



HARWICH PORT PARKING STUDY

HARWICH, MASSACHUSETTS

SEPTEMBER 2014



Howard/Stein-Hudson Associates, Inc.
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DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT, 100 CAMBRIDGE STREET, BOSTON, MA 02114

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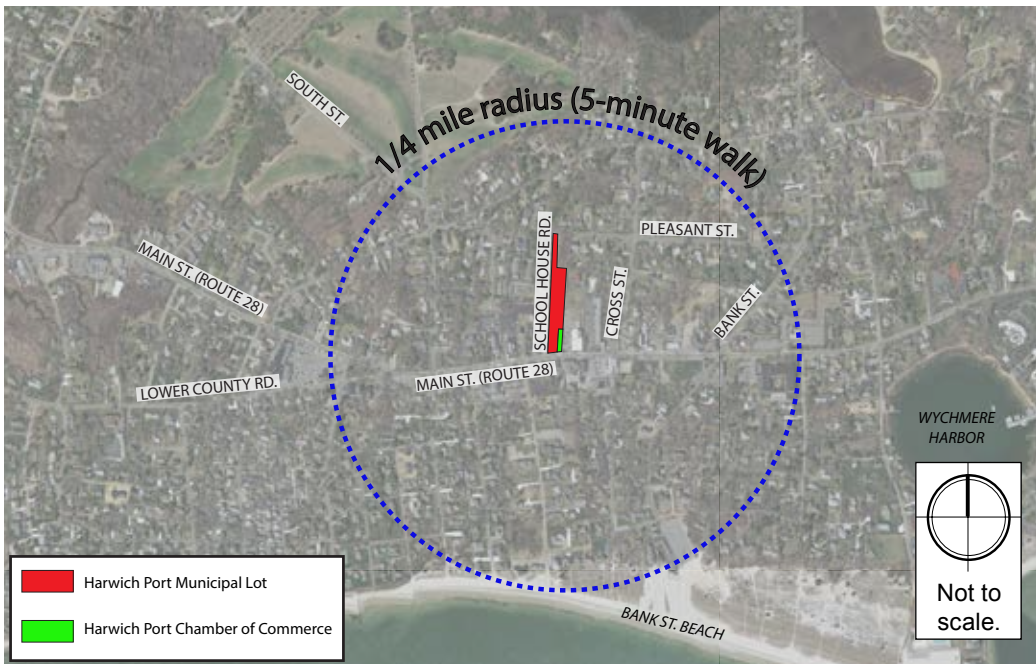


FIGURE 1 | SITE LOCATION

The Harwich Municipal Lot is positioned in a prime location for visitors of Downtown Harwich Port, located within a very short walking distance to restaurants, shops, banks, and churches as well as about 1/4 mile from the ocean to the south.

Introduction

Howard/Stein-Hudson Associates (HSH) conducted this parking study to evaluate the operation and capacity of the current municipal lot and to develop options to improve parking at the municipal lot and in the immediate area. The parking study was prepared under the Massachusetts Downtown Initiative Program. The study focuses primarily on the Town's municipal lot, with consideration to several parking lots on adjacent properties. The municipal lot, located between Main Street (Route 28) and Pleasant Street, is a popular location for visitors to local attractions.

The Town of Harwich is located on Cape Cod, with a year-round population of 12,600 but a summertime population of about 40,000. The municipal lot is located in the heart of downtown Harwich Port, along School House Road, which connects Pleasant Street to the north to Main Street (Route 28) to the south. The municipal lot is located adjacent to the Harwich Chamber of Commerce office at One Schoolhouse Road. The lot is positioned in a prime location for visitors of downtown Harwich Port, located within a very short walking distance to restaurants, shops, banks, and churches, as well as about 1/4 mile from the ocean to the south. **Figure 1** above shows the municipal lot's location within the Town of Harwich.

The goal of the parking study is to assess the parking demand on the municipal lot and the adjacent lots on a typical summer day and to recommend changes to the existing municipal lot layout and management strategy. HSH analyzed parking oc-

cupancy data, turnover data, and intercept surveys with visitors to the municipal lot to determine who parks at the municipal lot, for what purpose, and for how long. This data was used to determine approximately how many vehicles use the lot for shopping, dining, and the nearby beach. Finally, HSH offers several conceptual layouts and parking management strategies, and makes recommendations for the municipal lot as well as considerations for the adjacent study area parking lots.

Existing Conditions

PARKING LOT LAYOUT AND MANAGEMENT

The municipal lot consists of 77 marked parking spaces, divided into three sections: the South Municipal Lot, which consists of 25 general use spaces and six handicap accessible spaces; the Central Municipal Lot, which consists of 46 marked general use spaces; and the North Municipal Lot, which has seven unmarked parallel parking spaces. The Central Municipal Lot has a drive aisle that wid-



The existing plaza area just south of the Chamber of Commerce is used as a gathering spot for visitors.

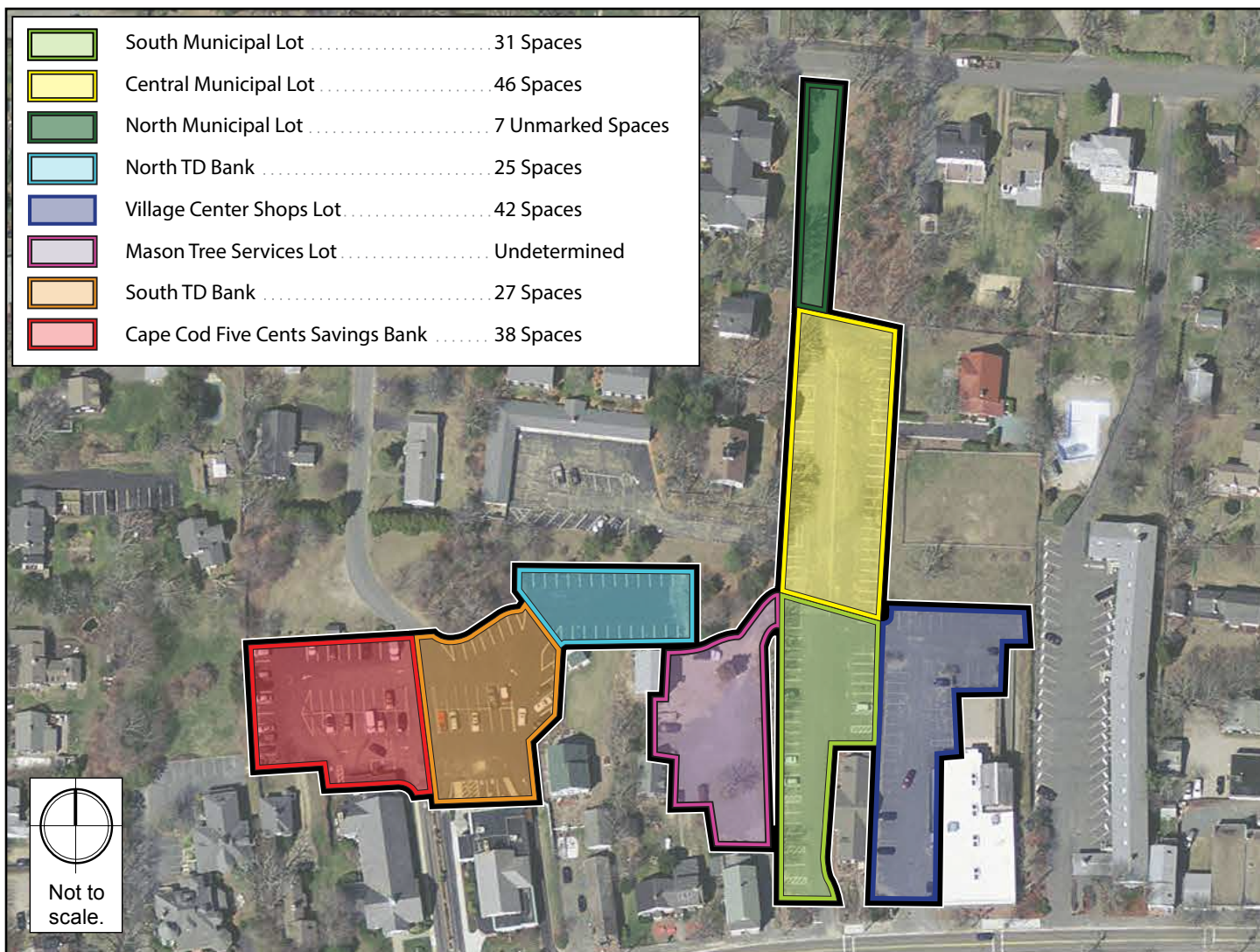


FIGURE 2 | STUDY AREA PARKING LOTS AND THEIR CAPACITIES

ens from 43 feet to the south to 54 feet to the north; 22 to 24 feet is typically considered to be a sufficient drive aisle for perpendicular parking spaces. A plaza area is located south of the Chamber of Commerce and is a popular resting space for visitors. **Figure 3** on the following page shows the existing layout of the municipal lot.

In addition to the municipal lot, five adjacent private lots were also studied:

- The Village Center Shops lot, consisting of 42 parking spaces;
- The South TD Bank Lot, consisting of 27 spaces;
- The North TD Bank Lot, consisting of 25 spaces;
- The Cape Cod Five Cents Savings Bank lot, consisting of 38 spaces; and
- The Mason Tree Services lot, a gravel area with unmarked spaces along the perimeter of the lot.

Figure 2 shows a key map of the study area parking lots and their capacities.

The 77 marked parking spaces in the municipal lot are unrestricted, except for the six handicap-accessible spaces. There is no charge to park in the lot, and no time restrictions at any of the parking spaces. As a result, those intending to park for just a few minutes share the same parking area as those who intend to park for multiple hours, and the lot tends to fill from south to north, as the southern driveway abuts downtown Harwich Port.

Visitors to the Harwich beaches may purchase a weekly sticker to give them access to the Town's beach parking lots. Town officials stated that prices are intended to be kept relatively low so that visitors are encouraged to buy the stickers, rather than try and find free parking farther away from the beach, such as the municipal lot. Sticker prices for July 1, 2014 – June 30, 2015 are \$65 for a one-week pass. Parking at the municipal lot is free, so, while the pricing system may be effective in raising revenue and keeping some capacity available at beach

HARWICH PORT PARKING STUDY
FIGURE 3 | MUNICIPAL PARKING LOT EXISTING CONDITIONS



parking lots, it may encourage customers to use the municipal lot instead. Town officials noted that many visitors drop off passengers and belongings at the beach before parking at the municipal lot.

PARKING OCCUPANCY AND TURNOVER

To determine who uses the Municipal Lot, when they use it, and how long they stay, several methods of data collection were used at the lot from July 5 through July 23, 2014. The parking turnover counts took place on July 5, 2014, when the weather was mostly sunny with a high temperature of 78° Fahrenheit. The parking intercept surveys took place on July, 19, 2014, when the weather was cloudy with a high temperature of 73° Fahrenheit.

PARKING TURNOVER COUNTS

Hourly parking turnover counts were conducted on July 5, 2014 from 9:00 a.m. – 8:00 p.m. to determine the typical amount of time vehicles were parked in the study area parking lots. The weather on the day of the count was mostly sunny, with some rain in the morning but clear by 9:00 a.m. with a high temperature of 78° Fahrenheit. Counts were collected in seven lots – the South, Central, and North Municipal lots, the Village Center Shops lot, the Cape Cod Five Cents Savings Bank lot, the South TD Bank lot, and the North TD Bank lot. **Figure 2** shows the lot locations and boundaries.

The following conditions were also observed while conducting the parking surveys. While there are no marked spaces in the North Municipal Lot, parking turnover was collected based on seven available spaces. At the Mason Tree Services Lot, parking turnover was not collected since parking spaces are not defined; however, the total number of vehicles parked was collected at the same times as the turnover counts. While occupancy and turnover was recorded for unmarked spaces, they were not included in the lot's overall occupancy and turnover figures, since visitors parked in these spaces may not represent the typical visitor to the lot.

Finally, turnover counts were collected every hour, so for the purpose of this analysis, the minimum length of stay was one hour. Thus, vehicles may have been parked for less than one hour, and may not have been counted. Conversely, vehicles parked for just less than 2 hours only would be recorded as staying for one hour.

SOUTH, CENTRAL, AND NORTH MUNICIPAL LOTS

The Municipal Lot, the primary focus of the study, is divided into three areas: the South Municipal Lot, the Central Municipal Lot, and the North Municipal Lot.

- The South Municipal Lot has 31 parking spaces, of which 6 are accessible spaces with a handicap restriction. Because these spaces are not general use spaces, they were removed from the overall occupancy and turnover analysis and were instead analyzed separately.
- The Central Municipal Lot has 46 parking spaces, though three motorists parked informally in the center aisle toward the north side of the lot. Since the spaces in the center aisle of the lot are not marked spaces, they were not counted toward the total number of parking spaces, but vehicles parked in these spaces were counted toward the total number of parked vehicles, resulting in a maximum possible occupancy of over 100%.
- The North Municipal Lot has no marked spaces, but vehicles parked in seven distinct parallel spaces, so turnover was conducted based on seven spaces.

SOUTH MUNICIPAL LOT TURNOVER



Existing Parking in the South Municipal Lot

When data collection began at 9:00 a.m., the South Municipal Lot was already 92% full, and the Central Municipal Lot was 22% full. This indicates that the southern lot does indeed fill first due to its proximity to Main Street and the ocean.

The South Municipal Lot was 100% occupied at 10:00 a.m., and remained 100% occupied until 5:00 p.m., with some turnover between these periods. Of the 25 vehicles parked in South Municipal Lot at 10:00 a.m., 64% remained at 1:00 p.m., a three-hour stay and 40% remained at 4:00 p.m., a six-hour stay. The overall average turnover of all the general use

spaces in the South Municipal Lot between 9:00 a.m. and 8:00 p.m. was 4.3 hours, possibly indicating that a large portion of visitors stayed at the lot for long periods, possibly to visit the beach. The overall occupancy of the South Municipal Lot was 97% over the course of the day; there were no time periods where the lot was less than 88% full. A parking area is considered effectively full when occupancy reaches 85% of capacity.

The accessible spaces in the South Municipal Lot were generally available; over the course of the day, these spaces had an average occupancy of 30%. Vehicles using these spaces never remained longer than three hours, and most stayed for just one hour. However, all handicap-accessible spaces were occupied during the 2:00 p.m. hour, despite being having occupancies of 50% or less throughout the rest of the day. It is possible that these spaces may have been used inappropriately so that visitors could run short errands, since the South Municipal Lot was at capacity and the Central Municipal Lot was over capacity at this time.

CENTRAL MUNICIPAL LOT TURNOVER

The Central Municipal Lot was slower to fill, and quicker to empty, than the South Municipal Lot, but still had occupancies

that met or exceeded capacity from 12:00 p.m. to 5:00 p.m.

By 10:00 a.m., the lot was 85% full, and was 102% full by 12:00 p.m., with vehicles parking in the drive aisle at the north end of the lot. After meeting or exceeding capacity until 5:00 p.m., occupancy dipped to 80% at 5:00 p.m. and decreased thereafter. At 3.8 hours, the average occupancy of vehicles parked in the Central Municipal Lot was slightly lower than that of the South Municipal Lot, but still long enough to suggest that many visitors utilize the lot to access the beach. The average occupancy over the course of the day was 80%.

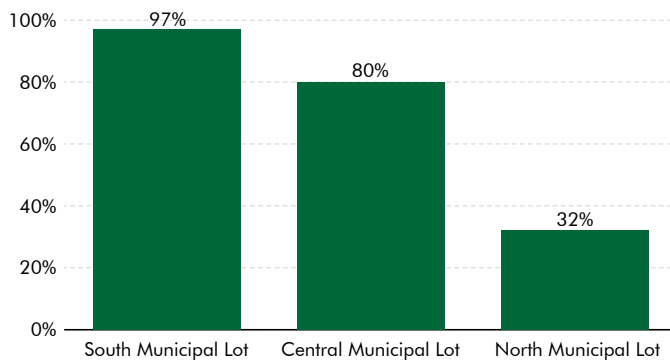
NORTH MUNICIPAL LOT TURNOVER

The North Municipal Lot, having no marked spaces, is similar to the drive aisle of the Central Municipal Lot in that visitors do not tend to park there until necessary.

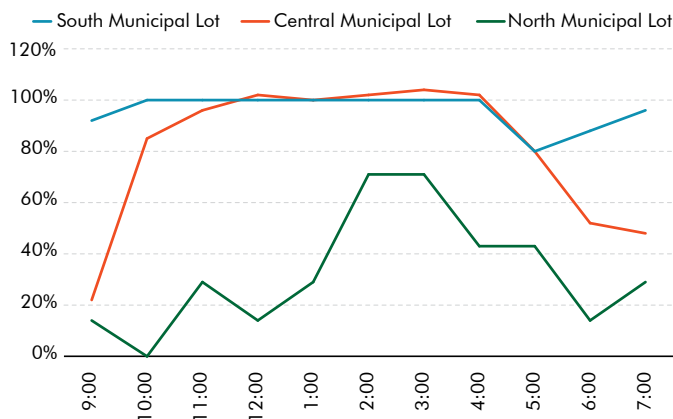
This lot may also be used for residents or visitors to the adjacent residences; one vehicle parked in this area for three separate sessions. The lot was not more than 29% utilized until 2:00 p.m., when it was 79% occupied, though it drops to 43% at 4:00 p.m. and 29% at 6:00 p.m. The average duration of parked vehicles was two hours; no vehicle stayed parked in this area for more than four hours, and several stayed for just one hour. The average occupancy of the North Municipal Lot



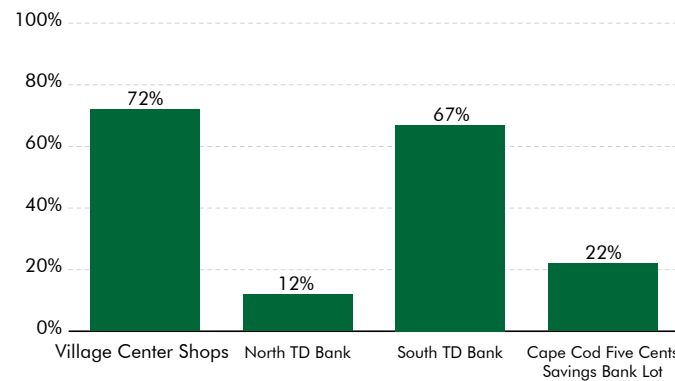
Informal Parking in the Central Municipal Lot



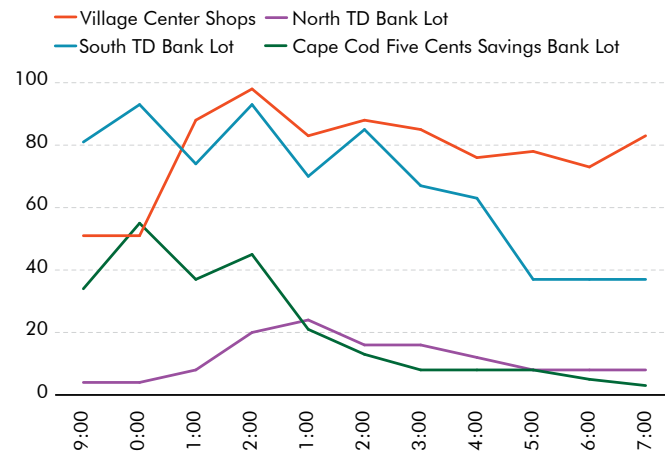
HARWICH PORT MUNICIPAL LOTS AVERAGE OCCUPANCY BY PERCENTAGE



HARWICH PORT MUNICIPAL LOT AVERAGE OCCUPANCY BY PERCENTAGE OVER TIME



HARWICH PORT AREA LOTS AVERAGE OCCUPANCY BY PERCENTAGE



HARWICH PORT AREA LOTS AVERAGE OCCUPANCY BY PERCENTAGE OVER TIME

was 32%. The low occupancy of the North Municipal Lot may be attributed to the lack of marked parking spaces, which may deter some visitors from parking in these informal spaces.

ADJACENT LOTS

While they are not the primary focus of the study, the four adjacent parking lots were studied because some beachgoers may park in these lots.



The Village Center Shops parking lot abuts the Harwich Port Municipal Lot to the east.

VILLAGE CENTER SHOPS LOT OCCUPANCY SURVEY

The Village Center Shops lot, which abuts the Harwich Port Municipal Lot to the east and connects directly to the municipal lot, contains 41 general use parking spaces and one handicap

parking space. It had a relatively high occupancy rate and average turnover compared to the other adjacent lots, but still had lower occupancy rates than the South and Central Municipal lots. The Village Center Shops was full from 51% to 88% full between 10:00-11:00 a.m., and remained above 75% until 6:00 p.m., peaking at 98% full at 12:00 p.m. The average turnover of the Village Center Shops lot was 3.4 hours, and the average occupancy was 72%.

SOUTH TD BANK LOT OCCUPANCY SURVEY

The South TD Bank lot, which lies just west of the Mason Tree Services lot, had the lowest average turnover of any of the lots studied. Vehicles remained in the South TD Bank Lot for an average of 5.0 hours, indicating heavy use by beachgoers, since banking activity typically has a short turnover. The long occupancy likely reflects some employee use of the lot; however, TD bank closes at 1:00 p.m. on Saturdays, the day data was being collected.

NORTH TD BANK LOT OCCUPANCY SURVEY

The North TD Bank lot, which can be accessed only using the South TD Bank lot, had a significantly lower parking demand than the South TD Bank Lot.

The average occupancy of the lot was just 12% over the course of the day, peaking at 24% during the 1:00 hour. Town officials stated that this lot is only rarely used and is relatively unknown. At 11:00 a.m., when the municipal lot was very close to capacity, just 8% of the North TD Bank lot's 25 spaces were filled.

Despite the low occupancy rates, the average stay of the vehicles that did park in the North TD Bank lot was 3.6 hours, indicating that some beachgoers or employees of area businesses may use the lot if the municipal lot is full.

CAPE COD FIVE CENTS SAVINGS BANK OCCUPANCY SURVEY

The Cape Cod Five Cents Savings Bank lot had an average occupancy of just 22% throughout the day, peaking at 55% during the 10:00 a.m. hour. Occupancy rates were less than 10% from the 3:00 p.m. hour until the end of the day. The average turnover of vehicles in the Cape Cod Five Cents Savings Bank lot was 2.0 hours.

The low occupancy rates and average turnover indicates that the lot is likely used primarily for banking activity.

INTERCEPT SURVEY

In addition to occupancy and turnover data, an intercept survey was conducted at the municipal lot on Saturday, July 19, 2014. The survey was conducted between 9:00 a.m. and 2:00 p.m., when the lot was fully occupied.

Users of the lot were asked the following questions while exiting their vehicles:

- What is your origin/hometown?
- Is your purpose of parking in the lot for nearby work, shopping/eating, going to the beach, or something else (please specify)?
- What is your destination?
- What is your anticipated duration of parking?
- How often do you park in the Harwich Port Municipal lot?

In addition to these questions, the time of arrival, number of passengers (including the driver), and parking zone (South, Central, or North Municipal Lot) were recorded for each ve-

hicle that parked in the lot. After completing the survey, visitors sometimes expressed their feelings on the lot or the general availability of parking in the area. Comments included:

- There is enough all-day parking;
- Are you going to start charging for this lot?;
- There are vehicles parking in the center of the road;
- Cars should not be able to idle by the entrance to the Harwich Chamber of Commerce;
- A couple stated they use the lot more often in the winter;
- Cars parked in the North Municipal Lot block my driveway because it is lacking "No Parking" pavement markings.

Figure 4 shows the origins of the users of the municipal lot on Saturday, July 19, 2014. As shown in Figure 4, more out-of-town users use the lot than users from Harwich.

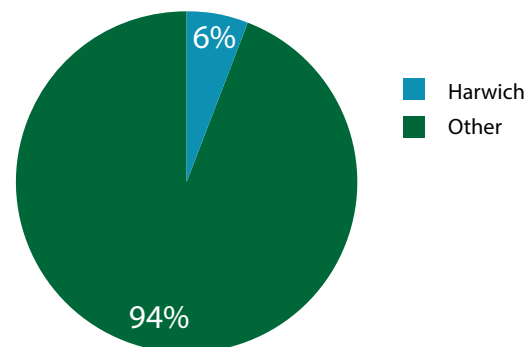


FIGURE 4 | ORIGIN OF USERS OF HARWICH PORT MUNICIPAL LOT

Figure 5 shows the destinations of users of the municipal lot on Saturdays. As shown in Figure 5 a much greater percentage of those surveyed use the lot to access the shops and restaurants (77%) than the beach (9%) or work (3%). This indicates that, while the lot is primarily used to park during the weekend to explore the town, there is also some demand for long-term parking for other activities, such as going to the beach or to work. It should be noted that some users of the municipal lot may have been hesitant to report that they were headed to the beach.

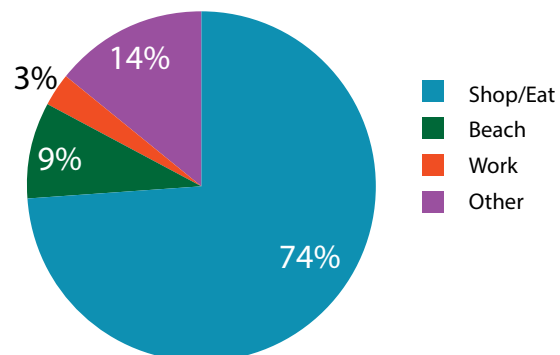


FIGURE 5 | DESTINATION OF USERS OF HARWICH PORT MUNICIPAL LOT, SATURDAY

Figure 6 shows the duration of stay of the users of the Municipal lot, as estimated by the users, on Saturdays. As shown in **Figure 6**, a much larger portion of users of the Harwich Port Municipal lot use the lot for short-term parking versus long-term parking. Of those who responded, 55% stated they were staying for less than one hour while 45% said they were planning on staying for more than an hour, including 8% who said they would be staying longer than 4 hours. These values indicate that the lot was being used primarily for quick shopping or dining trips rather than long visits to the beach. However, these figures do not include 89 drivers (53%) who were not sure how long they would be parked, did not answer this question, or were unable to be surveyed due to heavy lot activity. Those who stated that they were unsure of how long they would be parked were likely longer-term parkers, since short-term visitors likely plan to visit a small number of specific locations.

The differences in weather may help to explain the discrepancy between average turnover of vehicles reported in the turnover counts and the reported duration of stay reported in the parking occupancy counts. It is also possible that beachgoers underreported their anticipated length of stay.

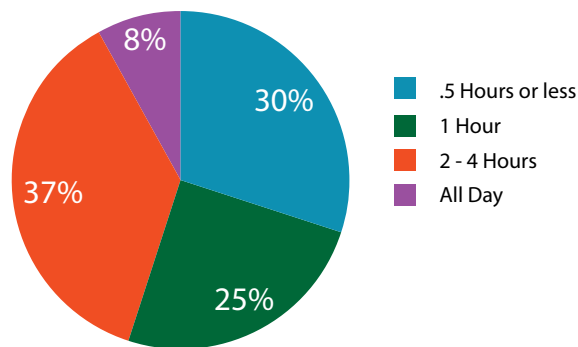


FIGURE 6 | REPORTED DURATION OF STAY AT MUNICIPAL LOT

SUPPLEMENTAL PARKING OCCUPANCY COUNTS

Town of Harwich officials conducted spot counts at the Harwich Port Municipal Lot and the surrounding lots during three days in July 2014. These counts measure occupancy only; detailed turnover data was not collected.

On Monday, July 7, a pleasant but windy day, activity at the lot was markedly lower than observed on Saturday, July 5, despite heavy vehicle and pedestrian traffic on Main Street (Route 28). The South Municipal Lot had occupancies of 85% or higher from 11:00 a.m. through 3:45 p.m.; however, the Central Municipal Lot never had occupancies over 36% over the course of the day.

At the other area lots studied, occupancy rates were also lower

than on July 5; the occupancy rate of the Village Center Shops lot peaked at 50% at 11:00 a.m., and the South TD Bank lot had a maximum occupancy of 48% at 11:00 a.m. Occupancy rates at the South TD Bank lot never exceeded 10%, and peaked at 68% at the Cape Cod Five Cents Savings Bank lot.

On Saturday, July 12, a warm, sunny day with heavy beach activity, the municipal lot was mostly full throughout the day. The South Municipal Lot had occupancies of at least 85% from 9:00 a.m. through 7:00 p.m., including 100% occupancy of non-handicap spaces at 11:00 a.m., 1:00 p.m., and 3:00 p.m. The Central Municipal Lot had occupancies of above 90% at 11:00 a.m., 1:00 p.m., and 3:00 p.m., and the North Municipal Lot had seven vehicles parked at 1:00 p.m. and eight parked at 3:00 p.m.

These occupancy values indicate heavy usage for beach users given the pleasant weather. Occupancy rates at the Village Center Shops lot peaked at 86% at 3:00 p.m. It was noted that the rear spaces of the Village Center Shops lot were used more than the spaces near the entrance to the Village Center Shops, suggesting that would-be users of the municipal lot used the Village Center Shops lot once the municipal lot was full.

The South TD Bank lot had peak occupancy of 60% at both 11:00 a.m. and 1:00 p.m., while the North TD Bank lot occupancy rate peaked at 12% at 11:00 a.m. The Cape Cod Five Cents Savings Bank lot had peak occupancy of 48% at 11:00 a.m., but was completely empty at 1:00 p.m., 5:00 p.m., and 7:00 p.m.

On Wednesday, July 23, a warm, breezy day, parking activity at the municipal lot was somewhat subdued. Occupancy rates at the South Municipal Lot were heavy from 11:00 a.m. through 3:00 p.m., but there was less activity in the Central Municipal Lot, where occupancy peaked at 60% at 1:00 p.m. The overall occupancy of the municipal lot's marked, non-handicap spaces was 73% at 1:00 p.m., the peak hour of all the periods observed; parking lots are considered effectively full at 85% occupancy.

The Village Center Shops lot was relatively empty throughout the day, peaking at 28% at 3:00 p.m. The South TD Bank lot had peak occupancy of 52% at 11:00 a.m., while the North TD Bank lot was empty throughout the morning and afternoon except for one parked car (4% occupancy) at 1:00 p.m. The Cape Cod Five Cents Savings Bank lot had peak occupancy of 38% at 11:00 a.m. A music festival took place at 6:00 p.m. until 9:00 p.m. Occupancy counts were taken at the North TD Bank lot at 7:00 p.m., and the lot was 100% full. It can be assumed that all the other lots in the area were full or nearly full. Town officials noted that parking was being closely managed by police officers, who directed visitors to empty spaces and blocked potential informal spaces with traffic cones.

PARKING OCCUPANCY AND TURNOVER SUMMARY

As anticipated, the municipal lot experiences high occupancy rates during warm, pleasant days when beach activity is heavy. The average turnover in the lot during one of these days was about four hours; while some visitors to the lot parked for an hour or less, others were parked for the full 11 hours surveyed, perhaps even longer. While it is unlikely that those parking in the lot for long periods are all beachgoers, as some may be employees of nearby businesses or exploring the area on foot or on bicycles, it is likely that a significant portion of the users of the municipal lot are destined for the beach.

At the other area lots surveyed, the Village Center Shops lot and the South TD Bank lot had the highest occupancy rates with average occupancies of 72% and 67%, respectively, over the course of a day. Similar occupancy rates were reported on the warmer days in counts conducted by the Town. Each also had average turnover lengths of longer than 3 hours, indicating that visitors are doing more than dining or visiting the bank. It is likely that some visitors to these lots are destined for the beach. Occupancy rates at the South TD Bank lot were low, but vehicles tended to stay for over three hours. Parking activity at the Cape Cod Five Cents Savings Bank lot appeared to be related to the bank, as occupancy peaked at about 50% and average turnover was just over one hour.

Future Considerations

It is clear that the municipal lot is not satisfying the peak summer time parking needs of the Town, as the demand for the municipal lot exceeds capacity on most summer days with pleasant weather.

As a result, vehicles tend to park in unmarked spaces, block driveways, and likely park in adjacent private parking lots. This high demand for parking during peak periods may be eased by increased management of the spaces in the municipal lot and the addition of parking spaces.

RECONFIGURE MUNICIPAL LOT

In evaluating the existing municipal parking lot layout, it is possible to increase parking capacity to meet the current demand at the municipal lot. There are several opportunities to enhance the current parking layout, including a short term restriping option. Additionally, long term circulation, parking and transportation enhancements are possible.

Some possible enhancements include:

- Use the wide drive aisle of the Central Municipal Lot more effectively by striping spaces in the center of the aisle;
- Make use of the green area in the North Municipal Lot;
- Provide a multi-use path through the municipal lot connecting Pleasant Street to Main Street;
- Consolidate two driveways on the west side of the lot into one, allowing more space along the edge of the lot to be used for parking; and
- Work with TD Bank to allow the North TD Bank lot to be used as an extension of the municipal lot if a direct connection between the lots can be made.

LOW-COST, SHORT-TERM OPTION

As demonstrated by visitors to the Municipal Lot, the current paved area in the lot can be optimized to provide more parking spaces without expanding the area of the lot.

As shown in **Figure 7**, revising the circulation from the current two-way operation to a defined one way circulation with aligned 60-degree parking will provide additional paved area available for parking.

The revision with a narrower aisle provides an additional center row of 17 parking spaces. Circulation to the surrounding two rows of parking would become one-way, allowing vehicles to naturally circle through the Central Municipal Lot in search for a space. The center row of parking spaces would be accessible to either direction of traffic. The existing driveways are maintained, and there is no change in impervious area of the lot.

The total number of parking spaces increases from 77 to 83, indicating a more efficient use of space than the current layout, even when accounting for vehicles parked in the center aisle.

This is a low cost, short term option that fundamentally restripes the current parking lot with new pavement markings.

LONG-TERM OPTIONS

HSH developed three options that may be implemented in the long-term that will increase the overall number of parking spaces in the municipal lot. The options include:

1. Adding a Multi-Use Path with Combined Roadway and Parking
2. Adding a Multi-Use Path with Separated Roadway and Parking
3. Maximize Parking Capacity on the Lot

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FIGURE 7 | LOW COST, SHORT-TERM OPTION



The three options each have some common elements.

- Consolidation of some commercial driveways along the western edge of the lot;
- Making use of the wooded area of the northeast corner of the lot;
- Expansion of the plaza area adjacent to the Chamber of Commerce;
- Incorporating bicycle and pedestrian accommodation; and
- Incorporating permeable areas throughout the lot.

The driveways to Mason Tree Services, the Anchorage condominium building, and the North TD Bank Lot could also be combined and are shown in all three long-term options; this allows more space along the western edge of the lot to be used for parking. The new combined driveway and the nearby parking layout accommodate 36-foot box trucks. Other driveways and access points have been maintained. This would require overcoming inherent legal challenges that driveway consolidation presents. If these measures are not possible, parking capacity will still be added but to a slightly lesser extent.

LONG-TERM OPTION 1: MULTI-USE PATH WITH COMBINED ROADWAY AND PARKING

Long-term Option 1 proposes a multi-use path, typically 12 feet wide, along the eastern side of the municipal lot. The path is separated from parking by a parking buffer, shown with brick pavers, and has green space along the eastern edge which may be enhanced with shade trees and plantings.

As shown in **Figure 8**, the plaza area near the Harwich Chamber of Commerce office is expanded by a total of 985 SF, including a small section just west of the office.

The parking area itself consists of 98 perpendicular parking spaces with a 22-foot drive aisle. The perpendicular spaces allow for the familiar two-way travel scheme of the current municipal lot. All six handicap-accessible spaces have been moved to the west side of the lot to accommodate the shifted entrance driveway and expanded plaza area. Similar to the existing condition, School House Road would be combined with the parking lot. The layout provides an additional 21 parking spaces compared to the existing condition.

Green islands with shade trees are introduced throughout the lot. Green space is also placed at the lot entrance to provide a “gateway” feeling when entering the lot to the south.

Long-term Option 1 results in a decrease in parking area of 7,700 SF from the existing condition. The option also proposes an additional 11,800 SF of impervious area of which 8,100 SF is the multi-use path and 3,700 SF is the expanded plaza area and parking buffer, resulting in a net increase in im-

pervious area of 4,100 SF. The multi-use path could be constructed using permeable materials, in which case, Long-term Option 1 would provide a net decrease in impervious area of 4,000 SF. The plaza area can be treated with green elements similar to the existing plaza, which will make the Chamber of Commerce offices and the Municipal Lot more inviting than the existing condition.

This option provides more parking spaces than the existing condition, with a minimal increase in impervious area (or a net decrease if permeable pavement is used for the multi-use path). The option provides a separated and dedicated multi-use path that is 12 feet wide for most of its length.

LONG-TERM OPTION 2: MULTI-USE PATH WITH SEPARATED ROADWAY AND PARKING

This option highlights connectivity between Main Street and Pleasant Street by providing a dedicated roadway and multi-use path in addition to a revised parking lot layout.

As shown on **Figure 9**, the parking area provides 91 spaces, an increase of 14 from the existing condition. The six handicap-accessible spaces, all located just north of the Chamber of Commerce office, are aligned perpendicularly. To the north of these spaces are 46 angled spaces along 16.5-foot one-way northbound aisle. To the north of these spaces are 39 perpendicular spaces along a 22-foot, 2-way drive aisle. Access to the dedicated roadway is provided at driveways.

Green islands with shade trees are introduced throughout the lot. The plaza area near the Chamber of Commerce is expanded by 1,800 SF, including a section to the west of the Chamber of Commerce office that is at least 8 feet wide. The plaza area can be treated with green elements similar to the existing plaza, which will make the Chamber of Commerce offices and the municipal lot more inviting than the existing condition.

This option increases the parking area by 900 SF from the existing condition. The option also proposes an additional 7,600 SF of impervious area of which 5,800 SF is the multi-use path and 1,800 SF is the expanded plaza area. The multi-use path may be constructed using permeable materials, which would limit the increase in impervious area to 2,700 SF.

Long-term Option 2 provides an 8-foot multi-use path, a dedicated roadway separated from the parking area, and a net gain of 14 parking spaces from the existing condition. The plaza is between the Harwich Chamber of Commerce office and Main Street (Route 28) is significantly expanded, allowing for increased recreational area. The separate roadway and parking configuration will help ease congestion within the lot itself, as some entering and exiting vehicles will be separated

FIGURE 8 | LONG-TERM OPTION 1: MULTI-USE PATH WITH COMBINED ROADWAY AND PARKING



FIGURE 9 | LONG-TERM OPTION 2: MULTI-USE PATH WITH SEPARATED ROADWAY AND PARKING



from vehicles maneuvering into and out of parking spaces. However, the separate roadway may encourage through traffic and faster vehicle speeds between Pleasant Street and Main Street (Route 28), which may be an undesirable side-effect of separating the roadway and parking.

LONG-TERM OPTION 3: MAXIMUM PARKING

This option proposes to maximize the parking capacity of the municipal lot. The parking lot layout is shown on **Figure 10**. The 140 total parking spaces represent a net increase in parking of 63 spaces, an 82% increase in total parking. Of note, the wooded area in the northwest corner of the lot is converted to parking area. In the South Municipal Lot, 32 parking spaces are provided, including handicap-accessible parking spaces in roughly the same location as the existing condition. In the Central and North Municipal lots, two one-way drive aisles provide access to the remaining 108 angled spaces in the municipal lot. Green islands are provided at end points. Periodic breaks in the parking area are provided to allow access to driveways.

The total parking area of the lot increases by 7,500 SF over the existing condition. While, the expanded plaza space of 420 SF results in a net increase of 7,900 SF over the existing condition. A larger green area just north of the Chamber of Commerce office is also provided.

Long-term Option 3 provides a large amount of new parking spaces at the expense of green space and mobility of pedestrians and bicyclists. The 82% increase in total parking area would help to alleviate the existing summer parking demand. The layout of the parking spaces would allow for a straightforward circulation of vehicles searching for a parking space. However, this option does not provide a space for pedestrians or bicycles to access Main Street (Route 28).

SUMMARY AND RECOMMENDATIONS

Until funding is secured for one of the three long-term options, the Low-cost, Short-term Option could be implemented in the near future to create six additional marked parking spaces in the Municipal Lot. The Low-cost, Short-term Option takes what visitors are already doing during peak periods (parking in the center of the drive aisle) and formalizes it while still ensuring adequate drive aisles for vehicles entering and exiting a parking space.

The three long-term options studied each have unique benefits. Long-term Option 1 proposes a separated multi-use path, a significant increase in parking with 19 additional spaces, and a relatively low impact to overall green space. Long-term

Option 2 show separates parking, through traffic, and pedestrians/bicyclists, while adding 14 parking spaces. Long-term Option 3 introduces a large number of new parking spaces (63), though additional benefits are limited. All long-term options increase the size of the plaza in front of the Chamber of Commerce to varying degrees, as well as provide a connection to the North TD Bank lot via a combined driveway with Mason Tree Services and the Anchorage condominium building.

HSH recommends the implementation of Long-term Option 1 for the Harwich Port Municipal Lot. This option provides a wider and more separated multi-use path than Long-term Option 2, while having the least impact on green area of any of the three long-term options. The overall number of parking spaces is increased by 21 spaces (27%). The distribution of green space makes the lot more welcoming than the existing condition. While the dedicated roadway proposed in Long-term Option 2 would separate through vehicles from parking vehicles, it may encourage unwanted traffic and vehicle speeds through the area. Long-term Option 3 provides by far the most new parking spaces, but it does not mitigate the loss of green space or provide an accommodation for pedestrians and bicycles. The large amount additional parking spaces may not even be necessary if an effective management program is implemented. Long-term Option 1 increases parking while addressing the Town's desire for a larger plaza area, redistributed green space, and accommodation for pedestrians and bicycles.

If possible, the Town should attempt to come to an agreement with TD Bank to allow overflow parking from the municipal lot to use the North TD Bank lot. This would provide an additional 25 spaces during peak periods, and alleviate the parking demand in downtown Harwich Port. As shown in the Long-term options, a connection can be provided via a combined driveway, allowing for easy access between the two lots.

MUNICIPAL LOT MANAGEMENT

As previously stated in the Existing Conditions section, there are no parking regulations in the Harwich Port Municipal Lot except for the six handicap-accessible spaces provided. This results in a parking lot where visitors can park in any space for as long as they desire. Harwich officials noted that, ideally, spaces in the South Municipal Lot would be used by short-term parkers only, while long-term parkers, such as beachgoers, would be assigned to the back (north side) of the municipal lot. This can be achieved through better management of the municipal lot. There are two typical parking management strategies: time limits and pricing.

HARWICH PORT PARKING STUDY
FIGURE 10 | LONG-TERM OPTION 3: MAXIMUM PARKING



MANAGEMENT STRATEGIES

TIME LIMITS

Enforcement of time limits is the most basic form of parking management. The Town would determine an appropriate upper time limit where visitors would be able to park. Visitors who exceed this limit would be ticketed. Time limits would allow the Town to designate areas of the Harwich Municipal Lot for short-term parking while designating others for longer-term parking. Time limits are typically communicated through signage in the parking lot, usually governing individual parking spaces or groups of spaces. This may also be achieved through large signage, placed at transition points, that governs an entire area of the lot. Individual signs for each parking space, or one sign placed between two parking spaces, are likely the most effective at communicating the time limit restriction; as signs are more spread out, it increases the likelihood that a visitor will not see the restriction.

Time limits, in order to be effective, must be enforced. This is typically achieved manually, using chalk markings on tires or recording of license plate numbers. This process should occur at least as frequently as the time limit itself; for example, in order to enforce a 15-minute time limit, enforcement should occur at least every 15 minutes to ensure that no vehicle is parked for more than the designated amount of time. This, of course, is labor-intensive, and is more realistically achieved with time limits of two or three hours.

PRICING

The other method of managing parking is charging a small fee for use of the lot. This is typically achieved through parking meters or a permit system. Harwich, like many communities on Cape Cod, use a sticker program for beach parking. This is an effective way to raise revenue as well as curb the demand on the beach parking lots, but it may result in visitors driving a short distance away for free parking.

Parking lots should be priced to encourage turnover, not solely to generate revenue. An effective pricing system would regulate the parking demand such that there are always some

parking spaces available for those who wish to park. Naturally, high prices result in empty parking lots, and prices that are too low do little to manage demand and encourage turnover. It is important that lots are priced to reflect the demand for parking and that prices are easily changed to achieve the right balance of price and parking occupancy.

Pricing for parking lots are typically governed by parking meters. There are two general types of parking meters: standalone parking meters at every parking space and electronic pay stations. Standalone parking meters at every parking space are more noticeable to visitors and also convenient to visitors; they are located at each parking space so visitors do not need to walk far to access the meter. Modern standalone meters can also accept credit cards.

The alternative to standalone parking meters are electronic pay stations. Pay stations are typically placed in central locations in a parking lot so that one is easily accessible from any of the parking spaces in the lot. Pay stations typically print a receipt that visitors can place in their windshield, or visitors enter the number of their parking space when paying. Parking space numbers are typically printed in pavement markings as well as reinforced with signage so that it is easily visible whether a vehicle is parked in a space or not. While both are effective, the printed receipt function system visitors to walk

back to their car and is also more difficult to enforce than a numbered space system.

Another method of payment for parking is Park and Pay method, which is used in many MBTA Commuter Rail parking lots. Visitors park in a numbered space, and then insert cash into an associated numbered lockbox. This payment typically grants parking for an entire day, as it does not enforce a time limit like a parking meter does. Thus, this method does not encourage vehicle turnover, and is likely an undesirable payment method for the municipal lot.

Revenues generated by pricing parking in the municipal lot may be re-invested in the downtown area with new public amenities, roadway and sidewalk repairs, landscaping, etc. A commitment to using parking funds for local, downtown improvements may make the public more supportive of implementing a pricing plan for the municipal lot.

The cost to provide electronic pay



Electronic pay stations such as these can replace dozens of standalone parking meters.

stations is about \$1000 each. Electronic meters are typically solar powered with a battery backup, so installation is relatively simple.

CASE STUDIES

Harwich Port is not alone in attempting to manage parking demand in more creative and effective ways. Communities on Cape Cod, in Massachusetts, and across the country have developed effective parking management systems that encourage turnover and keep spaces available where people want them.

PROVINCETOWN, MASSACHUSETTS

In addition to two manned lots with hourly parking rates, Provincetown has four unmanned municipal parking lots that are enforced using pay stations with an hourly rate. The lots are enforced from April 1 through October 31, seven days a week (including holidays) from 8:00 a.m. to 12:00 a.m. The price of these parking spaces range from \$1.50 to \$2.00 per hour. The money generated from these meters and the other lots throughout Provincetown is allocated to the town's parking fund, which is used for parking-related purposes and to reduce the property tax.

Provincetown is a relatively local example of a community that uses electronic pay stations to regulate parking lots. Based on its pricing scheme, it appears that the rate has been adjusted in some areas to regulate demand in certain lots. Finally, parking prices are not enforced in the off-season, when demand is lower throughout the community.

NEWTON, MASSACHUSETTS

Newton, Massachusetts's Cypress Street lot consists of 19 three-hour and 39 twelve-hour spaces. All are regulated using an electronic meter with numbered parking spaces. Certain numbered spaces have an upper limit of 3 hours per space, while the rest allow users to pay for the entire day from start to end of enforcement. This generally ensured that three-hour spaces turned over, though occupancy still reaches 100% during peak periods. Once the twelve-hour spaces fill, some long-term visitors elected to park in the short-term space and risk a ticket.

This case study shows that electronic pay stations can be effective with two separate parking regulations, though overall parking demand for both short-term and long-term spaces outpaced supply. However, the short-term spaces did turn over more frequently than the long-term ones.

SAN FRANCISCO, CALIFORNIA

San Francisco has implemented an innovative pricing system called SF Park, which uses sensors in parking spaces to determine the occupancy and turnover of parking spaces. This data is used to determine whether on-street parking is priced effectively to ensure that about parking space open space per block is available. If occupancy is too low in one area and too high in another, the City of San Francisco adjusts the prices of these spaces until their goal of one open space per block is achieved. In the months since beginning their testing of the system, San Francisco has been successful in freeing up spaces in congested areas while filling spaces in quieter areas, and the average price of parking has actually decreased since the before the SF Park program.

While Harwich is not a comparable community to San Francisco, this case study illustrates the effectiveness of setting the correct price for parking. While parking was not free before the SF Park system like it is at the Harwich Port Municipal Lot, prices set too low can cause congested parking areas. If and when a pricing system is implemented at the municipal lot, the occupancy of the lot should be monitored to ensure that the set price is not too low or too high to encourage use and turnover of the lot.



A SF Park smart meter

SALEM, MASSACHUSETTS

Salem, Massachusetts had a perceived parking problem, where visitors were concerned about a shortage of parking. However, its parking garage was largely vacant. The issue was the pricing scheme. The parking garage charged \$1.50 per hour while on-street spaces charged just \$0.50 per hour. This resulted in visitors circling for on-street spaces and disregarding the garage as an option. The City of Salem alleviated this issue by switching to a demand-responsive pricing scheme for

both on-and off-street parking spaces, with off-street parking more affordable than on-street spaces. Parking meters also set a four-hour limit to encourage some turnover while allowing visitors to walk through the city without worrying about moving their car. The plan has made it easier to find parking spaces around downtown Salem.

This example shows the importance of setting a price that is consistent with the demand for a parking space. Salem also implemented a time limit that was effective in encouraging visitors to stay in the area for an extended period without using a valuable parking space for the entire day.

SUMMARY AND RECOMMENDATIONS

TIME LIMITS

The Harwich Port Municipal Lot is not currently managed, and visitors are allowed to park for long periods of time, for free, in any of the 77 marked parking spaces. During peak periods in the summer, demand for these parking spaces is very high, resulting in vehicles parked in unmarked spaces and very likely overflow into adjacent private parking lots.

The lack of time limitations on any of the parking spaces allows visitors, particularly beachgoers, to park in any space for very long periods of time, reducing the number of available spaces for short-term shoppers and diners.

Enforcing time limits on some or all of the spaces in the municipal lot would achieve the goal of making some spaces close to Main Street (Route 28) available to short-term users. A time limit of 2 hours may be too short for those patronizing local restaurants, while time limits of 4 hours or more may not discourage beachgoers from parking in restricted spaces. A three-hour time limit should achieve the goal of encouraging turnover and allowing visitors ample time to explore local businesses. A three-hour time limit is also less than the average turnover currently observed on a warm, sunny summer day, indicating that this time limit would have an effect on current behavior. Since the goal is to free up spaces near Main Street rather than prohibit beachgoers from using the lot altogether, time limits should be longer, or removed altogether, from spaces located on the north side of the lot.

HSH recommends that the three-hour limit apply only to the 25 general use spaces in the South Municipal Lot in the Existing Conditions and the Low-cost, Short-term options while spaces in the Central Municipal Lot remain unrestricted. The natural division of parking spaces between the South Municipal Lot and the Central Municipal Lot will make the designation easy to distinguish. Because 16 of these 25 spaces had average turnover times of over three hours, this restriction would make a significant difference in the number of available

parking spaces in the South Municipal Lot.

In the long-term, a similar proportion (about one third) of spaces should be designated as three-hour spaces. The Town should continue to observe these short-term spaces to determine whether some spaces are generally available during a busy summer day; if occupancy of these spaces remains above 90%, more short-term spaces should be designated. The Town should be wary of the potential of increased use of lots such as the Village Center Shops lot or the TD Bank lots by beachgoers if a large portion of the municipal lot is designated as three-hour parking.

Time limits can be implemented in the short-term and/or if pricing is not implemented; however, time limits must be routinely enforced to be effective.

PRICING

If time limits alone prove to be ineffective or too difficult to enforce to be considered a long-term solution, introducing a pricing scheme for the municipal lot may help to encourage turnover and ensure short-term parking is generally available close to Main Street (Route 28). There is no charge for parking at the municipal lot, which incentivizes beachgoers to park in the municipal lot rather than the permit-only beach lots, despite a quarter-mile walk. HSH recommends the use of electronic pay stations with numbered parking spaces to govern a paid parking condition. This allows for fewer fixtures in the parking lot easier parking enforcement, and easier rearrangement of parking spaces if necessary.

Pricing should encourage turnover without imposing a large burden on visitors. Short-term parking spaces may also be treated differently than long-term ones. Short-term spaces should cost in the range of \$1.00 per hour and should be adjusted until several spots in the short-term lot are generally available throughout the day. To encourage users to use the lots for short-term trips, electronic meters can be programmed to make the first hour free of charge; this is recommended due to the 30% of visitors that responded to the intercept survey that stated they would be parked for one-half hour or less.

Long-term parking spaces should be priced lower than relation to beach sticker prices so that beachgoers do not abandon the municipal lot altogether. A daily pass for a beach sticker is \$15, with a one-week pass available for \$65. Long-term spaces priced at \$1.00 per hour would generate \$8.00 for an 8-hour stay, just over half the cost of a daily pass, while a \$2.00 per hour charge would cost more than a daily beach sticker. Therefore, similar to short-term spaces, long-term spaces should be priced in the range of \$1.00 per hour, with the first hour free. With this pricing scheme, there will be little confusion about cost, and short-term visitors can park in the

long-term lot without penalty. If, going forward, occupancy in the long-term lot is at or near capacity, prices may be raised independently of the short-term lot in order to ensure some spaces are usually available.

The Town of Harwich should consider the impacts to adjacent parking lots if a pricing scheme is applied to the municipal lot. The private parking lots in the area are generally unrestricted, and visitors may park in a nearby private lot rather than paying to park in the municipal lot. This may cause local businesses to increase enforcement.