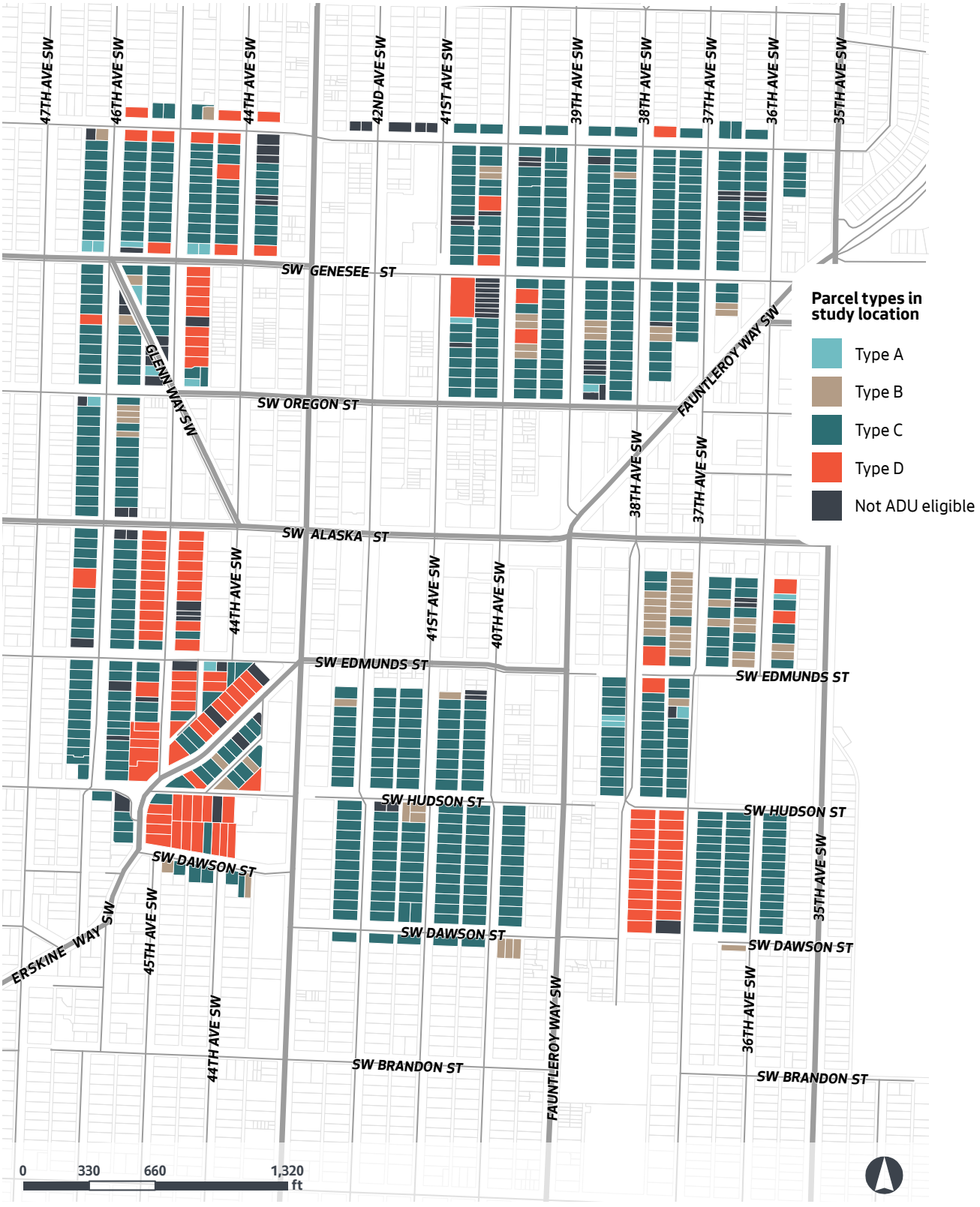
New in the FEIS Exhibit B-11 is a new exhibit in the Final EIS.

Exhibit B-12 Southwest Study Location



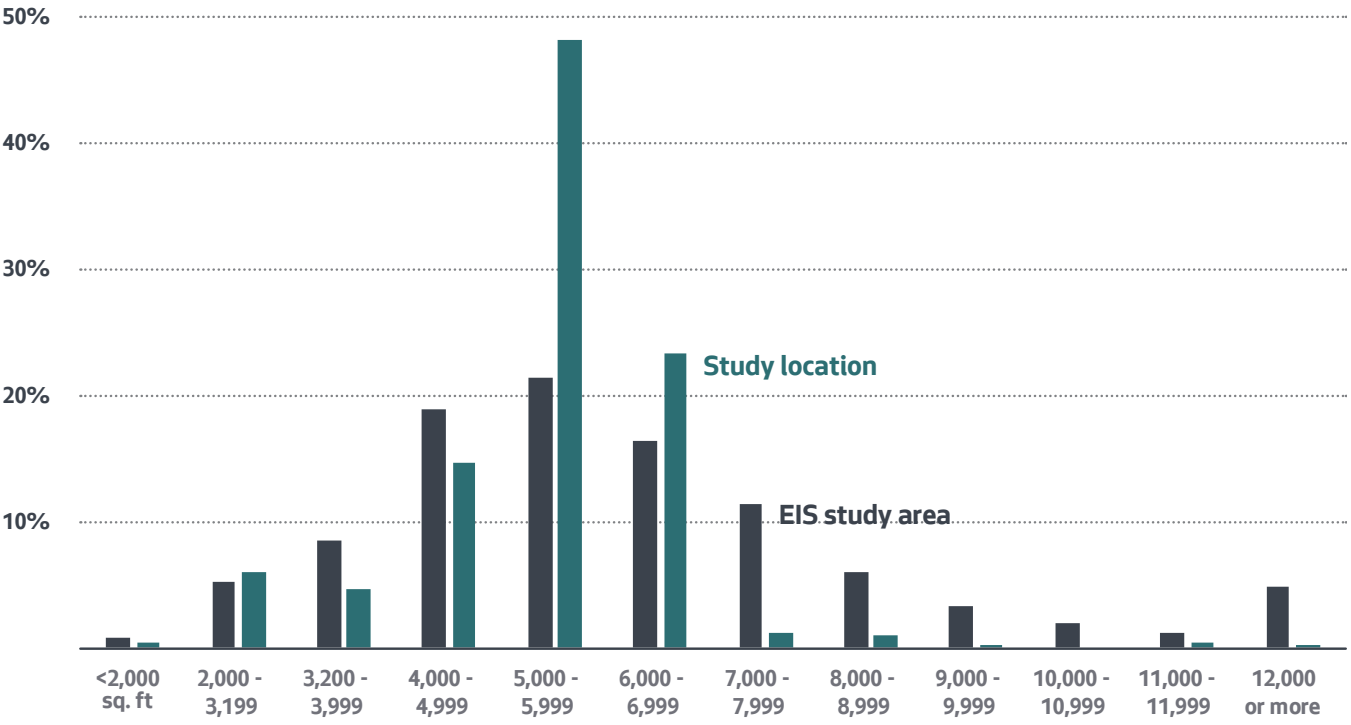
New in the FEIS Exhibit B-12 is updated in the Final EIS.

Exhibit B-13 Distribution of Parcel Types in the Southwest Study Location



New in the FEIS Exhibit B-13 is a new exhibit in the Final EIS.

Exhibit B-14 Distribution of Lot Sizes in the Southwest Study Location



New in the FEIS Exhibit B-14 is a new exhibit in the Final EIS.

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. For the northeast and northwest study locations, we collected data on parking supply and utilization for each block face generally using the methodology for data collection described in Tip 117 (SDCI 2011). SDOT collected parking supply and utilization data for the southeast and southwest study locations (SDOT 2016; SDOT 2017). Data collection for this analysis generally followed the methodology outlined in the Seattle Department of Construction and Inspection's Parking Waivers for Accessory Dwelling Units document (Tip 117).[2] 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 overnight parking data on the following Saturdays:

- Northeast: December 9, 2017
- Northwest: December 9, 2017
- Southwest: September 23 and September 30, 2017

2 Seattle Department of Construction and Inspections (SDCI). 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.[3] 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

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.

tracts; all block faces in the southeast location are located in the same census tract.

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-15 and Exhibit B-16. 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-15 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-16 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.[4]

4 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-17 presents weighted averages for number of vehicles per household for ADU households and renter-occupied households in Portland.

Exhibit B-17 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-18 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-19 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-18 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-19 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~~ 1.63 and ~~3.05~~ 4.64 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~~

several 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~~ 5 percent of eligible parcels will have 2 ADUs.
- ***Alternative 3.*** ~~1.5~~ 2 percent of all eligible parcels will develop 1 ADU and ~~1.5~~ 2 percent will develop 2 ADUs.
- ***Preferred Alternative:*** 5 percent of eligible parcels would have 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-20 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-20 Parking Supply by Study Location

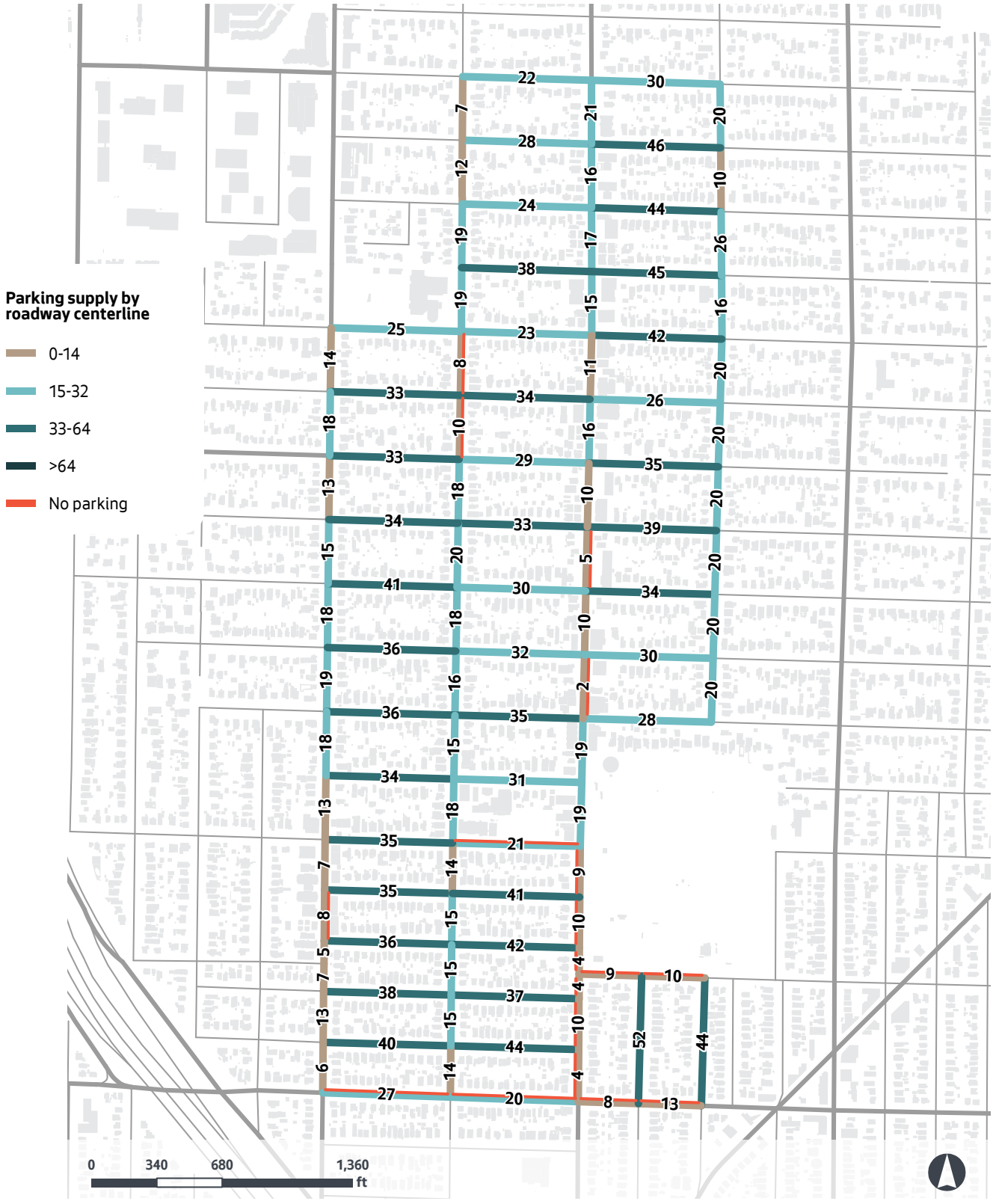
Study location	Blocks	Total on-street parking spaces	Average number of on-street parking spaces per block
Southeast	14	327	23
Northeast	108	2,403	22
Northwest	118	2,115	18
Southwest	99	2,682	27
Total	339	7,527	22

Exhibit B-21 through Exhibit B-24 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-21 Parking Supply in the Southeast Study Location

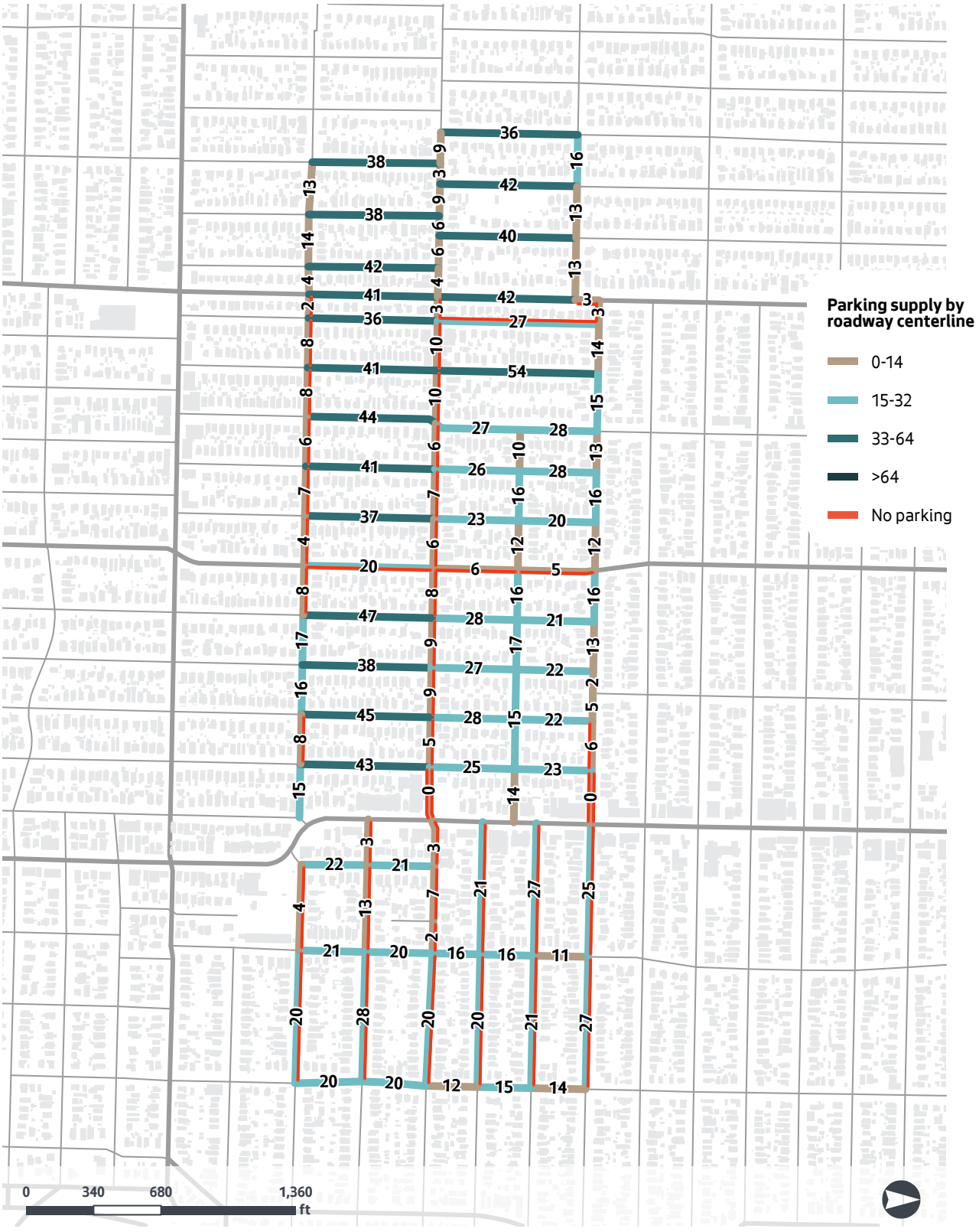
New in the FEIS Exhibit B-21 is updated in the Final EIS.

Exhibit B-22 Parking Supply in the Northeast Study Location



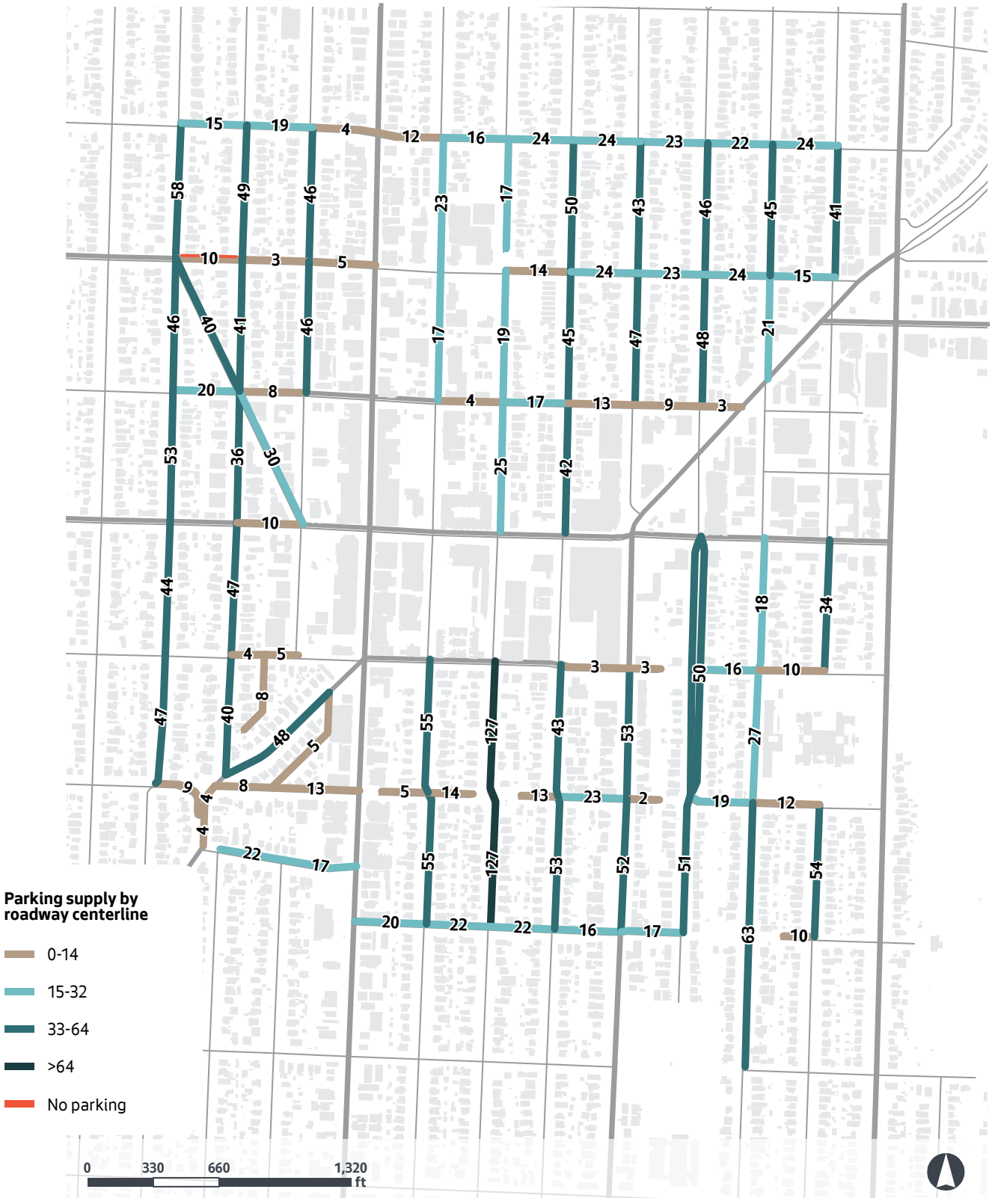
New in the FEIS Exhibit B-22 is updated in the Final EIS.

Exhibit B-23 Parking Supply in the Northwest Study Location



New in the FEIS Exhibit B-23 is updated in the Final EIS.

Exhibit B-24 Parking Supply in the Southwest Study Location



New in the FEIS Exhibit B-24 is updated in the Final EIS.

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-25 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-25 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.

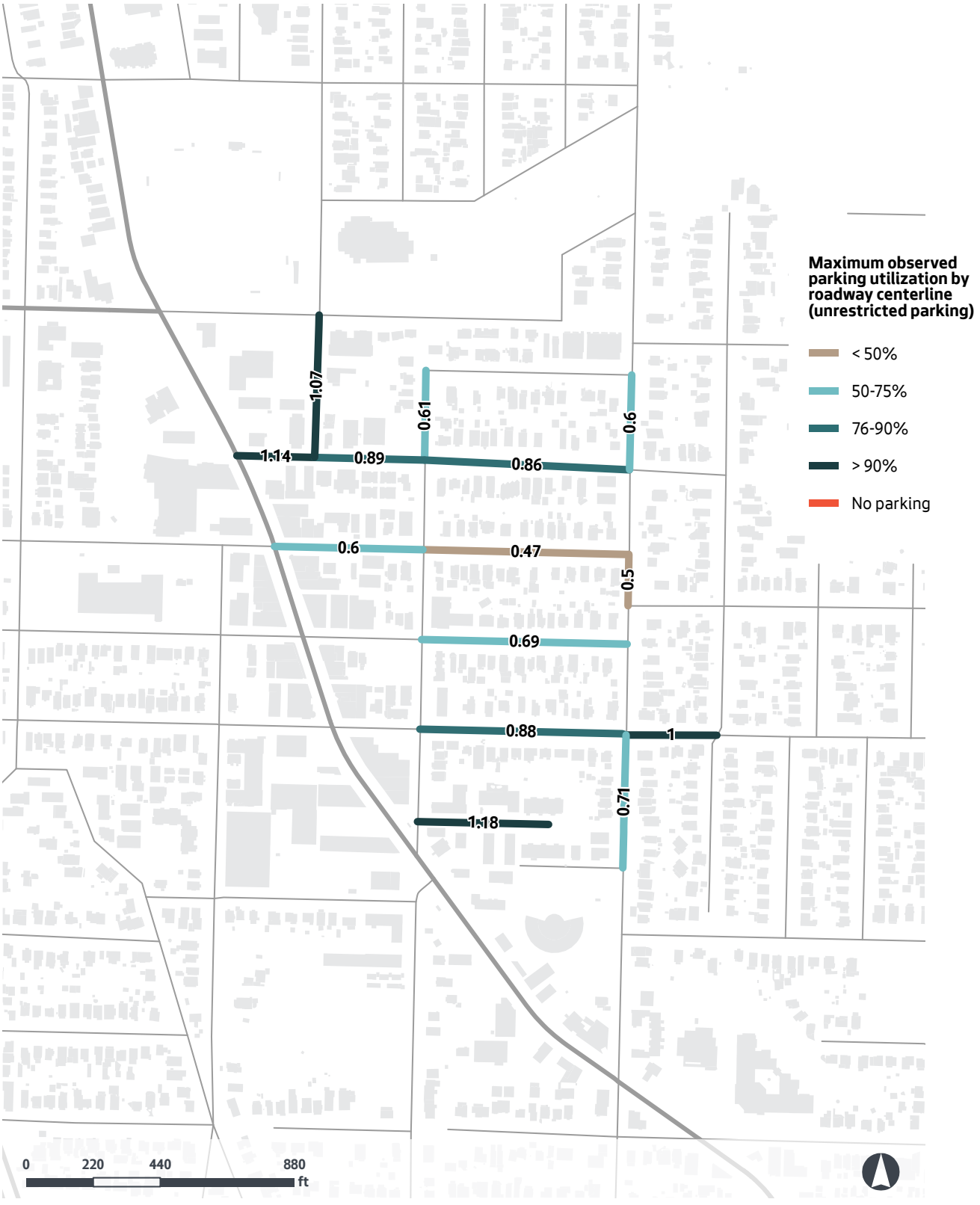
Exhibit B-26 shows weekday parking utilization rates per block for each study location. Overall, 57 percent of blocks across the study locations have utilization rates above 50 percent. Compared to others, the southeast study location has a higher share of blocks with utilization rates of at least 75 percent.

Exhibit B-26 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%

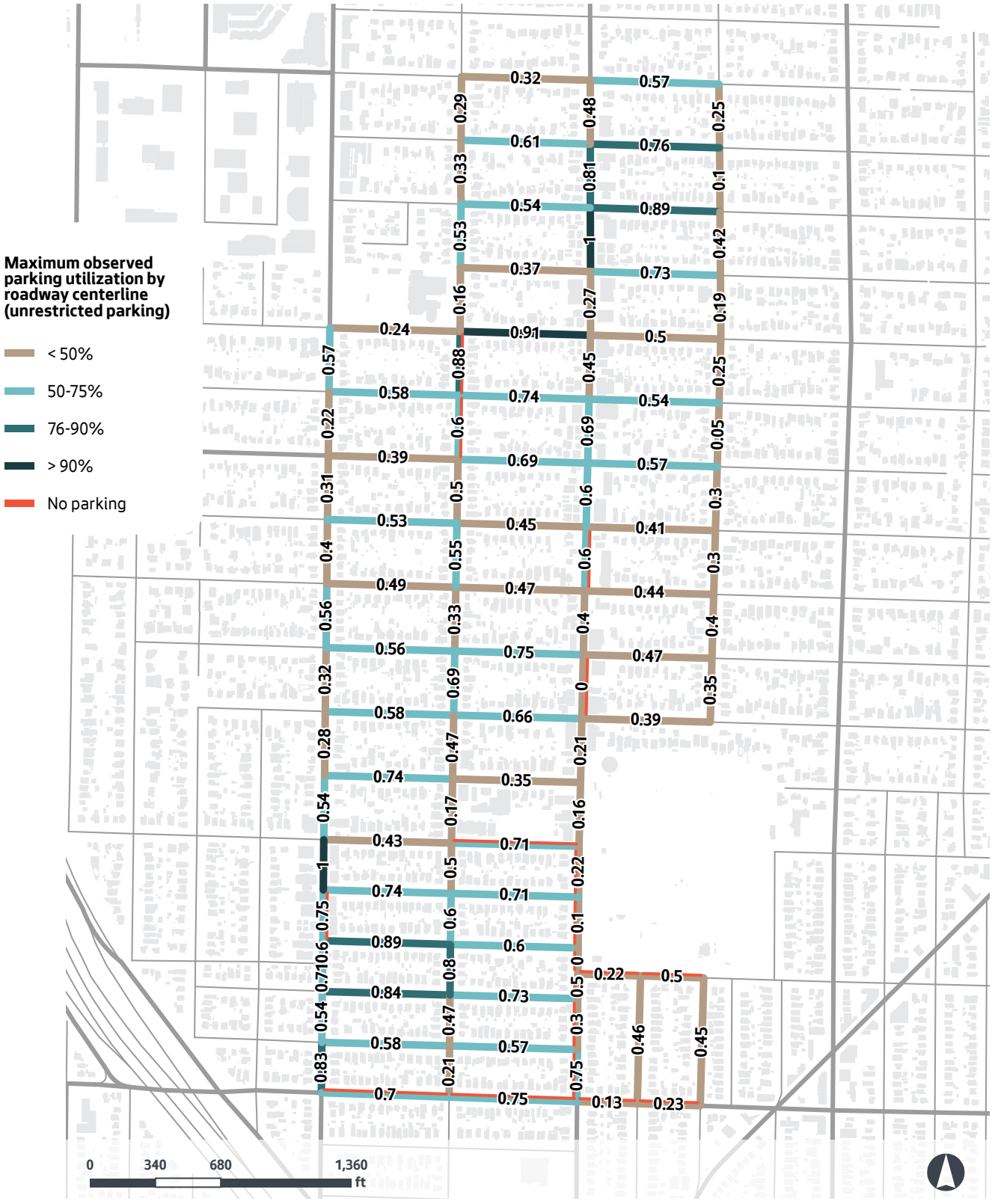
Exhibit B-27 through Exhibit B-30 show block-by-block weekday parking utilization rates for each study location using the categories shown in Exhibit B-26. Occasionally, parking demand exceeds the available parking supply, resulting in utilization rates above 100 percent. This could indicate illegal 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-27 Weekday Parking Utilization in the Southeast Study Location



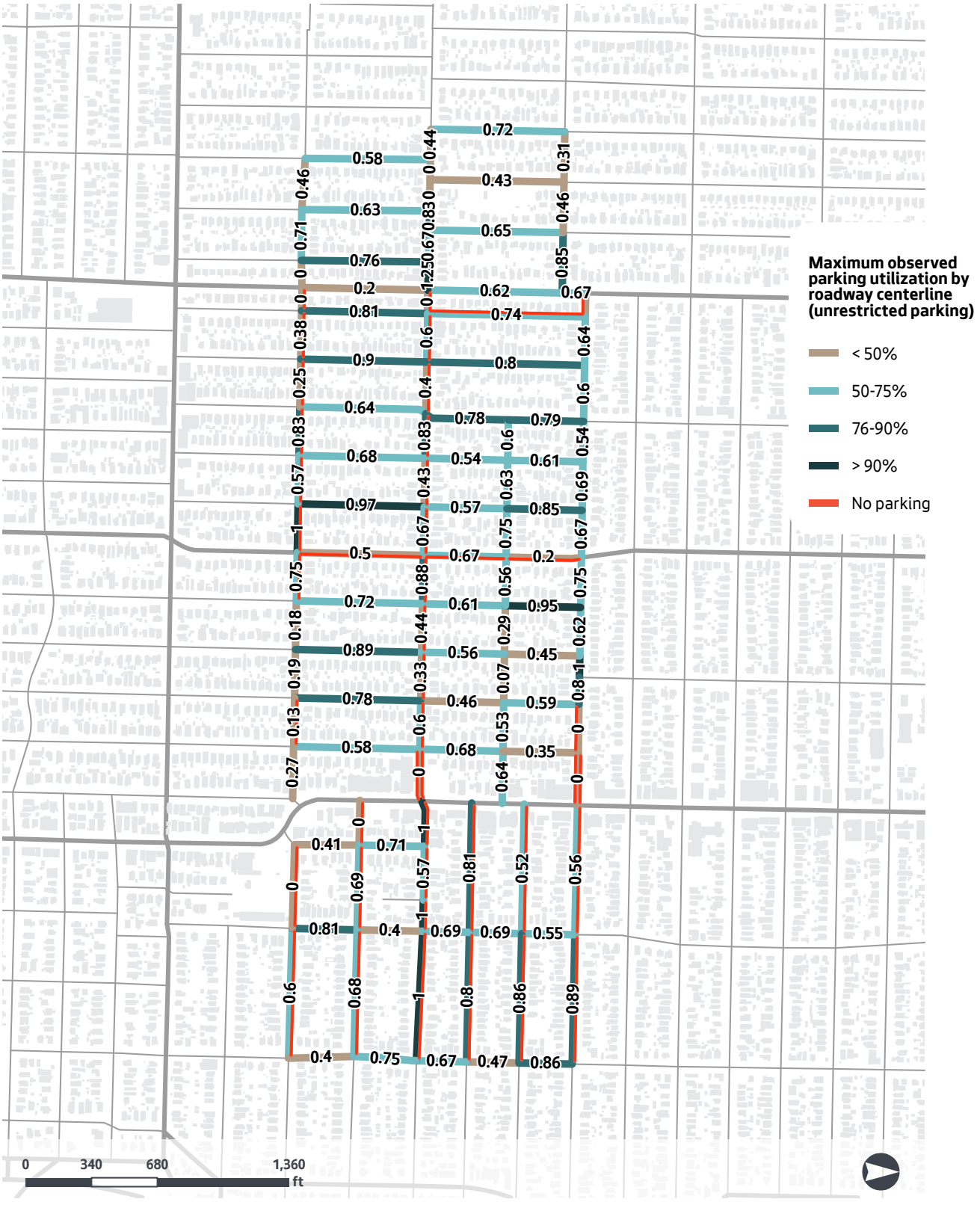
New in the FEIS Exhibit B-27 is updated in the Final EIS.

Exhibit B-28 Weekday Parking Utilization in the Northeast Study Location



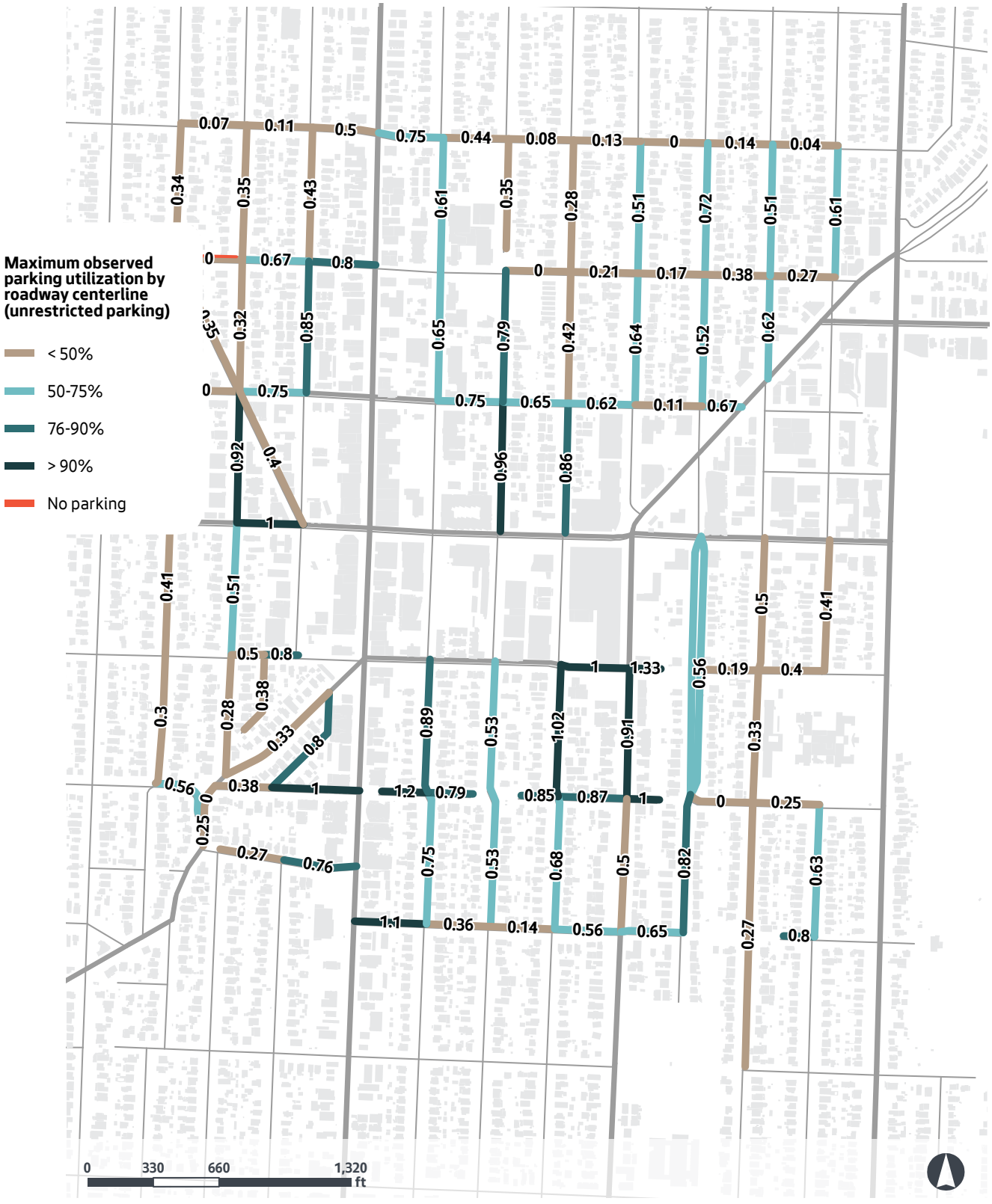
New in the FEIS Exhibit B-29 is updated in the Final EIS.

Exhibit B-29 Weekday Parking Utilization in the Northwest Study Location



New in the FEIS Exhibit B-29 is updated in the Final EIS.

Exhibit B-30 Weekday Parking Utilization in the Southwest Study Location



New in the FEIS Exhibit B-30 is updated in the Final EIS.

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-31 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-32 through Exhibit B-35 show existing parking availability for blocks in each study location and identify parcels by their eligibility for an ADU.

Exhibit B-31 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%**

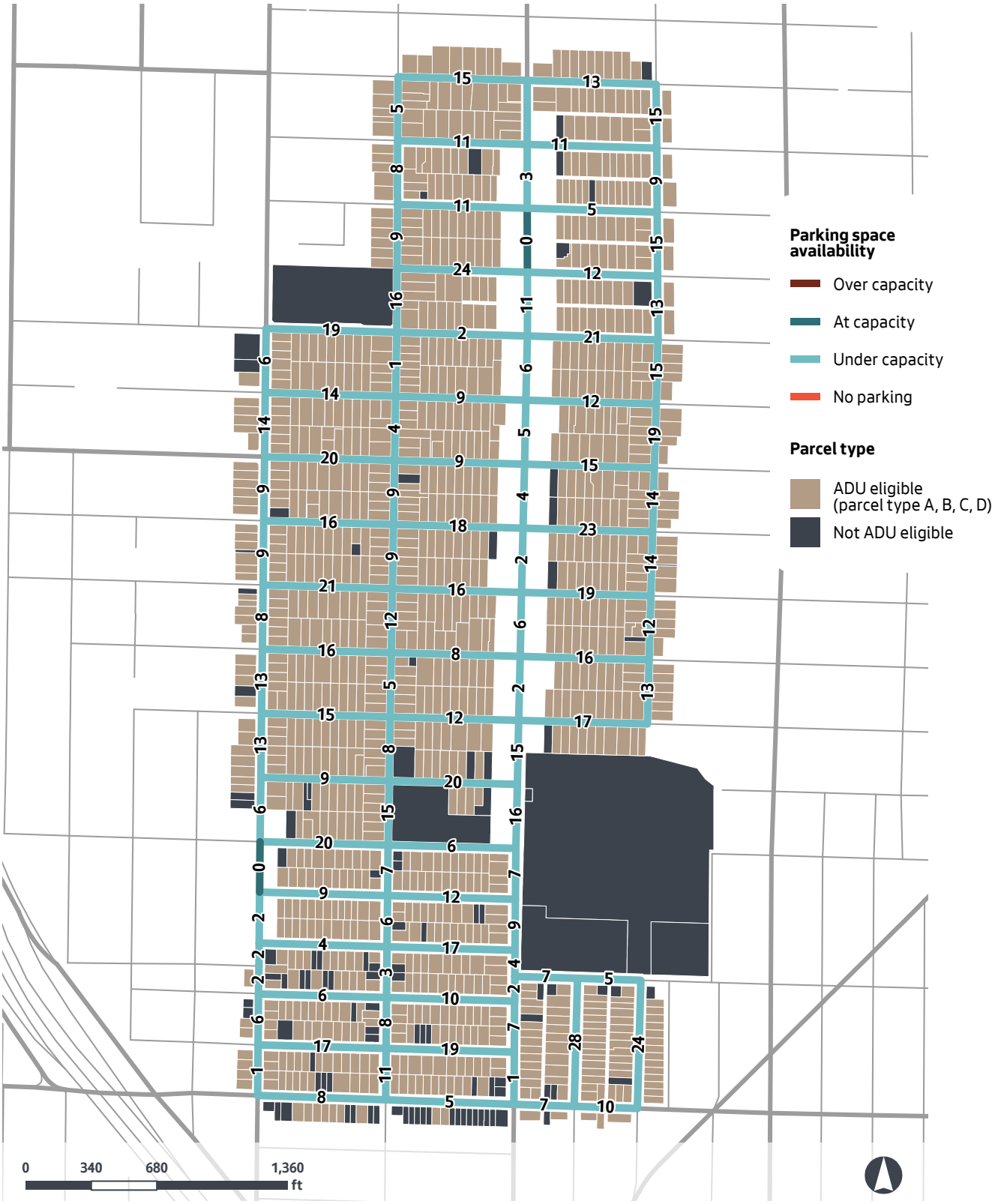
Exhibit B-32 Existing Parking Availability and Parcel Type in the Southeast Study Location

Numbers on map refer to the number of on-street parking spaces available.

New in the FEIS Exhibit B-32 is updated in the Final EIS.

Exhibit B-33 Existing Parking Availability and Parcel Type in Northeast Study Location

Numbers on map refer to the number of on-street parking spaces available.



New in the FEIS Exhibit B-33 is updated in the Final EIS.

Exhibit B-34 Existing Parking Availability and Parcel Type in Northwest Study Location

Numbers on map refer to the number of on-street parking spaces available.

New in the FEIS Exhibit B-34 is updated in the Final EIS.

Exhibit B-35 Existing Parking Availability and Parcel Type in Southwest Study Location

Numbers on map refer to the number of on-street parking spaces available.

New in the FEIS Exhibit B-35 is updated in the Final EIS.

ESTIMATING INCREASED PARKING DEMAND

Exhibit B-36 shows the estimated number of parcels in each study location eligible for an ADU based on the parcel typology described in Section 3.2, Planning Context. The northeast study location has the most eligible parcels (1,141) and the southeast study location the fewest (127). Exhibit B-37 through Exhibit B-39 show the estimated number of ADUs created in each study location under each alternative. Alternative 1 has the fewest ADUs developed (~~90~~ 91), followed by Alternative 3 (~~94~~ 283), and Alternative 2 and the Preferred Alternative (~~182~~ 300 each). 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-37 through Exhibit B-39 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~~ 21 percent of the parking supply, with the greatest increase in demand occurring under Alternative 2 and the Preferred Alternative.

Exhibit B-36 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-38). We estimate four ADUs created in the southeast study location that would generate five new vehicles that would occupy ~~6~~ 7 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~~ 3 percent for the northeast, 4

percent for the ~~and~~ northwest locations~~,~~ and 2 percent for the southwest location. 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-37 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-18 for detailed estimated vehicle ownership rates.

ALTERNATIVE 2

In Alternative 2, we assume that ~~3~~ 5 percent of eligible parcels have two ADUs, yielding ~~182~~ 300 ADUs and ~~207~~ 342 new vehicles across all study locations (see Exhibit B-38). 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~~ 21 percent). The overall utilization of available parking spaces under Alternative 2 ranges from 4 6 to ~~14~~ 21 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-38 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~~ 12	1.29	~~10~~ 15	72	~~14%~~ 21%	~~62~~ 57
Northeast	~~68~~ 114	1.15	~~78~~ 131	1,140	~~7%~~ 11%	~~1,062~~ 1,009
Northwest	~~58~~ 96	1.21	~~70~~ 116	793	~~9%~~ 15%	~~723~~ 677
Southwest	~~48~~ 78	1.03	~~49~~ 80	1,311	~~4%~~ 6%	~~1,262~~ 1,231
Total	~~**182**~~ **300**	—	~~**207**~~ **342**	**3,316**	~~**6%**~~ **10%**	~~**3,109**~~ **2,974**

1 See Exhibit B-18 for detailed estimated vehicle ownership rates.

ALTERNATIVE 3

In Alternative 3, we assume that ~~1.5~~ 2 percent of eligible parcels have at least one ADU, and ~~1.5~~ 2 percent of eligible parcels develop two ADUs. This yields a total of ~~135~~ 183 ADUs whose residents bring ~~155~~ 209 new vehicles to the study locations (see Exhibit B-39). The results for Alternative 3 are ~~nearly identical to~~ approximately double Alternative 1 and half of Alternative 2 and the Preferred Alternative. The share of available parking spaces used to satisfy new parking demand from ADU residents ranges from ~~3~~ 4 percent in the southwest study location to ~~11~~ 17 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-39 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~~ 9	1.29	~~8~~ 12	72	~~11%~~ 17%	~~64~~ 60
Northeast	~~51~~ 69	1.15	~~59~~ 79	1,140	~~5%~~ 7%	~~1,081~~ 1,061
Northwest	~~42~~ 57	1.21	~~51~~ 69	793	~~6%~~ 9%	~~742~~ 724
Southwest	~~36~~ 48	1.03	~~37~~ 49	1,311	~~3%~~ 4%	~~1,274~~ 1,262
Total	~~**135**~~ **183**	—	~~**155**~~ **209**	**3,316**	~~**3%**~~ **6%**	~~**3,161**~~ **3,107**

1 See Exhibit B-18 for detailed estimated vehicle ownership rates.

PREFERRED ALTERNATIVE

Results for the Preferred Alternative match Alternative 2. In the Preferred Alternative, we assume that 5 percent of eligible parcels have two ADUs, yielding 300 ADUs and 342 new vehicles across all study locations (see Exhibit B-40). 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 (21 percent). The overall utilization of available parking spaces under the Preferred Alternative ranges from 6 to 21 percent across all four study locations. Under the Preferred Alternative, increased parking demand resulting from ADU production in the four study locations does not exceed the existing on-street parking availability.

Exhibit B-40 Parking Availability after ADU Production under the Preferred Alternative

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	12	1.29	15	72	21%	57
Northeast	114	1.15	131	1,140	1%	1,009
Northwest	96	1.21	116	793	5%	677
Southwest	78	1.03	80	1,311	6%	1,231
Total	**300**	**—**	**342**	**3,316**	**10%**	**2,974**

1 See Exhibit B-18 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-41 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	Pref Alt
Southeast	78%	255	327	1.29	23	18	4	~~8~~ 12	~~6~~ 9	12
Northeast	53%	1,263	2,403	1.15	780	678	34	~~68~~ 114	~~51~~ 69	114
Northwest	63%	1,322	2,115	1.21	476	393	29	~~58~~ 96	~~42~~ 57	96
Southwest	51%	1,371	2,682	1.03	909	883	24	~~48~~ 78	~~36~~ 48	78
Total	**56%**	**4,211**	**7,527**	—	**2,188**	**1,972**	**91**	**~~182~~ 300**	**~~135~~ 183**	**300**

1 See Exhibit B-18 for detailed estimated vehicle ownership rates.

Exhibit B-41 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~~ 6 ~~to~~ and ~~835~~ 805 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~~ 1,972 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~~ 4 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 to 10 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~~s~~ 1 ~~and 3~~ (No Action), we estimate ~~Alternative 2~~ Alternative 3 would result in twice as many ADUs and vehicles across the four study locations: 183 ADUs and 209 vehicles, compared to 91 ADUs and 104 vehichles under Alternative 1 (No Action). Alternative 2 and the Preferred Alternative would result in more ADUs and vehicles still. We estimate approximately 300 ADUs and 342 vehicles across the four study locations under Alternative 2 and the Preferred Alternative. ~~, but nevertheless~~ Nevertheless, for all alternatives, 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-42 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~~ 6 percent across all alternatives and study locations.

Exhibit B-42 Estimated Future Parking Utilization

Study location	Existing	Alternative 1 (No Action)	Alternative 2	Alternative 3	Preferred Alternative
Southeast	78%	80%	~~81%~~ 83%	~~80%~~ 82%	83%
Northeast	53%	~~53%~~ 54%	~~56%~~ 58%	~~55%~~ 56%	58%
Northwest	63%	64%	~~66%~~ 68%	~~65%~~ 66%	68%
Southwest	51%	52%	~~53%~~ 54%	~~52%~~ 53%	54%
Total	**56%**	**57%**	**~~59%~~ 60%**	**~~58%~~ 59%**	**60%**