

Coliseum Central Special Events Management Plan Study



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COLISEUM CENTRAL SPECIAL EVENTS MANAGEMENT PLAN STUDY

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ABSTRACT

The Coliseum Central Business District is a bustling area in the City of Hampton that has undergone many changes in recent years. Located near the interchange of I-64 and Mercury Boulevard, the Coliseum Central Business District contains two facilities unique to the region: The Hampton Coliseum and the Hampton Roads Convention Center.

A number of mixed-use developments are currently planned for areas adjacent to the Coliseum and Convention Center. These developments include residential, retail, full-service hotels, restaurants, and entertainment uses including a dinner theater. With some of these developments planned for areas that are currently used for Coliseum and Convention Center parking, the amount and location of parking available for events will be affected by these new developments.

Because of the impacts that these developments may have on traffic flow and parking for Coliseum and Convention Center events, the City of Hampton requested that the staff of the Hampton Roads Transportation Planning Organization (HRTPO) conduct a study that examines the existing conditions as well as the impacts that these future developments will have.

ACKNOWLEDGMENTS

This report was prepared by the HRTPO in cooperation with the City of Hampton, the Virginia Department of Transportation (VDOT), and the Federal Highway Administration (FHWA). The contents of this report reflect the views of the staff of the Hampton Roads Area Transportation Planning Organization (TPO). The TPO staff is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, VDOT, or HRTPO. This report does not constitute a standard, specification, or regulation. FHWA or VDOT acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

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INTRODUCTION

The Coliseum Central Business District is a bustling area in the City of Hampton that has undergone many changes in recent years. Located near the interchange of I-64 and Mercury Boulevard, the Coliseum Central Business District contains a variety of retail establishments, hotels, offices, and two facilities unique to the region: The Hampton Coliseum and the Hampton Roads Convention Center.

The Hampton Coliseum has anchored the Coliseum Central area since its opening in 1970. The Coliseum has the largest seating capacity of any indoor facility in Hampton Roads, with 9,800 seats available for basketball games and 13,800 seats available for concerts. The Hampton Coliseum hosts a mix of events throughout the year including large concerts, monster truck shows, rodeos, the Hampton Jazz Festival, the circus, etc.

The Hampton Roads Convention Center is a recent addition to the Coliseum Central area. Opened in early 2005, the facility includes a total of 344,000 square feet of convention and exhibition space, including a 102,600 square foot exhibit hall. A 300 room Embassy Suites full service hotel is located adjacent to the Convention Center.

Access to the Coliseum and Convention Center is provided primarily by two routes: Coliseum Drive to the north and Convention Center Boulevard to the east. Coliseum Drive is the principal route for accessing the Coliseum and Convention Center, providing access from I-64 and Mercury Boulevard. Convention Center Boulevard, which was opened to traffic in December 2007, also provides access from I-64 via Armistead Avenue.

A number of mixed-use developments are currently planned for areas adjacent to the Coliseum and Convention Center. These developments include residential, retail, full-service hotels, restaurants, and entertainment uses including a dinner theater. With some of these developments planned for parcels currently serving as Coliseum and Convention Center parking lots, the amount and



Aerial view of the Hampton Coliseum and Hampton Roads Convention Center. Photo source: VDOT.

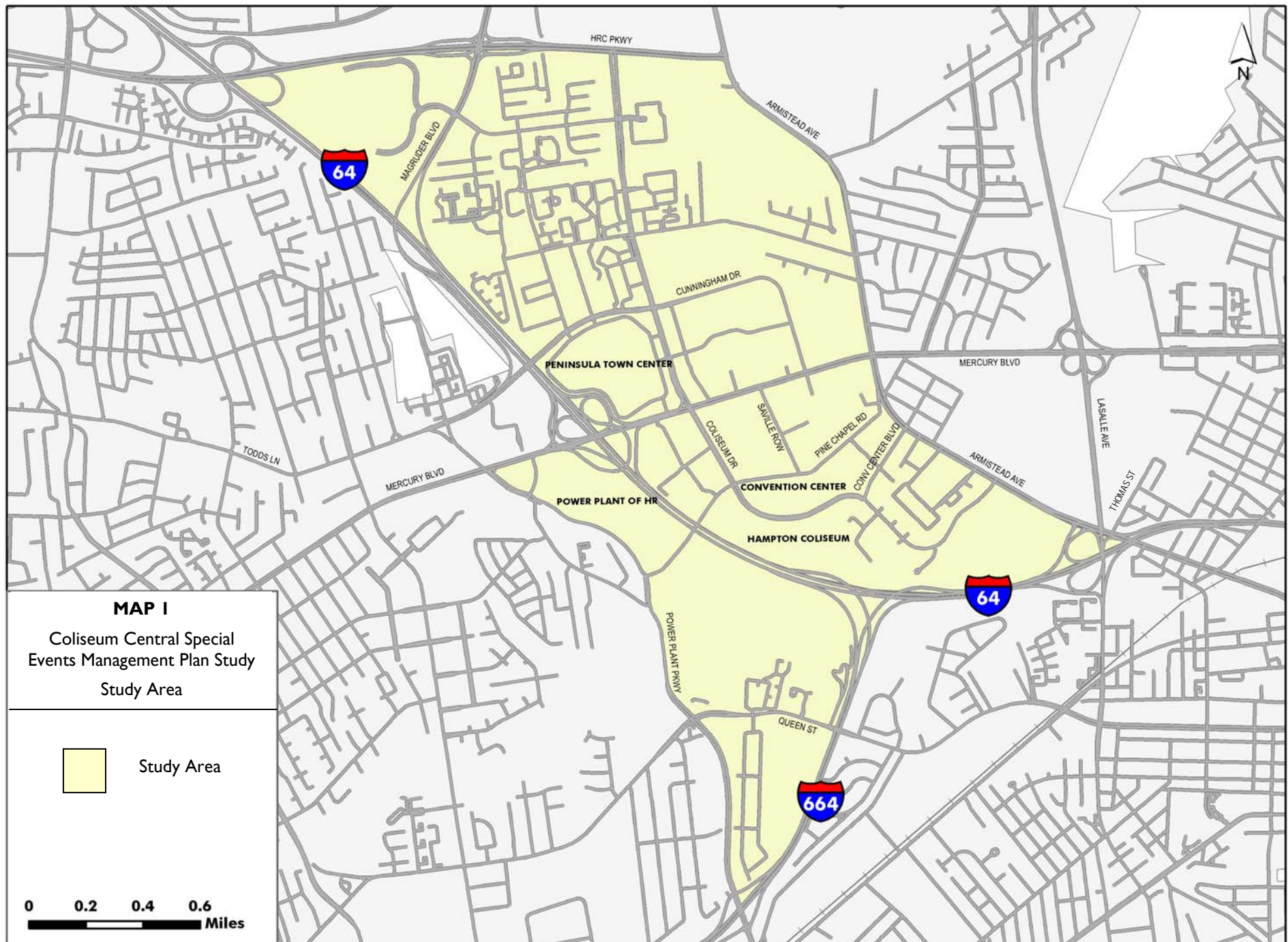
location of parking available for events may be impacted by these new developments.

Because of the impacts that these developments may have on traffic flow and parking for Coliseum and Convention Center events, the City of Hampton requested that the staff of the Hampton Roads Transportation Planning Organization (HRTPO) conduct a study that examines the existing conditions as well as the impacts that these future developments will have.

Study Area

The study area is primarily composed of the Coliseum Central Business District. The boundaries of the study area, as shown on **Map 1** on page 2, are Armistead Avenue to the east, the Hampton Roads Center Parkway to the north, I-64 and Power Plant Parkway to the west, and I-64 and I-664 to the south. Most of this study focuses on those areas adjacent to the Coliseum and Convention Center and the access points to the area.

Figure 1 on page 3 shows an aerial image of the immediate area around the Coliseum and Convention Center. This figure also shows the location and number of parking spaces in each of the Coliseum and Convention Center lots.





EXISTING CONDITIONS

This section includes a description of the existing conditions in the study area both during typical weekday peak travel periods as well as prior to and following major events. Included in this section are a description of the roadway network, the traffic management plan for major events at the Coliseum, existing traffic conditions, and signage leading to and from the Coliseum and Convention Center area.

Existing Roadway Network

Map 1 on page 2 shows the existing roadway network in the study area. I-64 passes through the study area, with access to the Coliseum and Convention Center provided by interchanges at Mercury Boulevard and Armistead Avenue/LaSalle Avenue. Other major roadways within the study area include Mercury Boulevard, Armistead Avenue, Coliseum Drive, and Power Plant Parkway.

Access to the Coliseum and Convention Center is provided primarily by two routes. Coliseum Drive provides access from I-64 via Mercury Boulevard and is the principal route used to access the Coliseum area. The newly constructed Convention Center Boulevard provides access from I-64 via Armistead Avenue.

Many changes have been made to the roadway network near the Coliseum and Convention Center in recent years. These changes include:

- The I-64 Coliseum Central project. This project added lanes to I-64 between I-664 and Hampton Roads Center Parkway and realigned the ramps at the I-64/Mercury Boulevard interchange. The I-64 Coliseum Central project was completed in July 2006, five years after construction was initiated.
- Convention Center Boulevard was opened in December 2007, providing a new 5-lane access from Armistead Avenue. Access to the Coliseum and Convention Center from areas to the east and north is now primarily served via this roadway rather than Pine Chapel Road.



The new Convention Center Boulevard was opened in 2007. Photo source: HRTPO.

- As part of the Convention Center Boulevard project, the intersection of Pine Chapel Road and Armistead Avenue was realigned, providing better channelization and adequate distance from this intersection and the Armistead Avenue/Convention Center Boulevard intersection.
- The overpass leading from eastbound Mercury Boulevard to northbound Coliseum Drive was demolished and replaced with an eastbound left turn bay.
- Streetscape improvements were made to Coliseum Drive between Mercury Boulevard and Pine Chapel Road. These improvements include stamped crosswalks, landscaped median refuge islands, wider sidewalks, and additional landscaping. Through lanes were removed from Coliseum Drive to make the area more pedestrian friendly and create room for widened sidewalks and landscaping.

Existing Traffic Management Plan

With thousands of people descending upon the Coliseum and Convention Center area in a short period of time, the City of Hampton and Hampton Coliseum officials implement traffic management plans to help traffic flow into and out of the event area as safely and efficiently as possible.

Depending on the event, different levels of traffic management are put in place. For smaller events no additional traffic management may be necessary. For the largest events city officials dispatch police officers and other personnel to parking lots and adjacent streets to help control traffic coming to the facility before the event (ingress) and leaving the area after the event (egress).

The source of the traffic management plan included in this report is the plan that was implemented for the Phish concerts that were held at the Hampton Coliseum on March 6, 7 and 8, 2009. Although the Phish concerts were unique for various reasons including the number of concerts, amount of activity in the area prior to the concerts, and the large number of attendees that were not from the Hampton Roads area, the traffic management plan used for the Phish concerts is similar to those used for other large events held at the Coliseum.

Ingress Plan

The ingress traffic management plan, which is shown in **Figure 2** on page 7, is implemented to aid event traffic flow into the Coliseum parking lots from I-64 via two routes: Mercury Boulevard/Coliseum Drive to the north and Armistead Avenue/Convention Center Boulevard to the east.

City police are used in various ways to improve traffic flow along these two routes to the Coliseum parking lots. Before major events police put out cones, barricades and other traffic control devices on the streets leading to the parking lots. Police control the traffic signals and direct traffic at four intersections near the Coliseum and Convention Center: Armistead Avenue at Convention Center



The Phish concerts in March 2009 brought thousands of visitors to the Hampton Coliseum and the City of Hampton.
Photo source: Hampton Coliseum.

Boulevard, Coliseum Drive at Mercury Boulevard, Coliseum Drive at Pine Chapel Road, and Coliseum Drive at Convention Center Boulevard.

City police and other personnel also direct traffic into the various parking lots. These parking lots are filled in the order shown in **Figure 2**, with lots on the eastern side of the Coliseum filled before the lots on the western side. Parking fees are added as a surcharge included in the event ticket price so money is no longer collected at the parking lot entrances. This greatly improves the flow of traffic into the parking lots.

For events where there are more vehicles than parking spaces available, overflow parking is used. This overflow parking is generally located in grassy areas adjacent to paved parking lots, particularly the areas adjacent to the lot directly west of the Coliseum.

Egress Plan

The egress traffic management plan, which is shown in **Figure 3** on page 8, is implemented after major Coliseum events so that attendees can leave the Coliseum and Convention Center area as quickly and as efficiently as possible. To execute this egress plan city police and personnel direct traffic and deploy various traffic control devices such as cones and barricades. Traffic is directed out of each of the parking lots as follows:

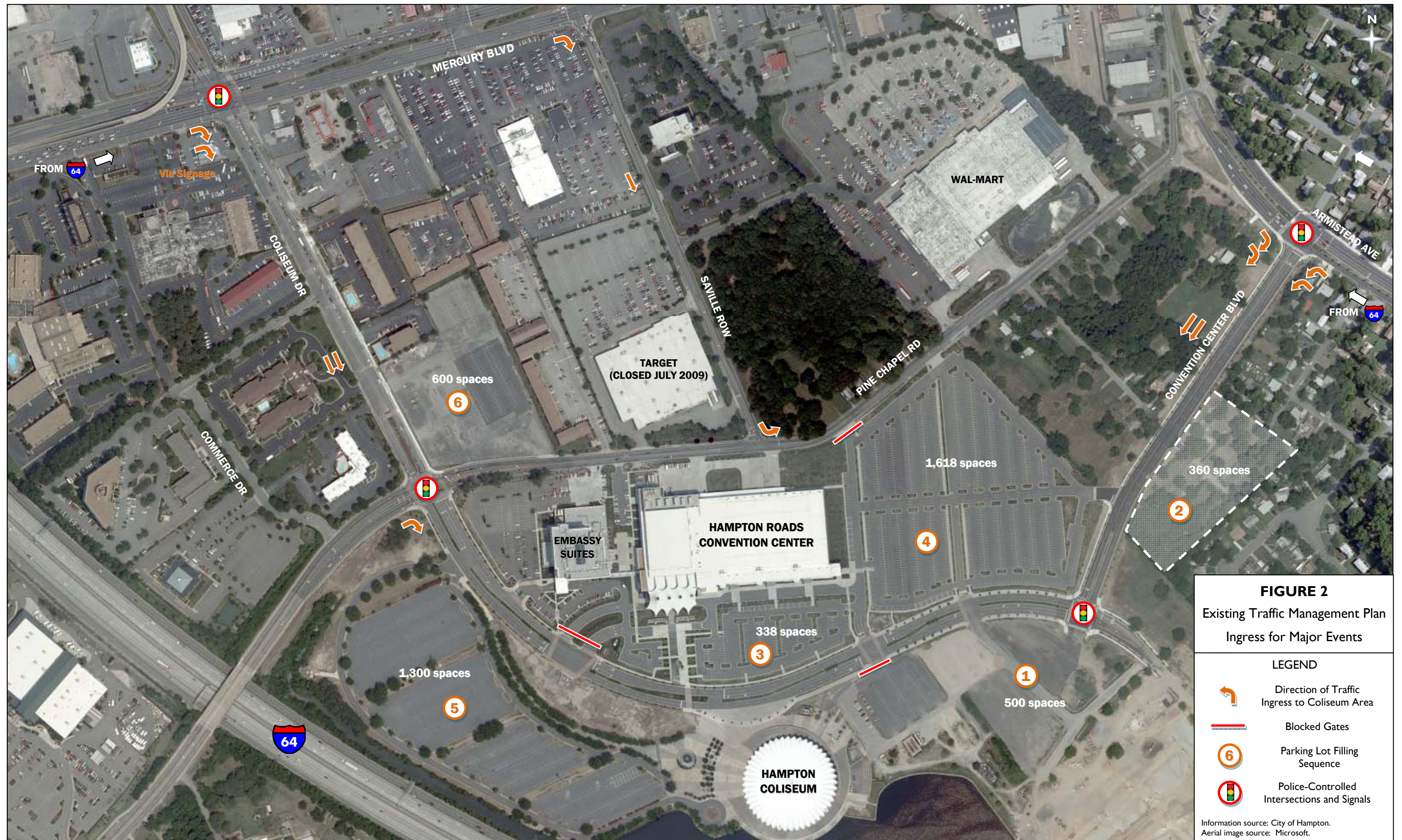
- Drivers leaving the lot located to the west of the Coliseum (19-acre lot) are directed north on Coliseum Drive. The southbound lanes of Coliseum Drive to the south of Pine Chapel Road are reversed so departing traffic uses all four lanes of Coliseum Drive. Drivers in the reversed lanes are directed onto westbound Pine Chapel Road where they can access I-64 or I-664 via Power Plant Parkway. Drivers in the regular northbound lanes continue north on Coliseum Drive where they can access I-64 via Mercury Boulevard.
- Drivers leaving the former Best Products store lot at the northeast corner of Coliseum Drive and Pine Chapel Road are directed onto northbound Coliseum Drive towards Mercury Boulevard. Traffic leaving this lot can also use eastbound Pine Chapel Road to access Mercury Boulevard via Saville Row.
- Drivers in the parking lot located directly to the east of the Convention Center can depart the lot via one of three exits. Traffic leaving through the northwest exit is directed onto Saville Row which provides access to Mercury Boulevard. Traffic leaving the northeast exit is directed onto eastbound Pine Chapel Road and then is directed onto westbound Armistead Avenue towards Mercury Boulevard. Traffic using the eastern exit is directed onto northbound Convention Center Boulevard and then must turn right onto eastbound Armistead Avenue towards I-64. No traffic leaving the Convention Center lot can directly access Coliseum Drive south of Mercury Boulevard.



The southbound lanes of Coliseum Drive to the south of Pine Chapel Road are reversed to aid in traffic egress. Photo source: HRTPO.

- Drivers in the other parking lots located to the east of the Coliseum and Convention Center are also directed onto northbound Convention Center Boulevard and eastbound Armistead Avenue towards I-64.

City police are also stationed after major events at five intersections to help traffic flow. These five intersections are Armistead Avenue at Convention Center Boulevard, Armistead Avenue at Pine Chapel Road, Coliseum Drive at Mercury Boulevard, Coliseum Drive at Pine Chapel Road, and Coliseum Drive at Convention Center Boulevard. At the four signalized intersections (the intersection of Armistead Avenue and Pine Chapel Road is not signalized), police control the traffic signals as well as direct traffic away from the event area.





Existing Traffic Conditions

This section examines the existing traffic conditions in the study area during both typical weekday conditions and conditions preceding and following major Coliseum events. Traffic conditions throughout this report were analyzed using both Highway Capacity Software, which is based on the deterministic methods included in the Highway Capacity Manual, and VISSIM, a microscopic traffic flow simulation software package that models the driving behaviors of each individual driver.

Congestion levels are classified using letter grades to categorize each roadway segment or intersection's level-of-service (LOS) and can be rated anywhere between LOS A and LOS F, with LOS A representing ideal free flow conditions and LOS F representing extreme congestion. Levels-of-service E and F are considered unacceptable operating conditions, while LOS D is considered a borderline but acceptable operating level.

Typical Weekday Peak Travel Periods

Figure 4 on page 10 includes the existing typical weekday traffic volumes and peak hour congestion levels in the study area. The traffic volumes were collected in 2007 and 2008 by VDOT and the City of Hampton. Traffic volume levels have been increasing in portions of the study area, particularly on I-64 and Mercury Boulevard. Other roadways, such as Coliseum Drive, Armistead Avenue, and LaSalle Avenue have experienced a decrease in traffic volumes in recent years. Most of these changes are likely due to the completion of the I-64 Coliseum Central project, which changed traffic patterns throughout the Peninsula during construction. Other traffic volume changes are likely due to the closure of the Coliseum Mall which is currently being converted into a mixed-use development called the Peninsula Town Center.

All of the roadways in the study area currently operate at acceptable levels of LOS D or better during the typical weekday peak travel hour, which



Traffic backs up on I-64 beyond the I-664 onramp preceding the Kiss Concert at the Coliseum in October 2009. Photo source: HRTPO.

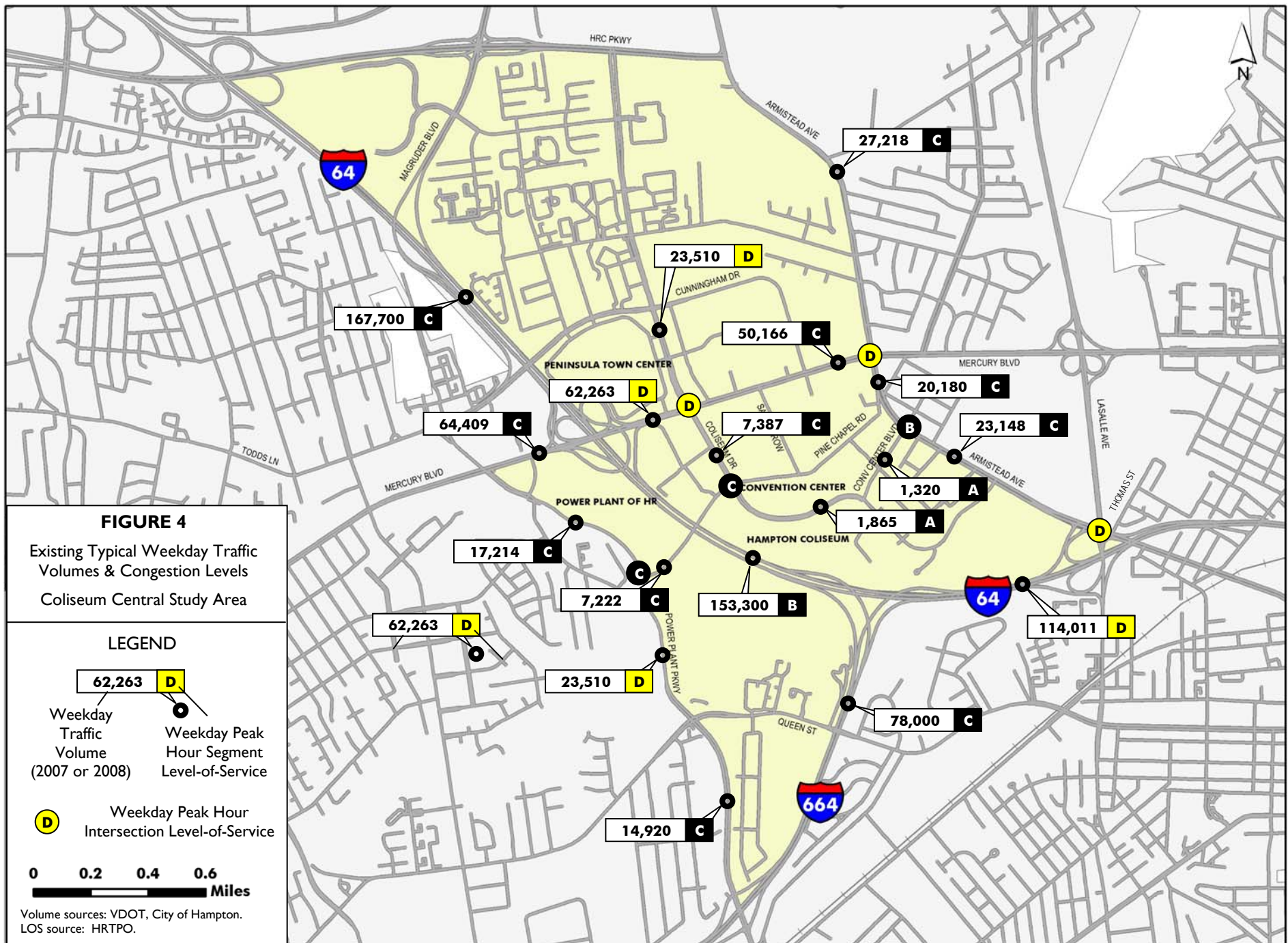
for this area of the City of Hampton is generally between 5:00 pm and 6:00 pm. Major intersections on the routes to the Coliseum area also operate at acceptable levels of LOS D or better during this peak hour, as shown in **Figure 4**.

Event Ingress Conditions

Although roadways and intersections in the study area operate at acceptable levels during the peak hour on typical weekdays, the addition of thousands of additional vehicles to the area during ingress for Coliseum events causes these roadways and intersections to become oversaturated, resulting in backups and delays.

Tables 1 and 2 on page 11 show the delay and queues that currently occur during ingress for major Coliseum events. Not surprisingly, many intersections in the area operate at LOS F during event ingress on both the Mercury Boulevard/Coliseum Drive and Armistead Avenue/Convention Center Boulevard approaches.

Of the two primary routes from I-64 to the Coliseum area, the Mercury Boulevard and Coliseum Drive route has both the highest volume of traffic as well as the longest delays and backups. Traffic from the I-64 westbound offramp to eastbound Mercury Boulevard must merge with traffic from eastbound Mercury Boulevard and the I-64 eastbound offramp



to turn right onto southbound Coliseum Drive towards Coliseum parking areas. This weaving and merging traffic results in backups that extend beyond the westbound offramp and onto the westbound I-64 through travel lanes. Average backups during event ingress currently extend back to the Pine Chapel Road overpass, while maximum backups can extend over 4000 feet, all the way back to the I-664 interchange.

The other primary approach from I-64 to the Coliseum, via Armistead Avenue and Convention Center Boulevard, also operates in oversaturated conditions. However, the queues on this route are much shorter and most of the congestion on this route occurs on Armistead Avenue in the vicinity of the I-64 westbound offramp and LaSalle Avenue. Average backups during event ingress currently extend over 300 feet from the LaSalle Avenue

intersection on westbound Armistead Avenue, which is at the I-64 westbound offramp. Maximum queues during event ingress, however, extend onto the I-64 westbound offramp to a point about 400 feet short of the through travel lanes of westbound I-64.

The congestion on this route is largely due to the unique roadway geometry of the area. There is only 320 feet on westbound Armistead Avenue between the base of the westbound I-64 offramp and LaSalle Avenue, and within this short area there is also a signalized intersection at Thomas Street. The weaving that occurs in this small area not only causes congestion issues but safety issues as well. This situation is discussed in detail on pages 32-35 in the Alternative Analysis section of this report.

| Intersection | Delay and Level-of-Service | | | | | |
|--|-----------------------------|-----|----------------|-----|--|-----|
| | Typical Weekday - No Events | | | | With Events | |
| | Peak Hour 5:00 - 6:00 pm | | 6:00 - 7:00 pm | | Peak Hour of Event Ingress (6:00 - 7:00 pm) | |
| | Delay | LOS | Delay | LOS | Delay | LOS |
| Coliseum Drive at Mercury Boulevard** | 50.8 sec/veh | D | 41.6 sec/veh | D | 109.1 sec/veh* | F |
| Coliseum Drive at Pine Chapel Road | 32.2 sec/veh | C | 31.1 sec/veh | C | 93.3 sec/veh* | F |
| Armistead Avenue at LaSalle Avenue | 40.7 sec/veh | D | 34.1 sec/veh | C | 90.7 sec/veh | F |
| Armistead Avenue at Conv. Center Boulevard | 19.2 sec/veh | B | 18.2 sec/veh | B | 51.3 sec/veh* | D |
| Armistead Avenue at Mercury Boulevard | 45.1 sec/veh | D | 39.0 sec/veh | D | 40.4 sec/veh | D |
| Pine Chapel Road at Power Plant Parkway | 24.9 sec/veh | C | 23.6 sec/veh | C | 21.3 sec/veh | C |

TABLE 1 – Levels of Service for Selected Intersections in the Study Area During Typical Weekdays and Event Ingress.

* Traffic signals at these intersections are operated by city police during event ingress. Delay levels are dependent on signal operation.

** Does not include backups on I-64 and the I-64 ramp during event ingress.

Based on Highway Capacity Software and VISSIM simulation.

| Route | Location | Average Queue | | Maximum Queue | |
|--|--|---------------|---|---------------|--|
| | | Length | Location | Length | Location |
| Westbound I-64/ EB Mercury Boulevard/ SB Coliseum Drive | EB Mercury Boulevard at Coliseum Drive | 319' | 600' short of the offramp from WB I-64 | 1019' | 100' beyond the offramp from EB I-64 |
| | Base of the WB I-64 offramp to EB Mercury Blvd | 2419' | 150' beyond the Pine Chapel Road overpass | 4055' | 100' beyond the onramp from I-664 |
| | SB Coliseum Drive at Pine Chapel Road | 1181' | 300' south of Mercury Boulevard | 2470' | Through the Mercury Boulevard intersection |
| Westbound I-64/ WB Armistead Avenue/ Convention Center Blvd. | WB Armistead Avenue at LaSalle Avenue | 310' | At the I-64 WB offramp | 1305' | 400' short of I-64 through lanes |
| | WB Armistead Avenue at Convention Center Blvd | 151' | Within left turn bay | 1007' | 300' beyond Findley Street |

TABLE 2 – Existing Average and Maximum Queues for Traffic Ingress for Major Coliseum Events.

Based on VISSIM simulation.

Event Egress Conditions

Managing traffic flow following events differs from managing traffic flow preceding events in various respects. While event ingress occurs during and immediately after the peak travel period, particularly for weekday events, event egress occurs later at night when traffic volumes are much lower. In addition, event attendees arrive at the site over a longer period of time whereas most attendees attempt to leave the site after the event in a much more compressed period of time.

Table 3 shows the amount of time it currently takes to clear event traffic from each of the parking lots based on an analysis using the VISSIM microsimulation model. According to the model the parking lots to the east of the Coliseum and Convention Center can currently be cleared in between 27 and 34 minutes after the event while the 19-acre lot to the west of the Coliseum currently takes about 29 minutes to clear. Coliseum officials have confirmed similar times to clear event traffic from the parking lots based on their observations.

Outside of the Coliseum parking lots, traffic flow during egress is slowed at a few key intersections. **Table 4** shows the amount of delay at selected intersections during event egress. The intersections that experience the most delay after events are Armistead Avenue at Convention Center Boulevard and Coliseum Drive at Mercury Boulevard. Most of the delay at the intersection of Armistead Avenue and Convention Center Boulevard occurs due to traffic on the three outbound lanes of Convention Center Boulevard being reduced to two right turn lanes onto eastbound Armistead Avenue. At the intersection of Coliseum Drive and Mercury Boulevard, most of the delay is due to vehicles on northbound Coliseum Drive making the left turn onto Mercury Boulevard towards I-64.

| Parking Lot | Time Needed to Clear Parking Lots After Major Events |
|--------------------------|--|
| 19-acre Lot | 29 minutes |
| 11-acre Lot | 27 minutes |
| Convention Center Lot | 32 minutes |
| Former Best Products Lot | 28 minutes |
| New 360-space Lot | 34 minutes |

TABLE 3 – Amount of Time it Currently Takes to Clear Parking Lots After Major Coliseum Events.
Based on VISSIM simulation.

| Intersection | Delay and Level-of-Service Event Egress | |
|--|---|-----|
| | Delay | LOS |
| Coliseum Drive at Mercury Boulevard | 201.3 sec/veh* | F |
| Coliseum Drive at Pine Chapel Road | 132.9 sec/veh* | F |
| Armistead Avenue at LaSalle Avenue | 52.3 sec/veh | D |
| Armistead Avenue at Conv. Center Boulevard | 272.9 sec/veh* | F |
| Armistead Avenue at Mercury Boulevard | 22.6 sec/veh | C |
| Pine Chapel Road at Power Plant Parkway | 24.7 sec/veh | C |

TABLE 4 – Delay and Levels of Service for Selected Intersections in the Study Area During Event Egress.

* Traffic signals at these intersections are operated by city police during event egress. Delay is dependent on signal operation.
Based on Highway Capacity Software and VISSIM simulation.

Existing Wayfinding Signage

The goal of wayfinding signage is to clearly and efficiently provide information to travelers who are not familiar with the area so that they can find their way from major roadways to their destination via preferred routes. This is done by providing the necessary information to drivers at each downstream decision point. This information should be disseminated with as few signs as necessary in order to avoid sign clutter and keep the motorist's attention.

In the case of the Coliseum and Convention Center, wayfinding signage should help direct traffic from I-64 and I-664 and principal arterials such as Mercury Boulevard to the streets that provide access to the event area. This is particularly important for smaller events where active traffic management is not used to help traffic flow. Wayfinding signs should also be in place that direct travelers from the Coliseum and Convention Center area back to the Interstate system.

An inventory of wayfinding signage leading to and away from the Coliseum and Convention Center is included in the **Appendix**. Currently signage is in place to direct westbound I-64 traffic destined for the Hampton Coliseum to use Exit #265B, the westbound Armistead Avenue exit. For the many drivers that do not use this exit there is also signage directing travelers to use Exit #263B, eastbound Mercury Boulevard. Eastbound I-64 event traffic is also directed to use Exit #263B, eastbound Mercury Boulevard. Signage is also in place that directs travelers away from the Coliseum and Convention Center parking lots to I-64 and I-664.

For the most part the current wayfinding signage effectively directs drivers to the Coliseum. Signs are in place on the Interstate system for the Coliseum, and the signage that Hampton has installed on city streets in recent years (as shown in the picture above) adequately directs travelers from the Interstate system to the Coliseum and Convention Center. The current wayfinding signage also



The City of Hampton installed new wayfinding signage to the Coliseum and Convention Center area upon the completion of the Convention Center. Photo source: HRTPO.

effectively directs travelers from the Coliseum area back to the Interstate system.

There is a lack of wayfinding signage on the Interstate system, however, for the Convention Center. There are no signs on I-64 or I-664 that mention the Convention Center. There are also no signs on eastbound Mercury Boulevard to the east of I-64 directing travelers to use Coliseum Drive to access the Convention Center. As stated previously there is signage on most of the adjacent city streets directing travelers to both the Coliseum and Convention Center.

There are also stationary changeable message signs (CMS) in place along I-64 and I-664, but VDOT does not currently use these signs to provide traveler information regarding Coliseum or Convention Center events. Current VDOT policy allows for using CMS on the Interstate system for special events if generic terms that are approved by VDOT are used to describe the event. VDOT's CMS policy for special events is also included in the Appendix.

Issues with Existing Conditions

Based on observations as well as results of the analyses performed for this section, the following issues currently impact traffic flow for major events at the Coliseum and Convention Center:

- Because high volumes of event traffic use the Mercury Boulevard interchange, traffic backs up from the intersection of Mercury Boulevard and Coliseum Drive up the offramp and onto the through lanes of westbound I-64. This queue can extend to the I-664 interchange at times.
- Congestion is also a problem preceding major events on Armistead Avenue in the area of I-64 and LaSalle Avenue, primarily due to the complex roadway geometry.
- Fiber-optic signs are in place on the eastbound signal mast arm of Mercury Boulevard at Coliseum Drive. These signs are activated during event ingress, indicating that right turns are permitted from the two rightmost lanes of eastbound Mercury Boulevard onto southbound Coliseum Drive. Most drivers, however, ignore the signs and merge into the rightmost lane, which permits fewer vehicles to turn right onto Coliseum Drive.
- During event egress it takes just under 35 minutes to entirely clear the event parking areas. Traffic flow during event egress, however, is slowed at a few key intersections.
- Although the existing signage effectively directs drivers towards the Coliseum, there is a lack of wayfinding signage on I-64 for the Convention Center.



Traffic backs up onto I-64 preceding the Kiss concert at the Coliseum, which impacted roadway safety. Photo source: HRTPO.

Additional Pedestrian-Friendly Modifications

Modifications have been made to the Coliseum Drive corridor in recent years as part of an effort to make the corridor more pedestrian-friendly. These changes have included adding stamped crosswalks, landscaped refuge islands, and narrowing Coliseum Drive between Pine Chapel Road and Mercury Boulevard to allow for wider sidewalks and more landscaping.

The City of Hampton is considering additional pedestrian-friendly modifications to the corridor. One of the proposed changes includes adding a raised median the entire length of Coliseum Drive between Pine Chapel Road and Mercury Boulevard. As part of this project as envisioned, the current lane uses on northbound Coliseum Drive at Mercury Boulevard would change to make room for the median. The current four-lane arrangement of two left turn lanes, one through lane, and one shared through-right turn lane would be replaced with a three-lane arrangement of one left turn lane, one shared through-left turn lane, and one shared through-right turn lane.

These changes would impact traffic flow on northbound Coliseum Drive, especially after major events at the Coliseum. To help alleviate these impacts, the City is considering implementing different lane uses on northbound Coliseum Drive after events. The temporary lane uses the City is considering are two left turn lanes and a shared through-right lane, and two left turn lanes and a



The City of Hampton is considering extending the raised landscaped median on Coliseum Drive from Pine Chapel Road to Mercury Boulevard.

shared left-through-right lane. These temporary lane uses would be implemented by using fiber-optic signs, similar to the ones that are currently in place on the signal mast arm of eastbound Mercury Boulevard at Coliseum Drive.

Table 5 shows the expected results that these various lane uses on northbound Coliseum Drive at Mercury Boulevard would have on congestion levels and parking lot clearance times. The existing lane uses provide much less delay and less time to clear the 19-acre and former Best Products store parking lots than the three alternatives. Of the three alternatives, the one that temporarily converts the middle lane from a through-left lane to a left turn only lane produces the least delay and quickest clearance time, although the difference in delay and clearance time between the three alternatives is minor.














| Lane Use on Northbound Coliseum Drive at Mercury Boulevard | Delay After Events - Northbound Coliseum Dr at Mercury Blvd | Time to Clear Parking Lots After Events | |
|--|---|---|--------------------------|
| | | 19-acre lot | Former Best Products Lot |
| Existing     | 292 sec/veh | 29.1 minutes | 27.8 minutes |
| Lane Use Currently Being Proposed    | 404 sec/veh | 31.9 minutes | 33.3 minutes |
| Change of Lane Use in Middle Lane During Egress    | 396 sec/veh | 31.2 minutes | 32.6 minutes |
| Change of Lane Use in Right Lanes During Egress    | 410 sec/veh | 31.7 minutes | 33.2 minutes |

TABLE 5 – Delay and Parking Lot Clearance Times with Various Lane Uses on Northbound Coliseum Drive at Mercury Boulevard. Based on VISSIM simulation.

BASE SCENARIO

A number of mixed-use developments are currently planned for areas adjacent to the Coliseum and Convention Center. These developments include a variety of residential, retail, hotel, restaurant, and entertainment uses.

With some of these developments planned for parcels that currently serve as Coliseum and Convention Center parking lots, the amount and location of parking available for events may be impacted. In addition, traffic flow for Coliseum and Convention Center events may be further disrupted by traffic generated by these new developments. This section examines the impact that these new developments are expected to have on traffic conditions in the vicinity of the Coliseum and Convention Center.

Future Developments

Three locations adjacent to the Coliseum and Convention Center, two of which are currently used for event parking, are currently being developed or targeted for new developments according to city officials. These locations include the 19-acre site immediately to the west of the Coliseum, the 11-acre site to the east of the Coliseum, and the H2O site to the east of the intersection of Coliseum Drive and Convention Center Boulevard. **Figure 5** on page 17 shows the location of these developments.

Due to the importance of the Coliseum Central Business District, the City of Hampton and Urban Design Associates developed the Coliseum Central Master Plan¹. This plan provides a roadmap for development within the Coliseum Central Business District including the areas adjacent to the Coliseum and Convention Center. The Coliseum Central Master Plan promotes community livability and sustainable development by encouraging mixed-use, higher density development and decreased dependency on travel by car.



Residences are currently being constructed at the H2O site to the east of the Hampton Coliseum. Photo source: HRTPO.

The Coliseum Central Master Plan was adopted by the Hampton City Council in September 2004 and amended in May 2005 and January 2007. The Master Plan received the 2005 Virginia Chapter of the American Planning Association Outstanding Plan Award for Master Plans.

Details of each of these three developments, as well as the plans for these sites as envisioned by the Coliseum Central Master Plan, are provided on the following pages.

¹ Urban Design Associates, "Coliseum Central Master Plan", September 2004, with amendments May 2005 and January 2007.

FIGURE 5
Overview of Future Developments in the Coliseum and Convention Center Area

225 spaces

1,618 spaces

Future Development/
Parking

Existing Parking
Locations

Information source: City of Hampton.

Aerial image source: Microsoft.



19-acre site

The 19-acre site is located immediately to the west of the Hampton Coliseum with frontage on I-64, Coliseum Drive, and Pine Chapel Road. Although the City of Hampton does not currently own the property, it is permitted to use the site for parking for Coliseum events. The site includes 1,300 paved parking spaces with additional parking on grassy areas for the largest events.

The Coliseum Central Master Plan envisions a mixed-use development for the 19-acre site. There have been various plans for this parcel throughout the years, with most plans involving mixed-use development and entertainment options. In May 2008 the city sold the 19-acre site to XL Development Group, which planned to construct a mixed-use development with retail and residential uses, a full-service hotel and a live dinner theater. Plans also included a parking structure to serve both the mixed-use development as well as major Coliseum events. Due to the current economic climate, however, the developer could not get the project financed. The developer is in the process of selling the parcel back to the city, although the developer will likely retain an option to repurchase the property in the future. In spite of the financing issues with the XL Development project, the city of Hampton prefers that the site be used for mixed-use development with a full-service hotel and theater.

For this base scenario analysis it is assumed that the fully-developed 19-acre site will include a large dinner theater, a full-service hotel, mid-rise rental residential properties, and retail stores. In addition it is assumed that the 19-acre site will include a parking structure that serves both development and event traffic, with access provided from Coliseum Drive.



FIGURE 6 - Location of the 19-acre site. Aerial image source: Microsoft.



19-acre site. Photo source: HRTPO staff.

11-acre site

The 11-acre site is located to the east of the Hampton Coliseum, just south of the intersection of Coliseum Drive and Convention Center Boulevard. The site is currently used for Coliseum event parking with a total of 500 parking spaces available. Current plans call for the Cordish Company to develop the site as a mixed-use development.

The Coliseum Central Master Plan also envisions mixed-use development on the site, with high density housing as well as restaurant and entertainment uses. The plan recommends that a parking structure be included to provide parking for both the mixed-use development and for Coliseum events. A small waterfront park is also envisioned for the area between the Coliseum and the 11-acre site.

For this base scenario analysis it is assumed that the fully-developed 11-acre site will include restaurants, high-rise residential properties, and entertainment uses. Parking used by both development and event traffic would also be provided with access from the intersection of Coliseum Drive and Convention Center Boulevard.



FIGURE 7 - Location of the 11-acre site. Aerial image source: Microsoft.



11-acre site. Photo source: HRTPO staff.

H2O development

The H2O development is currently being constructed along Freeman Drive to the east of the Hampton Coliseum. The 25-acre tract is being developed as part of a public-private partnership with the Hampton Redevelopment and Housing Authority and L.M. Sandler & Sons. Groundbreaking on the first units occurred in the summer of 2007.

Current plans call for nearly 500 higher-density residential units to be constructed in the fully built-out H2O development. Although construction continues, development of the site has been slowed by the condition of the real estate market with only a few blocks completed to date.

For the base scenario analysis it is assumed that the completed H2O development will resemble the current plans. Access would be provided to the west from the intersection of Coliseum Drive and Convention Center Boulevard and to the east from Freeman Drive, which intersects Armistead Avenue.



Newly constructed townhomes within the H2O Development. Photo source: HRTPO.



FIGURE 8 - Location of the H2O Development. Aerial image source: Microsoft.



FIGURE 9 - H2O Development site plan. Source: Chesapeake Homes.

Additional parking

As the current Coliseum and Convention Center parking lots are redeveloped, Coliseum officials have plans in place to add surface parking lots in phases on the eastern side of the complex. The first of these new lots, with 360 parking spaces, was recently completed to the east of Convention Center Boulevard.

The next parking lot planned for construction (Phase 1) will have 430 spaces and be located adjacent to the Convention Center lot to the west of Convention Center Boulevard. The second lot (Phase 2) will be located between the Phase 1 lot and Pine Chapel Road and have a capacity of 225 vehicles. The third lot (Phase 3) will also be located between the Phase 1 lot and Pine Chapel Road and contain 75 additional spaces. Finally an area to the east of the Coliseum would be converted to general event parking (Phase 4), creating an additional 207 spaces.

The Coliseum Central Master Plan includes recommendations for future parking for Coliseum and Convention Center events. As various tracts are developed, the master plan recommends the addition of parking structures serving both development and event parking within the same structure. The master plan also recommends considering using vacant areas to the north of Pine Chapel Road (such as the forested area in the top left corner of **Figure 10**) for surface parking as the existing parking lots are redeveloped.

For the base scenario analysis it is assumed that all four additional parking lots will be constructed, and parking structures would be included within the 19-acre and 11-acre developments for both event and development parking.

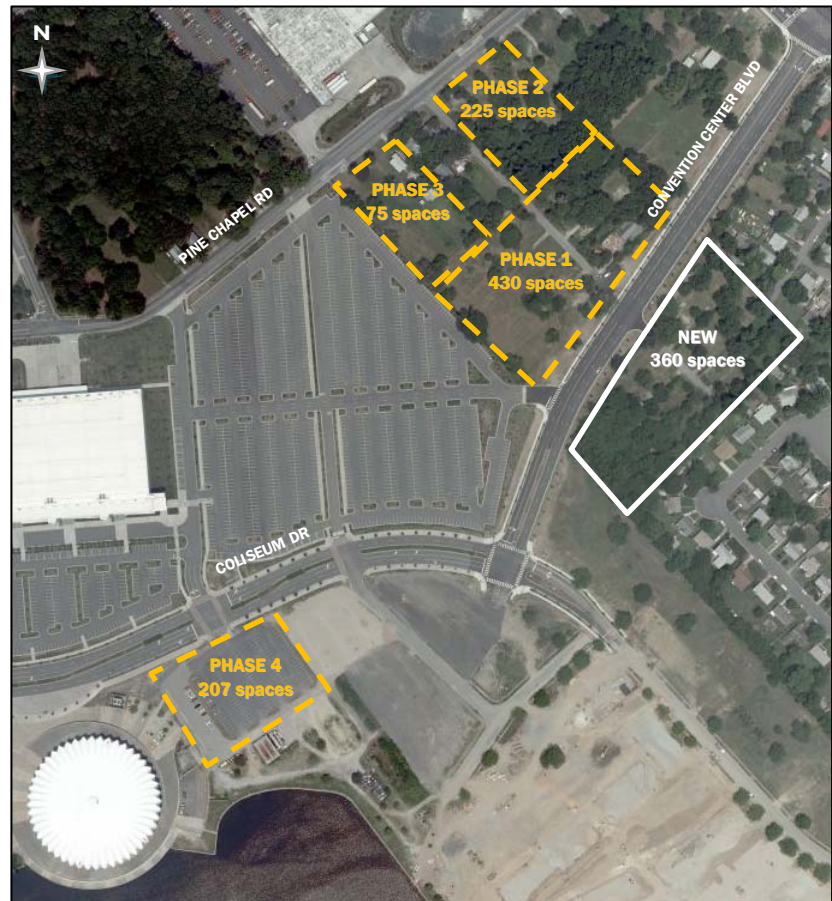


FIGURE 10 - Location of future parking sites. Aerial image source: Microsoft.

Traffic Generated by Future Developments

As the developments described in the previous section become reality the amount of activity in the Coliseum and Convention Center area will increase, with thousands of additional trips generated by these sites each day. This additional traffic will have an impact on traffic conditions for Coliseum and Convention Center events.

For this analysis it is assumed that three tracts - the 19-acre site, the 11-acre site, and the H2O development - will be developed as described in the previous section. Any redevelopment that will occur at other adjacent locations (such as the former Target site) is excluded from this analysis since plans for those sites are much more ambiguous at this point.

Projections of the number of trips generated by the 19-acre, 11-acre, and H2O developments are based on data included in the Institute of Transportation Engineer's (ITE) Trip Generation Manual.² For the expected land use types in these developments the trip generation rates for both weekdays and the afternoon peak hour of adjacent street traffic are shown in **Table 6** on page 23. The numbers in the table represent the number of vehicle trip ends, which are defined as the total of all vehicle trips entering the site plus all vehicle trips exiting the site, that are expected to be generated. As an example, a traveler that drives from their home to Site A and then departs Site A to return home would count as two trip ends at Site A.

Based on the data included in the Trip Generation Manual and assumptions regarding the amount of each type of land use that will be included in these three developments, the number of trips that would be generated by the 19-acre, 11-acre, and the H2O developments were estimated. These estimated trip ends are also shown in **Table 6** on page 23. These three sites are projected to generate approximately 17,000 trip ends each weekday, with 1,600 of these trip ends occurring during the afternoon peak hour of



The redeveloped 11-acre site is projected to generate over 3,000 trip ends each weekday. Photo source: HRTPO staff.

adjacent street traffic. By comparison a sold out concert at the Hampton Coliseum generates less than 10,000 vehicle trip ends.

It should be noted that these trip generation rates are based on single-use, free-standing sites. Multi-use developments similar to those planned for the area around the Coliseum and Convention Center tend to reduce the number of external trips due to interaction among the various land uses within the site. For example, a resident of an apartment within the multi-use site may walk to a restaurant within the complex rather than use their vehicle to drive to another restaurant. Quantifying this reduction in trips, which are defined as "internally-captured trips", is difficult since multi-use sites vary significantly. The ITE Trip Generation Handbook contains some internally-captured trip rate data for multi-use sites but ITE cautions against their use since the data is based on a very small sample size. Due to this, the number of trips generated for each site listed in Table 6 was not reduced to account for these internally-captured trips, resulting in a liberal estimate of the impact of these sites.

² Institute of Transportation Engineers, "Trip Generation Manual – 8th Edition", 2008.

| Land Use | Average Trip Ends Per Unit | | | | 19-acre Site | | | | 11-acre Site | | | | H2O Development | | | |
|--|--|--------------------------|-------------------------|---------------------------------------|--------------|-----------------|-------------------------|---------------|--------------|-----------------|-------------------------|---------------|-----------------|-----------------|-------------------------|---------------|
| | Land Use Unit | Average Rate Per Weekday | During the PM Peak Hour | PM Peak Hour Directional Distribution | Unit Count | Trips Generated | | | Unit Count | Trips Generated | | | Unit Count | Trips Generated | | |
| | | | | | | Daily | During the PM Peak Hour | | | Daily | During the PM Peak Hour | | | Daily | During the PM Peak Hour | |
| | | | | | | | Entering Trips | Exiting Trips | | | Entering Trips | Exiting Trips | | | Entering Trips | Exiting Trips |
| High-Rise Residential Condominium/Townhouse (3 or more floors) | Per Dwelling Unit | 4.18 | 0.38 | 62% entering, 38% exiting | - | - | - | - | 100 | 418 | 24 | 14 | 500 | 2,090 | 118 | 72 |
| Mid-Rise Apartment (3-10 floors) | Per Dwelling Unit | 6.72 | 0.39 | 58% entering, 42% exiting | 300 | 2,016 | 68 | 49 | - | - | - | - | - | - | - | - |
| Quality Restaurant | Per Seat | 2.86 | 0.26 | 67% entering, 33% exiting | - | - | - | - | 300 | 858 | 52 | 26 | - | - | - | - |
| Retail | Per 1,000 sq. ft. of Gross Leasable Area | 42.94 | 3.73 | 49% entering, 51% exiting | 150 | 6,441 | 274 | 285 | - | - | - | - | - | - | - | - |
| High-Turnover Sit-Down Restaurant | Per Seat | 4.83 | 0.41 | 57% entering, 43% exiting | - | - | - | - | 200 | 966 | 47 | 35 | - | - | - | - |
| Live Dinner Theater* | Per Seat | 0.98 | 0.19 | 85% entering, 15% exiting | 1,000 | 980 | 162 | 29 | - | - | - | - | - | - | - | - |
| Entertainment Facility | Per 1,000 sq. ft. of Gross Floor Area | 78.06 | 11.34 | 66% entering, 34% exiting | - | - | - | - | 15 | 1,171 | 112 | 58 | - | - | - | - |
| Hotel | Per Room | 8.17 | 0.59 | 53% entering, 47% exiting | 300 | 2,451 | 94 | 83 | - | - | - | - | - | - | - | - |
| TOTAL | | | | | | 11,888 | 597 | 446 | | 3,413 | 235 | 133 | | 2,090 | 118 | 72 |

TABLE 6 – Trip Generation Rates and Projected Trip Ends Generated by Future Developments.

Trip generation rates source: ITE Trip Generation Manual, 8th edition.

* Live Dinner Theater land uses are not included in the Trip Generation Manual. The number of trip ends for this land use type are estimated.

Base Scenario Traffic Conditions

This section examines the impacts that the previously described new developments will have on event ingress and egress. For this base scenario analysis traffic volumes based on the trip generation estimates listed in the previous section were added to the existing ingress and egress traffic levels on the existing roadway network. **Tables 7 and 8** show the delays and backups that both currently exist and those that can be expected when the three developments are completed for both ingress and egress conditions.

During event ingress, delays are expected to increase at all the analyzed intersections under the base scenario. Delays in the Coliseum Drive corridor are projected to increase the most, with a 35% increase in delay projected at the intersection of Coliseum Drive and Mercury Boulevard and a 30% increase projected at the intersection of Coliseum Drive and Pine Chapel

Road. Delays at intersections in the Armistead Avenue corridor are expected to increase at a much lower rate than those in the Coliseum Drive corridor. This is largely due to the largest of the new developments, the 19-acre site, impacting traffic conditions in the Coliseum Drive corridor much more than traffic conditions in the Armistead Avenue corridor.

In addition to additional delays at major intersections, backups preceding major events are also expected to worsen once the developments are complete. These longer queues will be most notable on westbound I-64 approaching the Mercury Boulevard interchange. Average queues that currently extend to just beyond the Pine Chapel Road overpass are projected to extend an additional 1,800 feet under the base scenario, nearly to the onramp from I-664. Maximum queues that currently extend

| Intersection | Delay and Level-of-Service | | | | | | | |
|--|----------------------------|-----|----------------|-----|----------------|-----|----------------|-----|
| | Event Ingress | | | | Event Egress | | | |
| | Existing | | Base Scenario | | Existing | | Base Scenario | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Coliseum Drive at Mercury Boulevard** | 109.1 sec/veh* | F | 147.3 sec/veh* | F | 201.3 sec/veh* | F | 185.8 sec/veh* | F |
| Coliseum Drive at Pine Chapel Road | 93.3 sec/veh* | F | 122.8 sec/veh* | F | 132.9 sec/veh* | F | 104.0 sec/veh* | F |
| Armistead Avenue at LaSalle Avenue | 90.7 sec/veh | F | 107.9 sec/veh | F | 52.3 sec/veh | D | 70.5 sec/veh | E |
| Armistead Avenue at Conv. Center Boulevard | 51.3 sec/veh* | D | 54.5 sec/veh* | D | 272.9 sec/veh* | F | 413.4 sec/veh* | F |
| Armistead Avenue at Mercury Boulevard | 40.4 sec/veh | D | 42.9 sec/veh | D | 22.6 sec/veh | C | 42.6 sec/veh | D |
| Pine Chapel Road at Power Plant Parkway | 21.3 sec/veh | C | 23.1 sec/veh | C | 24.7 sec/veh | C | 65.1 sec/veh | E |

TABLE 7 – Delay and Levels of Service for Selected Intersections During Event Ingress and Egress Under Existing Conditions and the Base Scenario.

* Traffic signals at these intersections are operated by city police during event ingress. Delay levels are dependent on signal operation.

** Does not include backups on I-64 and the I-64 ramp during event ingress.

Based on Highway Capacity Software and VISSIM simulation.

| Location | Average Queue | | | Maximum Queue | | |
|---|---------------|--|----------------------|---------------|---|----------------------|
| | Length | Location | Change from existing | Length | Location | Change from existing |
| Mercury Boulevard/Coliseum Drive | 562' | 350' short of the offramp from WB I-64 | +243' | 1499' | At the I-64 EB offramp | +480' |
| I-64 | 4256' | 800' short of the onramp from I-664 | +1837' | 7999' | 500' short of the offramp to I-664 | +3944' |
| Coliseum Drive/Pine Chapel Road intersection | 1208' | 300' south of Mercury Boulevard | +27' | 2314' | Through the Mercury Boulevard intersection | -156' |
| Armistead Avenue/LaSalle Avenue intersection | 803' | 900' short of the I-64 mainlines | +493' | 2444' | 700' onto the I-64 mainlines from the Armistead Ave offramp | +1139' |
| Armistead Avenue/Convention Center Blvd. Intersection | 189' | Within left turn bay | +138' | 1205' | 500' beyond Findley Street | +198' |

TABLE 8 – Average and Maximum Queues During Event Ingress at Selected Locations Under the Base Scenario.

Based on VISSIM simulation.

to the I-664 interchange are expected to extend all the way through the interchange under the base scenario.

During event egress, some intersections in the area are projected to experience an increase in delay under the base scenario. These intersections are primarily those located to the east of the event area in the Armistead Avenue corridor. This is caused by additional parking spaces being added to areas northeast of the Convention Center, which in turn produces more egress traffic leaving the event area via Armistead Avenue. Accordingly, intersections in the Coliseum Drive corridor are projected to experience a decrease in delay under the base scenario from current egress conditions.

This realignment of parking areas is also expected to impact the amount of time it takes to clear each lot after major events, as shown in **Table 9**. Clearance times are expected to increase in the lot to the east of the Convention Center, the new 360-space lot, and the new parking area within the 11-acre development. Decreases can be expected in the parking area within the new 19-acre development and the parking lot at the former Best Products store site. It is projected that it would take nearly 40 minutes to clear all of the parking lots after a major Coliseum event under the base scenario, which is 5 minutes longer than it currently takes.

| Parking Lot | Time Needed to Clear Parking Lots After Major Events | |
|--------------------------|--|---------------|
| | Existing | Base Scenario |
| 19-acre Lot/Development | 29 minutes | 23 minutes |
| 11-acre Lot/Development | 27 minutes | 39 minutes |
| Convention Center Lot | 32 minutes | 36 minutes |
| Former Best Products Lot | 28 minutes | 25 minutes |
| New 360-space Lot | 34 minutes | 38 minutes |

TABLE 9 – Amount of Time Needed to Clear Parking Lots After Major Coliseum Events Under Existing Conditions and the Base Scenario. Based on VISSIM simulation.

Issues with the Base Scenario

In addition to the issues that currently impact traffic flow before and after major events at the Coliseum, the following issues will likely arise once the new developments are complete based on the results of the analyses performed for this section:

- Additional delay and longer backups before events during ingress, and longer times to clear some of the parking lots after events. These longer queues, particularly the queue on westbound I-64 approaching the Mercury Boulevard interchange, will further compromise roadway safety.
- Conflicts between development traffic and event traffic. With these developments being located adjacent to the Coliseum and Convention Center, vehicular access to the new developments will be difficult during event ingress and egress. Conflicts between traffic destined for the new development and Coliseum events will impact the flow of traffic into the Coliseum and Convention Center parking lots during event ingress, worsening backups and compromising roadway safety.
- Parking during major events. As construction begins on these developments parking spaces dedicated to Coliseum and Convention Center events will be lost. Only 937 new parking spaces dedicated to Coliseum and Convention Center events are currently planned in addition to the 360 spaces that are included in the newly constructed lot to the east of Convention Center Boulevard. These 1,300 new parking spaces will not fully replace the 1,800 spaces that currently exist in the 19-acre lot and the 11-acre lot. Both the 19-acre lot and the 11-acre lot developments will need to have parking structures that will be shared by both users of the new developments and event traffic to account for this shortfall. Conflicts will be a problem between traffic destined for the new developments and event ingress traffic using the same entrances for the parking structures.

ALTERNATIVE ANALYSIS

A number of alternatives may help alleviate some of the impacts that the three future developments would have on traffic flow in the Coliseum area as well as address issues that currently exist with traffic flow before and after major events. These possible alternatives include:

- Provide additional access points to the new developments, particularly the 19-acre site. Providing alternative access points could help separate development and event traffic which would help with traffic flow during event ingress and egress.
- Divert event traffic away from the Mercury Boulevard and Coliseum Drive route by rerouting some event traffic from eastbound Mercury Boulevard to Power Plant Parkway and Pine Chapel Road.
- Widen the offramp from westbound I-64 to eastbound Mercury Boulevard to two lanes throughout the entire length of the ramp. This could help eliminate one of the chokepoints for traffic accessing the area during events.
- Make improvements to Armistead Avenue in the vicinity of the I-64 interchange and LaSalle Avenue. Improvements could increase the roadway capacity and safety of this corridor, which would safely allow more event traffic to use this route rather than more congested ones.

A description of each of these alternatives is provided throughout this section.



Improvements to Armistead Avenue in the vicinity of I-64 and LaSalle Avenue could allow more event traffic to use this route rather than more congested ones. Photo source: HRTPO.

Provide Additional Access to New Developments

One way to reduce the impact of the new developments on event traffic is to provide additional access points to these developments. These access points should be planned so that they will reduce the conflicts between traffic related to the new developments and event traffic.

Among the three development sites, providing alternate access to the H2O development would be the least difficult. As currently planned, access to the H2O site will be provided by Coliseum Drive, Convention Center Boulevard, and Freeman Drive. Freeman Drive will not be signed as a route to the Coliseum and Convention Center nor will egress traffic be directed onto Freeman Drive, so H2O development traffic will be able to use this route to avoid event traffic. Armistead Avenue, however, will be used by traffic destined for both the event area and these new developments, causing additional congestion in this corridor.

Alternate access to the 11-acre development would be more difficult since it only has frontage with Coliseum Drive. In addition the 11-acre development is expected to contain parking areas shared by both development and event traffic, making it difficult to separate these two traffic flows. Alternate access to the 11-acre site could be provided via Freeman Drive through the H2O development, although for many travelers accessing the 11-acre site from the north and east this could be more inconvenient than using event routes such as Convention Center Boulevard.

Since the 19-acre lot is bounded by I-64 to the southwest and a lake to the southeast, additional access for it would have to be provided from the northwest via Pine Chapel Road. While the Coliseum Drive access to the 19-acre site could be used for event traffic that parks in a proposed parking structure,



FIGURE 11 – Possible locations for additional access to the 19-acre development. Aerial image source: Microsoft.

| Highway Functional Classification | Legal Speed Limit | Centerline to Centerline Spacing | | |
|-----------------------------------|-------------------|--------------------------------------|--|---|
| | | Signalized Intersections/ Crossovers | Unsignalized Intersections/ Crossovers & Full Access Entrances | Partial Access One or Two Way Entrances |
| Urban Minor Arterial | ≤ 30 mph | 1,320' | 660' | 270' |
| | 35 - 45 mph | 1,320' | 660' | 305' |
| | ≥ 50 mph | 1,760' | 1,050' | 495' |
| Urban Collector | ≤ 30 mph | 660' | 440' | 200' |
| | 35 - 45 mph | 660' | 440' | 250' |
| | ≥ 50 mph | 1,050' | 660' | 360' |

TABLE 10 – Minimum Spacing Standards for Commercial Entrances, Intersections, and Crossovers. Source: VDOT.

the access from Pine Chapel Road could be used primarily for traffic accessing the development itself.

To avoid constructing the new access point on the grade approaching the I-64 overpass, the preferred location for this access point would be at the intersection of Pine Chapel Road with Commerce Drive. This location, however, is close to Coliseum Drive and does not meet VDOT's proposed minimum intersection spacing standards. **Table 10** on page 28 shows VDOT's proposed minimum intersection spacing standards for urban roadways based on the roadway functional classification and the posted speed limit³. With Pine Chapel Road classified as an urban collector with a posted speed limit of 35 miles per hour, the required minimum distance between signalized intersections would be 660 feet. Commerce Drive is only 300 feet to the west of the intersection of Pine Chapel Road and Coliseum Drive, well under this required minimum distance.

To meet the required 660 feet between signalized intersections, the entry to the 19-acre site would need to be located on the grade to the I-64 overpass. There is approximately 940 feet on Pine Chapel Road between the eastern bridge abutment and Coliseum Drive, providing enough distance to the east of the bridge to meet VDOT's minimum spacing standards. Locating an access point on the grade, however, would create various issues, including:

- Eastbound signal sight distance. Due to the crest of the overpass and its approaches, the visibility of a traffic signal at this new access point would be obscured. According to research done for the Texas Transportation Institute⁴, "Due to the additional complexities that the driver is faced with as he or she approaches a signalized intersection near a vertical curve, it is recommended that...decision sight distance be provided on the approach to the signalized intersection." For the eastbound approach, a decision sight

distance of 590 feet would need to be provided at a design speed of 35 miles per hour according to the AASHTO Green Book⁵, the manual that is universally used for roadway geometric design. 590 feet to the west of this proposed access point lies west of the western abutment of the bridge, clearly not providing enough sight distance for a traffic signal. One possible remedy for this would be to install a large advance warning sign on eastbound Pine Chapel Road to the west of I-64 overpass to alert drivers to the signal and also alert drivers when the signal is in the red phase.

- Stopping distance on a downgrade, particularly in wet conditions. The amount of space needed to stop on a 3% downgrade at 35 mph is 4% longer than on a level roadway. With the additional stops necessitated by the traffic signal at the new access point this would become an issue.

This proposed access point location is also approximately 15 feet higher than the site, which would either require the access road to be built at a grade or connect to the second floor of a parking structure. This grade would cause additional safety problems as well as impact the design of the development.

Another alternative is to provide only partial access to the 19-acre site from Pine Chapel Road. An example of partial access would be an entrance that permits right in/right out movements only. With only 250 feet required between partial entrances and signalized intersections for urban collectors with a posted speed limit of 35 mph, a partial intersection could be provided opposite Commerce Drive. This, however, would require vehicles exiting the 19-acre site to turn right towards Coliseum Drive, producing a conflict between that traffic and event traffic using Coliseum Drive. This would reduce many of the benefits of additional access to the development, so only the full intersection option was analyzed for this alternative.

³ Virginia Department of Transportation, "Proposed Access Management Design Standards for Entrances and Intersections: Minor Arterials, Collectors, and Local Streets." June 2009.

⁴ Barricklow, Paul and Marc Jacobson. "Guidelines for Using Decision Sight Distance at Signalized Intersections Near Vertical Curves." September 2004.

⁵ American Association of State Highway and Transportation Officials. "A Policy on Geometric Design of Highways and Streets." 2004.

Divert event traffic to Power Plant Parkway

The longest backups during event ingress occur along eastbound Mercury Boulevard through the offramp and onto westbound I-64, and these backups are expected to worsen with the addition of the new developments. For event traffic approaching the area from eastbound Mercury Boulevard to the west of I-64, Power Plant Parkway and Pine Chapel Road provide a viable alternative to this congestion on Mercury Boulevard east of I-64. Drivers could be informed of this alternative via either static signs or portable changeable message signs placed on eastbound Mercury Boulevard to the west of Power Plant Parkway.

The impacts of this alternative, however, may be limited since most event traffic on eastbound Mercury Boulevard and Coliseum Drive is from eastbound and westbound I-64 and not from Mercury Boulevard to the west of the area.



Power Plant Parkway and Pine Chapel Road can be used as an alternative to Mercury Boulevard and Coliseum Drive for some event traffic. Aerial image source: Microsoft.

Widen I-64 Ramp to Eastbound Mercury Blvd

The offramp from westbound I-64 to eastbound Mercury Boulevard is one of the most traveled roadways for event traffic in the Coliseum area. Event attendees use this offramp to travel from westbound I-64 to eastbound Mercury Boulevard, which provides access to the event area via Coliseum Drive, and this offramp will see an increase in traffic volumes once the new developments are in place. This ramp, along with the rest of the interchange, was improved as part of the I-64 Coliseum Central project.

This offramp has two lanes where it diverges from westbound I-64. However, one of the two lanes is dropped before the merge point with eastbound Mercury Boulevard. This lane drop helps contribute to the bottleneck that occurs during event ingress. Widening the ramp to two lanes where it merges with eastbound Mercury Boulevard would alleviate this bottleneck, although it may produce other problems with traffic flow beyond the interchange area.



The ramp from westbound I-64 to eastbound Mercury Boulevard drops from two lanes to one before merging with Mercury Boulevard. Aerial image source: Microsoft.

Improvements to Armistead Avenue

Although signage on westbound I-64 coming from the Southside directs Coliseum traffic to use the Armistead Avenue exit, most westbound traffic uses the Mercury Boulevard interchange and Coliseum Drive to access the Coliseum and Convention Center. This contributes to the congestion issues that occur during event ingress at the interchange of I-64 and Mercury Boulevard. With access to the event area from the east being greatly improved by the construction of Convention Center Boulevard, it would be beneficial if some of the westbound traffic that currently uses the Mercury Boulevard interchange used the westbound Armistead Avenue interchange instead. In addition, once the new developments are complete diverting event traffic to the Armistead Avenue route would also lead to fewer conflicts with traffic associated with the 19-acre development.

The complex roadway geometry of Armistead Avenue in the vicinity of I-64 and LaSalle Avenue, however, precludes directing more traffic to use westbound Armistead Avenue to access the Coliseum and Convention Center. Interstate 64 crosses Armistead Avenue and LaSalle Avenue just to the southeast of this intersection, and various ramps lead to and from I-64, Armistead Avenue, and LaSalle

Avenue. Traffic exiting onto westbound Armistead Avenue from westbound I-64 has a very limited and congested area within which to safely merge. There is only 320 feet on westbound Armistead Avenue between the westbound I-64 off ramp and LaSalle Avenue. In addition there is a signalized intersection within this segment at Thomas Street, only 100 feet from the end of the westbound I-64 offramp. Not only must traffic from I-64 safely merge onto Armistead Avenue but drivers on westbound Armistead Avenue that turn right onto Thomas Street or LaSalle Avenue must also weave into this I-64 offramp traffic.

This complex geometry greatly impacts safety as shown in **Figure 12** on page 33. During the three-year period between 2006 and 2008 there were 115 reported crashes at the intersection of Armistead Avenue and LaSalle Avenue. This intersection ranks 6th highest in the City of Hampton in terms of the number of crashes. There were an additional 25 crashes between the intersection area and the off ramp from westbound I-64. Of these 140 total crashes over the three-year period, 26 had injuries and there were no fatalities. The most common crash types were:



Armistead Avenue at LaSalle Avenue. Aerial image source: Microsoft.

FIGURE 12

Collision Diagram

Armistead Ave from LaSalle Ave to I-64
2006 - 2008

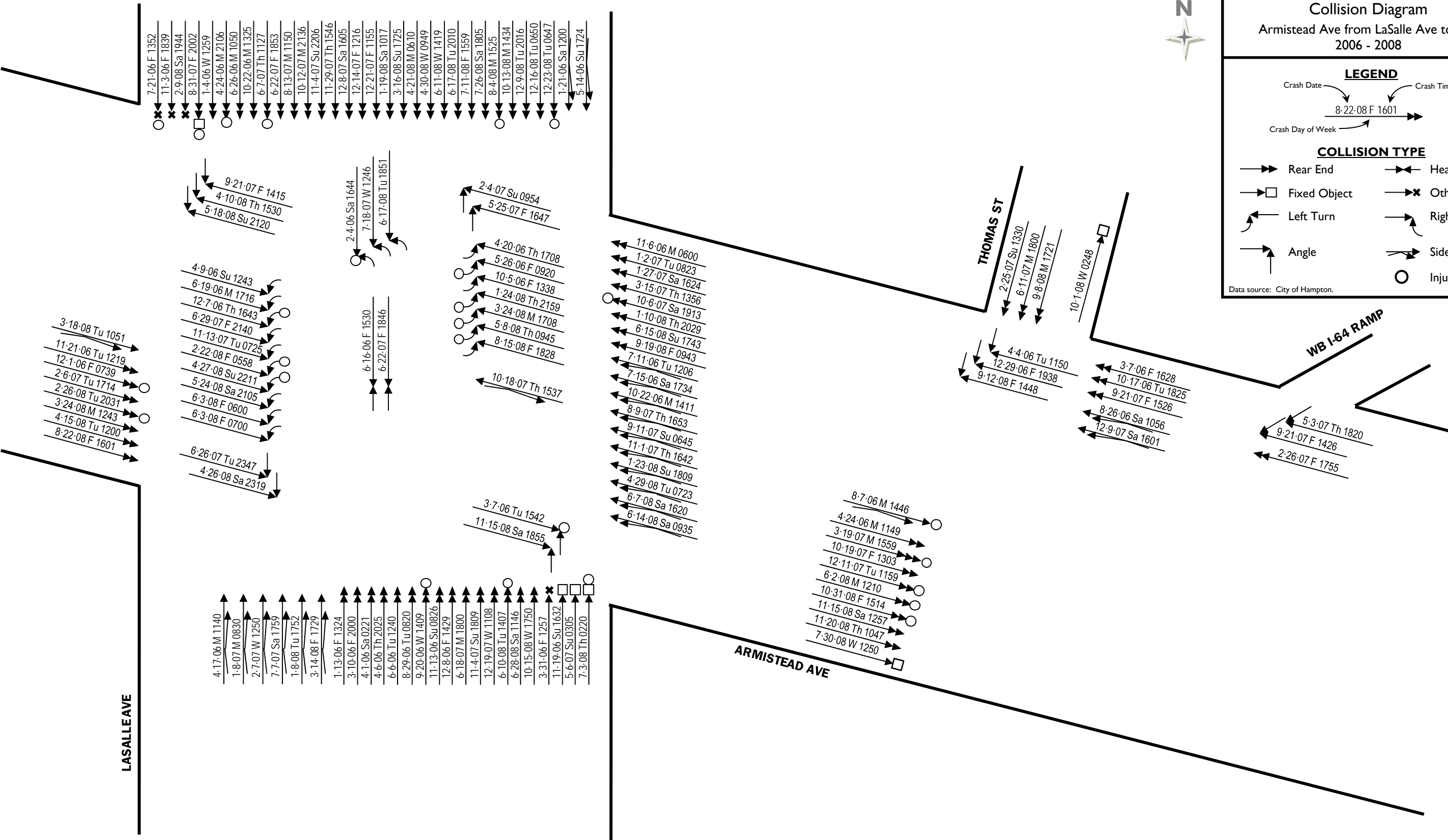
LEGEND

Crash Date → 8-22-08 F 1601
Crash Time of Day →
Crash Day of Week →

COLLISION TYPE

- | | |
|-----------------|----------------|
| →→ Rear End | →↔ Head On |
| →□ Fixed Object | →× Other |
| ↶ Left Turn | ↷ Right Turn |
| ↗ Angle | ↔ Sideswipe |
| | ○ Injury Crash |

Data source: City of Hampton.



- Rear end collisions on all four approaches of the intersection of Armistead Avenue and LaSalle Avenue. 57 of the 115 crashes (50%) at the intersection were rear end collisions. The southbound leg had 27 rear end crashes, the most of any leg at the intersection.
- Left turn crashes from both directions of Armistead Avenue onto LaSalle Avenue. 17 of the 115 crashes (15%) at the intersection were these type of left turn crashes. These left turn movements currently operate under protective/permissive signal phasing, which likely contributes to the high number of crashes. Changing to protective-only left turn phasing would reduce this number of left turn crashes.
- Sideswipes on westbound Armistead Avenue between I-64 and LaSalle Avenue. A total of 14 crashes during the three-year period were of this type.

In addition to the safety issues listed above, congestion is also a concern in this area. The intersection of Armistead Avenue and LaSalle Avenue currently operates at an acceptable LOS D during the typical weekday afternoon peak hour. During event ingress, however, the intersection operates at an unacceptable LOS F with the largest delays occurring on the primary ingress route of westbound Armistead Avenue coming from westbound I-64.

The levels-of-service listed above do not account for the congestion caused by the short weaving area on westbound Armistead Avenue. Both field observations and the VISSIM model indicate that Armistead Avenue to the east of LaSalle Avenue becomes congested during a typical weekday peak travel period due to the limited weaving area. On those evenings with major events at the Coliseum this weaving issue is magnified due to the higher event volumes as well as the increased number of drivers unfamiliar with the area. This causes traffic to back up on both the westbound I-64 offramp and westbound Armistead Avenue, leading to additional safety concerns.



The intersection of Armistead Avenue and LaSalle Avenue with the westbound offramp from I-64 in the background. The complexity of this intersection causes safety issues. Photo source: HRTPO.

While decreasing the amount of traffic that uses Mercury Boulevard and Coliseum Drive to access the event area would be beneficial, promoting additional use of the Armistead Avenue route for event traffic is not practical without improvements being made to Armistead Avenue in the vicinity of I-64 and LaSalle Avenue. Various improvements that could increase the safety and capacity of this complex area include:

- Install a traffic signal on westbound Armistead Avenue at the base of the westbound I-64 offramp. The premise of this alternative is to remove the unsafe weaving movements that occur on Armistead Avenue between I-64 offramp traffic and westbound Armistead Avenue traffic.
- Add an additional westbound through lane on Armistead Avenue from the westbound I-64 offramp through the LaSalle Avenue intersection. This would provide more space for traffic from the westbound I-64 ramp to safely merge onto Armistead Avenue and provide more capacity at the LaSalle Avenue intersection.
- Remove access to Thomas Street from Armistead Avenue, and reroute access to the neighborhood to LaSalle Avenue. This alternative would remove the signal in the limited space that is provided for weaving on westbound Armistead Avenue.

- Remove the existing offramp from I-64 westbound to westbound Armistead Avenue (Exit #265B) and reconstruct westbound Exit #265A to allow traffic to turn both directions onto Armistead Avenue at the location of the ramp to the west of LaSalle Avenue. This alternative would remove the weaving issues on westbound Armistead Avenue and decrease the number of vehicles traversing the intersection of Armistead Avenue and LaSalle Avenue.

The benefits and disbenefits of each of these alternatives are described in detail in **Table 11** below. Although each of these alternatives would solve some component of the safety and congestion issues in the area, other issues may arise from some of these alternatives. For example, installing a signal at the base of the existing offramp from I-64 westbound to westbound Armistead Avenue would remove the weaving issue but would cause other safety problems such as confusion with adjacent signals and additional stops.

| Alternative | Benefits | Disbenefits |
|---|---|---|
| Install a traffic signal at the base of the WB I-64 offramp to WB Armistead Ave. | <ul style="list-style-type: none"> Improves weaving issues on WB Armistead Avenue between I-64 and LaSalle Avenue. Signal would operate at acceptable LOS C during normal peak hour conditions. | <ul style="list-style-type: none"> Creates safety issues due to additional stops on I-64 ramp. Creates safety issue related to additional confusion with signals at Thomas St and LaSalle Ave. New signal would operate at unacceptable LOS E during event ingress conditions unless signal was manually controlled. Does not improve or remove traffic volumes from the Armistead/LaSalle intersection. Costs of adding additional lane on the offramp and signal installation and operation. |
| Add an additional WB lane on Armistead Avenue between the WB I-64 offramp through the LaSalle Avenue intersection. | <ul style="list-style-type: none"> Provides more room for traffic from the WB I-64 ramp to safely merge onto WB Armistead Avenue. Provides another through lane on WB Armistead Avenue through the LaSalle Ave intersection. | <ul style="list-style-type: none"> Does not improve the weaving situation for WB Armistead Avenue drivers that turn right onto Thomas St or LaSalle Ave. High costs of adding additional lane. |
| Remove access to Thomas Street from Armistead Avenue. Provide new access to the neighborhood from LaSalle Avenue. | <ul style="list-style-type: none"> Removes the signal in the short area on Armistead Ave between the I-64 WB offramp and LaSalle Ave, improving the weaving area. Improves safety by removing confusion with the Thomas St and Armistead Ave signals. | <ul style="list-style-type: none"> Still does not provide enough area to safely merge on WB Armistead Avenue between the I-64 offramp and LaSalle Ave. Does not improve safety or congestion at the Armistead/LaSalle intersection. High costs of adding new access to the neighborhood from LaSalle Avenue. |
| Remove Exit #265B from WB I-64 to WB Armistead Avenue. Provide access to WB Armistead Avenue via left turn lanes from an improved Exit #265A offramp. | <ul style="list-style-type: none"> Removes the safety and capacity issues caused by the short weaving area between the I-64 WB offramp and LaSalle Ave. This new intersection is expected to operate at acceptable LOS C during normal peak hour conditions. This new intersection is expected to operate at acceptable LOS D during event ingress conditions, even without police traffic control. Removes hundreds of vehicles from the Armistead/LaSalle intersection during peak and event ingress travel conditions. | <ul style="list-style-type: none"> Costs of improving the Exit #265A offramp from WB I-64, plus signal improvements. A full traffic signal at the Armistead/I-64 ramps intersection could cause problems due to the limited spacing (~400') between this intersection and LaSalle Avenue depending on signal coordination. The EB left turn bay from EB Armistead Ave to NB LaSalle Ave likely would need to be lengthened or widened to handle the additional left turn traffic. |

TABLE 11 – Possible Alternatives to Improve Armistead Avenue in the Vicinity of LaSalle Avenue and I-64.

Alternative Analysis Results

Table 12 on page 37 shows the effect that each of the previously described alternatives would be expected to have on backups and queues before and after major Coliseum events.

The impacts that each of the three alternatives that directly affect the areas to the north and west of the Coliseum are as follows:

- **Alternative #1** - Providing additional access to the 19-acre site via Pine Chapel Road. This alternative helps reduce the conflicts between development and event traffic and reduces the delays at intersections to the north and west of the Coliseum during both ingress and egress. Although this alternative reduces the average queues on eastbound Mercury Boulevard during ingress by 900 feet and the maximum queues by 2300 feet, the queues would still be longer than they currently are during the existing ingress conditions and would still back up onto the mainlines of I-64.
- **Alternative #2** - Diverting eastbound Mercury Boulevard event traffic from Coliseum Drive to Power Plant Parkway and Pine Chapel Road. While this alternative reduces the delays and queues at the intersection of Mercury Boulevard and Coliseum Drive, the amount of traffic that can be diverted under this alternative is not enough by itself to reduce the projected queues on I-64 to acceptable levels.
- **Alternative #3** - Widening the offramp from westbound I-64 to eastbound Mercury Boulevard. This alternative would improve the queues on this route, although the average and maximum queues would still back up onto the I-64 through travel lanes. This alternative will also be expected to lead to additional weaving and safety issues on eastbound Mercury Boulevard.

offramp and reconstructing Exit #265A to allow traffic to turn left onto westbound Armistead Avenue (Alternative #4D) provides the most benefits. Not only does this alternative remove the weaving issues on westbound Armistead Avenue but it also removes many of the vehicles traversing the intersection of Armistead Avenue and LaSalle Avenue. Each of the other alternatives (#4A – Adding a new traffic signal at the base of the existing offramp, #4B – Adding an additional lane on westbound Armistead Avenue, and #4C – Removing access to Thomas Street from Armistead Avenue) either do not improve the existing delay levels or do not fully address the weaving and safety problems on this route.

Two scenarios were analyzed that combine various components of these alternatives. The first scenario, a combination of Alternatives #2 and #4D, diverts traffic to Power Plant Parkway and relocates the offramp from westbound I-64 to westbound Armistead Avenue. This scenario would allow for event traffic using westbound I-64 to be diverted from the Mercury Boulevard interchange to the Armistead Avenue interchange, reducing the queues at the Mercury Boulevard interchange to acceptable levels. Delays would also be greatly reduced at intersections to the north and west of the Coliseum during event ingress.

The second scenario, a combination of Alternatives #1, #2, and #4D, provides additional access to the 19-acre site from Pine Chapel Road in addition to diverting traffic to Power Plant Parkway and relocating the Armistead Avenue offramp. This scenario, in addition to providing the benefits of the first scenario, further reduces conflicts between development and event traffic and further improves the delay at the intersection of Mercury Boulevard and Coliseum Drive during ingress and egress.

Of the alternatives concerning Armistead Avenue in the vicinity of I-64 and LaSalle Avenue, the alternative that involves removing the Exit #265B

| # | Alternative | Ingress | | | | | | | | | | Egress | | | | | | | | | | Comments | |
|---|--|---------------------------------|----------------------------|---------------------------------|----------------------------|-------------------------|-------------------------|----------------------|--------------------------------|----------------------|----------------------------|------------------------------|-------------------------|-----------------------|--------------------------|-------------------|-------------------------|-------------------------|----------------------|--------------------------------|----------------------|----------|---|
| | | Average Queues | | Max. Queues | | Delay (seconds/vehicle) | | | | | | Time to Clear Lots (minutes) | | | | | Delay (seconds/vehicle) | | | | | | |
| | | WB Armistead Ave at LaSalle Ave | WB I-64 ramp to EB Mercury | WB Armistead Ave at LaSalle Ave | WB I-64 ramp to EB Mercury | Coliseum at Mercury | Coliseum at Pine Chapel | Armistead at LaSalle | Armistead at Convention Center | Armistead at Mercury | Pine Chapel at Power Plant | 19-acre lot/development | 11-acre lot/development | Convention Center Lot | Former Best Products Lot | New 360 space lot | Coliseum at Mercury | Coliseum at Pine Chapel | Armistead at LaSalle | Armistead at Convention Center | Armistead at Mercury | | Pine Chapel at Power Plant |
| | Existing | 310' | 2419' | 1305' | 4055' | 109 | 93 | 91 | 51 | 40 | 21 | 29 | 27 | 32 | 28 | 34 | 201 | 133 | 52 | 273 | 23 | 25 | |
| 0 | Base Scenario | 803' | 4256' | 2444' | 7999' | 147 | 123 | 108 | 55 | 43 | 23 | 23 | 39 | 36 | 25 | 38 | 186 | 104 | 70 | 413 | 43 | 65 | Also backups on WB Armistead Ave at the signal to I-64 ramp. |
| 1 | Additional access to 19-acre site | 803' | 3310' | 2444' | 5660' | 140 | 81 | 108 | 55 | 43 | 24 | 21 | 39 | 36 | 22 | 38 | 167 | 62 | 70 | 413 | 43 | 53 | |
| 2 | Divert traffic to Power Plant Pkwy | 803' | 3928' | 2444' | 7373' | 135 | 160 | 108 | 55 | 43 | 29 | 23 | 39 | 36 | 25 | 38 | 186 | 104 | 70 | 413 | 43 | 65 | |
| 3 | Widen ramp from WB I-64 to EB Mercury | 803' | 1703' | 2444' | 4042' | 147 | 127 | 108 | 55 | 43 | 23 | 23 | 39 | 36 | 25 | 38 | 186 | 104 | 70 | 413 | 43 | 65 | Leads to weaving issues and add'l backups on EB Mercury Blvd |
| | Improvements to Armistead Avenue | | | | | | | | | | | | | | | | | | | | | | |
| 4A | Signal at base of existing WB ramp | 662' | 4256' | 1158' | 7999' | 147 | 123 | 108 | 55 | 43 | 23 | 23 | 39 | 36 | 25 | 38 | 186 | 104 | 70 | 413 | 43 | 65 | Leads to significant backups on WB Armistead Avenue @ the new signal. |
| 4B | Add an additional lane on WB Armistead | 341' | 4256' | 1505' | 7999' | 147 | 123 | 47 | 55 | 43 | 23 | 23 | 39 | 36 | 25 | 38 | 186 | 104 | 69 | 413 | 43 | 65 | Does not entirely address weaving issues. |
| 4C | Remove access to Thomas St | 541' | 4256' | 2146' | 7999' | 147 | 123 | 101 | 55 | 43 | 23 | 23 | 39 | 36 | 25 | 38 | 186 | 104 | 70 | 413 | 43 | 65 | Does not solve weaving issues. |
| 4D | Realign the ramp from I-64 to Armistead | 66' | 4256' | 286' | 7999' | 147 | 123 | 44 | 55 | 43 | 23 | 23 | 39 | 36 | 25 | 38 | 186 | 104 | 76 | 413 | 43 | 65 | Delay at new int. of Armistead & I-64 ramps during ingress is only 54 sec/veh. |
| Combined Alternatives with 500 Vehicles Diverted From WB Mercury Blvd Offramp to Armisted Avenue During Ingress | | | | | | | | | | | | | | | | | | | | | | | |
| 2/ 4D | Divert traffic to Power Plant Pkwy and Realign Offramp from WB I-64 to WB Armistead Ave | 65' | 66' | 276' | 394' | 90 | 117 | 44 | 58 | 43 | 29 | 23 | 39 | 36 | 25 | 38 | 186 | 104 | 70 | 413 | 43 | 65 | Delay at int. of Armistead & I-64 ramps during ingress would be 75 sec/veh. Avg. queues on ramp of 217', max. queues of 712'. |
| 1/ 2/ 4D | Additional access to the 19-acre site, Divert traffic to Power Plant Pkwy and Realign Offramp from WB I-64 to WB Armistead | 65' | 45' | 276' | 358' | 81 | 104 | 44 | 58 | 43 | 30 | 21 | 39 | 36 | 22 | 38 | 167 | 62 | 70 | 413 | 43 | 53 | Delay at int. of Armistead & I-64 ramps during ingress would be 75 sec/veh. Avg. queues on ramp of 217', max. queues of 712'. |

TABLE 12 – Alternative Analysis.

Based on Highway Capacity Software analysis and VISSIM simulation. Large increases are shown in red, large decreases are shown in green.

CONCLUSIONS

This study examined the existing traffic conditions for both typical weekdays and during major events at the Coliseum and Convention Center, as well as the impacts that proposed developments would be expected to have on traffic flow and parking for events. The following conclusions are made based on the analysis performed for this study:

- Roadways within the study area are not congested during the peak travel periods on typical weekdays. During major event ingress, however, portions of I-64, Mercury Boulevard and Armistead Avenue become congested. The worst congestion occurs on the I-64 and Mercury Boulevard route, with traffic at the Mercury Boulevard interchange backing up onto the mainlines of I-64 to the Pine Chapel Road overpass and beyond. After major events, parking lots can currently be cleared in a little over half an hour.
- Current wayfinding signage does an adequate job directing travelers towards the Hampton Coliseum and away from the event area, although most event traffic on westbound I-64 does not use the Armistead Avenue exit in spite of existing signage guiding them to do so. Signage is lacking on the Interstate system to direct travelers to the Convention Center.
- The three major developments proposed for the area adjacent to the Coliseum and Convention Center (the 19-acre site, 11-acre site, and H2O development) are projected to produce about 17,000 additional vehicle trips each weekday, including 1,600 during the afternoon peak travel hour. This traffic will conflict with traffic ingress and egress for major events at the Coliseum. Delays during event ingress are expected to worsen once the three major developments are complete, especially on I-64, Mercury Boulevard, and Coliseum Drive. The time to clear the parking lots after major Coliseum events is also expected to lengthen by about 5 minutes once the new developments are complete.
- Under current plans, there will not be enough new parking spaces created to account for the spaces that are located where the new developments will be constructed. Parking areas at the new developments will need to be shared between development and event traffic to account for this shortfall.
- Providing additional access points to the new developments, and in particular to the development located at the 19-acre site, would help reduce the conflicts between traffic generated by the development and event traffic. This would also reduce delays and queues before and after events, particularly along I-64, Mercury Boulevard, and Coliseum Drive.
- The complex roadway geometry of Armistead Avenue around the I-64 interchange and LaSalle Avenue currently restricts the amount of event traffic that can safely and efficiently use this route. Among possible improvements analyzed for this study, closing the current ramp from westbound I-64 to westbound Armistead Avenue and relocating the access to Exit #265A provides the greatest safety and congestion-mitigating benefits.

RECOMMENDATIONS

Based on the conclusions and other findings in this study, the following recommendations are made:

- Improvements should be made to Armistead Avenue in the I-64/LaSalle Avenue area to improve safety and traffic flow, and to allow for more event traffic to use this corridor instead of the Mercury Boulevard and Coliseum Drive route. Closing the current ramp from westbound I-64 to westbound Armistead Avenue and relocating the access to Exit #265A would provide the greatest safety and congestion-mitigating benefits and would allow for more event traffic to use this route.
- If the previous improvements are made, attempts should be made to divert event traffic on westbound I-64 from the Mercury Boulevard interchange to the Armistead Avenue interchange. This diversion would alleviate congestion and improve roadway safety in the I-64/Mercury Boulevard interchange area.

Since the signage on westbound I-64 already directs Coliseum traffic to use the westbound Armistead Avenue exit, more prominent signage that would be noticed by motorists needs to be provided for this diversion to be possible. The Coliseum and Convention Center are unique and highly visited destinations in the City of Hampton and the signage should reflect the significance of these facilities. Signage for these facilities should be prominent since large numbers of drivers destined for the Coliseum and Convention Center are from other parts of the region, state, or country and are likely unfamiliar with the area.

One method of making signage for the Coliseum and Convention Center

more prominent is to use wayfinding signage with logos, as shown on the picture on this page. Although not specifically mentioned in the Manual of Uniform Traffic Control Devices (MUTCD), similar signs have been installed on I-64 near the I-264 interchange in Norfolk for the Scope arena and the Virginia Beach Convention Center. Adding logos makes these signs unique and more prominent, catching the attention of travelers who are unfamiliar with the area.

- Other signage deficiencies should be addressed as recommended in the appendix, including adding references to the Convention Center on the Interstate system. In addition, signage should be installed that directs event



Proposed sign layout with logos directing travelers toward the Coliseum and Convention Center. Prepared by HRTPO staff.



Similar signage is in place to direct travelers to the Norfolk Scope and Virginia Beach Convention Center. Photo source: HRTPO.

traffic from eastbound Mercury Boulevard to the west of I-64 to use Power Plant Parkway and Pine Chapel Road to access the event area, thereby eliminating some of the volumes that use the intersection of Mercury Boulevard and Coliseum Drive.

- In addition to using standard signs to help direct travelers towards the Coliseum and Convention Center, Intelligent Transportation Systems should also be used to improve traffic flow. Various ITS infrastructure is already in place in the study area. VDOT operates many closed circuit cameras, changeable message signs and roadway sensors on I-64 and I-664. The City of Hampton operates ITS infrastructure including closed circuit cameras and roadway sensors at various intersections in the study area. The city also maintains a transportation operations center where staff monitors traffic via these cameras and sensors and change signal timings in many locations throughout the city. Additionally, the Coliseum owns two portable changeable message signs that should be used for major events.

ITS technologies should be used in a variety of ways to improve traffic flow and safety during events. Some examples include:

- Stationary changeable message signs on the Interstate system should be used to disseminate event traffic information. Currently VDOT does not provide this information on their changeable message signs. These signs could not only provide information to event traffic but could also alert travelers who are not attending the event to consider alternate routes to avoid event traffic.
- Travelers should also be alerted of slowed and stopped traffic via changeable message signs. As backups occur event traffic should be informed to consider alternate routes.
- Portable changeable message signs could be deployed on major routes in the



Portable changeable message signs similar to this one owned by the Coliseum should be located in critical areas to alert drivers of traffic conditions before and during major events. Photo source: HRTPO.

Coliseum area a few days before major events to alert travelers of the event. This advance warning will provide travelers with time to consider using alternate routes or traveling at alternate times to avoid event traffic. One area where this is successfully done is Anaheim, California⁶. In Anaheim this practice helps reduce roadway congestion and traffic delays since other motorists are less likely to use the same roadways as event traffic. City routes where this would be beneficial include Mercury Boulevard, Coliseum Drive, and Armistead Avenue.

- The city could control traffic signals from the transportation operations center, allowing police that currently control signals to be redeployed to other areas to aid traffic flow.
- Additional access points should be planned for the new developments, particularly the 19-acre lot. Since some of these developments will need to include parking structures that will be used by both development and event traffic, distinct access points should be constructed to separate development traffic from event traffic as much as possible, thereby improving traffic flow during event ingress and egress.

⁶ Federal Highway Administration, "Intelligent Transportation Systems for Planned Special Events", November 2008.

APPENDIX - COLISEUM AND CONVENTION CENTER WAYFINDING SIGNAGE

This section contains an inventory of wayfinding signage leading to and away from the Coliseum and Convention Center. The main principal of wayfinding followed in this section is that drivers—once directed by a sign to a place or a highway—should receive additional guidance at each subsequent downstream decision point. An analysis, with recommendations, of each approach and departure path to the Coliseum and Convention Center area (also referred to as the Event Area) is included.

This section addresses both conventional signage and changeable message signs. Since varying messages can be posted on changeable message signs, recommendations for use of these signs must conform with VDOT's policies. Section "4.7 Special Events" of VDOT's "Changeable Message Sign (CMS) Usage Procedure" (Feb. 2004) is shown below. Note that this policy is currently being revised.

"CMS may be used to help alleviate major traffic problems generated by special events (e.g., sporting events, festivals, auto races, graduations, etc.) Because VDOT prohibits the display of advertising messages on any CMS, messages related to special events shall only use generic terms describing the event and be approved by VDOT.

CMS usage of this type must be coordinated with the event organizers. Furthermore, CMS operators must remain available for contact with on-scene personnel to ensure message accuracy. This is especially important when CMS are used in conjunction with alternate route/parking strategies.

CMS may be used to inform drivers of other transportation opportunities for visitors to the special event (i.e. shuttle parking). CMS messages may also advise through-drivers of adverse traffic conditions created as a result of special event traffic or conditions, or to reroute."

Approaching the Event Area – From Southside Hampton Roads via Westbound I-64

I-64 Westbound – 1 Mile from Armistead Avenue Exit



Photo source: Google.

Recommendation:

Request VDOT use this Changeable Message Sign (CMS) during events to detail traffic conditions and direct traffic to use the Armistead Avenue exit as traffic conditions permit if Armistead Avenue is improved.

I-64 Westbound – 0.6 Mile from Armistead Avenue Exit



Photo source: Google.

Recommendation:

Although this sign is not intended for event traffic, it could be confusing to Coliseum seekers. Since this sign is intended to direct traffic to the “Coliseum Central Business District”, the sign should be replaced with a larger one with the words “Coliseum Central” placed together on one line to prevent confusion of travelers looking for the Coliseum. The exit should also be listed as “263 B – Mercury Blvd.” since Exit 265 A provides access to eastbound Armistead Avenue and southbound LaSalle Avenue towards downtown Hampton.

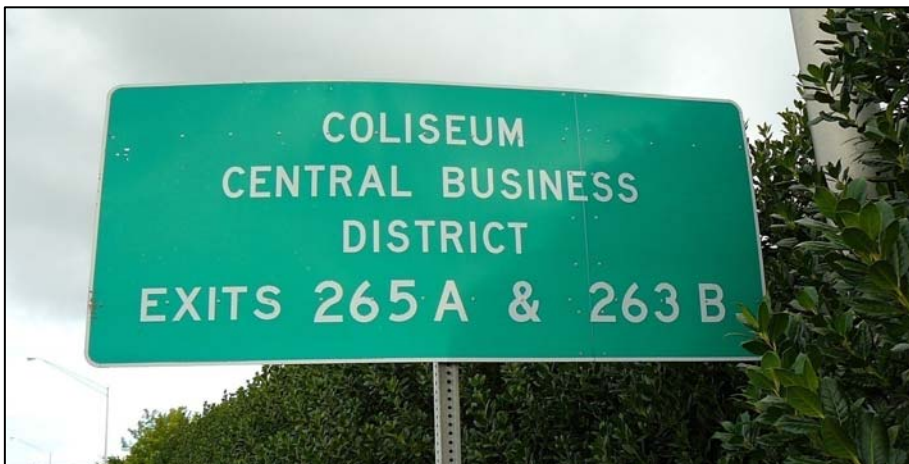


Photo source: HRTPO staff.

I-64 Westbound – 300' East of Armistead Avenue Westbound Exit



Photo source: HRTPO staff.

Recommendation:

To increase usage of Armistead Avenue by Convention Center traffic, modify this sign to include reference to "Convention Center" and list Langley AFB on a separate sign. If Armistead Avenue is improved, Coliseum and Convention Center logos should also be considered to bring more attention to this sign as is mentioned in the report (see page 39).

I-64 Westbound – At Armistead Avenue Westbound Exit



Photo source: Google.

The addition of any signage to this gantry would probably confuse the clear message which is currently sending.

I-64 Westbound – Approaching I-664 Exit



Photo source: HRTPO staff.

Recommendation:

Consider using this changeable message sign during major events to detail traffic conditions, particularly at the Mercury Boulevard interchange.

Armistead Avenue Westbound at Thomas Street



Photo source: HRTPO staff

Although this sign is small and located within a collection of other signs, it may provide some guidance to Coliseum seekers encountering the first traffic signal after exiting the interstate.

Armistead Avenue Westbound – 200' West of LaSalle Avenue



Photo source: Google.

Recommendation:

To provide guidance to event drivers who exited at Armistead Avenue, consider placing a large “Coliseum/Convention Center straight ahead” sign on this gantry. Consideration must take into account the additional loads that this new sign would have on the gantry.

Armistead Avenue Westbound at Lake Hampton Drive



Photo source: HRTPO staff.

Recommendation:

Replace this sign with a larger sign for “Coliseum and Convention Center”.

Armistead Avenue Westbound at Findley Street



Photo source: HRTPO staff

This sign is well-written and well-placed, covering both facilities in the Event Area.

Armistead Avenue Westbound at Convention Center Boulevard



Photo source: HRTPO staff

Recommendation:

Since this is a key decision point, consider placing an additional "Coliseum and Convention Center" sign at the intersection.

Approaching the Event Area – From Northern Hampton via Eastbound Armistead Avenue

Armistead Avenue Eastbound at Pine Chapel Road



Photo source: HRTPO staff.

Recommendation:

Move this sign 100' to the south so that it directs drivers to use Convention Center Boulevard. At its current location it is possible that many drivers respond to arrow on the sign by turning onto Pine Chapel Road.

Armistead Avenue Eastbound at Convention Center Boulevard



Photo source: HRTPO staff.

Recommendation:

Since this is a key decision point, add an additional sign for the "Coliseum and Convention Center" at this intersection.

Approaching the Event Area – Via Convention Center Boulevard

Convention Center Boulevard Westbound at Coliseum Drive



Photo source: HRTPO staff.

Recommendation:

In order not to "abandon" drivers who have followed signs directing them to Convention Center Boulevard, place a sign at this intersection directing traffic to turn right for "Coliseum and Convention Center".

Coliseum Drive Northbound at Eastern Entrance to Convention Center



Photo source: HRTPO staff.

Recommendation:

In order not to “abandon” drivers who have used Convention Center Boulevard to access the Convention Center, place a sign at this intersection informing drivers to turn right for the “Convention Center”.

Approaching the Event Area – Via Westbound Pine Chapel Road

Although not an official route, some drivers with local knowledge may use Pine Chapel Road to access the Event Area to avoid other routes.

Pine Chapel Road Westbound at Convention Center Parking Lot



Photo source: HRTPO staff.

This sign is well-placed and well-written.

Pine Chapel Road Westbound at Cut Thru to Coliseum Drive



Photo source: HRTPO staff.

This sign is well-placed and well-written, covering both Event Area destinations.

Approaching the Event Area – From Hampton via Power Plant Parkway

Power Plant Parkway Northbound at Pine Chapel Road



Photo source: HRTPO staff.

The “Coliseum and Convention Center” sign is well-placed and well-written, covering both Event Area destinations. The “Coliseum Central Business District” sign in the background could be confusing since travelers may think that this refers to the “Coliseum” and the “Central Business District” since the word “Coliseum” is on a line by itself.

Power Plant Parkway Southbound at Pine Chapel Road



Photo source: HRTPO staff.

Recommendation:

In order to promote Power Plant Pkwy and Pine Chapel Road as an alternate route to the Event Area and help Convention attendees return to the Convention Center area from the shops and restaurants along Power Plant Parkway, a sign should be placed at this intersection for southbound drivers on Power Plant Parkway, similar to the sign shown above for northbound Power Plant Parkway, directing them to the “Coliseum and Convention Center”.

Pine Chapel Road Eastbound at Coliseum Drive



Photo source: HRTPO staff.

This sign is well-placed and well-written, covering both Event Area destinations.

Although not an official route, some drivers with local knowledge may use Eastbound Pine Chapel Road to the east of Coliseum Drive to access the Event Area.

Pine Chapel Road Eastbound Approaching Cut Thru to Coliseum Drive



Photo source: HRTPO staff.

This sign is well-placed and well-written, covering both Event Area destinations.

Pine Chapel Road Eastbound at Cut Thru to Coliseum Drive



Photo source: HRTPO staff.

These signs are well-placed and well-written, covering both Event Area destinations.

Approaching the Event Area – From Points West via Eastbound I-64

I-64 Eastbound between HRC Parkway and Magruder Boulevard



Photo source: Google.

Recommendation:

Consider using this changeable message sign during major events to detail traffic conditions and direct traffic to use the Mercury Boulevard interchange as traffic conditions permit.

I-64 Eastbound between Magruder Boulevard and Cunningham Drive



Photo source: HRTPO staff.

The large green sign is well-written and well-positioned to direct drivers to the Coliseum.

I-64 Eastbound at the Cunningham Drive Overpass



Photo source: Google.

This large green sign is well-written and well-positioned to direct drivers to the Coliseum.

Recommendation:

At some location on eastbound I-64 prior to this location, add a sign indicating that this is also the exit for the Convention Center.

Ramp from I-64 Eastbound to Mercury Boulevard



Photo source: HRTPO staff.

This large green sign is well-written and well-positioned to direct drivers to the Coliseum.

Mercury Boulevard Eastbound at the I-64 Overpass



Photo source: HRTPO staff.

The green sign is well-written and well-positioned to direct drivers to the Hampton Coliseum. It could be modified to include reference to the Convention Center.

Mercury Boulevard Eastbound Past the I-64 Overpass



Photo source: Google.

The green sign is well-written and well-positioned to direct drivers to the Hampton Coliseum. It could be modified to include reference to the Convention Center.

Mercury Boulevard Eastbound Past the I-64 Overpass



Photo source: HRTPO staff.

Recommendation:

Add a large sign to this gantry to guide drivers to turn right at the next signal for the Coliseum and Convention Center. The additional loads that this new sign would add to the gantry must be considered for this recommendation.

Mercury Boulevard Eastbound at Coliseum Drive



Photo source: HRTPO staff.

Recommendation:

Although there is a LED message sign at the intersection of Mercury Boulevard and Coliseum Drive, there are no signs on eastbound Mercury Boulevard between the westbound I-64 off ramp and Coliseum Drive directing drivers to turn right onto Coliseum Drive for the Coliseum and Convention Center. This sign should be installed near the base of the offramp.

Coliseum Drive Southbound Approaching Pine Chapel Road



Photo source: HRTPO staff.

Recommendation:

With Coliseum Drive recently being narrowed at this location, consider moving this sign to a location where it will be visible, such as near the large pole shown between the sidewalk and the curb.

Coliseum Drive Southbound at Pine Chapel Road



Photo source: HRTPO staff.

Recommendation:

Place a sign (or signs) directing drivers and pedestrians to proceed straight ahead for the Coliseum and Convention Center.

Coliseum Drive Southbound Beyond Pine Chapel Road



Photo source: HRTPO staff.

This mobile changeable message sign (CMS) can be used either routinely (i.e. showing the same message in the same location for each event), or for special messages in various places as the need arises.

Coliseum Drive Southbound Beyond Pine Chapel Road



Photo source: HRTPO staff.

Recommendation:

Because of the difficulty noticing the Convention Center sign on the left, add a sign at this location directing drivers toward Convention Center drop off and parking areas.

Approaching the Event Area – From Southside Hampton Roads and Downtown Newport News via I-664

I-664 Northbound between Powhatan Parkway and the Queen Street Overpass



Photo source: Google.

Recommendation:

Because there is no sign for the Coliseum or Convention Center for I-664 drivers until the I-64 interchange (and that sign only lists the Coliseum), add a sign directing drivers to the Coliseum and Convention Center. If this location is used, the I-664 and Inner Loop signs could be removed. Consideration of the additional loads that this new sign would add to the gantry must be taken into account.

I-664 Northbound between Powhatan Parkway and I-64



Photo source: Google.

Recommendation:

Consider using this changeable message sign during major events to detail traffic conditions, particularly at the Mercury Boulevard interchange.

I-664 Northbound at I-64



Photo source: Google.

The brown sign on the left is well-written and well-placed for directing drivers to the Coliseum.

I-64 Westbound between I-664 and the Pine Chapel Overpass



Photo source: Google.

Recommendation:

Because there is no mention of the Convention Center on existing I-64 signs, consider adding a sign to this unused gantry directing drivers to the Convention Center. Adjacent signs already direct drivers to the Coliseum as shown below. Consideration of the additional loads that this new sign would add to the gantry must be taken into account.

I-64 Westbound at the Pine Chapel Road Overpass



Photo source: HRTPO staff.

The sign on the right is well-written and well-placed for directing drivers to the Coliseum.

I-64 Westbound at Mercury Boulevard



Photo source: HRTPO staff.

The sign on the right is well-written and well-placed for directing drivers to the Coliseum.

Approaching the Event Area – From Points West via Mercury Boulevard and the James River Bridge

James River Bridge Eastbound



Photo source: Google.

Although the changeable message signs on the James River Bridge currently only show bridge-related messages, they could be modified to show event-related messages per VDOT's policy.

Mercury Boulevard Eastbound at Warwick Boulevard



Photo source: HRTPO staff.

The sign on the left is well-written and well-placed to direct drivers to Hampton who are bound for the Coliseum or Convention Center.

Mercury Boulevard Eastbound at Jefferson Avenue



Photo source: HRTPO staff.

This sign is well-written and well-placed to direct drivers to Hampton who are bound for the Coliseum or Convention Center.

Recommendation:

Consider adding a sign inside the Hampton City Limits indicating that the Coliseum and Convention Center are ahead.

Leaving the Event Area – Towards I-64 Via Convention Center Blvd and Armistead Avenue

Cut Thru Southbound at Coliseum Drive



Photo source: HRTPO staff.

This sign is well-designed and well-placed to direct travelers leaving the parking lots towards I-64.

Coliseum Drive at Convention Center Boulevard



Photo source: HRTPO staff.

This sign is well-designed and well-placed to direct travelers towards I-64.

Convention Center Parking Lot at Convention Center Boulevard



Photo source: HRTPO staff.

This sign is well-designed and well-placed to direct travelers towards I-64.

Convention Center Boulevard Eastbound at Armistead Avenue



Photo source: HRTPO staff.

This sign is well-designed and well-placed to direct travelers leaving the parking lots via Convention Center Boulevard towards I-64.

Leaving the Event Area – Towards I-64 Via Pine Chapel Road and Armistead Avenue

Cut Thru Northbound Approaching Pine Chapel Road



Photo source: HRTPO staff.

Recommendation:

Provide a two-way “I-64” sign at the northbound end of the Cut Thru similar to those provided at other locations.

Pine Chapel Road Eastbound 150’ East of Cut Thru to Coliseum Drive



Photo source: HRTPO staff.

This I-64 sign is well-designed and well-placed to direct travelers leaving the Convention Center parking lot.

Pine Chapel Road Eastbound at Armistead Avenue



Photo source: HRTPO staff.

Recommendation:

In order not to “abandon” drivers traveling towards I-64, install a “To I-64” sign approaching Armistead Avenue. Since traffic for major Coliseum events is directed to turn left onto Armistead Avenue, a two-way I-64 sign may be necessary

Leaving the Event Area – Towards I-64 Via Coliseum Drive and Mercury Boulevard

Convention Center Entrance at Coliseum Drive



Photo source: HRTPO staff.

The I-64 sign is well-designed and well-placed to direct travelers leaving the Coliseum and Convention Center.

Coliseum Drive Northbound at Pine Chapel Road



Photo source: HRTPO staff.

The I-64 and I-664 signs are well-designed and well-placed to direct travelers leaving the Coliseum and Convention Center towards the Interstate system.

Coliseum Drive Northbound at Mercury Boulevard



Photo source: HRTPO staff.

This sign is well-designed and well-placed to direct travelers towards I-64.

Leaving the Event Area – Towards I-64/I-664 Via Pine Chapel Road and Power Plant Parkway

Pine Chapel Road Westbound at Coliseum Drive



Photo source: HRTPO staff.

Recommendation:

Provide signs for drivers leaving via Pine Chapel Road westbound towards I-664 (straight ahead) and I-64 (straight ahead or right turn). There are similar signs in place on the northbound Coliseum Drive approach to the intersection.

Pine Chapel Road Westbound at Power Plant Parkway



Photo source: HRTPO staff.

These signs are well-designed and well-placed to direct drivers to the Interstate system.

Power Plant Parkway Northbound at Mercury Boulevard

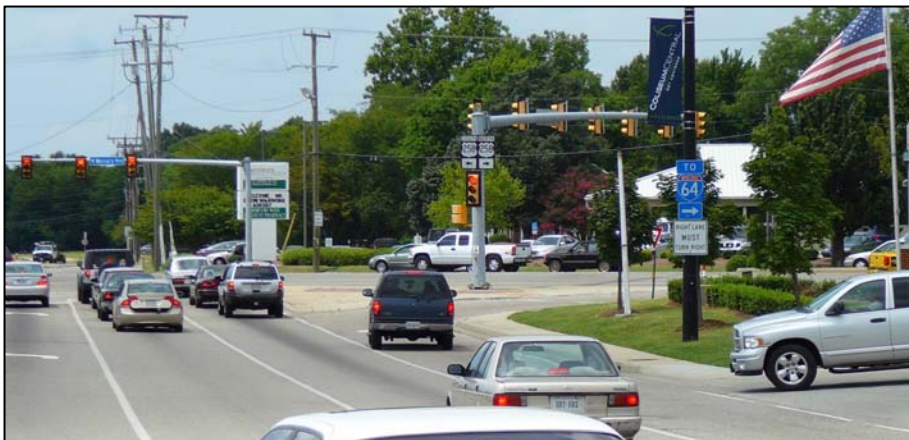


Photo source: HRTPO staff.

This sign is well-designed and well-placed to direct drivers to I-64.

Power Plant Parkway Southbound at Briarfield Road

Photo source: HRTPO staff.

This sign is well-designed and well-placed to direct drivers to I-664.