# Town of Carrboro

## Downtown Parking Plan

JULY 2017


PREPARED FOR:
Town of Carrboro, NC

PREPARED BY:
VHB

**A motion was made by Alderman Damon Seils, seconded by Alderman Sammy Slade, that this resolution be approved.**

A RESOLUTION RECEIVING PUBLIC COMMENT ON THE PARKING STUDY REPORT AND ASSOCIATED RECOMMENDATIONS

WHEREAS, the Town of Carrboro entered into a contract with VHB Engineering in November 2015 to conduct a parking study of the downtown; and

WHEREAS, the Board of Aldermen received the report and associated recommendations on February 21, 2017, and referred the materials to the Planning Board, the Transportation Advisory Board, the Environmental Advisory Board, the Northern Transition Area Advisory Committee, the Economic Sustainability Commission, and the Recreation and Parks Commission; and

WHEREAS, the advisory boards received a presentation from VHB Engineering on April 6, 2017, and have submitted comments on the report and associated recommendations; and

WHEREAS, the Board seeks to provide ample opportunities for the public to comment on parking study as well.

NOW, THEREFORE, BE IT RESOLVED that the Board adopts the report with its analysis and associated recommendations as the Parking Plan and directs staff to begin developing a strategy and timeline for its implementation, including a prioritization of the report's recommended management strategies and a description of the rationale for that prioritization.

BE IT FURTHER RESOLVED that the Board directs staff to incorporate the following into the plan as part of its adoption:

1. Augment the Town's historical and continuing focus on alternative modes of transportation, including bus service enhancements, to reduce future parking demand.

2. A targeted effort at the beginning of the plan's implementation to address specific parking-related challenges faced by one or two local business owners, which may provide case study examples for how the plan's recommended management strategies can support local businesses and the broader community.

This is the 25th day of April in the year 2017.

Aye: Alderman Seils, Alderman Slade, Alderman Chaney, Mayor Lavelle and Alderman Johnson Alderman Gist, Alderman Haven-O'Donnell

I, Catherine Dorando, Town Clerk for the Town of Carrboro, NC do hereby certify that the foregoing is a true and correct copy of a resolution adopted by the Carrboro Board of Aldermen.

TOWN OF CARRBORO INCORPORATED 1911 NORTH CAROLINA

Town Clerk


# Executive Summary

Since the 1980s, the Town of Carrboro has gradually acquired or leased properties to use as municipal parking lots, and currently maintains 655 parking spaces in the downtown area. The Town does not charge for the use of those spaces. Despite this investment, concerns relating to insufficient parking in the downtown have emerged, which has led the Town to reconsider its role in providing or managing parking for public uses. VHB Engineering, NC, P.C. was retained as the transportation consultant to lead the planning effort, involve stakeholders, collect existing conditions data, and identify potential strategies for parking management.

The plan vision was described by Town staff and Board of Aldermen as an inclusive process to examine the current and future states of parking in Carrboro, involving public outreach to identify potential barriers that may be preventing residents from visiting downtown more frequently.

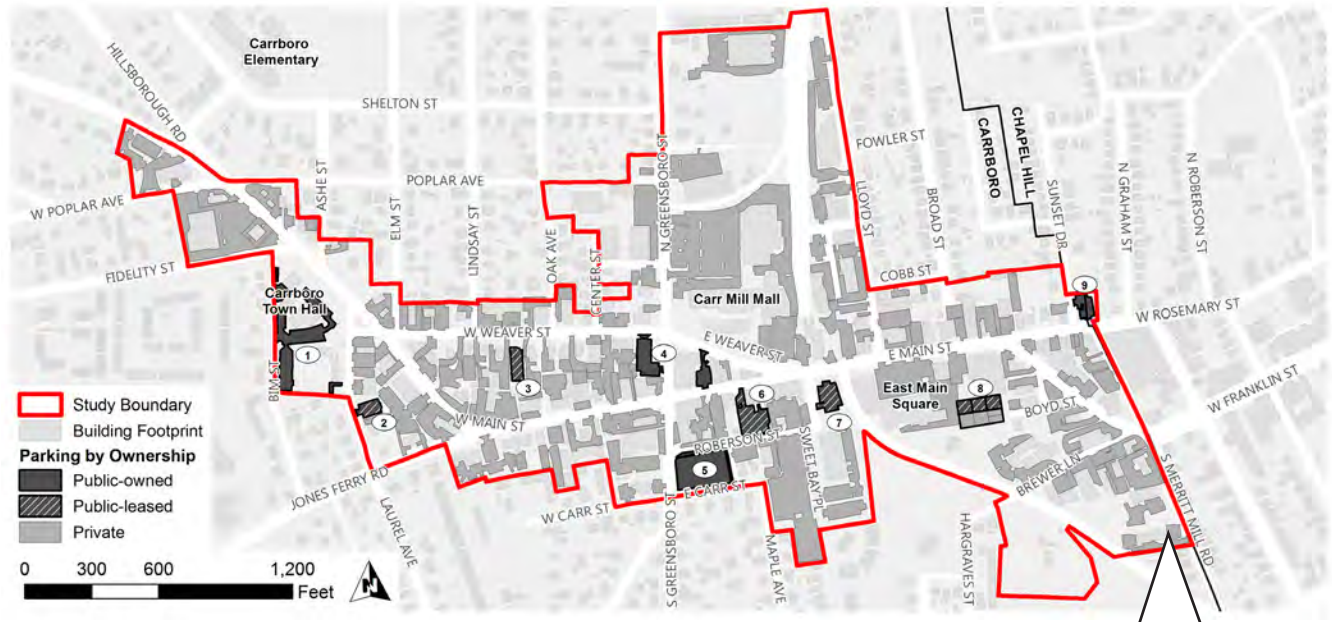
## Public Engagement

Public engagement items included a project website, online survey, social media outreach, two public meetings, attendance at the Farmers' Market, Coffee with a Cop and Business Alliance meetings, and individual meetings with local business owners. The project website received more than 300 page views and more than 600 individuals responded to the online survey. Feedback received during these public engagement activities helped to inform the planning process and shape the final plan recommendations.

## Existing Conditions

Using the Town's existing parking space inventory, VHB organized and conducted a field investigation to verify total spaces and collect utilization throughout the day. Private parking accounted for four out of every five total parking total spaces, while public parking accounted for the remaining 16%. Public parking includes 380 spaces that are leased by the Town within four (4) lots and a portion of one (1) parking deck. The Town of Carrboro owns 275 spaces within four (4) parking lots, which accounts for 7% of total parking spaces.

### Parking Lots by Ownership Type




**Public Parking:**
1. Town Hall
2. Laurel Ave. lot
3. W. Weaver St. lot
4. Century Center lot
5. S. Greensboro lot
6. E. Main St./Acme lot
7. Robertson St. @ RR lot
8. Hampton Inn parking deck (levels 1-3)
9. Rosemary St. lot

### Parking Spaces by Ownership

| Parking Type | Spaces | % of Total |
|---|---|---|
| Public – owned | 275 | 7% |
| Public – leased | 380 | 9% |
| Private | 3,293 | 84% |
| **Total** | **4,003** | **100%** |

The total number of parked cars were observed at four (4) periods between 9 AM and 9 PM on a typical Thursday in January 2016. This process was repeated on a typical Thursday in April, as well as a Saturday in April. These counts included all public and private parking areas to determine the maximum parking demand. The January counts observed a peak of 2,029 parked cars during the 11 AM to 1 PM lunchtime period. The April counts observed a peak of 2,122 parked cars during the same 11 AM to 1 PM lunchtime period, an increase of 5%. During this peak period, private lots were found to be 53% occupied and the public lots were found to be 52% occupied. For reference, the desired parking occupancy rate is between 80–90%, and most parking lots were well below this target. Parking lots over 90% occupied will contribute to unnecessary traffic circulation as drivers seek those hard-to-find remaining empty spaces.

**Observed Parked Vehicles by Time of Day**

| | CARS | | | OCCUPANCY | | |
|---|---|---|---|---|---|---|
| **Count Periods** | **January Thursday** | **April Thursday** | **April Saturday** | **January Thursday** | **April Thurdsay** | **April Saturday** |
| **9 AM–11 AM** | 1,858 | 1,942 | 1,493 | 49% | 49% | 37% |
| **11 AM–1 PM** | **2,029** | **2,122** | 1,475 | **51%** | **53%** | 37% |
| **2 PM–5 PM** | 1,699 | 1,879 | 1,487 | 42% | 47% | 37% |
| **6 PM–9 PM** | 1,426 | 1,758 | **1,561** | 36% | 44% | **39%** |

*Note: Parking counts include public and private lots (4,003 spaces in total).*
*The dark shaded cells represent the maximum number of parked cars, for each period, between all three data collections.*

Survey respondents and meeting attendees remarked that the most challenging time of day to find parking within a *public* parking lot was during the evening (6–9 PM) period, not during lunchtime. Parking counts supported this perspective, as 466 vehicles we observed parking within public lots during the evening period. During this same period, private parking lots were found to be only 39% occupied, suggesting that downtown visitors seek public parking rather than private lots after 6 PM.

**Comparison of Parked Vehicles within Public Lots Only, January–April**

| | CARS | | | OCCUPANCY | | |
|---|---|---|---|---|---|---|
| **Count Periods** | **January Thursday** | **April Thursday** | **April Saturday** | **January Thursday** | **April Thurdsay** | **April Saturday** |
| **9 AM–11 AM** | 304 | 354 | 361 | 46% | 54% | 55% |
| **11 AM–1 PM** | **356** | 368 | 285 | **54%** | 56% | 44% |
| **2 PM–5 PM** | 339 | 312 | 240 | 52% | 48% | 37% |
| **6 PM–9 PM** | 331 | **466** | **457** | 51% | **71%** | **70%** |

*Note: Parking counts include only public lots (655 spaces in total).*
*The dark shaded cells represent the peak period (466 cars for 655 public spaces is 71% occupancy).*

Parking occupancy is not evenly distributed among the varying parking lot sizes and locations. The pattern of parking lot occupancy is displayed and discussed further in the Existing Conditions section. In general terms, the high demand areas during the morning period were near O2 Fitness and Rise Biscuit and Donuts. Demand shifted to the restaurant-dense areas within the central portion of downtown Carrboro during

the 11 AM to 1 PM period. In the mid-afternoon, demand becomes more balanced. After 6 PM, demand shifts back to the central public and private parking lots located close to dinner restaurants.

## Length of Stay

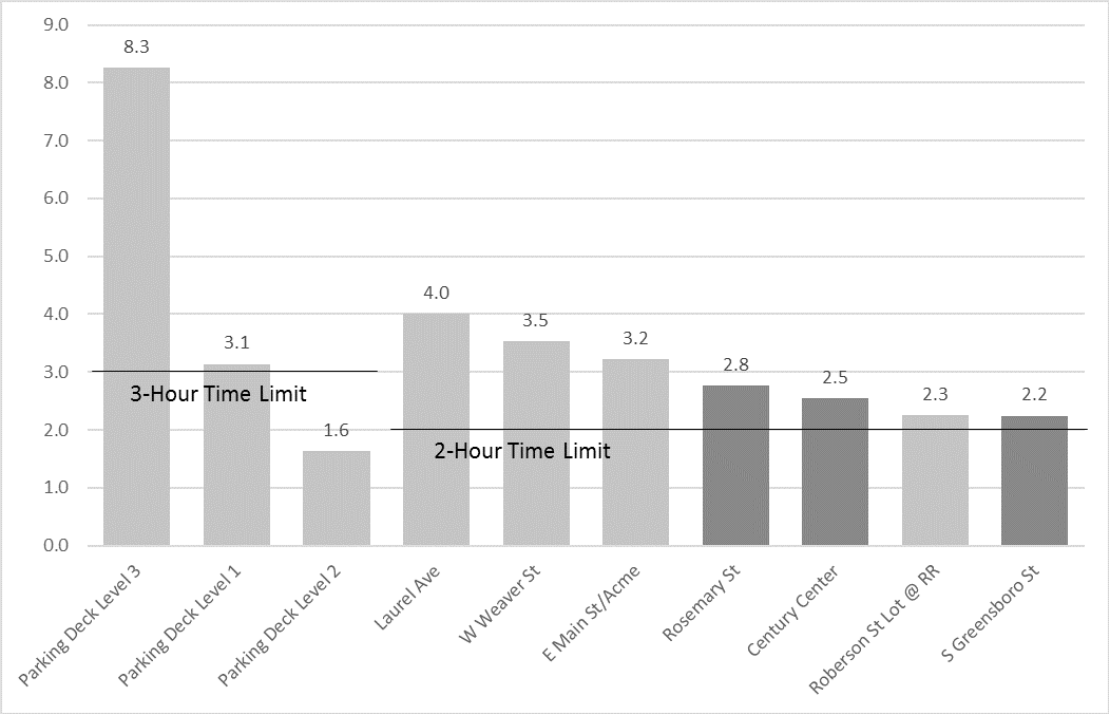
Data collection also included a length-of-stay analysis for public parking lots. Vehicle license plates were observed for all nine (9) public parking lots every hour between the hours of 8 AM and 6 PM. During a 10-hour period, more than 800 unique license plates were collected within public parking spaces. The majority of the vehicles (557 cars, representing 69%) were observed on three (3) or fewer occasions, suggesting that they remained parked for 3 hours or less. A minority of vehicles (151 cars, representing 19%) were observed on seven (7) or more occasions, suggesting that they remained parked in the same spot for most of the day and were likely downtown employees. It is assumed, based on their locations, that approximately 50 to 60 of these vehicles belonged to Town of Carrboro employees, 90 to 95 vehicles were owned by other downtown employees, and seven (7) may have been UNC students parking in the Rosemary Street lot.

These 151 cars represent a small number of total vehicles; however, they occupy public parking spaces for a large portion of the day. Factoring in the 10 hour period of data collection, these 151 cars observed on seven (7) or more occasions accounted for 48% of the total occupied time throughout the day, effectively rendering one-fifth (20%) of public parking spaces unavailable to visitors or customers.

An average length of stay was calculated for each parking lot. The public parking lots with the shortest average length of stay (in hours) were found to be the S. Greensboro Street lot (2.2), Roberson Street lot (2.3), and Century Center lot (2.5), all three of which are centrally located. The Rosemary Street lot is the next lowest (2.8), which is located at the very east end of Carrboro along Rosemary Street. These lots are more heavily used for short-term visitor parking.

Public parking lots with the longest average length of stay were found to be the third level of the Hampton Inn parking deck (8.3 hours), the Town Hall area (6.0), Laurel Avenue (4.0), and the Weaver Street lot (3.5). These lots are more heavily used for long-term employee parking, and are located farther from the center of downtown Carrboro than the lots with shorter average length of stay.

**Average Length of Stay (hours) for Public Parking Lots**




*Note: Dark shaded bars represent Town-owned parking lots; Light shaded bars represent leased lots.*

## Future Conditions

Future parking needs were examined by constructing a parking demand model to forecast future parking demand. The Town identified nine (9) development projects that are either under construction or anticipated in the next five (5) years, including hotel, residential, retail, civic, and mixed-use developments. The parking demand model includes assumptions based on input from Town of Carrboro staff and professional judgment, which are described in more detail within the Future Conditions section later in this report. This quantitative analysis does not support the need for the Town to construct or lease additional public parking spaces in the next 5 to 10 years.

### Existing Surplus

In general terms, this parking analysis revealed that the current combined public and private parking available in downtown Carrboro can effectively support 3,400 parked cars on a typical day. This study observed a maximum of 2,122 parked cars during field data collection, which represents the actual parking demand. The calculated existing parking surplus for downtown Carrboro on a typical weekday is 1,281 spaces. Public parking lots account for a surplus of 236 spaces, while private lots have more than four times as many. These are surplus spaces for a typical weekday, though they are often filled during special events. Refer to the Future Conditions section of this report for a further discussion and display of surplus parking.

## Future Surplus

VHB constructed a parking demand model to estimate the number of parking spaces needed to meet the expected demand for future development projects either under construction or anticipated. By 2021, downtown Carrboro may support more than 3,932 parked cars in its public and private lots. VHB estimates the future parking demand to be +900 new spaces. Adding the actual demand from the 2016 counts to the new parking demand yields a total future parking demand of 3,024 cars. This leaves an estimated future surplus of 908 empty spaces, within a range of +/- 140 throughout the day. Public parking lots will account for a small portion of the surplus parking, while private lots have five times as many surplus spaces. Refer to the Future Conditions section of this report for a further breakdown of future surplus parking.

On a typical weekday, downtown Carrboro has a **parking surplus** of **1,281 spaces**.

Based on the results of quantitative analysis of future conditions, the Town **does not need to construct or lease additional public parking spaces** in the next 5 to 10 years.

By 2021, estimated future parking demand will reduce the **parking surplus** to **908 spaces** on an average weekday.

## Management Strategies

The Town controls a small percentage (16%) of total parking. There is a surplus of parking during the busiest time of the busiest day of a typical weekday for both public and private parking lots. The data collected does not support the need for the Town to provide additional parking spaces today, or in the next 5 to 10 years. Rather than construct new parking lots or structured parking, **the Town may wish to focus on effectively managing its existing supply of 655 parking spaces**. There are many strategies for actively managing parking to achieve better balance of supply and demand. Strategies have been organized into five (5) categories: Education, Encouragement, Enforcement, Evaluation, and Engineering.

A full discussion of potential strategies is included in the Management Strategies section. In the near term, the Town of Carrboro should focus on the five (5) potential strategies expected to have the most significant impact:

1. **Education – Wayfinding and regulatory signage improvements.** The intended goal of improving wayfinding and signage is to increase visibility and consistency of all nine (9) public parking lots. Several stakeholders commented that they were unaware of several of the smaller public parking lots.
2. **Encouragement – Lighting and sidewalk improvements.** Lighting and sidewalk improvements are intended to encourage visitors to park once and walk to their destination, a stated goal of the business owners involved in this project.
3. **Enforcement – Time-limited parking options.** Enforcement strategies are intended to improve parking flexibility by providing a limited number of high turnover spaces in the high demand areas (30-minute parking) and long-term spaces in lower demand areas (4-hour parking).
4. **Evaluation – Shared parking arrangements between businesses.** Shared parking arrangements are intended to balance the use of the majority of parking (private spaces) within downtown by facilitating agreements between property owners.
5. **Evaluation – Annual data collection program to count parked vehicles.** Annual data collection may be the most important strategy because data should be used to validate the diverse opinions related to parking and to separate fact from speculation.

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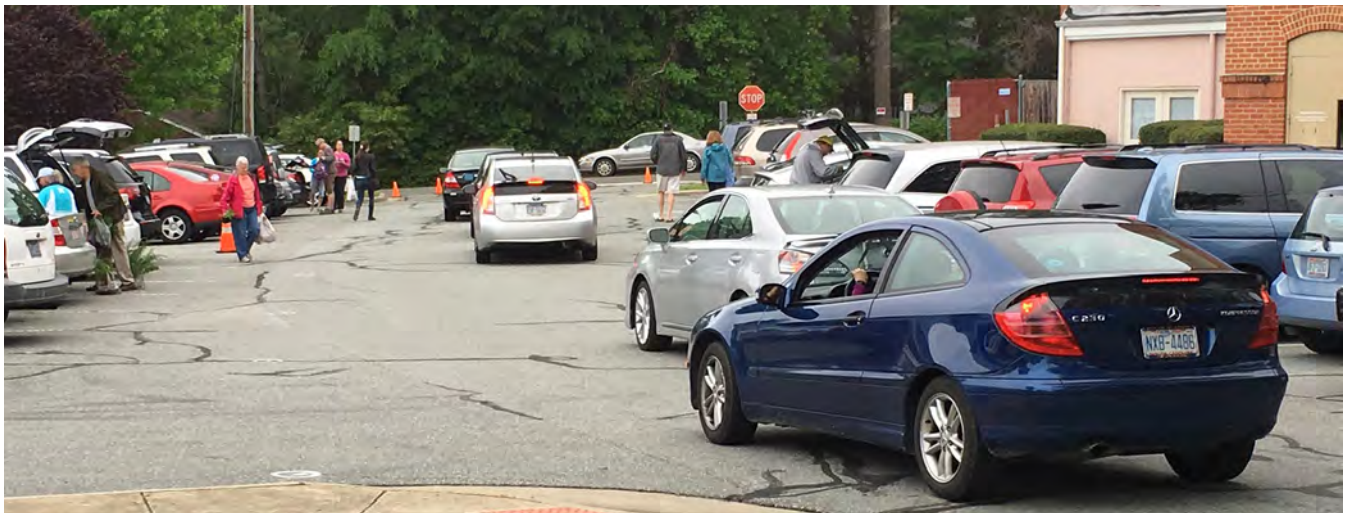
# 1 Introduction

Since the 1980s, the Town of Carrboro has gradually acquired or leased properties to use as municipal parking lots. The Town currently maintains approximately 650 parking spaces in the downtown area, and does not charge for the use of those spaces. Despite this investment, concerns relating to insufficient parking in the downtown have emerged, particularly as larger-scale development projects have been completed. This has led the Town to reconsider its role in providing or managing parking for public uses. VHB Engineering, NC, P.C. was retained in the fall of 2015 to serve as the transportation consultant to lead the planning effort, involve stakeholders, collect existing conditions data, and identify potential strategies for parking management.




# CARRBORO DOWNTOWN PARKING PLAN

## PLAN VISION

The plan vision explains its purpose and guides the analysis of data and recommendations. Town staff and members of the Board of Aldermen describe the plan vision as an inclusive process to examine the current and future states of parking in Carrboro, including public outreach, to gather public perceptions, to identify potential barriers that may be preventing residents from visiting downtown more frequently, and to develop a strategy for managing parking in the future.

## PLAN OBJECTIVES

Plan objectives are measurable outputs that support the overall plan vision. The first measurable output involves a full documentation of the existing parking conditions. These data are supplemented by an online survey of residents to identify parking behaviors and perspectives relating to parking. With these quantifiable resources collected, preliminary findings were presented to the public and feedback was obtained during the early stages of the project. After incorporating citizen feedback and more refined existing conditions data, business owners were contacted to discuss concerns and potential parking management strategies for the short-term and long-term growth of the Town.

# 2 Public Involvement

Seeking public input was an essential component of this planning process, gathering perspectives from residents, business owners, visitors, and Town staff. The public involvement phase of the project took place between February and August 2016, and included the following items or events.

# Public Engagement

Public engagement items were incorporated into this planning process to communicate the purpose of the project and allow citizens to describe their unique parking experiences.

## Project Website

The project website (www.parkcarrboro.org) launched in early February 2016 to outline plan objectives and inform the public of upcoming events. The website contained links to social media and the parking survey, as well as public meeting presentation slides and videos for people unable to attend the public meetings. The project website received more than 300 page views.

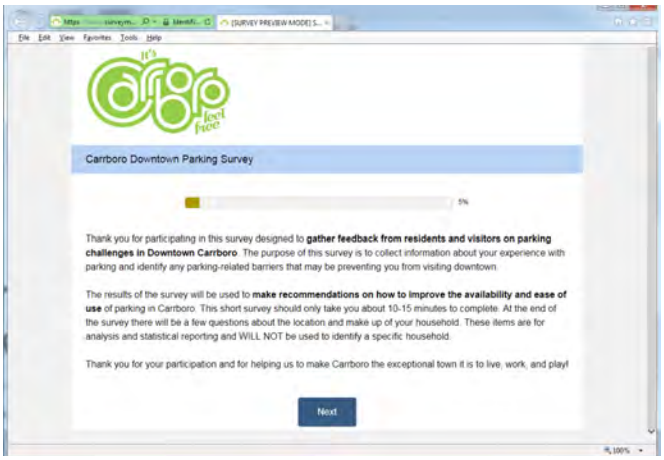

## Social Media

In addition to traditional public outreach, social media outlets were employed to share upcoming events and gather feedback from the public. Using the Town of Carrboro's Facebook page, as well as the hashtag #ParkCarrboro, members of the public were given a forum to express comments and concerns regarding the current parking system in Carrboro. Several tweets were sent marking public parking lots that were found to be full (or nearly full), including a time of day reference.

## Online Survey

An online survey for Carrboro residents, stakeholders, and visitors was developed using SurveyMonkey. The Carrboro parking survey launched on February 4, 2016, one (1) week before the first public meeting. The survey contained a variety of questions to assess the availability and potential barriers to parking in downtown Carrboro. A total of 602 respondents completed the survey, which closed in late August, during the six (6) month period.

Respondents were asked to provide the intersection of the two streets nearest their home location, rather than their home address. This information was requested to determine the distribution of responses from Carrboro residents who live more than one-half mile from downtown. These residents are less likely, or unable, to walk or ride a bicycle to visit downtown. A full summary of the survey results is included in the Appendix section.




## SURVEY RESULTS

### REASON FOR VISITING:

**More than half** of respondents visited downtown for leisure.

**84%** cited shopping and dining as primary reasons.

**38%** indicated they visited for work-related purposes.

### TRAVEL MODE:

While **23%** of respondents indicated that they **typically** bicycled or walked to downtown, driving (**74%**) was the largest transportation mode category.

**46%** of survey respondents indicated that Chapel Hill Transit or Go Triangle was a viable option for reaching downtown, but only **16%** of respondents said they (or family members) ride transit *regularly*.

### PARKING PERCEPTIONS:

Most respondents parked in a public lot (**69%**) the last time they visited downtown Carrboro.

**17%** of respondents indicated that the perception of parking availability negatively affected their plan to visit downtown.

**30%** indicated that the perceived lack of parking is a barrier for them to visit downtown.

**64%** expressed a negative view of a pay-for-parking scheme as a potential future option.

## Public Events

Public events were designed to engage the general public in the planning process, allow them to speak directly with the project team, and provide feedback on the existing conditions data (described in more detail within the Existing Conditions section of this report).

### Public Meetings

Two public meetings were held to present preliminary findings, promote feedback, and understand the parking concerns of residents and business owners.

The first public meeting attracted 30 attendees and was held on Thursday, February 11, 2016, at Carrboro Elementary School. Attendees signed in and had the opportunity to identify perceived parking constraints, both spatially on a map of downtown and qualitatively through written comments on poster board displays and comment sheets. VHB presented its preliminary findings from the January 2016 parking occupancy counts. Public comments included the need for long-term employee parking to free up the short-term public parking spaces, additional crosswalks along W. Main Street, wider sidewalks, and ADA improvements along sidewalks and public parking lots (gravel), as well as the need for a wayfinding map of all available public parking lots. Public opinions relating to free public parking versus paid public parking was divided; attendees represented both ends of the spectrum.

The second public meeting attracted 14 attendees, and was held on Thursday, June 16, 2016, at Town Hall. VHB presented additional data findings from the April 2016 parking occupancy counts collected on a typical Thursday and a Saturday to compare the parking trends throughout the day. Public comments from this meeting included the need to establish a "park once and walk downtown" strategy, as well as the need to grow acceptance of the idea of charging a fee for public parking where appropriate. Several attendees mentioned that they do not have trouble finding a parking space, and that parking shortage is only a perception. One property owner suggested that their most common parking challenge involves tenant businesses asking to arrange long-term employee parking in an off-site location (public lot).

### Farmers' Market Attendance

VHB attended the Farmers' Market on Saturday, April 30, 2016, to promote the online survey among market customers and generate feedback on the pattern of existing parking utilization. Many customers were interested in discussing parking, and all were provided with a card containing a link to the online survey.

VHB observed that many Farmers' Market customers drove and waited in a relatively long line of cars to enter the Town Hall parking lot in the hopes of potentially finding an open parking space. Some were successful, while others were forced to seek other parking options nearby. As a result, many sought on-street parking along Elm Street or the adjacent gas station.

Public comments included the identification of sidewalk gaps along several streets including:

- W. Main Street between Poplar Avenue and Fidelity Street.
- Laurel Avenue south of Town Hall.
- Bim Street behind Town Hall.
- S. Greensboro Street south of Carr Avenue extending all the way to the NC 54 interchange.

Customers expressed the significance of these sidewalk gaps as a barrier to walking to downtown from their homes.

Customers also noted the desire for a Farmers' Market park-and-ride option for the Chapel Hill Transit service that operates on Saturdays (CW route).

## Coffee with a Cop Attendance

On Friday, May 13, 2016, VHB attended a Carrboro Coffee with a Cop event at Johnny's Gone Fishing Coffee Shop on West Main Street. More than 20 Carrboro residents attended the event; VHB discussed the purpose of the parking study and asked for their participation in the online survey.

Attendee comments included discussions of the Carr Mill Mall parking lots, and the large (gated) employee parking lot on Roberson Street that is owned by the Carr Mill Mall. Wayfinding signage to identify public parking within the Hampton Inn parking deck and S. Greensboro Street lot was also discussed as a relatively simple improvement to raise awareness of public parking facilities.

"Coffee with a Cop" participants discussed ways to improve wayfinding and awareness of public parking facilities downtown.

## Stakeholder Events

The following outreach events were designed to engage downtown stakeholders from the public and private sectors. These events were not open to the general public.

### Walkability Micro-Audit

VHB coordinated a walkability micro-audit on Wednesday, April 13, 2016, performing a high-level assessment of potential challenges associated with walking to and from public parking areas toward popular destinations along Main Street in Carrboro. A secondary purpose of this task was to develop a repeatable process and series of evaluation criteria that could be performed for other public parking lots in the future.

This event was limited to eight (8) participants due to potential safety concerns while observing, photographing, and taking notes along roadways. The group of eight (8) individuals, including Town staff from Public Works, Police Department, Recreation and Parks, Planning, and a downtown property owner with on-site parking, represented various perspectives.

Two starting points were selected (S. Greensboro Street lot and Hampton Inn parking deck), and the group walked along existing sidewalks and roadway shoulders, scoring elements of walkability such as sidewalk presence and condition, intersection crossing type, wayfinding signage, and bicycle parking facilities. Scores for each category were summarized and compared between the two routes. A full summary of the walkability micro-audit is included in the Appendix section.

### Business Alliance Meeting

VHB staff attended a regularly scheduled Carrboro Business Alliance meeting on Thursday, May 26, 2016, to discuss the project timeline and promote feedback from business owners. The project website and online survey were provided and participants were asked to help spread the word to employees and customers. VHB staff proposed a list of general parking questions for follow-up discussions with business owners who wanted to share their parking insight and perspectives.

Business owner comments and questions included whether downtown employees were a significant generator of parking demand (and visitors represented a smaller portion), whether the project will include a discussion of the leased parking lots that the Town pays for on an annual basis, and whether recent parking occupancy from the Town of Chapel Hill will be included in this project.

### Business Stakeholder Meetings

VHB staff attended two (2) meetings with local business owners in August 2016. The purpose of these meetings was to directly involve business owners in the planning process, to discuss their parking needs, and to present some potential future strategies for balancing growth and parking. These meetings were in addition to the two public meetings and the one Business Alliance meeting, which also included local business owners.

The discussion centered on the importance of shared parking between adjacent businesses, long term employee parking options, reserving customer parking during the daytime (8 AM to 5 PM), the significance of "walk-by customers", and competition with suburban shopping centers.

Business owners agreed that the parking in front of their business should be prioritized for customers during the daytime. Therefore, employees should seek either satellite parking within a private lot or long-term parking within the public parking lots (2 hour time limited). Issues of personal security for employees walking to their vehicles was discussed as a recommendation for the Town or NCDOT to improve lighting, streetscape, and sidewalks. These enhancements would improve the perception of safety as well as encourage customers to park once and walk, which reinforces the "walk-by customers" concept.

Growth of downtown businesses is a desired goal for all stakeholders, whether in the form of an existing business expanding upward or outward, or a new business occupying a currently vacant space. Business owners are looking to the Town to provide the additional (flexible) public parking perceived as necessary for this growth, reducing the parking requirement for additional square footage. The Town's perspective has been data-driven, allowing the existing pattern of parking use (supply and demand) to inform this discussion before determining the Town's role in parking management. All sides are invested in the success and growth of downtown businesses, regardless of the parking management strategies presented and discussed.



# 3 Existing Conditions

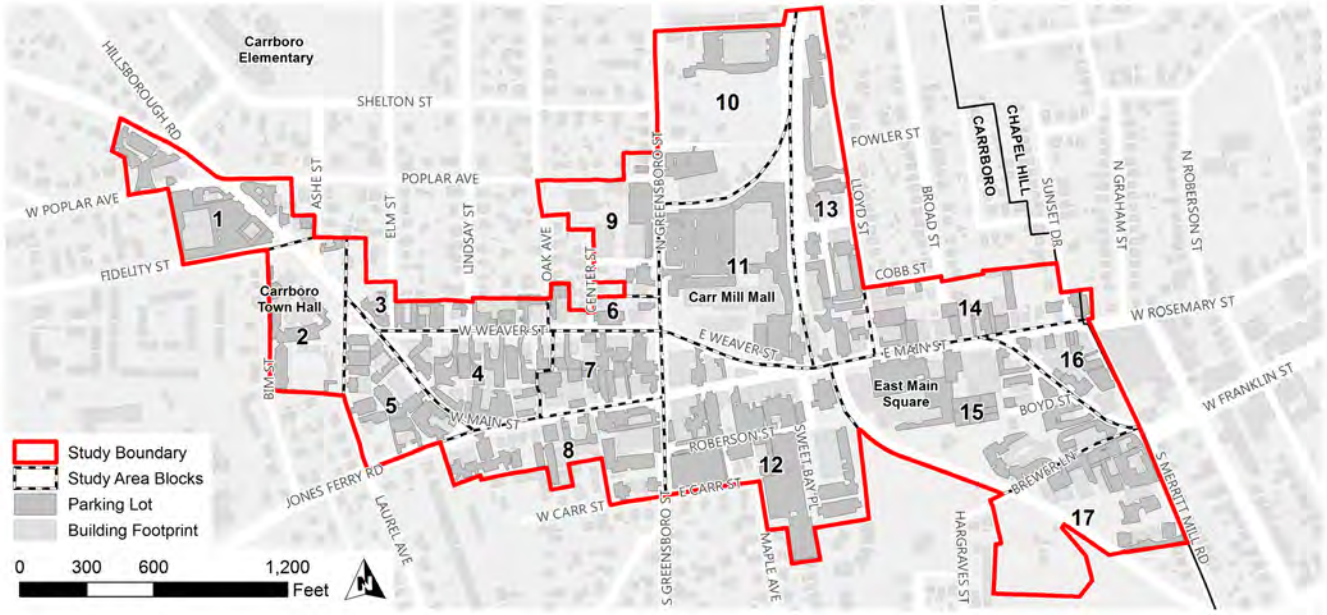
Using the Town's existing parking space inventory, VHB organized and conducted a field investigation to verify total spaces and collect utilization throughout the day prior to the first public meeting in February 2016.

Existing conditions data relating to total parking spaces and how they are utilized throughout the day were collected. These data allowed the project team to speak about parking from a quantitative perspective, while public involvement provided the qualitative perspective.

## Existing Parking Supply and Utilization

The project study area, defined by Town staff (Figure 1), includes properties within the B 1 (C), B 1 (G), B2, B3, and CT zones, according to the Town Zoning Map. The study area was divided into 17 blocks for the purposes of summarizing and reporting data. Parking occupancy was collected for each individual lot, both public and private. These data are reported by individual lots, groups of lots by different categories, and at the block-level.

**Figure 1. Study Area**




### Determination of Busiest Day of the Week

To determine the busiest day of a typical work week, VHB installed video equipment at the entrance/exit locations of the Rosemary Street lot and the S. Greensboro Street lot. Vehicle entries and exits were recorded and summarized per hour across a three-day collection period in November 2015. The results suggest that Tuesday's peak number of parked vehicles is 15% lower than Wednesday or Thursday, which were effectively equal. Thursday was selected to collect the full parking utilization counts.

## Parking Occupancy: January 2016

For the purposes of this report, public refers to parking that is owned or leased by the Town of Carrboro for use by Town staff, visitors, and the general public. Private refers to parking that is owned and managed by local businesses for their use to accommodate employees or customers.

A total of 4,003 parking spaces were observed within the downtown study area. Private parking accounted for four (4) out of every five (5) spaces (84%), while public parking accounted for the remaining 16% (Table 1).

**Table 1. Parking Spaces by Type**

| Parking Type | Spaces | % of Total |
|---|---|---|
| Public | 655 | 16% |
| Private | 3,293 | 84% |
| **Total** | **4,003** | **100%** |

*Note: Public includes spaces owned by the Town and leased from private land owners.*

Parking occupancy data was collected on Thursday, January 14, 2016. Orange County public schools were in session, as well as UNC-Chapel Hill spring semester classes. A total of four (4) parking counts were conducted—9 to 11 AM, 11 AM to 1 PM, 2 PM to 5 PM, and 6 PM to 9 PM—for all public and private parking areas. The team observed the maximum number of parked vehicles during the 11 AM to 1 PM lunchtime period, identifying 2,029 cars for 4,003 spaces (51% occupied). A lunchtime peak is common because the greatest number of employees, customers, and visitors are working, heading to lunch, or running errands during this time.

It is worth noting that during the busiest period of the day, the combined parking occupancy reached 51%. This means that in aggregate, half of all parking was empty during the peak January count period. Private lots were found to be 51% occupied, and public lots were found to be 50% occupied. For reference, the targeted parking occupancy for each lot should be between 85% and 90%, or roughly one (1) empty space for every seven (7) to 10 parking spaces. This targeted occupancy will ensure that vehicles are not unnecessarily "circling the block" or congesting parking lot aisles in search of that last empty parking space.

### Town-owned and Town-leased Parking

Public parking includes lots that are owned by the Town as well as lots that are leased by the Town from private land owners and made available for the public. The Town owns four (4) public parking lots, as well as some miscellaneous parking at the Fire Department and Police Station. The latter are not open to the public. The four (4) public-owned parking lots are the Town Hall lot, the Century Center lot, the S. Greensboro Street lot (including adjacent on-street spaces), and the Rosemary Street lot.

The Town leases parking within an additional five (5) lots that, which are distributed across the study area (Figure 2), and listed below from west to east:

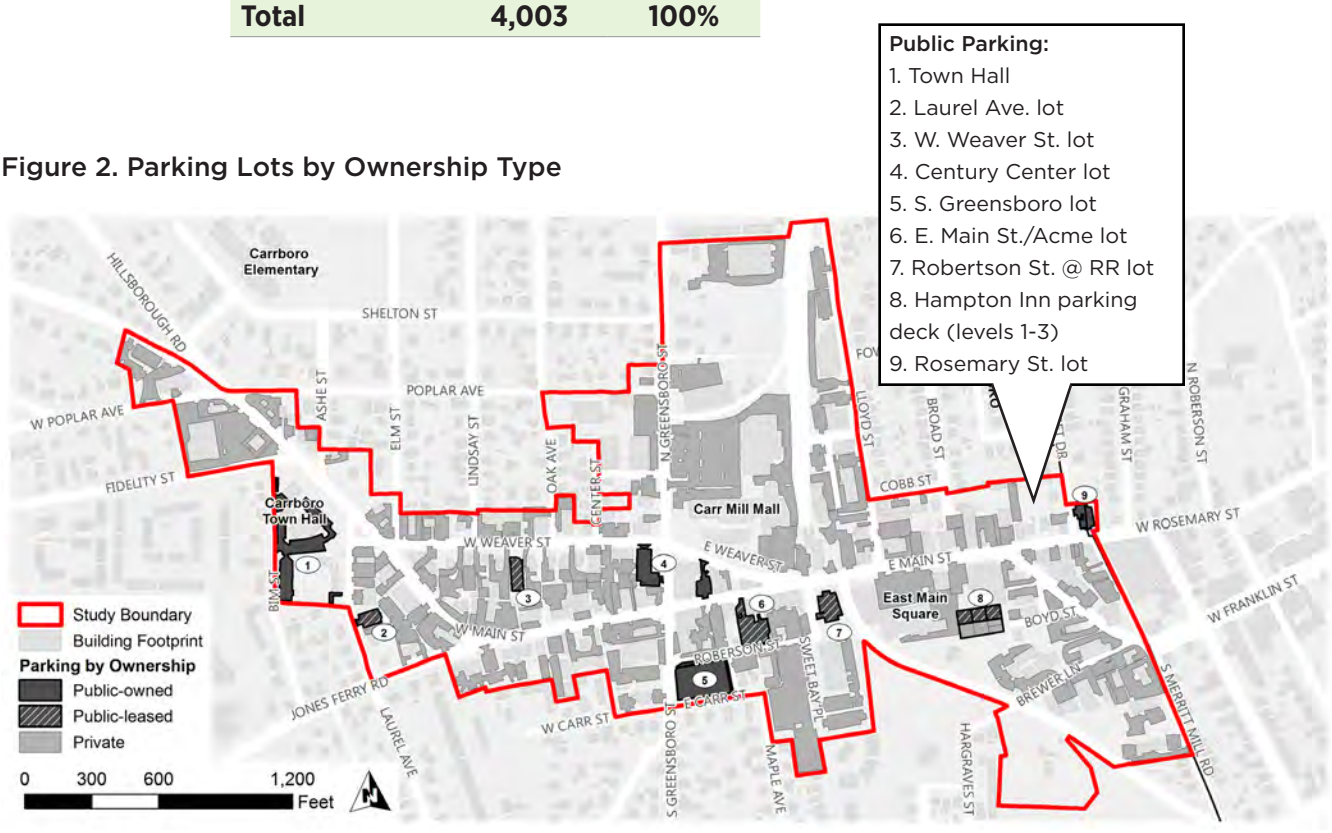
- Laurel Avenue lot
- W. Weaver Street lot
- E. Main Street/Acme lots (combined into one)
- Roberson Street lot at the railroad tracks
- East Main Square (Hampton Inn Hotel) parking deck levels 1–3

Leased parking accounts for a large percentage (58%) of the 655 total public parking spaces (Table 2). Most of this leased parking (250 spaces) is within the East Main Square (300 E. Main) parking deck.

**Table 2. Parking Spaces by Ownership**

| Parking Type | Spaces | % of Total |
|---|---|---|
| Public – owned | 275 | 7% |
| Public – leased | 380 | 9% |
| Private | 3,293 | 84% |
| **Total** | **4,003** | **100%** |

**Figure 2. Parking Lots by Ownership Type**

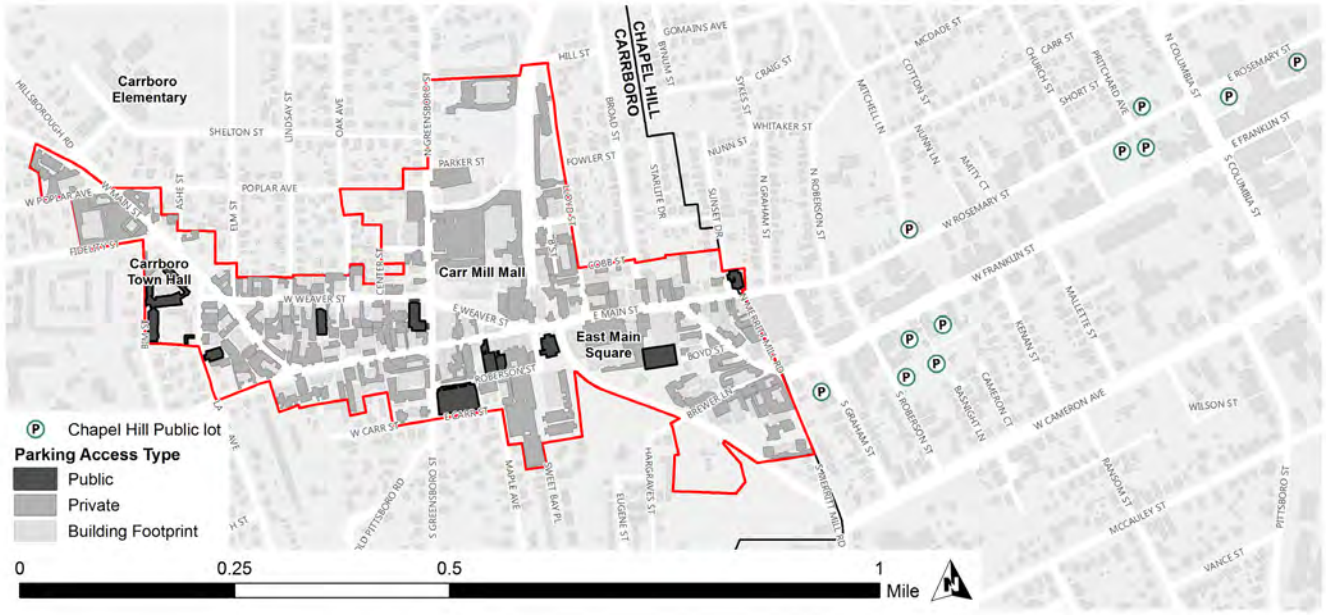


## Town of Chapel Hill Parking Data

A similar parking occupancy study was conducted in the neighboring town of Chapel Hill during the same time period. The Chapel Hill parking study is not related to this parking plan; however, the data collected by the Town of Chapel Hill was shared with the Town of Carrboro and VHB, and is summarized below for context.

The Town of Chapel Hill collected parking occupancy data for 11 of their public parking lots along Rosemary Street and Franklin Streets in January 2016. Six (6) of these lots, representing 323 spaces, are located within a quarter-mile of the town boundary between Chapel Hill and Carrboro (Figure 3). The remaining five (5) public lots are more than a half-mile from Carrboro.

**Figure 3. Town of Chapel Hill Public Parking Lots**




The Town of Chapel Hill study counted cars at five (5) periods throughout the day. That study observed the highest total occupancy (651 parked cars, 70% occupancy) during the 11:30 AM to 2 PM period, the same lunchtime peak as the Town of Carrboro occupancy counts. Parking occupancy dropped during the afternoon to 46% and 42%, but rebounded to 60% occupancy during the 6 PM to 8 PM period. It is important to note that the Town of Chapel Hill charges a fee of $1 to $1.50 per hour for parking, typically between 8 AM and 8 PM.

VHB further investigated the six (6) Town of Chapel Hill parking lots nearest to Carrboro. The closest parking lot (S. Graham Street lot) is reserved for employees during the day, and becomes an hourly pay lot between 6 PM and 8 PM. After 8 PM, this lot is free to the public and a total of six (6) cars were observed parking there. The second-closest parking lot (Mitchell Lane lot) is adjacent to the Hargraves Community Center. A total of four (4) cars were observed parking there.

The remaining Chapel Hill lots nearest Carrboro are located along W. Franklin Street near several restaurants. The data display a traditional lunchtime and dinnertime peak period of use. These data do not suggest that the proximity to Carrboro is influencing the pattern of parking for these Town of Chapel Hill parking lots. Therefore, no further examination was needed.

## Parking Occupancy – April 2016

VHB collected parking occupancy data on Thursday, April 21, 2016, to confirm the trends observed during the initial counts in January. The same four (4) collection periods were used to directly compare the total number of cars and occupancy percentages between these two sets. The overall peak period for parking remained during the lunchtime 11 AM to 1 PM period, with a maximum number of parked vehicles reaching 2,122 cars for 4,003 spaces (53% occupied).

The greatest number of parked cars were observed during the April occupancy counts, and the difference varied depending upon the time of day. For example, 84 additional cars were observed during the 9 AM to 11 AM period, representing a 5% increase. The same 5% increase was observed during the lunchtime peak. A much larger increase was observed during the afternoon and evening (Table 3). To put another way, vehicles left earlier in the afternoon during the January counts, but remained longer in the afternoon and evening during the April counts. These data suggest that an additional 5% of parked cars can be expected for the spring months. This increase may become more significant in the afternoon and evening, when additional outdoor dining and other activities are possible due to warmer weather.

**Table 3. Comparison of Parked Vehicles, January–April**

| Count Periods | January | April | Increase | % Increase |
|---|---|---|---|---|
| **9 AM–11 AM** | 1,858 | 1,942 | +84 | 5% |
| **11 AM–1 PM** | **2,029** | **2,122** | +93 | 5% |
| **2 PM–5 PM** | 1,699 | 1,879 | +180 | 11% |
| **6 PM–9 PM** | 1,426 | 1,758 | +332 | 23% |

*Note:Parking counts include public and private lots (4,003 spaces in total)*
*The dark shaded cells represent the peak period (2,122 cars for 4,003 spaces is 53% occupancy)*

### Public Parking Occupancy

Meeting attendees remarked that the total number of parked cars may peak during the lunchtime period, but the most challenging time of day to find parking within a public parking lot was during the evening (6 PM to 9 PM) period. This was expressed during the initial project kickoff meeting, during the Farmers' Market and Coffee with a Cop events. VHB removed the private parking lot data from the analysis to evaluate this feedback. Table 4 below reports the same comparison of parking occupancy for only the 655 public parking lots. Note the April peak period was observed during the evening, not during lunchtime.

**Table 4. Comparison of Parked Vehicles in Public Lot, January–April**

| Count Periods | January | % Occupancy | April | % Occupancy | Increase | % Increase |
|---|---|---|---|---|---|---|
| **9 AM–11 AM** | 304 | 46% | 354 | 54% | +50 | 16% |
| **11 AM–1 PM** | **356** | **54%** | 368 | 56% | +12 | 3% |
| **2 PM–5 PM** | 339 | 52% | 312 | 48% | -27 | -8% |
| **6 PM–9 PM** | 331 | 51% | **466** | **71%** | +135 | 41% |

*Note:Parking counts include only public lots (655 spaces in total)*
*The shaded cell represents the peak period (466 cars for 655 public spaces is 71% occupancy)*

The reduction of parked cars during the 2 PM to 5 PM period, from 339 in January to 312 in April, represents a data anomaly. The total number of parked cars during this time increased; however, a larger number were parked in private parking lots (+207) than public lots (-27). The net effect is an overall increase of 180 cars in April compared to January's counts.

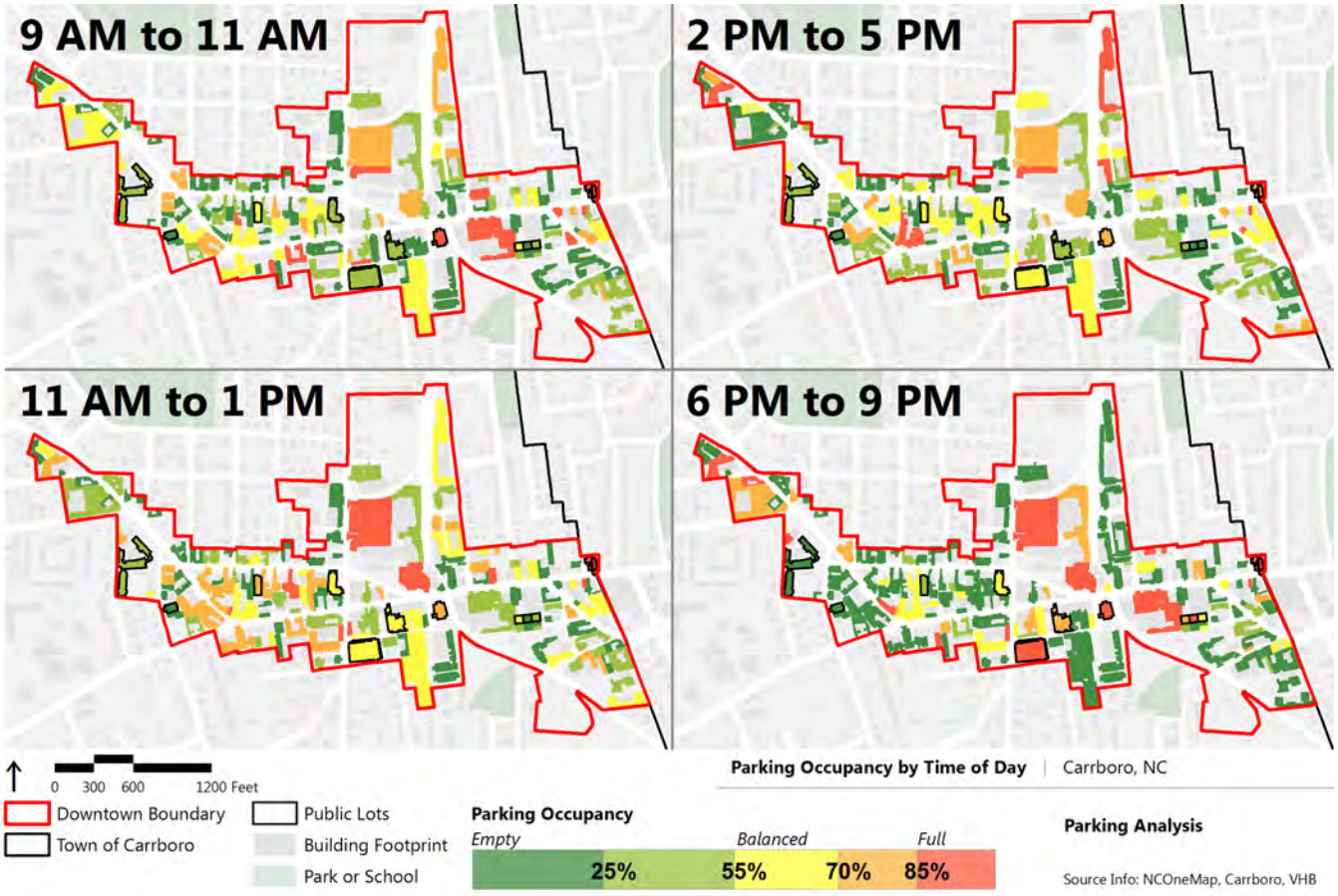
The significant difference between January and April counts is during the 6 PM to 9 PM period, where an increase of +135 additional vehicles were observed (41% increase) over the January count period. The 466 parked vehicles within the 655 public parking spaces represents a 71% occupancy rate, which is higher than the lunchtime period for public lots and total parking lots. Nevertheless, there are still empty spaces available. This summary confirms the stakeholder feedback that the most challenging time of day to find parking within a public parking lot is during the evening (6 PM to 9 PM) period. Again, this 40% increase is likely due to the influence of weather, drawing more people and their cars to downtown in April, as opposed to January.

## Parking Occupancy Pattern

Parking occupancy is not evenly distributed among the varying parking lot sizes and locations. Figure 4 displays the pattern of individual parking lots based on their percent occupancy (cars divided by total spaces). Dark and light green lots are considered very low parking occupancy (below 55%). Yellow parking lots are more appropriately balanced (56–70%). Orange lots are approaching the optimal capacity (71–85%), and red parking lots are considered at capacity (> 85%).

The pattern in the morning period (9 AM to 11 AM) displays many yellow lots, with some orange and red lots. During the lunchtime period, this parking demand pattern shifted to mostly yellow and orange lots, particularly clustered in the center of the study area. During the afternoon period (2 PM to 5 PM), fewer lots were found to be yellow, with noticeably more light green lots along Main and Rosemary Streets. The evening period (6 PM to 9 PM) is polarized between dark green (low occupancy) lots that were effectively empty and many red or orange lots, particularly in the center of town, that were effectively full (Figure 4).

Figure 4. Comparison of Peak Period Occupancy by Lot, April 2016




## Saturday Occupancy – April 30, 2016

VHB also performed parking occupancy counts on Saturday, April 30, 2016, to compare the pattern to a typical weekday. The total number of parked cars is lowest on Saturday for the morning, lunchtime, and afternoon periods (Table 5). Total parking occupancy on Saturday was between 37% and 39%, meaning that more parking spaces were empty than occupied. Businesses that are not open on weekends, such as offices or banks, or that open later in the afternoon or evening, such as bars/clubs or dinner-only restaurants, could be one significant explanation for this pattern.

**Table 5. Observed Parked Vehicles by Time of Day**

| Count Periods | January Thursday | April Thursday | April Saturday |
|---|---|---|---|
| **9 AM–11 AM** | 1,858 | 1,942 | 1,493 |
| **11 AM–1 PM** | **2,029** | **2,122** | 1,475 |
| **2 PM–5 PM** | 1,699 | 1,879 | 1,487 |
| **6 PM–9 PM** | 1,426 | 1,758 | **1,561** |

*Note:Parking counts include public and private lots (4,003 spaces in total)*
*The shaded cell represents the maximum number of parked cars, for each period, between all three data collections*

## Public Parking Occupancy (Saturday)

Saturday parking occupancy for public lots only is different than the total parking occupancy trend. If all private lots are excluded from the analysis, then the number of vehicles parking in public lots peaks during the evening 6 PM to 9 PM period, similar to the typical weekday trend in April. Table 6 indicates that the Saturday trend is relatively high in the morning during the Farmers' Market, drops during the lunch and afternoon periods, and then increases during the evening period nearly to the level of a typical weekday (457 cars for 655 spaces is 70% occupancy).

Empty parking spaces after 6 PM on a Saturday may be found on level 3 of the parking deck (43 empty spaces; 46% occupied), Town Hall (85 empty spaces; 13% occupied), or the W. Weaver Street lot (29 empty spaces; 15% occupied). The remaining public lots contained a total of 30 empty spaces, some of which may have been reserved (signed) for ADA or are inaccessible due to diagonal parking.

**Table 6. Observed Parked Vehicles within Public Lots by Time of Day**

| Count Periods | January Thursday | April Thursday | April Saturday |
|---|---|---|---|
| **9 AM–11 AM** | 304 | 354 | 361 |
| **11 AM–1 PM** | **356** | 368 | 285 |
| **2 PM–5 PM** | 339 | 312 | 240 |
| **6 PM–9 PM** | 331 | **466** | **457** |

*Note:Parking counts include only public lots (655 spaces in total)*
*The shaded cell represents the peak period (evening period for April and Saturday)*

## Length-of-Stay Analysis

The length of time that a typical vehicle is parked within a public parking space is an important topic for this parking study to assess. The Town has a 2-hour time limit for most public parking lots between the hours of 7 AM and 5:30 PM Monday through Friday, with two exceptions: the parking deck, which has a 3 hour time limit for public parking on levels 1–3, and Town Hall, which does not allow overnight parking (3 AM to 5 AM).



VHB performed a separate field data collection effort on Thursday, January 14, 2016, to observe and document the vehicle license plates for all nine public parking lots every hour between the hours of 8 AM and 6 PM. The resulting database contains 813 unique license plates collected over a 10 hour period.

A majority of vehicles (557 cars, representing 69%) were observed on three (3) or fewer occasions, suggesting that they remained parked for 3 hours or less. A minority of vehicles (151 cars, representing 19%) were observed on seven (7) or more occasions, suggesting that they remained parked in the same spot for most of the day and likely belonged to downtown employees (Table 7). It is assumed, based on their locations, that approximately 50 to 60 of these vehicles were Town of Carrboro employees, 90 to 95 vehicles were owned by other downtown employees, and seven (7) may have belonged to UNC students parking in the Rosemary Street lot.

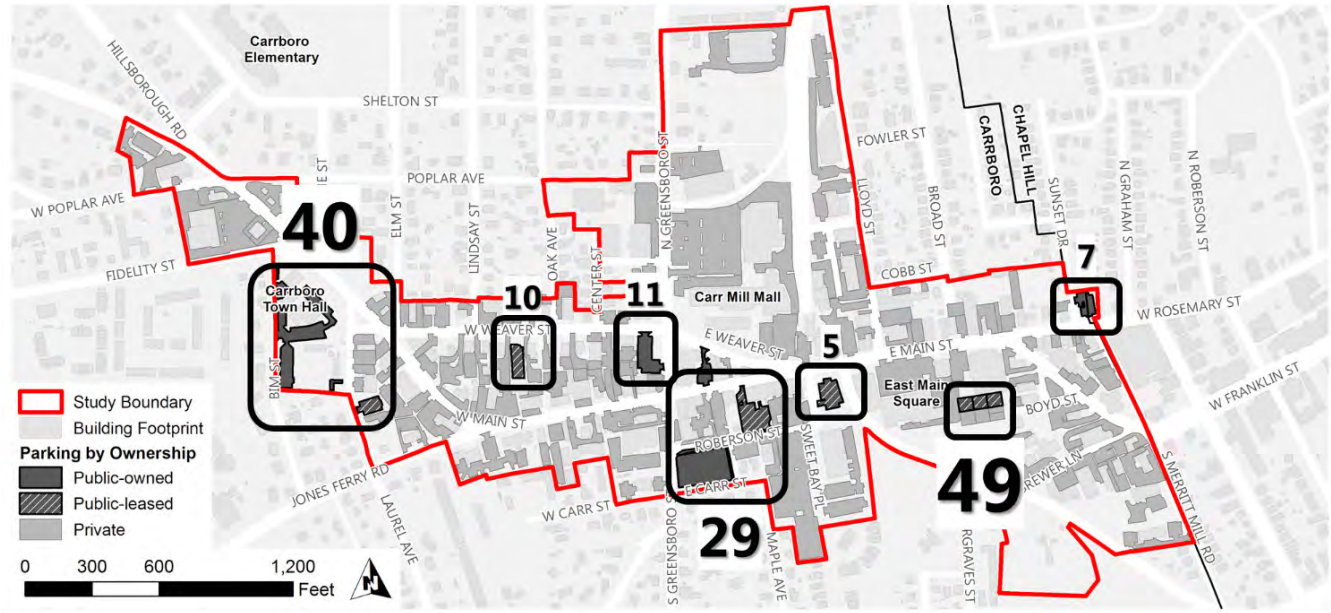
**Table 7. Number of Unique License Plates Observed in Public Lots**

| Frequency Observed | Unique Plates | % | % |
|---|---|---|---|
| 10 | 32 | 4% | **19%*** |
| 9 | 41 | 5% | |
| 8 | 42 | 5% | |
| 7 | 36 | 4% | |
| 6 | 30 | 4% | 13% |
| 5 | 27 | 3% | |
| 4 | 48 | 6% | |
| 3 | 81 | 10% | 69% |
| 2 | 143 | 18% | |
| 1 | 333 | 41% | |
| **Total** | **813** | | |

*Note:License plates were observed every hour for 10 hours within public parking lots only.*
** represents 151 vehicles that were observed on seven (7) or more occasions.*

Meeting attendees and local business owners suggested that the percentage of vehicles observed parking more than seven (7) hours should be much larger than 19%. This is a widely shared perspective that has been conveyed on multiple occasions. Their suspicion is correct if you consider the effect of total occupied time during the day. The 32 vehicles observed on 10 occasions accounted for 320 occupied hours of time. The 41 vehicles observed on nine (9) occasions accounted for 369 occupied hours of time, and so on. If we consider that more than 2,646 occupied hours of time were observed during the 10 hour period, then the minority of cars observed on seven (7) or more occasions actually accounted for 48% of the total occupied time throughout the day. For comparison, the 69% of vehicles observed on three (3) or fewer occasions accounted for one-third of the total occupied time (Table 8). **This analysis validates the perspective that a small number of vehicles (151) are effectively rendering these public parking spaces unavailable to visitors or customers.** Figure 5 displays the location of these 151 vehicles that were observed parking on more than seven (7) occasions. The parking deck and Town Hall area account for 89 of the 151 cars observed parking on more than seven (7) occasions. It is interesting to note that the Rosemary Street lot contained seven (7) of these long-term parked vehicles. Public feedback suggested that this highly visible lot was filled by UNC student vehicles for the entire day.

**Figure 5. Number of Long-Term Parked Vehicles by Lot**




*Note: Long-term Parked Vehicles include those observed on more than seven (7) occasions.*

**Table 8. Comparison of Occupied Time within Public Parking Lots**

| Frequency Observed | Unique Plates | % | % | Occupied Time | % | % |
|---|---|---|---|---|---|---|
| 10 | 32 | 4% | **19%*** | 320 | 12% | **48%*** |
| 9 | 41 | 5% | | 369 | 14% | |
| 8 | 42 | 5% | | 336 | 13% | |
| 7 | 36 | 4% | | 252 | 10% | |
| 6 | 30 | 4% | 13% | 180 | 7% | 19% |
| 5 | 27 | 3% | | 135 | 5% | |
| 4 | 48 | 6% | | 192 | 7% | |
| 3 | 81 | 10% | 69% | 243 | 9% | 33% |
| 2 | 143 | 18% | | 286 | 11% | |
| 1 | 333 | 41% | | 333 | 13% | |
| **Total** | **813** | | | **2,646** | | |

*Note:License plates were observed every hour for 10 hours within public parking lots only.*
** represents the same 151 vehicles, occupying 48% of the total occupied time.*

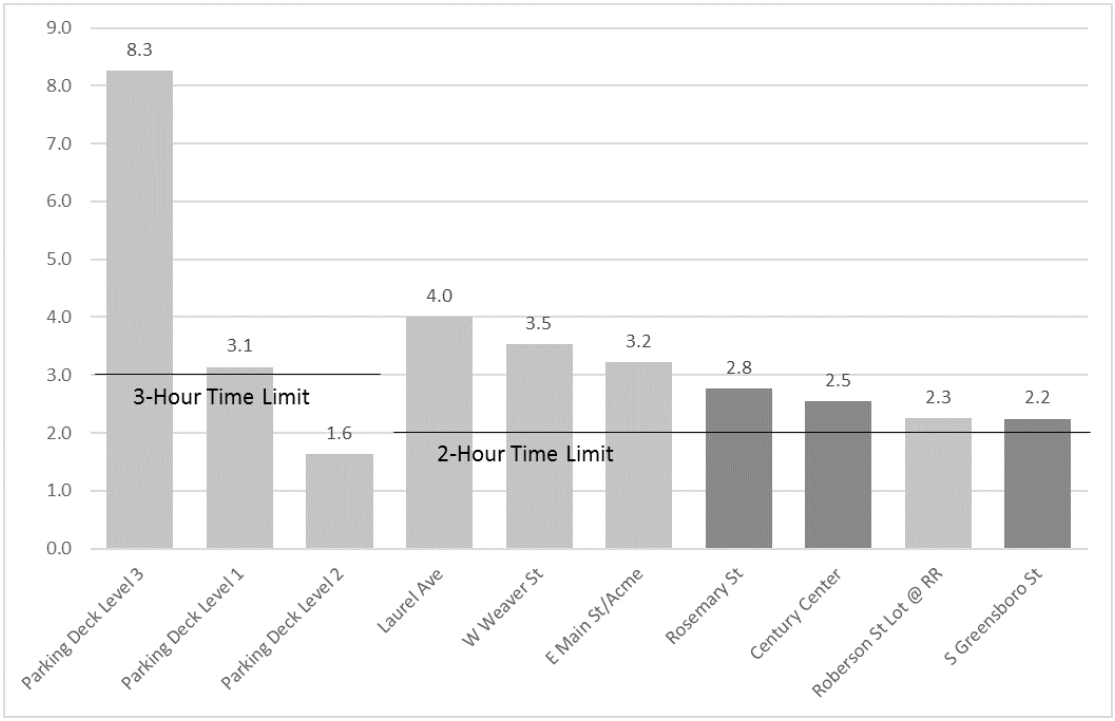
The next task was to identify the public parking lots where these long-term parking vehicles are observed. Figure 6 displays the average length of stay for each lot. Note that the parking deck allows 3-hour parking, and only vehicles observed on level 3 were found to stay longer than this threshold of time. These vehicles were identified as being owned by employees of the East Main Square property, who have been instructed to park on level 3, leaving the first two levels for customers.

The remaining lots are 2-hour parking during the day, except for Town Hall. The Laurel Avenue and W. Weaver Street lots are both located on the west side of downtown, and these lots averaged the longest length of stay for public lots (4.0 and 3.5 hours, respectively).

The Rosemary Street lot is perceived by stakeholders as being filled by UNC students for a large portion of the day. This analysis reveals that the average length of stay was found to be only 2.8 hours during the day (8 AM to 5 PM). The significance of this issue with UNC students appears to be exaggerated, based on these data.

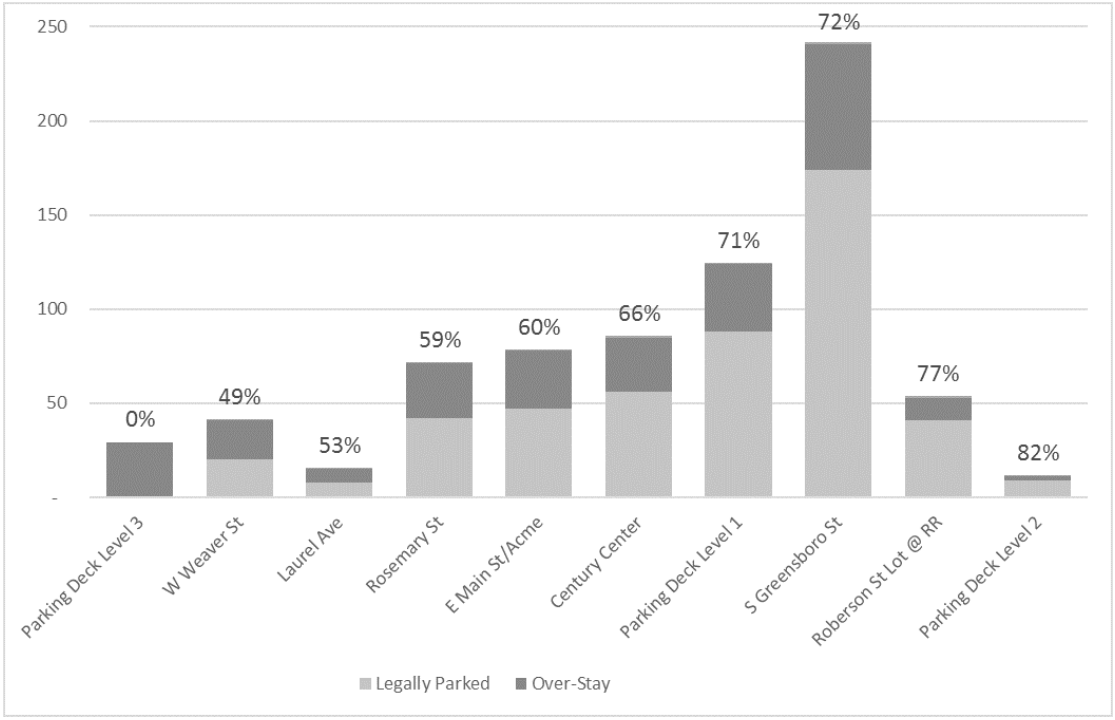
To examine parking compliance with the 2-hour or 3-hour time limits, the license plate dataset was queried and the data was summarized by lot from lowest percent compliance to highest. The four (4) parking areas with the lowest percentage of compliance (parking deck level 3, Town Hall, the W. Weaver Street lot, and the Laurel Avenue lot), as shown in Figure 7, also have the highest average length of stay as depicted in Figure 6.

**Figure 6: Average Length of Stay (Hours) for Public Parking Lots**




*Note: Dark shaded bars represent Town-owned parking lots; Light shaded bars represent leased lots.*

**Figure 7. Parking Time Limit Compliance for Public Parking Lots**




*Note: Dark shaded bars represent Town-owned parking lots; Light shaded bars represent leased lots.*

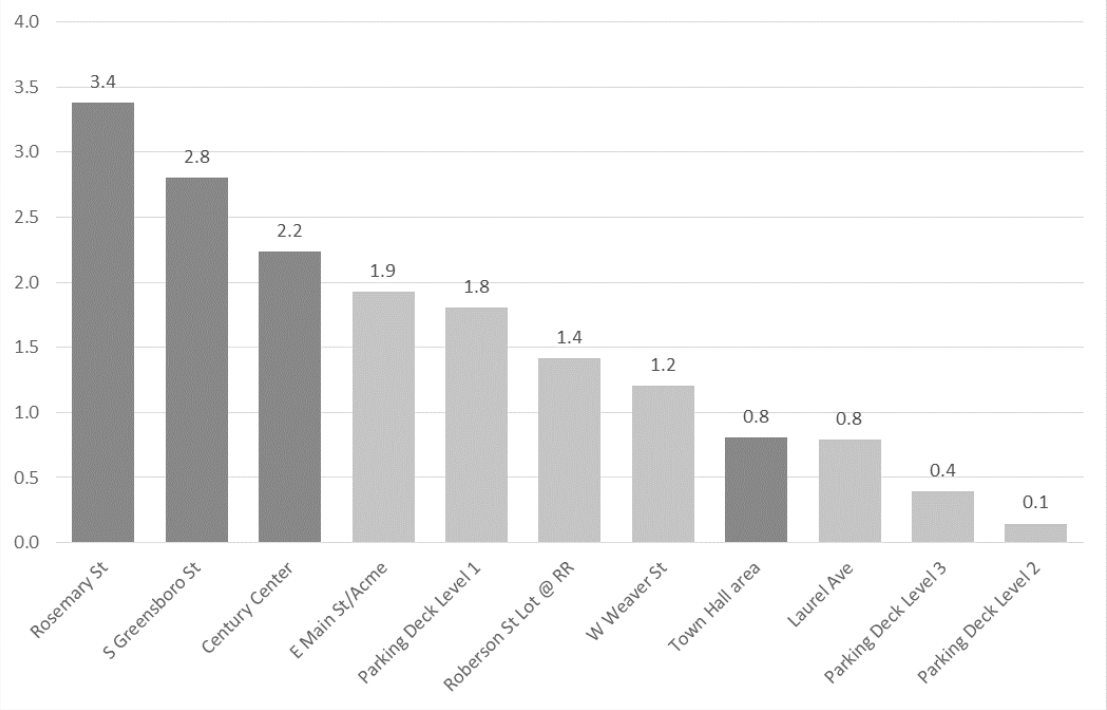
## Turnover Rate

A parking turnover analysis is similar to the length-of-stay analysis; however, turnover represents the total number of different vehicles that use a parking lot during the day. Turnover is calculated as the total number of unique license plates found within a lot divided by its number of spaces. A low turnover rate (< 1.5) is expected for employee parking areas such as Town Hall. A high turnover rate (> 1.75) is expected for customer parking areas such as on street spaces or centrally located lots that are enforced regularly. Using the same license plate data, turnover rates were calculated for each public lot and sorted lots from high to low turnover (Figure 8).

The results suggest that the three (3) lots with the highest turnover are all public owned parking lots. The Rosemary Street lot supported 71 unique license plates for its 21 parking spaces, which equals a turnover rate of 3.4. The S. Greensboro Street lot is much larger, and supported 255 unique plates for 91 parking spaces (2.8 vehicles per space). The Century Center lot supported 85 vehicles within its 38 parking spaces (2.2 vehicles per space).

The parking lots with the lowest turnover rate included levels 2 and 3 of the parking deck (0.1 and 0.4, respectively), the Laurel Avenue lot (0.8), the Town Hall area (0.8), and the W. Weaver Street lot (1.2).

**Figure 8. Turnover Rate for Public Parking Lots**




*Note: Dark shaded bars represent Town-owned parking lots; Light shaded bars represent leased lots. Turnover rates < 1.0 suggest that fewer cars parked in a lot than the total number of spaces (e.g., 80 cars for 100 spaces)*

## Public Parking Management and Enforcement

Public parking lots are signed as 2 hour parking between the hours of 7 AM and 5:30 PM. The exceptions are Town Hall (no overnight parking) and the Hampton Inn parking deck (signed as 3-hour parking for levels 1–3). The purpose of the 2 hour limit is to discourage long-term parking and encourage turnover in public-owned lots. Based on the parking occupancy counts in January and April 2016, the S. Greensboro Street lot (57–64%), the E. Main Street/Acme lot (57–88%), and the Roberson Street lot (61–83%) are all approaching or near the ideal 85% maximum occupancy. These data suggest that the 2 hour time limit is effective at preventing full parking lots (> 85% occupied) during the lunchtime peak.

### Parking Enforcement

Parking enforcement is handled by the Carrboro Police Department. This is common for many small to mid-sized cities in North Carolina. The challenge with this methodology, however, is that Police Department staff is often occupied attending to other, more urgent duties. As a result, parking enforcement is not consistent throughout the weekday, and over-stay parking occurs (confirmed by the length-of-stay analysis depicted in Figure 6).

The Town has used new temporary signage at parking lot entrances to encourage voluntary compliance with the 2 hour parking limit, stating that parking citations may be issued. The average length of stay for the S. Greensboro Street lot was observed to be 2.2 hours, the shortest of all public lots, and the turnover rate was 2.8 (second highest). These data suggest that this lot is used for short-term parking and turns over frequently. It is unclear whether the new signage at the entrances is influencing these conditions because data were not collected before the signs were placed.


*Sign indicating time-limited parking.*


*Temporary signage at the entrance to the S. Greensboro Street lot.*

## Private Parking Signage

Private parking lots are also signed to prevent unauthorized parking. These private signs represent a **wide variety of styles and formats, which may contribute to confusion as drivers attempt to read each unique sign**, including the fine print. Private signs often do not include the times of day during which parking is reserved, such as: "Reserved Parking, Towing Enforced."

Because they are privately owned, these parking lots are not a viable option for drivers 24 hours per day, 7 days per week, unless they are specifically shopping or patronizing the store that owns the lot. As a result, these parking lots may remain empty for a large portion of the day, night, or weekend. Parking occupancy counts seem to confirm that most private lots are less than half-full for most of the day and essentially empty after 6 PM (Figure 4).





# 4 Future Conditions

VHB constructed a parking demand model to estimate the number of parking spaces needed to meet the expected demand for future development projects. The model may be adjusted or updated as additional information is obtained or assumptions are revised.

The Town generated a list of current and anticipated development projects within the next five (5) years and the estimated parking associated with each. VHB identified the project locations and assigned each with a respective parking analysis block ID (Figure 1). Table 9 shows the estimated number of additional parking spaces created at the conclusion of each individual project. The list of projects includes hotel, residential, retail, civic, and mixed-use developments.

**Table 9. Future Development Projects List**

| # | Project Name | Sq Ft | Land Use | Parking to be Removed[1] | Parking Added[2] | Next Balance |
|---|---|---|---|---|---|---|
| 1 | Hilton Garden Inn | 149 beds | Hotel | - | +337 | +264 |
| 2 | East Main Square Buildout | 205,000 | Mixed Use | -88 | +15 | |
| 3 | Shelton Station A | 23,000 | Office | - | +40 | +170 |
| 4 | Shelton Station B | 130 beds | Residential | - | +130 | |
| 5 | PTA Thrift Shop | 5,000 | Retail | - | +30 | +30 |
| 6 | Club Nova | 9,000 | Office | -20 | +26 | +6 |
| 7 | CVS Relocation | 11,000 | Retail | -26 | +50 | +24 |
| 8 | Orange County Library | 15,000 | Library | -91 | +100 | +9 |
| 9 | Museum/Arts | 46,000 | Civic | -36 | +156 | +120 |
| | **SUBTOTAL** | | | **-261** | **+884** | **+623** |

*Note: [1]Parking to be Removed represents existing surface parking lots/areas that are expected to be future building sites. These values are estimated by VHB based on site plans, project descriptions, and professional judgment.*
*[2]Parking Added column was generated with input from the Town of Carrboro.*

## Model Assumptions

Below are the assumptions that influence the future demand modeling process. Adjustments to each input will have iterative effects on other calculations and modify the outputs. Assumptions listed below were made based on input from Town of Carrboro staff and professional judgement.

- The peak period is assumed to be the time of day when the greatest number of parked cars was observed, including public and private parking areas.
- Lunchtime (11 AM to 1 PM) was observed to be the overall peak period, based on parking occupancy counts collected on Thursday, April 21, 2016.
- Effective Capacity is assumed to be 85% of total parking spaces within a parking lot.
- Existing building square footages were supplied by the Town of Carrboro, as of July 2016.
- Existing land uses were inferred from permissible use codes and descriptions, which were reviewed by the Town of Carrboro.
- Total future parking demand was calculated from ITE Parking Generation Manual, 85th percentile values for each land use category. These values represent the future parking "Demand-High" values.
- Time-of-day reduction factors were applied based on ITE Parking Generation

Manual. These values represent the future parking "Demand-Low" values.

- List of future development projects were generated by the Town of Carrboro, as of July 2016.
- Estimated parking removed per project is the existing parking spaces removed to accommodate the new development. This was assumed based on project descriptions, site constraints, and professional judgement.
- Town of Carrboro estimated the number of proposed parking spaces gained for each project based on the best available project information and descriptions.
- CVS project assumes relocation from its current location with backfill of a similar business into the existing space.

## ITE Manual – Parking Generation

VHB referred to the Institute of Transportation Engineers (ITE) Parking Generation Manual, 4th Edition to estimate the future parking demand generated by each of the nine (9) current and future development projects. The ITE Manual contains research from transportation engineering and planning professionals, and is regularly updated with actual parking occupancy counts from urban and suburban locations across the country. This resource is universally accepted as the standard resource for parking generation and guidance.

The ITE Manual provides two points of reference for parking studies. The first is the total parking demand that represents the maximum number of parked vehicles regardless of the time of day (i.e., the worst case condition). This is essentially the Black Friday shopping condition in late November. The total parking demand influences the maximum number of parking spaces to be built; however, it is not the only estimate. This plan will refer to this as the future "Demand-High" value.

The second point of reference includes time-of-day factors (percentage of total) that reduce the total future parking demand to the expected typical demand over a typical weekday or weekend day. These values influence the expected number of parked vehicles during the AM, lunchtime, PM, or evening periods. This plan will refer to this as the future "Demand-Low" value.

These two estimates allow a planning study to compare the worst-case condition ("Black Friday" shopping) with the typical peak period condition, providing a low and high range of future demand and preventing oversupply of parking that will sit empty most of the year. Public outreach comments and survey feedback voiced support of this goal of preventing oversupply of unnecessary parking. Many viewed empty parking spaces as an inefficient use of space that could more desirably be used for development or open space, and preferred the encouragement of alternative modes of travel rather than supplying additional parking.

## Existing Demand and Balance

To calibrate the parking demand model to the current conditions, VHB calculated parking demand for all buildings within the study area using values from the ITE Manual, and compared these with the actual parking occupancy counts collected in April 2016. Because the Town of Carrboro has applied consistent parking requirements to development projects, we anticipated that the actual parking demand would be very similar to the calculated parking demand.

VHB observed a total of 2,122 cars parked during the lunchtime peak period. This value represents actual parking demand. Using the ITE Manual for guidance, VHB calculated a current parking demand of 2,096 cars for this same period of the day, which is 98.8% of the observed demand. This comparison validates the model inputs (Table 10).

**Table 10. Existing Parking Demand Comparison**

| Scenario | Spaces | Actual Demand (cars) | Calculated Demand (ITE) |
|---|---|---|---|
| Existing | 4,003 | 2,122 | 2,096 |

*Note: Calculated Demand is 98.8% of the Actual Demand. Both estimates represent the 11 AM to 1 PM lunchtime period.*

### Targeted Parking Occupancy

The number of empty parking spaces was observed to be 1,880 during the lunchtime peak period (11 AM to 1 PM). In practice, it is undesirable for a parking lot to be 100% full—the targeted parking occupancy for each lot should be between 85% and 90%, or roughly one (1) empty space for every seven (7) to 10 parking spaces. This targeted occupancy will ensure that vehicles are not unnecessarily "circling the block" or congesting parking lot aisles in search of that last empty parking space.

### Existing Surplus

Applying a desired maximum parking lot occupancy of 85%, the current combined public and private parking available in downtown Carrboro can effectively support 3,403 parked cars. This is also called the Effective Capacity. VHB observed a maximum of 2,122 parked cars, which represents the actual demand. **Therefore, the calculated parking surplus for downtown Carrboro on a typical weekday is 1,281 empty spaces for the existing conditions.** The split between public and private surplus parking spaces is displayed in Table 11.

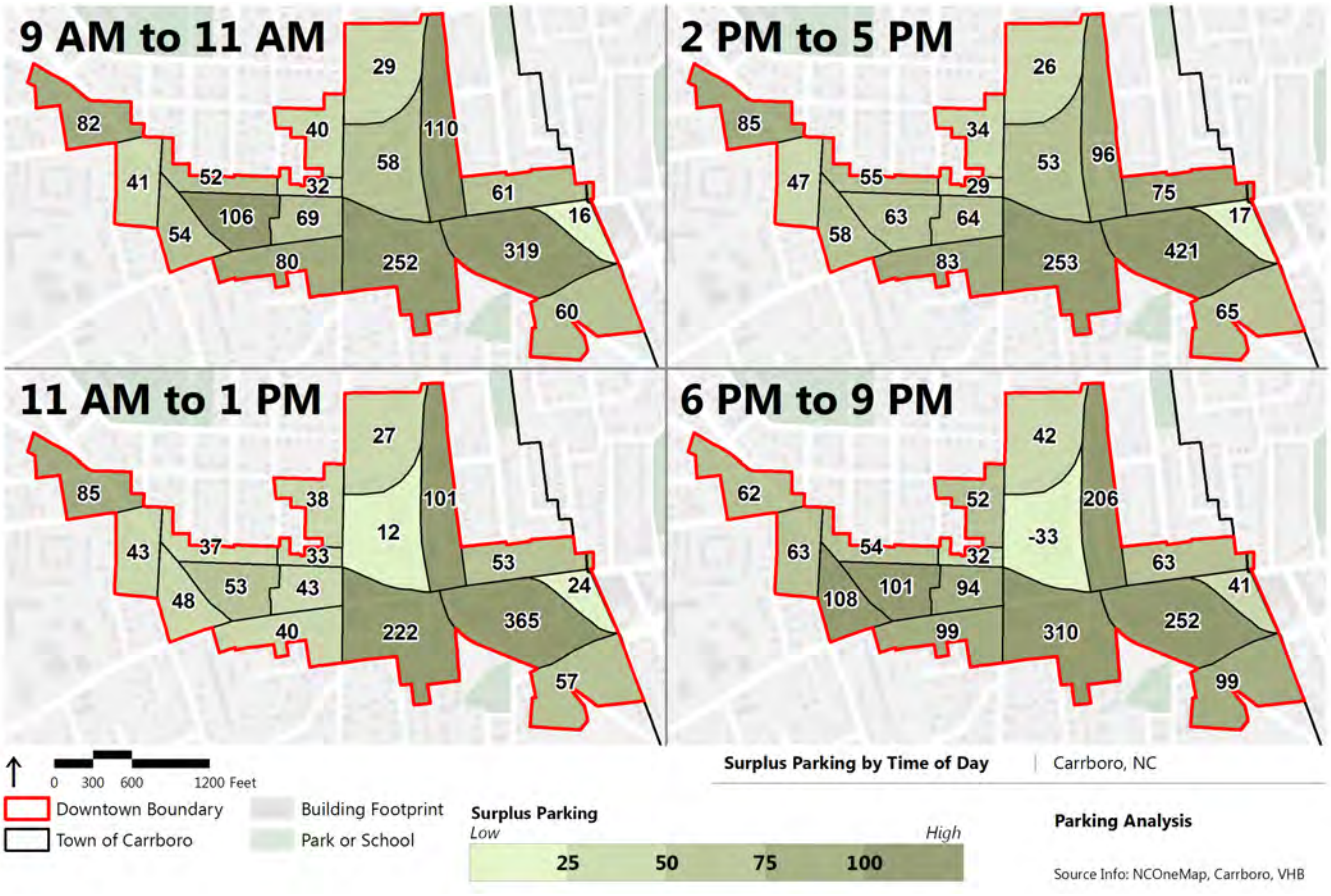
**Table 11. Existing Parking Surplus**

| Scenario | Spaces | Targeted Occupancy | Effective Capacity | Actual Demand (cars) | Existing Surplus |
|---|---|---|---|---|---|
| Public | 655 | 85% | 557 | 368 | 189 |
| Private | 3,348 | 85% | 2,846 | 1,754 | 1,092 |
| **Total** | **4,003** | **85%** | **3,403** | **2,122** | **1,281** |

*Note: Actual Demand (cars) from the 11-1 PM peak period, collected on Thursday April 21, 2016*
*Effective Capacity is the total Supply x Targeted Occupancy (4,003 x 0.85)*
*Existing Surplus is the Effective Capacity – Actual Demand (3,403 – 2,122)*

Figure 9 displays how surplus parking spaces are not evenly distributed across all parking analysis blocks within the study area. Some parking analysis blocks have an existing surplus of 10 to 20 spaces, while others have a surplus of more than 300 spaces, depending upon the time of the day. Note the parking analysis block that includes the Carr Mill Mall has a surplus parking value of -33 during the evening 6 PM to 9 PM period. Even though there are 400 spaces available, this negative value is due to the 373 cars observed exceeding the Effective Capacity (340 spaces) of the analysis block.

**Figure 9. Comparison of Surplus Parking by Block and Time of Day**



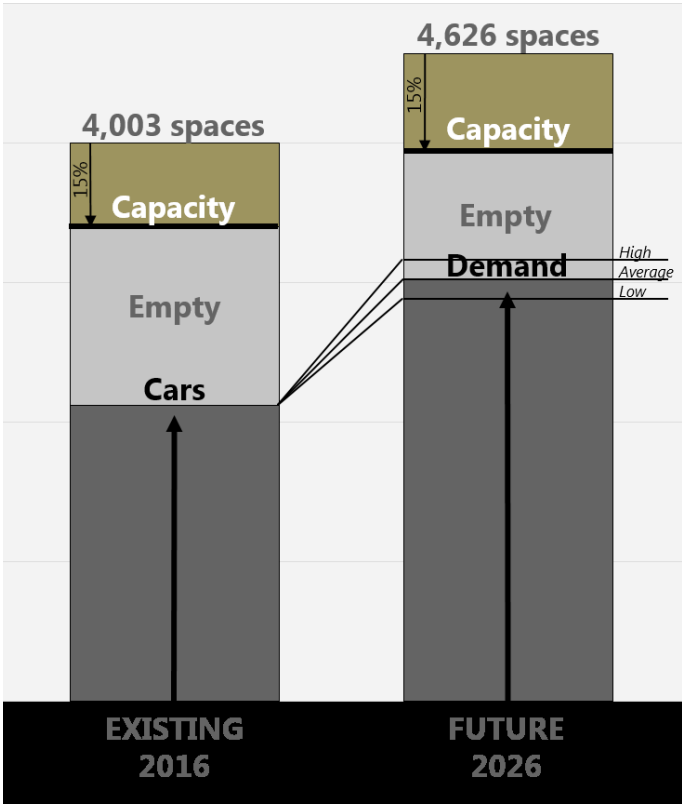

*Note: Observed Thursday, April 21, 2016. Refer to Figure 1 for a map of the parking analysis blocks represented above.*

## Future Demand and Balance

Quantifying the future parking supply-demand balance is valuable information for the Town. This information serves as the justification for potential management strategies and programs that may be aimed at modifying, mitigating, or reducing future parking demand, which are described in the Management Strategies section of this report.

VHB applied parking demand rates to each development project with guidance from the ITE Manual and input from the Town (Table 9). Parking demand was compared between the existing and future conditions to quantify the magnitude of new parking demand that is expected as new development or redevelopment projects are approved. The estimated future parking demand is expected to increase within the range of +761 to +1,044 cars during the future peak period. These values represent the two sample points provided by the ITE Manual Parking Generation section, described above (peak time of day adjustment and maximum).

**Figure 10. Existing and Future Demand and Balance**




Each project will provide new parking spaces based on the current Town land use ordinance. Some of these projects are anticipated to remove existing surface parking as part of the development process, this is reflected by the Parking to be Removed category. This estimate is conservative for the purposes of this plan, and based on preliminary information. It is likely that projects will be designed to avoid as much parking removal as practical. The net result of parking removed and added is estimated to be +623 parking spaces (Table 12).

**Table 12. Future Development Parking Modifications**

| Parking Modification | Spaces | New Demand-Low | New Demand-High |
|---|---|---|---|
| Parking to be Removed[1] | -261 | - | - |
| Parking to be Added | +884 | - | - |
| **Net Balance** | **+623** | **+761** | **+1,044** |

*Note: [1]Parking to be Removed represents existing surface parking lots/areas that are expected to be future building sites.*
*VHB will use the average of new demand-low and new demand high ((761 + 1,044) ÷ 2 = 903).*

## Future Surplus

The future Effective Capacity is calculated by applying the same desired maximum parking lot occupancy of 85% to the future parking supply. Future parking supply is expected to increase by +623 spaces due to the anticipated future projects. By 2021, downtown Carrboro will support 3,942 parked cars (Effective Capacity). VHB estimates the future parking demand to be +903 new spaces, which is the average of the low and high demand values from Table 12. Adding the actual demand from 2016 counts to the new demand yields a total future parking demand of 3,024 cars. This leaves an **estimated future surplus of 908 empty spaces**, within a range of +/- 140 throughout the day. The pattern of future parking surplus is displayed in Figure 11.

Public parking lots will account for a small surplus of parking spaces, while private lots are expected to have nearly five times as many surplus spaces in the future (Table 13). A mechanism to allow for public use of private lots during the evenings or weekends, when the business is no longer open, is not currently in place. As a result, these private parking spaces remain empty. Suggestions for better utilization of these spaces are addressed in the Management Strategies section of this report.

**Table 13. Future Parking Surplus**

| Scenario | Future Spaces | Targeted Occupancy | Effective Capacity | Future Demand | Future Surplus |
|---|---|---|---|---|---|
| Public | 784 | 85% | 666 | 524 | 142 |
| Private | 3,842 | 85% | 3,266 | 2,500 | 766 |
| **Total** | **4,626** | **85%** | **3,932** | **3,024** | **908** |

*Note: Note: Future Spaces estimated from future development projects.*
*Effective Capacity is the total Supply x Targeted Occupancy (4,626 x 0.85).*
*Future Demand is calculated as the average between the Low and High Demand estimates, added to the existing demand.*
*Future Surplus is the Effective Capacity – Future Demand (3,932 – 3,024)*

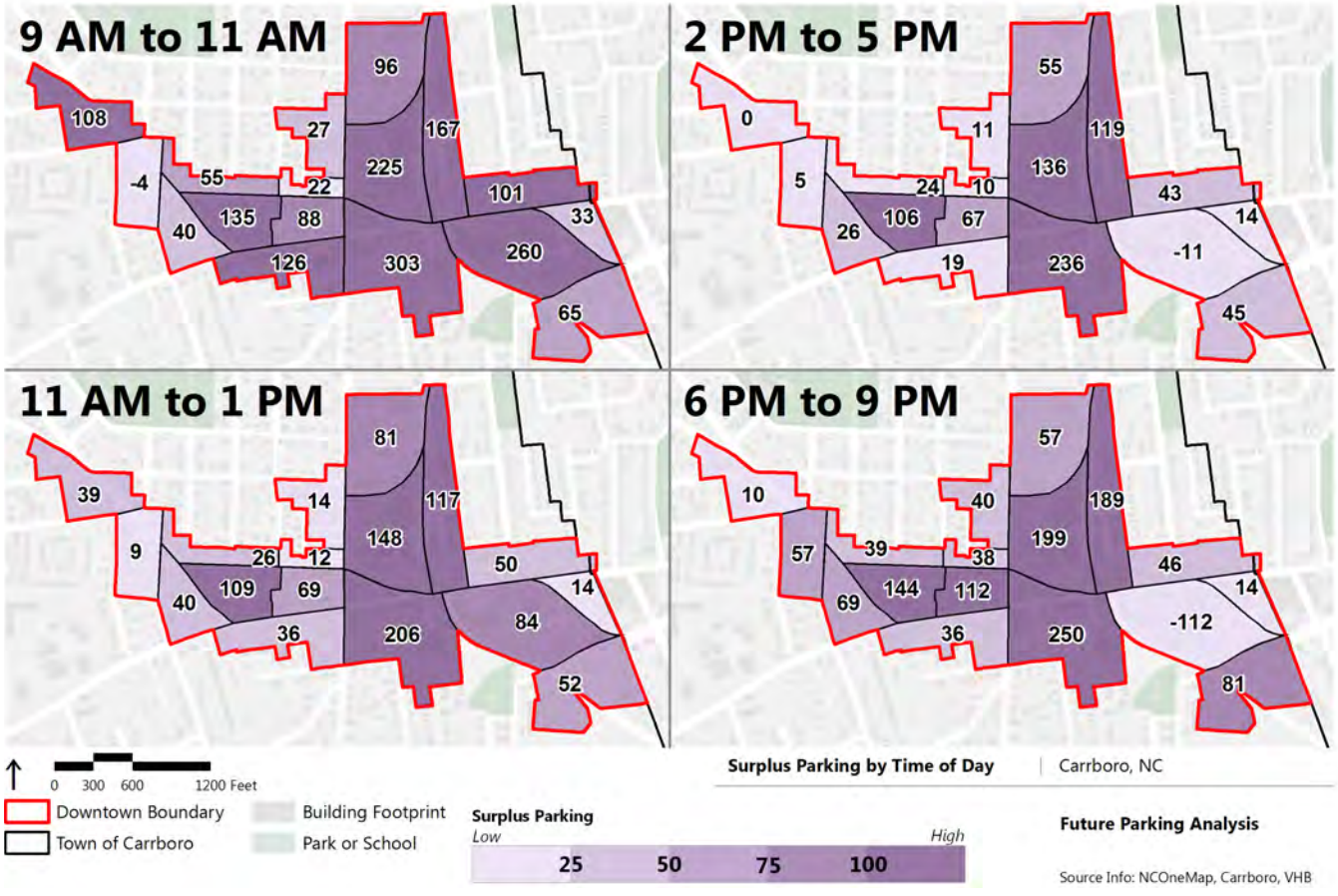
## Future Surplus of Public Spaces

Private parking is included within this future demand model because eight (8) of the future development projects are private, and private parking accounts for 84% of total parking. The two (2) future development projects involving public parking (though still considered private developments) are both within the same block (#12), south of Main Street between S. Greensboro Street and the railroad tracks. For the purposes of this section, all other public parking lots are assumed to be unchanged from current supply and demand.

Block #12 has 196 public parking spaces within three (3) public lots. Utilization counts observed a maximum of 158 parked vehicles parked during the busiest period, which happened to be the evening 6 PM to 9 PM period.

The future parking demand model anticipates a net gain of +129 parking spaces for this block from the two development projects (Library and Museum/Arts), yielding 325 parking spaces for public use. Assuming the same targeted occupancy of 85%, these lots will support 276 parked vehicles. The estimated new demand generated by these two projects is +232 cars with a range of +/- 15, leaving a surplus of 44 empty spaces in the future.

**Figure 11. Estimated Future Parking Surplus by Block and Time of Day**



## What Does This Mean for the Town of Carrboro?

The Town controls a small percentage (16%) of total parking. There is a surplus of parking during the busiest time of the busiest day of a typical weekday for both public and private parking lots. The data collected does not support the need for the Town to provide additional parking spaces today.

During the course of the next five (5) years, parking demand is expected to increase by 900 new parking spaces due to new development; these projects should provide a sufficient number of additional new spaces to mitigate this demand. The balance of spaces needed will reduce the existing surplus of more than 1,200 spaces to approximately 900 surplus spaces, which factors in an artificial maximum occupancy of 85% (leaving 15% of spaces empty). This quantitative analysis does not support the need for the Town to construct additional parking spaces in the next five (5) years.

Rather than construct new parking lots or structured parking, the Town may wish to more effectively manage its existing supply of 655 parking spaces. These qualitative improvements to parking supply would include, in the immediate-term, reviewing all 63 reserved parking spaces (non-ADA signs) to identify whether they are needed, or if they may be removed. This would also include ensuring that all public parking lots are consistently signed, striped, maintained, and easily accessible so that visitors are aware and willing to park in these lots.

# 5 Management Strategies

Future parking demand is not evenly distributed across the entire study area, just as the existing parking demand and surplus is not evenly distributed. Some downtown locations will experience a parking shortfall during peak periods while other locations in downtown will have excess parking. There are many strategies for actively managing parking to achieve better balance of supply and demand, described below. Strategies have been organized into five (5) categories: Education, Encouragement, Enforcement, Evaluation, and Engineering.

The first four (4) categories offer a variety of cost-effective management strategies with the goal of reducing or balancing demand throughout the existing parking supply. The final category (Engineering) involves physically constructing new parking lots/decks. Public opinions received during the online survey process, public meetings, outreach events and business owner discussions, suggest that citizens of Carrboro prefer a variety of parking management approaches rather than a "build more parking" solution.


## Education

Education strategies seek to inform citizens of the principles, vision, and goals of the parking system management strategy in the hopes of modifying parking behavior. Initiatives should reinforce the Town's message relating to parking:

1. Carrboro supports a dynamic, mixed-use, and multimodal downtown.
2. Carrboro desires convenient parking for short-term visitors.
3. Carrboro acknowledges that reducing unnecessary vehicular circling will benefit everyone.
4. Carrboro encourages a "park once and walk" strategy.
5. Carrboro encourages long-term parking in low-demand lots.
6. Carrboro will use strict enforcement (citations) as a last-resort option.
7. Carrboro will continually evaluate parking demand and manage parking accordingly.

The following subsections provide more detailed education considerations for the Town, including signage, employee parking, walk-time perceptions, alternative transportation, costs, and land uses.

## Wayfinding and Regulatory Signage Standards

Stakeholders routinely discussed signage throughout the planning process. Standard signage provides a level of familiarity and peace of mind for drivers, especially if they are first-time visitors to Carrboro. Public parking lots currently have similar signage at the parking lot entrances, though improvements can be made to improve consistency. The 2-hour parking time limit between 7 AM and 5:30 PM is clearly marked; however, the language is slightly different. Examples include:

- 2 HR Parking Enforced All Spaces"
- 2 HR Parking Enforced"
- 2 HR Parking
- 2 HR Limit"

More important than the language is the actual sign size, shape, color, and placement. Figure 12 shows that these four (4) messages are displayed on three different sign types, ranging in size from 4 to 18 inches in height, 12 to 24 inches in width, and mounted from 1 to 7 feet above the ground. One sign has a brown background with white lettering, another is white with black lettering, and the other two are white with green lettering. These inconsistencies can lead to driver indecision, especially for unfamiliar visitors, when attempting to find available public parking.

Loading zone parking spaces along E. Weaver Street are reserved between 7:30 AM and 5:30 PM. To promote consistency with public parking lots, the restriction should be adjusted to begin at 7 AM.

**Figure 12: Existing Public Parking Signage**


Public parking signs specify when the 2-hour time limit is enforced. It is assumed that after 5:30 PM these parking lots are unrestricted and open to the public.

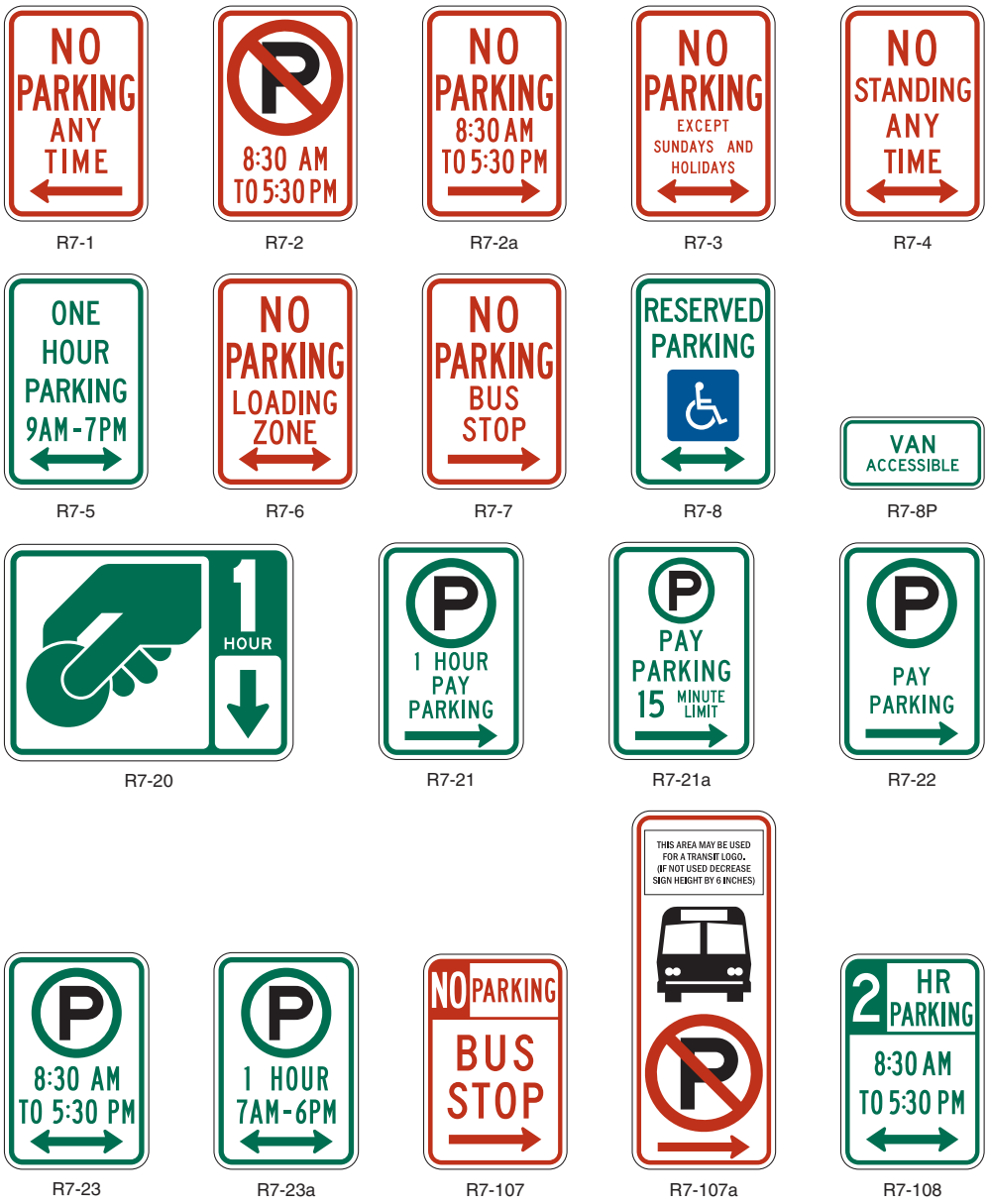
Private parking signs display similar restrictions for customer parking (Figure 13). The time of day that towing is enforced is inconsistently displayed. Some private signs specify "24/7", while others provide the specific hours, and some simply state "Permit Required" or "Towing Enforced." Private parking signs have a variety of sizes, shapes, colors and placement, which inadvertently promotes confusion or even fear of parking incorrectly.

Private parking signs that do not specify the hours of towing enforcement are assumed to be unavailable for the entire 24-hour day. Even if the hours are displayed (e.g., 7:30 AM to 5:30 PM), drivers will choose not to park after the restriction ends in fear of being towed. This behavior may explain the 6 PM to 9 PM parking utilization pattern (Figure 4), where most private parking lots were nearly empty (green) while public lots were nearly full (orange/red).

**Figure 13: Existing Private Parking Signage**


The Town of Carrboro does not have authority to regulate private parking signs that are beyond the roadway right-of-way. This should not preclude the Town from working with the Chapel Hill-Carrboro Chamber of Commerce and Carrboro Business Alliance to discuss how these inconsistencies may contribute to unsatisfied customers, initiate standardization of signage, and seek methods to incentivize businesses to replace their existing signs.

**The Town of Carrboro should adopt a set of parking signage guidelines that are compliant with the Manual on Uniform Traffic Control Devices (MUTCD), and begin to incrementally replace existing public parking signs over time.** The new signs must include standard language and consistent hours of enforcement, and stipulate that public parking is unrestricted after 5:30 PM. Preferably, the latter will be in the form of a separate sign plaque that may be attached below any existing signs (public or private). The overall cost of improving public parking signage could range from $1,000 to $5,000.




*Example MUTCD parking signage. Source: USDOT, Manual on Uniform Traffic Control Devices, 2009.*

## Long-term Employee Parking

Many business owners encourage their employees to park farthest from the front door or within an adjacent public parking lot in order to leave parking spaces for customers. This practice benefits businesses that may have a limited number of convenient spaces or a large staff (e.g., restaurants). The potential downside to this practice is that the limited number of public spaces are virtually unavailable for large portions of the day (see length-of-stay report section). If the Town began to strictly enforce the 2-hour time limits, then these employees would potentially face a parking citation.

One approach would be to designate a limited number of spaces as long-term employee parking, preferable in low-demand lots located in the farthest corners of the lot. A second option would involve coordination between adjacent business

owners to allow a limited number of employees to share parking between two or more businesses. The total number and time of day would have to be agreed upon in advance and evaluated after additional parking utilization data is collected.

## Walk Times Map

Overcoming perception is a challenge for parking system management. Customers often remark that a certain parking lot is "too far to walk" unless they have a direct line of sight to their destination. One strategy to overcoming perception of walking distances is to develop a walk-times map that displays the approximate number of minutes between certain locations.

Rather than create a new product from scratch, the approximate walking time (in minutes) could be added to existing publications such as the:

- Walk Carrboro Attractions Map http://www.walkcarrboro.com/map.html
- Public Parking Map http://gis.ci.carrboro.nc.us/GIS/downloads/printmap/BWParking.pdf
- Downtown Parking Map http://gis.ci.carrboro.nc.us/iCarrboro/cParking.html

The average person walks at a rate of 3 miles per hour (+/- 0.75), which equates to one (1) mile in 20 minutes. This reasonably concludes that a quarter-mile distance (1,320 feet) can be covered by a 5 minute walk. The distance between Town Hall and the Hampton Inn hotel is approximately 2,800 feet, or a 10 minute walk-time.

Only 7% of survey respondents indicated that the last time they chose to drive to downtown the walk to their destination was more than five (5) minutes, and only 3% found their walking time to be "Long." This finding suggests that respondents are willing to park and walk a reasonable distance from free public parking lots, and this distance is likely greater than one-quarter mile (five minutes). The overall cost of preparing a walk-times map, published to the Town's website, could range from $1,000 to $10,000, depending upon whether a graphic designer is involved.

For the purposes of this plan, **the Town should consider a pilot program to encourage walking from distant public parking lots** by installing signs at those lots (such as the Rosemary Street lot or Town Hall) with messages such as "If you park here, it is a 5-minute walk to the Weaver Street Market" or even "Delicious coffee is only a 5-minute walk away" if additional encouragement is needed. For the opposite direction, signs along Weaver Street could reference the short distance to "free public parking" in both directions. The goal of this initiative is to modify a person's perception of walking distances. The overall cost of planning and installing Walk Carrboro signs could range from $500 to $2,000.

### Guerrilla Wayfinding

Guerrilla Wayfinding (also known as Tactical Urbanism) is a recent movement to promote walking and bicycling through the grassroots installation of temporary signage by citizens (as well as the Town/City government). This idea was mentioned by attendees at the first Carrboro public meeting, referencing Matt Tomasulo, the originator of the Walk [Your City] movement in 2012.


*Photo source: Blue Cross and Blue Shield of NC*

The signs are approximately 1 foot by 1 foot in size, made of water-resistant material, and attached to existing poles or posts with plastic zip ties (example displayed below). Each sign displays an encouraging message, such as "It is a 5-minute walk to a grocery store" or similar destinations. Signs are $20 each regardless of the number of signs ordered, and this does not include shipping. The project website, https://walkyourcity.org, contains information on the movement and its success in the past three (3) years.

### Alternative Transportation Mode Shift

The Town of Carrboro encourages the use of alternative modes of transportation very effectively. The amenities (programs) and facilities (infrastructure) to promote bicycling, walking, and transit are apparent all over town as well as during conversations with the public. Parking demand is directly linked to the number of individuals who choose alternative modes of transportation.

Rather than invest in the acquisition of land and construction of surface parking or structured parking decks, the Town chose to invest in infrastructure such as sidewalks, bicycle lanes, shared use paths, and bicycle parking as well as non-physical amenities, like public transit, to encourage non-automotive travel. For additional parking flexibility, the Town chose to begin leasing properties from private land owners for use as public parking lots for those who may not be able to choose an alternative mode. The overall program cost of improving sidewalks and installing bicycle facilities and amenities could range from $50,000 to $500,000 per year, with some grant funding potential if there is a dedicated local match.

Limiting the potential barriers that prevent citizens from choosing alternative modes is the primary objective of this management strategy initiative. Based on the public survey, the following items may serve as potential barriers to be addressed by the Town:

- 65% of respondents want more bicycle racks, and 24% believe there are too few.
- 19% of respondents do not own a bicycle, and 41% were unlikely to ride one.
- 6% of respondents indicated that possible barrier to visiting downtown more frequently were related to alternative modes of transportation. Specific references were made to:
  - Improved bus frequency, particularly late evenings and weekends.
  - Sidewalks and bicycle lanes extending further from downtown.
  - Clearing debris/ice/snow from bicycle lanes more frequently.
  - Unsafe bicycling due to frequency of driveways.

## Additional Tradeoffs

If reducing future parking demand through alternative transportation options seems like a challenge for some citizens, then perhaps linking this initiative to individual cost-savings will tip the scales. Commuter calculator tools are commonly used estimating weekly, monthly, or annual expenses relating to driving to work. Some of these online tools may be found by performing a Google search of "commute calculator." A couple of notable results include:

1. www.transportationchoices.org/reasons/commute-calculator
   - Includes estimate of monthly greenhouse gas reduction
2. www.commutesolutions.com/commute-cost-calculator/
   - Includes widget to embed into your own website
3. www.commuterpage.com/pages/tools-resources/calculators/cost-of-commuting-calculator/
   - Includes links to TDM programs in Northern Virginia/Washington, DC
4. www.commutesmart.info/commute-cost-calculator.asp
5. www.bestworkplaces.org/calculat/calc508.html

These tools can also be used to estimate the round-trip cost of driving to downtown Carrboro from a person's home or place of employment. Reduction of greenhouse gases are included on some online commuter calculator tools (item #1 in the above list) to link this parking management strategy to environmental quality benefits.

## Encouragement

Encouragement strategies seek to incentivize citizens and downtown employees to use all parking lots, especially low demand parking lots farthest from the center of downtown. The goal is to seek voluntary compliance without the use of parking enforcement, through incentives for individuals and/or free publicity for businesses that encourage parking behavior that benefits downtown. This type of "Support Local Businesses" campaign is already prevalent in Carrboro, and simply needs to be reinforced to promote parking and walking.

Incentives for individuals may include coupons for a free cup of coffee, half-price lunch, discounted tickets to an upcoming event, or branded merchandise (t-shirt, coffee tumbler) from participating downtown merchants. Business recognition may include free or discounted advertisement in a local paper, website, social media page, or radio broadcast. **The Town Government should serve as the administrator of these initiatives** through the Carrboro Business Alliance and regular meetings with merchants, boards and various committees, or even the weekly Farmers' Market events.


*Image source: Carrboro Business Alliance*

### Lighting and Sidewalk Improvements

Local business stakeholders discussed qualitative improvements, such as lighting and sidewalks, when talking about customers visiting multiple shops without the need to re-park each time. These types of amenities reinforce the unique sense of place where visitors feel safe and decide to spend additional leisure time. Carrboro businesses are reliant upon customer "walk-by" traffic, where people choose to enter a store they are walking past even if they didn't come to downtown for that specific reason. Encouraging this behavior may involve reinvestment in sidewalk infrastructure, pedestrian crossing at intersections, landscape lighting improvements, or the addition of outdoor music. For instance, lighting and music improvements may be most valuable at West Weaver Street near the public parking lot, but should also include other portions of downtown, such as along Roberson Street where sidewalks and crosswalks were observed to be lacking during the walkability micro-audit.

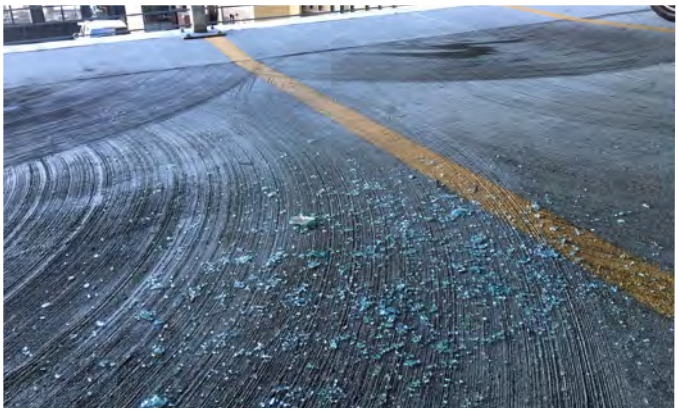
The concept encourages more exploration on foot by making the streetscape more inviting to visitors, who may then choose to spend additional time (and dollars) in downtown. The costs of improving sidewalk lighting or adding music would be tied to a general streetscape enhancement plan. These types of projects would also include access management (limiting driveways), accessibility and intersection safety improvements, and the addition of street trees. This type of capital improvement project would require various sources of public and private funding.

## Improved Perception of Security

Related to lighting improvements is the perception of safety. This encouragement program involves Crime Prevention Through Environmental Design (CPTED), which suggests that proper design of buildings and public spaces can lead to a reduction in crime and the perception of fear. Training programs for CPTED concepts are available through the National Crime Prevention Association (NCPA) at www.ncpc.org. Elements from CPTED include:

- Controlling the number of entrance/exit points to a parking lot or building.
- Incorporating natural surveillance (for maximum visibility).
- Territoriality (such as fencing or landscaping treatments to define a space).
- Maintenance of public areas.

This project's public survey found that 4% of survey respondents felt "Sometimes unsafe" within public parking lots. This represents a small portion of respondents; however, perception of safety is a critical element to the success of a parking management system. The perception of security relates back to the importance of walk-by customers discussed by business stakeholders. Downtown businesses will benefit from more customers spending additional time walking (and not driving) in the downtown.



*Broken glass observed within parking deck. Photo source: VHB.*

## Bicycle-Friendly Businesses

Carrboro has 30 registered Bicycle-Friendly Businesses through the Carrboro Bicycle Coalition (http://bikecarrboro.com/what-we-do/bike-friendly-business-program). Benefits of such a designation may include free promotion and recognition of the

business, a plaque to display in the store/shop, enhanced health and wellness of employees, reduced absenteeism, and connection with the local community. The Carrboro Bicycling Coalition (CBC) assists businesses with the application process, and the physical installation of bicycle racks.

Encouraging and promoting bicycle-friendly businesses will indirectly contribute to the goal of balancing future parking demand by reducing the need for long-term employee parking. Bicycle-friendly businesses indirectly contribute to this project's vision and goals by limiting the potential barriers to bicycling, such as limited bike parking locations. This initiative may not have a significant impact on future parking demand as compared with others; however, one or two additional empty parking spaces may have an important effect within a small parking lot. The overall program cost of encouraging and promoting the Bicycle-Friendly Business initiative could range from $1,000 to $5,000 per year.


*Photo source: Carrboro Bicycle Coalition*

## Healthy Lifestyles Initiative

Parking and walking from a distant parking lot may be rolled into a healthy lifestyles campaign to promote 10,000 steps per day. Pedometers are low-cost branded merchandise that can be used as an incentive. This campaign may also consider a monthly step challenge among organizations to see which group can tally the greatest number of steps, and win prizes (supplied through donations). Healthcare benefit providers (e.g., BCBS or Humana) offer similar wellness programs to incentivize employees to live more active lifestyles. The concept is to unite groups based on their common business interest of maximizing convenient parking for customers, while providing incentives for employees to participate. The program costs for this type of healthy lifestyles initiative would be negligible, as they are likely tied to private company insurance providers.

Collectively, these encouragement initiatives may only shift parking behaviors temporarily, or on a small scale. For more widespread behavior shifts, the Town may consider enforcement initiatives, discussed in the next section.

## Enforcement

This section outlines parking enforcement strategies that promote vehicle turnover. Strict enforcement through the issuance of citations (fees) should be a last-resort strategy; however, it may be necessary for high-demand areas between N. Greensboro Street and Lloyd Street.

Parking enforcement is currently performed by the Carrboro Police Department on an as-needed basis. If a parking citation is issued, the current fee is $35 for the first offense, $50 for the second offense, and $100 for each subsequent offense within a 365-day period. The parking citation for violation of an ADA/accessibility parking space is a $50 fee.

### Downtown Ambassador Initiative

Parking enforcement does not need to be a punitive initiative. Town of Carrboro enforcement officers should be visibly present within areas of high parking demand; however, their role should be adjusted towards an "Ambassador of Downtown." This parking plan has identified the locations of greatest parking demand, and the busiest time of the day (lunchtime) for a typical weekday. **Parking Ambassadors should perform more frequent "tours" of the high-demand parking areas, be visible and friendly, and offer direction to nearby parking areas for long-term parking.** This goal of this initiative is not to write a parking citation, but rather to encourage visitors to voluntarily comply with the 2-hour time limit for public parking lots and to educate them about parking options.


*Downtown ambassador program. Photo source: City of Coral Gables, FL*

**Parking Ambassadors should interact directly with downtown merchants, ask what their customers' parking needs are, and report back to the Town or Downtown Business Alliance.** This strategy does not require money for new equipment to purchase, or a new funding source from the Town, but will involve staff time for coordination and communication.

Results from the length-of-stay analysis should inform the priority lots for targeted enforcement. **The Town should collect future parking utilization counts on an annual or semi-annual basis, and the results should be used to identify targeted enforcement areas.**

## Time-Limited Parking

Parking enforcement seeks a balance between the needs of many different users. Some users may only need a 30-minute parking space, while others are seeking 1-hour, 2-hour, or longer-term parking. This places parking enforcement in a difficult, occasionally hostile situation of enforcing the variety of parking options equally and consistently.

The Town offers 30-minute parking within the Century Center parking lot along N. Greensboro Street. Parking utilization counts found that this lot was mostly full during the daytime, and 100% occupied on Saturday evening after 6 PM. **The Town should consider adding a limited number of individually-signed 30-minute parking spaces in strategic locations within other high-demand parking locations.** These locations could be identified by business owners and supported by actual parking count data. One such location would be the E. Main Street/Acme lot, as this is highly visible and centrally located. Coordination with the Police Department is essential prior to installing new parking signs. The overall cost of adding time-limited parking signage in certain locations could range from $500 to $5,000, depending upon the sign fabrication costs of the Carrboro Public Works Department, which has the ability to produce signs in-house.

A limited number of long-term parking spaces may also be beneficial, perhaps as few as four (4) to five (5) spaces as a pilot program. The average length-of-stay analysis identified several potential candidates for long-term parking, such as the parking deck level three (3), the Laurel Avenue lot, and the W. Weaver Street lot (all averaging more than 3.5 hours).

Employees of the East Main Square development are directed to park on level 3 of the parking deck. It may be beneficial in the future to relocate these vehicles to the roof level, which may involve issuing a parking permit, in order to free up public parking on level 3. A second option would be to issue hangtag permits that allow for long-term parking beyond the 3-hour limit. In the near term, these suggestions are unnecessary since the deck does not reach capacity during the typical weekday period.

The Laurel Avenue and W. Weaver Street lots appear to include private business employee parking; this was confirmed by discussions with business stakeholders. One potential approach would be to sign a limited number of spaces at the rear of these lots for 4-hour or 6-hour parking. A second option would be to issue hangtag permits that would prevent a parking citation for overstay parking. Neither of these options is an ideal approach, as they do not reduce future parking demand; however, they are options to discuss with business owners.

### Citation and Appeals Procedures

If the Town desires to actively enforce the 2-hour time limits and issue parking citations, then a full enforcement and appeals process would need to be initiated, including lengthy public involvement. Some important considerations for such a program would include:

- Institute a grace-period of several days/weeks at the beginning of the initiative.
- Institute a no-charge warning citation for first-time citations. Include information on where long-term parking is available as well as alternative transportation.
- Offer a streamlined citation appeals process; be fair and consistent to avoid the appearance of favoritism at all costs.
- Offer a discounted citation amount if it is paid within 96 hours (or another specified time); escalate the fee if it is paid after a specified time (four (4) weeks).
- Investigate an electronic parking management and enforcement software solution that integrates with DMV license plate database (e.g., T2 Systems, TickeTrak, or AIMS).
  - » Contact nearby municipalities and inquire about their enforcement software solution capabilities and limitations.
  - » Contact vendors of enforcement software to request a demonstration.
  - » Select a software vendor that offers compatibility with tablet/mobile phone hardware of the Town's choosing (Android most likely).
  - » Coordinate with Town and County IT Departments to establish a database of repeat parking offenders (scofflaw list), and include a policy for escalating fees for these individuals.

The overall parking enforcement program cost could range from $50,000 to $250,000 per year depending upon the desired number of staff, equipment and vehicles, hardware and software, and/or training. The first-year startup costs to purchase equipment and integrate software would be additional.

## Evaluation

This section outlines administrative strategies to collect additional data, utilization trends over time, and evaluate parking demand as it changes.

### Annual Data Collection Program

This project prepared materials for a field data collection of parking lot occupancy for four (4) periods throughout a typical weekday. Occupancy counts are best performed semi-annually as needed, or as requested to establish a baseline trend throughout the year. These data points are important for separating fact from opinion, and may be used to justify future parking management changes to businesses and the public. Without a record of parking occupancy counts collected across multiple days and months, there may not be a consensus on how to adequately manage public parking. The overall cost of a data collection program could range from $500 to $15,000 per year depending upon whether the field crew consists of Town staff or interns, or is outsourced, and whether any equipment is leased for data collection or analysis.

## Online Survey

Online survey instruments, such as the one completed for this plan, are an effective measure of public opinions relating to parking, especially as they change over time. The field counts described above represent actual parking utilization, while a public survey measures the perception of parking and whether any previous management adjustments are having a desired impact. Such parking behavior surveys should be brief and repeatable so that many data points may be collected over time (no more than twice a year). The overall cost of an online survey could range from $500 to $5,000 per year depending upon marketing and promotion of the survey, format (digital or hard copies), and analysis of data.

Minor changes to the parking management system must be supported by data, not opinion. Data may include the online survey or parking utilization counts. The purpose of these data is to establish a baseline and track the shift of parking demand as a result of parking management changes. **The Town should post results of the survey to a Town website for education of the public and evaluation of the parking program.**

## Formation of Downtown Parking Board

Parking has been managed on an ad-hoc basis; however, it could be more formalized with stakeholder representation. The Town may benefit from discussing public parking issues during an existing board/committee meeting, such as the Carrboro Business Alliance meetings. Stakeholder involvement is essential—this existing board or committee must have representation from the Town, County, Police, downtown merchants, and property owners. Perhaps, in time, this group will grow into a more formalized Downtown Parking Board as needed. This is not essential, however. In the meantime, this group could simply discuss parking challenges related to high-demand parking areas. The initial costs for a Downtown Parking Board would be negligible, as this would arise from an existing board or committee meeting.

Parking occupancy collected on different weekdays throughout the year will identify areas that are consistently underutilized. With this information, the Town or Parking Board can work with property owners on shared parking arrangements to allow shared use of parking lots during low-demand periods of the day. For example, banks and churches have relatively low parking demand during the busiest part of a typical weekday (lunchtime), and offices have very few parked cars during the evening dinnertime period. These are both opportunities for formal or informal arrangements between adjacent businesses; however, these arrangements must be data-driven to maximize their effectiveness.

Special events are considered atypical from weekday trends, and therefore traffic and parking accommodations for special events may best be handled separately by the Police Department or another agency with staffing capabilities. **Town-sponsored events should have a default parking management plan with overflow parking available at the Town Hall, Carrboro Elementary School, or similar locations, should the need arise.**

### Shared Parking Arrangements

Working through the Downtown Parking Board, arrangements to share parking lots should be encouraged. These arrangements would be particularly relevant to adjacent property owners and apply during specified times of the day. This message should be consistently marketed from multiple public and private agencies as a constant reminder to employees and employers: high-demand parking is for customers; low-demand parking is for employees.

**The Town of Carrboro should take an active role in facilitating shared parking arrangements between business owners.** Shared parking is especially important to Carrboro since private parking constitutes such a large percentage (84%) of total parking. The official Land Use Ordinance has required an appropriate number of parking spaces for each business on an individual basis. Adjacent properties are busy at different times of the day (or months of the year), and therefore surplus parking is available for shared use during the day or evening. The significance of this initiative cannot be understated. Parking utilization counts identified the greatest number of parked vehicles during lunchtime (11 AM to 1 PM); however, parking demand within public lots was greatest during the 6 PM to 9 PM period, when very few private spaces were occupied.


*Potential opportunity for a shared parking arrangement between adjacent businesses*

To communicate parking arrangements to the public, the Town should recommend, and create, a standard sign or plaque added to an existing sign that specifies "Public Parking after ___ PM" or another similar message at the entrance to the private lot. The overall cost of generating a standard sign plaque could range from $500 to $5,000, depending upon using a sign shop for fabrication. This is intended to be a voluntary agreement to support downtown merchants. The Town would play a limited role in facilitating the discussion and fabricating the sign plaque.

## Engineering

Engineering solutions involve the planning, design, and construction of new parking facilities. This category is presented last because the low-cost and quick-return Education, Encouragement, Enforcement, and Evaluation strategies should be programmed for the short-term, while Engineering solutions are considered for the long-term. If the initial strategies have a desired reduction of parking demand, then the need for engineering solutions may be delayed or reduced significantly.

## Lot Design and Restriping

Many of the existing public parking lots are unpaved (gravel) with concrete wheel stops to mark individual parking spaces. Because there are no parking stall lines, people will naturally leave additional space between their vehicle and the adjacent vehicle to avoid door dings. It is also possible for vehicles to inadvertently park askew or diagonal without the painted stall lines for guidance. This behavior reduces the total number of vehicles than can park within the lot and impacts utilization counts.

*Public Parking Lot (left) and Private Parking Lot (right)*

To maximize the capacity of the existing parking lots, the Town could either pave and stripe these lots, or stripe the gravel with paint rather than traditional thermoplastic markings. Paving each lot would also require civil engineering design plans for stormwater management. This approach is more expensive, and conflicts with the overall vision for the Town as an environmentally-sensitive community; however, the negative aspects of gravel parking lots include higher maintenance costs and poor aesthetic-quality for the visitor in addition to inefficient parking habits.

Striping the gravel parking lots will require frequent maintenance to ensure that the painted lines are visible. This may be a low-cost approach to indirectly gain additional parking spaces without new construction. Individual parking lot layout and design plans could be developed using AutoCAD software to identify the most efficient parking lot layout that would fit within the constraints of the property. The overall cost of an engineering parking lot striping plan could range from $1,500 to $5,000 per lot depending upon the availability of planimetric data, aerial imagery, stormwater control infrastructure, lighting, and engineering seal requirements.

## Paid Parking Options

Management strategies presented above reference different methods for actively managing a parking system. The term “actively” is deliberately chosen because a parking system that is left unmanaged will quickly be ignored, abused, and become ineffective or problematic. Incorporating hourly paid parking lots is one particularly effective strategy for promoting turnover in high-demand areas, although it is not the only strategy.

**Utilization data collected by this project does not support the need for paid parking options in Carrboro.** There are empty parking spaces available near high-demand areas during all weekday and weekend periods. Installation of a paid parking system within one or few public parking lots will simply encourage drivers to illegally park in empty private parking lots or park farther away and walk. The likely result is empty parking in high-demand areas and further parking frustration elsewhere.

There is no "trigger" to identify the moment or conditions where a paid parking system is needed. Support for the installation of parking meters will come from business owners, downtown employees, residents, visitors, and Town government. This support will likely arise from a commonly observed parking problem or recurring challenge that is shared by all user groups and verified by data collected over time. Support for paid parking may also build following a pilot study where a single Carrboro lot is converted to hourly parking. The Rosemary Street lot would be an excellent candidate for this, given its single entry, relatively small size, and highly visible location. The public response from this pilot study lot may determine whether additional public lots are feasible for paid parking options.

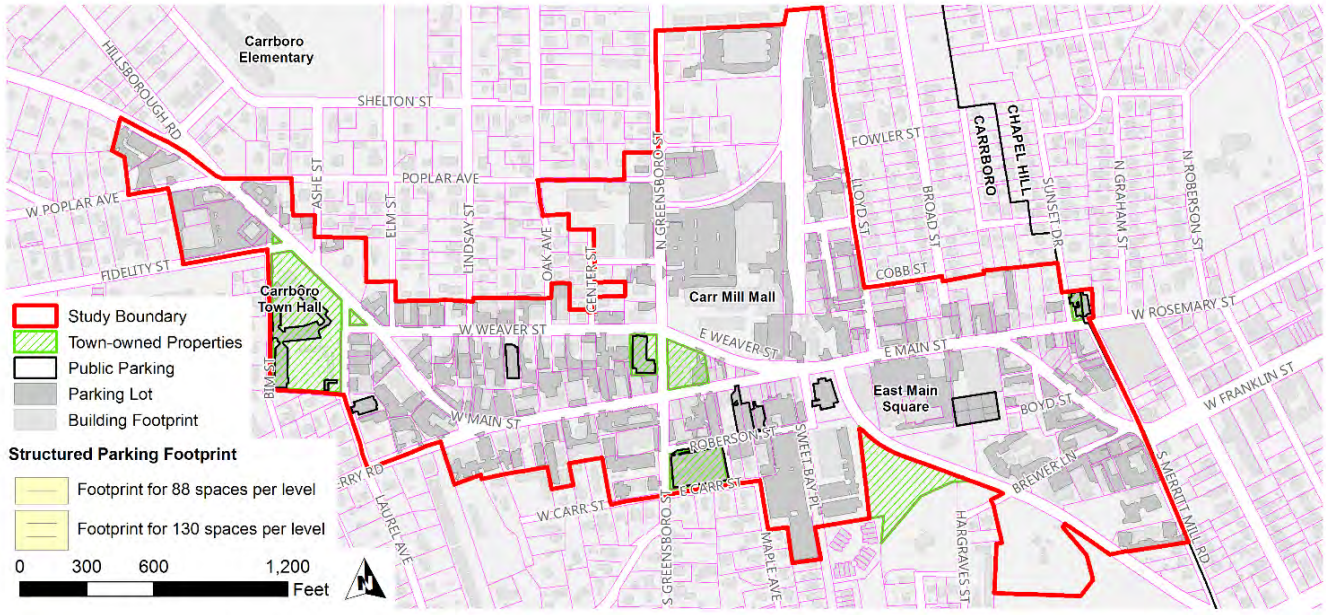
As downtown Carrboro further develops, and parking demand intensifies to a point where paid parking options could be considered, it is important that parking enforcement initiatives discussed above have been set in motion. It is vital that the parking citation and appeals procedures have been streamlined and integrated within an electronic parking enforcement software solution. Enforcement of paid parking areas is critical to its success. A paid parking lot provides premium parking to those who are willing to pay for this convenience. Consequently, there is an expectation that this premium parking will be available (less than 85% occupied) when needed.

## Structured Parking Options

**The Town should plan for longer-term structured parking options, while simultaneously working to delay or avoid the need for such construction through other parking management strategies.** The first step is to identify potential sites for a structured parking deck or surface parking lots, and perform a feasibility level analysis (Preliminary Engineering Report). The Town of Carrboro is constrained by available land of reasonable size to support a structured parking deck. Unless private property is to be purchased, the Town of Carrboro has limited locations where a parking deck could be constructed.

The minimum width for a standard two-bay parking deck is 120 feet wide, and a standard three-bay parking deck is 180 feet wide. Exceptions can be made to narrow the drive isle and convert to one-way traffic flow; however, these exceptions often result in fewer parking spaces per level and a less efficient overall design. Figure 14 displays two minimum footprints needed to support a structured parking deck in Downtown Carrboro. One footprint will support 88 spaces per level and has two bays of parking. The second footprint will support 130 spaces per level and has three bays of parking. As you may observe, there are very few properties in Town large enough to fit such a footprint, and even fewer properties owned by the Town of Carrboro.

**Figure 14. Approximate Footprint Required for Structured Parking**




Nearly all buildings in downtown are one to two stories tall. Each level of a parking deck would be 10 to 12 feet high. Assuming a minimum height of 10 feet and a minimum of three levels, a potential structured parking deck would be taller than any surrounding building other than the East Main Square development.

## Cost of Construction, Maintenance, and Operation

Typical construction costs for surface parking range between $4,000 and $10,000 per space, while parking deck construction cost range between $15,000 and $24,000 per space[1].

Parking planning studies use $5,000 per space for surface parking, and $20,000 per space for structured parking. The actual construction costs vary depending on site constraints such as topography, underground utilities, and stormwater control devices, as well as labor and material considerations (fluctuating price of steel or concrete). The existing 275 public parking spaces that are owned by the Town would cost $1.4 million if constructed today. Likewise, the 380 leased parking spaces (most of which are structured parking) would cost $5.6 million if constructed today. The total value of all public parking assets is estimated to be worth $7.0 million.

Annual operation and maintenance (O&M) costs are above and beyond the cost to construct. O&M including parking management staff, inspecting the structure, making repairs, pressure washing, supplying electricity for lighting, and removing waste costs are also highly variable depending upon the total number of facilities. Annual maintenance costs can average between $50 for surface parking lots only, to $200 to $800 per space for structured parking facilities[2].

## Land Tradeoffs

Parking accounts for a large portion of any downtown, especially if surface parking lots are more prevalent than structured parking decks. Using available GIS data resources, VHB performed a summary of the study area to determine the approximate percentage of area that is devoted to parking. Summarized in Table 14 and Figure 15, this analysis found that parking lots and driveways account for 43 acres, or 30% of the total 141 acres of land.

**Table 14. GIS Summary of Land Categories in Downtown Carrboro**

| Land Categories | Sq Ft | Acres | % Total |
|---|---|---|---|
| Buildings | 925,221 | 21.2 | 18% |
| Landscape/Open Space | 1,221,200 | 28.0 | 24% |
| **Parking/Driveway** | **1,881,829** | **43.2** | **37%** |
| Sidewalks, Roadway Right-of-Way | 847,990 | 19.5 | 17% |
| Railroad Right-of-Way | 230,550 | 5.3 | 4% |

*Note: Area calculated from available GIS datasets.*
*Square Footage (Sq Ft) represents 2-dimensional area (building footprint).*
*Right-of-Way represents area beyond individual property boundaries (parcels).*

**Figure 15. Land Categories within Downtown Carrboro**


Constructing new public parking would be a significant investment in land, in addition to the cost of construction discussed in the previous section. A 100-space surface parking lot, for example, would require approximately 33,000 square feet (0.76 acres) of land. There are very few parcels of land within the study area where such a lot could be constructed.

Structured parking (also referred to as a deck) is a viable option for many downtowns that are constrained by land or topography. The same acreage of land can support three to five times as many spaces, depending upon the number of levels in the deck. Because structured parking is roughly four times the cost of surface parking, most decks are at least four levels tall. There are two important considerations for structured parking: net gain of spaces and scale of economies. Converting an existing surface parking lot into a structured parking deck involves removing existing parking spaces during construction and yielding a smaller net gain of parking when complete. The overall benefit of a 450-space parking deck should factor in the number of spaces removed (e.g., 75 spaces) for a net gain of +375 spaces by the project. The other consideration is scale of economies, which suggests that smaller parking decks will be less cost effective than larger parking decks. The rule-of-thumb is to maximize the available site rather than build a certain number of desired spaces. Constructing a stand-alone, four-level, 160-space deck would not be a cost-effective solution, whereas these same 160 spaces incorporated into a mixed-use development that wraps around structured parking would likely be a more effective use of the available site.

*[1]Carl Walker (2016), Mean Construction Costs, Carl Walker Consulting (www.carlwalker.com); at http://www.carlwalker.com/wp-content/uploads/2016/05/2016-Carl-Walker-Cost-Article.pdf*

*[2]Todd Litman (2016), "Transportation Cost and Benefit Analysis II – Parking Costs, VTPI (http://www.vtpi.org/); at http://www.vtpi.org/tca/tca0504.pdf*


# 6 Implementation

The purpose of this section is to organize a general plan of action for the Town of Carrboro based on stakeholder feedback and professional judgement. Parking initiatives identified in this section constitute a change to the “Business as Usual” role that the Town has been operating within.

The Town should become a facilitator of shared parking arrangements between adjacent properties, relying upon regular parking occupancy data as the basis for any agreements. This approach will have the greatest return on investment, maximizing existing surface parking without the need to construct new spaces.

Public outreach was a significant portion of this planning process. During the June 2016 mid-point public meeting, attendees were presented with several potential parking management strategies and asked to vote for the categories that had the greatest potential benefit on parking. Education, Engineering, and Enforcement strategies received the highest number of votes from participants. Engineering scenarios, as they pertained to this meeting, included connecting sidewalks, leasing additional parking from private landowners, and constructing new parking.

Action items for the Town to consider have been identified and grouped as near-term and long-term initiatives. Near-term initiatives are looking 1 to 5 years ahead, while initiatives for the long term should begin now and plan for 5 to 10 years ahead.

## Near-term Initiatives

Near-term initiatives are programming for the short-term and seek low-cost, quick implementation improvements that will reduce future parking demand. The goals of these initiatives are to:

- Promote shared parking arrangements between businesses.
- Collect regular parking occupancy data during the peak period.
- Deploy more consistent parking regulatory signs.
- Encourage vehicle turnover in high-demand parking areas.
- Encourage use of low-demand parking areas.
- Encourage the use of alternative transportation modes to reduce future parking demand.

## Long-term Initiatives

Long-term goals will require some time to develop, or are dependent upon data collection following the near-term programs. The goals of these initiatives are to:

- Coordinate and leverage redevelopment opportunities with identified stakeholders.
- Identify *potential* sites for a parking deck.
- Discuss Public-Private Partnership options, and potential land swap arrangements.
- Seek a compromise that will benefit parking and businesses.
- Perform a Preliminary Engineering Report (PER) for structured parking.

To support these goals, the parking management strategies identified in the previous report section were organized into a phased 10-year implementation plan (Table 15). It is not necessary for the Town to follow the sequence in a prescriptive manner, but to use the table below as a suggestion for the types of initiatives to consider within stages of a 10-year process to improve parking. This recommended sequence should be revisited each year based on a continual evaluation of parking demand and utilization patterns.

**Table 15. Recommended Implementation by Year**

| Category | Management Strategy | Year 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Education** | Wayfinding and regulatory signage | ■ | ■ | ■ | | | ■ | | | | |
| | Long-term employee parking | ■ | ■ | | | | | | | | |
| | Walk-times map | ■ | | | | | | | | | |
| | Alternative transportation mode shift | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| **Encouragement** | Lighting and sidewalk improvements | | | ■ | | | ■ | ■ | | | ■ |
| | Improved perception of security | ■ | ■ | | | | | | | | |
| | Bicycle-friendly businesses | | ■ | ■ | ■ | ■ | | | | | |
| | Healthy lifestyles initiative | | ■ | ■ | ■ | ■ | | | | | |
| **Enforcement** | Downtown Ambassador initiative | | | | | ■ | ■ | ■ | | | |
| | Time-limited parking | | ■ | ■ | ■ | | | | | | |
| | Citation and appeals procedures | | | | | | | ■ | ■ | | |
| **Evaluation** | Annual data collection program | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | Online survey | ■ | | ■ | | ■ | | ■ | | ■ | |
| | Formation of Downtown Parking Board | | | | | | ■ | ■ | ■ | ■ | ■ |
| | Shared parking arrangements | ■ | ■ | | ■ | | ■ | | ■ | | ■ |
| **Engineering** | Lot design and restriping | | ■ | | | ■ | | | | | |
| | Structured parking options | | ■ | | | | ■ | ■ | ■ | ■ | |
| | Cost of construction, O&M | ■ | ■ | | | | ■ | ■ | | | |
| | Land tradeoffs | | | | | ■ | ■ | | | | |

■ Near-term Initiative
■ Long-term Initiative