HPE
Hall Planning & Engineering, Inc.

Transportation Report for the

City of Portsmouth Downtown Master Plan and Waterfront Strategy
(Portsmouth, Virginia)

Prepared For

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I. INTRODUCTION

The City of Portsmouth, Virginia, conducted a charrette with HOK and Hall Planning & Engineering (HPE) from February 16-21, 2009 in downtown Portsmouth. The focus was the revision of Portsmouth's downtown master plan and waterfront strategy. The charrette included interviews with stakeholders to identify transportation issues, as well as an examination by HPE of the area's transportation context. HPE studied traffic speeds and street designs in a sample of Portsmouth locations, conducted interviews with City Public Works and Planning staff, and met with local citizens and citizen groups.

The purpose of the charrette was to propose design solutions that could revive the economic life of the downtown and waterfront areas. HPE's goal during the charrette was to work with Portsmouth's existing streets, institutions, and traffic patterns to re-establish a safe, walkable, sustainable downtown core.

"Walkability" is a term used in this effort to describe the extent to which places are comfortable for pedestrians, cyclists and transit users. Walkable places require a mix of uses, public spaces, a fine-grained network of connected streets that provides many options for travel, managed vehicle speeds and human-scaled development placing amenities and services within a ¼ mile radius of one's home.

II. PROJECT DESCRIPTION

Portsmouth, Virginia is located on the western side of the Elizabeth River, directly opposite Norfolk. With a population of 100,500 (2000 Census), Portsmouth has a great history as a port town and city. It has miles of waterfront land and is part of the harbor of Hampton Roads.

Challenges include restoring the high levels of walkability that existed in Portsmouth prior to WWII. In the last fifty years, development patterns have emphasized automobile transportation over walkability. The resulting downtown area has become less inviting to pedestrians. HPE's assessment and recommendations attempt to soften the contemporary edge of this area and restore greater levels of walkability.

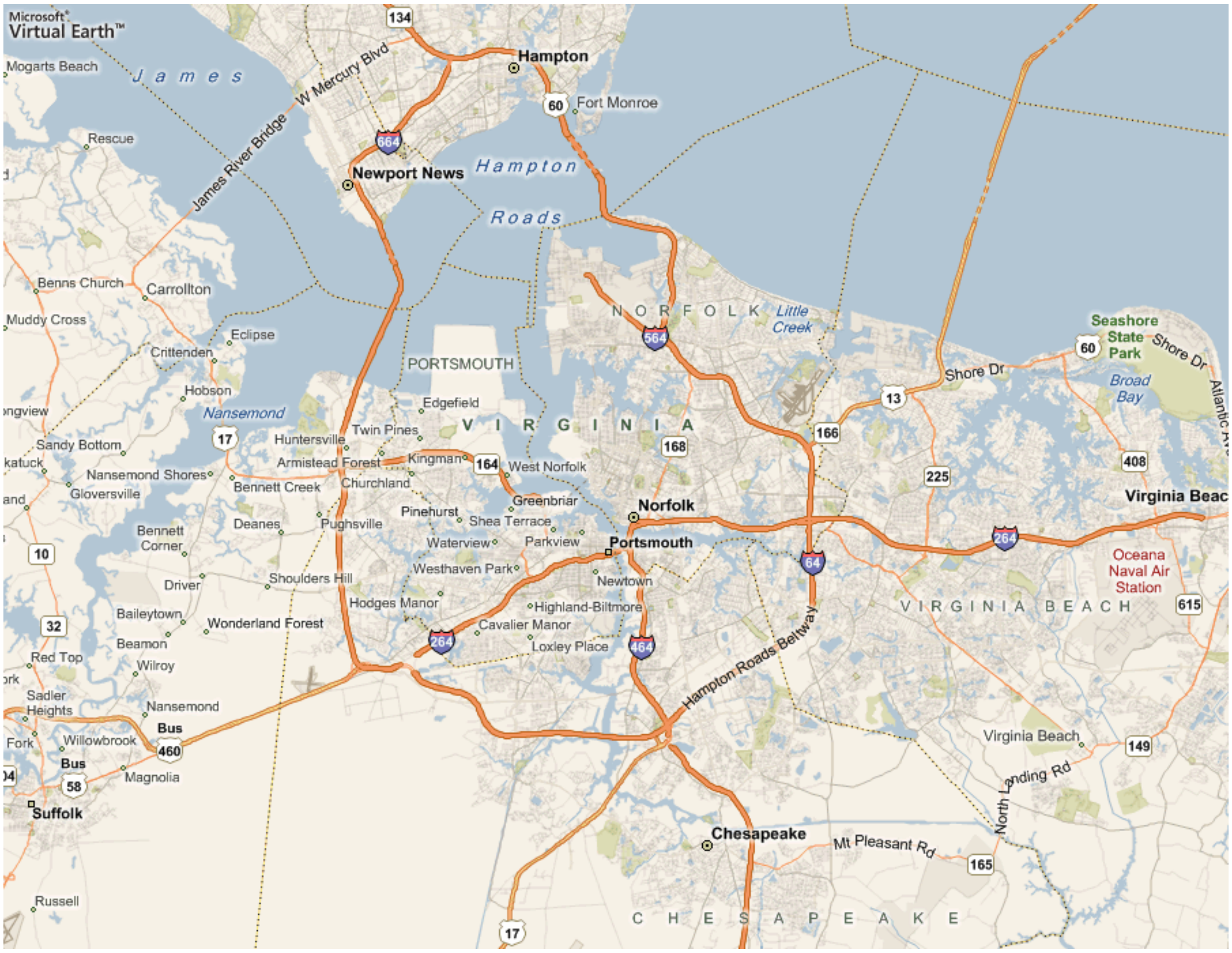

Figure 1: Location Map

III. ISSUES ANALYSIS AND RECOMMENDATIONS

From a transportation planning context, HPE recognizes the following issues for the Portsmouth Plan:

A. Walkable Urban Design
B. Walkable Thoroughfares
C. Vehicle Circulation and Mobility
D. Bicycle Facilities
E. Transit
F. Other Transportation Issues

A. Walkable Urban Design

Much of America's suburban land development pattern suffers from street and highway networks influencing its structure. Highways designated as arterials change little as they approach developed areas. Generally speeds drop from 55 to 45/35 mph, but on-street parking is usually not allowed in emerging areas and is often removed from older areas. Arterial street designs, by definition, tend to exclude intersections with side streets of limited volume, leading to longer block size (600 to 1,000 feet and higher) and higher speeds 45 mph or more, both of which cause difficulty for pedestrians. (As shown in **Figure 2**, pedestrians have a much higher chance of being killed in a collision with an automobile as the automobile speed increases past 30 mph.) The arterial street term appeared as early as 1919 in the "American Highway Engineers' Handbook" edited by Arthur H. Blanchard. The arterial function described therein by Nelson P. Lewis clearly anticipated that commercial streets 60 feet wide achieve greater success than those 80 or 100 feet in width (p. 369). The early planners, therefore, never intended arterial streets to have "access to land" limited by subsequent design manuals. Finer grained street networks better serve urban peak travel demand due to multiple streets serving multiple modes – walking, cycling, transit and the motor vehicle.

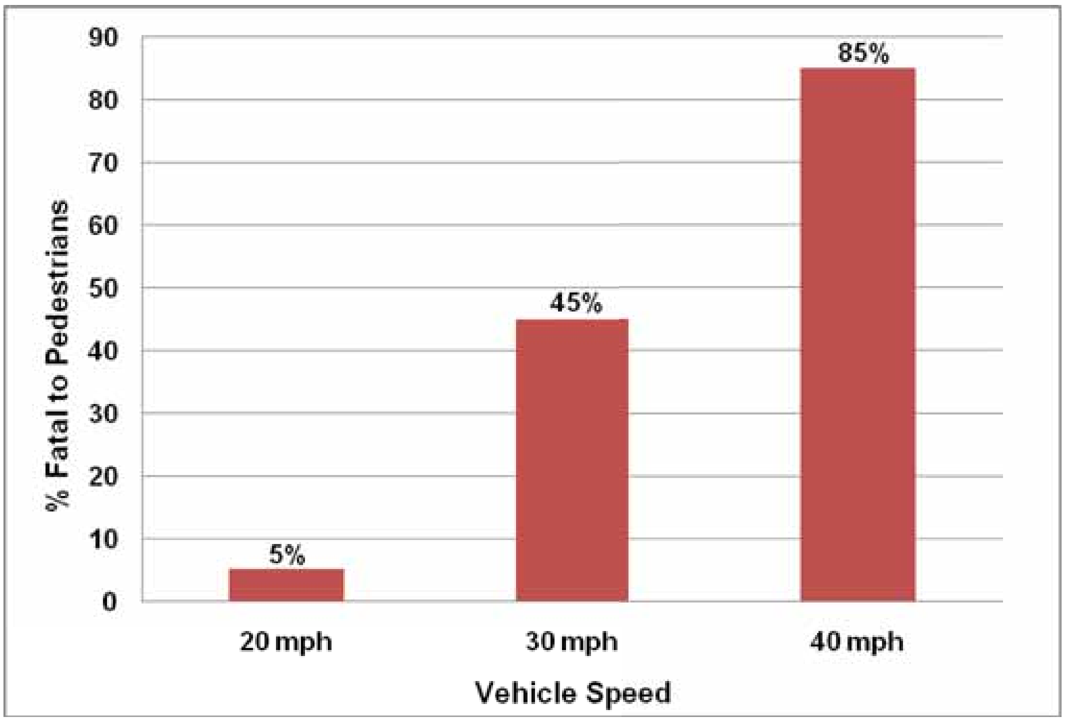

Figure 2: Percent of crashes fatal to pedestrians, related to vehicle speed
Source: U.K. Department of Transportation, *Killing Speed and Saving Lives*, London, 1987.

To achieve urban places that encourage (and thrive with) pedestrians, bicycles, and transit vehicles as part of the mobility mix, the patterns of proposed development must be specified first, during the community planning stage. Then, transportation plans for balanced mobility can be crafted with walkability considered first and vehicle mobility second. This is not to imply that motor vehicle mobility will be dramatically reduced, but that pedestrians, exposed to the open environment are more vulnerable than are drivers, and solutions for their comfort are more complex. Often, greater walkability yields only small reductions in vehicle capacity, even though vehicle speeds are lower. Generally more streets per square mile result from a more open network and drivers can avoid the degree of peak hour congestion that occurs when a limited number of large streets break down.

Downtown Portsmouth, as shown in **Figure 3**, was envisioned during the charrette to develop with higher intensities at specific locations, consistent with its historical growth patterns. These areas would be highly walkable with thoroughfare designs that promote managed traffic speeds, wider sidewalks, buildings to the back of street, trees, and other features as described below under Walkable Thoroughfares.

Insert Drawing

Figure 3: Downtown Portsmouth Charrette Vision

B. Walkable Thoroughfares

Following the paradigm of LU-1 TR-2, or Land Use First/Transportation Second, the design team identified areas for redevelopment or areas where walkability improvements were needed and created specific land use designs for these areas. Walkable thoroughfares were then created or adapted from existing street sections to serve these areas with appropriate vehicle speeds. The target speed for a walkable thoroughfare is 30 mph or less. HPE proposed revised street sections for High Street, Crawford Parkway, London Street and Court Street. The location of each of the proposed sections below is indicated in **Figure 4.**

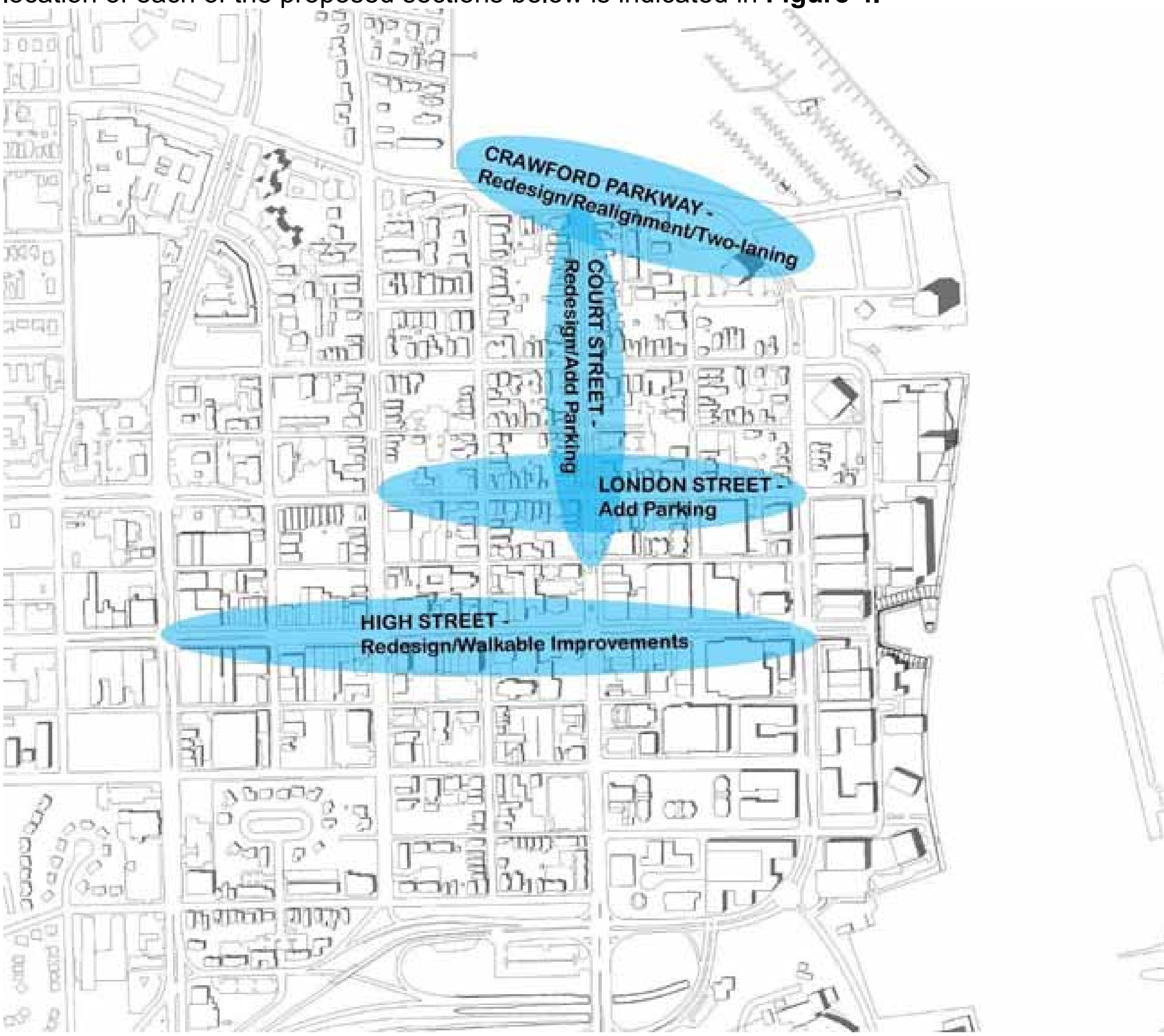

Figure 4: Focus Areas – Revised Street Sections

High Street

The charrette team applied the Walkability Index to High Street, downtown Portsmouth's commercial spine. The Walkability Index was developed by HPE as a means to objectively analyze a street's walkability by evaluating its physical design elements. Grading a thoroughfares walking environment is basic to assessing its total mobility.

For HPE's Walkability Index, the following ten criteria have been selected to indicate quality of the walking experience of High Street:

1. Measured Speed
2. Pavement Width
3. On-street Parking
4. Sidewalk Width
5. Connectivity
6. Pedestrian Features
7. Street Enclosure
8. Land Use Mix
9. Façade Design
10. Transit/Bicycle

The range of scores from 0 to 100 clearly indicates levels of walkability noted below:

SCORE	WALKABILITY LEVEL
90-100 points	High Walkability (A)
70-89 points	Very Walkable (B)
50-69 points	Moderately Walkable (C)
30-49 points	Basic Walkability (D)
20-29 points	Minimal Walkability (E)
19 points or less	Uncomfortable/hazardous for Walking (F)

Table 1: Scores and Quality of Walkability

A complete technical memo describing the Walkability Index can be found in **Appendix A**.

High Street scored an average of 69 points out of 100 as a result of applying the HPE Walkability Index to each block between Crawford Street and Effingham Street. (See **Appendix B** for full assessment). This indicates that High Street is "moderately walkable (grade of "C")."

The walkability index identified several key elements that could be improved along High Street. Better speed management and the provision of additional parking will improve its overall walkability and Walkability Index score. As shown below, improvements can be phased, some in the near-term and others in the medium to long-term, to provide Portsmouth with the flexibility to monitor the area's development and schedule improvements accordingly.

The revised design for High Street, shown in **Figure 5**, utilizes the existing right of way of 100 feet, thus avoiding significant cost. Currently, High Street utilizes 8-foot parallel parking spaces, 10-foot median and 15-foot travel lanes. HPE observed that parking was nearly 90% occupied throughout the day on most blocks, indicating a need for increased supply. By removing the median and restriping parking to reverse-angle parking, High Street could create greater on-street parking supply. The increased parking and narrower travel lanes will also help manage vehicle speeds, which in some areas were measured in excess of 25 mph. These modifications can be made within the current 58' curb face to curb face dimensions of High Street, again minimizing cost of conversion.

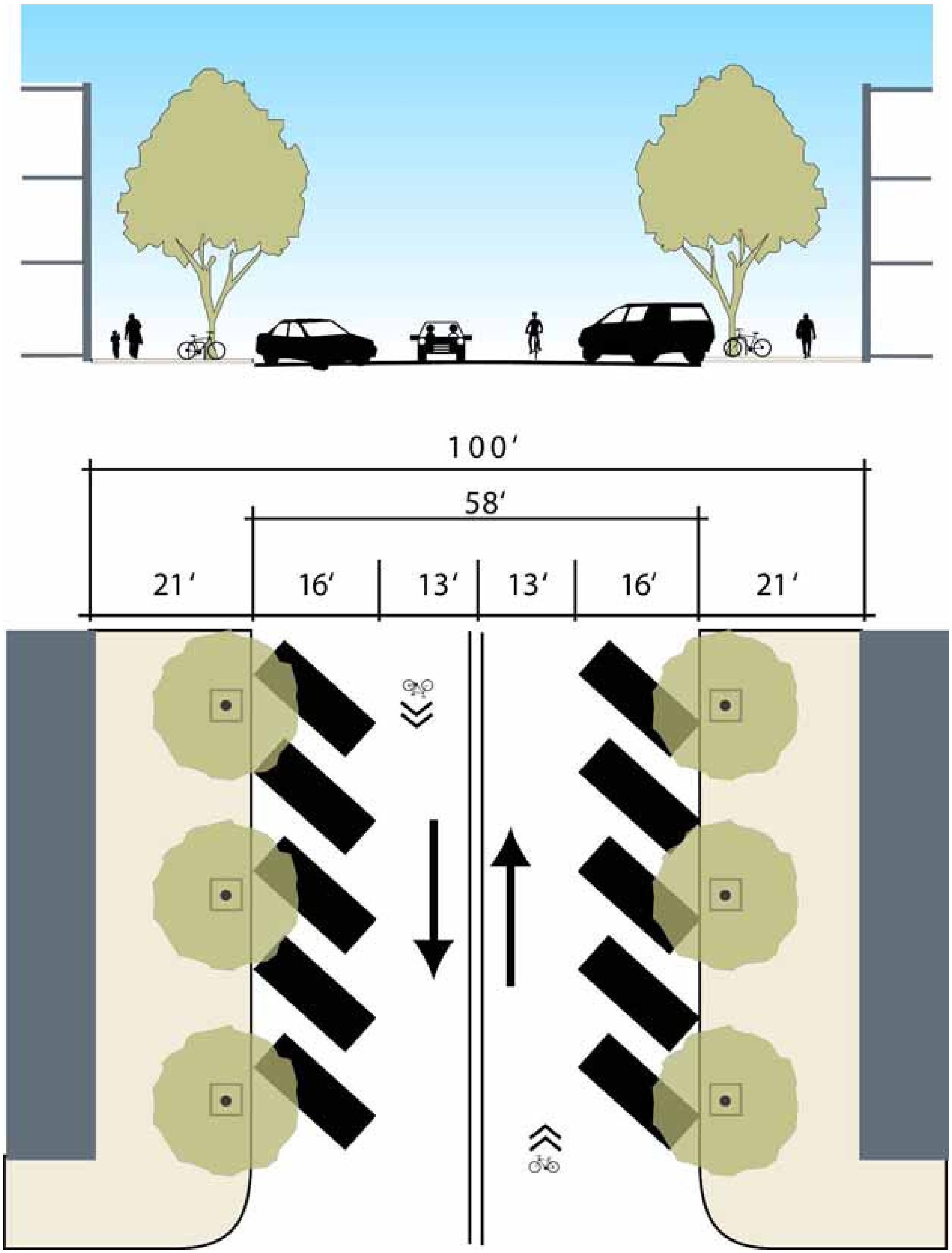

Figure 5: High Street Near-Term Improvements

Reverse angled parking has been utilized in cities throughout the country, such as Seattle, Tucson, Birmingham, Salt Lake City, and Washington DC.[1]

As shown in **Figures 6 and 7** spaces are angled in the opposite direction, compared to head-in angle parking. The entrance maneuver is quite similar to parallel parking, but requires one less step.

1. The operator pulls past the parking space with blinker actuated to indicate intent to park
2. The operator proceeds in reverse into the 45 or 60 degree angle space.

The principal benefits of this recommendation are increased parking inventory and increased safety.

Figure 6: Reverse Angle Parking in Vancouver; Shows benefit of loading cars from the curb

Figure 7: Steps to Reverse Angle Parking

[1] The images and information on reverse angle parking was obtained from the report, "Back-in/head-out Angle Parking" by Nelson\Nygaard Consulting Associates. 785 Market Street, Suite 1300, San Francisco, CA 94103. January 2005.

Cities have cited numerous safety benefits and reduction in crashes with reverse angled parking. A study of reverse or back-in angled parking was conducted in 2003, with follow-up evaluation in 2005, by GAI Consultants for the Borough of Pottstown, PA. This study discusses the implementation of reverse angled parking along an arterial highway through the Borough's central business district (CBD), the first application in Pennsylvania. Paralleling Portsmouth's history, the Borough of Pottstown has struggled to revitalize its downtown core since the middle of the 1990's. The lack of available parking, close to the retail, was seen as deterrent to continued redevelopment. Also damaging the core's revitalization efforts was the bisection of the CBD by an urban arterial, or "Main Street," that preferred vehicle mobility over urban form and the use of other modes. The Borough's Downtown Comprehensive Plan called for the "creation of a more pedestrian friendly, multi-modal environment while maximizing the amount of available parking and its proximity to the retail establishments that line the downtown core."[2]

The Borough proposed the implementation of reverse angle parking to meet the objectives of creating more parking spaces and providing a more pedestrian- and bicycle-friendly environment. PENNDOT's conditional approval required a follow up analysis of the effectiveness, efficiency and safety of the installation of reverse angle parking, which was conducted in 2005, two years after implementation. The following conclusions were made:

- The installation resulted in no reduction in operating speeds, but it was noted that speed along the corridor was never really a concern. Furthermore, it was noted that although there was no impact on operating speeds, the project did reduce the number of travel lanes from four to two, so the project may have actually had a beneficial impact on traffic flow in that they were able to accommodate the same traffic volume with half the available infrastructure with no impact to travel speed.
- Analysis of accident experience shows an overall reduction in the number and severity of accidents, though some accident categories increased, primarily due to the unfamiliar nature of the parking and the introduction of the bicycle lanes. Ultimately, accidents associated with parking spaces declined substantially. Most areas of concern can be addressed with minor changes to signage and/or striping.
- The issue of left turn exiting of vehicles out of the angled space is still a concern, though only one accident as of this study had involved such maneuver.

The post-implementation analysis concluded that reverse angle parking along High Street has been accepted favorably by the public, Borough officials and the Police. Also, partially due to the success of this project, the City of Philadelphia Traffic Guidelines now specify reverse angle as the preferred standard for angle parking.

Reverse-angle parking safety is due to users re-entering the traffic stream from a back-in angled space having a safety advantage over parallel and head-in parking spaces. Drivers in back-in angled spaces command an optimum viewing position of on-coming traffic making, it easier and safer to exit the space. They are also able to see pedestrians and cyclists more easily and do not have their vision impeded by varying lengths of adjacent vehicles. Others have also cited the advantages of the "safety zone" that is created by opening car doors in reverse angled

[2] The information on the reverse-angled parking study conducted for the Borough of Pottstown, PA was obtained from the report, "Back-in Angle Parking in the Central Business District" prepared by John A. Nawn, P.E., PTOE. April 30, 2003.

spaces, which deter children from entering the street. The doors act as a barrier and guide children more safely to the sidewalk.

The revised thoroughfare section above also includes greater bicycle accommodations. HPE observed a lack of bike racks, which discourages cyclists from frequenting the businesses along High Street. Appropriate to the context and character of High Street, a minimum of one bicycle rack, capable of supporting two bikes should be provided within the public frontage for every five vehicular parking spaces. HPE suggests use of the simple Inverted "U" rack, shown below, which supports two bikes. The racks can be ornamented to highlight the unique character and history of High Street.

Figure 8: Sample "Inverted U" Bicycle Rack

Providing shared lane markings, such as a sharrow, will also encourage greater bicycle use. A sharrow is a specific pavement marking, described below and later in the **Bicycle Facilities** section of this report. Sharrows indicate preferred routing and location for bicyclists within a thoroughfare travel lane and also indicate to motorists that cyclists are sharing the thoroughfare. Greater visibility of cyclists yields increased safety, especially in the vulnerable intersection turns area.

Sharrows are the preferred facility type for bicyclists on thoroughfares with posted speeds of 20 mph and 30 mph, particularly for streets with on-street parking. The sharrow pavement marking consists of a bicyclist or bicycle symbol with two chevrons on top, indicating the direction of travel (**Figure 9**). The sharrow should be located such that the center of the marking is along an imaginary line 5' away from the edge of the parking lane, if a parking lane is present, or 5' from the curb face if no parking lane is present. On multilane thoroughfares, the sharrow is located in the rightmost lane. The sharrow should be placed at the beginning and end of each block and at least once mid-block. If desired, a sign indicating "Share the Road" or "Bicyclists Sharing Road" may also be used in conjunction with the sharrow.

Figure 9: Sharrow Marking

Figures 10 and 11 below illustrate sharrows in use in Tallahassee, Florida. They are prevalent all over the country and are being included in the Manual on Uniform Traffic Control Devices (MUTCD) next update.

Figure 10: Sharrow in use in Tallahassee, FL

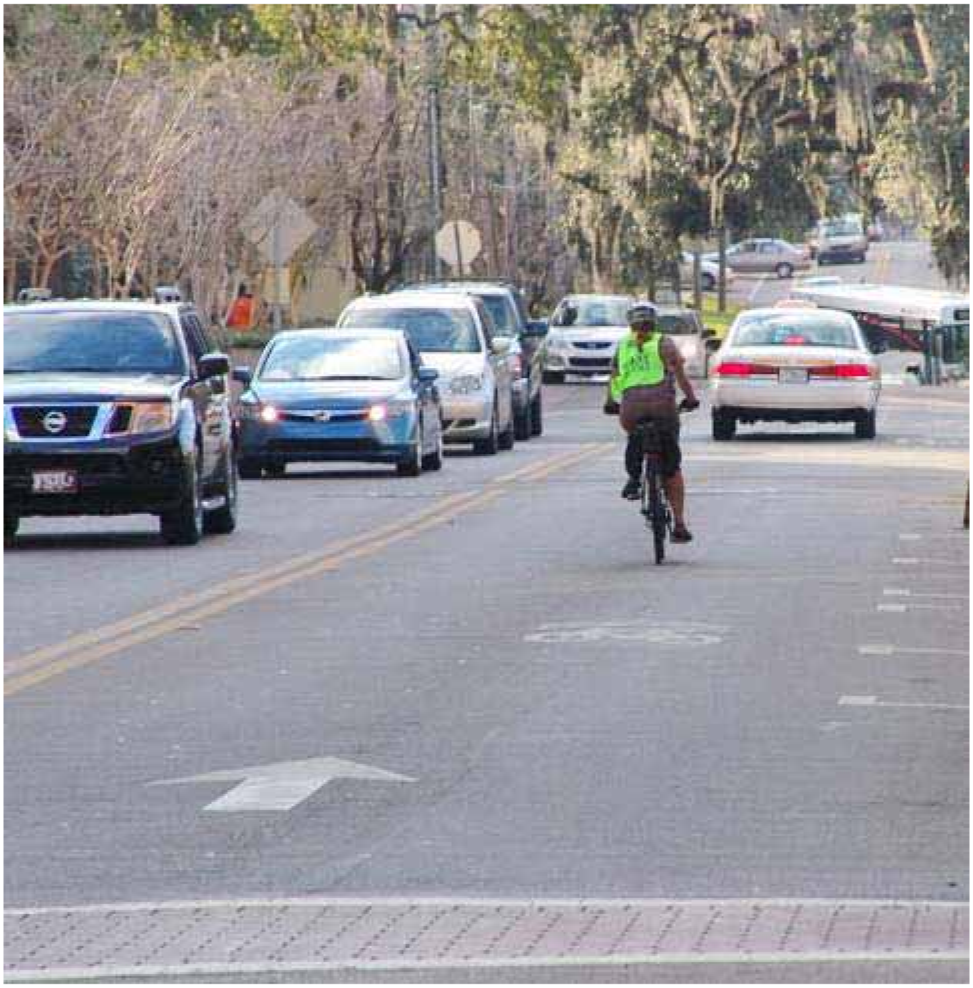

Figure 11: Sharrow in use in Tallahassee, FL

Applying these changes to High Street will greatly improve its walkability and will improve its Walkability Index score a letter grade (score improves from 69 to 72, a grade of "B" and "very walkable").

Long-term modifications include the presence of streetcars that will utilize the travel lanes, again within the existing 58-foot right of way (**Figure 12**). Streetcar and other transit recommendations are covered in greater detail in the Transit section of this report.

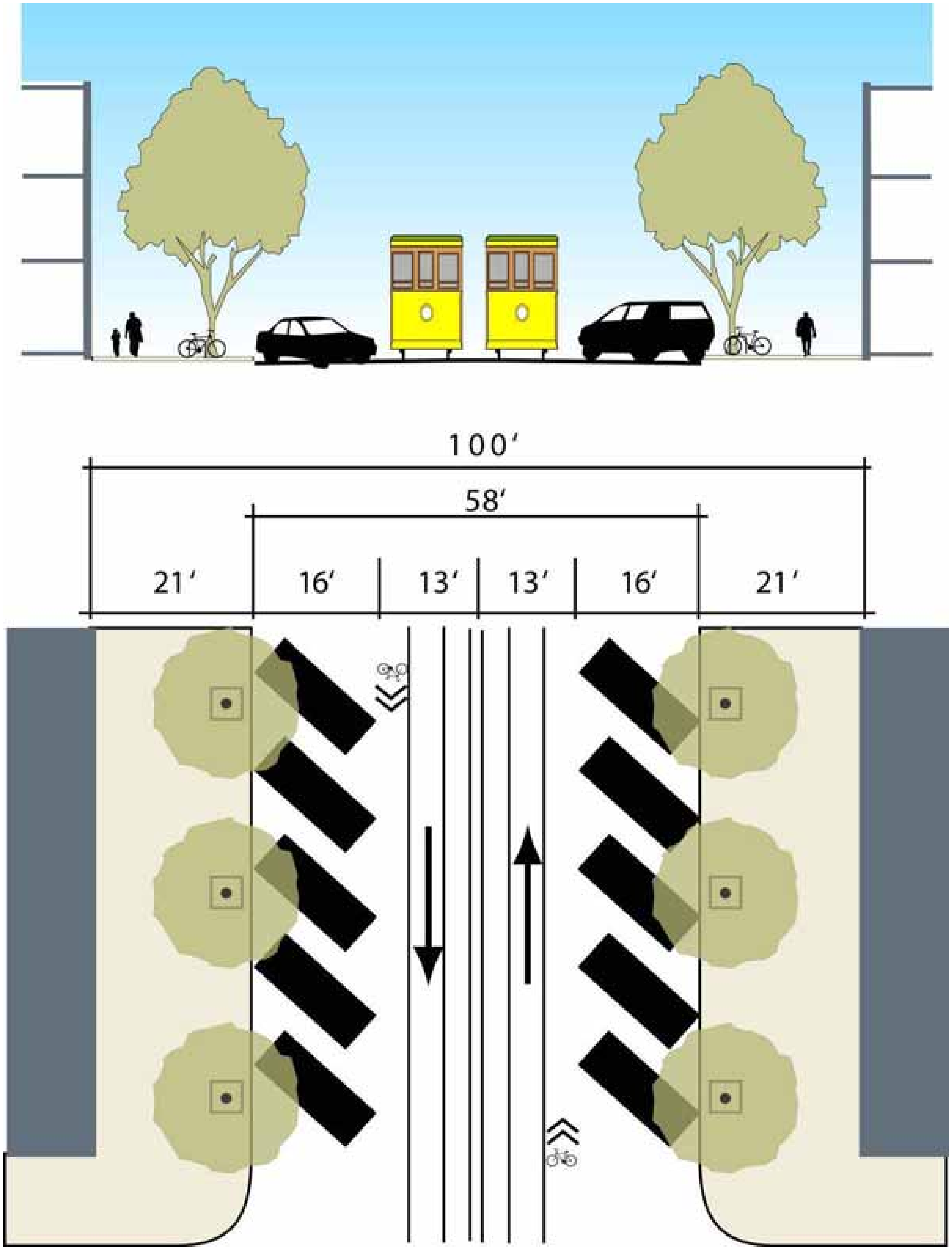

Figure 12: High Street Long-Term Improvements

Crawford Parkway

The City of Portsmouth has plans to narrow Crawford Parkway to two lanes (one in each direction between North Street and Effingham Street. The affect of this road diet provides room for a new seawall, to help prevent flooding along the roadway, as well as a new waterside path and bike lanes.

HPE proposes the use of two street sections for the newly designed Crawford Parkway consistent with its context (see **Figure 13).**

Figure 13: Crawford Parkway Thoroughfare Assignment

Figure 14 below illustrates a design for Crawford Parkway which utilizes the existing eastbound lanes for travel. The remaining right of way is dedicated to bike lanes, 12-foot shared use walking/biking path and open space that will provide ample room for a future light rail route. These improvements compliment the drive-like character of this section of Crawford Parkway along the waterfront.

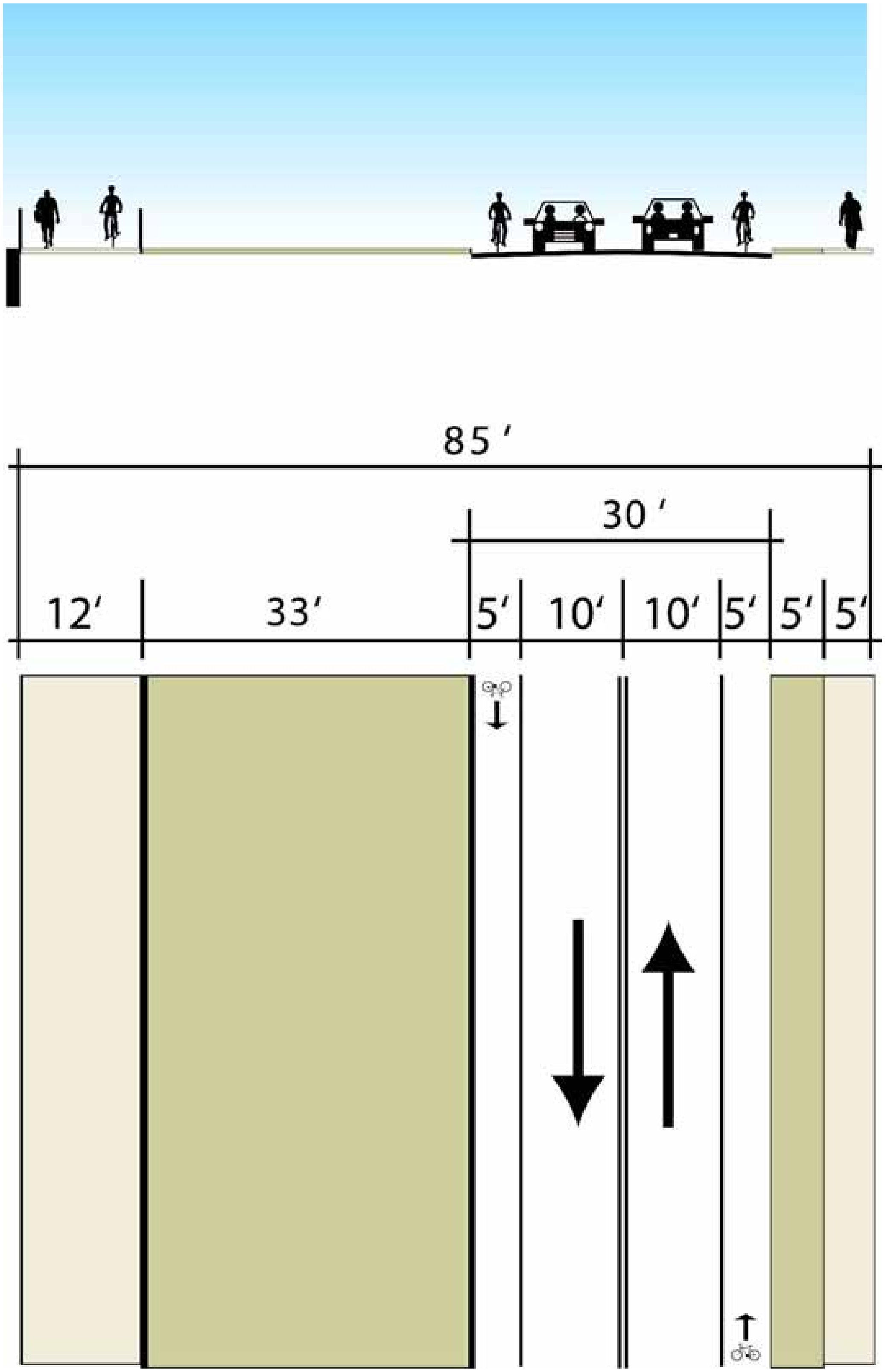

Figure 14: Crawford Parkway Drive with Shared-use Path and bike lanes

The urban street section near the new Holiday Inn should provide on-street parking and a shared lane marking or "sharrow" (**Figure 15**). HPE also suggests Crawford Parkway be realigned slightly to form two 200' radius curves, lowering the design speed (**Figure 16**).

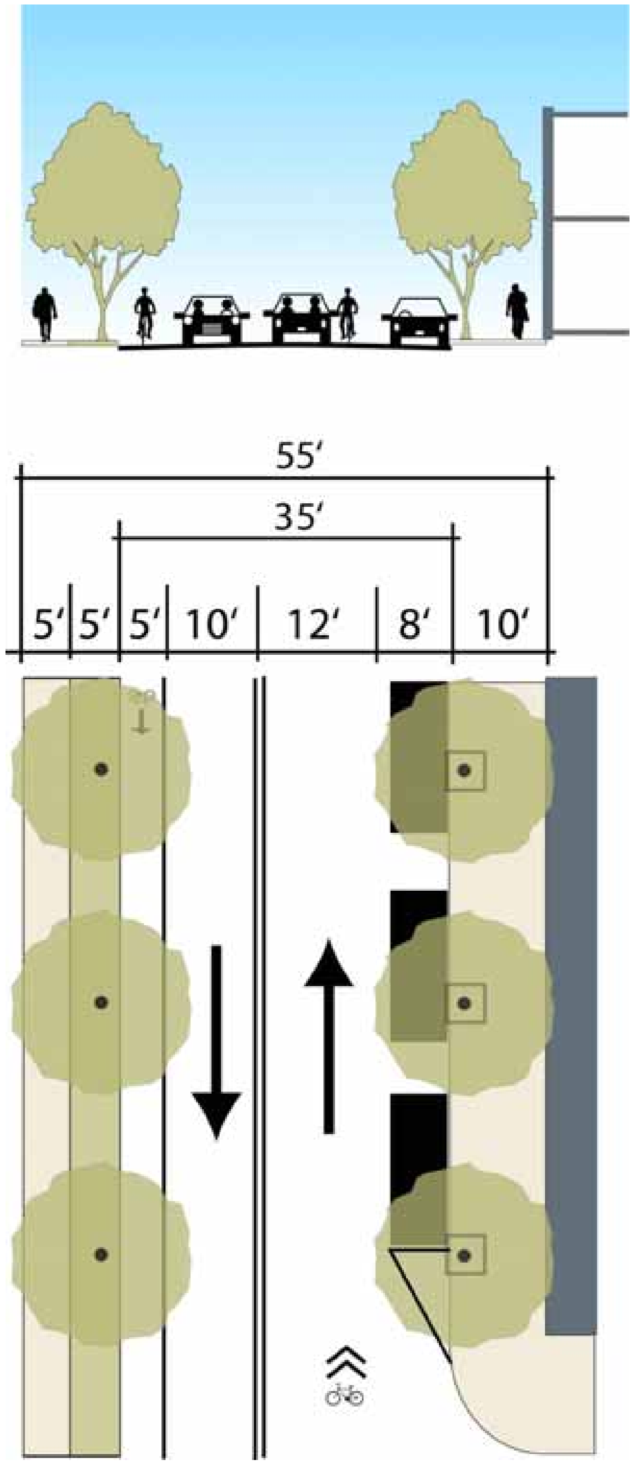

Figure 15: Crawford Parkway Commercial Street with On-Street Parking

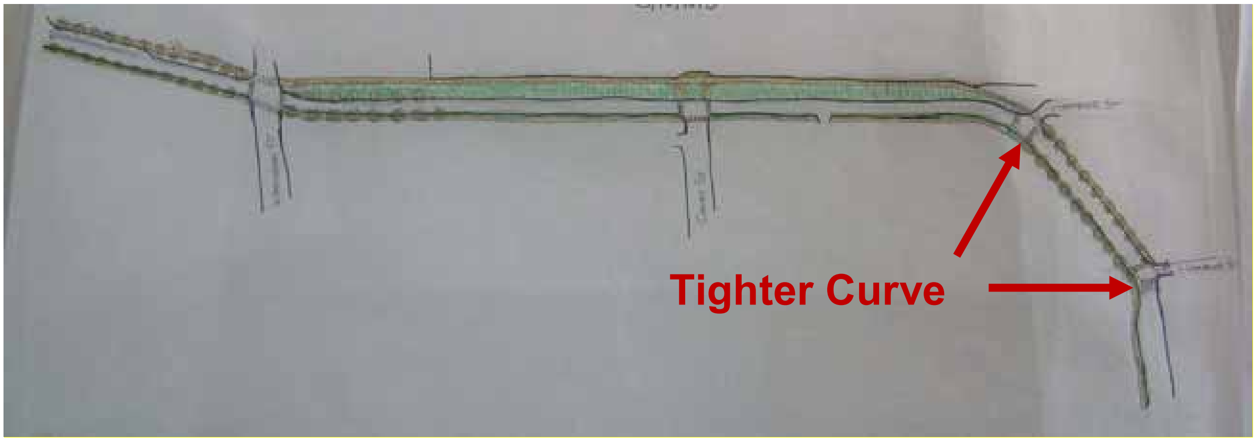

Figure 16: Crawford Parkway Realignment

London Street

Two major issues along London Street significantly affected its overall walkability: speed management and lack of on-street parking. HPE observed average speeds of 24 mph, with top speeds of 33 mph. Top speeds in excess of 30 mph are unfriendly to pedestrians. HPE also heard from residents and business owners that the lack of parking limits development potential along London Street as well as neighboring High Street.

Figure 17 below illustrates modifications to London Street, between utilizing the existing right of way. As shown, within the existing 35-foot traveled way, two 7.5-foot parallel parking lanes and two 10-foot travel lanes could be provided. Centerline striping should be removed and, where possible, Portsmouth should utilize rough pavement texture to further manage speeds to an acceptable level. Sharrows are recommended to facilitate bicycle travel on this street.

In addition to speed management, these recommended improvements are more appropriate to the residential character of London Street.

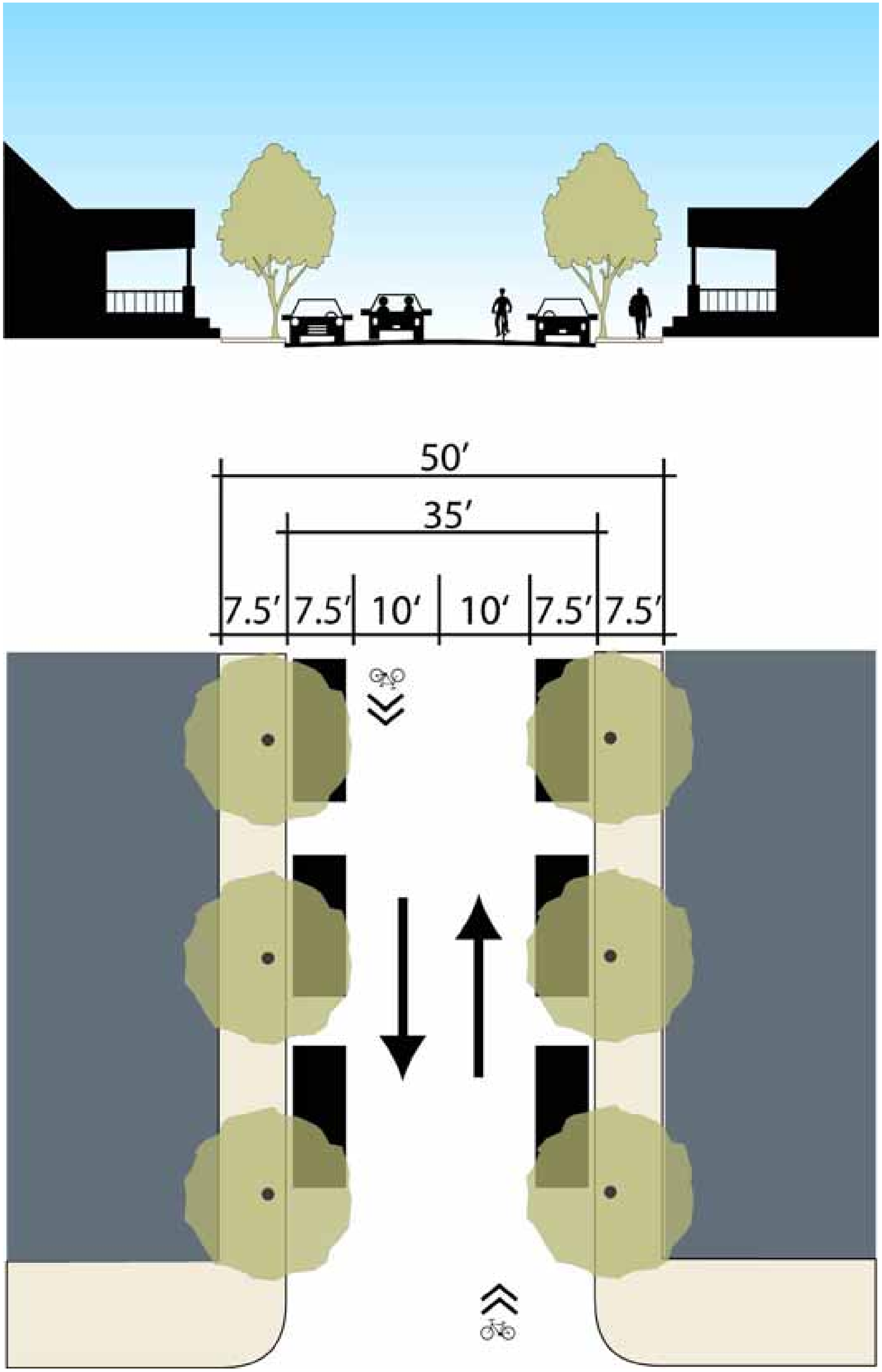

Figure 17: London Street Section with On-street Parking

Court Street

Court Street's wide travel-way (56 feet shown in **Figure 18**) presents a number of opportunities for redesign, given its changing context between High Street and Crawford Street. HPE heard from residents the need to manage speeds (average speed in excess of 25 mph) and potentially provide additional parking, specifically in commercial areas.

Court Street is a residential street between Crawford Parkway and London Street, requiring very low speeds and less on-street parking for improved walkability. As Court Street transitions into a commercial context south of London Street, on-street parking opportunities should be increased, while the presence of other elements such as increased pedestrian activity and taller, denser buildings will help to manage speeds.

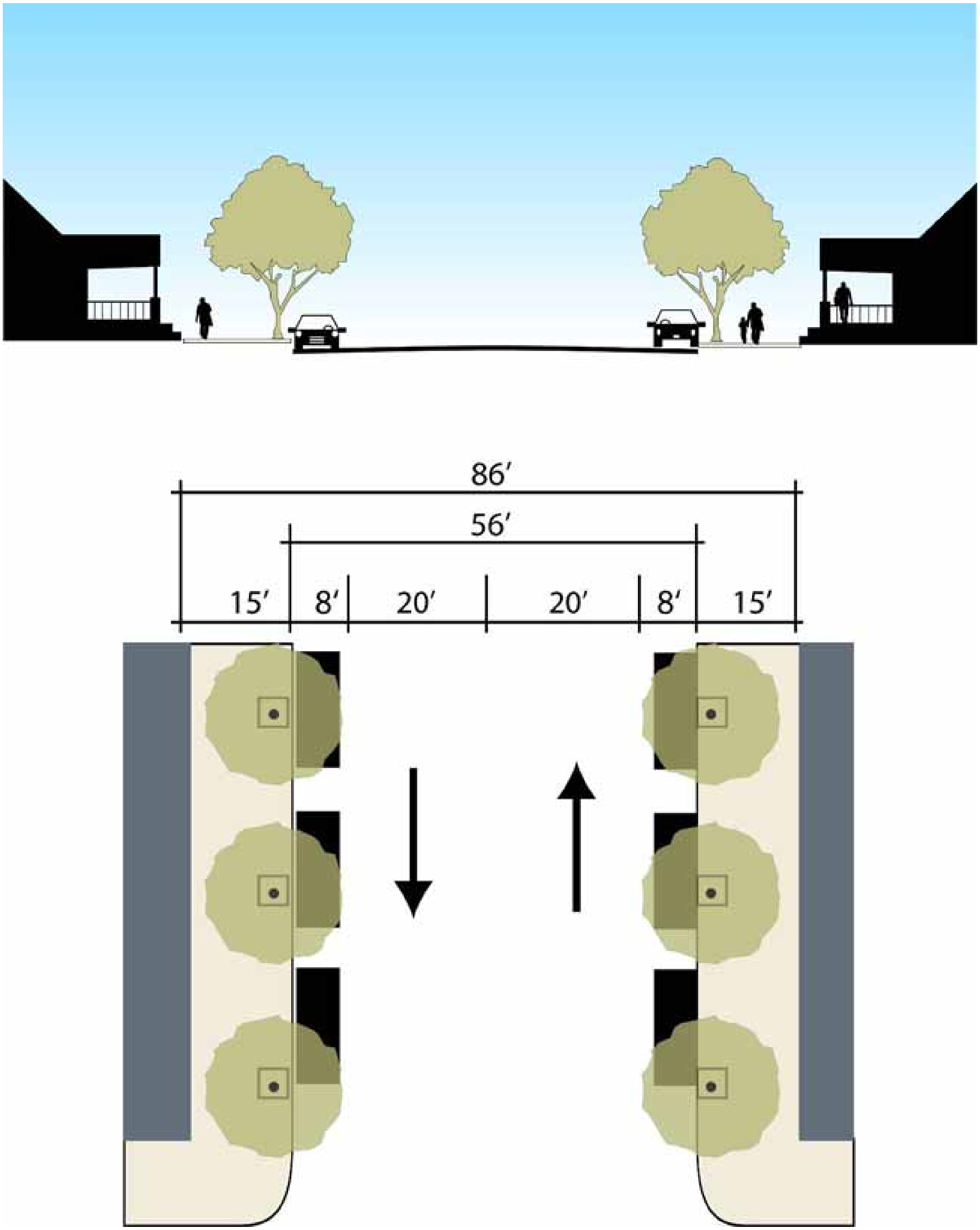

Figure 18: Court Street Existing Condition

HPE prepared several sections for Court Street that change according to the context, as shown in the following **Figure 19**. The major change in context occurs at London Street; whereby Court Street is predominately residential north of London Street and transitions into a commercial thoroughfare south of London Street. The proposed thoroughfare sections are located and designed to take this context change into consideration.

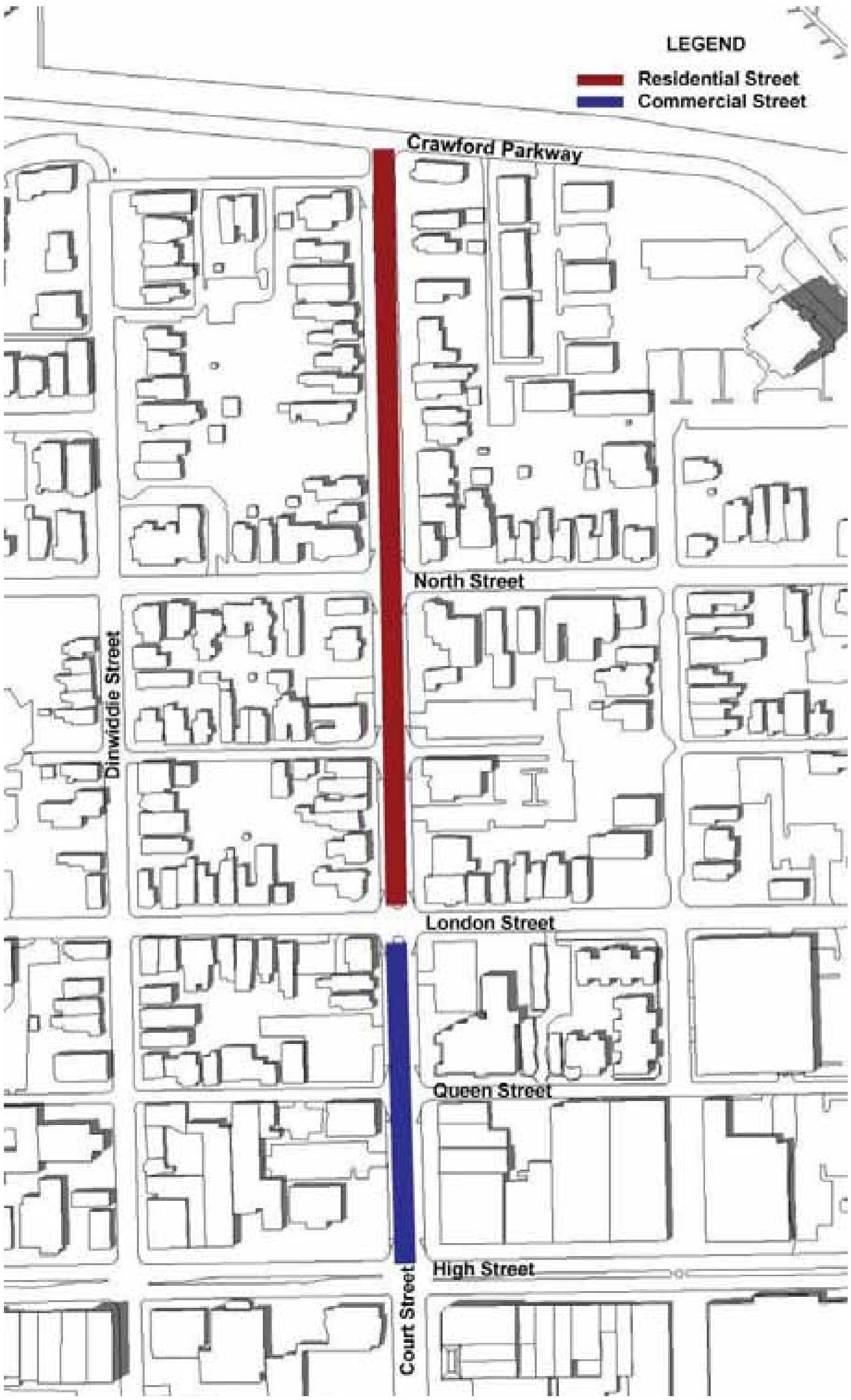

Figure 19: Court Street Thoroughfare Assignment

Figures 20 and 21 below represents two residential sections that manage speed, while remaining consistent with the context of Court Street between Crawford Parkway and London Street. The basic configuration is the same for both suggested sections: an 8-foot parallel parking lane on each side and two 12-foot travel lanes divided by a 16-foot median. The difference between the two is the option of median plantings. A more traditional median, including planted trees is suggested in the first image. Residents might want to consider, however, a less intrusive planting style, such as the bioswale presented in the second image. The bioswale is a more environmentally friendly option and one that would not obstruct views to the river. Either option is acceptable from a speed management perspective. The enclosure created by a planted median (Figure 20) is expected to provide better speed management, but given the short blocks and overall urban context of the street, either option will function acceptably, and the view of the river might be considered of greater value than the slightly greater reduction in expected speeds.

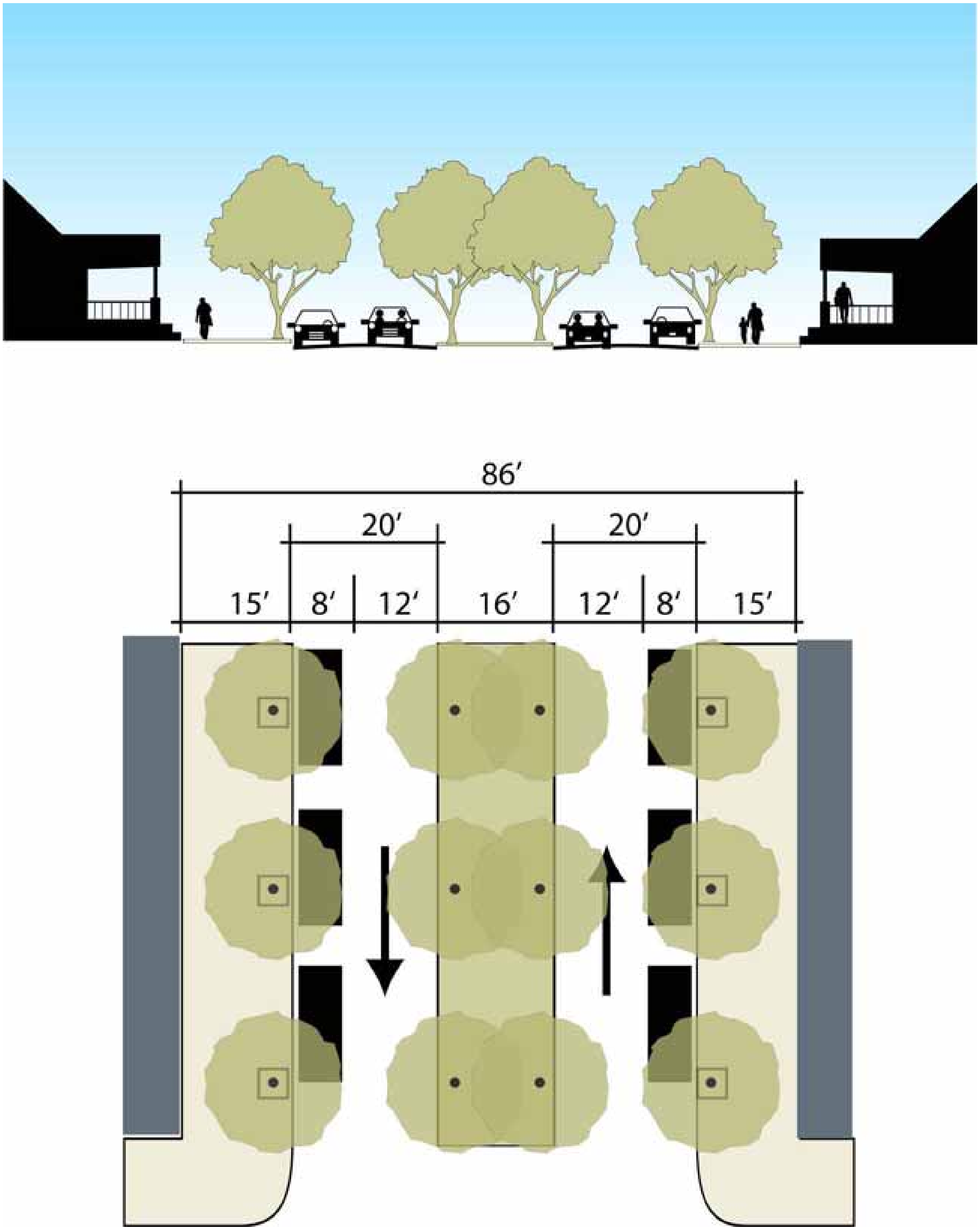

Figure 20: Court Street Residential Section with Median Trees

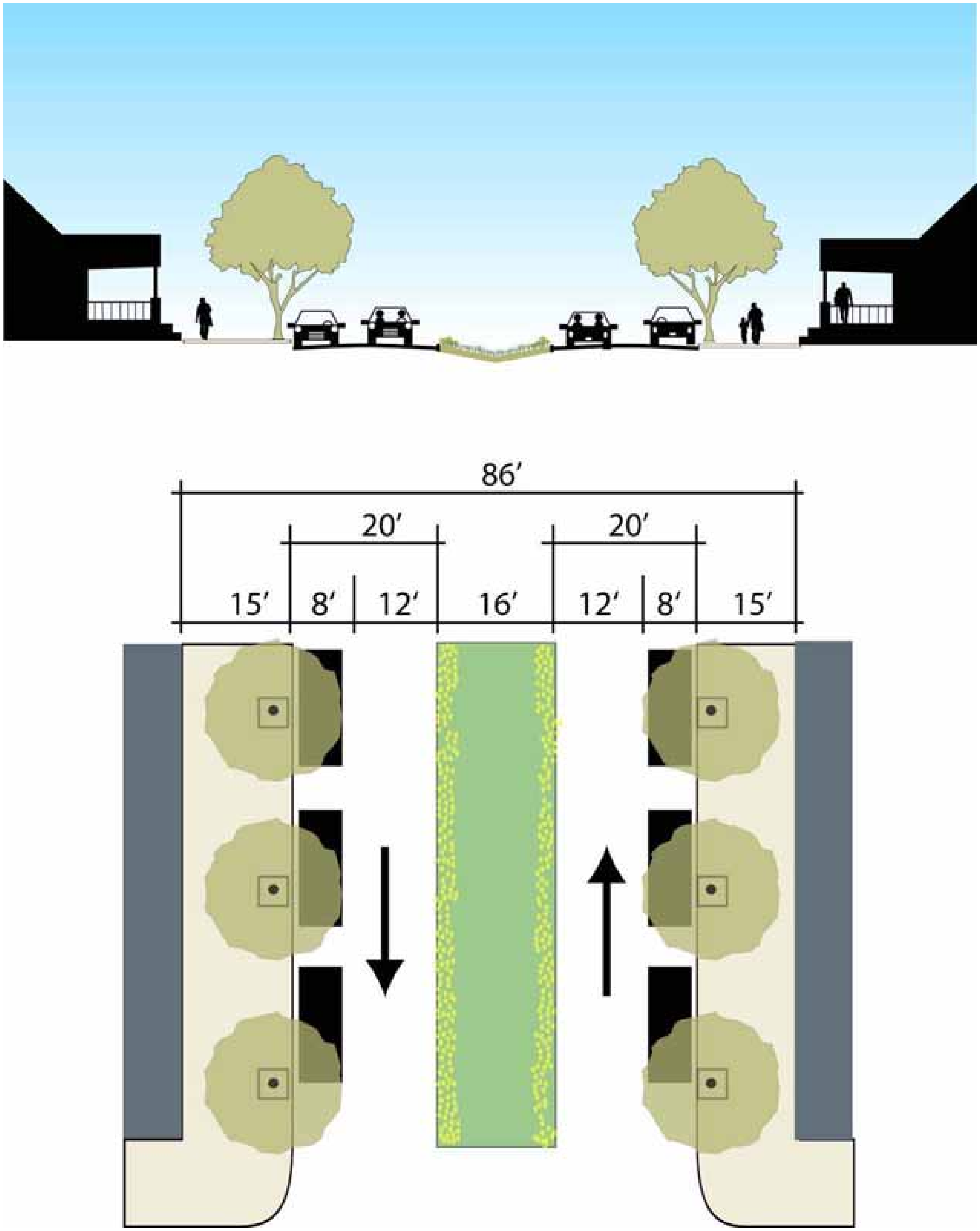

Figure 21: Court Street Residential Section with Bioswale Median

The context on Court Street becomes more urban and commercial between London Street and High Street. Consistent with that context, it is recommended that the parking supply be increased. **Figure 22** depicts a section that includes median parking, like that seen on Washington Street.

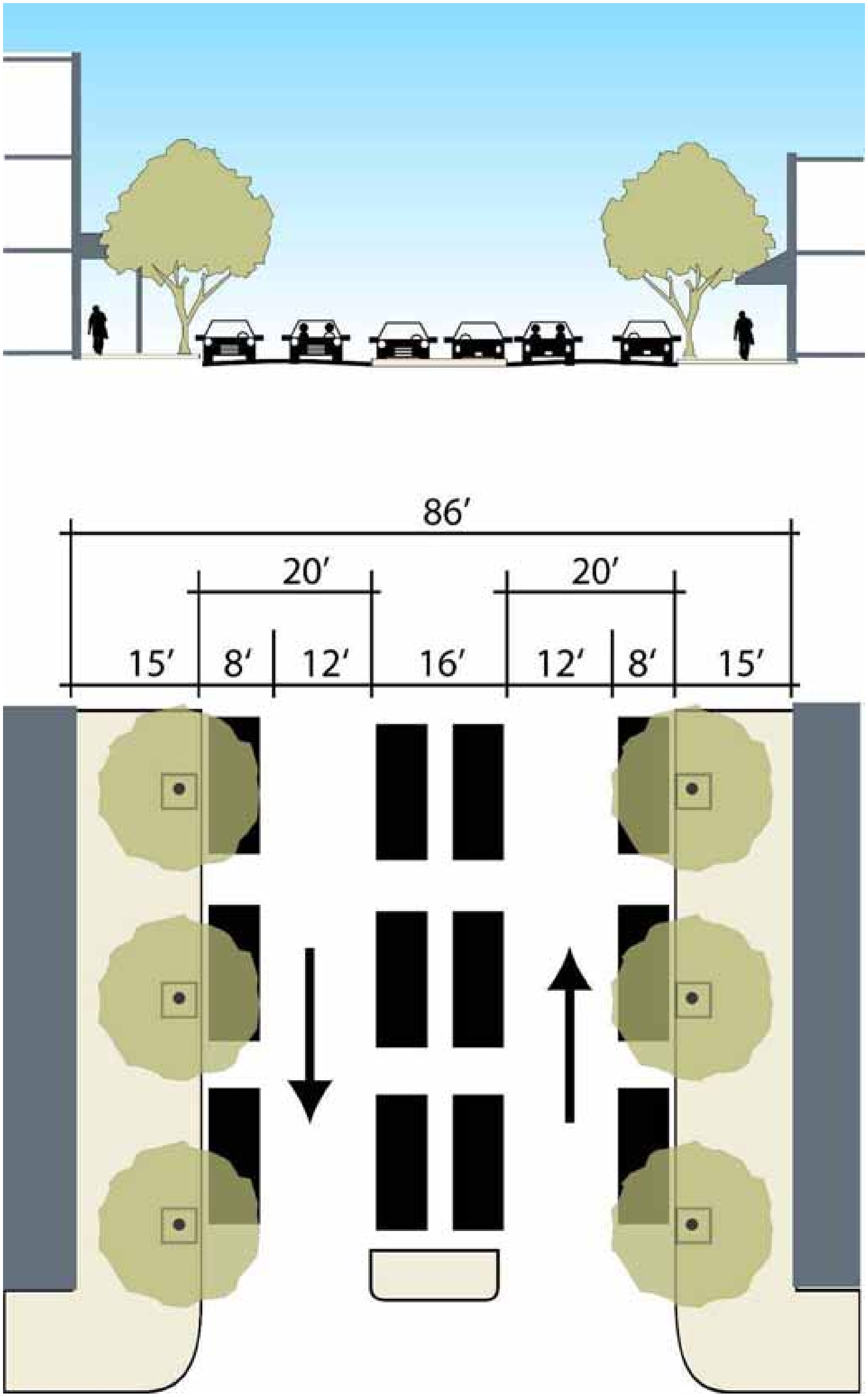

Figure 22: Court Street Commercial Section with Median Parking

C. Vehicle Circulation and Mobility

Transportation facilities and systems provide excellent tools to support the future vision for Portsmouth, as established by the community. As noted earlier, the Portsmouth community desires to maintain its walkable city structure and become a place where pedestrians can live, shop and find entertainment.

What factors contribute to an excellent pedestrian experience? Observations and design know-how suggest the following prioritized features, listed in reverse order of importance.

10. Narrower Streets
9. Street Trees
8. Lower Traffic Volumes
7. Sidewalks
6. Interconnected Streets
5. On-street Parking
4. Lower Traffic Speeds
3. Mixed Land Use
2. Buildings Fronting the Street
1. Small Block Size

These parameters have proven themselves in the field. When a majority of these elements are combined in one location, pedestrians are routinely observed. Portsmouth's walkable streets are no exception to this experience.

The Downtown Portsmouth study area has an excellent physical network of streets. The tight grid of small blocks provides multiple routes for pedestrians and vehicle operators and should provide high levels of accessibility and traffic capacity. HPE observed that the system operates quite well overall, as evidenced by the amount of traffic carried on each street.

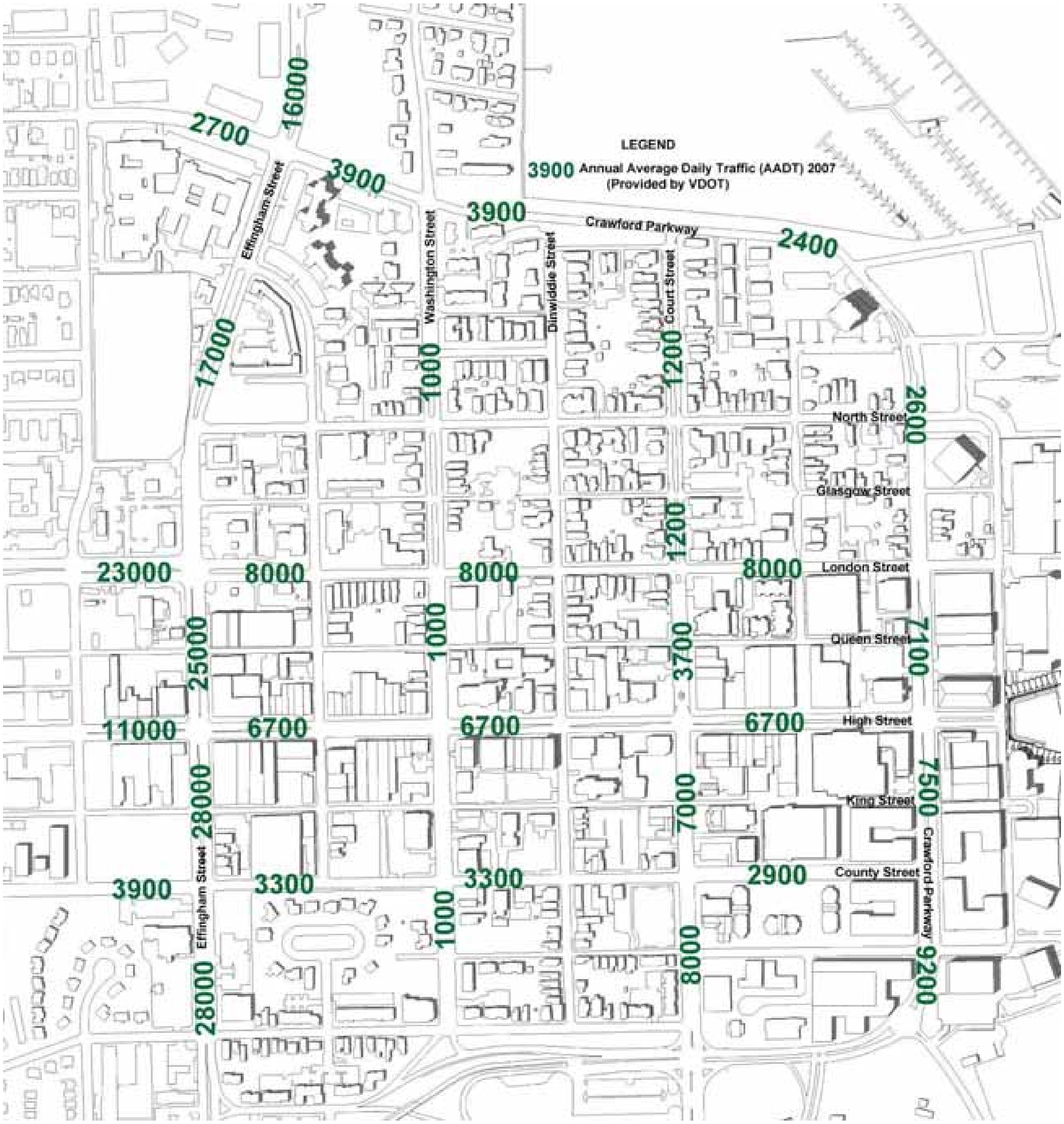

Figure 23: Downtown Portsmouth 2007 Annual Average Daily Traffic

Typical level of service standards indicate that Downtown Portsmouth streets are operating below capacity. One exception occurs at the I-264 tunnel to Norfolk, where in the PM peak hour, congestion occurs along Effingham Street caused by the number of vehicles exiting Portsmouth. The tunnel will always act as a choke point, given its design. The City of Portsmouth should incentivize commuters to stay in town during those high traffic times, with the double benefit attracting people to local businesses, while eliminating some of the contributing traffic along Effingham.

HPE observed the following traffic control devices in Downtown Portsmouth (**Figure 24**):

- Signals at:
  - Effingham Street and London Street
  - Effingham Street and High Street
  - Effingham Street and County Street
  - Effingham Street and South Street
  - Washington Street and London Street
  - Washington Street and County Street
  - Court Street and London Street
  - Court Street and High Street
  - Court Street and County Street
  - Crawford Parkway and London Street
  - Crawford Parkway and High Street
  - Crawford Parkway and County Street
  - Crawford Parkway and Port Center Parkway

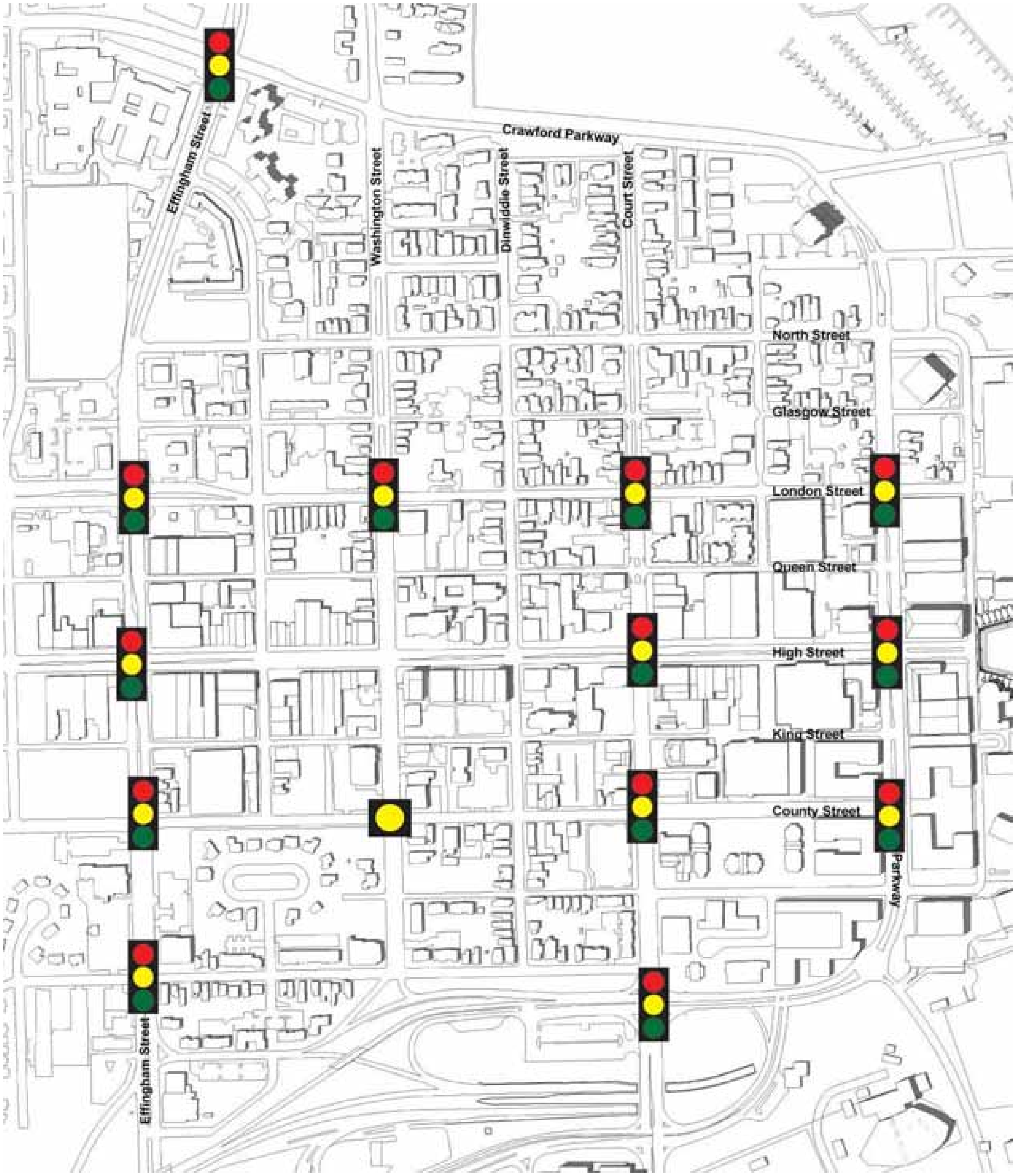

Figure 24: Downtown Portsmouth Signals

- All way stops at (**Figure 25**):
  - Green Street and North Street
  - Washington Street and North Street
  - Dinwiddie Street and North Street
  - Middle Street and North Street
  - Dinwiddie Street and London Street

➢ Middle Street and London Street

Figure 25: Downtown Portsmouth All way Stops

- Side street stops along (**Figure 26**):
  - North Street and Court Street
  - North Street at Crawford Parkway
  - North Street at Effingham Street
  - Washington Street at Crawford Parkway
  - Green Street at London Street
  - Green Street at High Street
  - Washington Street at High Street
  - Dinwiddie Street at High Street
  - Dinwiddie Street at County Street

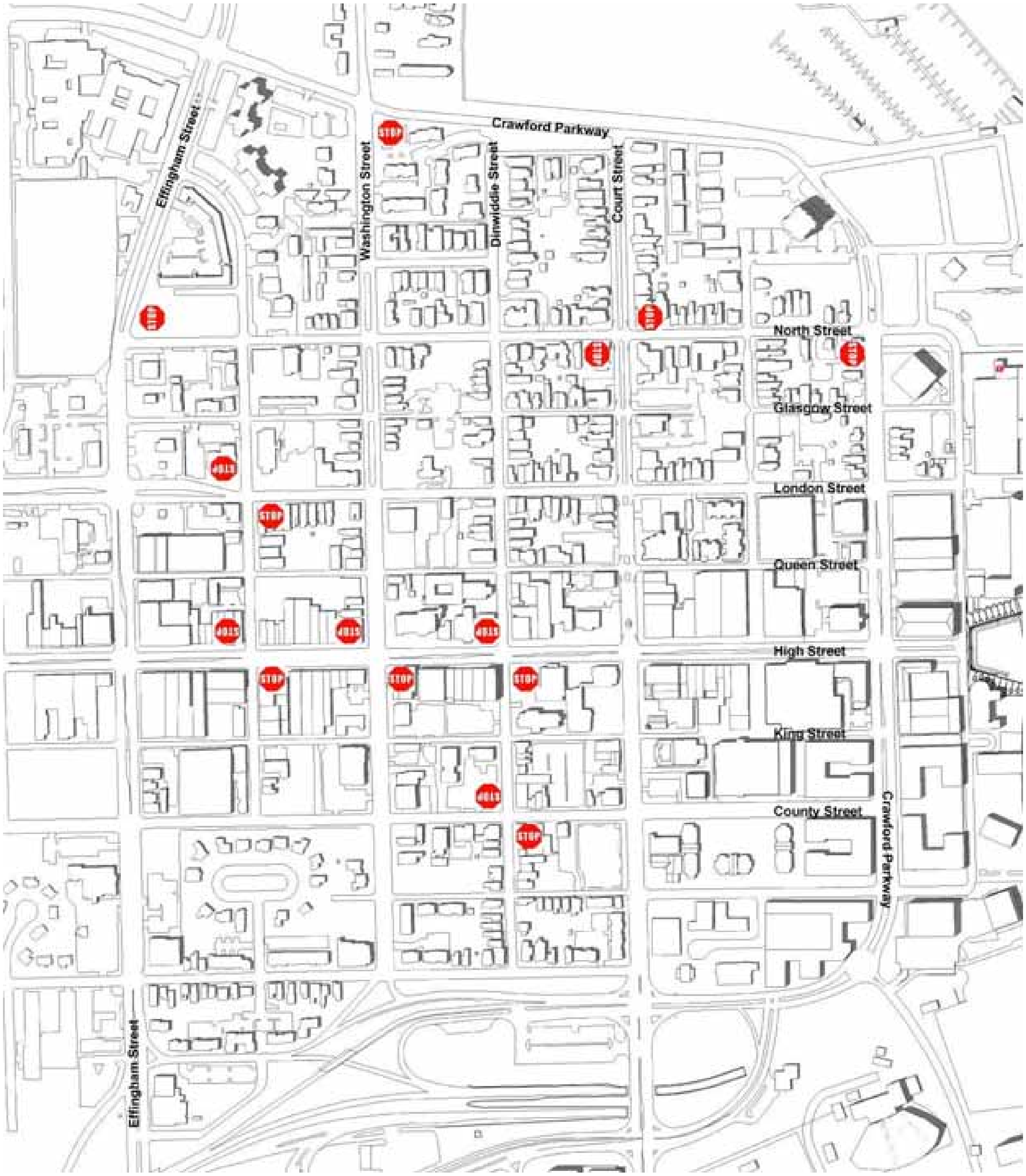

Figure 26: Downtown Portsmouth Side Street Stops

The use of these devices also assists the City's traffic circulation and mobility through reduced travel speeds and traffic dispersion. HPE did observe several underutilized streets in the system, and while level of service is higher, a better balance of traffic loading within the area network could be achieved by leveling the motor vehicle volumes to achieve an advantageous effect on the street network. HPE recommends installing a traffic signal at High Street and Washington Street. Doing so will further manage traffic speeds and encourage some vehicles to find alternate routes to Effingham and London Streets in the peak hours.

D. Bicycle Facilities

The presence of bicycle facilities is integral to an area's overall walkability. HPE reviewed the potential for bicycle facilities for Downtown Portsmouth and found a number of ways the City can link different areas of the downtown by providing basic infrastructure to cyclists.

Once automobile speeds go above 30 mph, many, if not most, cyclists become uncomfortable attempting to share the road with motorists. And unfortunately, some motorists are reluctant to share the road with anyone (including other motorists) and treat all non-automobile transportation as a threat or an infringement on the "right" of automobile drivers to use the street exclusively.

Modern traffic engineering addresses this problem three separate ways: with the bike lane, the shared use marking (sharrow) and the shared use path or side path.

Bike Lanes

The bike lane is a 4'-6' wide lane along the right side of the street for use of bicyclists. During the 1980's and 1990's, bicycle lanes received a great deal of attention from the newly-established Bicycle Pedestrian Coordinators in all state departments of transportation and serious thought and consideration has been given to the design and operation of bike lanes. Bike lane treatment at intersections, for instance, has been revised over the years to help train cyclists to ride safely, rather than reinforce unsafe riding habits (such as attempting to turn left from the right-most lane, a novice bicyclist mistake). For high-speed roads, then, bicycle lanes are the preferred way to encourage and permit safe bicycle usage of the street.

Nevertheless, bike lanes also create their own special set of safety concerns and should be used in the appropriate context. For instance, consider the following:

1. Conflicts: The addition of a new lane on the right side of the street immediately creates an entirely new set of turning conflicts at any intersection. This is not as much of a problem on arterial streets with few intersections, but can be a much larger problem if bike lanes are used in areas with small block sizes, frequent driveway accesses or other frequent intersections.

2. Motorist Attention: Motorists who would fail to pay attention to a cyclist in the regular travel lane may be even less likely to pay attention to a cyclist in a bicycle lane, resulting in lane encroachment and sometimes fatality for the cyclist legally using the bike lane.

3. Bike Lane Invulnerability: This is the corollary to motorist inattention. Some cyclists seem to regard the bike lane as a place of invulnerability, forgetting that the cyclist is operating a vehicle on the street along with other traffic. Unlike a bike path, which is completely separate from the roadway and has no interaction with automobiles, the bike lane is simply another lane on the street, and all the rules of the road still apply. Novice cyclists may not recognize the difference, and fatalities have occurred because fast-moving cyclists failed to pay attention to the traffic around them and respond appropriately to a motorist's error in judgment.

4. Passing Distance: Motorists generally allow less passing distance for a cyclist in a bike lane, versus a cyclist in the regular travel lane, adding to the sense of discomfort some

cyclists associate with bicycle lanes ("Evaluation of Shared Use Facilities for Bicycles and Motor Vehicles", Florida Department of Transportation/University of North Carolina at Chapel Hill, 1996).

5. On-street Parking: On streets with on-street parking, a standard 5' bike lane places bicyclists directly in the "door zone" of parked cars. Bicyclists are trained to ride a good 5'-6' away from a parked car to avoid the "door zone"; riding the center of a bike lane places the cyclist only 2.5' from the parked car, directly in the "door zone". A 1999 FHWA report, conducted by the University of North Carolina at Chapel Hill, videotaped over 2,500 cyclists riding in bike lanes and concluded that bike lanes adjacent to on-street parking was positively correlated with an increase in collisions between cyclists and parked cars (FHWA FHWA-RD-99–034 A COMPARATIVE ANALYSIS OF BICYCLE LANES VERSUS WIDE CURB LANES: FINAL REPORT).

6. Speed Management: On-street parking, in conjunction with 10' or narrower travel lanes, calms traffic by creating uncertainty in the mind of the passing motorist. There is no way to avoid a suddenly-opened car door, so the motorist must travel more slowly and pay attention. If a 5' bike lane is striped next to the parked car, however, motorists in the adjacent travel lane can safely ignore the parked cars entirely, which completely eliminates the speed-management benefits of having on-street parking. The Institute of Transportation Engineers recognized in their "Residential Street Design and Traffic Control" (1989) report that travel lanes wider than 10' limit the ability to achieve design speeds of 25 mph or lower; a 10' lane with a 5' bike reads as a 15' wide lane to a motorist (p. 23, p. 68).

To mitigate these issues, bike lanes are not recommended in this plan on streets with target speeds of 30 mph or less. Bike lanes should be utilized in more rural areas or sub-urban, low density, mostly residential areas. Shown below, bike lanes are recommended for the lower density portions of Crawford Parkway, north of London Street and south of County Street.

In areas where bicycling is to be encouraged, but speeds need to be kept below 30 mph to support walkability, the sharrow is the recommended bicycle pavement marking, as described below.

Sharrows Show The Way

As part of the "Land Use First/Transportation Second" paradigm, the design of a thoroughfare is expected to change to reflect the context of the area through which it passes.

This context-based change in design has presented problems in the past for the provision of bicycle facilities. Bike lanes, described above, are appropriate, safe, and useful on country highways and arterial streets, but are inappropriate when placed adjacent to parked cars or otherwise used on slower urban streets, where the design speed is 30 mph or less. Adding a 5' bike lane to the outside of even a narrow 9' travel lane essentially creates a 14' or pavement width, which in turn makes 30 mph operating speeds very difficult to achieve. Therefore, bike lanes are typically dropped when on-street parking is added, reflecting a change in context, and cyclists are expected to share the travel lane in the slower-speed urban context.

Simply dropping the bike lanes is a less than optimal solution, however, for the following reasons:

- Sending a message to cyclists that they are not welcome on the urban context street, because they formerly were on a "facility" dedicated to them, and now they are not
- Violation of driver expectations – one generally expects a lane to continue unless some alternative is provided
- Management of motorist expectations – bike lanes effectively remove the bicyclist from the motorists' consideration, so why are the cyclists suddenly appearing in front of the motorists in the urban context? It may appear to the motorists that the cyclists "came from nowhere"

The answer to these concerns is the shared lane marking, or "sharrow", a new traffic control device included in the draft Manual of Uniform Traffic Control Devices (MUTCD) and already in use in many cities in the United States. The sharrow, shown in **Figures 9-11** earlier in the report, is placed on a 35 mph or lower-speed street, where there is insufficient room to provide for a separate bicycle lane, or where a bike lane is contraindicated due to the need for on-street parking.

The sharrow indicates to bicyclists and motorists that cyclists are now expected to share the travel lane, rather than travel in separate travel lanes. For transition areas, the sharrow is accompanied by "Bike Lane Ends" and "Bicycles Sharing Roadway" signs, indicating to motorists and cyclists that the context is changing and therefore the street design is also changing.

Studies conducted in San Francisco, where the sharrow was invented, found that the sharrow decreased wrong-way bicycling, helped cyclists avoid "dooring" crashes adjacent to parked cars, and still allowed on-street parking to play its vital role in urban street function. CalTrans has already adopted the sharrow as a traffic control device for the State of California based on these findings.

This plan recommends using the sharrow wherever traffic speeds are to be maintained at 30 mph or less and in urban, higher density mixed use areas, rather than incorporating a bike lane. Where a transition from a bike lane street section to a sharrow street section is needed, the transition is accomplished per MUTCD guidance using appropriate merge distances and signing, based on roadway travel speeds. Specifically, the sharrow is recommended for London Street, High Street, and Crawford Parkway wherever on-street parking is used.

Shared Use Paths

The shared use path is completely separated from motor vehicle traffic, similar to a wide sidewalk but generally with greater separation from the travel lane. The AASHTO Guide to the Development of Bicycle Facilities (1999) (Guide) indicates a minimum of 5' separation between the path and any adjacent roadway, and the installation of a barrier if this separation is not possible.

Shared use paths are, as the name indicates, shared by a variety of users. As compared to roads and streets, which are used exclusively by vehicles (either motorized or human-powered), shared use paths may be used by pedestrians who are strolling, running, or walking pets; children on scooters or tricycles; roller-bladers; or even pedestrians not moving at all but stopped to sight see or rest. Consequently, the level of mobility afforded to cyclists may be less than what is found on an adjacent street network. The Guide recommends a design speed of

30 mph for shared use paths, but this speed will be very difficult to achieve or maintain on a heavily-used path.

Paths work best in a rural or suburban context, where intersections with other streets are infrequent. In urban areas where frequent intersections are required, however, paths require more careful consideration.

HPE recommends a shared use path be installed along the waterfront at Crawford Parkway, as shown in Figure 14 and Figure 23. A path already exists connecting to the Waterfront Walk, and modifications to this path described in greater detail below.

HPE incorporated all three facilities described above into an integrated bicycle plan for Downtown Portsmouth appropriate to context.

Figure 27 below illustrates the location and use of each bike facility. Specifically, bike lanes area recommended for the higher speed, lower density portions of Crawford Parkway north of London Street and south of County Street. Sharrows are proposed for London Street, High Street, and Crawford Parkway wherever on-street parking is used. A separated shared-use path is recommended for Crawford Parkway along the northern waterfront.

Where no facilities are indicated, it is assumed the cyclist will share the road with motor vehicles, as speeds will be low enough for cyclist comfort and safety.

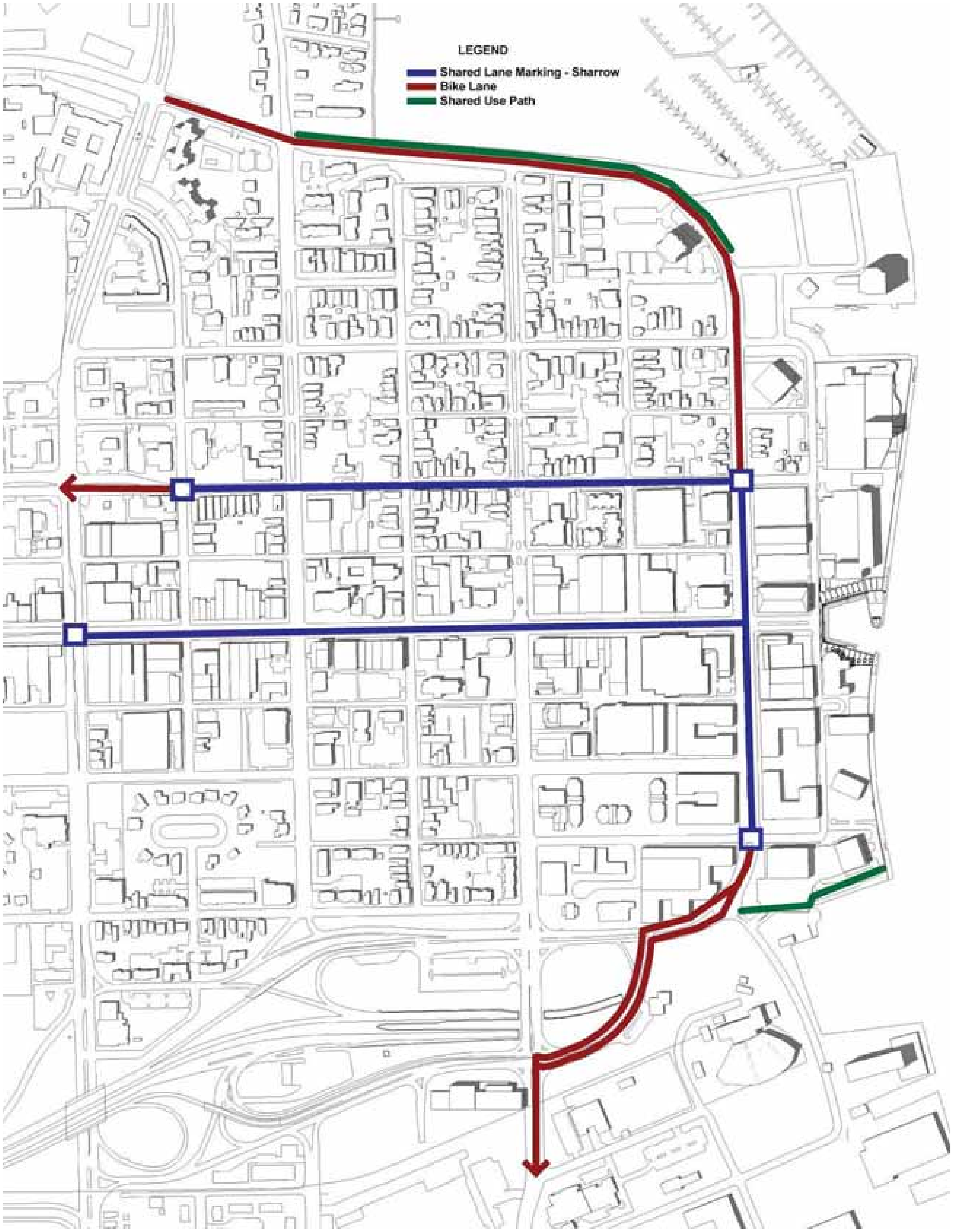

Figure 27: Downtown Portsmouth Bicycle Facilities Plan

E. Transit

Hampton Roads Transit (HRT) is a regional public transportation service offering services within and between Hampton, Norfolk, Chesapeake, Virginia Beach, Portsmouth, Newport News and Suffolk. Services operate to most major attractions and amenities. Formed in 1999 as the first voluntary merger of two transit agencies in the country (Pentran and TRT), HRT operates four regular fixed bus routes in Portsmouth: Routes 47, 45, 50 and 41.

Most recent data indicates HRT carried nearly 4 million passenger trips during the last quarter of 2008, servicing seven cities with a total population of 1.3 million. The system recovers 23% of its revenue through the farebox, which is comparable to the national average.

HRT also operates a downtown shuttle service in Portsmouth, the Loop, running every 15 minutes during peak hours and every 30 minutes during off-peak hours.

One focus of the Downtown Plan was the introduction of an electric streetcar system to Downtown Portsmouth. In addition to maintaining the shuttle and bus services, HPE identified a potential street car alignment (**Figure 28**) that would connect the NTELOS Center with other areas of downtown. The street car alignment utilizes existing right of way and loops through Downtown's most critical areas, including stops at the Navy Hospital entrance and along High Street.

The streetcar concept is sometimes dismissed as improbable due to its expense, however, the expense is often much lower than expected. In the general scheme of transportation funding, layout and operation of a streetcar system is no more expensive than the acquisition of right-of-way and construction for a major road or street. In an industry where numbers are rounded to the nearest million, street car systems are not unreasonably expensive, vast though the cost may seem to the average citizen, who may be comparing the cost to a City budget or a personal bank account. Cost alone should not deter Portsmouth from pursuing a street car system.

The advantages of a streetcar system are compelling. In terms of walkability, the recommendations for narrower streets, more on-street parking, and slower traffic speeds will naturally support transit. As the city redevelops, the pressure for additional transit will only increase. A steel-wheel trolley is an effective way to provide mobility by providing access into and through the downtown area. Portsmouth is spatially very adaptable for this kind of transportation. A streetcar is an excellent choice of transit mode that will be able to carry sufficient passengers to support the intensity of development possible in Downtown Portsmouth.

The original streetcars were themselves land development tools, and modern streetcars often serve the same purpose. Experience in other cities has shown that streetcars have an ability to leverage investment and redevelopment that rubber-tired vehicles simply do not have. From this perspective, investment in a streetcar system is actually an investment in economic development of the city, should the city decide to pursue this option.

Figure 24 below illustrates the City of Portsmouth's existing transit routes, as well as a proposed street car alignment.

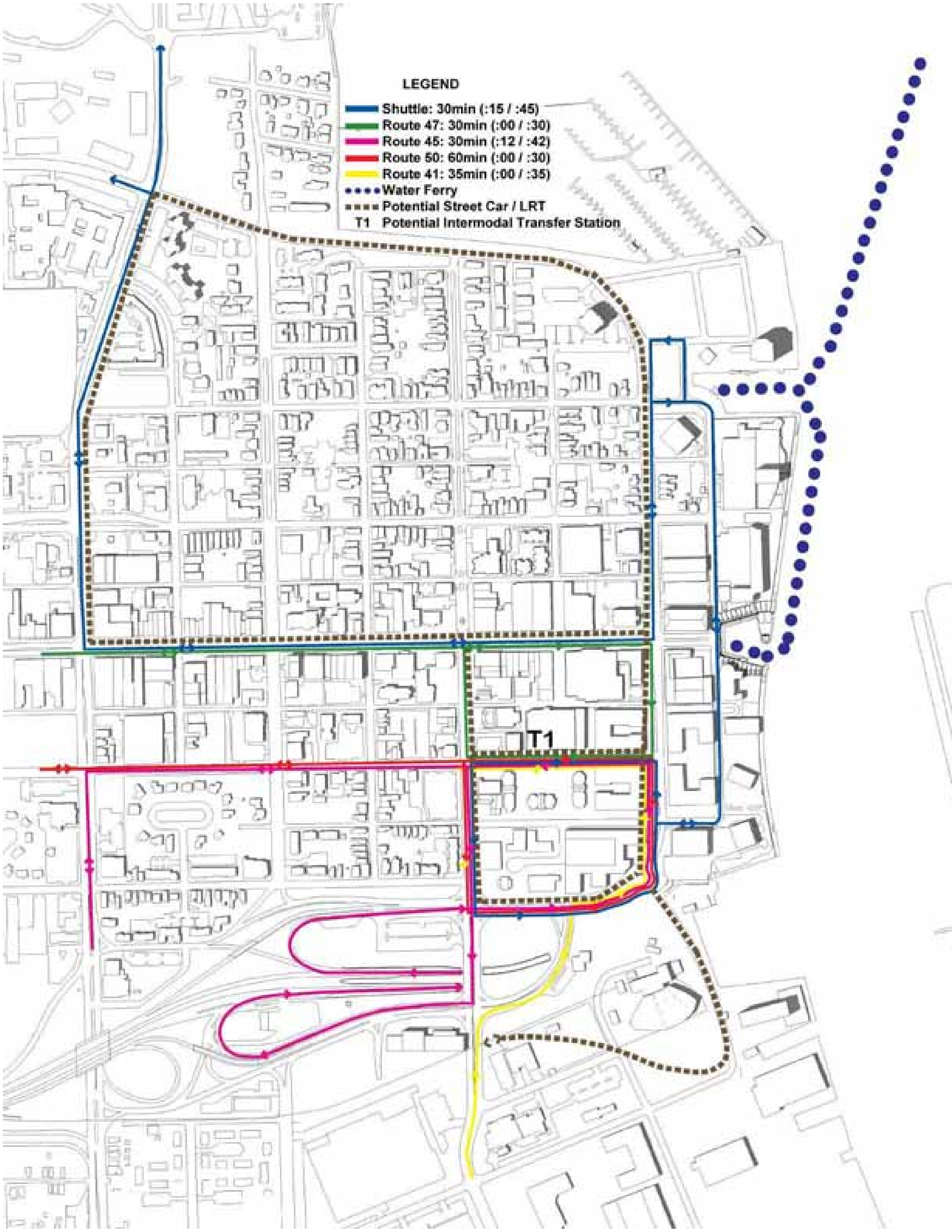

Figure 28: Downtown Portsmouth Transit Plan – Existing and Potential

In a revitalized downtown area, HRT could play a key role in providing affordable public transportation for employees and residents. As the downtown infills, parking will become more valuable and in greater demand, and greater reliance must be placed on public transit. HRT's connection to the rest of the region will be a critical part of the multimodal transportation system. If downtown redevelopment is walkable, per this downtown plan, it will also be transit-friendly and transit-supportive.

F. Other Transportation Issues

In addition to the items discussed above, the City of Portsmouth should address the following items to ensure residents and visitors a great walkable experience in Portsmouth:

- Install approved Historic District signage on I-264 and at other relevant gateways
- Redesign entrance to waterfront walk

Signage

Several residents and merchants expressed the desire to install signage along I-264 alerting motorists to Portsmouth's "Historic District" designation. HPE agrees this would help attract visitors to the Portsmouth area and suggest the City, along with downtown merchants, should apply with the appropriate authority for this signage. Research with the Virginia Department of Transportation indicates that an approved white-on-brown sign must be requested through the state's Integrated Directional Signing Program, which is administered by a third party contractor, Virginia Logos.

The Integrated Directional Signing Program (IDSP) was developed to provide Virginia motorist service businesses, attractions, tourist destinations and other specific points of interest with a single contact if they desire to have their location identified on a road sign along the state controlled and maintained roadway system to provide motorist with directional guidance and information about their location.

The Virginia Logos website, www.virginialogos.com, outlines the process and requirements for obtaining a "Supplemental Guides Sign". An application can also be found on this website, as well as fee information. In addition to the application and according to their fee description, obtaining a sign would require a one-time, non-refundable application and site inspection fee of $250 and annual fee of $700 (for signs greater than 12 square feet) or $250 (for signs under 12 square feet).

Waterfront Walk Entrance

The charrette team spent a great deal of time walking around downtown Portsmouth and along its waterfront. Portsmouth offers a great walking experience in most locations. The entrance to the waterfront walk is one exception. Simple improvements to this location near the NTELOS Pavilion at Harbor Center would dramatically increase the waterfront's attractiveness. The images below illustrate the areas in need of improvements such as landscaping, removal of overgrown bushes, foot bridge realignment and proper signage.

Figure 29: Waterfront Walk Entrance near NTELOS Pavilion – Bridge to Nowhere (Removal of brush under the bridge would permit visual connectivity to the Waterfront Walk, alleviating the "bridge to nowhere" impression.)

Figure 30: Waterfront Walk Entrance near NTELOS Pavilion – Uninviting (The appearance of the blue utility structure should be improved to support the overall experience of the Waterfront Walk.)

Figure 31: Waterfront Walk Entrance near NTELOS Pavilion (Landscaping would greatly improve the attractiveness of this view.)

IV. CONCLUSION

Citizens indicated the desire during the charrette to revive economic life in Portsmouth's historic downtown area. The residents further envisioned a return to the walkable city structure of the early 1900's, with downtown residences, places to shop and find entertainment, and restoration of the civic centers in the area. The traffic engineering and transportation planning approaches described here respect that vision. HPE recommends the following items:

- Use walkable thoroughfares to manage traffic speeds and improve pedestrian safety
- Provide additional on-street parking in specific locations
- Provide a mix of user-friendly bicycle facilities
- Continue to fund the existing bus transit system providing the bulk of the area's public transit service
- Develop the electric street car system to leverage additional urban investment
- Redesign an inviting waterfront walk

Everything the City of Portsmouth needs to know to build its future is contained in the bones of its traditional downtown area. Small blocks, small streets, sidewalks, and buildings that create enclosure and a sense of place are the primary elements. The downtown was designed before the automobile appeared on the scene, and in rebuilding Portsmouth's downtown, designers must consciously return to that type of planning. Put aside the past 100 years of automobile-oriented development, and treat the vital automobile as a servant to the pedestrian, not vice versa. The transportation proposals in this report are based on this concept.

APPENDIX A

Walkability Index Technical Memo (Attached Separately as PDF)

APPENDIX B

Walkability Index Assessment for High Street (Attached Separately as PDF)