April 26, 2016 | Interim Report of Findings

Northwest Portland Parking Studies

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Study Description & Methodology

Overview

A number of changes to management of the on-street parking supply in Northwest Portland are underway, including an expansion of the Zone M permit area and the introduction of metered parking. To evaluate the effects of these changes, a detailed study of parking utilization throughout the district is being conducted. This report presents the interim findings, evaluating the utilization of on-street parking in Northwest Portland prior to the current management changes. The results presented herein will provide a basis for evaluating the impacts of the management changes, and offer additional insights about potential strategies and opportunities to manage on-street parking in the district.

Methodology

The methodology employed for the data collection phase of this project consisted of two steps: an inventory of parking supply, including the number and types of stalls, followed by occupancy counts.

To complete the first step, an inventory of the supply of parking stalls was conducted, tracking the number and location of parking spaces along each block face as well as designated users, maximum time stays, and other pertinent information as applicable. Since most spaces in Northwest Portland are unmarked (i.e., not striped to denote individual parking spaces), it is noted that in some cases the actual number of parking spaces can vary slightly from time to time depending upon the size and spacing of parked vehicles. The inventory was conducted utilizing a tablet PC. The data collected in this step were utilized to set up data collection tools in the form of spreadsheets, to be used during the following step.

Figure 1: Data were collected on tablet PCs using the Google Sheet apps

Following the inventory step, parking demand data were collected. The study area was subdivided into 33 routes, with each route consisting of approximately 20 to 25 block faces. Route sizes and configurations were designed such that data collectors were able to walk and collect data over the entire route once per hour without needing to work excessively quickly. Each block face within the study area was thus visited once per hour from 7:00 AM to 10:00 PM on a Tuesday, Wednesday, or Thursday between February 18 and March 17, 2015. Additionally, data were collected once per hour from 10:00 AM to 12:00 AM on Saturday to gain an understanding insights into parking utilization on weekends. Saturday data collection occurred on March 14 and March 21, 2015, and approximately 25% of the study area was sampled.

The data was collected on tablet PCs utilizing the route-optimized spreadsheets created during the inventory phase. During each hourly orbit of a given route, the first four digits of the license plate of each vehicle parked in a stall along the route were recorded, to allow for analysis of both occupancy and duration of stay. Whether each parked vehicle had a City of Portland parking permit—and which zone the permit corresponded to if so—was also recorded.

Additionally, in order to gain an understanding of loading demand and loading zone utilization within the district, data were collected at 55 of approximately 60 designated loading zones within the district. Loading zones were visited approximately once every 20 minutes, and if a loading zone was occupied, the type of vehicle (i.e., commercial or private), and first four digits of the license plate number were collected. Loading zone data were collected on Wednesday, March 25 and Thursday March 26, 2015 from 5:00 AM to 5:00 PM.

Altogether, this work represents the most comprehensive study of parking within a subarea of Portland conducted to date. The observations in this report were drawn from a total of 116,420 unique observations of a parking space, and data collectors walked a total of more than 565 miles in order to collect the data.

Metrics

The key metrics employed in this analysis are described below.

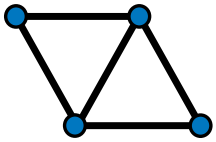
- **Stalls** indicate number of parking spaces available on a block face or within a subarea. The average length of a stall in Northwest Portland was observed to be approximately 18 feet. In most cases, the number of stalls was determined by direct observation of the number of cars parked, which is to say, the generally high rate of parking utilization in the study area negated the need to estimate parking spaces by measuring linear frontage along a block face. However since most parking in the study is unstriped, the actual number of stalls along a block may vary slightly based on vehicle sizes, how efficiently vehicles are parked, etc. This analysis therefore assumes a static number of stalls based upon how people were typically observed to utilize the parking spaces.

- **Occupancy** is a measure of how much of the on-street supply is utilized, expressed as a percentage of the total parking supply. When occupancy levels exceed 85%, parking is functionally full; this is often indicative of a need for a change in management. The term 'peak hour' is used in this report to indicate the hour of the day when occupancy is observed to be highest. The timing of the peak hour and the occupancy level during the peak hour relative to other times of day reveal important information about drivers of demand.

- **Duration of stay** (or **stay length**) is the length of time that a particular vehicle is observed to occupy a particular parking space. Stay lengths of more than three to four hours likely indicate residential or commuter

	A	B	C	D	E	F	G	H
233	Block #		13 Block Face	BF28303	Block Side	West	Time Limit	180
234	West side of 8th between Davis & Everett							
235								
236	Start: NW Davis							
237	Stall #	Use Code	Hour	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM
238			Actual Time	7:33:00 AM	8:13:00 AM	9:24:00 AM	10:25:00 AM	11:25:00 AM
239		1 m		x	x	060e	060e	060e
240		2 m		x	x	090d	090d	418f
241		3 m		x	x	1421	1421	476b
242		4 m		x	x	759g	759g	x
243		5 m	Plates:	x	x	3284	x	r40y
244		6 m		x	x	4023	4023	4023
245		7 m		x	x	743h	743h	743h
246		8 m		x	x	277g	277g	277g
247		9 m		x	x	3399	3399	3399
248	End: NW Everett			7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM
249								
250								
251	Block #		14 Block Face	BF28304	Block Side	West	Time Limit	180
252	West side of 8th between Everett & Flanders							
253								
254	Start: NW Everett							
255	Stall #	Use Code	Hour	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM
256			Actual Time	7:34:00 AM	8:14:00 AM	9:26:00 AM	10:27:00 AM	11:27:00 AM
257		1 np						
258		2 m		x	5377	617f	617f	617f

Figure 2: Example of the data collection tool utilized during this study



demand, while shorter stay lengths are likely to indicate demand for retail, restaurant, entertainment, or commercial uses. Since each parking space was observed once every hour, this measure has some level of uncertainty for shorter stay lengths.

- **Unique vehicles served** refers to the number of the number of different vehicles (based upon the recorded license plate numbers) observed on a per-stall basis. This metric complements duration of stay in providing an understanding of the turnover of parking stalls. Along commercial corridors, it is desirable for parking to serve as many unique vehicles as practical, as this indicates a robust turnover of customers. A parking stall serving fewer than three unique vehicles over the study day is likely serving residential demand or a lower-demand area, while three or more unique vehicles served is more likely indicative of a parking space serving commercial uses or a mix of uses. Since data were collected once per hour, the number of unique vehicles served reported herein is likely lower than the actual number of unique vehicles that utilize stalls with short time limits.

- **Percentage of overstays** is reported for stalls that have a signed maximum stay length, and refers to the percentage of vehicles that were observed to exceed that time limit. High percentages of overstays could indicate that time limits are not adequate to serve demand; conversely, they could also represent the need for more robust enforcement. As with other turnover metrics, the percentages of overstays reported herein are affected by the one-hour resolution of data, and thus entail uncertainty for spaces with time limits of one hour or less.

- The **percentage of vehicles with Zone M permits** (or other permits) is utilized in this analysis to further understand the drivers of demand. Low percentages of Zone M permits within Zone M is likely indicative of retail or commercial demand, while high percentages of Zone M permits outside of Zone M are likely to indicate spillover demand from Zone M residents and workers. Following the expansion of Zone M, the change in permit usage observed will provide insights into the efficacy of the management strategy.

Study Area & Stall Types

The study area is bounded by W Burnside Street to the south, NW Vaughn Street to the north, NW 26th Avenue and NW Westover Avenue to the west, and NW 18th Avenue to the east. Zone K, which is made up of the two blocks east of SW 16th Avenue between W Burnside Street and NW Northrup Street is not included in the study area. Zone M is included in the study area and is located at the southern end, between W Burnside Street and NW Irving Street.

A robust mix of land uses is present in the area. Three distinct areas of interest are identified to represent the variety of these uses: the Conway blocks in the northeastern corner, the Legacy Medical Center in the direct center, and NW 21st and 23rd Avenues. NW 21st and NW 23rd Avenues are main commercial streets with several bars, restaurants, and high end shopping options. Many buildings along these streets are mixed-use; with businesses and services on the ground floor and residential dwellings on floors above. Legacy Medical Center is located on NW 22nd Avenue between NW Lovejoy and NW Northrup Streets. The medical center is made up of several buildings and blends in with the commercial and residential buildings surrounding it. The Conway blocks run along the Fremont Bridge off-ramp, which provides access to both Highway 30 to the north and Interstate 405 to the south. The area is primarily made up of industrial and office uses.

The study area includes the following 10 types of parking stalls:

- **Unregulated:** Standard spaces with no permit requirements, time stays, or any other indication of a defined use or time.
- **Zone M Permit:** Spaces dedicated to Zone M Permit holders. Without a permit, these spaces are available for a limited time ranging from 90 minutes to 4 hours. Zone M Permit holders have no time limits.
- **Limited Time Stay**: Spaces with maximum time stays of 4 hours, 2 hours, 90 minutes, 1 hour, 30 minutes, 20 minutes, 15 minutes, 10 minutes, or 5 minutes.
- **Loading Zones:** Spaces reserved for loading and unloading activities for some or all of the day. Typically, these stalls revert to general use spaces after 7:00 PM.
- **Reserved/Temporary No Parking:** Spaces that were reserved for construction, road/sewer maintenance, or another purpose during some or all of the period that they were observed.
- **No Parking during certain hours:** Spaces that were reserved for postal services or another purpose during certain times during the day.
- **School Pick-Up/Drop-off:** Spaces that were located adjacent to a school and were marked as reserved for school uses only.
- **Carshare:** Spaces reserved for shared vehicles such as Zipcar vehicles.
- **Disabled:** Spaces reserved for use by wheelchair users displaying a placard.
- **Bike Corral:** Spaces converted to bike parking with multiple on-street bike staples available.

The entire study area consists of a total of **6,184 parking stalls,** including **3,428 unregulated stalls, 1,410 Zone M stalls,** and **1,086 Limited Time Stay stalls** with maximum permitted stay lengths ranging from 5 minutes to four hours. Figure 3 shows the number and types of stalls within the study area.

In order to observe the impacts on the management changes to areas just outside the expanded Zone M, the study area is slightly larger than the extents of the expanded Zone M. Approximately 4,700 spaces within the study area will be available to Zone M permit holders following the expansion. Those spaces will include approximately 2,800 metered spaces which will except Zone M permit holders, and approximately 1,900 non-metered Zone M spaces. An exact number will be available once the final meters are installed in the expanded Zone M area and the detailed post-implementation inventory is completed.

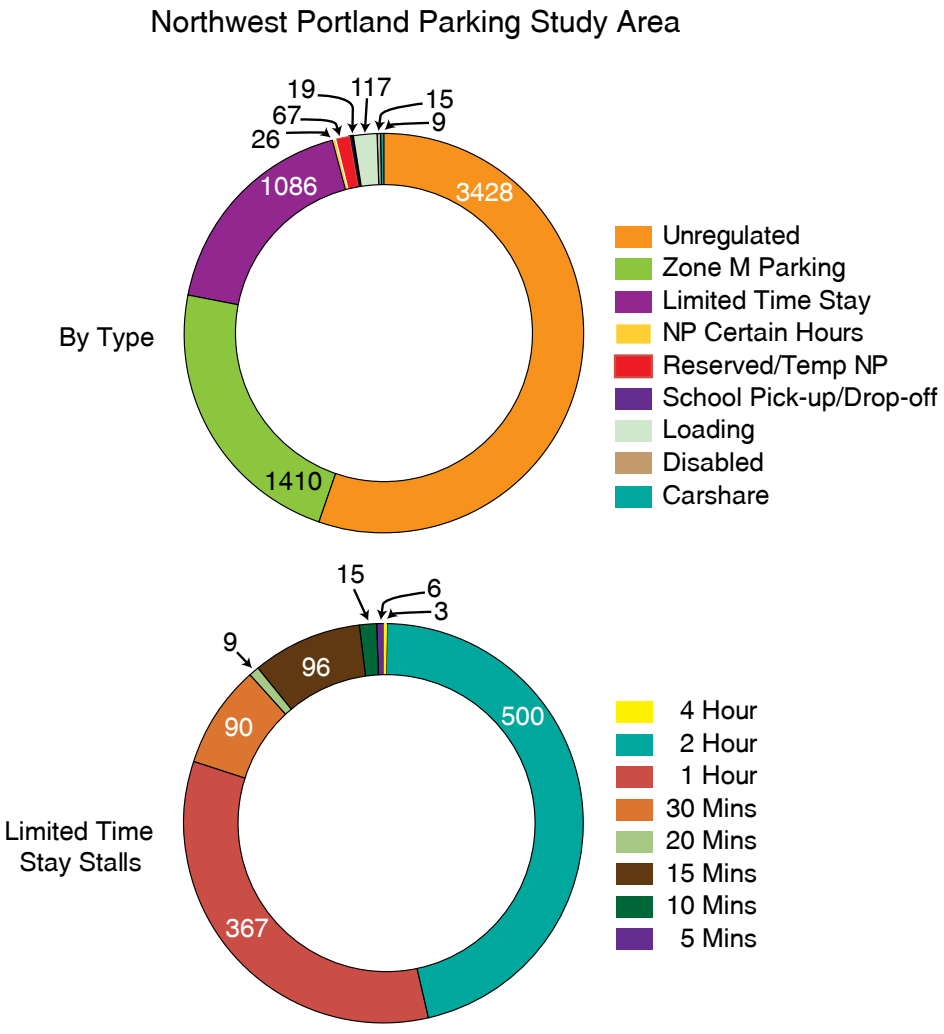


Figure 3: Stall types and quantities in the NW Portland Parking Study area

Additionally, data were collected within a subarea of the greater study area on Saturday. The subarea was chosen to provide to the extent possible a representative sample of the range of stall types, future management types, and land uses within the overall study area. The Saturday study area consists of a total of **1,212 parking stalls,** including **413 unregulated stalls, 385 Zone M stalls,** and **414 Limited Time Stay stalls.** Figure 4 shows the number and types of stalls within the Saturday subarea, and Figure 5 shows the geographic boundaries of the study area.

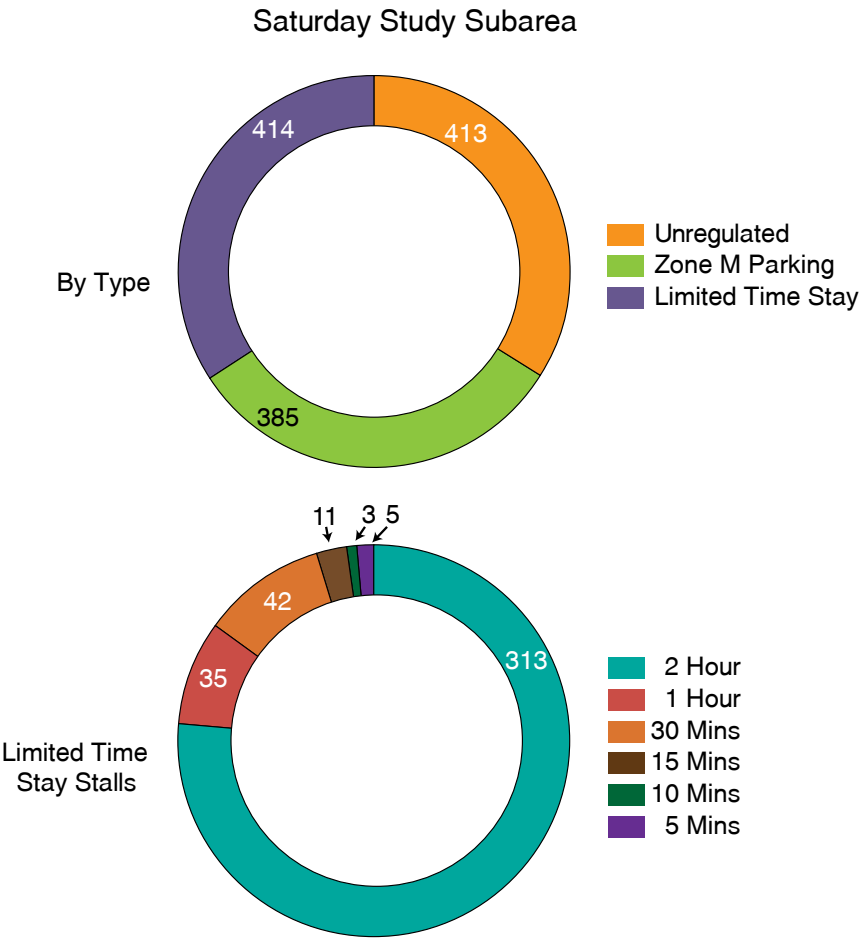


Figure 4: Stall types and quantities in the Saturday study subarea

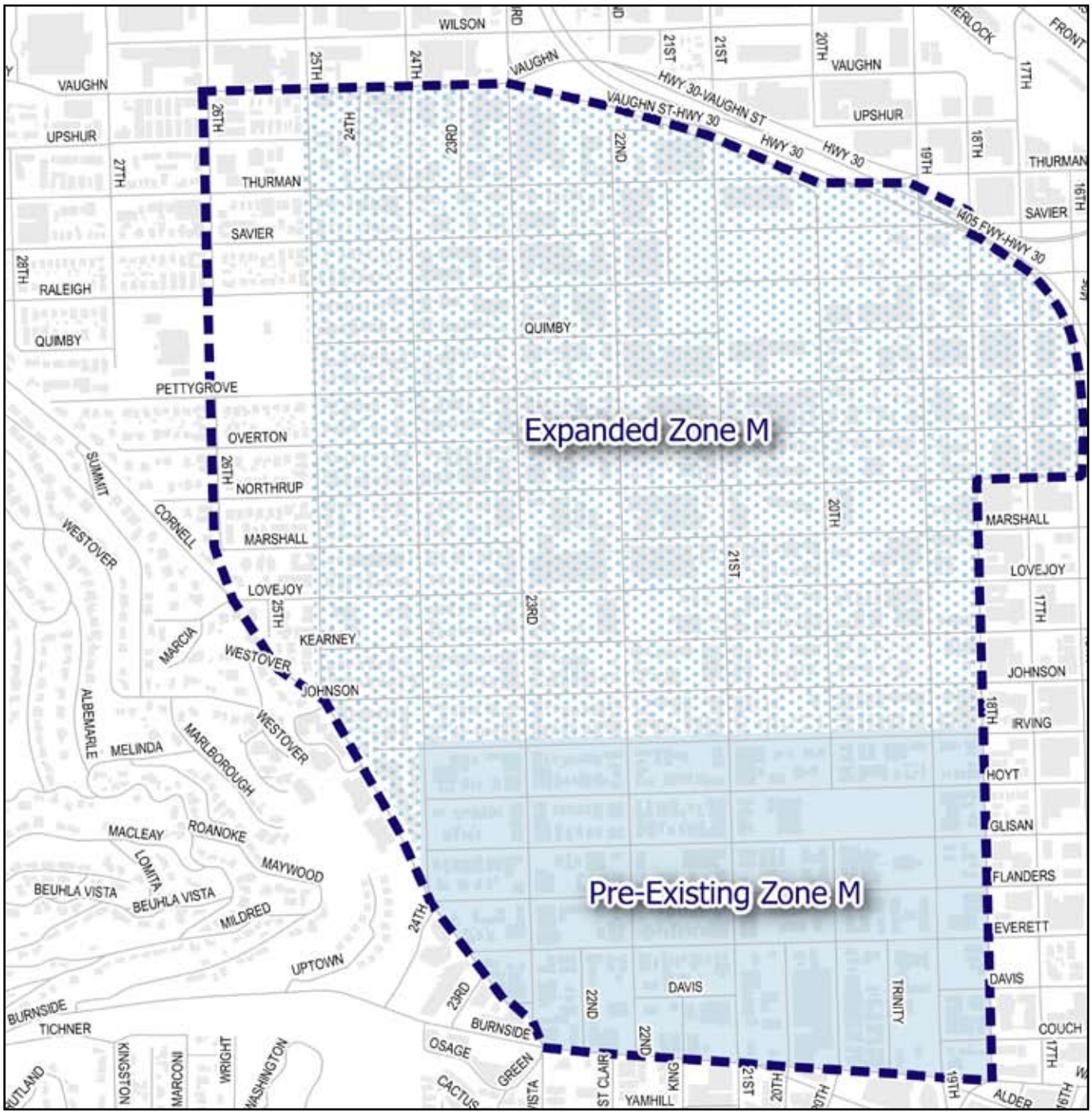


Figure 5: Northwest Portland Parking Study Area

Demand & Occupancy

To gain a basic understanding of how parking within the district is functioning, it is useful to look at how parking occupancy varies over the course of the day. In addition to providing a general picture of parking demand and the timing of peak hours, the shape and properties of occupancy curves can yield important insights about the land uses driving demand and other factors affecting parking usage.

The occupancy curve in Figure 6 shows overall parking occupancy throughout the study area for weekdays. In this figure and the several similar figures that follow, the time of day is shown on the horizontal axis and the percent of available parking that was observed to be occupied is shown on the vertical axis. Additionally, a line indicating an occupancy level of 85% is shown—this occupancy level is generally considered to be indicative of 'functionally full' parking. At parking occupancies at or near 85%, high instances of illegal parking, cruising for parking, and other undesirable behaviors are often observed.

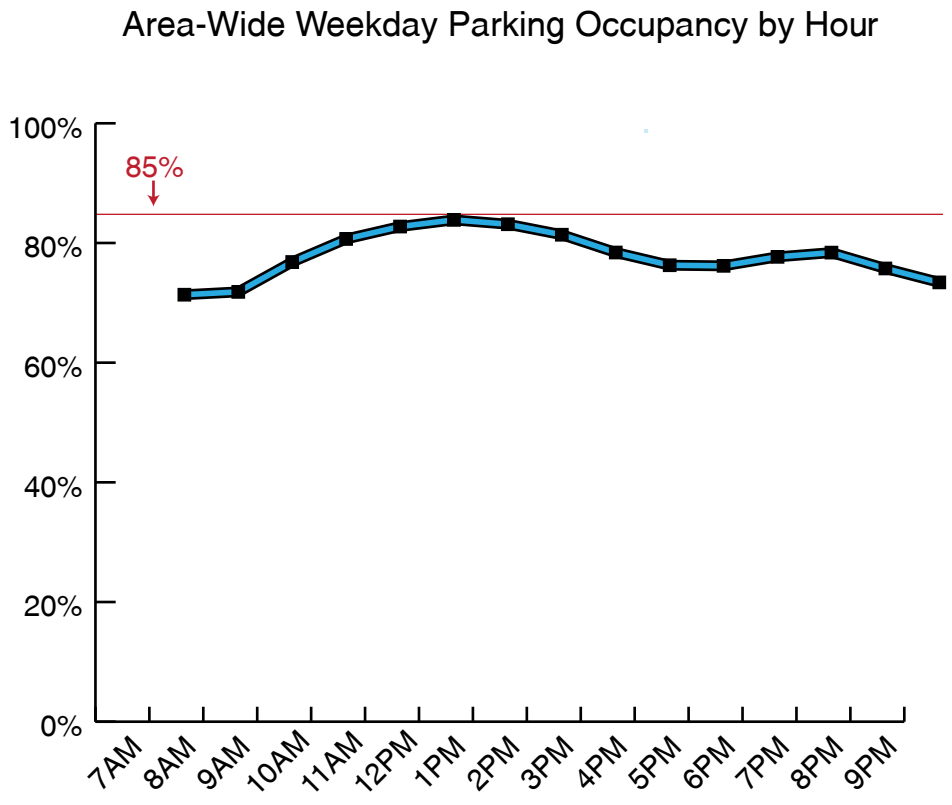


Figure 6: Area-wide weekday parking occupancy by hour for the overall Northwest Portland study area

Though demand was found to be high region-wide throughout the day, the period from late morning to early afternoon was found to have the highest demand. The peak hour for the day was found to occur at 12:00 PM., and a second, less pronounced peak was observed at 7:00 PM. Heat maps showing the parking occupancy geographically during these peak hours are shown in Figures7 and 8 on the following pages. Occupancy maps for the other observation hours are provided in the appendix to this report.

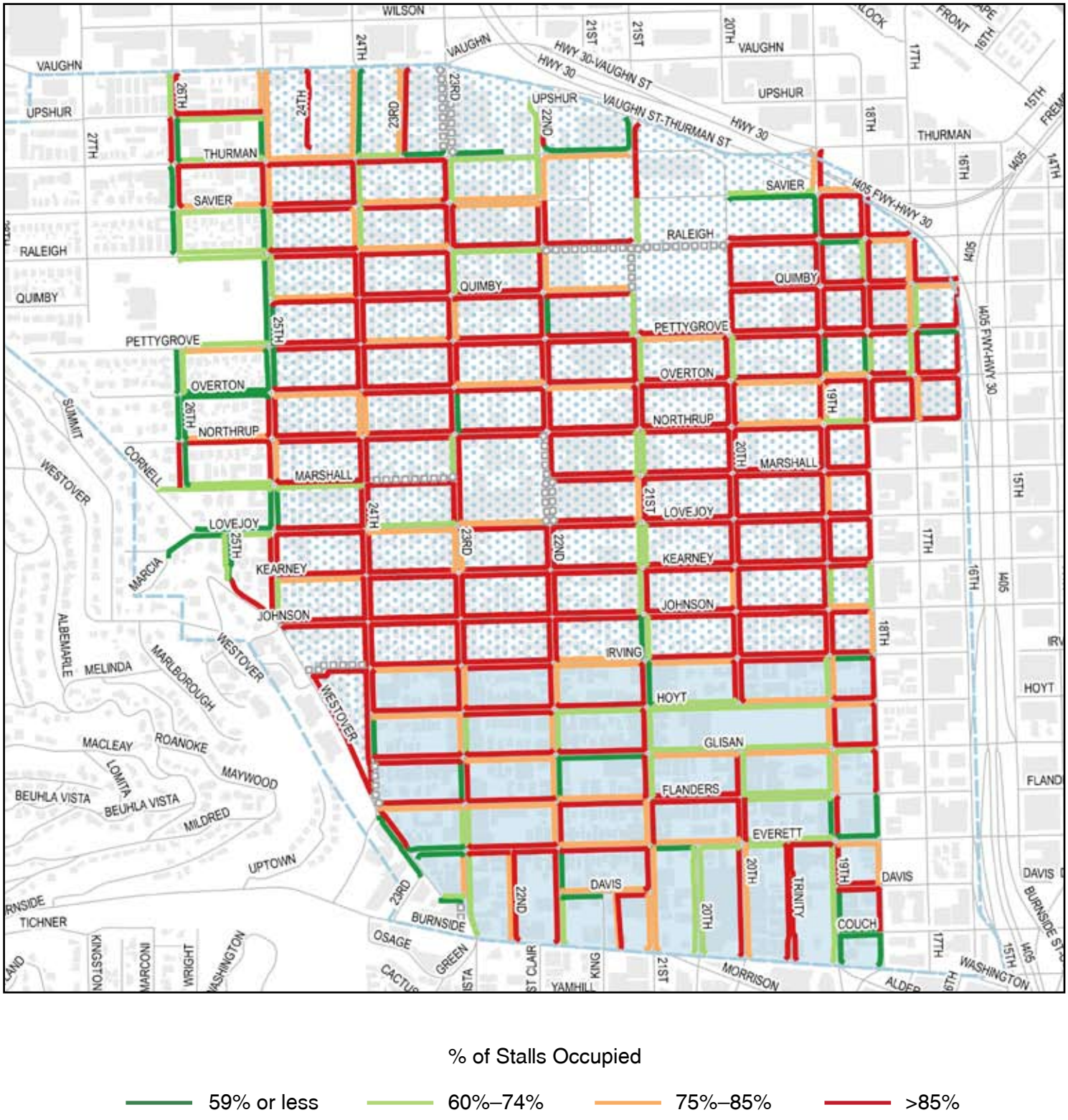
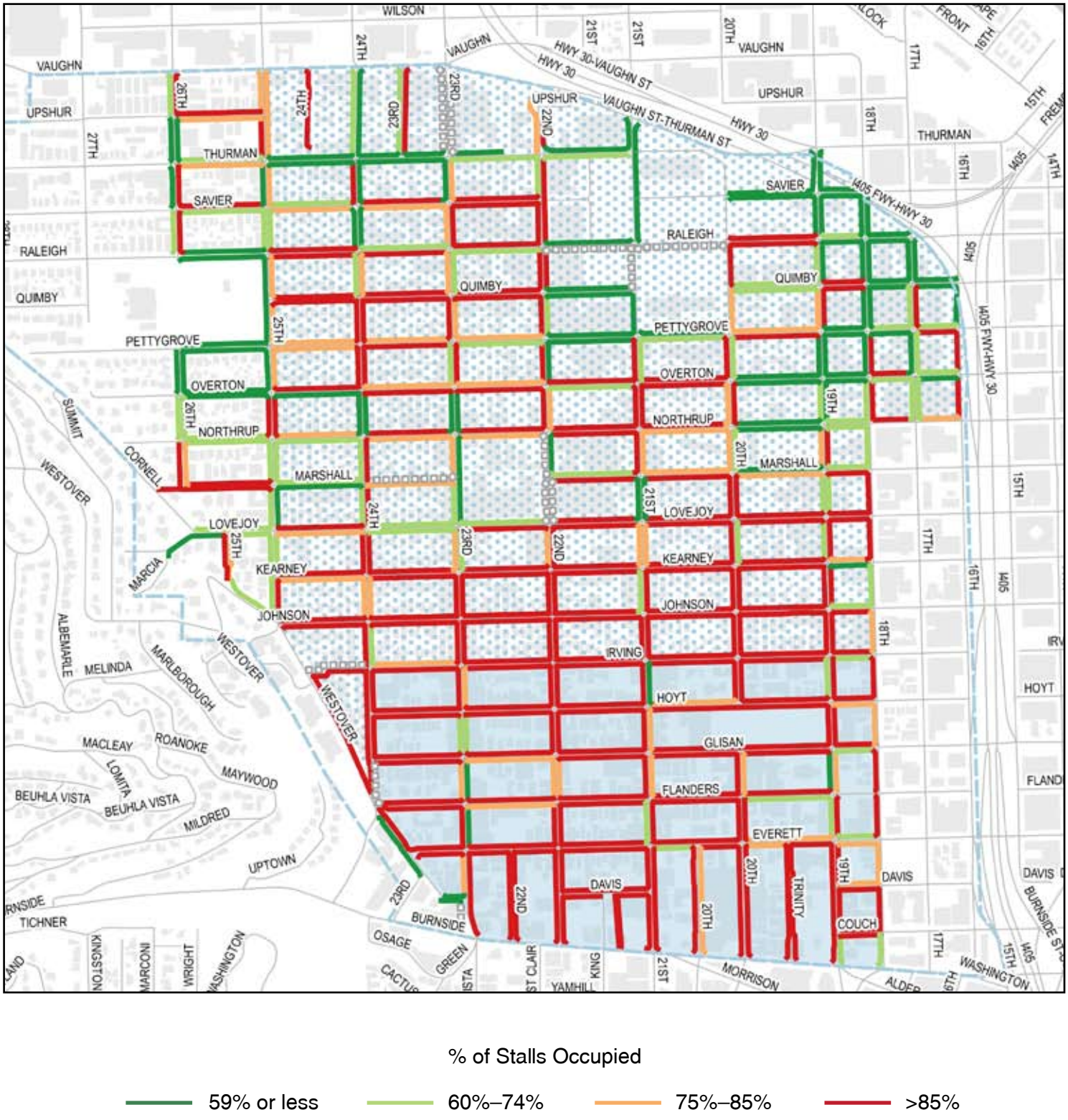


Figure 7: Occupancy during the 12:00 PM peak hour



% of Stalls Occupied

59% or less | 60%–74% | 75%–85% | >85%

Figure 8: Occupancy during the 7:00 PM peak hour

During the pre-implementation data collection phase, there were three general management types for the general-use parking stalls within the district—unregulated stalls, Zone M stalls, and limited time stay stalls with maximum stays ranging from five minutes to four hours. The occupancy by hour for these three management types is shown in Figure 9.

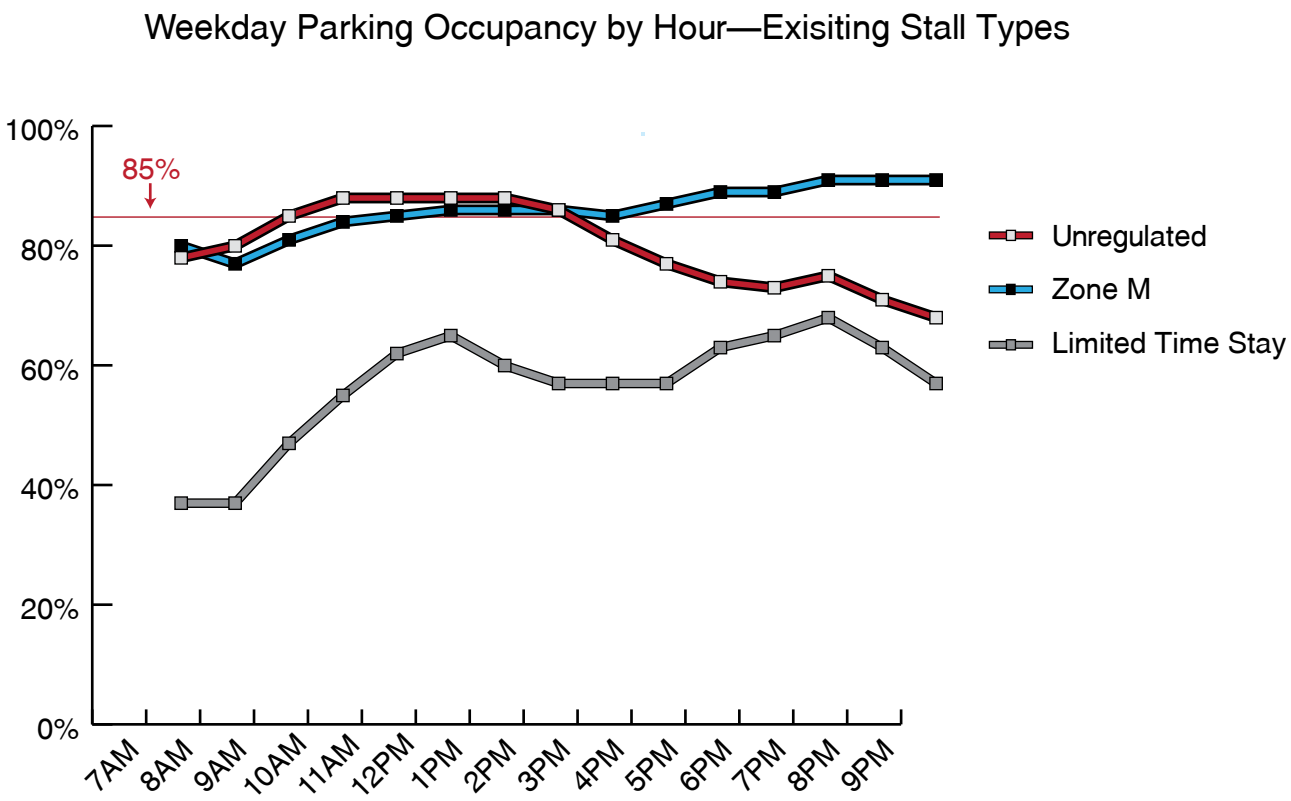
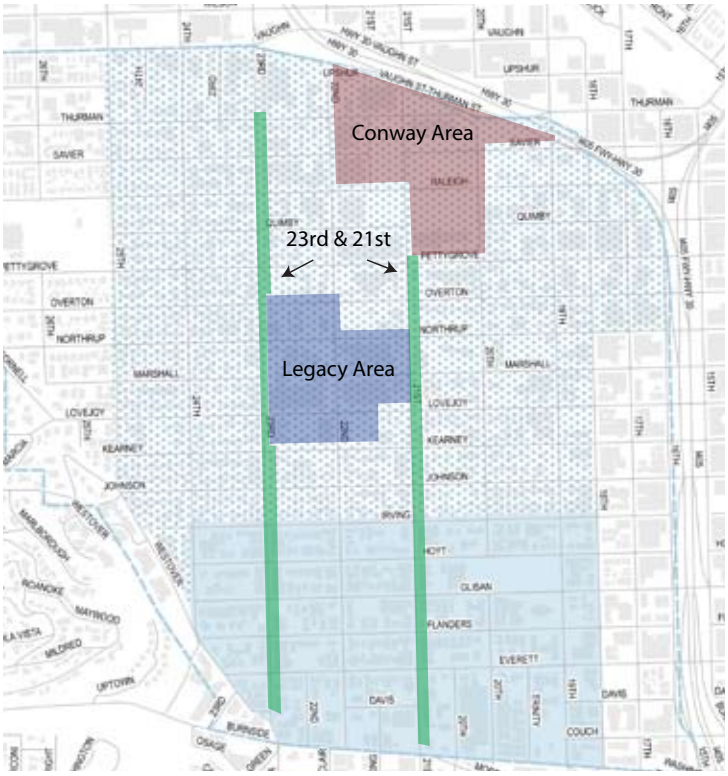


Figure 9: Area-wide weekday parking occupancy by hour for existing management types.

Further insights can be obtained by looking at the occupancy curves for several areas of interest within the study areas. Figure 10 shows the geographic locations and parking occupancy curves for three areas of interest within the district: The area surrounding Legacy Medical Center, the area in the vicinity of the Conway facility, and the commercial corridors located along NW 21st and 23rd Avenues. These occupancy curves show how the corresponding generators of parking demand affect the parking demand within the district in aggregate.

Locations of Areas of Interest



Weekday Parking Occupancy by Hour—Areas of Interest

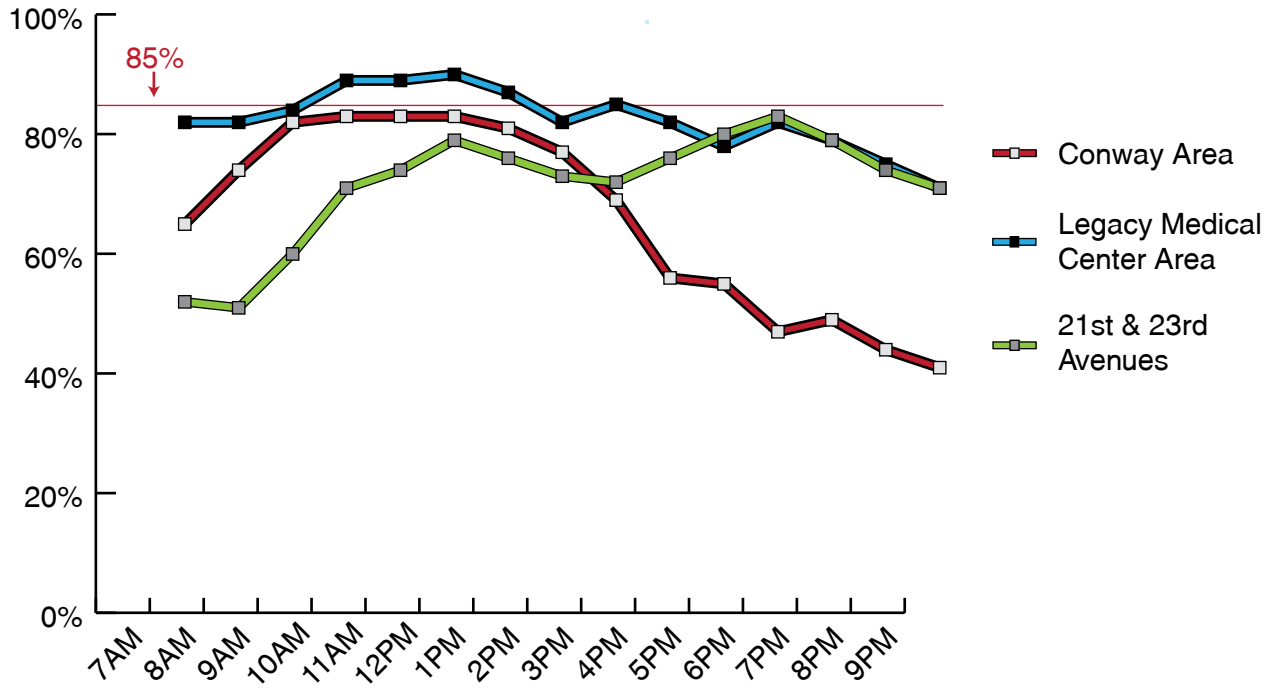


Figure 10: Parking occupancy by hour for three areas of interest within the study area: the Conway blocks, the Legacy Medical Area, and the NW 21st and 23rd Avenue commercial corridors. Locations of these areas within the study area are shown above the occupancy graphs.

Key Observations: Weekday Demand & Occupancy

- High occupancies were generally observed throughout the study area, particularly in residential areas. At the 12:00 peak hour, parking throughout the district was found to be nearly 85%. Thus, available on-street parking is functionally full *throughout the entire district* at this time, and it is nearly so for several more hours in the late afternoon and early evening. This makes Northwest Portland uniquely challenging from a parking management perspective; no other area outside the central city generates such high demand.

- As a whole, the study area has a relatively consistent level of demand throughout the day, resulting in the accordingly flat occupancy curve shown in Figure 6. This is an artifact of the robust mix of land uses present throughout the study area. Since these uses have different peak hours for parking demand (e.g., restaurant uses generate peak demand during lunch and dinner periods, office uses generate peak demand mid-morning, residential uses generate peak demand overnight, etc.), the combination of these uses over a large study area results in a relatively consistent level of demand. Thus if the mix of land uses within the district were to shrink—for example, if the Conway area were redeveloped into primarily residential uses—this could present additional challenges to parking management.

- Stalls within the existing Zone M were observed to have higher occupancy levels during the late afternoon and nighttime periods than unregulated stalls in the study area. This is likely due to the fact that the existing Zone M is located in the southern part of the study area, which is significantly more dense and residential in context than the remainder of the study area.

- Unregulated stalls were observed to have maximal demand during the late morning and early afternoon hours. The likely reasons for the significant portion of this demand are the impacts of the conway facility and people driving to the district and utilizing the unregulated spaces before walking or cycling into the central city.

- Along these lines, the parking spaces just outside of the existing Zone M were observed to be some of the most heavily occupied parking spaces in the study area. These spaces are the closest unregulated spaces to Portland's central business district.

- The limited time stay stalls within the study area, many of which lie along the NW 21st and 23rd Avenue commercial corridors, have two noticable peaks, with the first occurring at 12:00 to 1:00 PM and the second occurring at 6:00 to 7:00 pm. This is similar to the patterns observed in Portland's Central City, along NE 28th Avenue, and in other primarily commercial areas, and suggests that commercial land uses including retail and restaurants are driving demand.

- Limited time stay stalls generally were observed to have much lower occupancy rates than other stalls within the district. This is partially by design; stalls with maximum time stays of 5, 10, and 15 minutes in particular are intended to be readily available for short stays .

Saturday Occupancy

As with weekday occupancy curves, the shape and characteristics of the Saturday occupancy curve, the timing of the peak hours, and the general levels of demand observed reveal important information about the drivers of demand and thus about potential management strategies and opportunities. However, it is important to keep in mind that there are key differences; for example, office and industrial uses can be expected to contribute significantly less to overall demand on Saturday relative to retail, restaurant, recreational, and related uses.

As described previously, the Saturday study area consists of approximately one-quarter of the overall study area, and was selected to encompass a mix of the key areas and land uses found that are representative of the larger study area. Occupancy rates observed during the Saturday data collection are summarized in Figure 11.

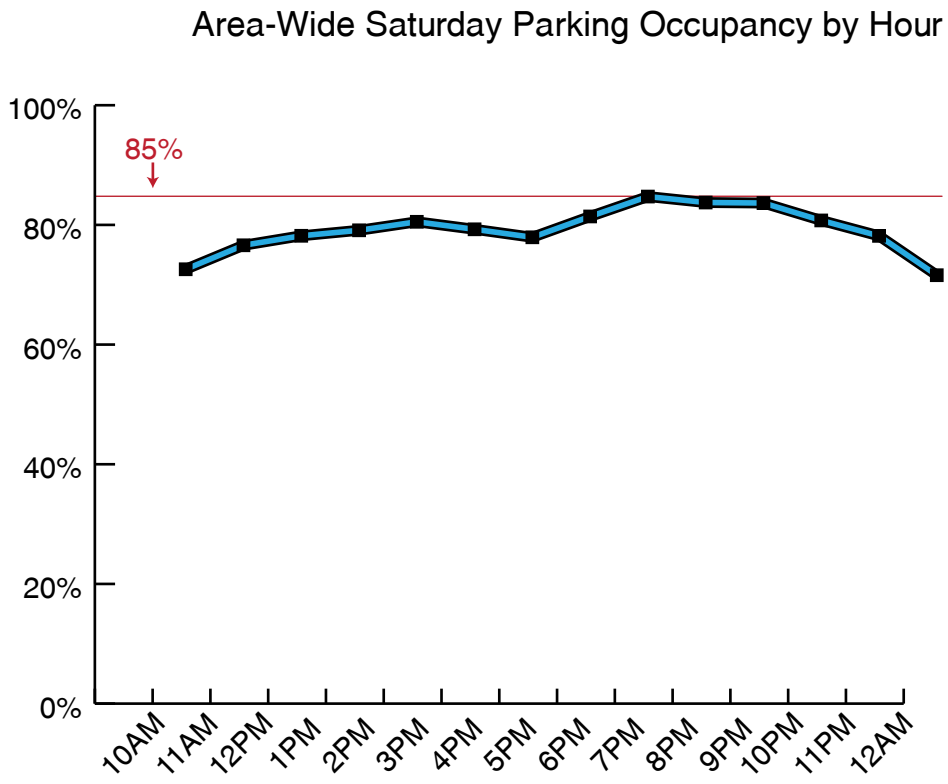


Figure 11: Area-wide Saturday parking occupancy by hour for the entire Saturday study subarea

As on weekdays, demand was found to be high throughout the study area through all hours of the day. The highest demand on Saturdays was observed to occur in the mid-to-late evening. The 7:00 hour was identified as the peak hour, though the 8:00 and 9:00 hours have nearly identical demand. A heat map showing the parking occupancy geographically during this peak hours is shown in Figures 12 on the following page. Occupancy maps for the other observation hours are provided in the appendix to this report.

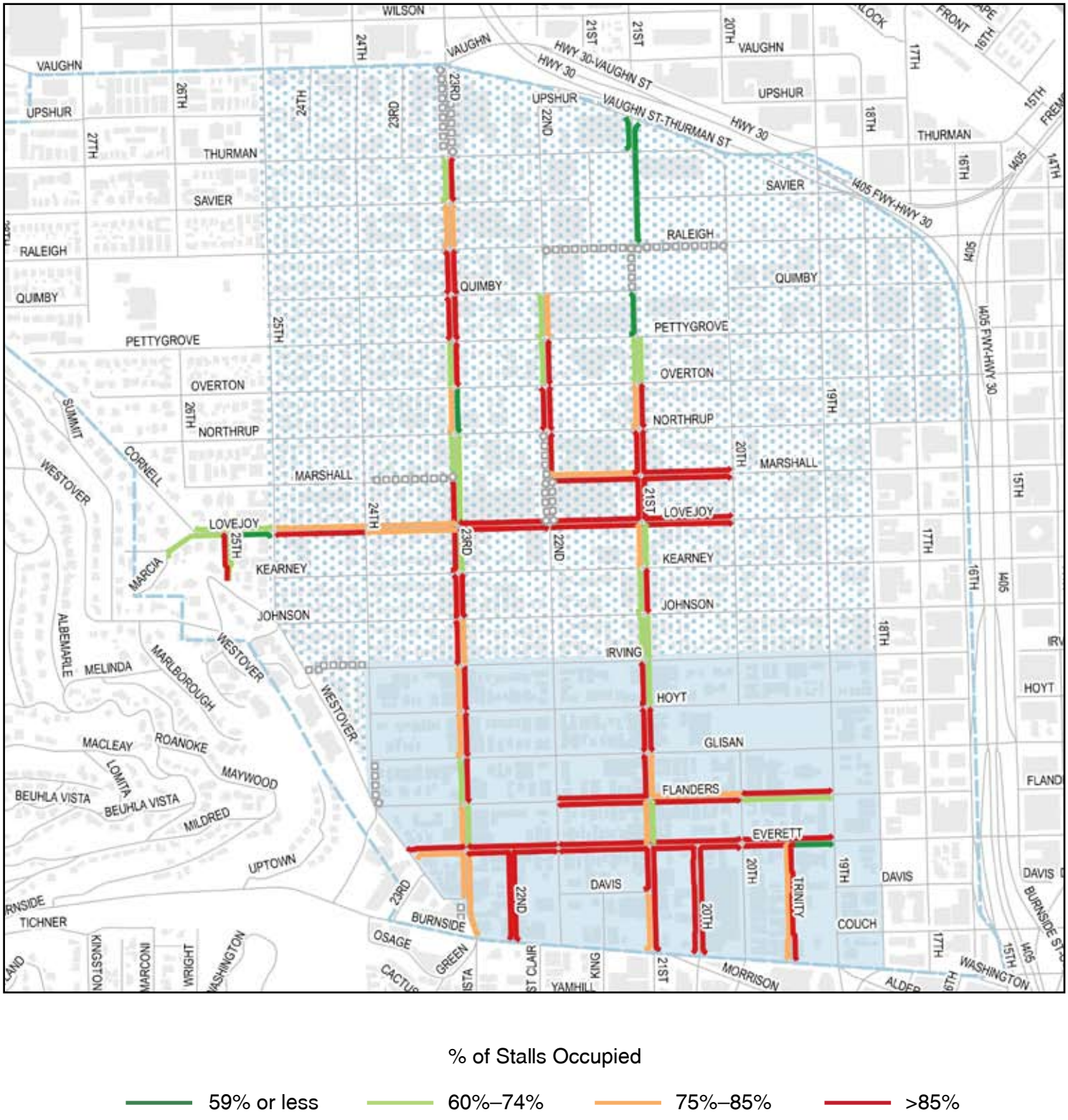


Figure 12: Saturday occupancy during the 7:00 PM peak hour

As with weekday parking occupancy, it is useful to look at Saturday's observed occupancy curves based upon the existing management strategies. This curve is shown in Figure 13, with takeaways and observations following.

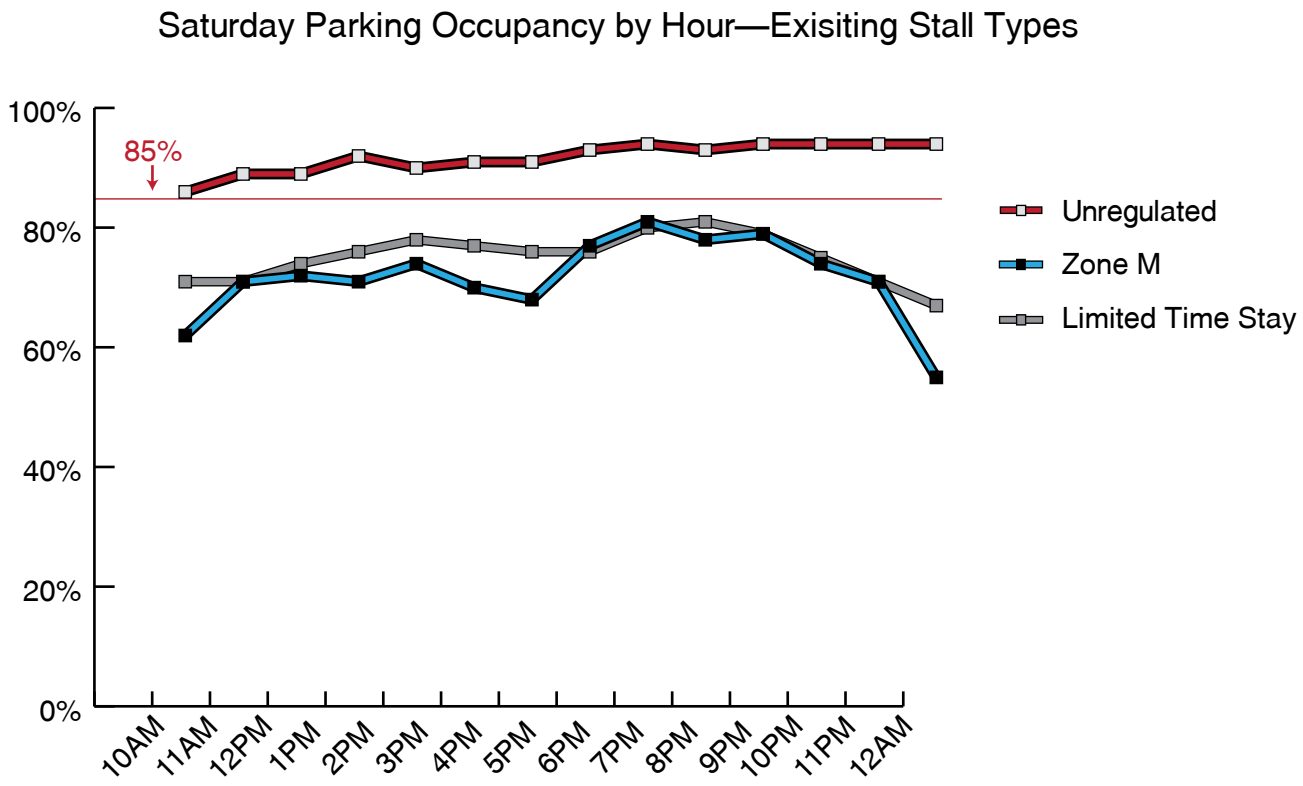


Figure 13: Saturday parking occupancy by hour for existing management types.

Key Observations: Saturday Demand & Occupancy

- Like on weekdays, high occupancies were generally observed throughout the subarea on Saturdays, particularly in residential areas. As with weekdays, the Saturday data show significant parking congestion throughout the subarea at most times of day.

- Parking demand was relatively consistent over the course of the day on Saturdays, as it was on weekdays. A noteworthy difference is that the peak hour on weekdays occurs at noon, with the several hours surrounding it nearly as busy, while the peak hour on Saturdays occurs at 7:00 PM, with the period ranging from about 6:00 PM to 10:00 PM nearly as busy. This likely owes to a combination of two factors: (1) the Saturday subarea includes fewer primary employment areas, which generate maximal demand midday, than the study area as a whole; and (2) Demand on Saturday is more heavily driven by restaurant and entertainment uses than on weekdays.

- Unregulated stalls within the subarea were subject to exceedingly high demand. Such demand levels typically suggest the need for metering, and indeed, most of these stalls will be metered (with some meters exempting Zone M permit holders) following implementation.

- The consistency of demand throughout both weekdays and Saturdays likely indicates that much of the demand is driven by local residents and workers. This could limit effectiveness of some planned improvements such as the combination metered/permit zones, and should be carefully tracked moving forward.

Weekday Turnover

Several factors describing parking turnover complement occupancy in providing an understanding of how parking is functioning. An examination of the lengths of time for which vehicles are parked can yield insights into what land uses are driving demand and what potential changes or small adjustments to management might result in more efficient use of the on-street parking system. The number of unique vehicles each space is serving typically is inversely related to duration of stay and provides additional information to these ends. For spaces with maximum allowable time stays, the percentage of overstays provides information about whether the time limits are meeting demand, and where enforcement may be warranted.

Turnover properties observed on weekdays are shown in Figures 14, 15, and 16. Figure 14 summarizes turnover observed in unregulated spaces and Zone M spaces under existing (pre-implementation) conditions. Figure 15 summarizes turnover observed in limited time stay stalls under existing conditions. Figure 16 geographically shows the average unique vehicles served per space by block face.

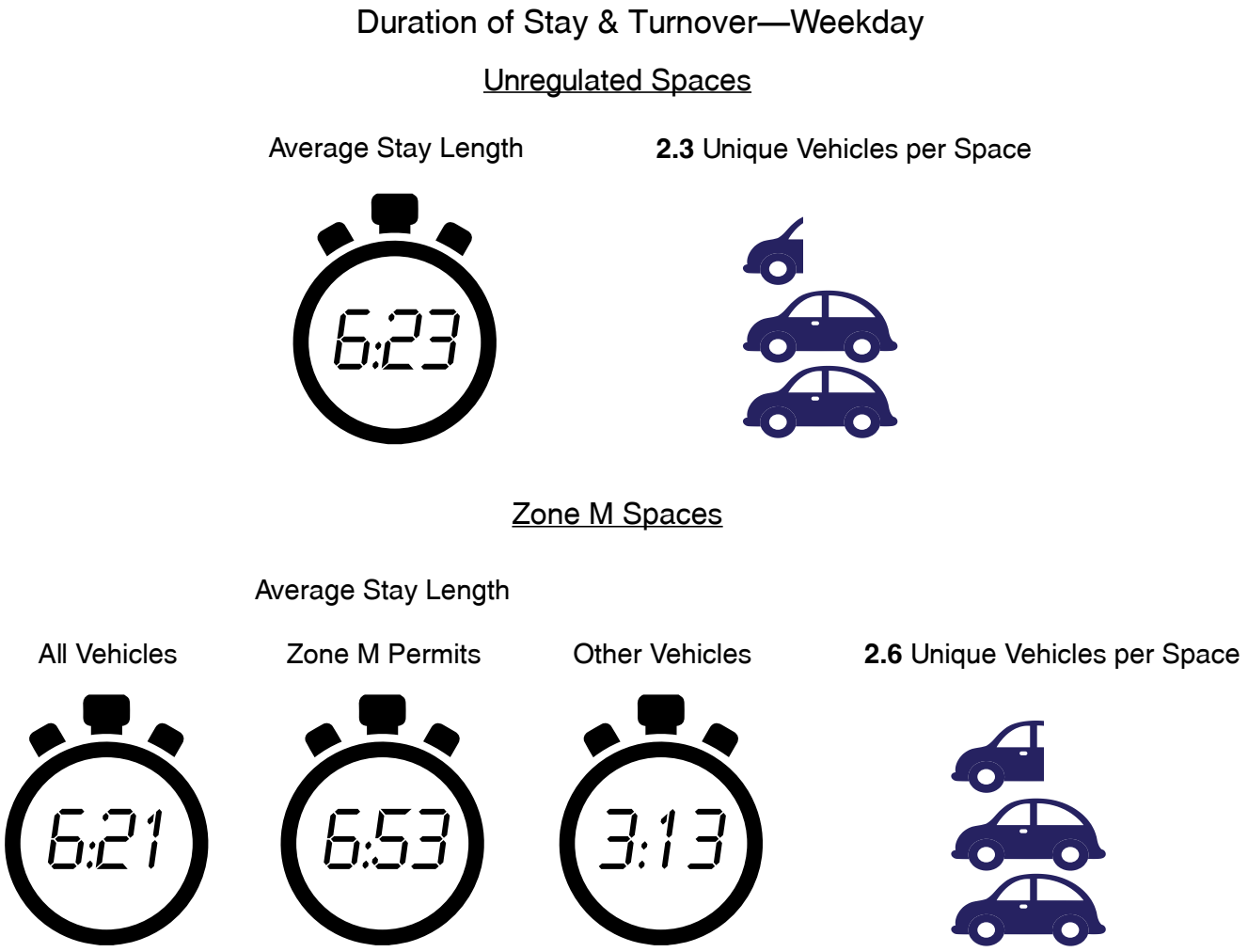


Figure 14: Weekday duration of stay and unique vehicles served for unregulated spaces and Zone M stalls

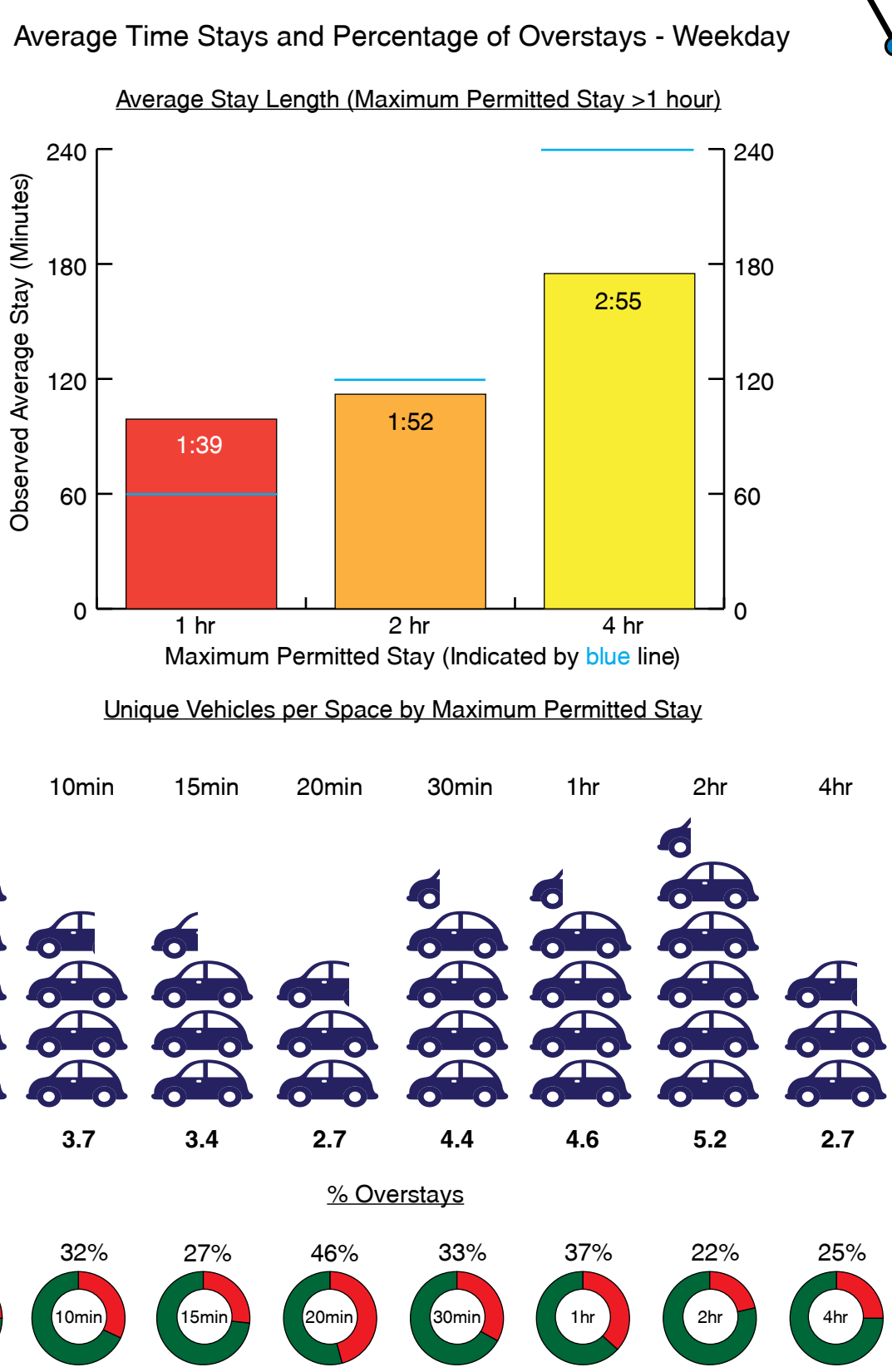


Figure 15: Weekday unique vehicles served, percentage of observed vehicles exceeding the posted time limit for limited time stay stalls. Duration of stay is also shown for limited time stay stalls with time limits of more than one hour

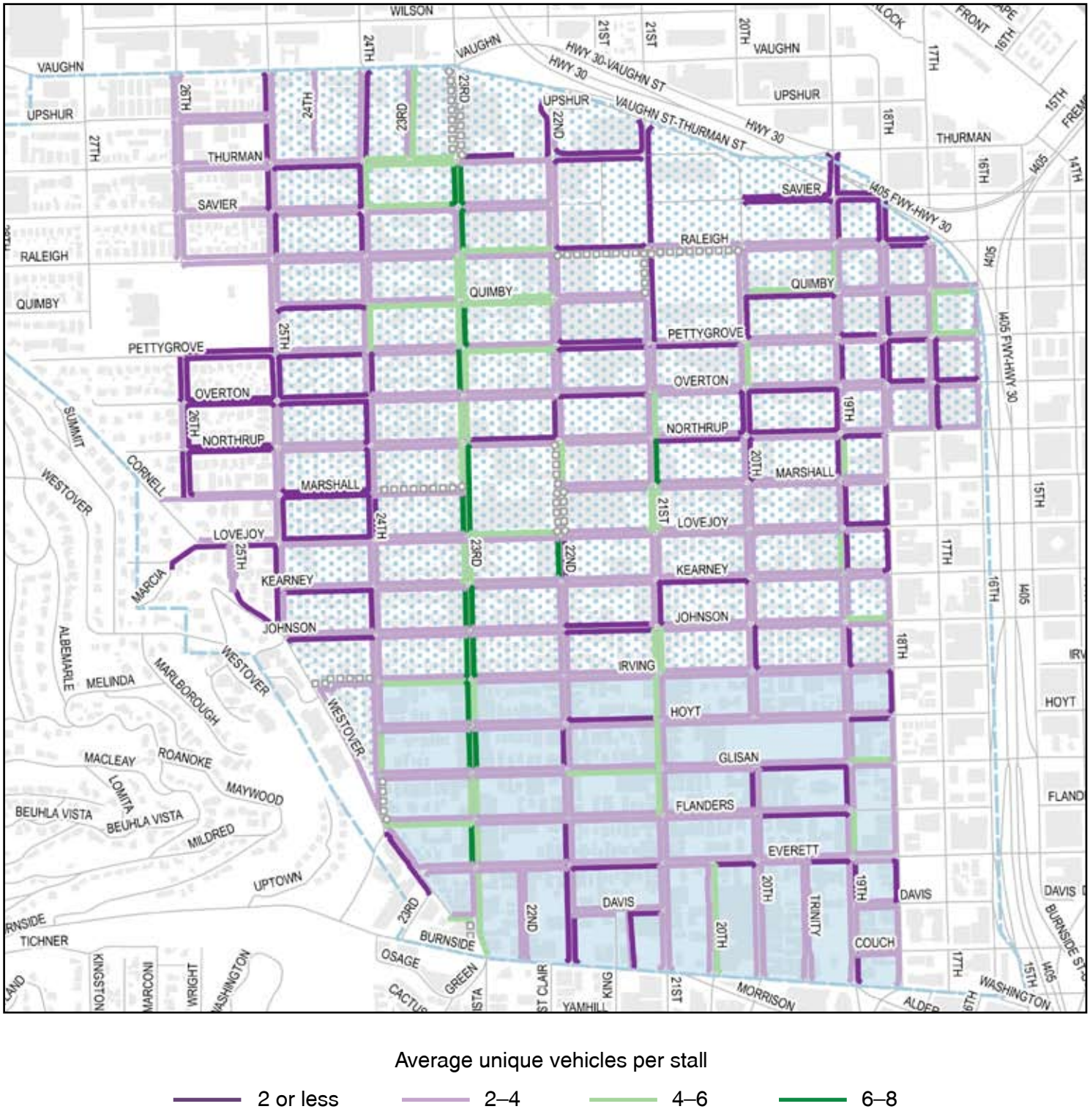


Figure 16: Number of unique vehicles served per stall on weekdays

Saturday Turnover

Turnover properties observed on Saturdays within the Saturday subarea are shown in Figures 17, 18, and 19. Figure 17 summarizes turnover observed in unregulated spaces and Zone M spaces under existing (pre-implementation) conditions. Figure 18 summarizes turnover observed in limited time stay stalls under existing conditions. It is noted that only five 5-minute stalls lie within the Saturday subarea, and none of these five were occupied during any of the 14 observation hours. Figure 19 geographically shows the average unique vehicles served per space by block face.

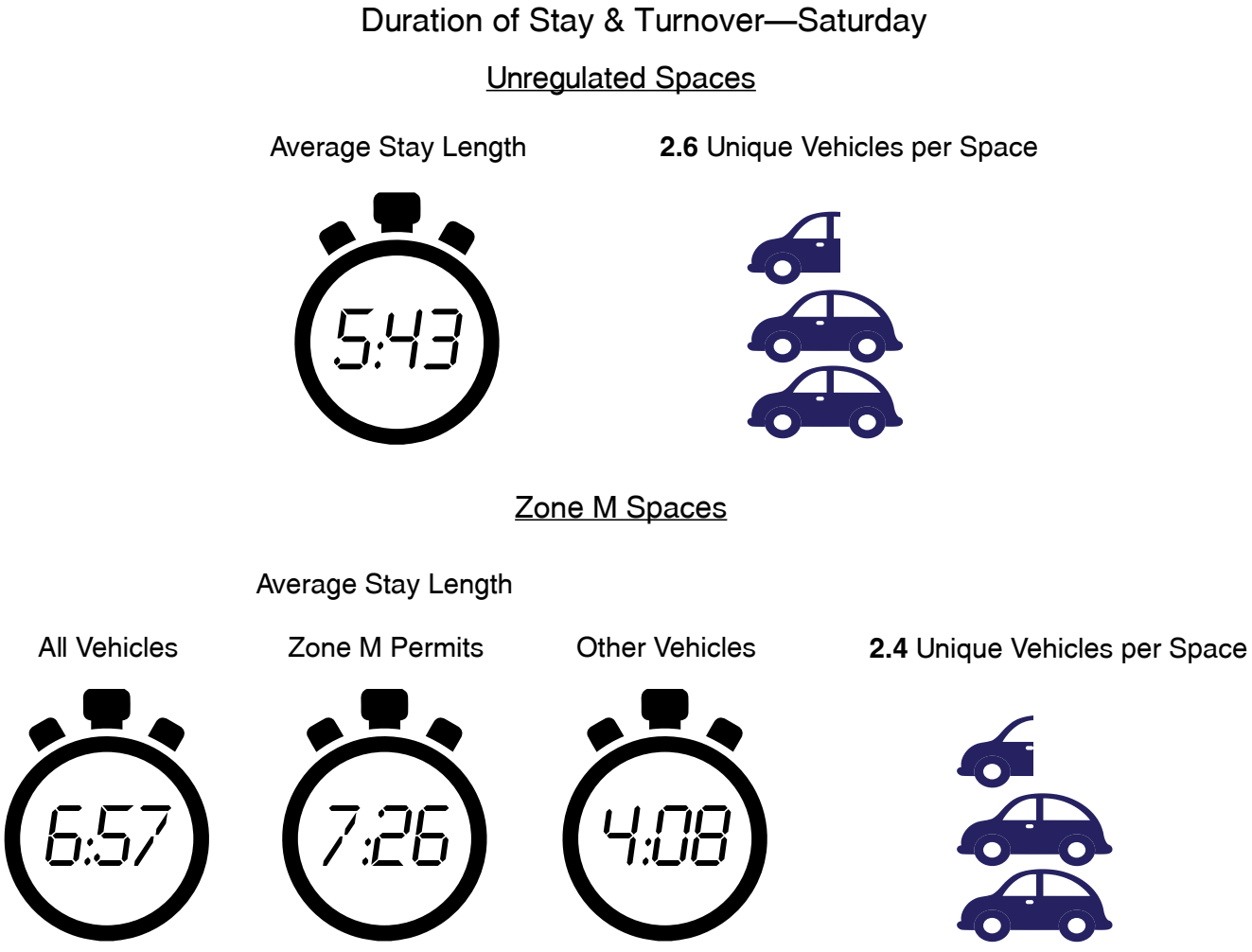


Figure 17: Saturday duration of stay and unique vehicles served for unregulated spaces and Zone M stalls

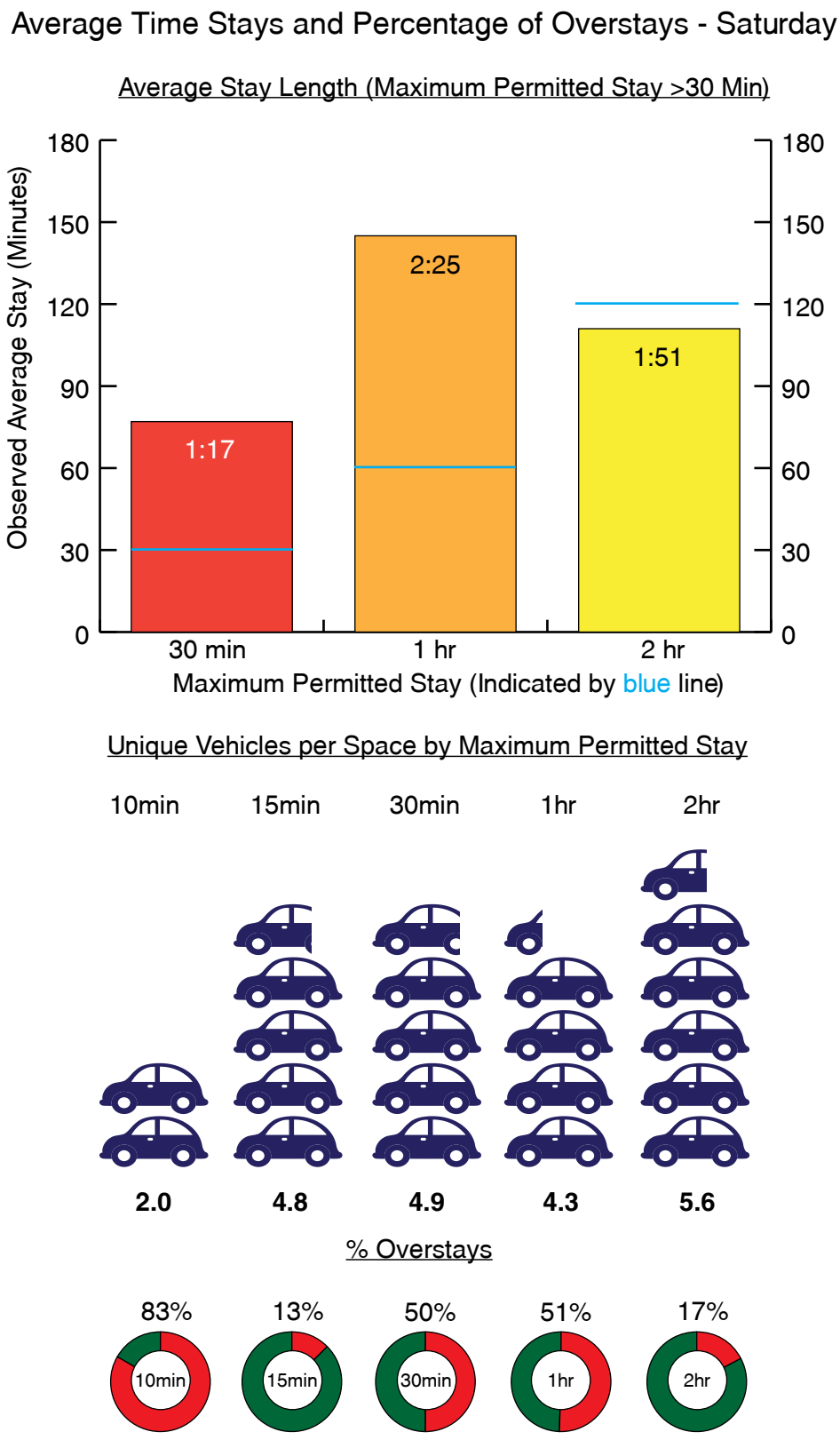


Figure 18: Saturday unique vehicles served, percentage of observed vehicles exceeding the posted time limit for limited time stay stalls. Duration of stay is also shown for limited time stay stalls with time limits of more than one hour

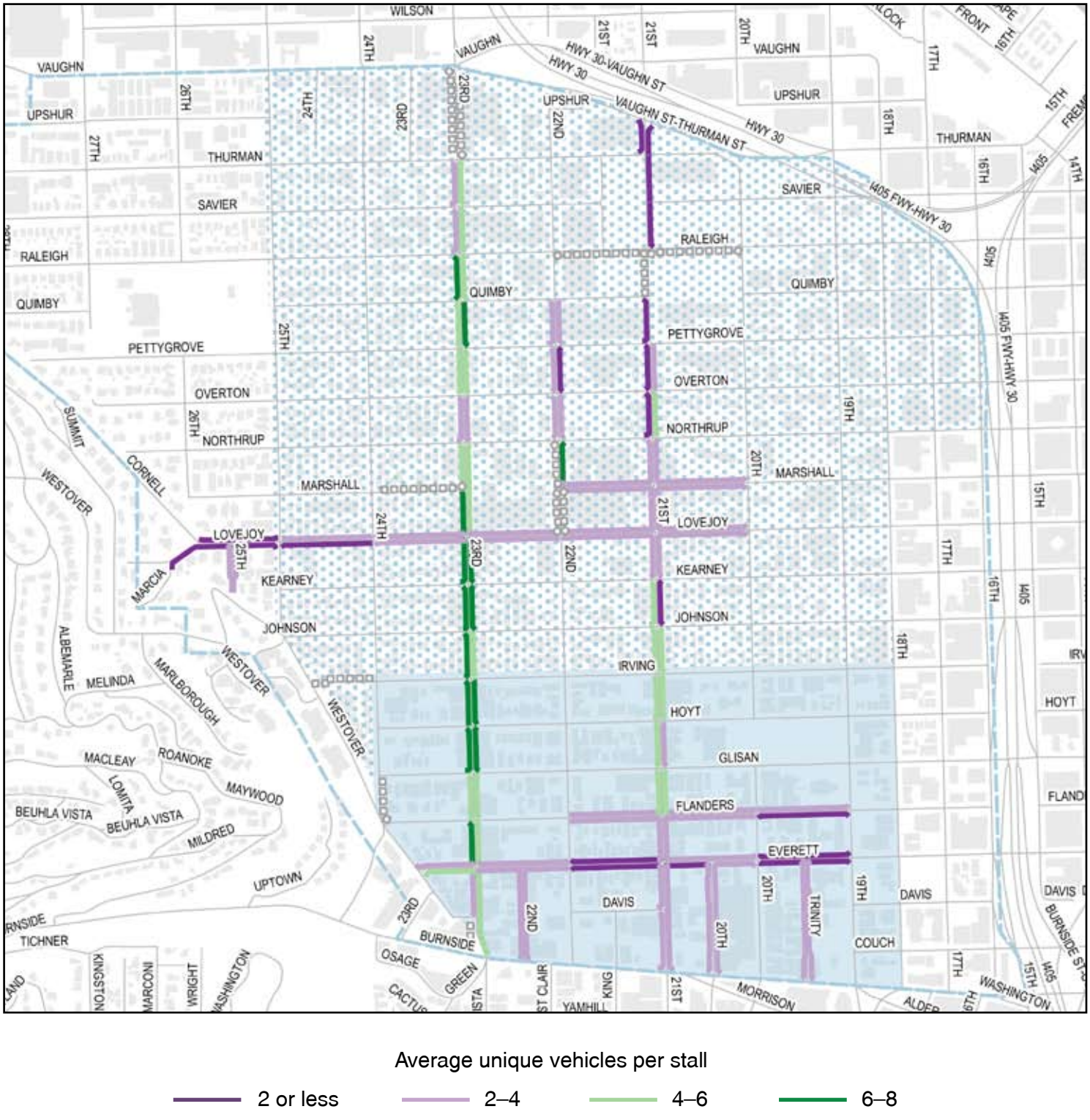


Figure 19: Number of unique vehicles served per stall on Saturdays

Key Observations: Duration of Stay & Turnover

- Average stay lengths for unregulated spaces are slightly longer on weekdays, while average stay lengths in Zone M spaces are slightly longer on Saturdays. At 6:23 on weekdays and 5:43 on Saturdays, stay lengths in the unregulated stalls appear to be driven primarily by local demand, including residents and employees who commute from other areas.

- As one might expect, vehicles with Zone M permits are observed to have significantly longer stay lengths within Zone M spaces on both weekdays and Saturdays. Vehicles without Zone M permits have an average stay length of just more than three hours on weekdays, and just more than four hours on Saturdays. This is noteworthy, as most of Zone M has a three-hour time limit for non-permitted vehicles, and under future conditions these spaces will typically have four-hour limits for non-permitted vehicles. It is likely that these vehicles are parking in Zone M spaces on side streets because the limited time stay stalls along the major corridors have maximum times that are too short to accommodate the stay durations of these vehicles. The planned strategy of replacing limited time stay stalls with two- or four-hour metered stalls appears to be an effective strategy to address this demand.

- The time stays of vehicles with Zone M permits within Zone M are observed to be six to seven hours, which is indicative of local demand including residents and workers.

- The number of unique vehicles served was not observed to vary significantly between unregulated and Zone M spaces, and was relatively consistent between weekdays and Saturdays. In all cases, these spaces were observed to serve about 2.5 vehicles during the study day (7:00 AM to 10:00 PM on weekdays, and 10:00 AM to 12:00 AM on Saturdays).

- Limited time stay stalls, which are located primarily along the commercial corridors, served more vehicles than the unregulated or Zone M stalls. For both weekdays (5.2 vehicles/stall) and Saturdays (5.6 vehicles/stall), the two-hour stalls served the greatest number of vehicles of any stall type in the study area. These stalls are thus serving primarily commercial demand, and two hour time stays are often ideal for accommodating this demand.

- Coupled with relatively low occupancy rates, the percentages of overstays and the average time stays observed suggest that there is limited demand for stalls with maximum stays of one hour or less.

- In aggregate, the observations of stay length and turnover summarized herein indicate that there is a high demand for stays of approximately two to four hours and low utilization of stalls with time stays of less than one hour in particular.

- The one-hour resolution of data introduces some level of uncertainty to the results reported in this section, particularly for stalls with lower time limits. The effects that the data resolution has upon each of these factors and the impact on the findings herein are explained in the section of this report entitled *Metrics.*

Weekday Permit Usage

Permit usage provides an understanding about how stay lengths vary between local and visitor parking demand. Additionally, by contrasting how permit usage varies over the course of the day and over the range of the study area, it can provide an understanding of whether the permit program is effectively managing the parking supply to the benefit of both residents and guests of the district. Crucially, permit utilization under existing conditions provides a baseline for comparison following the expansion of permit zone.

Figure 20 summarizes permit usage over the course of an entire weekday and during the weekday peak hour (12:00 PM). This shows the breakdown of who is parking within each of the management areas. Figure 21 geographically shows weekday permit usage by block face during the peak hour.

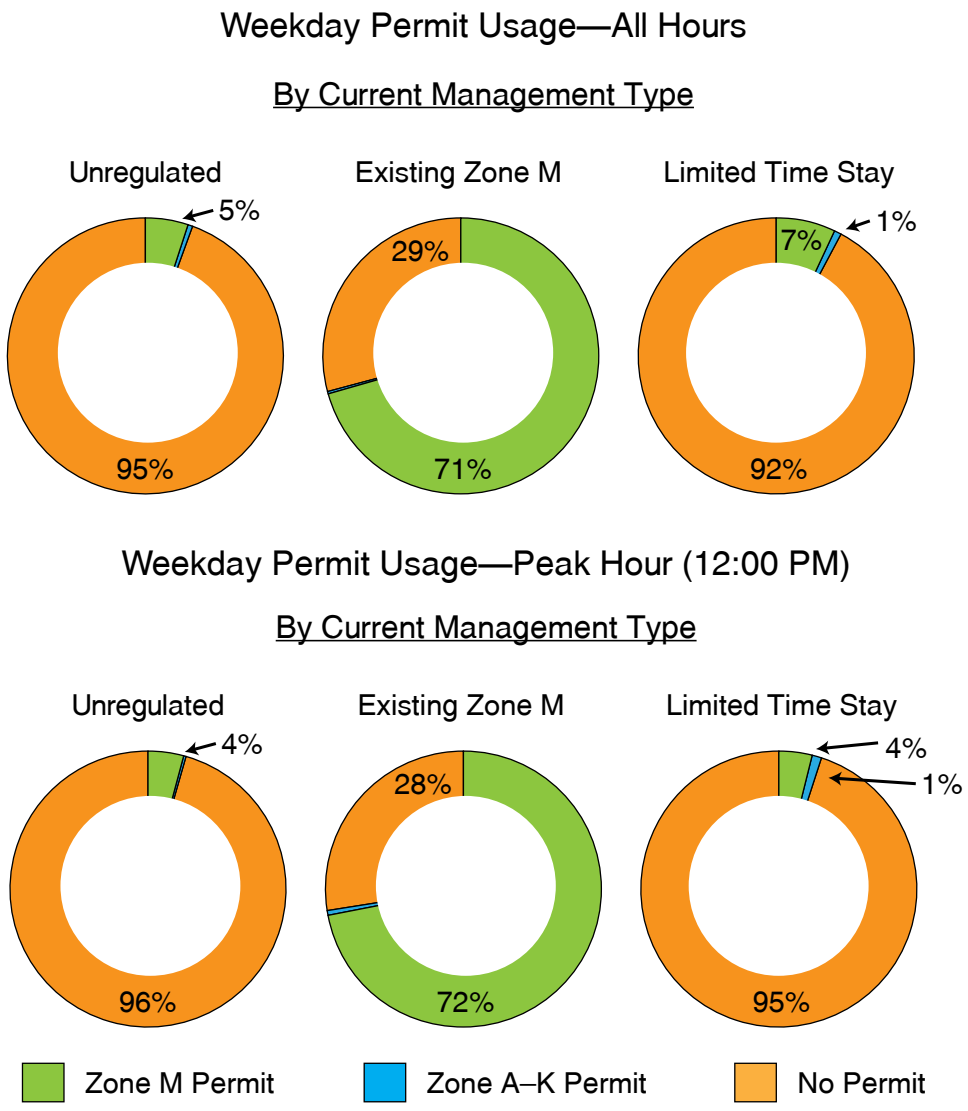


Figure 20: Weekday usage of Zone M permits under existing conditions for existing and future management within the study area over the entire study day

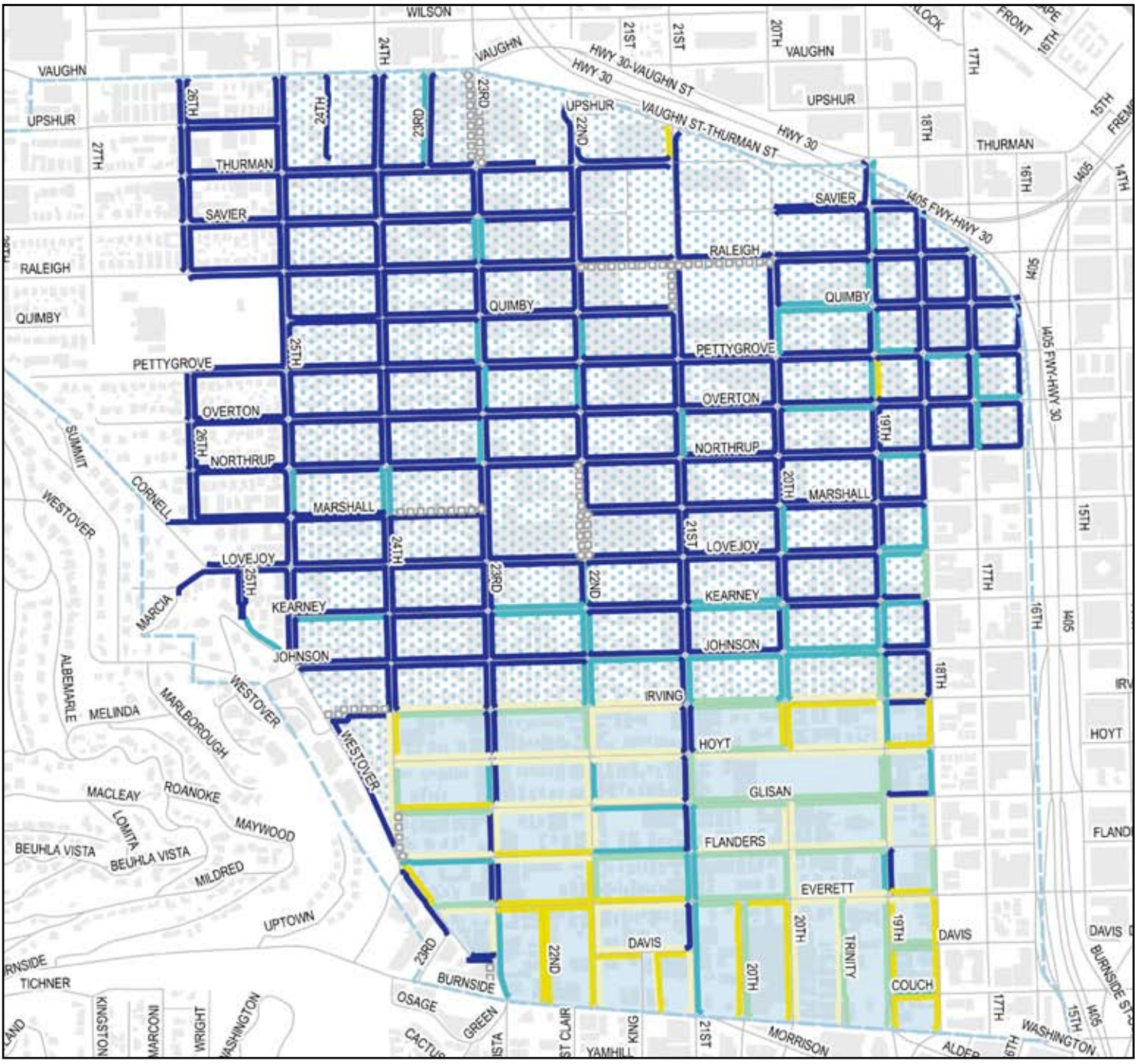


Figure 21: Weekday permit usage during the 12:00 PM peak hour

Saturday Permit Usage

Since permit usage can be used as a proxy for determining whether parking demand is due to locals or visitors to the district, comparing weekday and Saturday permit usage can help identify which sorts of demand are responsible for differences in observed occupancy and turnover. Permit usage on Saturdays is summarized in Figures 22 and 23. Figure 22 summarizes permit usage over the course of an entire Saturday and during the peak hour (7:00 PM), and Figure 23 geographically shows weekday permit usage by block face during the peak hour.

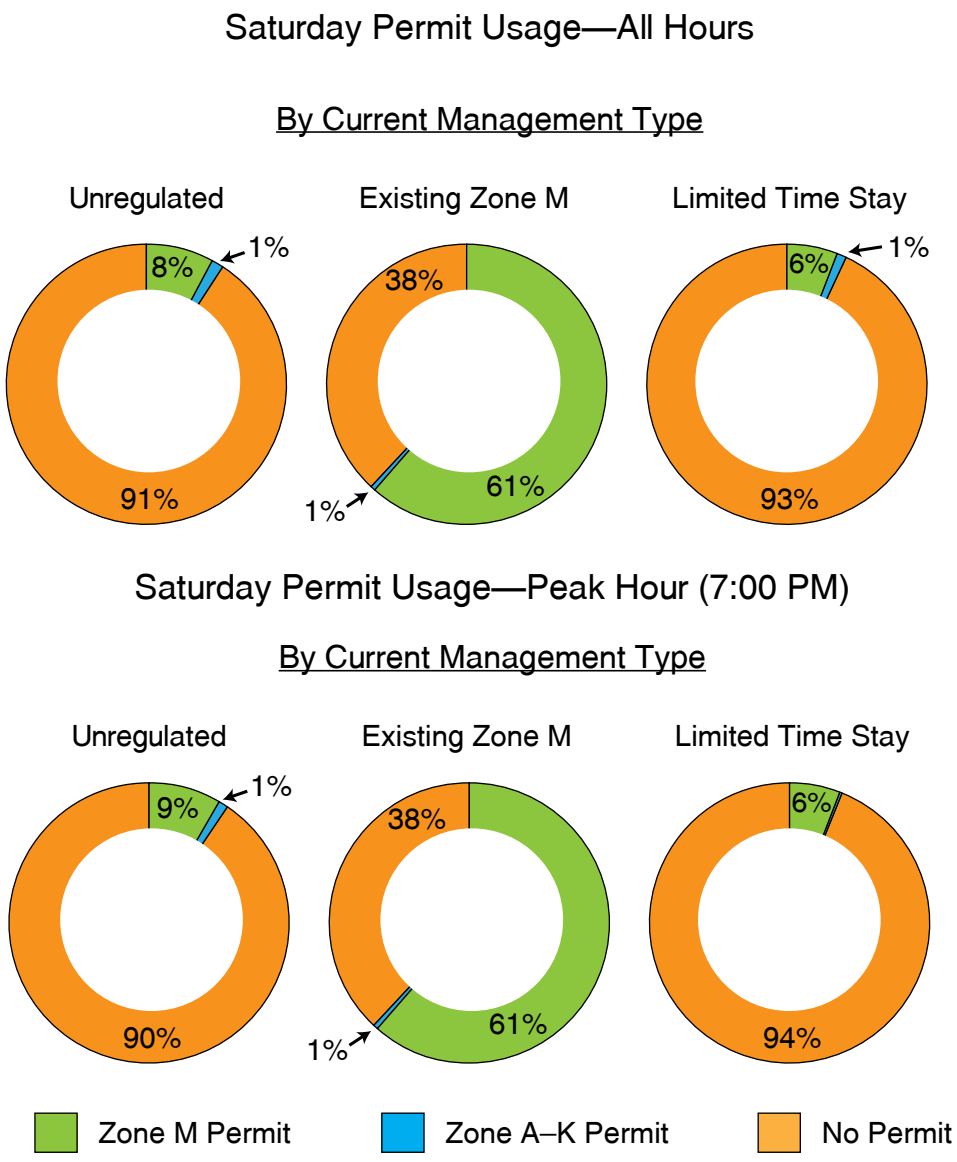


Figure 22: Weekday usage of Zone M permits under existing conditions for existing and future management within the study area over the entire study day

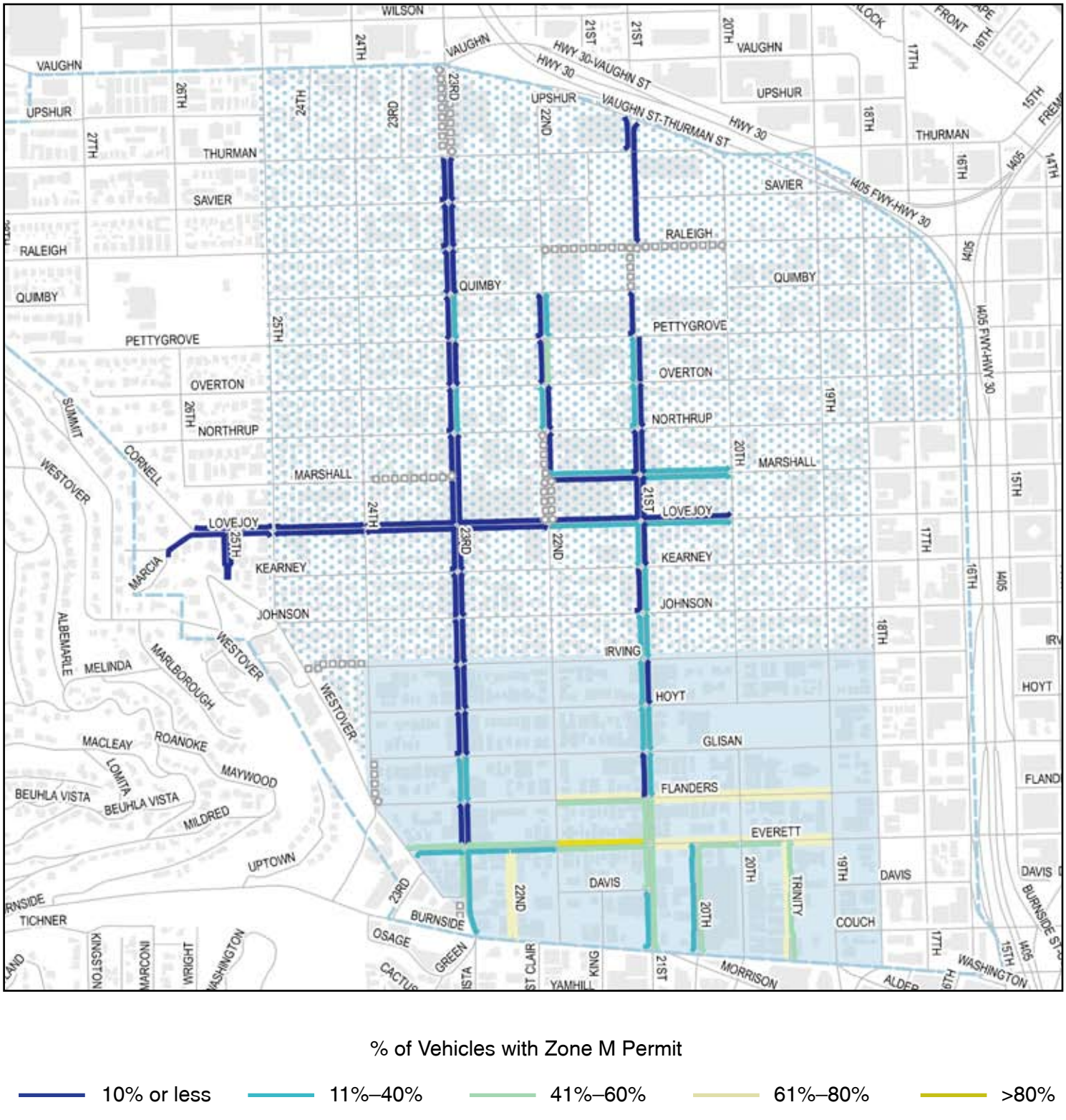


Figure 23: Weekday permit usage during the 12:00 PM peak hour

Key Observations: Permit Usage

- On weekdays, approximately 70% of vehicles parked in Zone M at any given time were observed to display Zone M permits, while 30% did not display Zone M permits. It is likely that some of the non-permitted vehicles within Zone M are owned by local residents who have elected not to purchase a permit. However, combined with observations of turnover and utilization, the high percentage of vehicles without Zone M permits utilizing Zone M parking indicates that there is significant demand for visitor parking within Zone M that is not currently met by more restrictive limited time stay stalls.

- On Saturdays, the number of vehicles without Zone M permits rose to approximately 40% of all parked vehicles within the zone. Thus, a slightly higher amount of the demand is attributable to visitors on Saturdays than on weekdays. One potential explanation is that there is less Saturday demand for workers of the district, but a greater level of demand for retail, restaurant, and other uses that have high intensities on weekends.

- Permit usage did not vary significantly over the course of the day on either weekdays or Saturdays. Combined with observations of occupancy within the existing Zone M, this suggests that the level of local demand is relatively constant over the course of typical days.

- Among unregulated space, the utilization of Zone M permits is unsurprisingly highest just outside of Zone M. Similarly, Zone K users were observed to frequently utilize the unregulated stalls just outside the Zone K boundary.

- Generally, the findings regarding permit utilization support the expansion of Zone M northward and the introduction of paid parking to the study area. High levels of local demand like those observed within the study area are often best treated through permit programs, and high levels of visitor demand are often best treated through metering. Comparing permit utilization under existing conditions to permit utilization following implementation of the new management program will provides a baseline for evaluating the success of the new measures.

Loading Zone Usage

To paint a complete portrait of parking within the study area, an understanding of loading demand and loading zone usage is necessary. While loading zones comprise only a small portion of the overall curb zone space within the district, loading demand can have an outside impact on parking availability if this demand is not readily met by on- or off-street loading spaces. It is also essential to have an understanding of how loading demand varies across the study area in order to inform policy on loading zone requirements that accompany new development.

The data collected on loading demand consist of observations of 55 loading zones within the study, with a curb zone usage equivalent to 112 parking stalls. Observations of each loading zone were made every 20 minutes from 5:00 AM to 5:00 PM. The observed loading zone occupancy over the course of the study day is shown in Figure 25. The peak time for loading activities was 11:00 AM, when 21 of the 55 loading zones (38%) were occupied. It is noted that because loading zones vary significantly in size, the areas shown in this figure should be interpreted as representing the percentage of loading zone frontage occupied rather than as a percentage of the number of designated loading zones occupied. For example, a loading zone large enough to accommodate a large truck would appear full if occupied by either a large truck or two smaller trucks/vans; it would appear only half full if occupied by a single small truck or van.

Figure 25 shows the locations of the 55 loading zones observed for this study, as well as the percentage of time they were observed to be occupied over the study day.

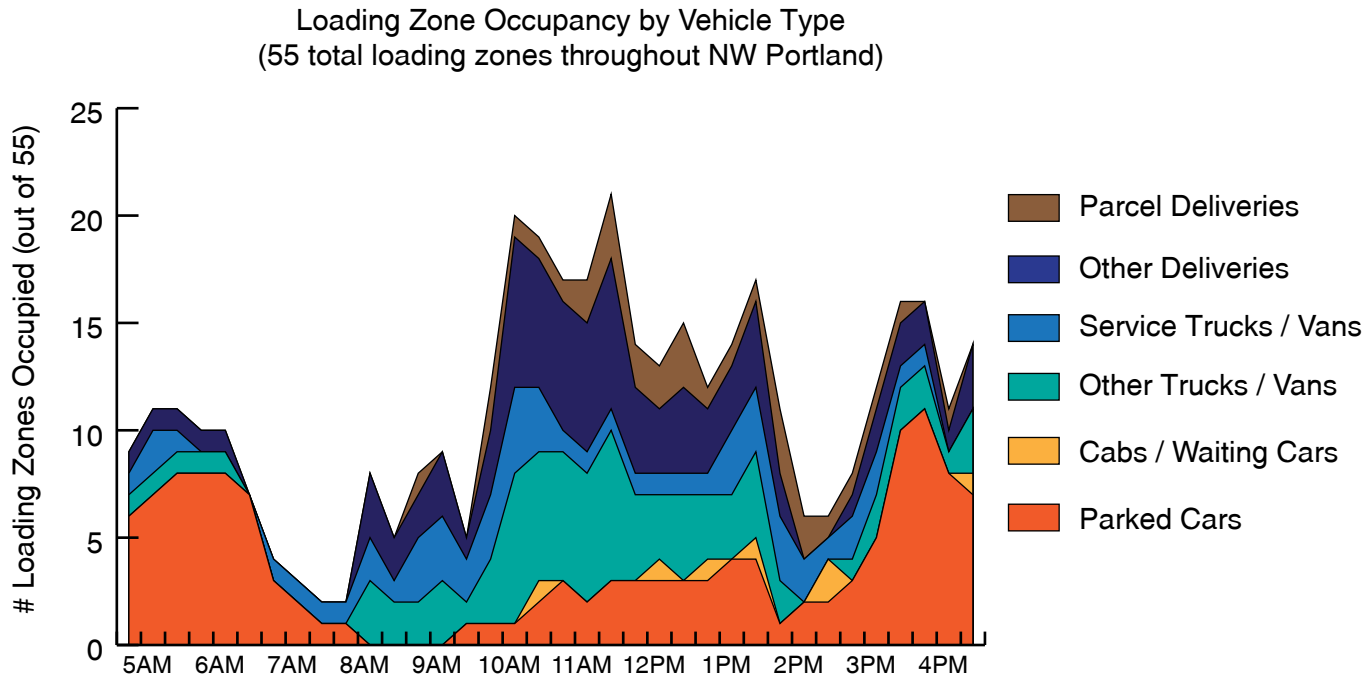


Figure 24: Loading zone occupancy levels by vehicle type over the course of the study day

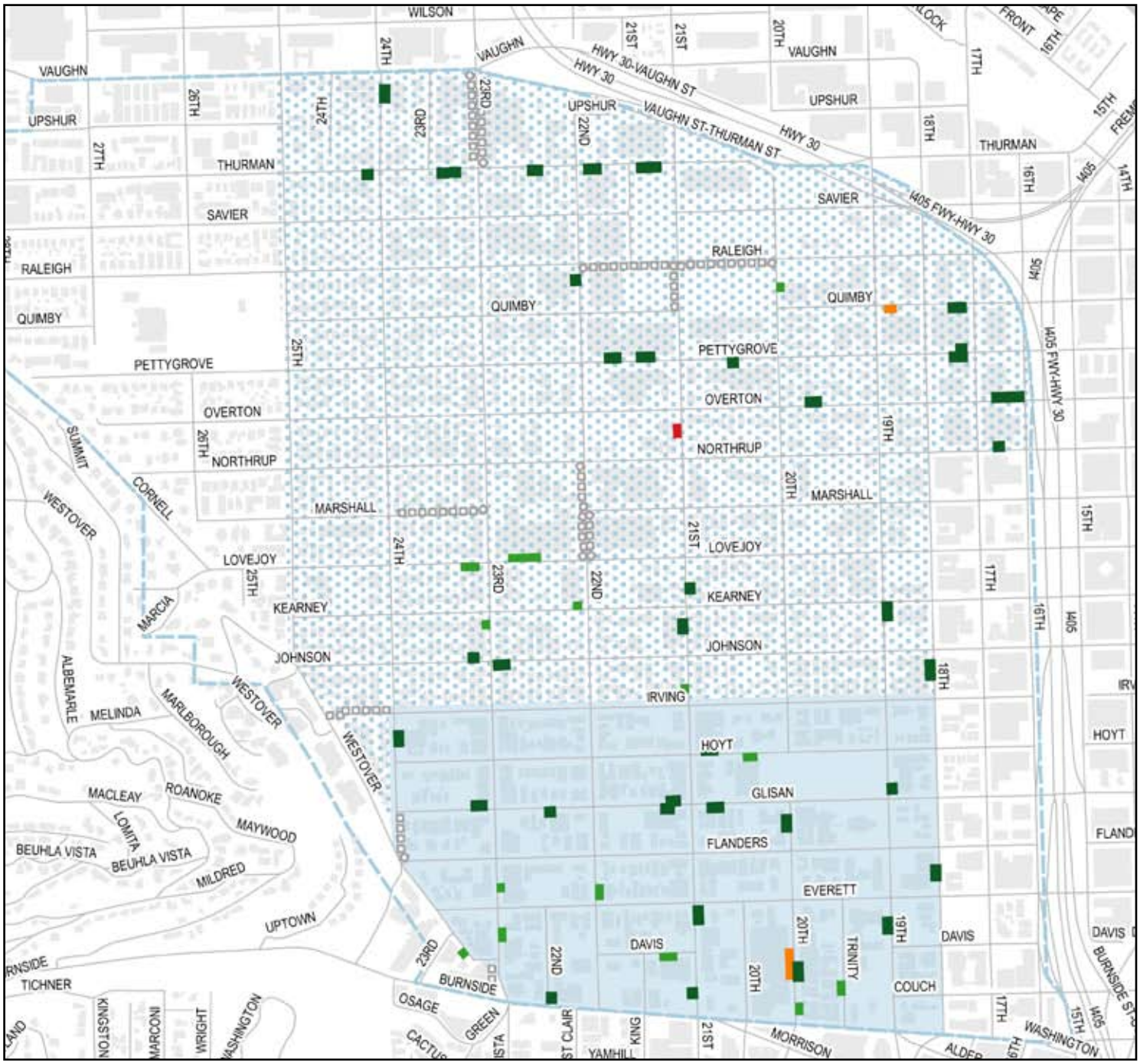


Figure 25: Locations of Loading Zones and Time Occupied

Future Parking Management

This analysis represents the 'before' portion of a before-and-after analysis of the impacts of several planned changes to parking management throughout the study area. Following the implementation of these changes, the following strategies will be utilized to managing parking in the study area. The boundaries of the major zones described below are shown in Figure 26.

- The **four hour or by permit zone** will be signed only (i.e., not metered) and will allow visitors to park for up to four hours without charge; Zone M permit holders are exempt from this time limit. This zone will cover the northern, eastern, and western portions of the study area. Most of the parking that will comprise this zone consists of parking that was previously unregulated.

- The **metered only** zone will be implemented along the NW 21st and NW 23rd Avenue commercial corridors. All spaces in this zone will be metered, and all users must pay to park during metered hours (9:00 AM to 7:00 PM Monday through Saturday). The meter rate will be $1.60 per hour, and maximum time stays will be a either two hours or four hours.

- The **metered or by permit zone** will include the existing Zone M, and extend northward to NW Pettygrove Street between NW 20th and 24th Avenues. This zone features a somewhat unique management strategy: parking will be metered at the same hours and rates as the metered only zone, but Zone M permit holders will be exempt from paying. The time limit throughout this zone will be four hours, with Zone M permit holders also exempt from time limits.

- Though many of the stalls that are currently **limited time stay** stalls will be replaced by metered parking, some will remain as limited time stay stalls. These will primarily be concentrated in the northern and particularly the northeastern parts of the study area.

- The planned changes will not significantly impact the other zones described in the previous section, including loading zones, school pick-up/drop-off zones, etc.

Since the goal of this report is to analyze on-street parking prior to implementation of these changes, and since all data analyzed within were collected prior to implementation, it is noted that this report uses the terms 'existing conditions,' 'presently, etc. to refer to the pre-implementation set of management strategies, even though a number of the changes described above are already complete as of this writing. When management changes are fully enacted, a follow-up study will take place to more thoroughly analyze the effects and impacts of these new management strategies.

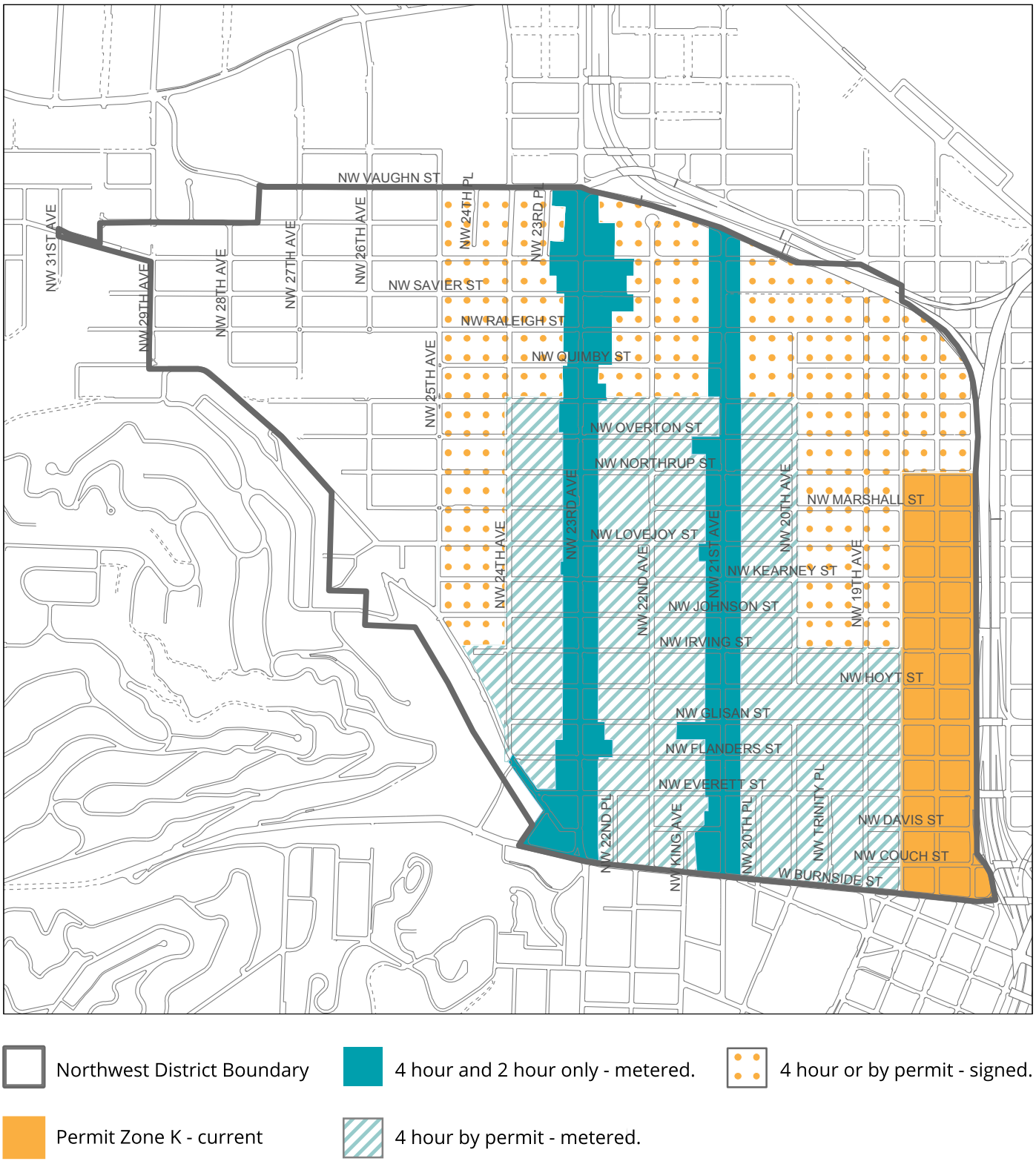
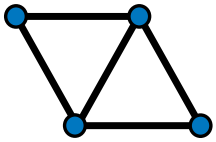


Figure 26: Planned future parking management (Figure: PBOT)

Summary of Findings



- **Occupancy** – During the weekday, high occupancies were generally observed throughout the entire study area and there was a relatively consistent level of demand throughout the day. The robust and diverse mix of land-uses have different expected peak hours, and though a mid-day peak is present, the parking demand is spread out throughout the day. Stalls within the exising Zone M were observed to have highest occupancy levels during the late afternoon and nighttime periods, while unregulated stalls were observed to have maximum demand during the late morning and early afternoon. Further, the limited time stay stalls saw two noticable peaks at 12:00 PM and 6:00 PM. These peaks appear to primarily be driven by the immediately surrounding land-uses: the limited time stay stalls are primarily along the commercial roadways of NW 21st and 23rd Avenues, the unregulated stalls are primarily near the industrial and office uses of the Conway blocks, and the Zone M stalls are primarily centered around the dense and residential portion of the study area.

- **Stay Length and Turnover** – Weekday observations found that in both unregulated and Zone M stalls, the average stay length was slightly under six and a half hours. Within the Zone M spaces, non-permit holders had the shortest stay lengths, with an average of just over three hours while permit holders had longer stay lengths of nearly seven hours. Limited time stay stalls, which are generally located along the commercial corridors, served more unique vehicles that either the unregulated or Zone M stalls, and both the one-hour and two-hour stalls had an average time stay of just under two hours.

- **Permit Usage** – On weekdays, approximately 70% of the vehicles parking in Zone M stalls were observed to display Zone M permits. The remaining 30% of vehicles in Zone M do not have permits, and this is expected in part to be due to the high visitor demand not being accommodated by limited time stalls. The permit usage did not vary significantly throughout the day.

- **Saturday** – As on weekdays, high occupancies were observed on Saturday and occupancy levels were relatively constant throughout the day, with the peak being 7:00 PM. Nighttime demand is higher on Saturdays than on weekdays, with the highest demand period extending until approximately 10:00 PM. Unregulated stalls in particular had high demand, above 85% throughout the day. The average time stays within both Zone M stalls and unregulated stalls were slightly higher on Saturdays than on weekdays. Saturdays also saw more unique vehicles served per stall for all stall types, including the limited time stay stalls located along commercial corridors. On Saturdays, 40% of vehicles parking in Zone M stalls did not have Zone M permits, compared to 30% on weekdays. This indicates that weekends see a higher visitor demand than the typical weekday.

- **Loading Zones** – Loading Zones were observed every 20 minutes and saw a peak demand at 11:00 AM with a occupancy rate of 38 percent. Generally, loading zone occupancy was observed to be low, indicating that loading space is typically available for delivery and service trucks within the district. In some cases, improved management of loading zones (e.g., including allowing standard parking in loading zones earlier in the day), may benefit overall parking availability within the area.

- **Overall,** the observations summarized within this report indicate a need for new and more robust parking management strategies within the NW Plan District. The management changes currently in process appear to address many of the issues and challenges observed during this pre-implementation study. A post-implementation study is planned for Spring/Summer 2016 to evaluate the efficacy of the new managements strategies, and to identify and improve remaining challenges.

Appendix A:
Weekday Hourly Occupancy Maps

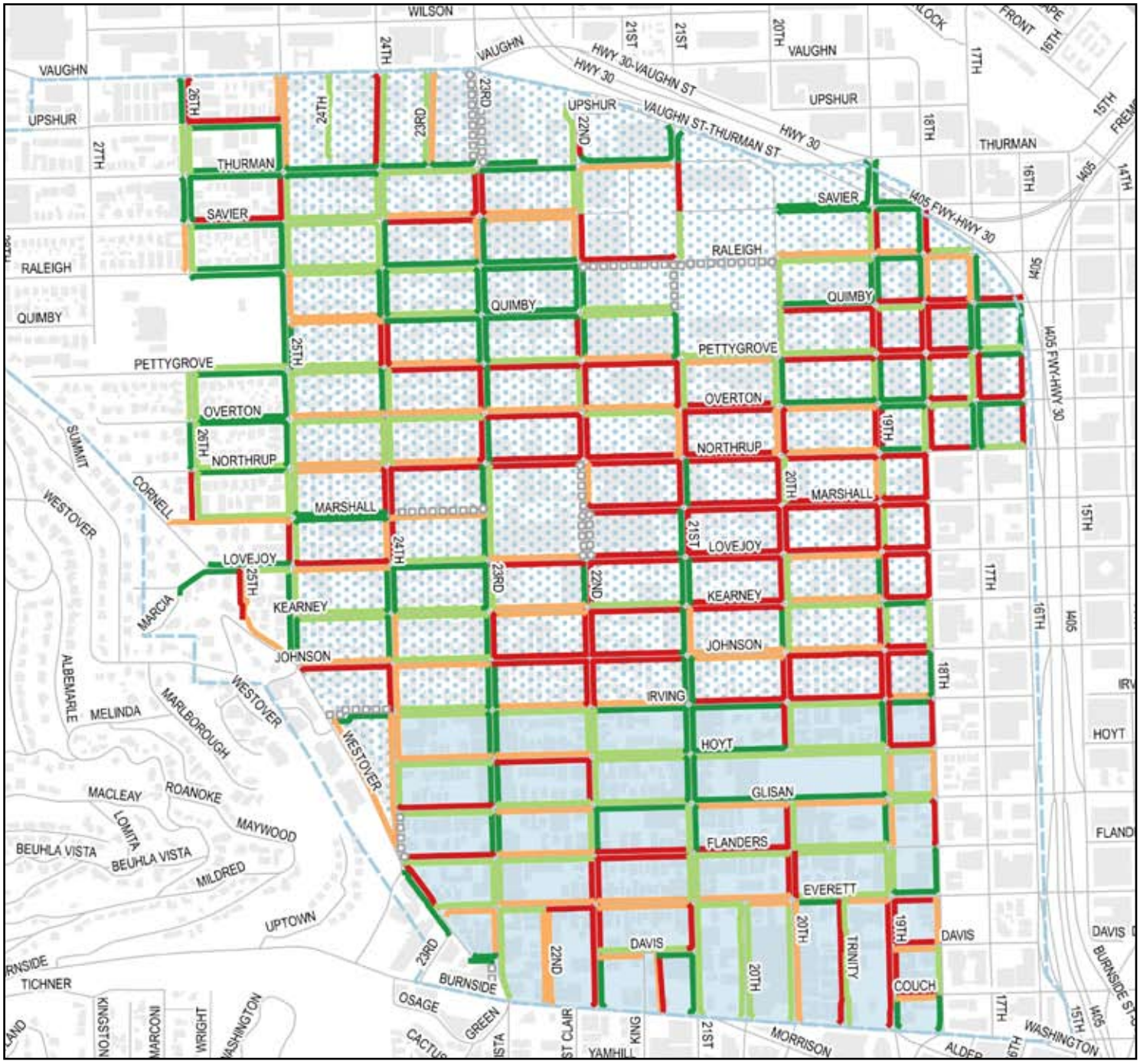


Figure A1: Weekday occupancy during the 7:00 AM hour

Figure A2: Weekday occupancy during the 8:00 AM hour

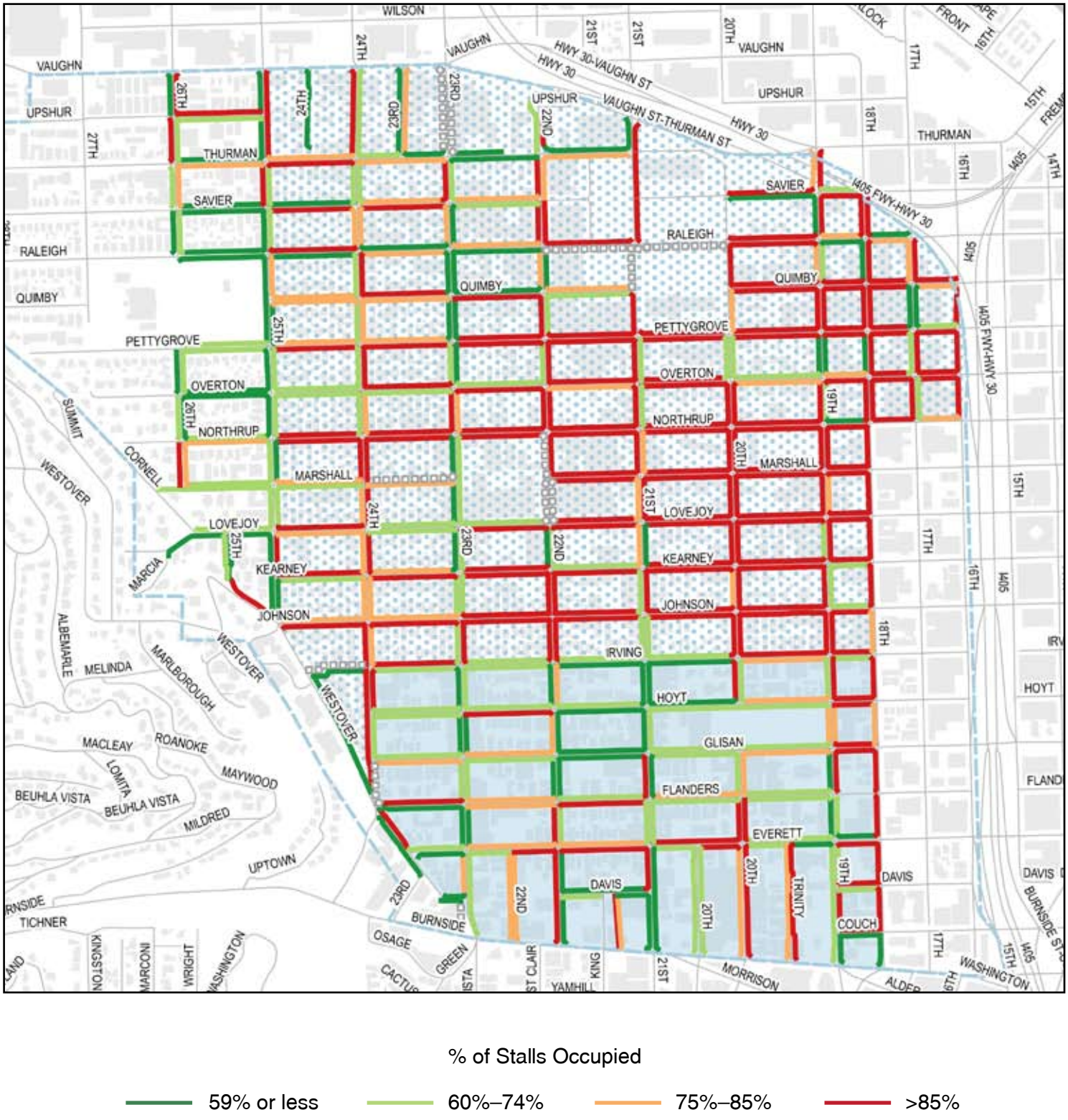


Figure A3: Weekday occupancy during the 9:00 AM hour

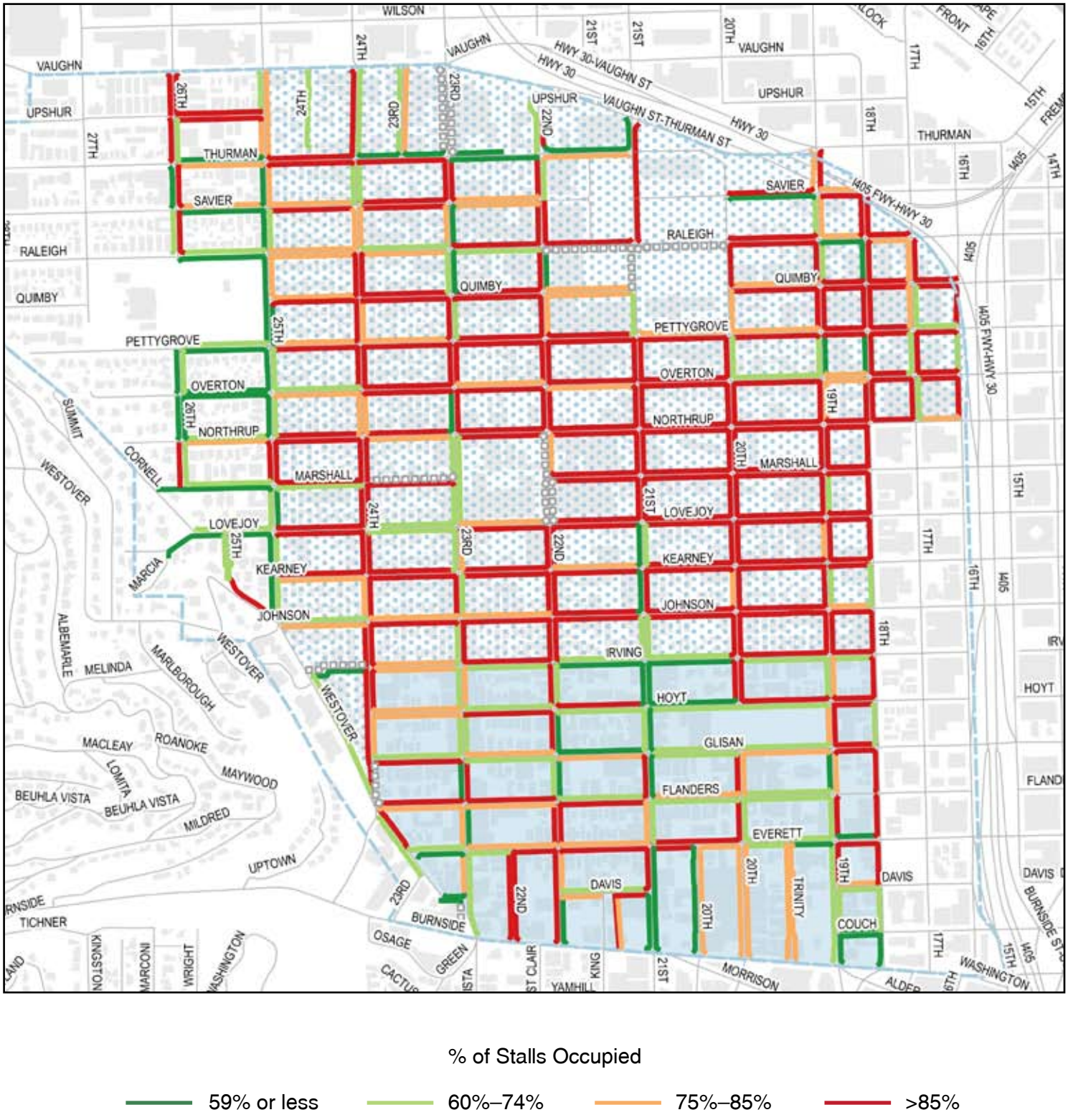


Figure A4: Weekday occupancy during the 10:00 AM hour

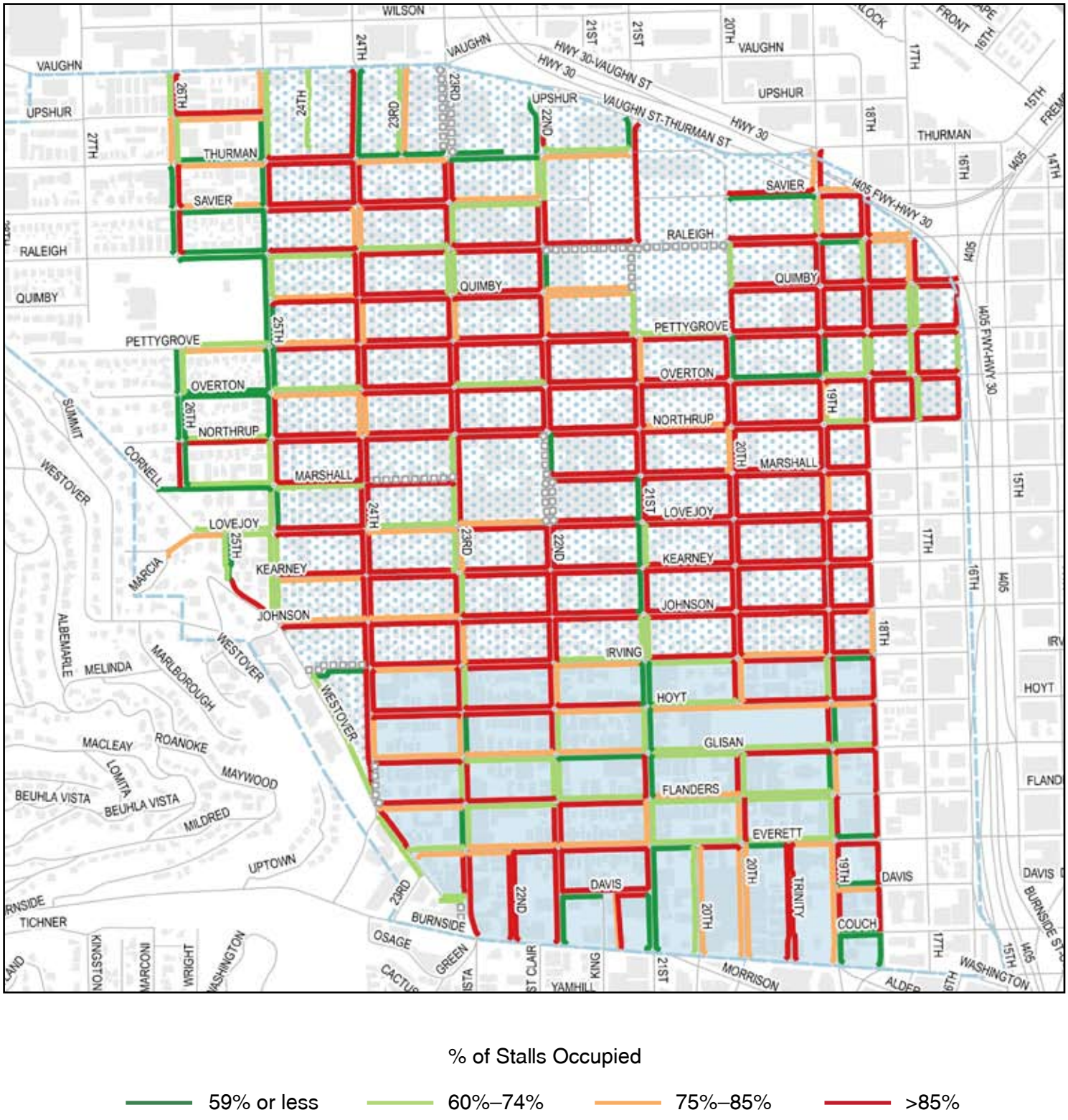


Figure A5: Weekday occupancy during the 11:00 AM hour

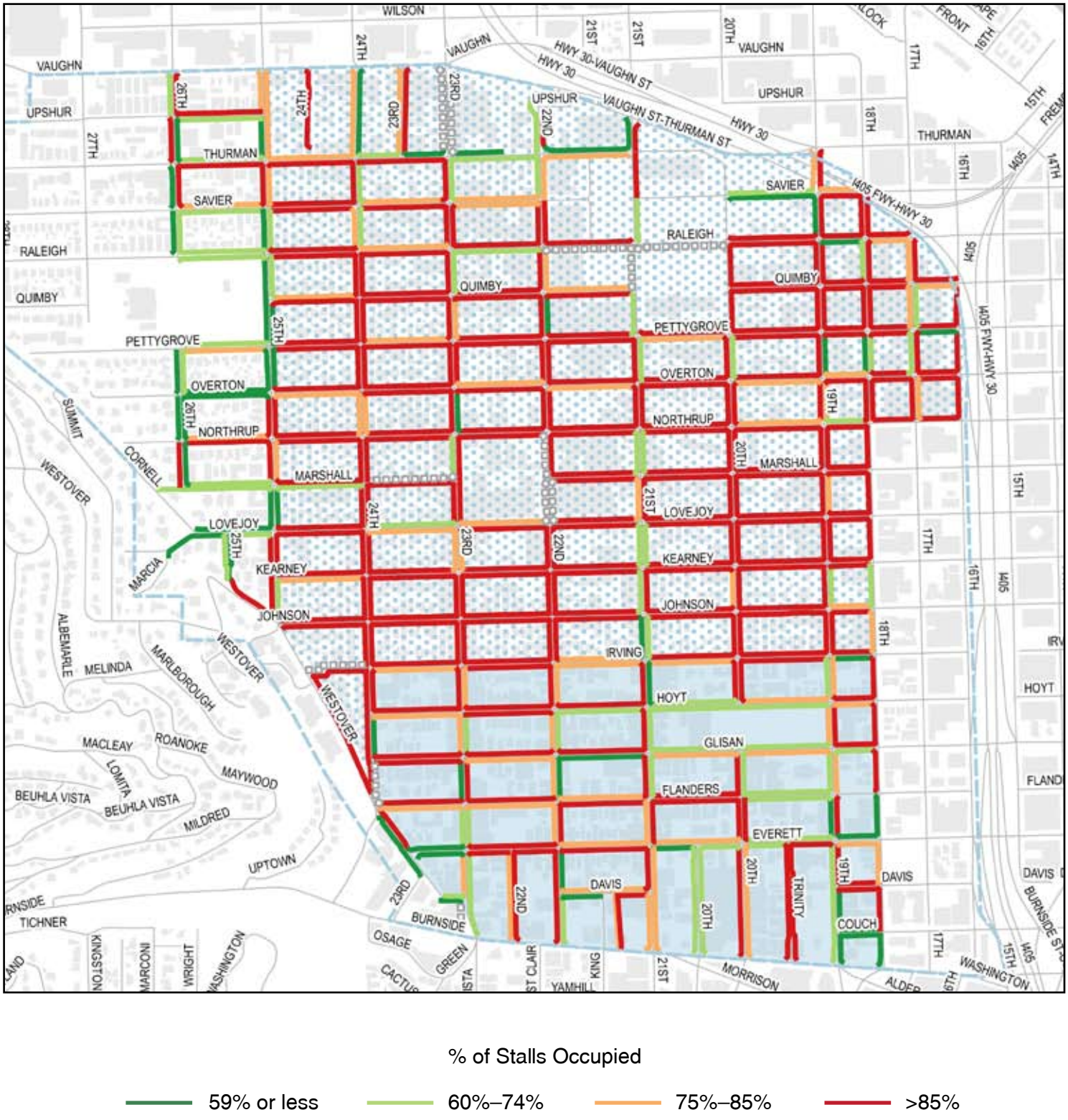


Figure A6: Weekday occupancy during the 12:00 PM hour

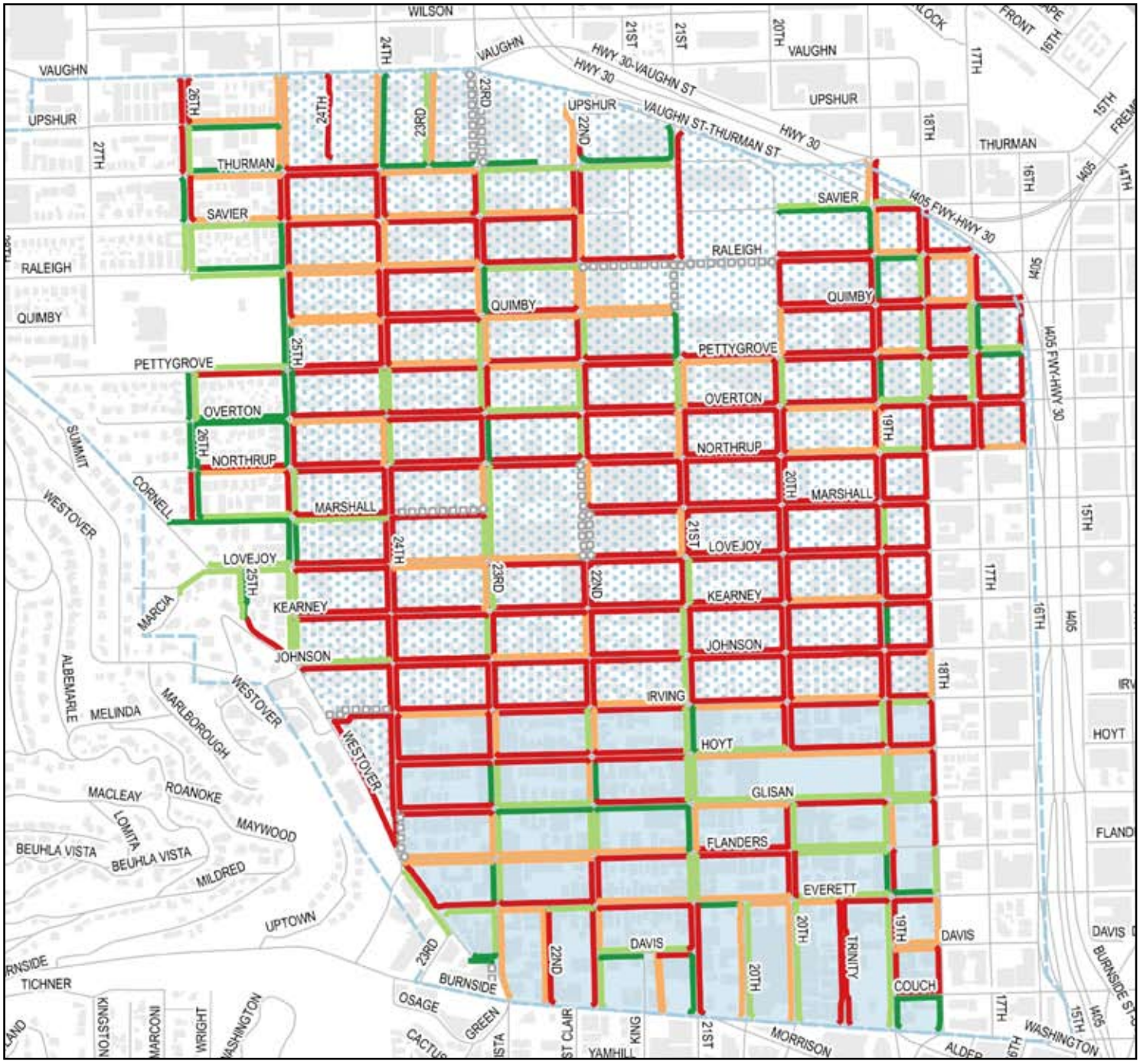


Figure A7: Weekday occupancy during the 1:00 PM hour

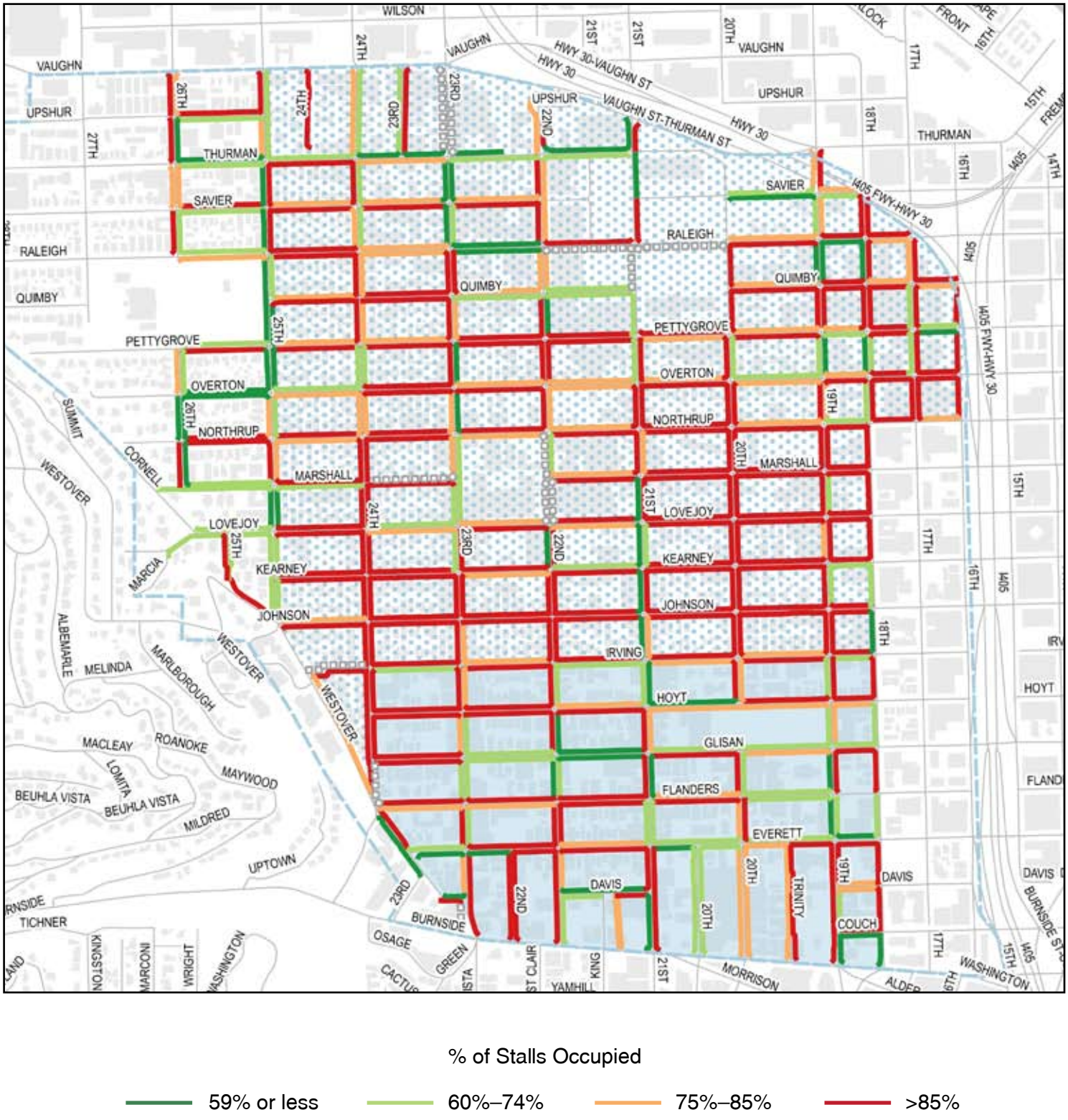


Figure A8: Weekday occupancy during the 2:00 PM hour

% of Stalls Occupied

59% or less | 60%–74% | 75%–85% | >85%

Figure A9: Weekday occupancy during the 3:00 PM hour

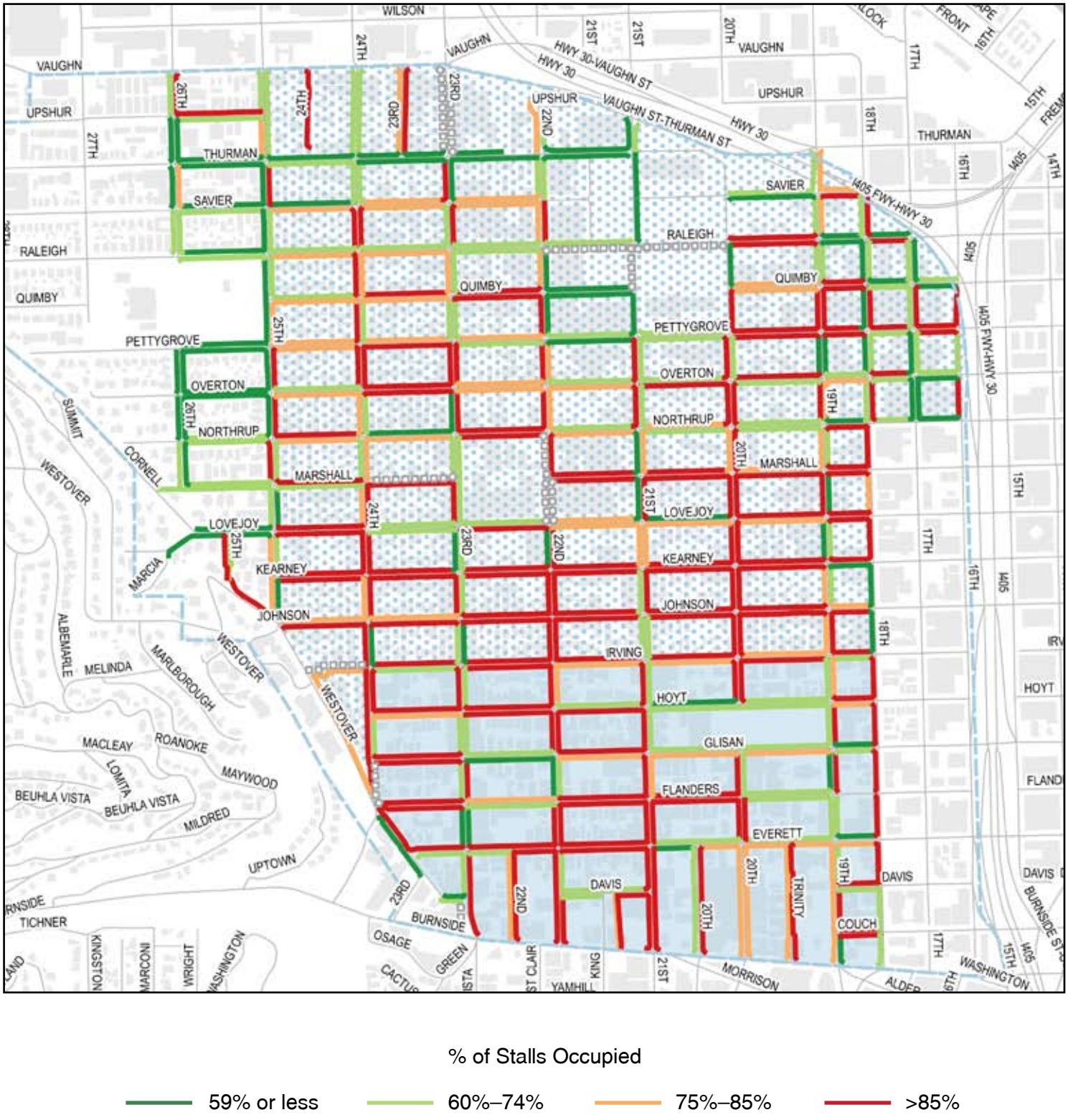


Figure A10: Weekday occupancy during the 4:00 PM hour

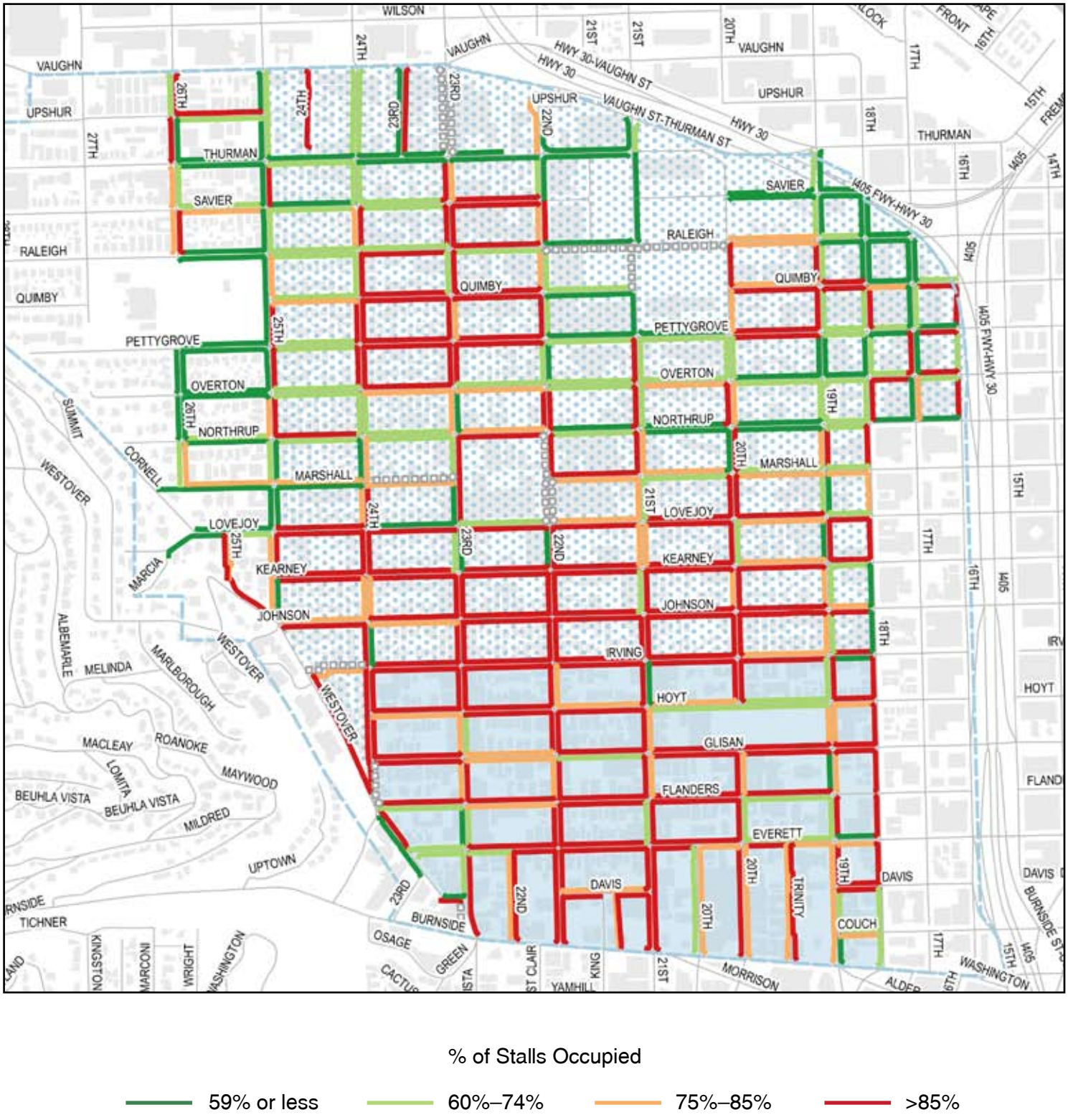


Figure A11: Weekday occupancy during the 5:00 PM hour

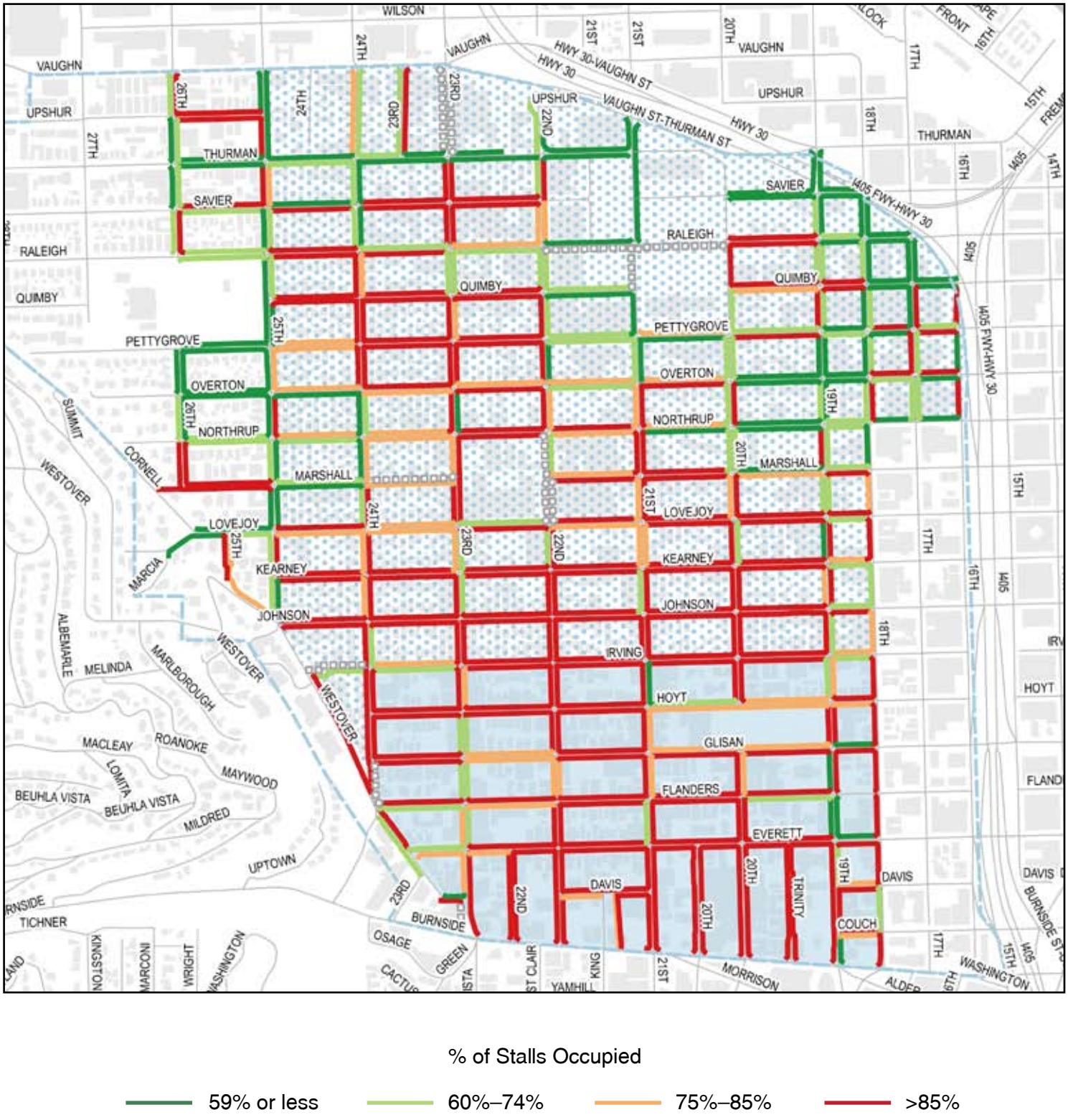


Figure A12: Weekday occupancy during the 6:00 PM hour

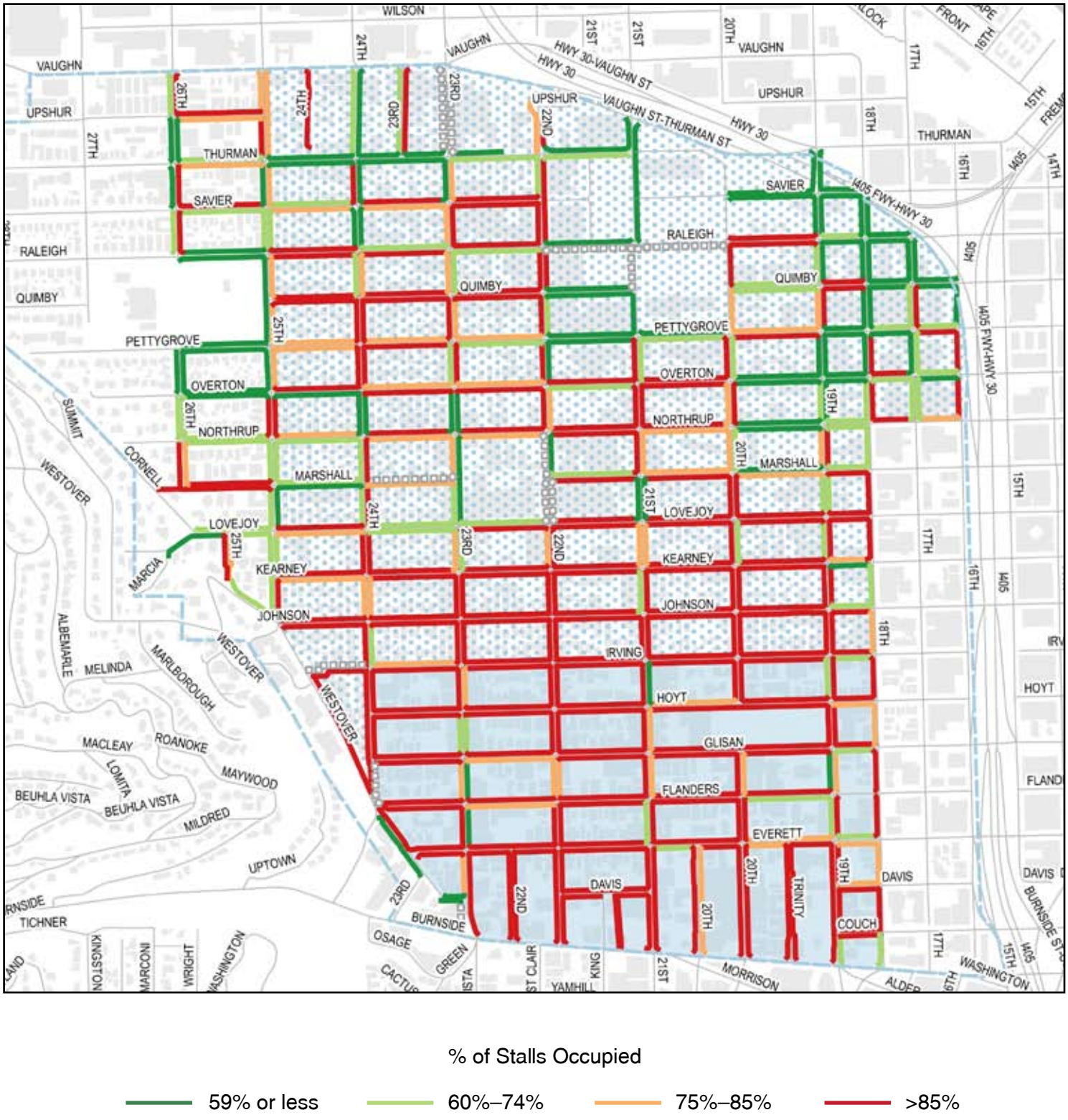


Figure A13: Weekday occupancy during the 7:00 PM hour

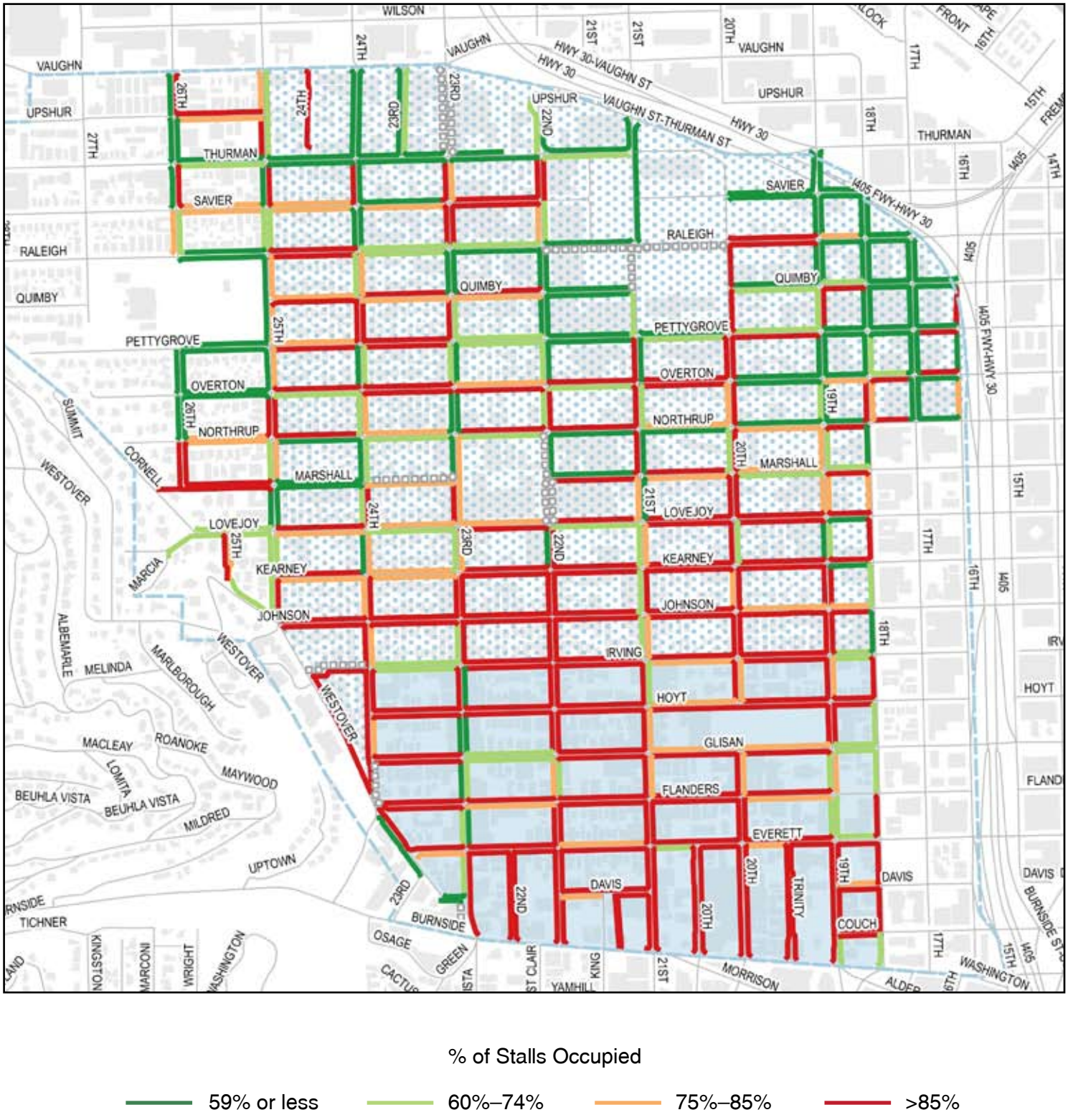


Figure A14: Weekday occupancy during the 8:00 PM hour

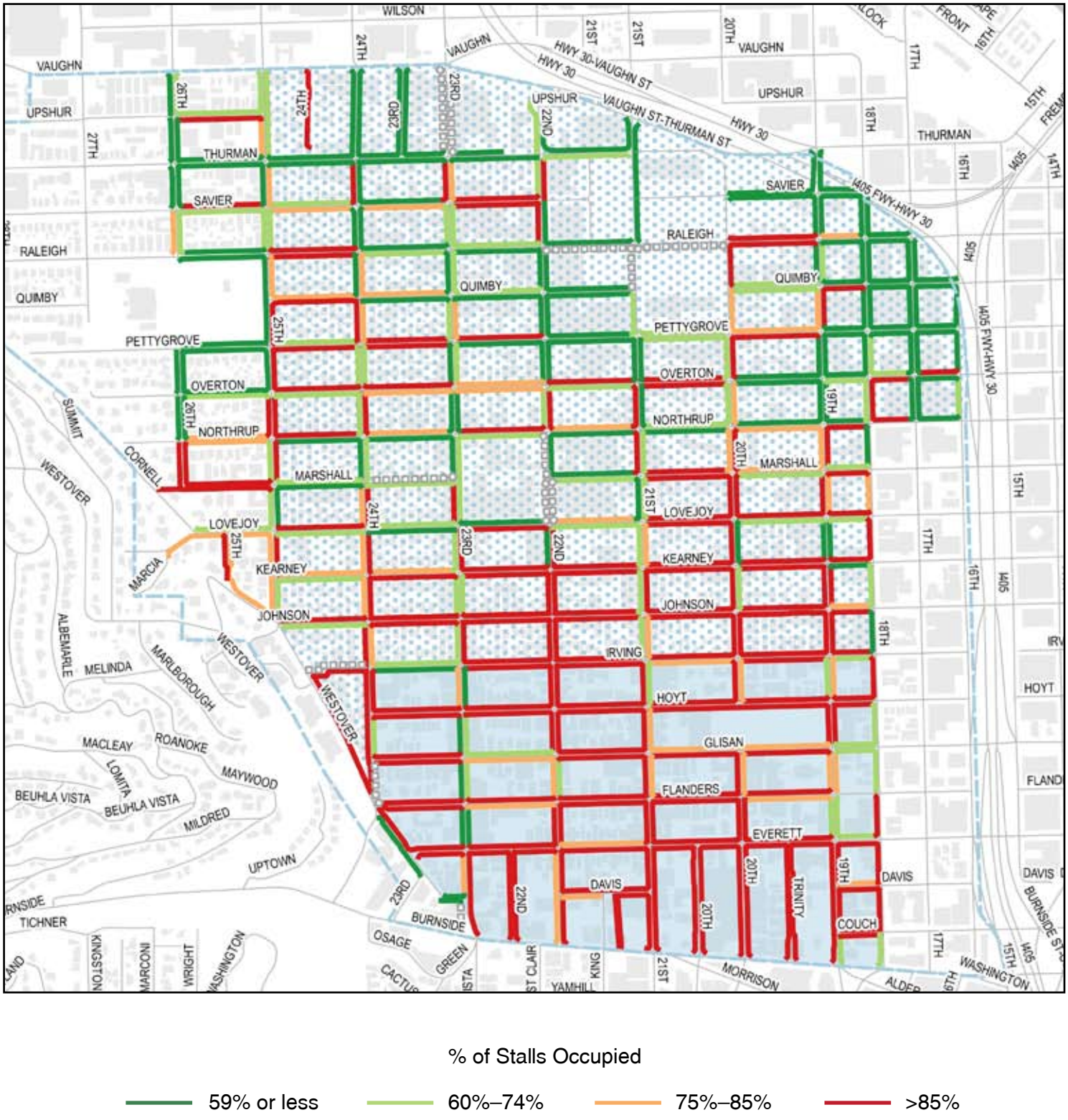


Figure A15: Weekday occupancy during the 9:00 PM hour

Appendix B:
Saturday Hourly Occupancy Maps

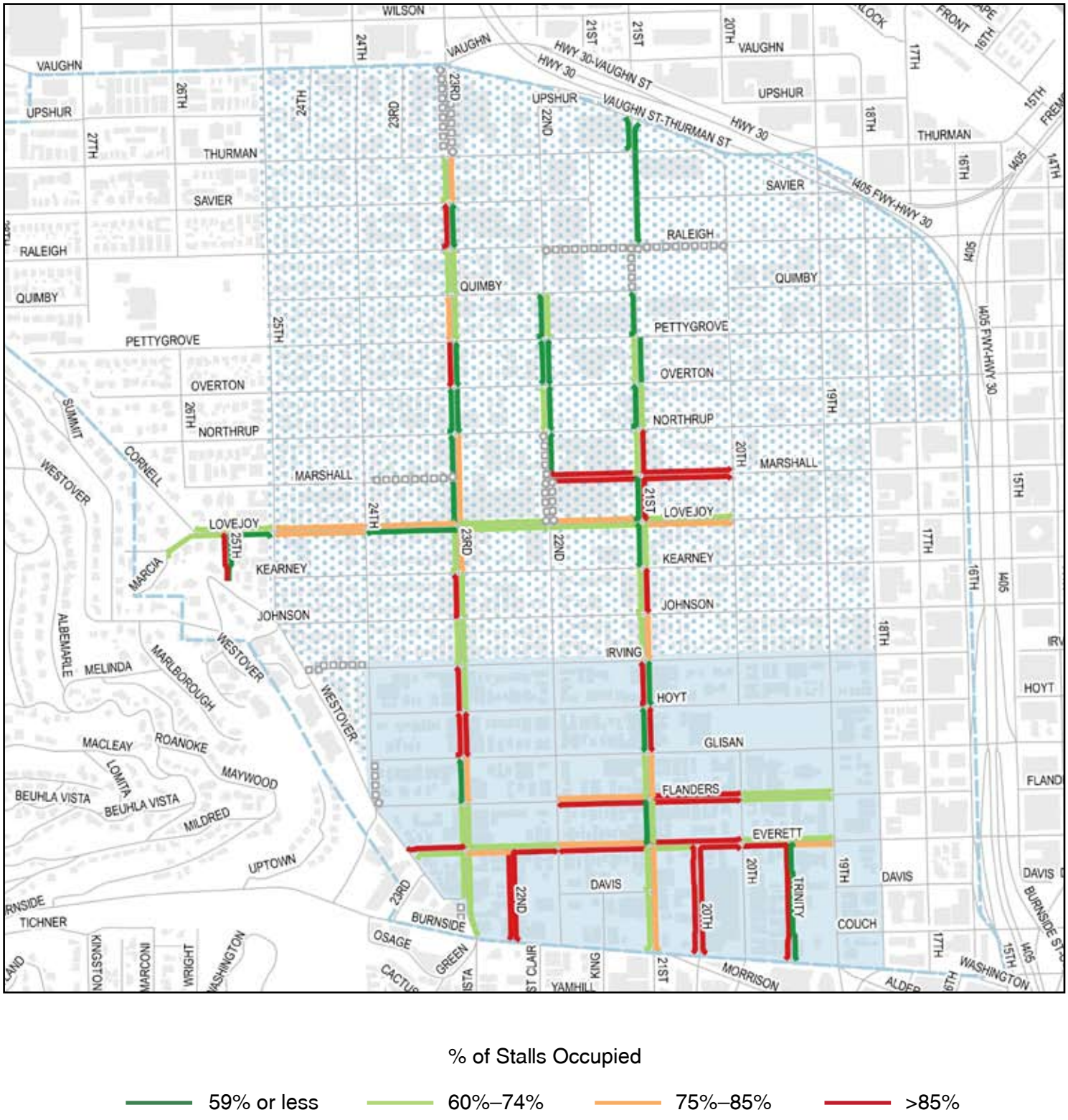


Figure B1: Saturday occupancy during the 10:00 AM hour

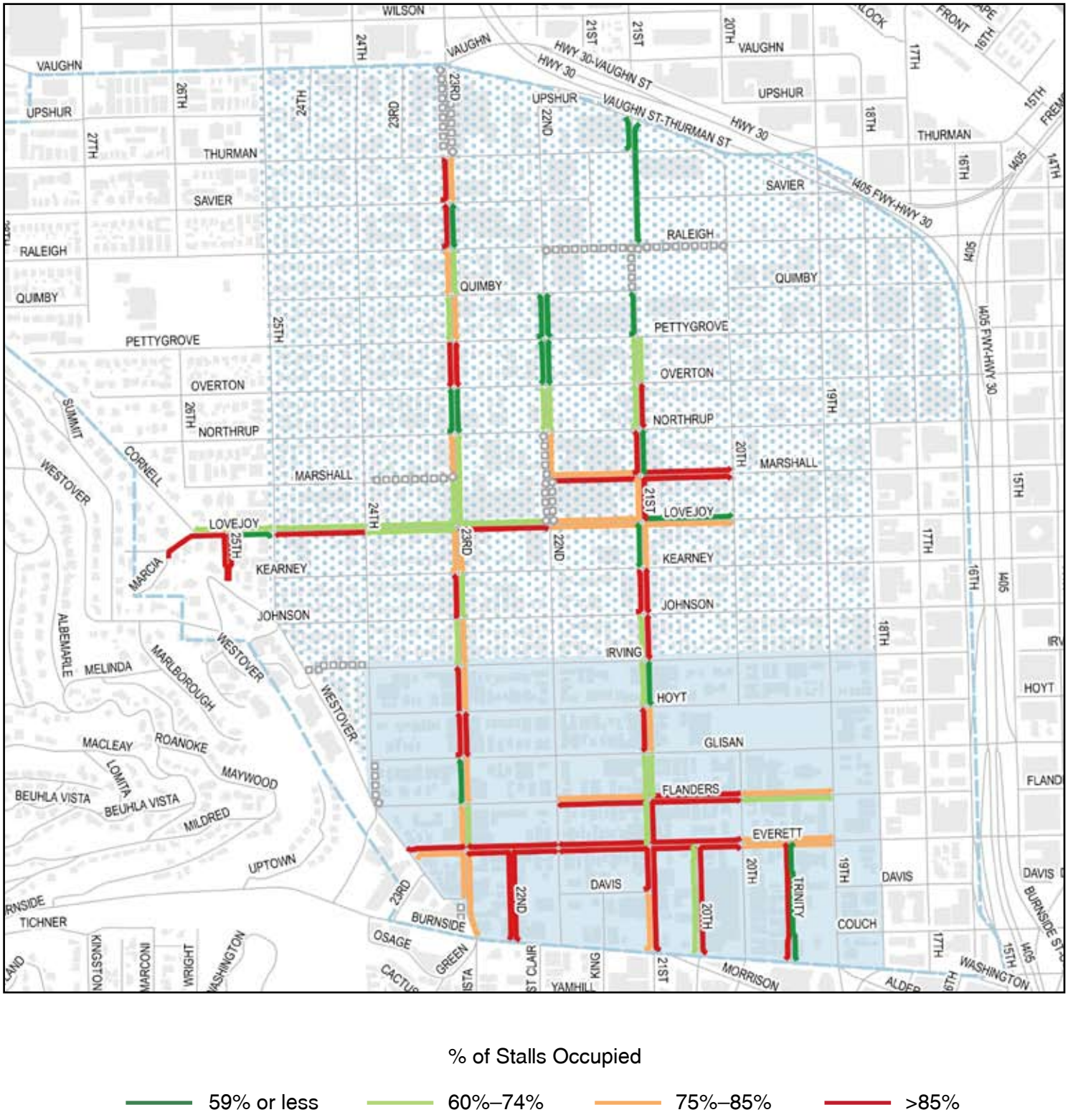


Figure B2: Saturday occupancy during the 11:00 AM hour

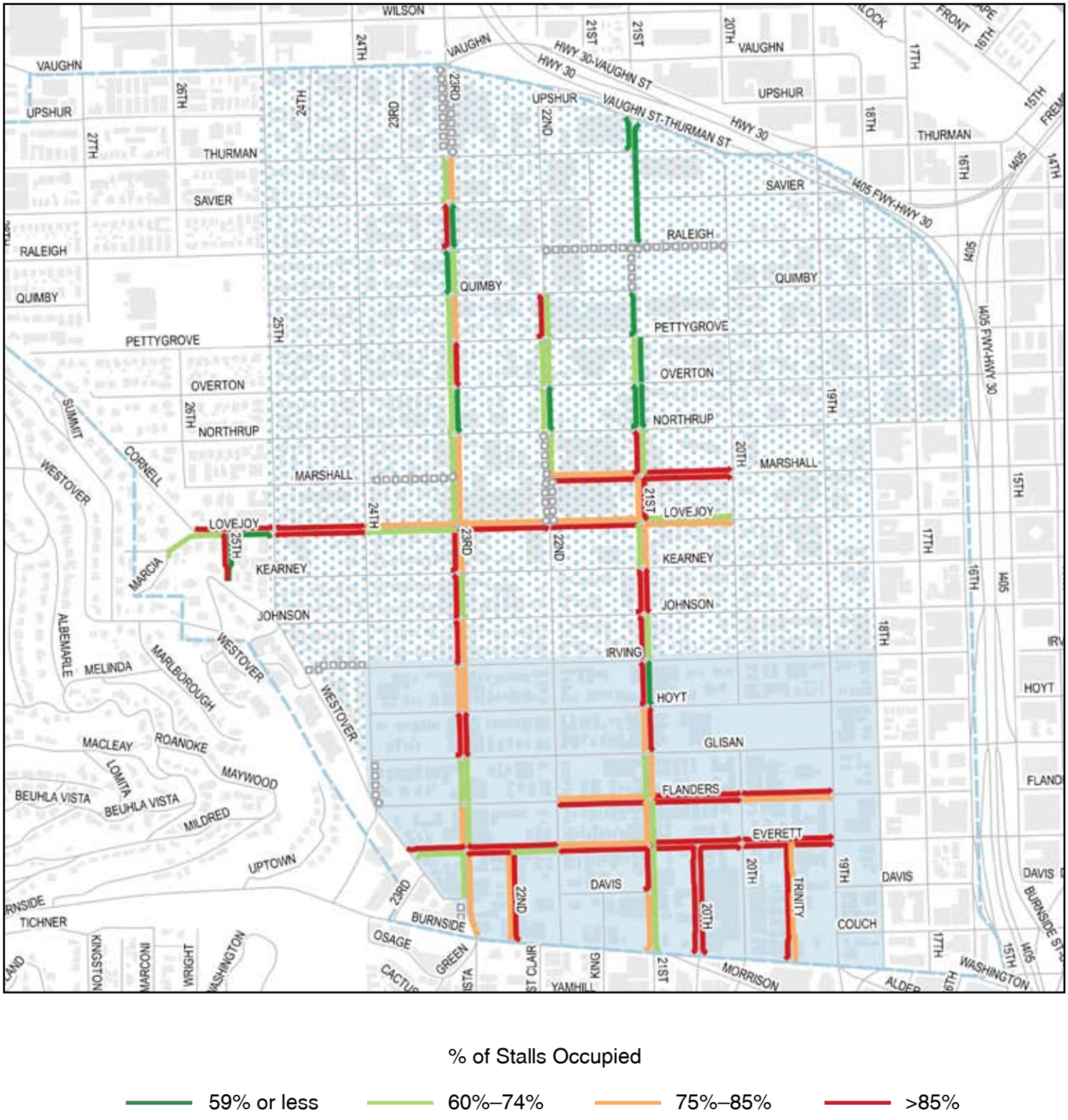


Figure B3: Saturday occupancy during the 12:00 PM hour

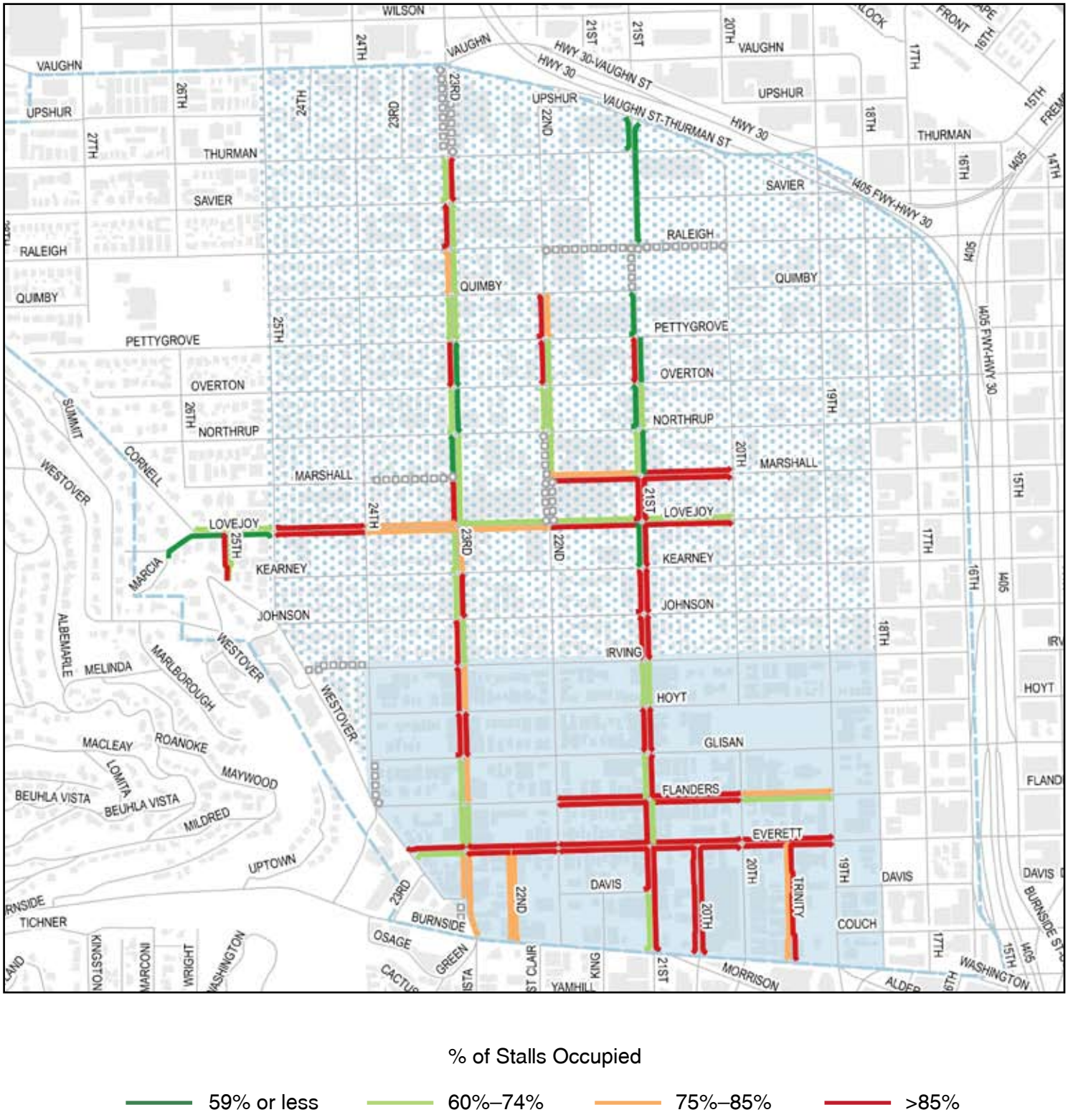


Figure B4: Saturday occupancy during the 1:00 PM hour

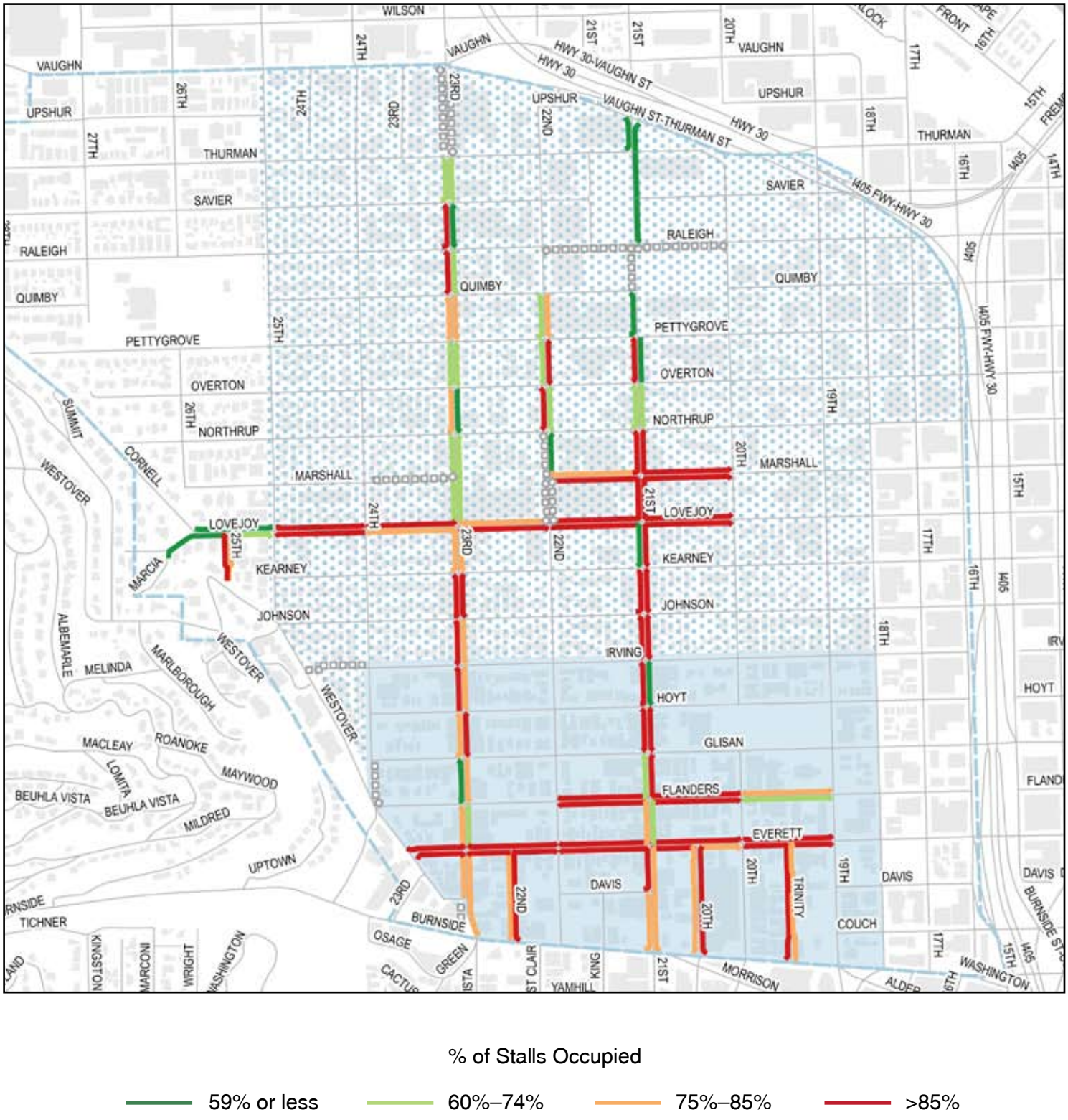


Figure B5: Saturday occupancy during the 2:00 PM hour

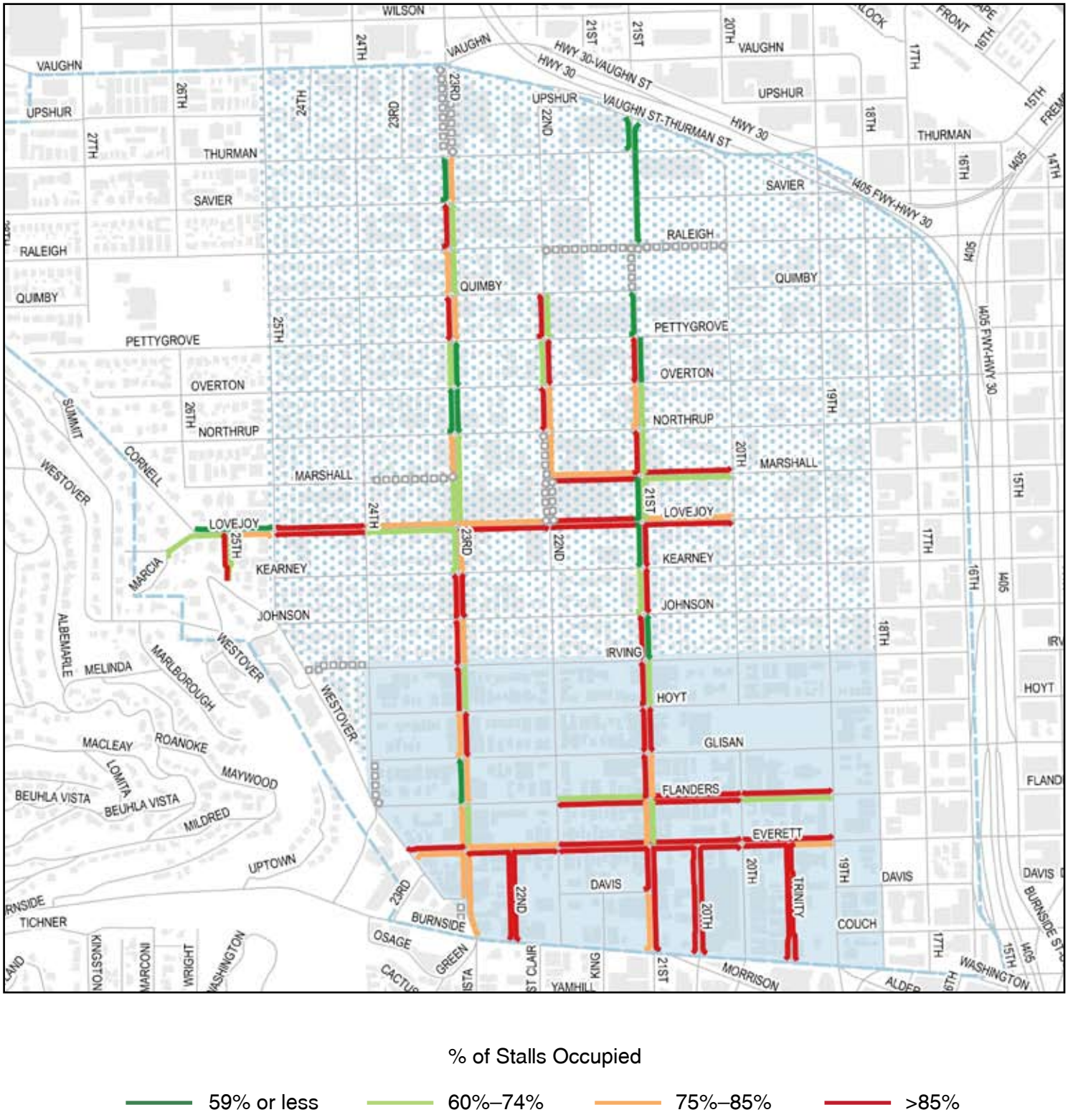


Figure B6: Saturday occupancy during the 3:00 PM hour

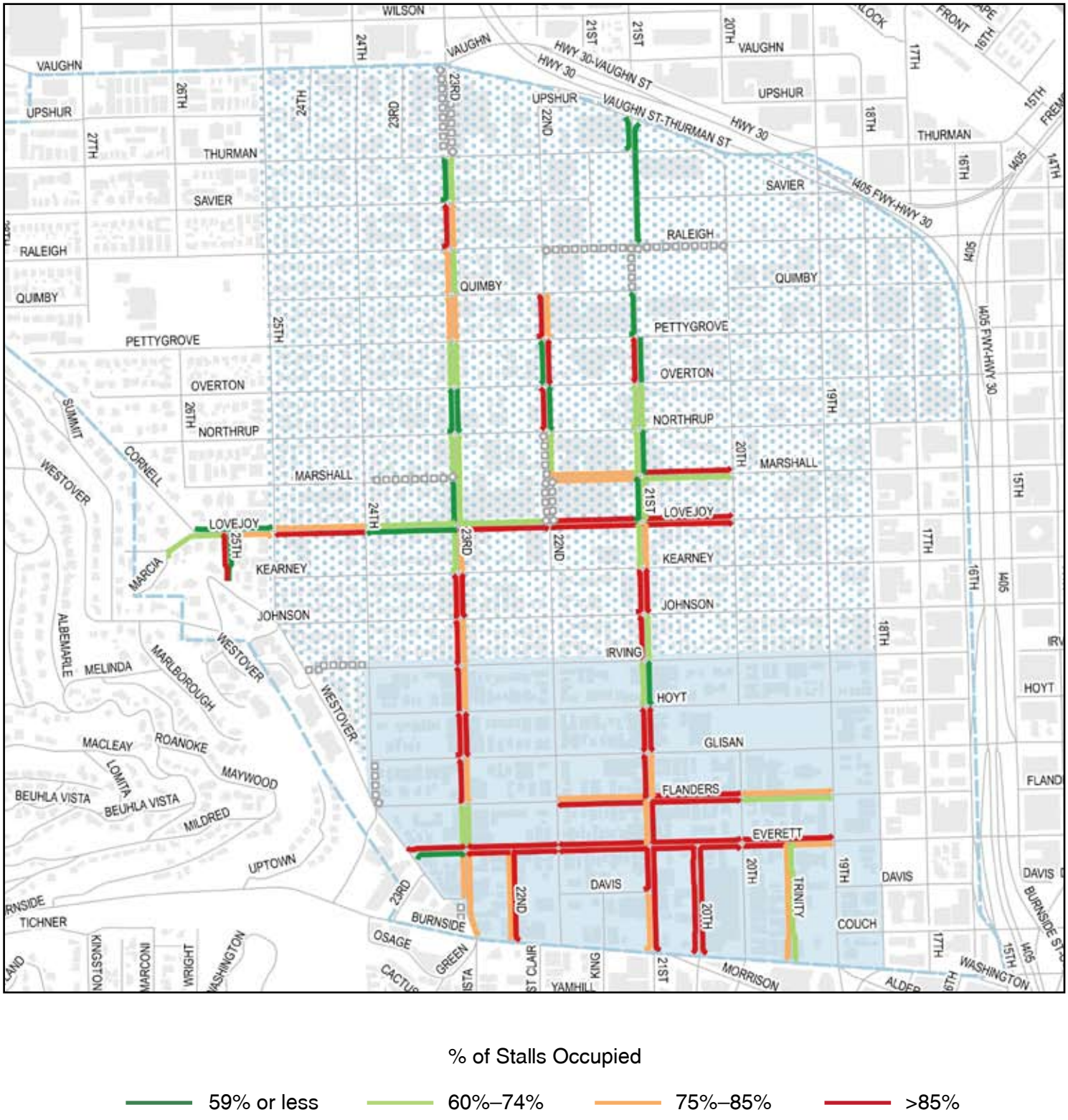


Figure B7: Saturday occupancy during the 4:00 PM hour

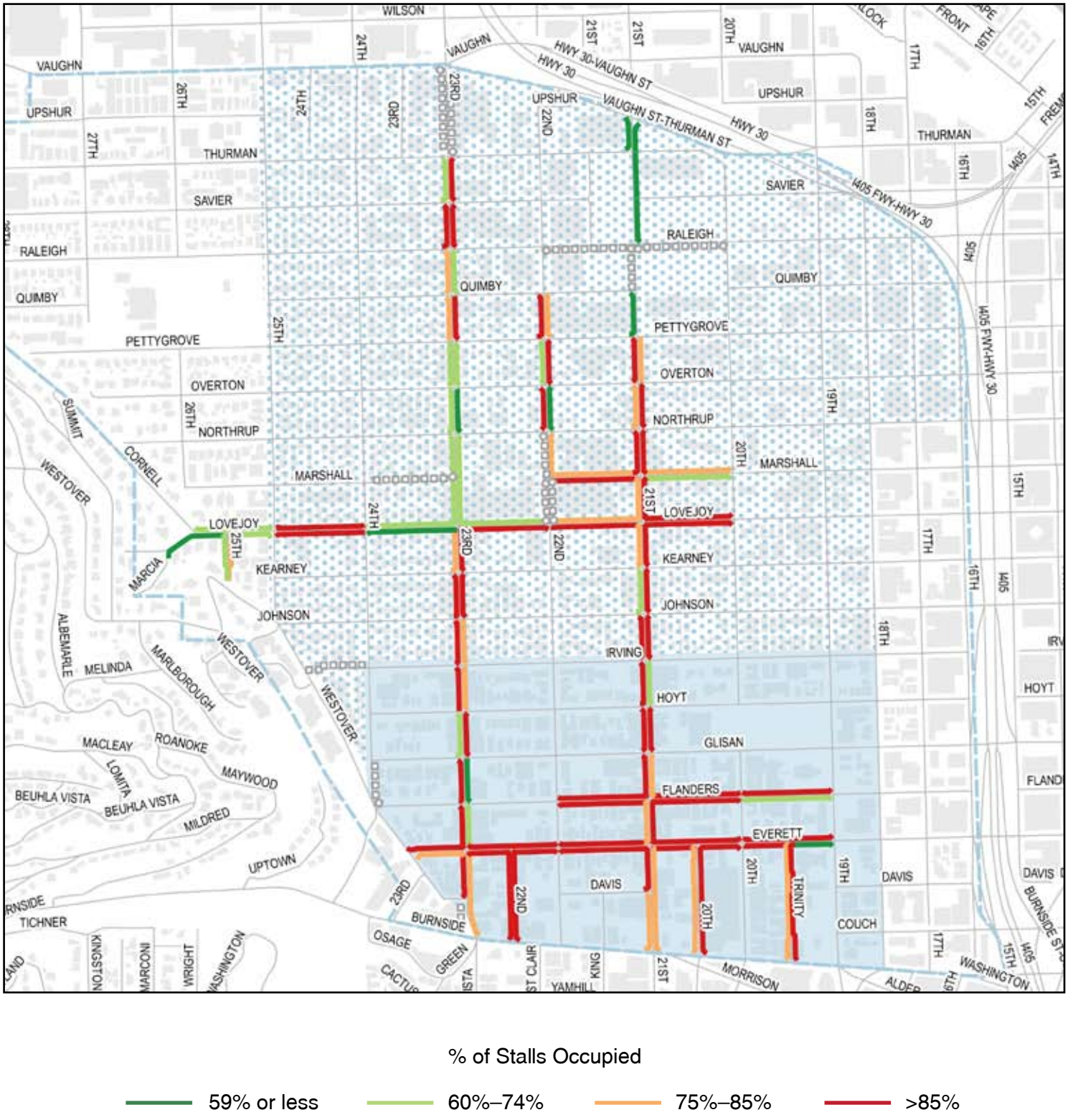


Figure B8: Saturday occupancy during the 5:00 PM hour

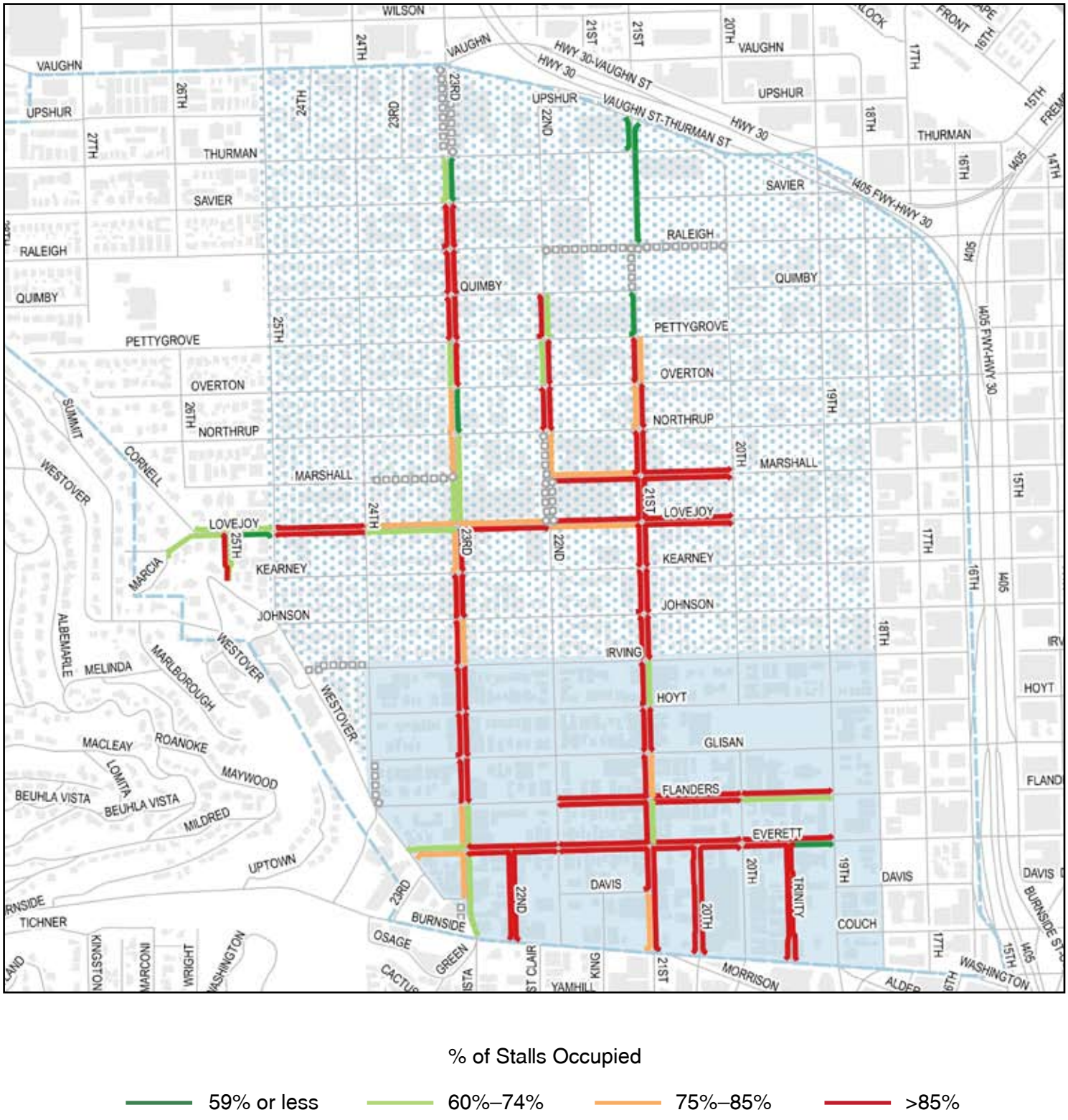


Figure B9: Saturday occupancy during the 6:00 PM hour

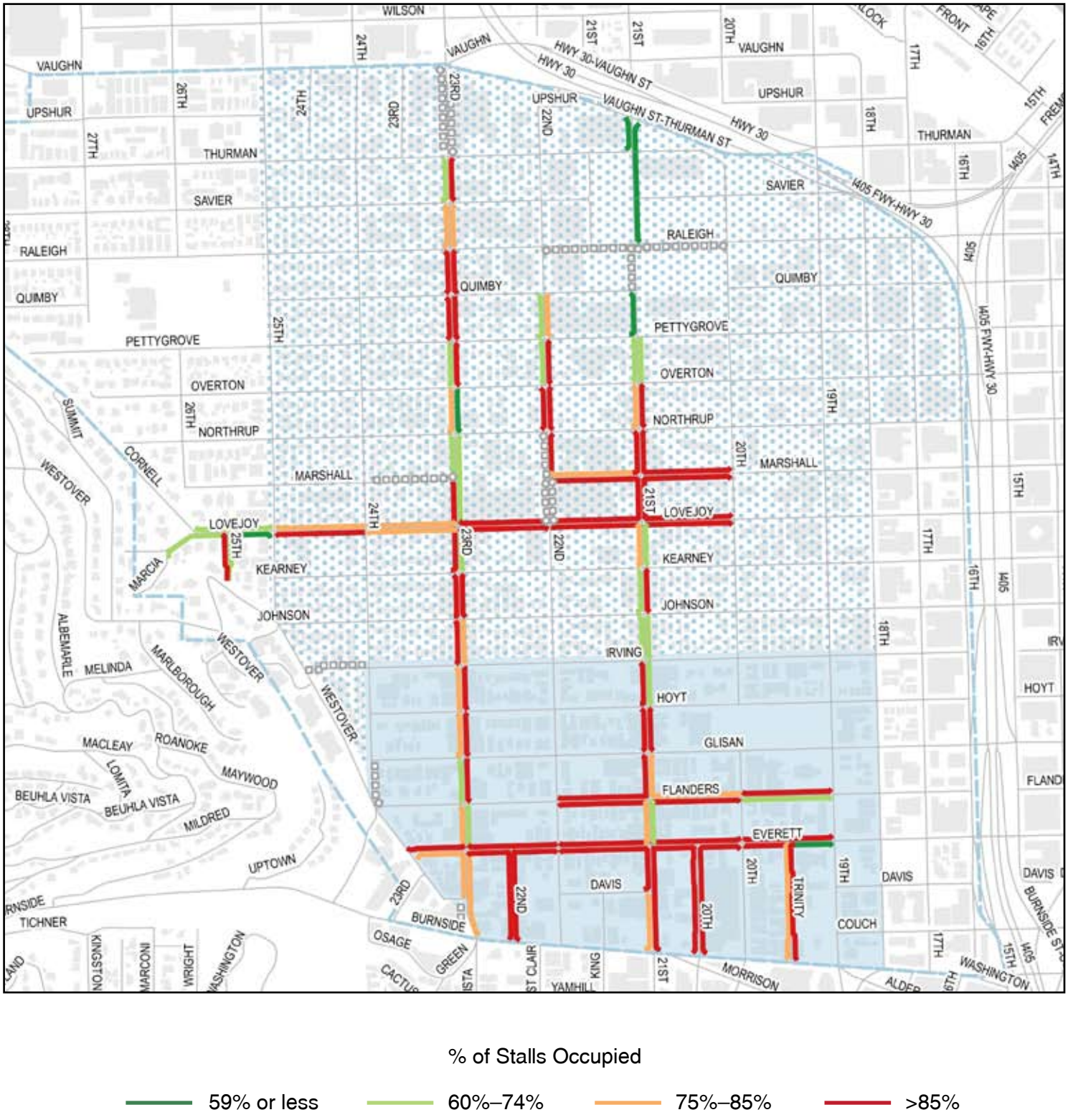


Figure B10: Saturday occupancy during the 7:00 PM hour

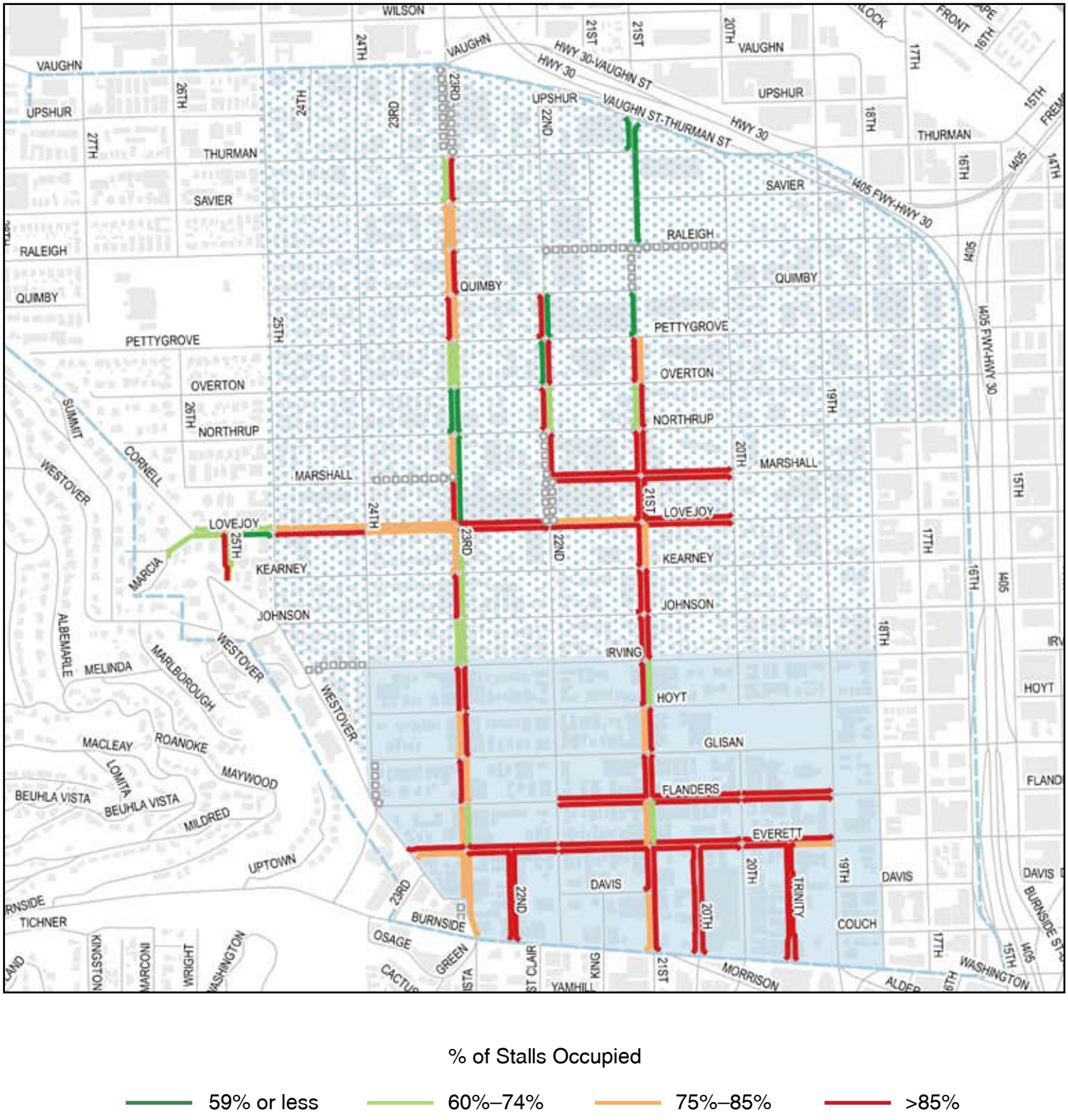


Figure B11: Saturday occupancy during the 8:00 PM hour

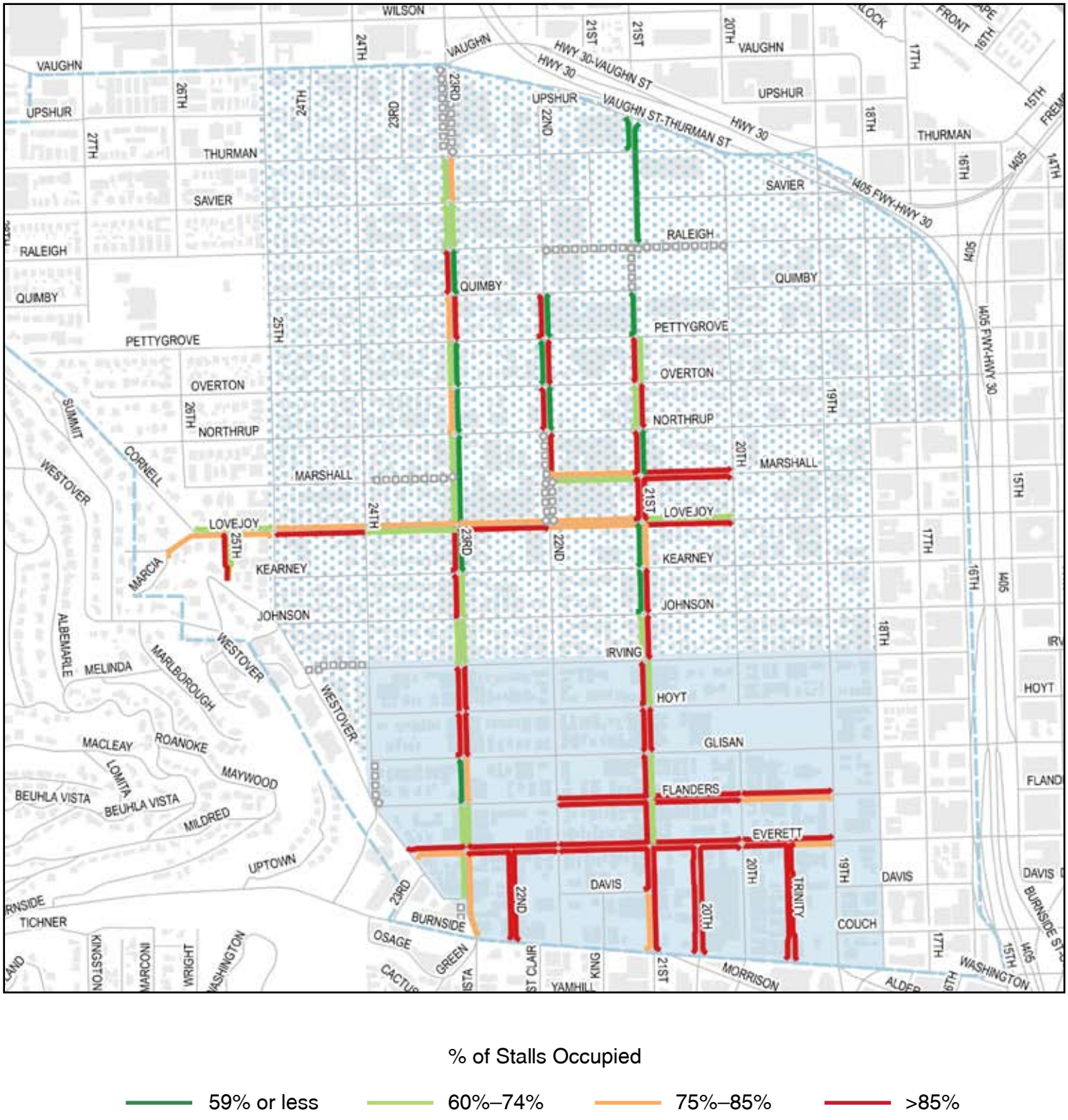


Figure B12: Saturday occupancy during the 9:00 PM hour

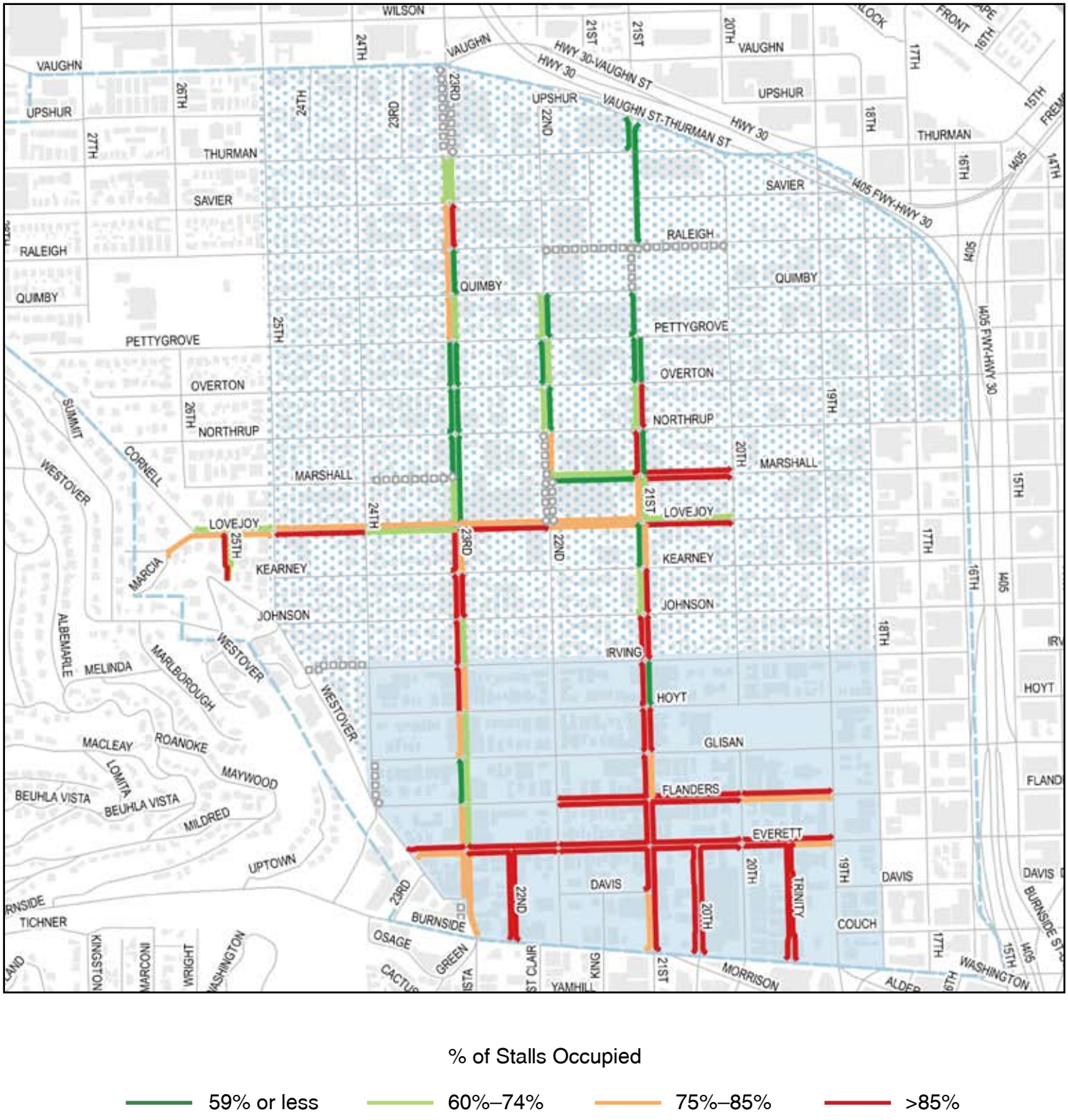


Figure B13: Saturday occupancy during the 10:00 PM hour

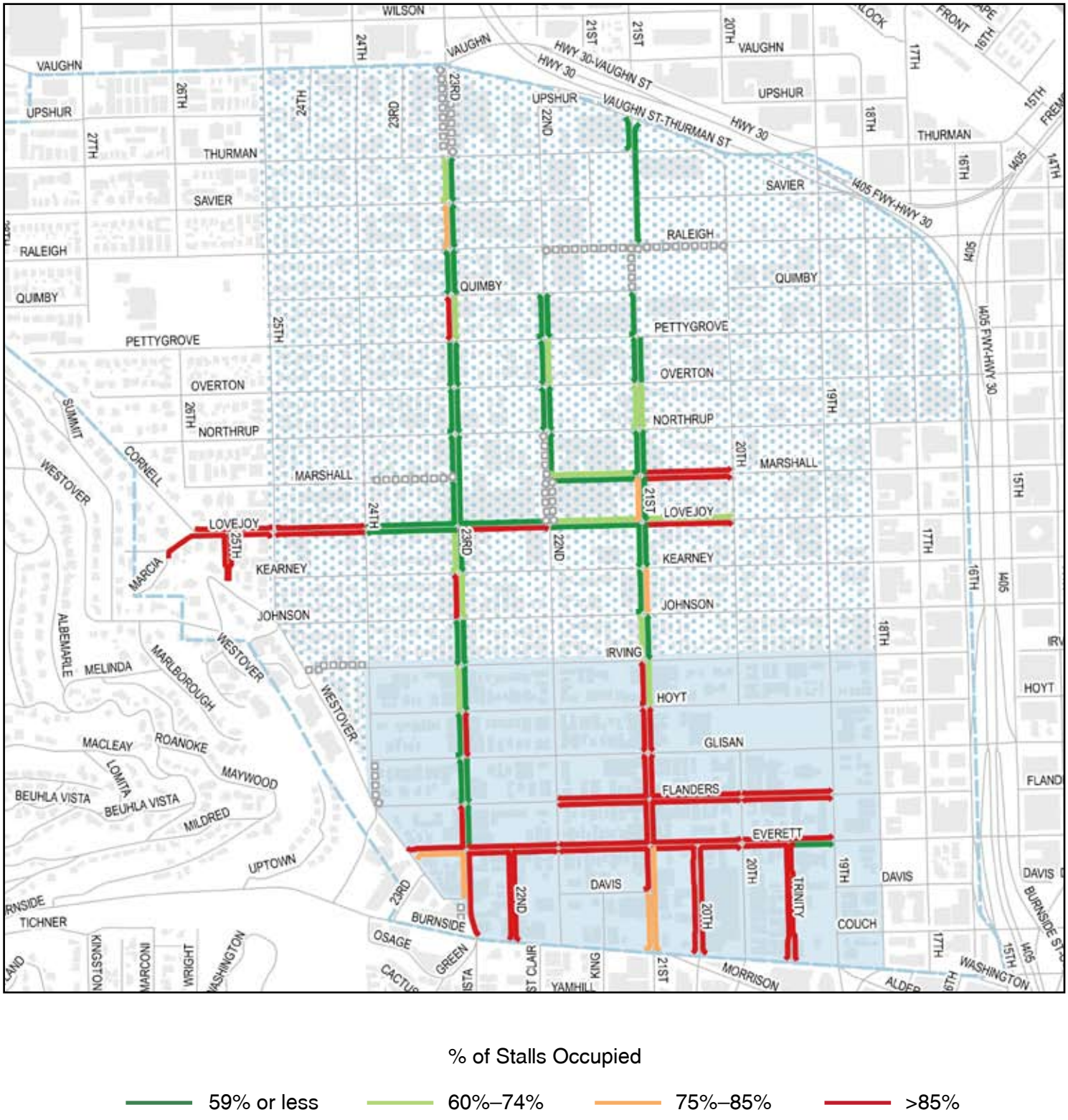


Figure B14: Saturday occupancy during the 11:00 PM hour