Pinnacle Delaware Riverfront Site
Traffic Impact Study

Prepared for
Pinnacle Entertainment Inc.

By
Pennoni Associates, Inc.
Consulting Engineers

October 11, 2006
PINN 0603

Harry E. Laspee
PA PE License No. 33831-E

TABLE OF CONTENTS

LIST OF IMAGES

LIST OF TABLES

LIST OF CHARTS

LIST OF APPENDICES

EXECUTIVE SUMMARY

Pinnacle Entertainment Inc. is proposing an entertainment and gaming complex (which will be referred to from this point on as the Pinnacle Project site) to be located on the Delaware River Waterfront in the City of Philadelphia near the intersection of Dyott Street and Delaware Avenue and Richmond Street.

The Pinnacle Project site is conveniently located immediately adjacent to Interstate 95 in an industrial area on the Delaware River waterfront near the Northern Liberties / Fishtown sections of the City. The parcels which will be occupied by the Pinnacle Entertainment Project are currently zoned G2 (Heavy Industrial). Within the immediate vicinity of the project site, the primary land uses are G2 (Heavy Industrial), R10A (Single-Family Twin/Row Houses); LR (Least Restricted), C1, C2 (Commercial) and C7 (Commercial with Parking).

The nearest residential communities are the Fishtown and Northern Liberties neighborhood which are generally located to the West and South of the site respectively. In addition, the Kensington and Port Richmond neighborhoods are located just due north and northwest of the site respectively. I-95 is located between the residential communities and the proposed Pinnacle Entertainment Project site and therefore generally buffers the site from the residential communities.

In its Phase 1 build-out condition, the proposed Pinnacle Entertainment Project will consist of the following:

- Single–level, 80,000 SF casino, featuring 3,000 slot machines
- 3,000 car parking garage/lot
- 5 restaurants plus a food court
- 12-screen multiplex movie theater
- A water feature and seasonal waterfront ice-skating rink
- 36,000 SF of retail and entertainment outlets.

It is anticipated that Pennsylvania Gaming Control Board will award gaming licenses towards the end of 2006 and if awarded a license Pinnacle will open its Temporary Casino (with 1,500 slot machines) within 6 months following the license award. It is also anticipated that the design and construction of the Permanent Casino will be completed within 24 to 30 months following the license award. According to this anticipated timeline, the Temporary Casino would open in mid 2007 and the Phase I Permanent Casino would open in early to mid 2009.

Access to the Pinnacle Project, prior to the completion of the new Girard Avenue Interchange (which is discussed below) will be provided via Dyott Street. This intersection will be re-configured and signalized.

Girard Avenue Interchange

PENNDOT has a major project planned to improve the I-95 corridor north of Center City Philadelphia, which includes the re-design of the Girard Avenue Interchange. PENNDOT's proposed improvements to the I-95 Girard Avenue Interchange will significantly alter and improve access to the proposed Pinnacle Entertainment Project. It is our understanding that as of this date, the Girard Avenue Interchange project is in the *Final Design* phase of development.

Based on information revealed during our Development Feasibility Study we understand that the timeline for the proposed Pennsylvania Department of Transportation (PENNDOT) I-95 Girard Avenue Interchange (GIR) project calls for the completion of the interchange by 2011. Although efforts will be made to expedite the final design and construction of the PENNDOT GIR Project to coincide with the timeline for the casino development, it is possible that the PENNDOT project

may not be completed until after the permanent casino featuring 3,000 slot machines is operational.

The geometry of the Girard Avenue Interchange will be re-designed to facilitate access to and from the I-95 within the vicinity of the study area. Additionally, the GIR project it will also improve traffic interaction between the Major arterials within the study area including Columbia Avenue (S.R. 2010); Delaware Avenue (S.R. 2001) and Richmond Street (S.R. 2001); Aramingo Avenue (S.R. 2009) (S.R. 2009) and Girard Avenue (S.R. 2008).

Due to the proximity and convenience of I-95, up to 80% of the site generated traffic is anticipated to utilize I-95 to access the site as outlined below. Since access to and from northbound I-95 is relatively direct via the Girard Avenue ramps, up to 40% of the site-generated traffic will not access the local residential roadway network at all during the existing conditions. Access to and from southbound I-95 will require the site-generated traffic to use the local roadway network only for relatively short distances within the study area during the existing conditions. Once the I-95 Girard Avenue Interchange Project is completed, access to the Pinnacle Entertainment Project site from and to I-95 will be greatly facilitated since direct connections from and to both northbound and southbound I-95 will be available virtually at the front door of the site, thereby greatly reducing the traffic impacts to the local community since approximately 80% of the site-generated traffic is expected to utilize I-95 to access the site.

The proximity of the Pinnacle Site to major public transit facilities is another attribute of the site. The Girard Avenue Station of SEPTA's Market–Frankford Line is located approximately ¾ mile from the site and SEPTA's newly renovated Route 15 Trolley Line, which runs along Girard Avenue and Richmond Street, provides transit access from the Girard Avenue Station to a point within a block of the site. In addition, several bus routes (including Routes 25, 54 and 57) intersects with the Route 15 Trolley Line in close proximity to the site. The proximity of these transit facilities is expected to be particularly attractive for potential local casino employees more so than the casino patrons. It is anticipated that only a small percentage of the casino patrons will utilize public transit in traveling to the site. For the purpose of achieving a conservative analysis, a modal split reduction was not applied to the trips generated by the Pinnacle Entertainment Project.

Data Collection

The study area consists of fifteen (15) intersections. In general within the study area, the roadway system is somewhat complex and atypical of a simple grid-pattern infrastructure commonly found in Philadelphia. This is due to several major arterials which are positioned in an angle against all the local streets which are arranged in the typical grid pattern. For example, the geometry of the Delaware Avenue (S.R. 2001) was designed to follow the pattern of the Delaware River while Aramingo Avenue (S.R. 2009) is commonly positioned in a 45 degree angle in reference to the grid. Additionally there are also several on- and off-ramps to accommodate vehicles to and from I-95 and to allow smooth connection between the arterials. Ultimately, not all movements between the major arterials and I-95 are sufficiently accommodated; this is due to many reasons, among which are the lack of space and the complex pattern of the local roadways.

The field data collection includes the following:

- Vehicular turning movement counts at the fifteen (15) identified intersections which includes heavy vehicles and pedestrians during an average weekday (Tuesday, Wednesday, and/or Thursday) between the hours of 7:00 AM – 9:30 AM and 4:00 PM – 6:00 PM

- Automatic Traffic Recorder (ATR) counts on Richmond Street (S.R. 2001), Girard Avenue (S.R. 2008), Aramingo Avenue (S.R. 2009), Delaware Avenue (S.R. 2001) and the I-95 on- and off-ramps.

Scenarios Analyzed

Based on the above timelines for the Pinnacle Entertainment Project and the PENNDOT GIR Project the following traffic scenarios were analyzed:

Existing Condition:

1. Existing Condition (2006): The existing condition captures the existing traffic operation during the time the Traffic Impact Study is conducted. Traffic volume data, lane configuration and signal timing data are collected from the field and the analysis includes the existing roadway network only. (i.e. without the new I-95 GIR interchange). The Existing Condition analysis provides a baseline reference point from which future conditions can be estimated and analyzed.

Future Conditions:

2a. Future Pre-Development Condition (2007): This condition is built on the existing condition (Scenario 1a) and a general background traffic growth of 2.1% is applied to all existing volumes to represent the increase of traffic for one year.

2b. Future Post-Development Condition (2007) – Temporary Casino: For the purpose of this study, it is assumed that the construction of a temporary casino (consisting of 1,500 gaming units) is completed in 2007. The traffic generated by the newly built temporary casino is added to the existing and background traffic in the year 2007.

3a. Future Pre-Development Condition (2009): This condition is built on the existing condition (Scenario 1a) and a general background traffic growth of 6.3% is applied to all existing volumes to represent the general increase of traffic; additional traffic generated by any planned development within the study area and/or the immediate vicinity of the study area are also included.

3b. Future Post-Development Condition (2009) – Phase 1 Permanent Casino: For the purpose of this study, it is assumed that the Phase 1 construction of the *permanent casino* (consisting of 3,000 gaming units and all of the above-referenced auxiliary uses) is completed in 2009. As such, the traffic generated by the newly built permanent casino is added to the future traffic in the year 2009.

4a. Future Pre-Development Condition (2011) – New Girard Avenue Interchange: This condition takes into account the newly constructed Girard Avenue Interchange as well as changes in traffic pattern and/or volume incurred by the completion of the new Girard Avenue Interchange as outlined in the "I-95 Girard Avenue and I-676 Vine Expressway Interchanges, Section GIR Traffic Study" prepared by the Delaware Valley Regional Planning Commission in June 2005. Additionally, it also takes into account a general background growth of 10.5% and traffic generated by any planned development within the study area and/or the immediate vicinity of the study area.

4b. Future Post-Development Condition (2011) – Phase 1 Permanent Casino facilitated by New Girard Avenue Interchange: In this scenario the traffic generated by the Pinnacle Entertainment Project is added to the traffic volume in Scenario 4a.

Trip Generation

In order to estimate the number of new traffic generated by the proposed Pinnacle Entertainment Project, a combination of literary research and field data collection and analysis were conducted. Traditionally, the standard reference utilized to estimate traffic generated by new developments is a publication entitled Trip Generation by the Institute of Transportation Engineers. However, Trip

Generation does not include a significant amount of data for gaming uses and the data provided does not sufficiently represent the type of casino which is proposed in Philadelphia.

One of the major considerations in estimating the trip generation rates is the fact that the state of Pennsylvania has just recently allowed gaming facilities in July of 2004. Therefore data must be collected based on similar facilities with similar demographic and geographic environments.

It is noted that a new casino which specializes in electronic gaming, typically also include other auxiliary uses such as food and beverage areas, entertainment, amenity retail, employee facilities, public circulation and support space. Since these auxiliary uses do not generally function on their own, they are generally not considered as traffic generators. However, for the purpose of this study, a partial trip generation rates have been assigned to each auxiliary use.

Based on the literary research and field data collection and analysis, the resultant peak hour trip rates per gaming unit were as follows:

- Weekday morning peak hour = 0.165
- Weekday evening peak hour = 0.406
- Saturday evening peak hour = 0.477

The above rates applied to the 1,500 units for the Temporary establishment will translate to 716 trips (379 entering and 336 exiting) total traffic generated during the Saturday evening peak hour; 609 trips (286 entering and 323 exiting) total traffic generated during the weekday evening peak hour; and 248 trips (193 entering and 54 exiting) total traffic generated during the weekday morning peak hour.

Similarly, the above rates applied to the 3,000 units for the Phase 1 Permanent establishment will translate to 1865 trips (878 entering and 770 exiting) total traffic generated during the Saturday evening peak hour; 1332 trips (630 entering and 702 exiting) total traffic generated during the weekday evening peak hour; and 583 trips (437 entering and 146 exiting) total traffic generated during the weekday morning peak hour.

Trip Distribution

It is expected that 80% of the site generated traffic will utilize the I-95 while the remaining 20% will utilize the local roads.

Additionally any future condition analysis will also take into account the traffic volume increases that are expected to occur throughout the region over this period. Existing traffic volumes are typically increased by an annual growth factor of 2.1% (2002 PENNDOT Table 371) to account for traffic volume increases from general background growth. In addition, approved developments and the associated traffic generation within the project study are added to the roadway network.

Other Developments (Committed)

At the time this study was conducted, other development close to the study area includes the "Waterfront Square Condominium Development" which comprises a total of 780 residential units. This development is located on the Delaware River waterfront at Penn and Poplar Streets which is about ¾ mile south of the Pinnacle Entertainment Site. For the purpose of achieving a conservative analysis we have included 50% of the total trips generated by this development during the analyzed peak hours. Additional trips contributed by this development were calculated utilizing the rates provided by the Trip Generation by the Institute of Transportation Engineers.

Analysis

Based on the capacity analysis at the study intersections during the six primary scenarios described above, the worst case presents itself during the weekday evening peak hour (identified

as any one-hour between 4:00 PM to 6:00 PM). This is due to the highest commuter-related traffic which also occurs at this time.

An article titled "Gaming Casino Traffic", published in the ITE Journal, March 1998, by Paul C. Box and William Bunte identify that the typical evening peak hour of a casino establishment during the weekday peak hour occurs later (6:00 PM) than the peak period of the commuter-based traffic. However, in order to be conservative, we have added the site-generated traffic onto the base peak hour volumes during the weekday evening peak hour; which was determined to at 5:00 PM based on the data collected from the field.

During the selected worst-case scenario, which is the weekday evening peak hour, capacity analyses at the study intersections indicate that all intersections will operate at overall LOS "D/d" or better with all movements also operating at LOS "D/d" or better with the exception of the following intersections:

Weekday Morning Peak Hour	Weekday Evening Peak Hour	Saturday Evening Peak Hour
• Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010) • Richmond Street (S.R. 2001) and Dyott Street • Richmond Street (S.R. 2001) and Cumberland Street • Aramingo Avenue (S.R. 2009) and Huntingdon Street and Belgrade Street • Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access	• Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010) • Richmond Street (S.R. 2001) and Dyott Street • Richmond Street (S.R. 2001) and Cumberland Street • Aramingo Avenue (S.R. 2009) and Huntingdon Street and Belgrade Street • Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access • Aramingo Avenue (S.R. 2009) and Cumberland Street • Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010)	• Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010) • Richmond Street (S.R. 2001) and Dyott Street • Richmond Street (S.R. 2001) and Cumberland Street • Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access • Aramingo Avenue (S.R. 2009) and Cumberland Street • Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010)

The following are the mitigation measures which will be recommended for implementation at each of the above intersections.

At the intersection of Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010):
- Provide a 75-feet long left turn lane storage bay for the southbound approach (on Columbia Avenue).
- Re-time the signal in order to accommodate the changes of traffic volume and pattern associated by the proposed Pinnacle Entertainment Project as well as the new Girard Avenue Interchange.

At the intersection of Richmond Street (S.R. 2001) and Dyott Street
- Install a new signal (pre-timed with pre-set programs for the peak hours, 60-second cycle length, 2-phase)
- Reconfiguration of Dyott Street approach to incorporate one left turn lane, one shared left and right turn lane and one right turn lane.

- Re-stripe the eastbound approach of Richmond Street (S.R. 2001) to incorporate 100' right turn lane bay.
- NOTE: Prior to the completion of the new Girard Avenue Interchange, primary access to the Proposed Pinnacle Entertainment Project will be taken at a new signalized intersection across from the proposed on- and off-ramps to the I-95 NB.

At the intersection of Richmond Street (S.R. 2001) and Cumberland Street:

- Install a new signal (pre-timed with pre-set programs for the peak hours, 60-second cycle length, 2-phase). Additionally, this new-signal should be evaluated and re-timed as necessary prior to the completion of the new Girard Avenue Interchange.

At the intersection of Aramingo Avenue (S.R. 2009) and Huntingdon Street and Belgrade Street:

- Re-time the signal in order to accommodate the changes of traffic volume and pattern associated by the proposed Pinnacle Entertainment Project as well as the new Girard Avenue Interchange.

At the intersection of Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access:

- Modify the existing signal timing/phasing. Provide a permitted-protected left turn phase for both the EB/WB and NB/SB approaches. The cycle length and the pedestrian-actuated scramble phase will remain.

At the intersection of Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008):

- Currently, at this unsignalized intersection, the southbound approach (Girard Avenue) operates at a LOS "f". **It is noted that currently, this intersection meets the requirement for a signal warrant during the weekday evening peak hour**.

At the intersection of Aramingo Avenue (S.R. 2009) and Cumberland Street:

- Provide three lanes on the eastbound (Cumberland Street) approach: one dedicated left turn lane (10'); one through lane (10') and one dedicated right turn lane (14'). Skip marks should be provided to facilitate the through movement into the receiving lane.
- Re-stripe the westbound (Cumberland Street) approach to clearly delineate the right turn lane and the left turn lane. This approach currently operates as such, but there are not pavement markings to define the designated lanes.

At the intersection of Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010):

- Provide protected-permitted left turn phase for the westbound left turn approach.

The location of the proposed Pinnacle Entertainment Project is within the local street network and along the Interstate 95 (I-95) corridor. Presently, there are four ramps that serve the project area:

- I-95 Northbound Exit Ramp to Delaware Avenue (S.R. 2001) (Ramp A);
- I-95 Southbound Entry Ramp from Aramingo Avenue (S.R. 2009) (Ramp B);
- I-95 Northbound Entry Ramp from Delaware Avenue (S.R. 2001) (Ramp C); and,
- I-95 Southbound Exit Ramp to Girard Avenue (S.R. 2008) (Ramp D).

Based on the preliminary CORSIM analysis assessment performed on the subject ramps, the proposed development does not appear to significantly impact freeway and ramp operations in the area.

In conclusion, based on the capacity analysis of the fifteen intersections included in this Traffic Impact Study the proposed mitigation efforts outlined above will enable the existing roadway facilities to accommodate the new traffic drawn by the proposed Pinnacle Entertainment Project. It is important to note that for the pre-development scenarios, the analysis of individual

intersections after the completion of the new Girard Avenue Interchange shows a marked improvement in traffic operations, due to the redesign of the interchange which in turn improves access to the I-95 as well as improving the interaction between the major arterials.

The improvements that are outlined above are primarily localized and can be accommodated within the currently available existing public right-of-way. Additionally, capacity analysis at the impacted intersections, after implementation of improvements indicates that the recommended mitigations are effective.

1. INTRODUCTION

1. A. Project Description

The Pinnacle Project Site is conveniently located immediately adjacent to Interstate 95 in an industrial area on the Delaware River waterfront. The nearest residential communities are the Fishtown and Northern Liberties neighborhood which are generally located to the West and South of the site respectively. In addition, the Kensington and Port Richmond neighborhoods are located just due north and northwest of the site respectively. I-95 is located between the residential communities and the proposed Pinnacle Entertainment Project site and therefore generally buffers the site from the residential communities. Within the immediate vicinity of the project site, the primary land uses are G2 (Heavy Industrial), R10A (Single-Family Twin/Row Houses); LR (Least Restricted), C1, C2 (Commercial) and C7 (Commercial with Parking). The Pinnacle Entertainment Project is located near the intersection of Dyott Street and Delaware Avenue/Richmond Street as shown in FIGURE 1A.

In its Phase 1 build-out condition, the Pinnacle Entertainment Project will consist of the following:

- Single – level, 80,000 SF gaming area, featuring 3,000 slot machines
- 3,000 car parking garage/lot
- 5 restaurants plus a food court
- 12-screen multiplex movie theater
- A water feature and seasonal waterfront ice-skating rink
- 36,000 SF of retail and entertainment outlets.

The conceptual site plan for the Pinnacle Entertainment Project is shown in FIGURE 1B.

It is anticipated that Pennsylvania Gaming Control Board will award gaming licenses towards the end of 2006 and if awarded a license, Pinnacle will open its Temporary Casino (with 1,500 slot machines) within 6 months following the license award. It is also anticipated that the design and construction of the Permanent Casino will be completed within 24 to 30 months following the license award. According to this anticipated timeline, the Temporary Casino would open in mid 2007 and the Phase I Permanent Casino would open in early to mid 2009.

1. B. Girard Avenue Interchange

Based on information revealed during our Development Feasibility Study we understand that PENNDOT has a major project planned to improve the I-95 corridor north of Center City Philadelphia, which includes the re-design of the Girard Avenue Interchange. PENNDOT's proposed improvements to the I-95 Girard Avenue Interchange will significantly alter and improve access to the proposed Pinnacle Entertainment Project. It is our understanding that as of this date, the Girard Avenue Interchange project is in the *Final Design* phase of development.

The conceptual layout of the proposed Girard Avenue Interchange is shown in FIGURE 1C-1 and 1C-2.

We understand that the timeline for the proposed Pennsylvania Department of Transportation (PENNDOT) I-95 Girard Avenue Interchange (GIR) project calls for the completion of the interchange by 2011. Although efforts will be made to expedite the final design and construction of the PENNDOT GIR Project to coincide with the timeline for the Pinnacle Entertainment Project development, it is possible that the PENNDOT project may not be completed until after the permanent casino featuring 3,000 slot machines is operational.

The geometry of the Girard Avenue Interchange will be re-designed to facilitate access to and from the I-95 within the vicinity of the study area. Additionally, the GIR project it will also improve traffic interaction between the Major arterials within the study area including Columbia Avenue (S.R. 2010); Delaware Avenue (S.R. 2001) and Richmond Street (S.R. 2001); Aramingo Avenue (S.R. 2009) and Girard Avenue (S.R. 2008).

FIGURE 1D-1 indicates the way to access I-95 to and from the Pinnacle Project Site utilizing the existing infrastructure. FIGURE 1D-2 indicates the way to access I-95 to and from the Pinnacle Project Site utilizing the NEW Girard Avenue Interchange.

Due to the proximity of I-95 to the site up to 80% of the site generated traffic is anticipated to utilize I-95 to access the site as outlined below. Since access to and from northbound I-95 is relatively direct via the Girard Avenue ramps, up to 40% of the site-generated traffic will not access the local residential roadway network at all under the existing conditions. Access to and from southbound I-95 will require the site-generated traffic to use the local roadway network for relatively short distances within the study area under the existing conditions. Once the I-95 Girard Avenue Interchange Project is completed, access to the Pinnacle Entertainment Project site from and to I-95 will be greatly facilitated since direct connections from and to both northbound and southbound I-95 will be available virtually at the front door of the site, thereby greatly reducing the traffic impacts to the local community since approximately 80% of the site-generated traffic is expected to utilize I-95 to access the site.

The proximity of the Pinnacle site to major public transit facilities is another attribute of the site. The Girard Avenue Station of SEPTA's Market–Frankford Line is located approximately ¾ mile from the site and SEPTA's newly renovated Route 15 Trolley Line, which runs along Girard Avenue and Richmond Street, provides transit access from the Girard Avenue Station to a point within a block of the site. In addition, several bus routes (including Routes 25, 54 and 57) intersect with the Route 15 Trolley Line in close proximity to the site. The proximity of these transit facilities is expected to be particularly attractive for potential local employees more so than the patrons of the Pinnacle Entertainment Project. It is anticipated that only a small percentage of the Pinnacle Entertainment Project patrons will utilize public transit in traveling to the site. For the purpose of achieving a conservative analysis, a modal split reduction was not applied to the trips generated by the Pinnacle Entertainment Project. A broader discussion of means and suggestions for facilitating public transit access to the site is included in the body of the report.

Based on the above timelines for the Pinnacle Entertainment Project development and the PENNDOT GIR Project the following traffic scenarios were analyzed:

1. C. Traffic Study Analysis Scenarios

Existing Conditions (2006): The existing condition captures the existing traffic operation during the time the Traffic Impact Study is conducted. Traffic volume data, lane configuration and signal timing data was collected from the field and the traffic conditions on the existing roadway network were analyzed (i.e. without the new I-95 GIR interchange).

The Existing Condition analysis provides a baseline reference point from which future conditions can be estimated and analyzed.

Future Conditions:

The Future Conditions analysis consists of six scenarios as listed below:

Scenario 2a **Future Pre-Development Condition (2007)**	**VS.**	**Scenario 2b** **Future Post-Development Condition (2007) – Temporary Casino**
Scenario 3a **Future Pre-Development Condition (2009)**	**VS.**	**Scenario 3b** **Future Post-Development Condition (2009) – Phase 1 Permanent Casino**
Scenario 4a **Future Pre-Development Condition (2011) – New Girard Avenue Interchange**	**VS.**	**Scenario 4b** **Future Post-Development Condition (2011) – Phase 1 Permanent Casino facilitated by New Girard Avenue Interchange**

Due to the proximity and convenience of I-95, 80% of the site generated traffic is anticipated to utilize I-95 to access the site. Existing access to and from southbound I-95 will require the site-generated traffic to use the local roadway network for relatively short distances within the study area. However, once the I-95 Girard Avenue Interchange Project is completed, access to the Pinnacle Entertainment Project site from and to I-95 will be greatly facilitated since direct connections from and to both northbound and southbound I-95 will be available virtually at the front door of the site, thereby greatly reducing the traffic impacts to the local community since approximately 80% of the site-generated traffic is expected to utilize I-95 to access the site.

2. EXISTING CONDITIONS ASSESSMENT

2. A. Existing Infrastructure Included in the Study Area

The scope of the study area was in part based on discussions with the local community and the Philadelphia Gaming Advisory Task Force. The following fifteen (15) intersections were selected as part of the study area:

1. Delaware Avenue (S.R. 2001) / Columbia Avenue (S.R. 2010) and Allen Street.
2. Delaware Avenue (S.R. 2001) and Berks Street.
3. Delaware Avenue (S.R. 2001) / Aramingo Avenue (S.R. 2009) and Richmond Street (S.R. 2001)
4. Richmond Street (S.R. 2001) and Dyott Street.
5. Richmond Street (S.R. 2001) and Schirra Drive
6. Richmond Street (S.R. 2001) and Girard Avenue
7. Richmond Street (S.R. 2001) and Cumberland Street
8. Richmond Street (S.R. 2001) and Huntingdon Street
9. Richmond Street (S.R. 2001) and Lehigh Avenue
10. Aramingo Avenue (S.R. 2009) and Lehigh Avenue
11. Aramingo Avenue (S.R. 2009) and Huntingdon Street
12. Aramingo Avenue (S.R. 2009) and Cumberland Street
13. Aramingo Avenue (S.R. 2009) / York Street and Moyer Street
14. Girard Avenue (S.R. 2008) and Berks Street
15. Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010)

A field view of existing conditions at fifteen (15) intersections within the study area was conducted to obtain general data regarding intersection geometry, traffic signals, and signage located at each location. In general within the study area, the roadway system is somewhat complex and atypical of a simple grid-pattern infrastructure commonly found in Philadelphia. This is due to several major arterials which are positioned in an angle against all the local streets which are arranged in the typical grid pattern.

For example, the geometry of the Delaware Avenue (S.R. 2001) was designed to follow the pattern of the Delaware River while Aramingo Avenue is commonly positioned in a 45 degree angle in reference to the grid. Additionally there are also several on- and off-ramps to accommodate vehicles to and from I-95 and to allow smooth connection between the arterials. Ultimately, not all movements between the major arterials and I-95 are sufficiently accommodated; this is due to many reasons, among which are the lack of space and the complex pattern of the local roadways.

These intersections are numbered and described more fully as follows:

1) Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010)

Image 1

At this signalized intersection, Columbia Avenue (S.R. 2010) intersects Delaware Avenue (S.R. 2001) perpendicularly while Allen Street intersects Delaware Avenue (S.R. 2001) on an angle at the northwest corner of the intersection. The directional configuration is illustrated in Image 1. Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010) are both arterial state highways.

North of the intersection, Columbia Ave allows for one-way traffic traveling south into the intersection. "Do Not Enter" signs are present at the intersection to prevent vehicles from entering Columbia Avenue. Parking is permitted on both sides of Columbia Avenue.

Columbia Avenue (S.R. 2010) is designated two-way south of Delaware Avenue. There is a bus stop on Columbia Avenue at the southeast corner of the intersection. Allen Street allows for one-way traffic traveling northwest, out of the intersection. Parking (unmarked spots) is permitted on one side of the street with no noted restrictions. The east leg at this intersection (Delaware Avenue) has two through lanes and one dedicated left turn lane to Columbia Avenue.

The right through lane is permitted to bear right onto Allen Street. Westbound Delaware Avenue (S.R. 2001) exits the intersection with three through-lanes. Eastbound Delaware Ave enters and exits the intersection with two through-lanes separated by a concrete median. No left turns or turns on red are permitted at the intersection. The right through lane is able to make a right turn onto Columbia Avenue. Parking is permitted along the south curb with no restrictions.

All curbs and sidewalk appears to be in satisfactory condition. Bicycle lanes are present along Delaware Avenue (S.R. 2001) in both directions. The speed limit on arterial state highway S.R. 2001 (Delaware Ave.) is posted at 30 MPH.

2) Delaware Avenue (S.R. 2001) and Berks Street

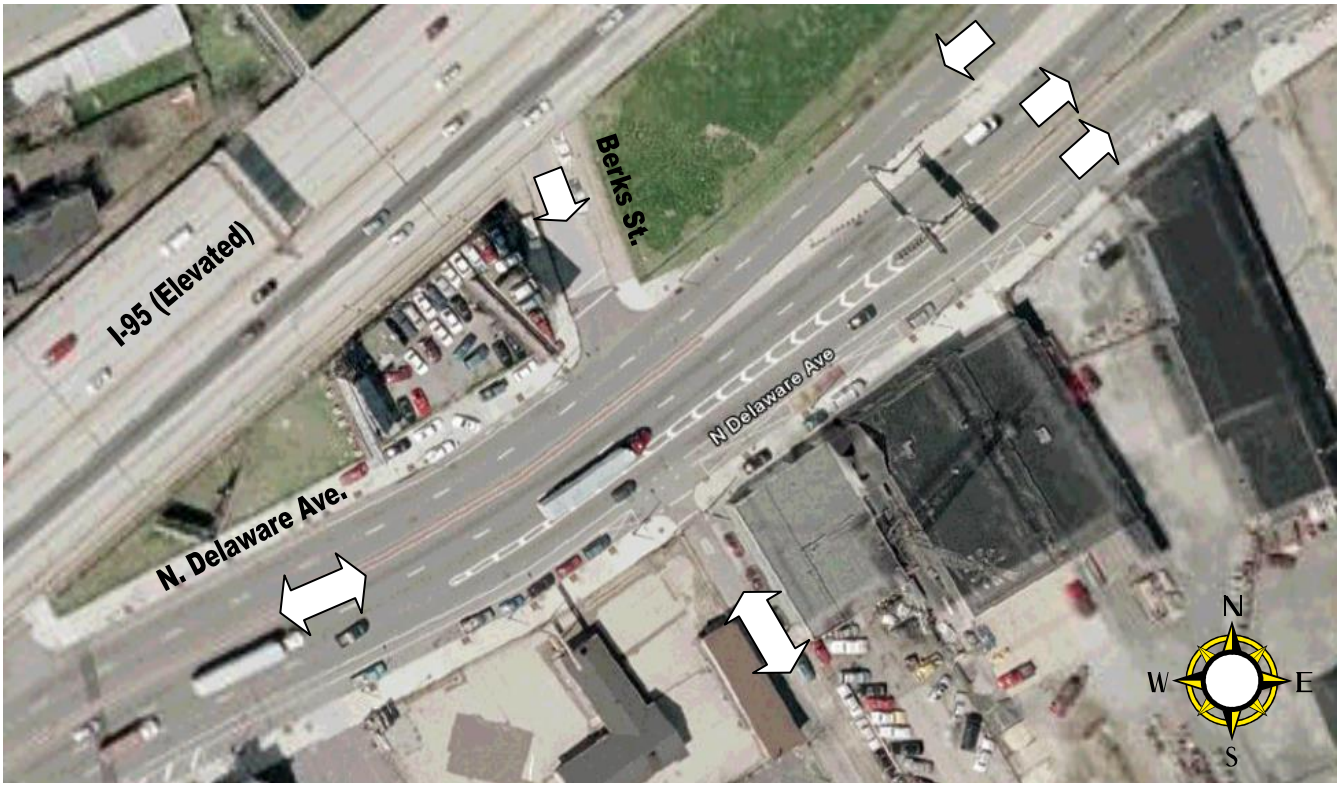


Image 2

At this unsignalized intersection, Delaware Avenue (S.R. 2001) has free flowing traffic and Berks Street is STOP-controlled. On the north leg, Berks Street is designated one-way southbound. Due to the presence of a median along Delaware Avenue, vehicles approaching southbound along Berks Street can only make a right turn onto Delaware Avenue.

On the south leg, Berks Street is designated two-way. This minor street is connected to Beach Street, located further south and is not pictured in the image. The pavement condition on this side street is not suitable for general traffic.

All curbs and sidewalk along Delaware Avenue (S.R. 2001) are in satisfactory condition. Bicycle lanes are present along Delaware Avenue (S.R. 2001) heading towards Richmond Street. The posted speed limit on Delaware Avenue at this location is 25 MPH.

3) Delaware Avenue (S.R. 2001) and Aramingo Avenue (S.R. 2009) and Richmond Street (S.R. 2001)

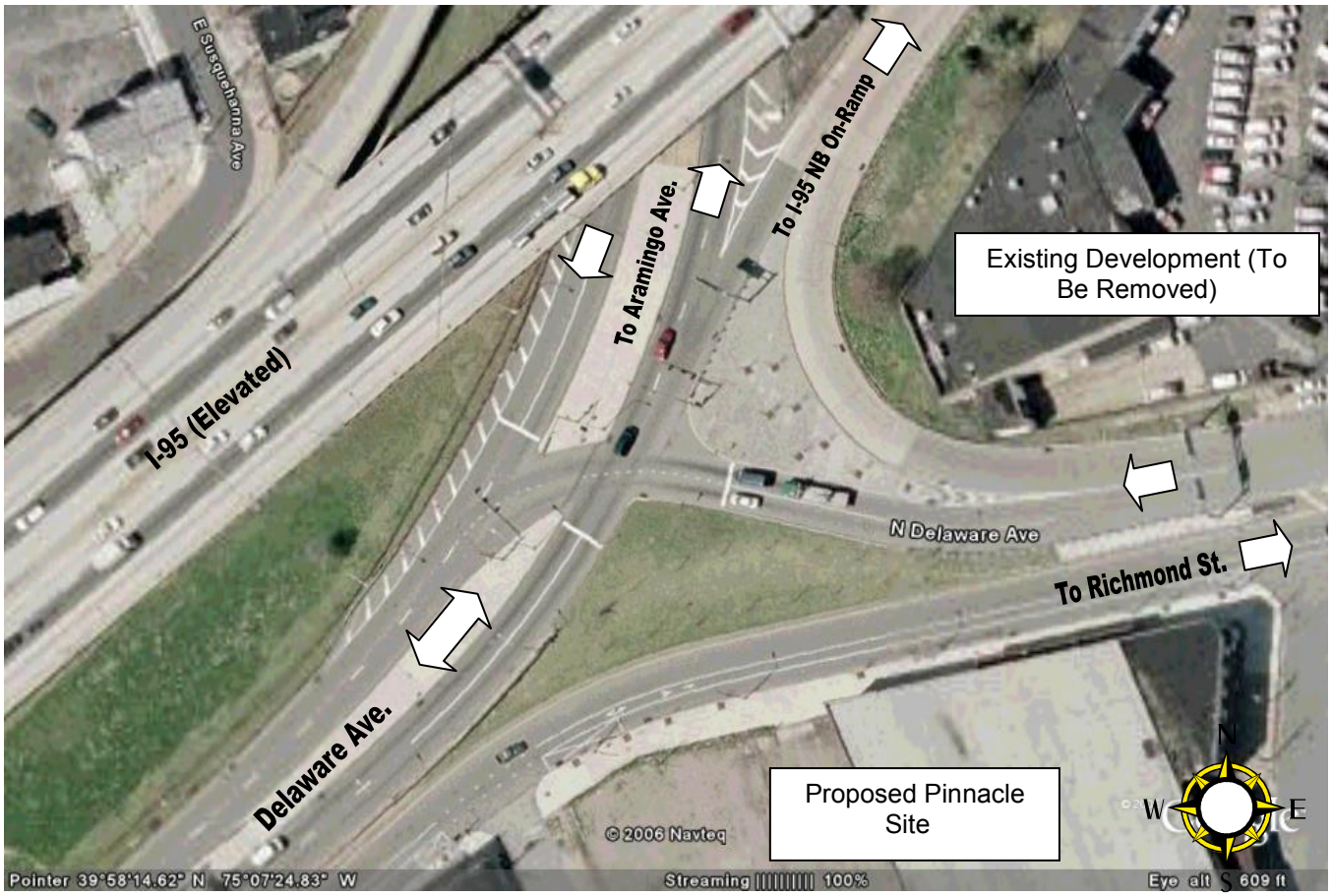


Image 3

This is a signalized "Y" intersection with Delaware Avenue (S.R. 2001) as the northeast approach. Vehicles originating from Richmond Street (S.R. 2001) can make a left turn into Delaware Avenue through a gap in the median and both lanes are permitted to turn left onto Delaware Avenue westbound. A chanelized right turn lane onto Aramingo Avenue (S.R. 2009) and to the on-ramp for I-95 NB which is located approximately 75 yards before the intersection. Delaware Avenue has two through-lanes in both the eastbound and westbound directions. No turns (in any direction) are permitted from Delaware Avenue at the intersection.

As seen in the image above, the westbound and eastbound traffic on Delaware Avenue are separated by a concrete median. The right through-lane for eastbound traffic on Delaware Avenue has the option of bearing right onto the ramp for I-95 NB, or continuing on Aramingo Avenue (S.R. 2009) after going through the intersection. Eastbound traffic wishing to get on Richmond Street (S.R. 2001) from Delaware Avenue can bear right onto Richmond Street approximately 150 yards before the intersection.

It is noted that *there is no direct route to get from Aramingo Avenue (S.R. 2009) onto Richmond Street (S.R. 2001). Vehicles must proceed from Aramingo Avenue onto Delaware Avenue and then make a U-turn on Delaware Avenue (at Columbia Ave.) to be able to get on Richmond Street from eastbound Delaware Avenue.* There are no bike lanes or pedestrian crossings located at the intersection. There are numerous signs which restrict pedestrian access to the intersection.

All curbs and sidewalk appear to be in satisfactory condition. Bicycle lanes are present along Delaware Avenue heading towards Richmond Street (S.R. 2001). Speed limit on Delaware Ave. is posted at 30 MPH.

4) Richmond Street (S.R. 2001) and Dyott Street

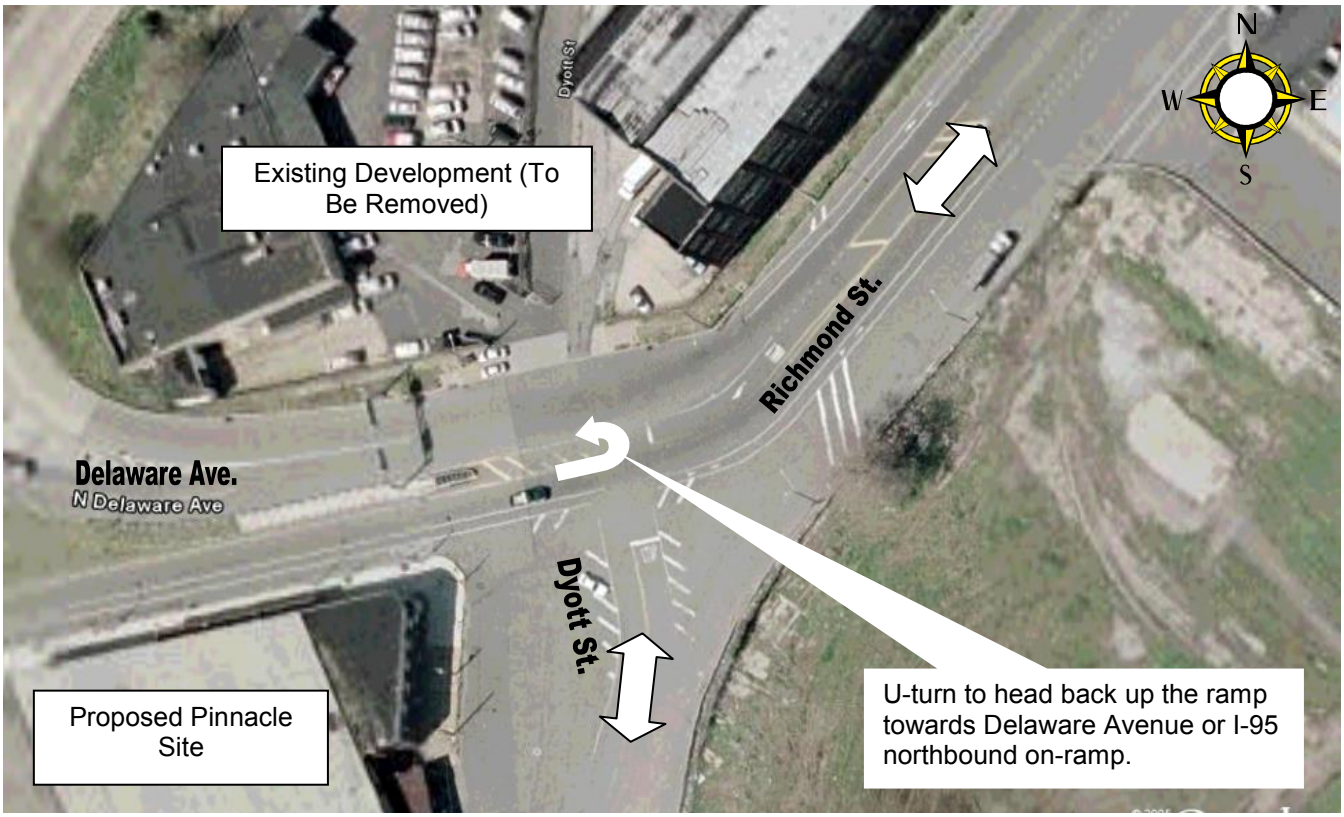


Image 4

This intersection is currently unsignalized. Dyott Street has two-way traffic marked in fading paint on the pavement; however traffic rarely follows these markings. This intersection is very wide. Dyott Street measures approximately 200 feet wide at its intersection with Richmond St. Richmond St. measures about 100 feet on the west leg and about 88 feet on the east leg. Often, cars use this area to make a U-turn (indicated in Image 4 above) to head back up the ramp towards Delaware Avenue (S.R. 2001) or I-95 NB onramp. This intersection occurs at a curve in Richmond Street (S.R. 2001) which allows for Richmond to proceed into Intersection #3 (described above).

Richmond Street (S.R. 2001) permits two-way traffic in both directions and there is one lane per direction. When traveling west on Richmond St, there is a left turn lane in the painted median of the road. East of the intersection, Richmond permits parking on both sides of the street with no restrictions in areas east of the intersection. The eastbound lane has an extremely wide shoulder.

Observations during peak travel times show that traffic markings along this shoulder are often disregarded and treated as if there are two lanes heading eastbound. Richmond Street enters the intersection from the east as a spur off of Delaware Avenue. This area permits parking along the south shoulder and also includes a bicycle lane.

Bicycle lanes are present on both the eastbound and westbound shoulders of Richmond St., east of the intersection. On the westbound approach on Richmond, the bicycle lane ends at the intersection with no visible area where it begins again. Westbound traffic on Richmond has the option of going north on I-95, west on Delaware Ave, or east on Aramingo after proceeding through the intersection and into Delaware Avenue (S.R. 2001) and Berks Street intersection. Sidewalk is not provided along Richmond Street (S.R. 2001) and Dyott Street. The pavement condition along Richmond Street is in satisfactory condition. Dyott Street may need to be resurfaced.

5) Richmond Street (S.R. 2001) and Schirra Drive

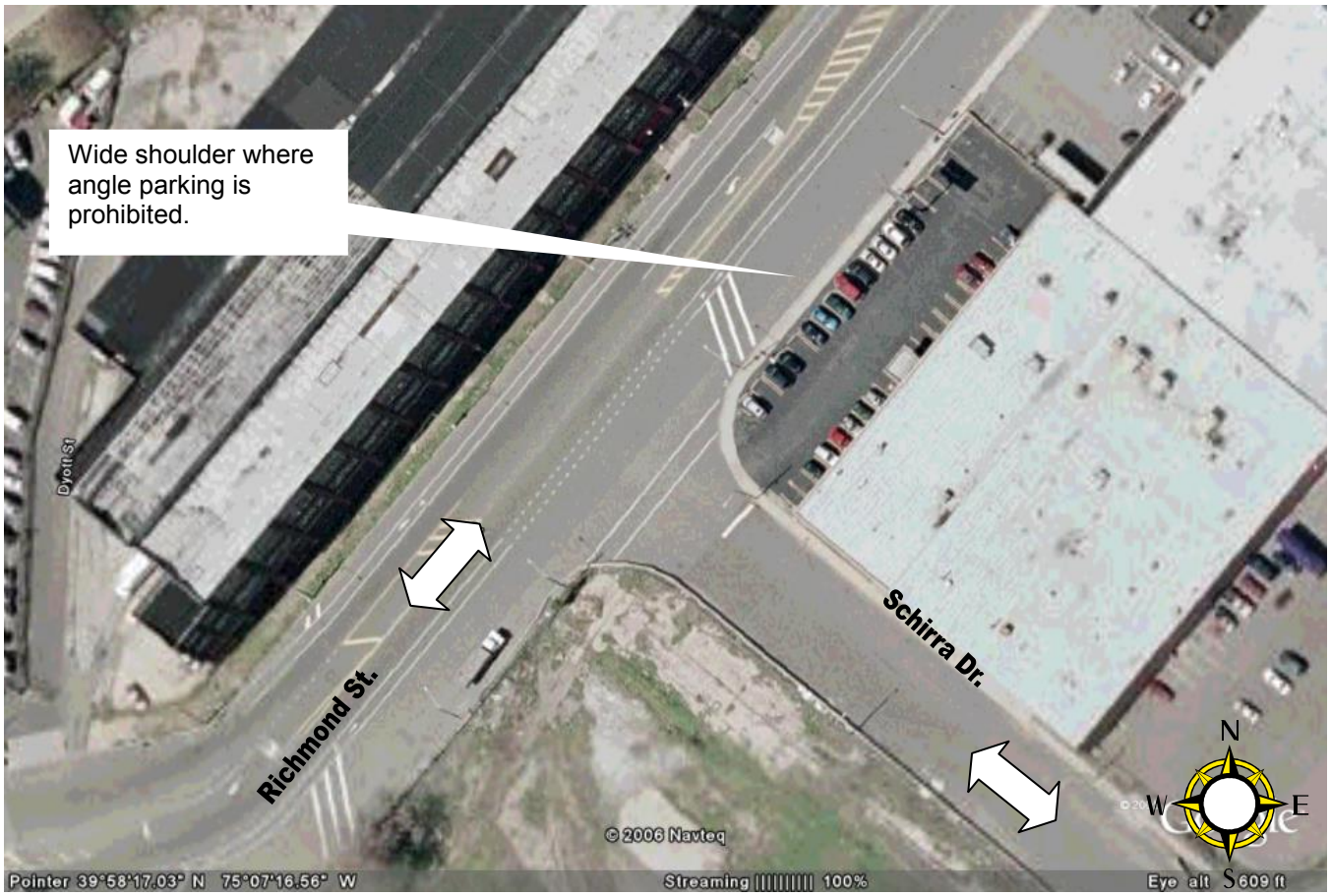


Image 5

This intersection is currently unsignalized. Schirra Dr. is easily wide enough for two-way travel however there are no lane markings to show any configuration of lanes. Traffic entering the intersection from Schirra Dr. has a stop sign with a stop bar before proceeding onto Richmond. Traffic can turn either right or left from this point. Richmond Street (S.R. 2001) has one through-lane in each direction, both before and after the intersection.

Eastbound Richmond has an extremely wide shoulder with pavement markings before and after the intersection (as indicated in the image). The only parking restriction is a sign which prohibits “angle parking.” Observations during peak travel times show that traffic markings along this shoulder are often disregarded and treated as if there are two lanes heading eastbound. When traveling west on Richmond St, there is a left turn lane in the painted median of the road. Eastbound Richmond permits parking along the curb with no restrictions. Bicycle lanes are present on both shoulders of Richmond Street (S.R. 2001) Traffic signs which are along the north curb of Richmond Street are often obscured by overgrowth of weeds and small trees. There is one marked pedestrian crosswalk which crosses over Schirra Drive; however, this crosswalk dead-ends into a temporary jersey barrier on the southwest corner of the intersection. This Jersey barrier forms the curb line around the southwest corner of the intersection.

6) Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008)

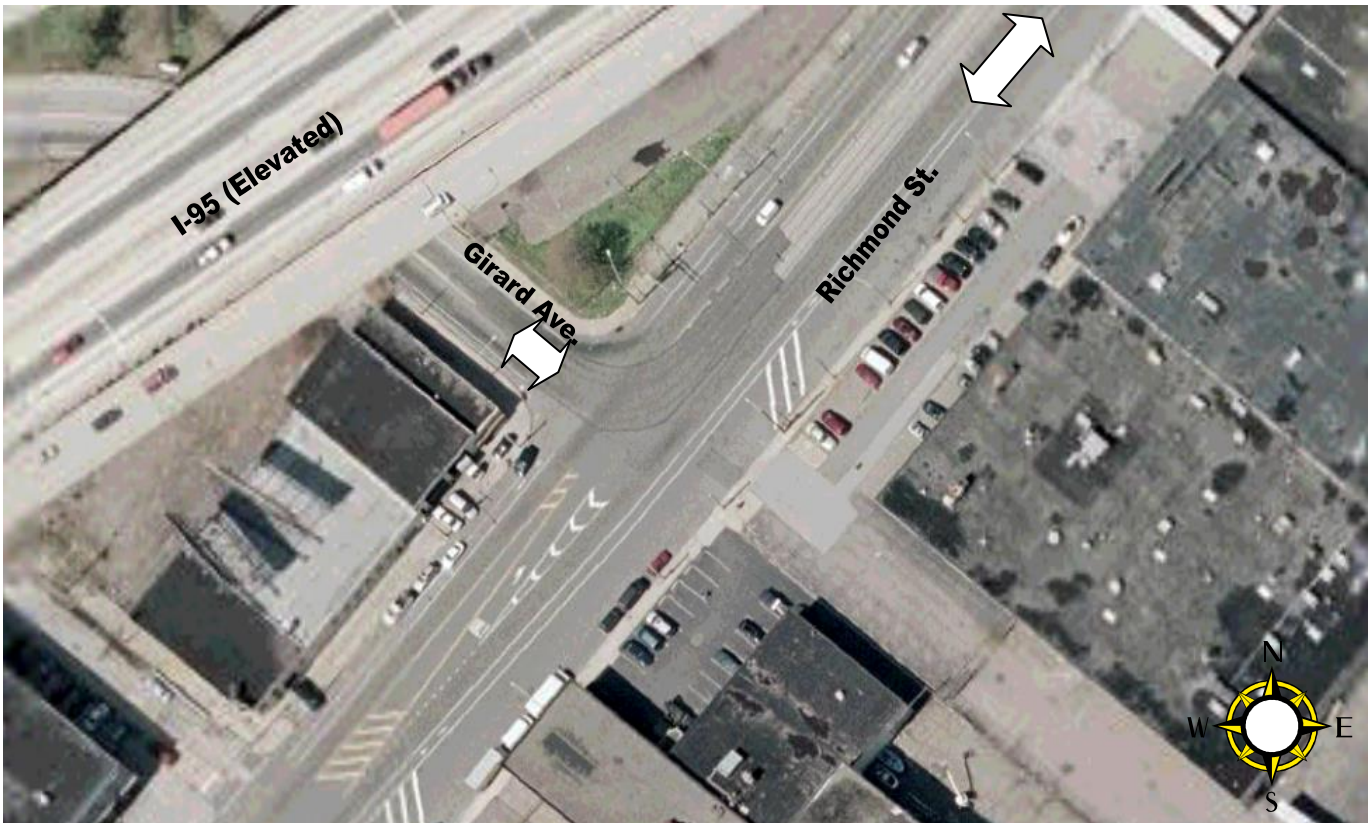


Image 6

This intersection is currently unsignalized. Girard Avenue (S.R. 2008) is a two-way road with one travel lane in each direction. There is a small shoulder on both sides of the road. Traffic is able to turn either left or right onto Richmond Street (S.R. 2001). Parking is prohibited on Girard Avenue in the area of the intersection.

Richmond Street (S.R. 2001) is a two-way intersection with one through-lane in each direction. For vehicles traveling eastbound, there is a left turn lane within the painted median.

Eastbound Richmond has an extremely wide shoulder with pavement markings before and after the intersection with trucks parked along the curb. Westbound lanes on Richmond Street have a shoulder/parking along the curb with restrictions only at fire hydrants and driveways. In general, pavement markings east of the intersection are very faded/worn and barely visible. This may be in part to the change in traffic patterns due to the trolley tracks.

Two sets SEPTA Route 15 of trolley tracks extending along Girard Avenue (S.R. 2008) turn east onto Richmond Street at this intersection. This provides for two-way trolley operation. The centerline of the roadway for both Girard and Richmond is positioned such that it is between the sets of trolley tracks (SEPTA Route 15 travels along Girard Avenue and Richmond Street). This means that the individual trolleys are traveling in the same direction as the vehicles. Vehicles were frequently observed ignoring pavement markings (those that are still visible) to pass trolleys which move slowly. There is at least one trolley stop right at the intersection on Girard Avenue.

Bicycle lanes are present along the shoulders of both sides of Richmond Street. There were no marked pedestrian crosswalks located at this intersection. There is one overhead sign structure support on the northeast corner of the intersection; however the sign is no longer attached to this structure.

7) Richmond Street (S.R. 2001) and Cumberland Street

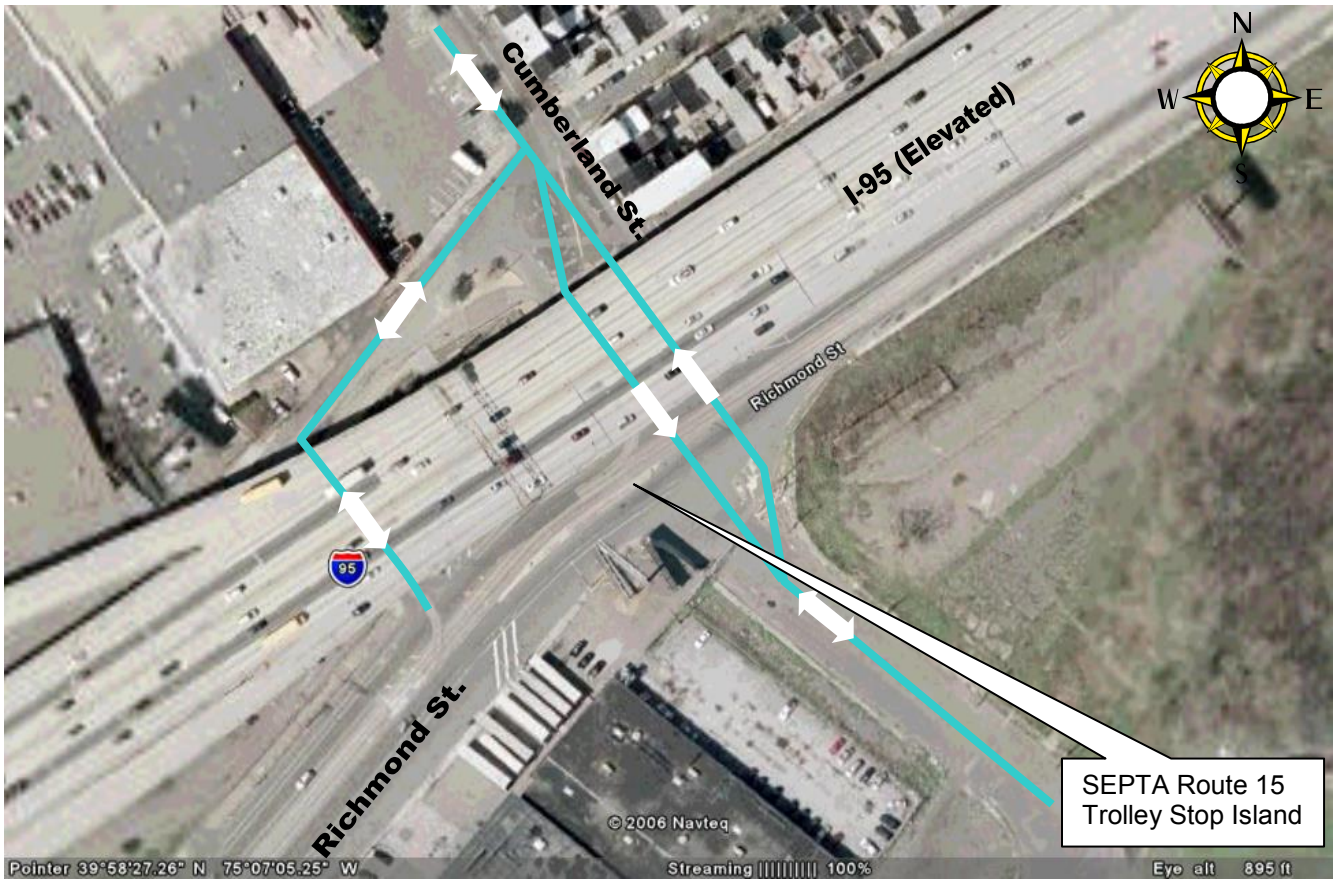


Image 7

This intersection is currently unsignalized. Cumberland Street intersects Richmond Street (S.R. 2001) directly adjacent to the elevated sections of Interstate 95. Because of this, Cumberland Street is divided by a I-95 pier. The pier columns are surrounded by a concrete median and curb; however there are no traffic safety features in this area (i.e. guiderail). Cumberland Street supports two-way traffic before being split into brief one way segments approximately 100 yards north of the intersection (indicated in Image 7). The one-way sections under I-95 are properly signed with "do not enter" and "one way" signs. These two, one-way sections form the intersection with Richmond Street (S.R. 2001). When traveling north from the intersection on the one-way portion of Cumberland Street, there is an entrance directly under I-95 which is for a municipal parking lot. A bus stop is present along the west shoulder of the one-way section for vehicles traveling south. One to two buses were observed to be stopped at this bus stop nearly all the time. A single set of trolley tracks runs through the southbound one-way section of Cumberland Street. No trolleys were observed using this section of track during the field reconnaissance.

Richmond Street (S.R. 2001) is a two-way street with one through-lane in each direction on both sides of the intersection. For the purpose of this study Richmond Street will be assigned an east-west direction. Eastbound vehicles have a dedicated left turn lane onto Cumberland Street. This left turn lane however is directly on top of the set of trolley tracks which travel eastbound. There is also a concrete island which separates the left turn lane from the through lane. This island is used for the trolley stop for the eastbound trolley.

We observed that numerous vehicles do not use the left turn lane to make left turns, but rather use the through-lane that is located to the right of the trolley stop traffic island. It is our observation that the placement of the left turn lane on the left side of the trolley island (where passengers wait for the trolley) gives drivers a sense of insecurity. Additionally the trolley tracks make driving on this area uncomfortable and motorists wishing to make

a left turn are sometimes reluctant to become stopped behind a trolley that may be stopped to board or discharge passengers. West of the intersection, the eastbound lanes have a wide shoulder with pavement markings and some parking.

Observations during peak travel times show that traffic markings along the eastbound shoulder are often disregarded and drivers treat the shoulder and normal lane as if there are two lanes heading eastbound. *However, it is noted that all vehicles traveling along Richmond Street have to merge back into one lane east of Cumberland Street; which makes the de-facto two-lane operation dictated solely by the volume of traffic along Richmond Street. In general, vehicles prefer to be on the center lane to avoid having to merge back into traffic.*

As discussed earlier, immediately east of this intersection, the eastbound shoulder ends leaving one through-lane. Westbound Richmond Street is comprised of a single through-lane on both the east and west sides of the intersection.

Both directions of Richmond Street have a bicycle lane adjacent to the travel lane. There appears to be a marked crosswalk that crosses Cumberland Street to the north of the intersection. This current configuration however requires people to walk over the concrete median which has an 8-inch curb. There are no depressions in the median curb to allow for disabled individuals to remain inside of the crosswalk. No crosswalks were evident across Richmond Street. Parking is permitted along the north curb of Richmond Street both before and after the intersection.

On the south end of the intersection, there is a gated entrance to Cumberland Street which completes the loop with Beach Street and Schirra Drive and serves the adjacent industrial area. There is a concrete island in the middle of the turning area into this gate. A few temporary jersey barriers are in place in front of the chain link fence that forms the opening. No vehicles were observed using this entrance during the field view.

8) Richmond Street (S.R. 2001) and Huntingdon Street

Image 8

This intersection is currently unsignalized. Huntingdon Street intersects Richmond Street directly adjacent to the elevated section of Interstate 95 and Huntingdon Street is stop controlled at the intersection.

Huntingdon Street is a one-way street, 34-feet wide and allows on-street parking on both sides of the street. For the purpose of this study Richmond Street will be assigned an east-west direction. Richmond Street operates as one-lane approaches both eastbound and westbound, lane markings are faded.

9) Richmond Street (S.R. 2001) and Lehigh Avenue

Image 9

This intersection is currently signalized. Richmond Street is a two-way street with one through-lane in each direction on both sides of the intersection. For the purpose of this study Richmond Street will be assigned an east-west direction.

Lehigh Avenue is an arterial state highway (S. R. 2014) marked as a one lane in each direction with a median area delineated with pavement markings. Lehigh Avenue has a very wide paved area which allows room for possible future increase in roadway capacity. Currently, the wide shoulders are utilized for angle parking. In general, pedestrian crosswalks are only provided across Lehigh Avenue at the signalized intersections (e.g. E. Thompson St.; Belgrade St and Aramingo Ave.). Continental crosswalks are provided across the minor streets that intersect with Lehigh Avenue.

10) Aramingo Avenue (S.R. 2009) and Lehigh Avenue

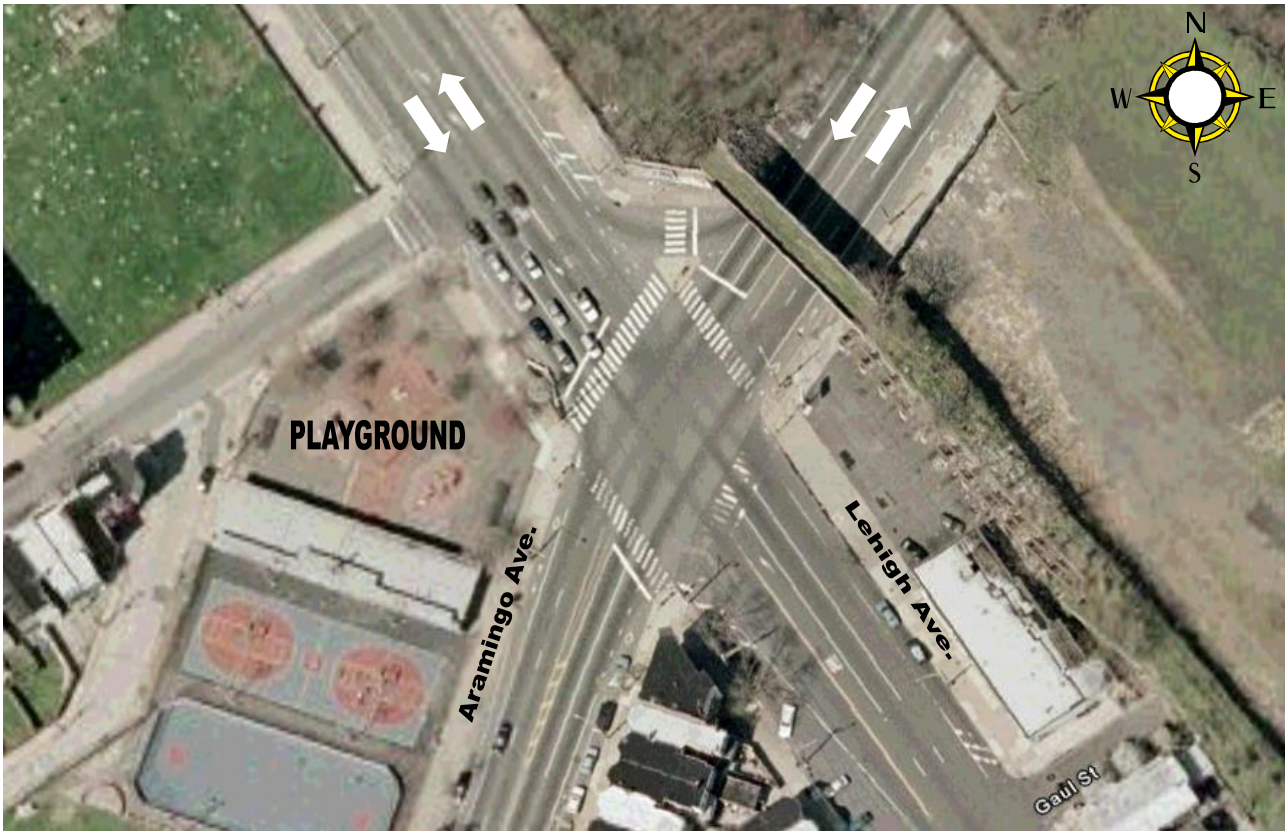


Image 10

This intersection is currently signalized. Immediately north of Gaul Street (shown in the lower right corner of the Image 10), northwest-bound Lehigh Avenue widens from one lane in each direction into three lanes: one dedicated left turn lane, one through lane and one shared through/right turn lane. The southeast-bound Lehigh Avenue also provides one dedicated left turn lane, one through lane and one shared through/right turn lane. Bike lanes are provided on this side of Lehigh Avenue.

The Aramingo northbound approach provides one shared through/left turn lane and one shared through/right turn lane, additionally, bike lanes are provided on both sides at this approach. The Aramingo southbound approach provides one shared through/left turn lane, one through lane, and one dedicated right turn lane.

Pedestrian accommodation includes sidewalk and continental crosswalks. It is observed that a long clearance time (15 seconds of all-red time) is provided at this intersection, this is most likely due to its location (adjacent to Aramingo Square playground) and the width of Lehigh Avenue.

11) Aramingo Avenue (S.R. 2009), Huntingdon Street and Belgrade Street

Image 11

This intersection is currently signalized. The directional configuration is illustrated in the image. The northbound Aramingo approach provides one shared through/left turn lane and one shared through/right turn lane. The southbound Aramingo approach provides one through lane and one shared through/right turn lane.

All curbs and sidewalk along Aramingo Avenue (S.R. 2009) are in satisfactory condition. Bicycle lanes are present along Aramingo Avenue in both directions. The posted speed limit on Aramingo Avenue (S.R. 2009) at this location is 30 MPH.

Both Huntingdon St. and Belgrade St. operate as one-lane approaches. Pedestrian accommodation includes sidewalk and continental crosswalks.

12) Aramingo Avenue (S.R. 2009) and Cumberland Street

Image 12

Cumberland Street is a one-way street, with traffic traveling south, to the north of the intersection and a two-way street to the south of the intersection (indicated in the image). There are no lane markings at the stop bar located north of the intersection on Cumberland Street however, cars routinely form two lanes.

One lane operates as a dedicated left turn lane onto eastbound Aramingo and the other lane operates as a shared right/through lane. There is a driveway entrance to the CVS Pharmacy on Cumberland Street approximately 20 feet from the northwest corner of the intersection.

Traffic entering the intersection from northbound approach of Cumberland Street must either turn right or left onto Aramingo Avenue due to the one way portion of Cumberland at the north end of the intersection. No parking is present in the immediate area of the intersection on Cumberland Street. Thompson Street spurs off of eastbound Aramingo approximately 40 yards before the intersection and then intersects Cumberland Street shortly thereafter. Vehicles are able to turn either left or right on Cumberland Street, or remain going straight on Thompson Street Thompson Street serves as a means for vehicles traveling east on Aramingo to make a right onto Cumberland Street since no turns are allowed for eastbound vehicles on Aramingo Avenue (S.R. 2009) at the intersection.

Aramingo Avenue (S.R. 2009) has two through-lanes in each direction at this intersection. Westbound Aramingo has a left turning lane with no protected green arrow. There is a painted median on Aramingo on the westerly side of the intersection. Bicycle lanes are present along both sides of Aramingo Avenue. No parking is permitted along Aramingo in either direction. Pedestrian crosswalks are present along all 4 sides of the intersection. There are no pedestrian signals for these crosswalks.

13) Aramingo Avenue (S.R. 2009)/York Street/Moyer Avenue and Port Richmond Village Shopping Access

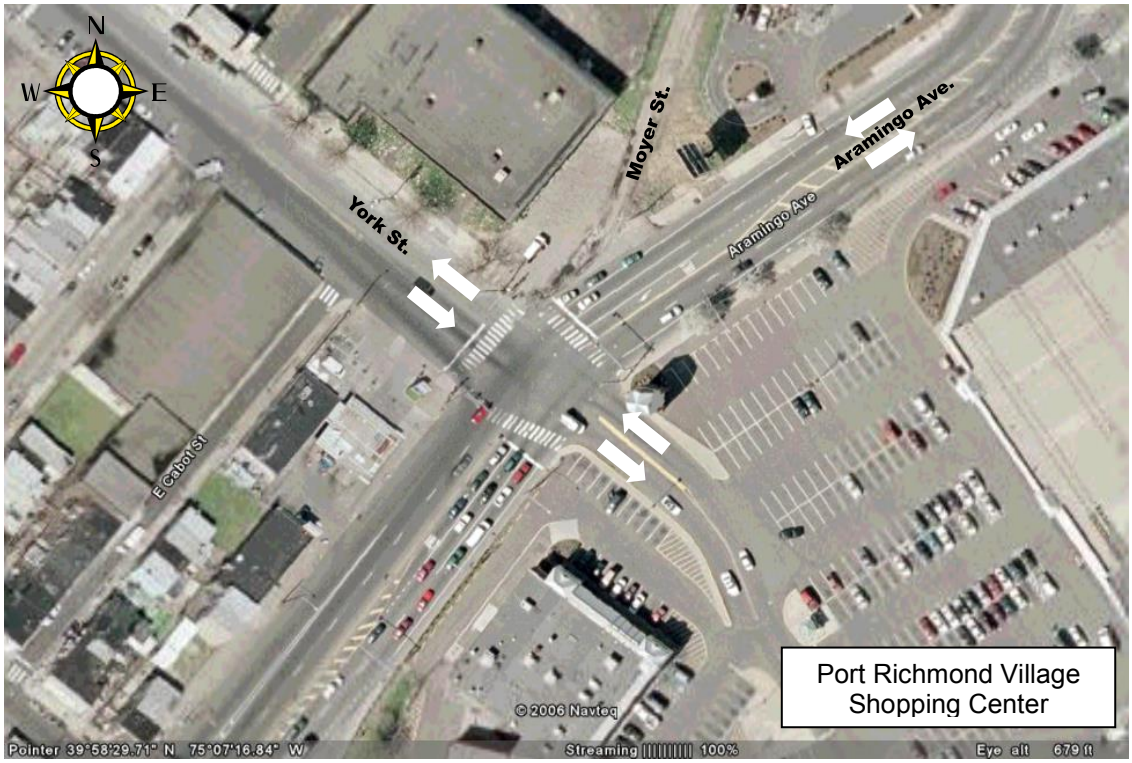


Image 13

This intersection is currently signalized. York Street intersects Aramingo Ave. at a 90 degree angle. The southerly end of the intersection will be considered York Street however it is the entrance to the Port Richmond Village Shopping Center. The northerly end of York Street carries two-way traffic. One lane goes north from the intersection while the single south lane forms 3 individual turning lanes approaching the intersection. The right lane allows for right turns, the center lane is to continue straight into the shopping center, and the left lane is for left turns. There are lane use control signs which show this lane configuration, however the paint striping has deteriorated significantly and is difficult to see. The south end of York road exhibits one lane into the shopping center and two lanes out of the shopping center. There are no lane configurations marked on the ground for the lanes exiting the shopping center, however there are signs indicating that the "Left lane must turn left". The left turn has a protected green arrow. The right lane is able to either proceed straight or turn right onto Aramingo Avenue (S.R. 2009). There is a concrete median between the entrance and exit to the shopping center.

Aramingo Avenue (S.R. 2009) has two through-lanes in each direction. Both directions have an unprotected left turn lane. There is a concrete median on the west side of the intersection. A bicycle lane is present on both sides of Aramingo. At the northeast corner of the intersection, the bicycle lane widens enough that it can actually be used like a shoulder. Several cars were seen using the bicycle lane as a right turn lane to turn onto northbound York Street. This is also the area where the trolley tracks are covered with asphalt. There is an entrance a gas station in the immediate vicinity of the intersection at the northwest corner on both Aramingo Avenue (S.R. 2009) and York Street. Immediately to the west of the intersection on Aramingo Ave, a 3rd lane begins to form for the ramp to Girard Avenue. No parking is permitted on Aramingo in the immediate vicinity of the intersection. Pedestrian crosswalks are located at the north, east, and west sides of the intersection. These crosswalks have hand/man pedestrian signals. When pedestrians activate the push-button; all signals turn to red for a predetermined length of time.

Moyer Street has a single trolley track running through it which has been abandoned. It does not appear that this road is used frequently and is in general disrepair. Moyer Street intersects with Aramingo Ave. on a slight angle at the intersection. The trolley tracks that continue up Moyer Street become covered in asphalt once they get to Aramingo Ave.

14) Girard Avenue (S.R. 2008) and Berks Street

Image 14

The intersection of Girard Avenue and Berks Street is currently signalized. Girard Avenue consists of two (2) lanes in each direction with auxiliary left turn lanes where necessary. In addition, trolley stop islands for the Route 15 SEPTA trolley are located at the intersection. Berks Street is one-way southbound at the intersection and a left turn lane with a protected green arrow phase is provided at the intersection to allow westbound Girard Avenue traffic to turn onto Berks Street. Currently, bus and truck traffic is prohibited from Berks Street south of Girard Avenue. Berks Street is designated one-way northbound on the north side of Girard Avenue and one-way southbound on the south side of Girard Avenue. The condition of the pavement, lane markings, sidewalk and curbing is in satisfactory condition. Girard Avenue (S.R. 2008) has a posted speed limit of 25 MPH in this area.

15) Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010)

The intersection of Girard Avenue and Columbia Avenue (S.R. 2010) is currently signalized. Girard Avenue consists of two (2) lanes in each direction with auxiliary left turn lanes where necessary. In addition, trolley stop islands for the Route 15 SEPTA trolley are located at the intersection. Columbia Avenue is one-way southbound at the intersection and a left turn lane is provided at the intersection to allow westbound Girard Avenue traffic to turn onto Columbia Street.

Image 15

Columbia Avenue is designated one-way southbound on both sides of Girard Avenue. The condition of the pavement, lane markings, sidewalk and curbing is in satisfactory condition. Girard Avenue has a posted speed limit of 25 MPH in this area.

2. B. Existing Public Transit Facilities

One of this site's attributes is its proximity to major public transit facilities. The Girard Avenue Station of SEPTA's Market–Frankford Line is located approximately ¾ mile from the site and SEPTA's newly renovated Route 15 Trolley Line, which runs along Girard Avenue and Richmond Street, provides transit access from the Girard Avenue Station to a point within a block of the site. In addition, several bus routes (including Routes 25, 54 and 57) intersect with the Route 15 Trolley Line in close proximity to the site.

The existing transit facilities are presented in FIGURE 1E.

2. C. Existing Traffic Volume Data Collection

Traffic volume data was collected at all fifteen (15) intersections listed above.

Two types of volume data were collected:

1) Turning movement counts, this count includes all vehicular traffic, heavy vehicles and pedestrians during an average weekday (Tuesday, Wednesday, and/or Thursday) between the hours of 7:00 AM – 9:30 AM and 4:00 PM – 6:00 PM, conducted in August 17, 18, 21, 23 and 28, in the year 2006.

2) Automatic Traffic Recorder (ATR) counts were also obtained on Richmond Street (S.R. 2001), Girard Avenue (S.R. 2008), Aramingo Avenue (S.R. 2009), Delaware Avenue (S.R. 2001) and the I-95 on- and off-ramps for a four (4) to six (6) day period (including Saturday and Sunday), in August 2006.

Existing volumes are illustrated in FIGURES 2A through 2C. The field data are provided in APPENDIX A.

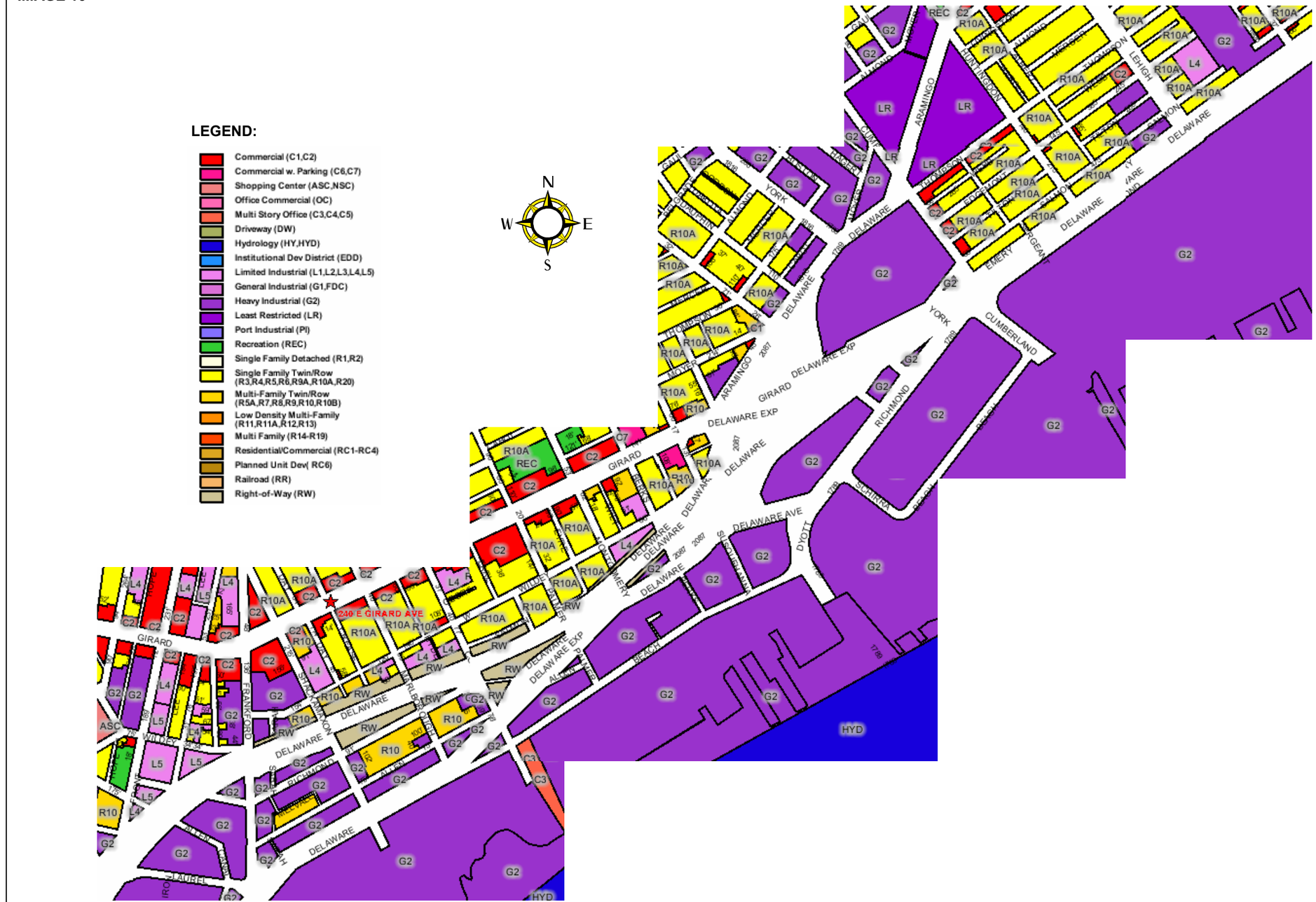
2. D. Existing Land Uses

The proposed development is along a section of the Delaware River that is within the larger context of an established and expanding mix-used waterfront that includes significant residential, tourism, hotel, restaurant and commercial office development interspersed with the more traditional industrial waterfront uses.

The Pinnacle Project site is conveniently located immediately adjacent to Interstate 95 in an industrial area on the Delaware River waterfront. The parcels which will be occupied by the Pinnacle Entertainment Project are currently zoned G2 (Heavy Industrial). Within the immediate vicinity of the project site, the primary land uses are G2 (Heavy Industrial), R10A (Single-Family Twin/Row Houses); LR (Least Restricted), C1, C2 (Commercial) and C7 (Commercial with Parking).

The layout of the existing land uses are illustrated in Image 16 in the next page.

IMAGE 16


LEGEND:
Commercial (C1,C2)
Commercial w. Parking (C6,C7)
Shopping Center (ASC,NSC)
Office Commercial (OC)
Multi Story Office (C3,C4,C5)
Driveway (DW)
Hydrology (HY,HYD)
Institutional Dev District (EDD)
Limited Industrial (L1,L2,L3,L4,L5)
General Industrial (G1,FDC)
Heavy Industrial (G2)
Least Restricted (LR)
Port Industrial (PI)
Recreation (REC)
Single Family Detached (R1,R2)
Single Family Twin/Row (R3,R4,R5,R6,R9A,R10A,R20)
Multi-Family Twin/Row (R5A,R7,R8,R9,R10,R10B)
Low Density Multi-Family (R11,R11A,R12,R13)
Multi Family (R14-R19)
Residential/Commercial (RC1-RC4)
Planned Unit Dev(RC6)
Railroad (RR)
Right-of-Way (RW)
N
W
E
S
240 E GIRARD AVE
DELAWARE
GIRARD
YORK
CUMBERLAND
DELAWARE EXP
DELAWARE AVE
ARAMINGO
RICHMOND
FRANKFORD
DYOTT
EMERY
LEHIGH
THOMPSON
HYD

3. PROJECT OVERVIEW

3. A. Overview

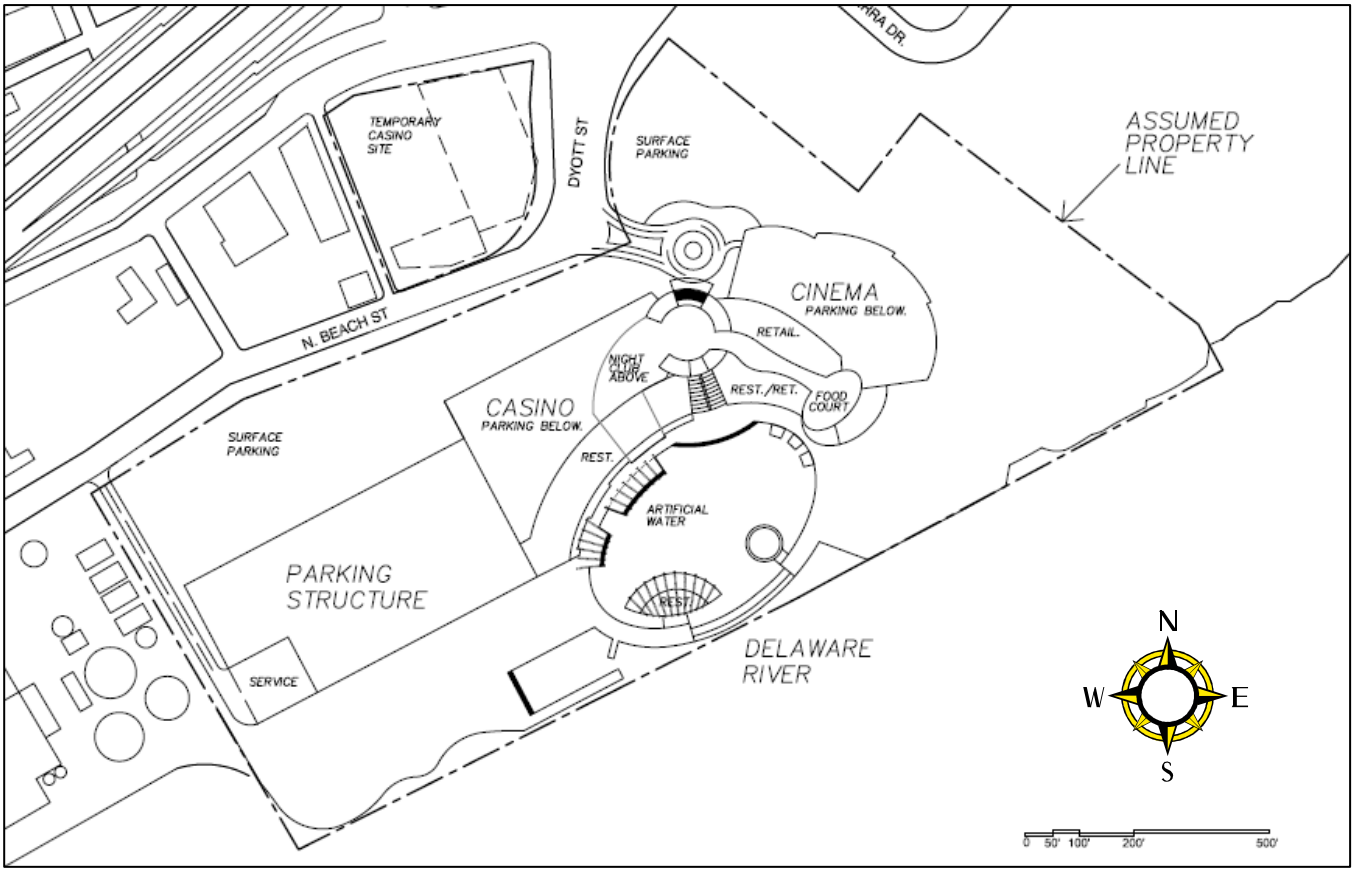


Image 17. The composition of the Pinnacle Entertainment Project. This conceptual site plan indicates the general site layout, however, it is noted that the site plan is subject to refinement as the project is developed.

The Pinnacle Entertainment Project will include the following:

- 5 (five) restaurants plus a food court: 2 (two) will be considered high-turnover restaurants (ITE LU 932), 2 (two) will be considered fast-food restaurants (ITE LU 934) and 1 (one) will be considered a quality restaurant (ITE LU 931).
- 12-screen multiplex movie theater (ITE LU 445)
- A water-feature and a seasonal waterfront ice-skating rink (approximately a total area of 137,000 square foot)
- 36,000 square foot retail and entertainment outlets; which will be broken down into 23,691 square foot of general retail (ITE LU 820) and 23,691 square foot of specialty shop (ITE LU 814)

3. B. Parking

All parking for the Pinnacle Entertainment Project will be self contained on-site. During the operation of the temporary casino featuring 1,500 slot machines, ample surface parking will be provided on-site, adjacent to the temporary casino building. The temporary parking lot will be accessible from Dyott Street during the operation of the temporary casino.

In addition, a 3,000 car parking garage structure will be constructed on the southerly portion of the site as indicated on the site plan during Phase 1 of the project to provide parking for the permanent casino featuring 3,000 slot machines. A ratio of one parking space per slot machine will be maintained for the project to assure

adequate on-site parking. The proposed parking garage will be accessible from a new signalized site driveway that will access Richmond Street opposite the proposed on and off ramps from southbound I-95 that are to be constructed under PennDOT's I-95 Girard Avenue Interchange Project as depicted on the site plan.

4. TRIP GENERATION

4. A. Developing the Trip Generation Rates

The standard reference generally utilized to estimate traffic generated by new developments is a publication entitled Trip Generation by the Institute of Transportation Engineers. However, Trip Generation does not include a significant amount of data for gaming uses. It was determined that the data provided by the Trip Generation does not sufficiently represent the type of gaming venue which is proposed in Philadelphia.

As such, additional research was conducted to identify other sources of trip data.

Among the articles and publications which were used are the following:

- "Trip Generation Characteristics of Small to Medium Sized Casinos" by Michael Trueblood and Tara Gude, ITE 2001 Annual Meeting Compendium.
- "Gaming Casino Traffic" by Paul C. Box and William Bunte, ITE Journal, March 1998
- "Trip Generation rates for Las Vegas Area Hotel-Casinos" by Kenneth W. Ackeret and Robert C. Hosea III, ITE Journal, May 1992
- "Recalibration of Trip Generation Model for Las Vegas Hotel/Casinos" by Curtis D. Rowe, Mohamed S. Kaseko and Kenneth W. Ackeret, ITE Journal, May 2002

Field data collection was also conducted at the following similar locations:

- Delaware Park, Wilmington, DE (2003)
- Freehold National, New Jersey (2003)
- Dover Downs, Dover, DE (2003)
- Philadelphia Park, Philadelphia, PA (2003)

It is noted that the state of Pennsylvania has just recently allowed gaming facilities in July of 2004. In order to obtain an accurate approximation of the number of trips generated by a proposed gaming facility, data must be collected based on similar facilities with similar demographic and geographic environments. It is understood that a well-established casino will not have the same traffic and trip generation characteristics as a recently build one; a casino located in Las Vegas – where gambling was legalized since 1931 and the primary economic motivator is recreational uses – will not have the same traffic and trip generation characteristics as the proposed Pinnacle Entertainment Project. Other aspects such as demographics, site access and visibility as well as parking facilities differ from that of the proposed gaming facilities in Pennsylvania.

It is noted that a new casino which specializes in electronic gaming, typically also include other auxiliary uses such as food and beverage areas, entertainment, amenity retail, employee facilities, public circulation and support space. Since these auxiliary uses do not generally function on their own, they are generally not considered as traffic generators. However, for the purpose of this study, a partial trip generation rates have been assigned to each auxiliary use.

Out of this data, the trip generation rates from the Delaware Park Saturday evening driveway vehicle counts appear to be most suitable to be applied to the proposed site. While The Delaware Park site does have a live horse racing, the traffic count was conducted when the live horse racing facility was closed and therefore the trips attracted by the gaming facility were isolated. Additionally, the Delaware Park site is compatible with the proposed development, in that it includes a similar number and type of supporting patron services within the gaming device facility.

An article titled "Gaming Casino Traffic", published in the ITE Journal, March 1998, by Paul C. Box and William Bunte, provides trip generation rates and an analysis of the daily fluctuation in generated traffic for two gaming casino facilities. The article establishes trip generation rates per gaming position for the study sites, which could not be directly applied to this site, because the sites included in the article contain table type gaming positions (blackjack, poker, Keno). However, it does provide an hourly breakdown of the daily traffic percentages.
In order to develop trip generation rates for the weekday evening peak hour, the Saturday evening rate was adjusted based on ratios provided in the Box and Bunte ITE article mentioned previously.

The Saturday midday peak hour rate was obtained using the Box and Bunte article which provides an hourly breakdown of the daily traffic percentages. The resultant peak hour trip rates per gaming unit were as follows:

- Weekday morning peak hour = 0.165
- Weekday evening peak hour = 0.406
- Saturday evening peak hour = 0.477

In all of the references we utilized, the gaming venues studied did not typically include a movie theater within the site. Based on the development site plan, the movie theater will be physically located inside the Entertainment Center structure and can be considered as an amenity for the gaming patrons. This is true for all of the other uses within the Pinnacle Entertainment Project. However, from a traffic impact perspective, we have taken a conservative approach, in that we did not consider the movie theater (as well as the other uses included in the Pinnacle Entertainment Project) as purely auxiliary. Technically, a purely auxiliary use is considered not to generate any traffic since the use in itself does not generate any traffic independently (e.g., the concession stand in a movie theater, or a dedicated parking garage); however, we believe that in order to be conservative, we have taken a percentage of the trip generation contribution to account for the trips that may be generated independently by these auxiliary uses:

The peak hour site-generated traffic estimates are contained in TABLE 1 below.

TABLE 1
Trip Generation Summary

L.U.	Description	Var	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
445	Movie Theater (w Matinee)	Screen	N/A	N/A	N/A	12	5	7	289	173	116
932	High Turnover Restaurants	SF	16	8	8	15	9	6	28	18	10
934	Fast Food	SF	61	37	24	36	19	18	62	32	31
931	Quality Restaurants	SF	1	1	0	10	7	3	15	9	6
820	General Retail	SF	1	1	0	4	2	2	4	2	2
814	Specialty Shop	SF	8	4	4	3	1	2	3	1	2
465	Ice Skating Rink*	SF	N/A	N/A	N/A	32	15	18	32	15	18
Total Auxiliary Uses			**87**	**51**	**36**	**112**	**58**	**56**	**433**	**250**	**185**
Temp Casino (1,500 units)			**248**	**193**	**54**	**609**	**286**	**323**	**716**	**379**	**336**
Phase 1 Casino (3,000 units) with Auxiliary Uses			**583**	**437**	**146**	**1332**	**630**	**702**	**1865**	**1008**	**857**

*Winter Months Only

A summary worksheet of the trip generation is provided in APPENDIX C.

4. B. Traffic Generated by Existing Site Use

The project site is currently comprised of four (4) parcels, three of which are vacant lots and one parcel is currently occupied by a vacant building. These current uses are not expected to generate traffic and therefore were not taken into account as a reduction.

4. C. Modal Split, Transit Facility and Charter Buses Utilization

If the proposed Pinnacle Entertainment Project is to be located near public transit services, the utilization of public transit is estimated to reduce the trip generation rate, however caution must be exercised in approximating the percent reduction due to availability of public transportation. As such, for the purpose of achieving a conservative analysis, a transit reduction will not be applied to the trips generated by the Pinnacle Entertainment Project.

Additionally it is necessary to consider the impact of charter buses, if any, to the trip generation rates. Casino and Franchise buses are commonly utilized by many casinos, however based on conversations with representatives of Pinnacle Entertainment Project, significant usage of charter buses is not anticipated in the operation of the Pinnacle Entertainment Project.

Based on the Final Report published on the Philadelphia Gaming Advisory Task Force website, it is estimated 33% of gamers visiting a North Delaware site (such as this site) will arrive in other modes of transportation, which is broken down as follows:

Pedestrian = 3%
Taxi = 10%
Casino Bus = 8%
Public Transit = 12%

However, for the purpose of achieving a conservative analysis, *a modal split reduction was not applied* to the trips generated by the Pinnacle Entertainment Project.

4. D. Weekday Peak Hour of Generator vs. Weekday Peak Hour of Adjacent Street

We have conducted field data collection, analysis and literary research to identify the critical analysis periods which will be pertinent for the proposed Pinnacle Entertainment Project.

We have revised our previous assumption and identify the following critical hours: *one weekday morning peak hour; one weekday evening peak hour and one Saturday evening peak hour*. In general, our research indicated that the typical casino peak hour does not coincide with the adjacent street peak hour (which is mostly influenced by commuter travel patterns).

Our research has revealed published technical resources which indicate that the “true” peak hour of a gaming facility of similar size and geographic location as the proposed Pinnacle Entertainment Project will typically occur around 6 PM in the evening during weekdays and a little earlier in the afternoon during the weekend (See Chart A).

However the field data collected on a weekday *and* Saturday from Delaware Park and Dover Downs shows that the evening peak hour could occur closer to 5 PM followed by a stable decline (See Chart B).

Chart A

24-Hour Casino Traffic Fluctuation Pattern
From "Gaming Casino Traffic" by Paul C. Box and William Bunte, ITE Journal, March 1998

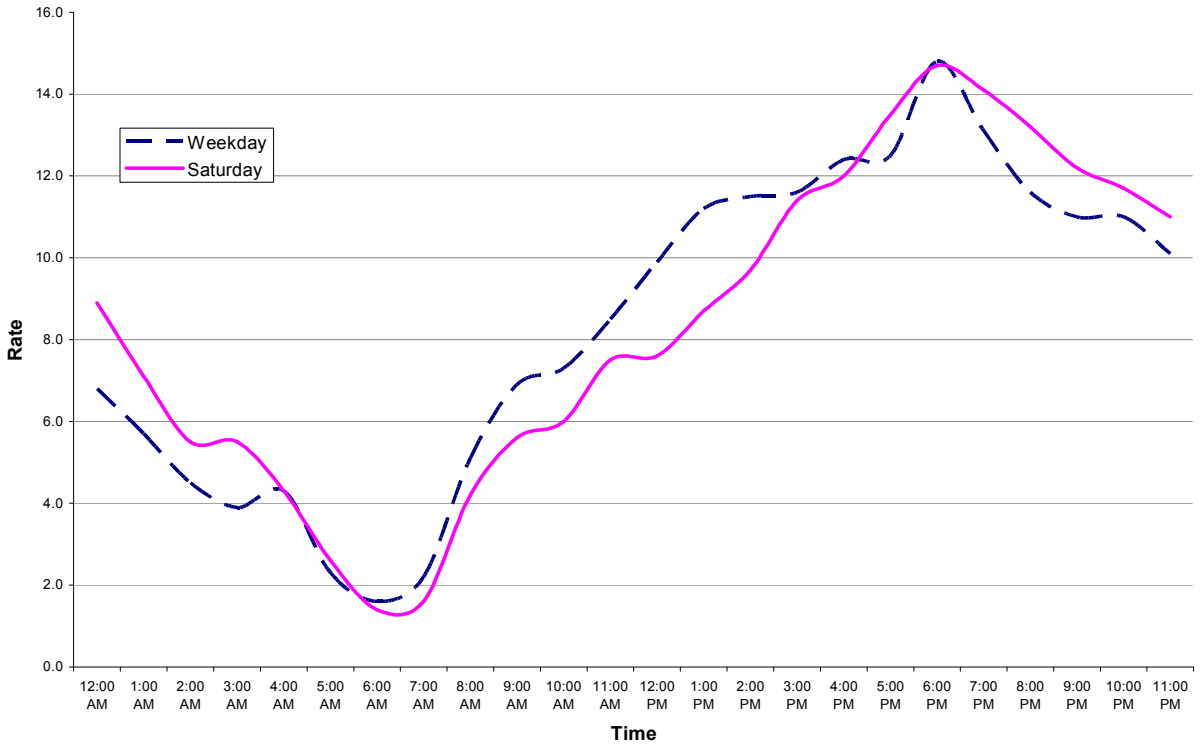
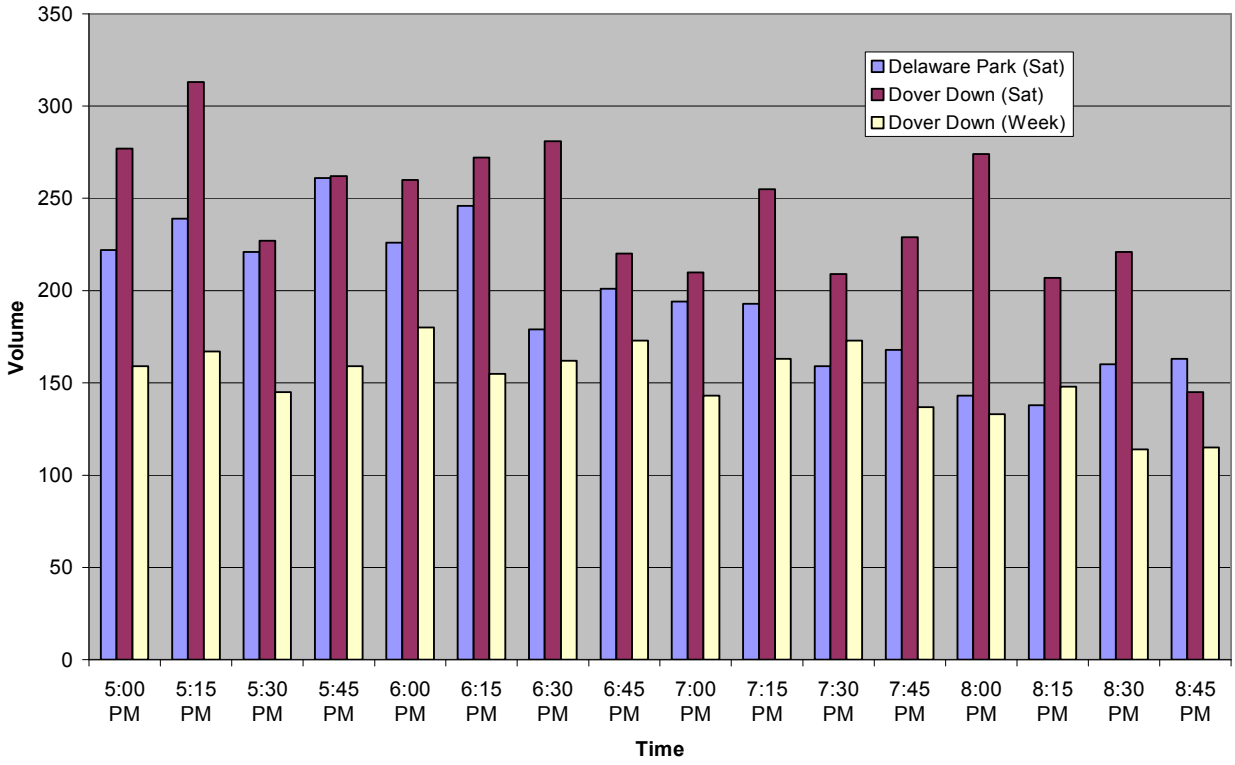


Chart B

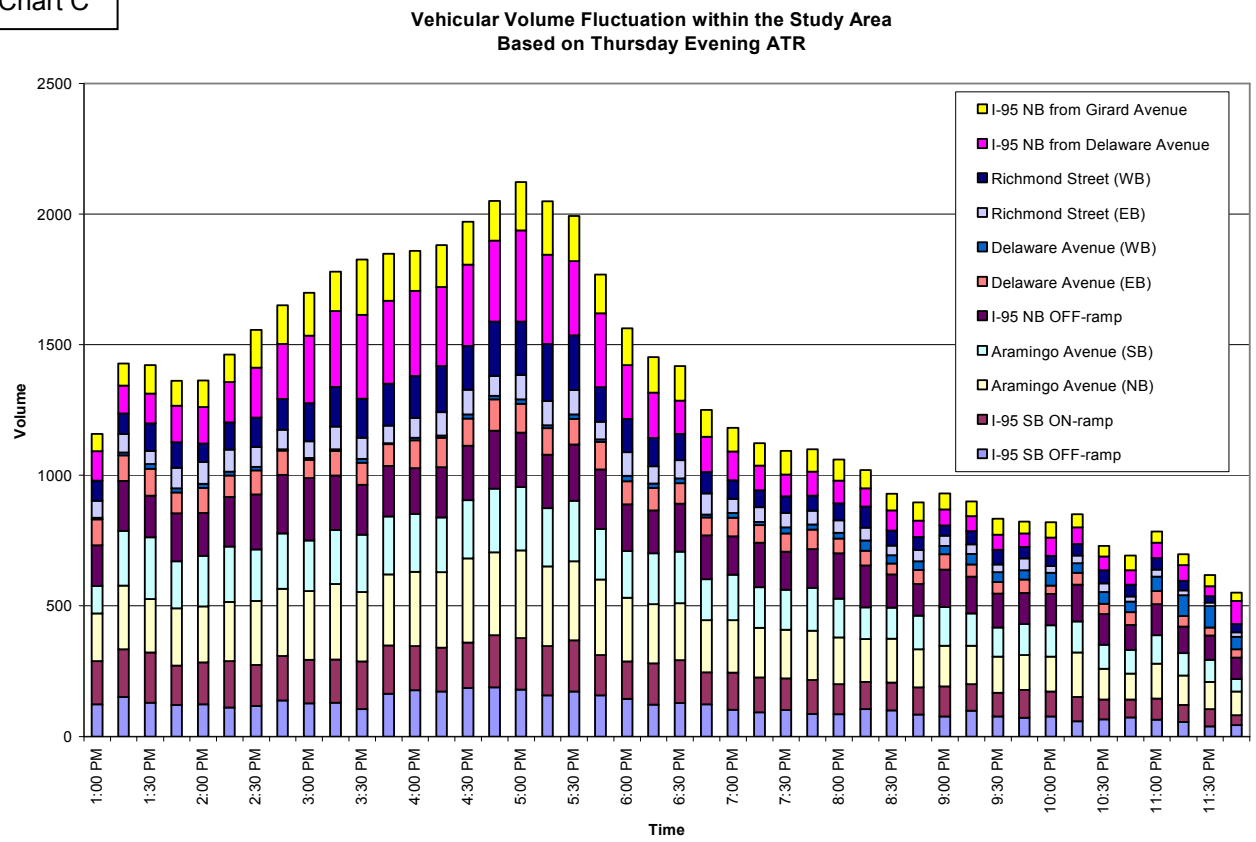
Evening Peak Hour Based on Field Data



It was decided that in order to achieve a conservative analysis we have utilized the traffic generation rates derived during the "true" gaming facility peak hour to generate an estimate of the total trips generated by the proposed Pinnacle development. Subsequently this total project-generated traffic was added to the peak hour traffic volumes which were identified during regular street peak hours based on existing field counts.

Based on the ATR counts trip generation rates for the facility during the adjacent street peak hour is approximately 15% to 20% lower than the peak rates since the peak hours do not coincide. However, we did not apply these reduced trip generation rates in the Traffic Impact Study. Chart C below shows the volume fluctuations within the study area based on ATR counts.

Chart C



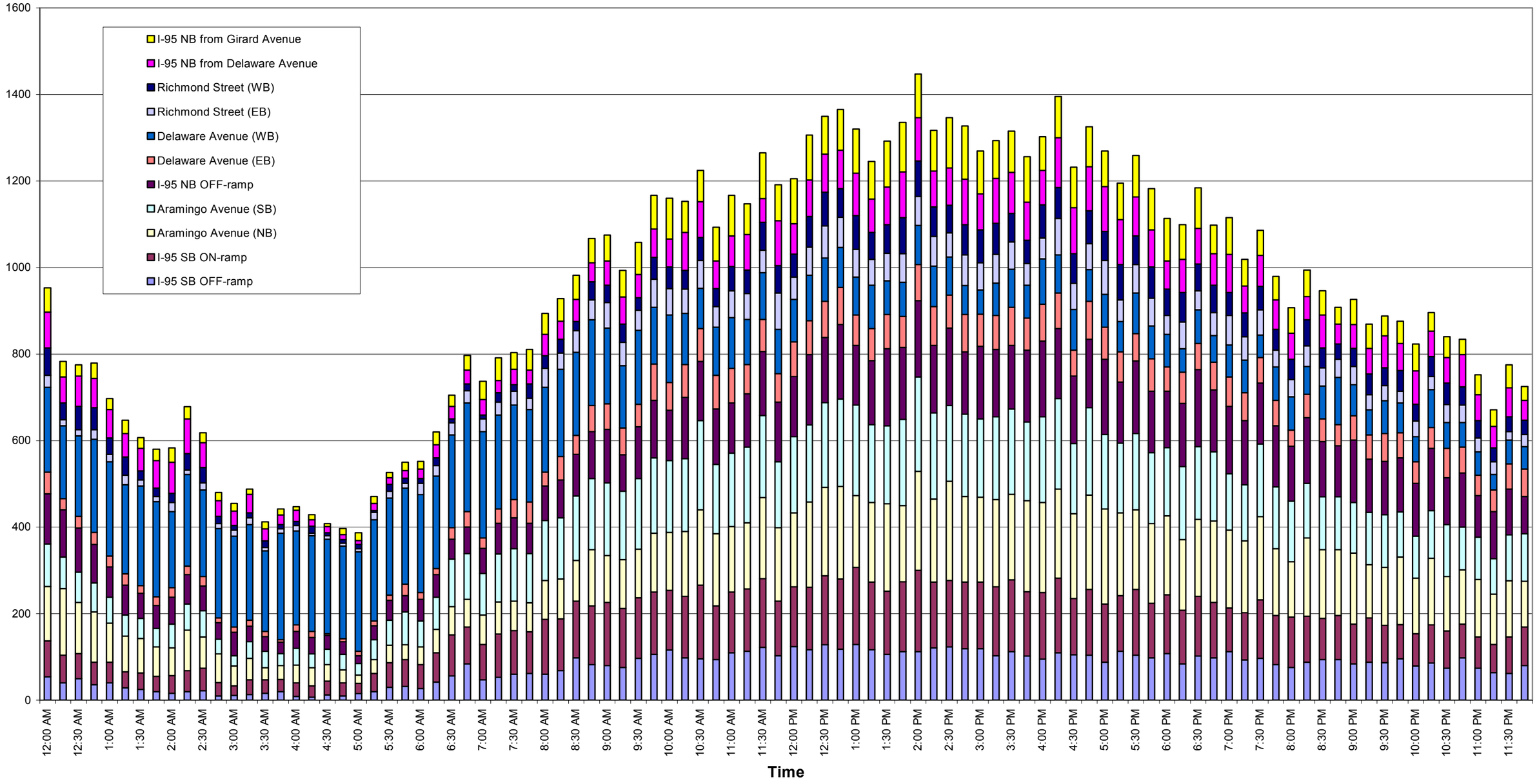
4. E. Saturday Peak Hour

Based on the turning movement count conducted at Delaware Park and Dover Down, the Saturday peak hour appears to occur at 5 PM. This will be the hour that we utilize for the analysis.

ATR counts at the study are shows that the Saturday street peak hour occurs at 2 PM (see Chart D in the following page). In this case, because the offset between the generator's peak hour (5 PM) and the street peak hour (2 PM) was clearly shown, we do not impose the trips generated by the proposed Pinnacle Entertainment Project onto the (street) peak hour traffic volumes.

Chart D

Vehicular Volume Fluctuation within the Study Area
Based on Saturday ATR



4. F. Trip Distribution and Assignment

The new vehicle trips generated by the proposed gaming facility development will be distributed and assigned to the roadway network based on a combined evaluation of existing traffic patterns, the anticipated characteristics and behavior of the development-generated traffic, the location of regional transportation facilities, public transportation facilities (SEPTA buses and trains) and the assumed access scenarios.

It is expected that the majority of site traffic generated during the peak periods will use I-95. In addition, the trips generated by the proposed Pinnacle Entertainment Project will also use local roadways such as Delaware Avenue, Richmond Street (S.R. 2001), Aramingo Avenue (S.R. 2009) and Girard Avenue (S.R. 2008). The percentages of site traffic assigned to these roadways are summarized in TABLE 2.

TABLE 2
Trip Distribution Summary

I-95							
ENTERING	**Via:**	**AM**	**PM**	**EXITING**	**Via:**	**AM**	**PM**
From South	I-95 N Off-Ramp (access the site via Delaware Avenue)	40%	40%	To North	I-95 N On-Ramp	40%	40%
From North	I-95 S Off-Ramp (access the site via Girard Avenue (S.R. 2008), Columbia Avenue (S.R. 2010) and Delaware Avenue)	40%	40%	To South	I-95 S On-Ramp (access this on-ramp via Richmond St., Cumberland St. and Aramingo St.)	40%	40%
Local Roads							
ENTERING	**Via:**	**AM**	**PM**	**EXITING**	**Via:**	**AM**	**PM**
From West	N. Delaware Ave.	2%	7%	To West	N. Delaware Ave.	7%	2%
From East	Richmond St.	3%	1%	To East	Richmond St.	1%	4%
From West	E. Girard Ave.	2%	3%	To West	E. Girard Ave.	3%	3%
From North	E. Columbia Ave.	1%	0%	To North	E. Columbia Ave.	0%	0%
From North	Berks St.	0%	0%	To North	Berks St.	0%	2%
From North	E. York St.	2%	2%	To North	E. York St.	2%	2%
From North	E. Cumberland St.	2%	2%	To North	E. Cumberland St.	2%	0%
From North	E. Huntingdon St.	0%	0%	To North	E. Huntingdon St.	0%	0%
From East	Belgrade St.	1%	0%	To East	Belgrade St.	0%	0%
From North	E. Lehigh St.	4%	3%	To North	E. Lehigh St.	3%	3%
From NE	Aramingo Ave.	3%	2%	To NE	Aramingo Ave.	2%	4%

FIGURE 9 illustrates the anticipated distribution of project traffic and the assignment of the new trips to the roadway network in the vicinity of the project. A summary worksheet of future traffic volume assignments are provided in APPENDIX B.

5. OPERATIONAL ANALYSIS OF EXISTING CONDITIONS

Analysis was performed for three peak hour time periods: Weekday AM, Weekday PM and Saturday PM.

In order to capture, analyze and compare the existing and future operational conditions, two traffic analysis models were created.

The first was a model of the existing city street network. The computer software program Synchro, developed by Trafficware®, is able to model complex street networks in accordance with the procedures outlined in the Highway Capacity Manual, Special Report 209 (HCM), published by the Transportation Research Board, Washington D.C. The HCM sets forth nationally accepted standards regarding traffic operations and capacity analysis.

The second model was completed in CORSIM, which is a software package developed by the Federal Highway Administration (FHWA) that is used to simulate freeway/ramp operations. Together, these models look at the operational characteristics of the entire roadway network within the study area. They provide a basis from which to determine how well the existing network is currently performing, but also allows the determination of future traffic conditions based upon basic changes in the infrastructure, (i.e., the new Girard Avenue Interchange) which may change the existing volume and travel pattern.

5. A. Intersection Capacity Analysis (Using SYNCHRO)

The intersection capacity analyses were performed in accordance with the procedures outlined in the Highway Capacity Manual, Special Report 209, published by the Transportation Research Board, Washington D.C., using Trafficware's Software, Synchro. The results of these analyses provide Level of Service, volume/capacity descriptions and average seconds of delay for the intersection movements.

Level of Service (LOS) is a measure of vehicle operator satisfaction with the driving experience. For the study intersections, this has been noted with designations “A” through “F” for the signalized intersection and “a” through “f” for unsignalized intersections based on the average vehicle delay per each approach and the overall intersection. The Level of Service concept is a rating system established to objectively evaluate the operational adequacy of an intersection or roadway.

5. A. 1. Existing Condition Level of Service and Capacity Analysis

The detailed Level of Service and capacity analysis reports are provided in APPENDIX X. The levels of service are summarized in a table provided in APPENDIX X. Each intersection that does not meet threshold criteria for the time periods and development scenarios analyzed are described below:

5. A. 1. 1. Existing Weekday Morning Peak Hour

Capacity analyses at the study intersections indicate that all intersections operate at overall LOS “D/d” or better with all movements also operating at LOS “D/d” or better with the exception of the following:

Signalized Intersection:

- **The signalized intersection of Aramingo Avenue (S.R. 2009) and York Street (# 13)** operates at an overall LOS “C”; however, the northbound left turn movement at the intersection of Aramingo Avenue (S.R. 2009) and York Street operates at a deficient LOS “F” (83). The delay on the northbound left turn is primarily due to an all-pedestrian (“Pedestrian Scramble”) phase which is actuated by a push-button. All other movements at this intersection operate at LOS “D” or better.

5. A. 1. 2. Existing Weekday Evening Peak Hour

Capacity analyses at the study intersections indicate that all intersections operates at overall LOS "D/d" or better with all movements also operating at LOS "D/d" or better with the exception of the following:

Signalized Intersections:

- **The signalized intersection of Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010) (# 1)** operates at an overall LOS "E" (79). This is due to the eastbound approach, which is operating at a deficient LOS "F" (98). All other movements at this intersection operate at LOS "D" or better.

- **The signalized intersection of Aramingo Avenue (S.R. 2009) and York Street (# 13)** operates at overall LOS "C". However, the eastbound (York Street) left turn movement operates at LOS "F" (104) and the through movement operates at LOS "E" (58). All other movements at this intersection operate at LOS "D" or better.

- **The signalized intersection of Aramingo Avenue (S.R. 2009) and Huntingdon/Belgrade Street (# 11)** operates at overall LOS "E" due to the southbound approach on Aramingo Avenue which is currently operating at LOS "E".

Unsignalized Intersections:

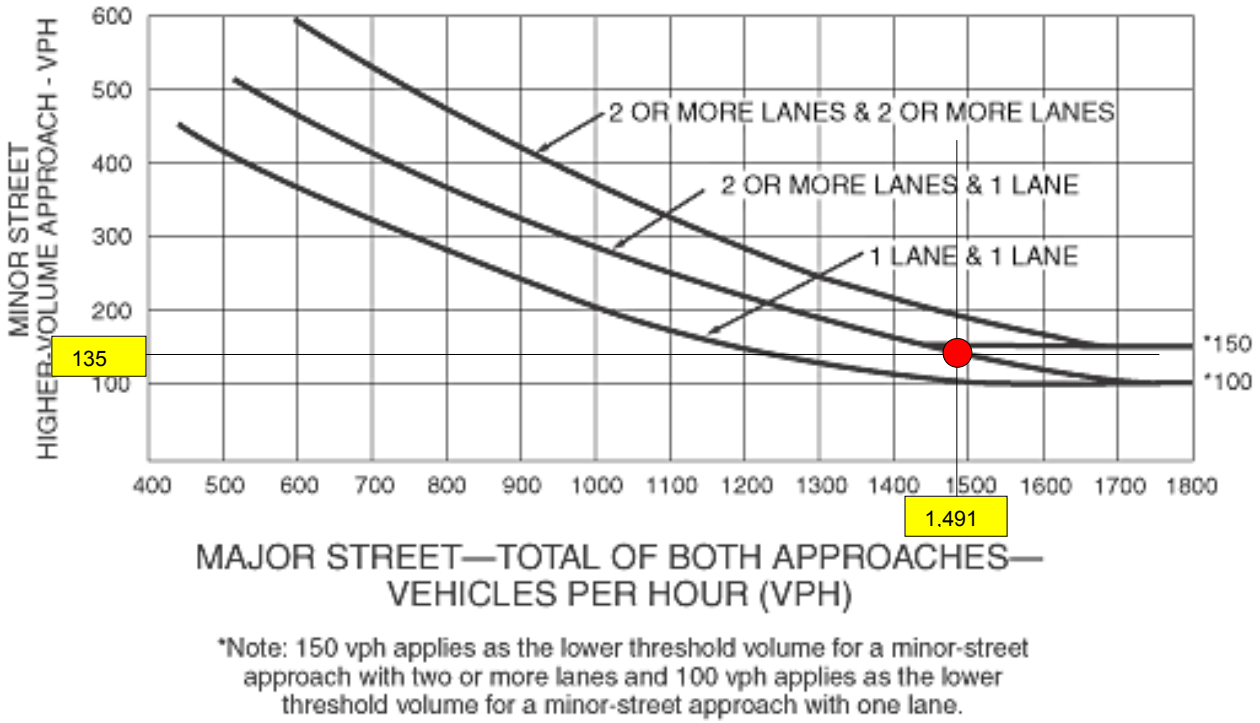
During the evening peak hour, the increase of vehicular volume along Richmond Street (S.R. 2001) makes it difficult for the STOP-controlled approaches (minor street approaches) to find sufficient gaps. As a result the minor street approaches at the following unsignalized intersections are experiencing a deficient LOS:

- **At the unsignalized intersection of Richmond Street (S.R. 2001) and Dyott Street (# 4)**, the northbound approach (Dyott Street) operates at a LOS "f" (166). This deficient operation is primarily applicable to the northbound left turn approach from Dyott Street – due to the excessive width of Dyott Street (approx. 120 feet) there is plenty of room to allow a de-facto channelized right turn lane at this intersection. Similarly, the small amount of traffic exiting the existing industrial building (southbound approach) experiences the same dilemma. The southbound approach will operate at LOS "f" (95).

- **At the unsignalized intersection of Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008) (# 6)**, the southbound approach (Girard Avenue) operates at a LOS "f". *It is noted that this intersection currently meets the requirement for a signal warrant during the weekday evening peak hour*. The signal warrant analysis is presented below:

Weekday Evening Peak Hour Signal Warrant Analysis for Intersection of Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008)

A traffic signal warrant analysis was conducted for the currently unsignalized intersection of Richmond Street and Girard Avenue in accordance with PENNDOT Publication 201, Engineering and Traffic Studies, Subchapter E, "Traffic Signals", in specific, the major and minor street volumes were plotted on Figure 4C-3 (Warrant 3, Peak Hour). The volumes are based on the evening peak hour volume data collected from the field on August 17, 2006.



5. A. 1. 3. Existing Saturday Evening Peak Hour

Capacity analyses at the study intersections indicate that all intersections operates at overall LOS "D/d" or better with all movements also operating at LOS "D/d" or better with the exception of the following:

Signalized Intersection:

- **The intersection of Aramingo Avenue (S.R. 2009) and York Street (# 13)** operates at overall LOS "C". However, the eastbound (York Street) left turn movement operates at LOS "E" (69). All other movements at this intersection operate at LOS "D" or better.

Unsignalized Intersection:

During the evening peak hour, the increase of vehicular volume along Richmond Street makes it difficult for the STOP-controlled approaches (minor street approaches) to find sufficient gaps. As a result the minor street approaches at the following unsignalized intersections are experiencing a deficient LOS:

- **At the unsignalized intersection of Richmond Street and Girard Avenue (# 6)**, the southbound approach (Girard Avenue) operates at a LOS "e" (37).

6. OPERATIONAL ANALYSIS OF FUTURE CONDITIONS

6. A. FUTURE PRE-DEVELOPMENT CONDITION LEVEL OF SERVICE AND CAPACITY ANALYSIS

6. A. 1. Pre-Development Traffic Volumes

The future traffic conditions will account for the traffic volume increases that are expected to occur throughout the region over this period. Existing traffic volumes are typically increased by an annual growth factor of 2.1% (2002 PENNDOT Table 371) to account for traffic volume increases from general background growth. In addition, approved developments and the associated traffic generation within the project study are added to the roadway network.

6. A. 2. Other Developments (Committed)

At the time this study was conducted, other development close to the study area includes the "Waterfront Square" Condominium Development which comprises a total of 780 residential units. This development is located on the Delaware River Waterfront at Penn and Poplar Streets, which is about ¾ mile south of the proposed Pinnacle Entertainment Project Site. At the time this study was conducted, the construction of this development was nearly complete, but the units were not occupied. For the purpose of achieving a conservative analysis we have included 50% of the total trips generated by this development during the analyzed peak hours. The additional trips contributed by this development were calculated utilizing the rates provided by the Trip Generation by the Institute of Transportation Engineers

6. A. 3. Description of the Analyzed Pre-Development Scenarios

As previously discussed in the beginning of this study, the following are the three pre-development Scenarios which are included for analysis.

- **Scenario 2a: Future Pre-Development Condition (2007):** This condition is built on the existing condition (Scenario 1a) plus a general background traffic growth of 2.1% is applied to all existing volumes to represent the increase of traffic for one year; additional traffic generated by any planned development within the study area and/or the immediate outskirts of the study area are also included.

- **Scenario 3a: Future Pre-Development Condition (2009):** This condition is built on the existing condition (Scenario 1a) plus a general background traffic growth of 6.3% (2.1% annual growth) is applied to all existing volumes to represent the general increase of traffic; additional traffic generated by any planned development within the study area and/or the immediate outskirts of the study area are also included.

- **Scenario 4a: Future Pre-Development Condition (2011) – New Girard Avenue Interchange:** This condition takes into account the newly constructed Girard Avenue Interchange as well as changes in traffic pattern and/or volume incurred by the completion of the new Girard Avenue Interchange as outlined in the "I-95 Girard Avenue and I-676 Vine Expressway Interchanges, Section GIR Traffic Study" prepared by the Delaware Valley Regional Planning Commission in June 2005. Additionally, it also takes into account a general background growth of 10.5% (2.1% annual growth) and traffic generated by any planned development within the study area and/or the immediate outskirts of the study area.

6. A. 4. Pre-Development Levels of Service

As with the existing condition evaluation, traffic operation for the future pre-development condition was evaluated at the study intersections during the analyzed peak hours. The comparison of the pre-development scenarios (for year 2007, 2009 and 2011) was conducted for the purpose of anticipating any future traffic operational issues which will arise even without the presence of the proposed Pinnacle Entertainment Project.

6. A. 4. 1. Future Pre-Development Weekday Morning Peak Hour

Capacity analyses at the study intersections indicate that all intersections will operate at overall LOS "D/d" or better with all movements also operating at LOS "D/d" or better with the exception of the following:

# 7 **Richmond Street (S.R. 2001) and Cumberland Street** **Currently Unsignalized**		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Unsignalized	**Unsignalized**	**Unsignalized**
At this intersection the northbound approach will operate at LOS "d".	At this intersection the northbound approach will degrade to LOS "e" (37).	At this intersection the northbound approach will operate at LOS "d". Based on the volumes provided by the DVRPC Study, it appears that the changes of traffic pattern due to the new interchange will improve the operation of this intersection.
#11 **Aramingo Avenue (S.R. 2009) and Huntingdon Street and Belgrade Street** **Currently Signalized**		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Signalized	**Signalized**	**Signalized**
This intersection will operate at overall LOS "D". All movements are anticipated to operate at LOS "D" or better.	This intersection will operate at overall LOS "D". The shared southbound through/right movement will degrade to a deficient LOS "E" (62).	This intersection will operate at overall LOS "D". The shared southbound through/right movement will degrade to a deficient LOS "E" (73).
#13 **Aramingo Avenue (S.R. 2009) and York Street** **Currently Signalized**		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Signalized	**Signalized**	**Signalized**
This intersection will operate at overall LOS "C".	This intersection will operate at overall LOS "C".	This intersection will operate at overall LOS "C".

The northbound left turn movement is anticipated to operate at a deficient LOS "F" (100). The eastbound left turn is anticipated to operate at a deficient LOS "E" (56).	The northbound left turn movement is anticipated to operate at a deficient LOS "F" (156). The eastbound left turn is anticipated to operate at a deficient LOS "E" (57).	The northbound left turn movement is anticipated to operate at a deficient LOS "F" (270). Based on the volumes provided by the DVRPC Study, it appears that the changes of traffic pattern due to the new interchange improve the operation of the eastbound left turn; this movement is anticipated to improve to LOS "D".

6. A. 4. 2. Future Pre-Development Weekday Evening Peak Hour

Capacity analyses at the study intersections indicate that all intersections will operate at overall LOS "D/d" or better with all movements also operating at LOS "D/d" or better with the exception of the following:

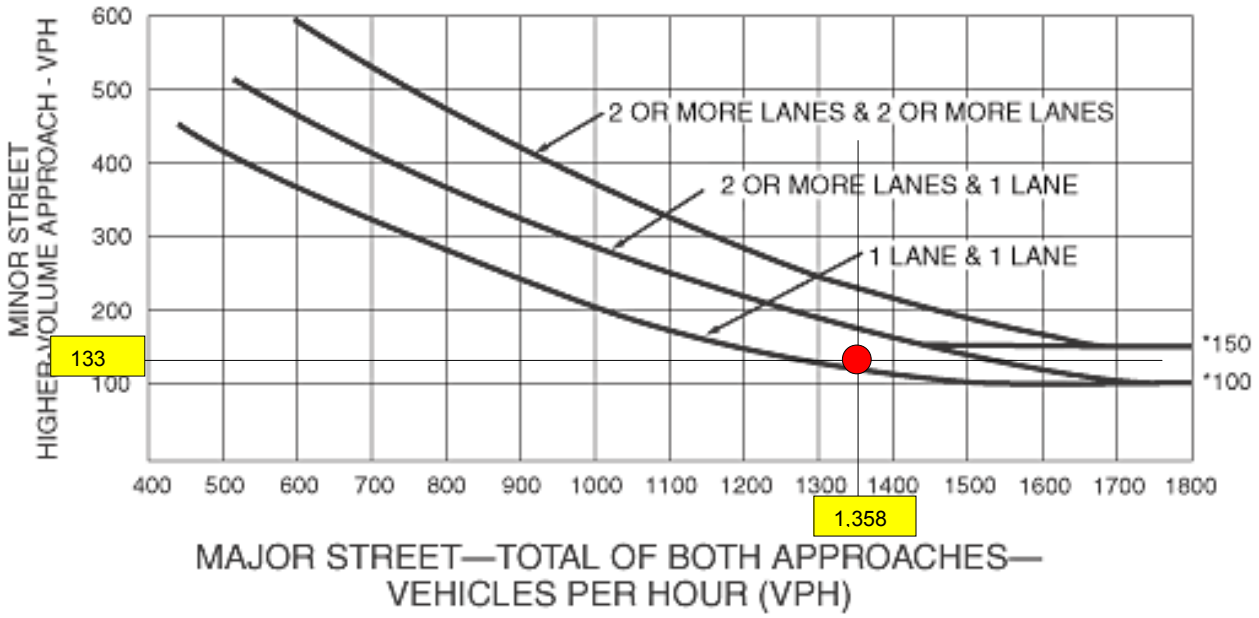
#1 Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010) Currently Signalized		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Signalized	**Signalized**	**Signalized**
This intersection will operate at deficient overall LOS "F" (86). The shared eastbound through/right movement will degrade to a deficient LOS "F" (107).	This intersection will operate at deficient overall LOS "F" (110). The shared eastbound through/right movement will degrade to a deficient LOS "F" (143).	This intersection will operate at deficient overall LOS "F" (93). The shared eastbound through/right movement will degrade to a deficient LOS "F" (93). NOTE: Changes in the traffic pattern resulted from the New Girard Avenue interchange is anticipated to slightly improve the operation of this intersection, however, deficient Level of Service will remain.

#4 Richmond Street (S.R. 2001) and Dyott Street Currently Unsignalized		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Unsignalized	**Unsignalized**	**Eliminated**
The northbound approach (Dyott St.) will operate at LOS "f" and the southbound approach (access to the existing industrial building) will operate at a LOS "f".	The northbound approach (Dyott St.) will operate at LOS "f" and the southbound approach (access to the existing industrial building) will operate at a LOS "f".	As part of the New Girard Avenue Interchange Project, Dyott Street will be converted as a cul-de-sac and will no longer intersect Richmond Street.
#7 **Richmond Street (S.R. 2001) and Cumberland Street** **Currently Unsignalized**		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Unsignalized	**Unsignalized**	**Unsignalized**
All movements at this intersection will operate at acceptable LOS "d" or better.	The northbound approach (Cumberland St.) will operate at LOS "e" (36).	The northbound approach (Cumberland St.) will operate at LOS "f" (65). NOTE: In the year 2011, it is projected that the volume during the evening peak hour will increase and will meet Warrant 3 (as discussed below). Under signalized operation, all movements at this intersection will operate at LOS "D" or better and the overall intersection LOS will be "C".

Weekday Evening Peak Hour Signal Warrant Analysis for Intersection of Richmond Street (S.R. 2001) and Cumberland Street (#7)

A traffic signal warrant analysis was conducted for the currently unsignalized intersection of Richmond Street and Cumberland Street in accordance with PENNDOT Publication 201, Engineering and Traffic Studies, Subchapter E, "Traffic Signals". The major and minor street volumes were plotted on Figure 4C-3 (Warrant 3, Peak Hour).

Pre-development volumes for the year 2011 were extrapolated from the evening peak hour volume data collected from the field on August 17, 2006. The future volume has taken into consideration the general growth and traffic generated by committed developments within the vicinity of the study area.



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

#6 Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008) Currently Unsignalized		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Unsignalized	**Unsignalized**	**Proposed to be Signalized**
For all future pre-development conditions, the northbound (Girard Ave.) share left/right turn movements will operate at LOS "f" with a significant amount of delay. This is due to the fact that vehicles queuing in the minor street cannot find sufficient gaps on Richmond Street. As established in the existing condition, the intersection of Richmond Street and Girard Avenue already meet warrant during the existing evening peak hour. In the future conditions, it is expected that the volume		Under a two-phase pretimed operation with 60-second cycle length, this intersection will operate with overall LOS "C" with all movements operating at LOS "D" or better.

increase at this intersection due to general growth and traffic generated by planned developments within the study area will further support the need for a signal installation at this intersection.		
#13 Aramingo Avenue (S.R. 2009) and York Street Currently Signalized		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Signalized	**Signalized**	**Signalized**
This intersection will operate at overall LOS “C”. The eastbound left turn movement is anticipated to operate at a deficient LOS “F” (108). The eastbound through movement is anticipated to operate at a deficient LOS “E” (58).	This intersection will operate at overall LOS “C”. The eastbound left turn movement is anticipated to operate at a deficient LOS “F” (134). The eastbound through movement is anticipated to operate at a deficient LOS “E” (59). The northbound left turn movement is anticipated to operate at a deficient LOS “F” (91).	The new Girard Avenue interchange will alter the traffic flow within the study area, in specific pertaining to accesses to the I-95 and the interaction between Girard Avenue, Aramingo Avenue, Delaware Avenue and Richmond Street, as such there will be a change in the traffic volumes at this intersection. This intersection will operate at overall LOS “C”. The eastbound left turn movement is anticipated to operate at a deficient LOS “E” (56). The westbound left turn movement is anticipated to operate at a deficient LOS “E” (57). The northbound left turn movement is anticipated to operate at a deficient LOS “E” (56).

6. A. 4. 3. Future Pre-Development Saturday Evening Peak Hour

Capacity analyses at the study intersections indicate that all intersections will operate at overall LOS "D/d" or better with all movements also operating at LOS "D/d" or better with the exception of the following:

#6 **Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008)** **Currently Unsignalized**		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Unsignalized	**Unsignalized**	**Proposed to be Signalized**
The southbound shared left/right turn approach (Girard Ave.) will operate at LOS "e" (37)	The southbound shared left/right turn approach (Girard Ave.) will operate at LOS "f" (58)	Under a two-phase pretimed operation with 60-second cycle length, this intersection will operate with overall LOS "B" with all movements operating at LOS "C" or better.
#13 **Aramingo Avenue (S.R. 2009) and York Street** **Currently Signalized**		
Scenario 2a (2007)	**Scenario 3a (2009)**	**Scenario 4a (2011) with the Completion of the New Girard Avenue (S.R. 2008) Interchange**
Signalized	**Signalized**	**Signalized**
This intersection will operate at overall LOS "C". The eastbound left turn movement (York Street) is anticipated to operate at a deficient LOS "E" (69).	This intersection will operate at overall LOS "C". The eastbound left turn movement (York Street) is anticipated to operate at a deficient LOS "E" (73).	This intersection will operate at overall LOS "C". Based on the volumes provided by the DVRPC Study, it appears that the changes of traffic pattern due to the new interchange will improve the operation of the eastbound left turn; this movement is anticipated to improve to LOS "D".

Future volumes during the analysis year 2007, 2009 and 2011 are illustrated in FIGURES 2A through 8C Summary outputs from the analysis software are provided in APPENDIX C.

6. B. FUTURE POST-DEVELOPMENT CONDITION LEVEL OF SERVICE AND CAPACITY ANALYSIS

In this section, the impact of the Pinnacle Project traffic will be analyzed.

6. B. 1. Description of the Analyzed Post-Development Scenarios

As previously discussed in the beginning of this study, the following are the three post-development Scenarios which are included for analysis.

Scenario 2b. Future Post-Development Condition (2007) – Temporary Casino: For the purpose of this study, it is assumed that the construction of a *temporary casino* (consisting of 1,500 gaming unit) is completed in 2007. As such, the traffic generated by the newly built temporary casino is added to the future traffic in the year 2007 and the operation of the roadway network and study intersections is compared to Scenario 1b above.

Scenario 3b. Future Post-Development Condition (2009) – Phase 1 Permanent Casino: For the purpose of this study, it is assumed that the Phase 1 construction of the *permanent casino* (consisting of 3,000 gaming unit and all of the other auxiliary uses) is completed in 2009. As such, the traffic generated by the newly built permanent casino is added to the future traffic in the year 2009 and the operation of the roadway network and study intersections is compared to Scenario 3 above.

Scenario 4b. Future Post-Development Condition (2011) – Phase 1 Permanent Casino facilitated by New Girard Avenue Interchange: In this scenario the traffic generated by the Pinnacle Entertainment Project is added to the traffic volume in Scenario 5.

6. B. 2. Post-Development Levels of Service

As with the pre-development condition evaluation, traffic operation for the future post-development condition was evaluated at the study intersections during the analyzed peak hours. The comparison of the pre-development scenarios and the post development scenarios was conducted for the purpose of anticipating any future traffic operational issues which will arise due to the presence of the proposed Pinnacle Entertainment Project.

A comparison of the weekday morning, weekday evening and Saturday evening peak hours revealed that the "worst case scenario" occurs during the weekday evening peak hour (identified as any one-hour between 4:00 PM to 6:00 PM). This is due to the fact that the highest commuter-related traffic also occurs at this time.

An article titled "Gaming Casino Traffic", published in the ITE Journal, March 1998, by Paul C. Box and William Bunte identify that the typical evening peak hour of a casino establishment during the weekday peak hour occurs later (6:00 PM) than the peak period of the commuter-based traffic. However, in order to be conservative, we have added the site-generated traffic onto the base peak hour volumes during the weekday evening peak hour; which was determined to at 5:00 PM based on the data collected from the field.

The results of the capacity analyses will reveal the problem areas associated with additional traffic attracted by the proposed Pinnacle Entertainment Project and will be utilized to formulate recommended mitigation efforts.

6. B. 3. Impacted Intersections Based on Capacity Analysis in Synchro

Capacity analyses at the study intersections indicate that all intersections will operate at overall LOS "D/d" or better with all movements also operating at LOS "D/d" or better with the exception of the following intersections:

Intersection No.	Weekday Morning	Weekday Evening	Saturday Evening
1.	Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010).	Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010).	Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010).
2.	Richmond Street (S.R. 2001) and Dyott Street	Richmond Street (S.R. 2001) and Dyott Street	Richmond Street (S.R. 2001) and Dyott Street
	NOTE: This intersection will be the primary access to the Propose Pinnacle Entertainment Project prior to the completion of the New Girard Avenue Interchange and as such this intersection will be signalized and reconfigured.		
3.	Richmond Street (S.R. 2001) and Cumberland Street.	Richmond Street (S.R. 2001) and Cumberland Street.	Richmond Street (S.R. 2001) and Cumberland Street.
4.	Aramingo Avenue (S.R. 2009) and Huntingdon/Belgrade Streets.	Aramingo Avenue (S.R. 2009) and Huntingdon/Belgrade Streets.	No impact.
5.	Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access.	Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access.	Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access.
6.	No impact.	Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008).	Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008).
		It is noted that currently, this intersection meets the requirement for a signal warrant during the weekday evening peak hour.	
7.	No impact.	Aramingo Avenue (S.R. 2009) and Cumberland Street.	Aramingo Avenue (S.R. 2009) and Cumberland Street.
8.	No impact.	Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010)	Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010)

NOTE: The Levels of Service at the impacted intersections are tabulated in APPENDIX G. The table will clarify the specific Scenarios in which the above intersections are impacted by the proposed Pinnacle Entertainment Project. The table will also show the Levels of Service *after* improvements.

7. FREEWAY AND/OR RAMP CAPACITY ANALYSIS (USING CORSIM)

The FHWA program, TSIS-CORSIM 5.1, was used to analyze the operational characteristics of the freeway and/or ramps to and from the I-95 before and after the completion of the new Girard Avenue Interchange for the pre- and post-development scenarios. The results from each model are summarized in TABLE 4.

7. A. Existing Conditions

The location of the proposed Pinnacle Entertainment Project is within the local street network and along the Interstate 95 (I-95) corridor. Presently, there are four freeway ramps that serve the project area:

- I-95 Northbound Exit Ramp to Delaware Avenue (Ramp A);
- I-95 Southbound Entry Ramp from Aramingo Avenue (Ramp B);
- I-95 Northbound Entry Ramp from Delaware Avenue (Ramp C); and,
- I-95 Southbound Exit Ramp to Girard Avenue (Ramp D).

The entire project area was modeled in CORSIM to simulate traffic operations associated with ramps, ramp termini, and the intersections associated with the ramp termini. By simulating traffic operations in the project area, the anticipated interaction between freeway and local street traffic due to the development of the project can be more accurately estimated. Please refer to the accompanying table for all analysis results.

7. B. Future Conditions

7. B. 1. Year 2007 – Pre-Development Scenario Existing Conditions

Ramps A through D serve as access points between I-95 and the local street network and currently facilitate more through traffic than actual destination bound vehicles. Presently, most of these ramps operate at acceptable levels of service, except for Ramp C. Ramp C serves as the last point of access to I-95 northbound for vehicles using northbound Delaware Avenue as an alternate route to I-95 during saturated conditions. Delaware Avenue terminates in this area and no other alternate service route is available in the northbound direction; consequently, the traffic demand at Ramp C is especially high.

7. B. 2. Year 2007 – Post Development Scenario – Temporary Facility

All ramps operate at levels of service similar to those experienced in the Pre-Development scenario. The table shows reduction in volumes at some of the ramps, which results from upstream intersections being congested and thus not allowing as many vehicles to process through to the ramp approaches. There is also a proposed signal at Dyott Street and Richmond Street which improves flow in that area, evidenced by the slight increase in traffic at some of the ramps during the weekday peak hours.

7. B. 3. Year 2009 – Pre-Development Scenario

The difference between this scenario and the existing scenario is minimal; thus traffic behaves similarly and there are no significant changes. Most of the ramps show improvement over the 2007 scenario, but this is primarily due to the reduction of ramp approach volumes as a function of the capacity and traffic demand of roadways in this area. As the area becomes more congested, intersections and local streets become more saturated, resulting in a reduction in the number of vehicles actually reaching the ramps during the peak hour. More data is needed to determine the actual demand volumes of the ramps in all post-year scenarios.

7. B. 4. Year 2009 – Post Development Scenarios

Ramps A and C yield a degradation in level of service, from LOS D to LOS F during this scenario. It appears that a significant number of trips generated by the development are attracted to these ramps primarily due to their close proximity to the proposed entertainment project. All other ramps are projected to operate at or near pre-development levels of service.

7. B. 5. Year 2011 – Pre-Development Scenario, New Girard Avenue Interchange

It was assumed that the new Girard Avenue Interchange proposed by PennDot would be completely constructed and opened by the year 2011; thus it was included in the future year analysis.

Although traffic is increased in the year 2011, most ramps in the study area are projected to improve operationally in the Year 2011 scenario. Ramp D is the only ramp which does not experience improved operations in this scenario; however, its performance is essentially the same as it is in the existing scenario. All other ramps yield improvements in LOS which meets or exceeds what is being experienced in the existing condition. All improvements in LOS can be directly attributable to the new Girard Avenue interchange, as it serves to reroute inbound freeway traffic to more operationally sound local street connections.

7. B. 6. Year 2011 – Post Development Scenario, New Girard Avenue Interchange

Trips attributable to the proposed entertainment project were distributed throughout the new network and analyzed over the new interchange. Compared to the Year 2011 Pre-Development scenario, Ramps C and D are projected to experience some operational degradation in the post-development scenario. The projected conditions are primarily due to volume adjustments accommodating the increased number of trips from I-95 Southbound to the proposed entertainment project and to I-95 Northbound exiting the project area.

7. B. 7. Conclusion

Based on the preliminary CORSIM analysis assessment performed on the subject ramps, the proposed development does not appear to significantly impact freeway and ramp operations in the area under existing or future scenarios.

Further analysis should be performed in order to support this conclusion, as the analysis performed in this effort provides a preliminary assessment only and should not be used for final design purposes.

TABLE 3
CORSIM Level of Service Comparison Table

		2007 (Existing) Pre-Development No Casino		2007 (Existing) Post Development Temporary Casino		2009 Pre-Development No Casino		2009 Post Development Permanent Casino		2011 Pre-Development New Interchange		2011 (Perm. Casino) Post Development New Interchange	
Description	Traffic Data	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday	Weekday	Saturday
RAMP A I-95 NB Off Ramp to Delaware Ave	Ramp Volume (veh/hr)	1029	830	976	748	970	777	1291	789	1064	549	1274	783
	Ramp Speed (mi/hr)	32.9	33.2	29.2	33.0	32.9	33.2	25.3	33.0	38.9	39.9	37.6	39.3
	Density (pc/mi/ln)	31.3	25.0	33.4	22.6	29.5	23.4	51.0	23.9	27.3	13.8	33.9	19.9
	LOS	D	C	D	C	D	C	F	C	C	B	D	B
RAMP B I-95 SB On Ramp from Aramingo Ave	Ramp Volume (veh/hr)	941	999	1023	912	812	836	1093	912	795	631	684	473
	Ramp Speed (mi/hr)	46.5	46.5	46.3	46.5	46.5	46.5	46.3	46.5	45.4	45.7	45.7	46.1
	Density (pc/mi/ln)	20.2	21.5	22.1	19.6	17.5	18.0	23.6	19.6	17.5	13.8	15.0	10.3
	LOS	C	C	C	B	B	B	C	B	B	B	B	B
RAMP C I-95 NB On Ramp from Delaware Ave	Ramp Volume (veh/hr)	2080	1654	2156	1192	1911	1192	1987	1379	2267	1344	2548	1759
	Ramp Speed (mi/hr)	35.1	37.1	35.4	38.8	36.4	39.0	36.1	37.9	38.9	41.4	38.7	40.5
	Density (pc/mi/ln)	59.3	44.6	60.8	30.7	52.5	30.5	55.1	36.4	58.3	32.5	65.9	43.5
	LOS	F	F	F	D	F	D	F	F	F	D	F	F
RAMP D I-95 SB Off Ramp to Girard Ave	Ramp Volume (veh/hr)	1034	701	748	468	859	543	993	847	842	655	1075	970
	Ramp Speed (mi/hr)	49.9	61.7	60.8	63.4	60.4	62.4	58.2	61.5	39.0	39.2	13.3	39.5
	Density (pc/mi/ln)	20.7	11.4	12.3	7.4	14.2	8.7	17.1	13.8	21.6	16.7	81.2	24.6
	LOS	C	B	B	A	B	A	B	B	C	B	F	C

8. RECOMMENDATIONS

8. A. Recommended Improvements to Mitigate the Impact of the Proposed Development

The following are the mitigation measures which are recommended for implementation at each of the above intersections.

1. At the intersection of Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010) (# 1):
   - Provide a 75-feet long left turn lane storage bay for the southbound approach (on Columbia Avenue (S.R. 2010)).
   - Re-time the signal in order to accommodate the changes of traffic volume and pattern associated by the proposed Pinnacle Entertainment Project as well as the new Girard Avenue Interchange.

2. At the intersection of Richmond Street (S.R. 2001) and Dyott Street (# 4):
   - Install a new signal (pre-timed with pre-set programs for the peak hours, 60-second cycle length, 2-phase)
   - Reconfiguration of Dyott Street approach to incorporate one left turn lane, one shared left and right turn lane and one right turn lane.
   - Re-stripe the eastbound approach of Richmond Street to incorporate 100' right turn lane bay.
   - NOTE: Prior to the completion of the new Girard Avenue Interchange, primary access to the Proposed Pinnacle Entertainment Project is proposed at a new signalized intersection across from the proposed on- and off-ramps to the I-95 NB.

3. At the intersection of Richmond Street (S.R. 2001) and Cumberland Street (# 7):
   - Install a new signal (pre-timed with pre-set programs for the peak hours, 60-second cycle length, 2-phase). Additionally, this new-signal should be evaluated and re-timed as necessary prior to the completion of the new Girard Avenue interchange.

4. At the intersection of Aramingo Avenue (S.R. 2009) and Huntingdon Street and Belgrade Street (# 11):
   - Re-time the signal in order to accommodate the changes of traffic volume and pattern associated by the proposed Pinnacle Entertainment Project as well as the new Girard Avenue Interchange.

5. At the intersection of Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access (# 13):
   - Modify the existing signal timing/phasing. Provide a permitted-protected left turn phase for both the EB/WB and NB/SB approaches. The cycle length and the pedestrian-actuated scramble phase will remain.

6. At the intersection of Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008) (# 6):
   - Currently, at this unsignalized intersection, the southbound approach (Girard Avenue) operates at a LOS "f". **It is noted that currently, this intersection meets the requirement for a signal warrant during the weekday evening peak hour**.

7. At the intersection of Aramingo Avenue (S.R. 2009) and Cumberland Street (# 12):
   - Provide three lanes on the eastbound (Cumberland Street) approach: one dedicated left turn lane (10'); one through lane (10') and one dedicated right turn lane (14'). Skip marks should be provided to facilitate the through movement into the receiving lane.
   - Re-stripe the westbound (Cumberland Street) approach to clearly delineate the right turn lane and the left turn lane. This approach currently operates as such, but there are not pavement markings to define the designated lanes.

8. At the intersection of Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010) (# 15):
   - Provide protected-permitted left turn phase for the westbound left turn approach.

Based on the capacity analysis prior to the implementation of the proposed mitigation efforts outlined above; all impacted intersections will operate at acceptable LOS “D” or better with all movements operating LOS “D” or better.

The improvements that are outlined above are primarily localized and can be accommodated within the currently available are/right-of-way. Additionally, capacity analysis at the impacted intersections, after implementation of improvements indicates that the recommended mitigations are effective.

Future pre-development volumes for the year 2007 are illustrated in FIGURES 3A through 3C.
Future pre-development volumes for the year 2009 are illustrated in FIGURES 4A through 4C.
Future post-development volumes for the temporary Pinnacle Entertainment Project establishment are illustrated in FIGURES 5A through 5C.
Future post-development volumes for the permanent Pinnacle Entertainment Project establishment are illustrated in FIGURES 6A through 6C.
Future pre-development volumes for the year 2011 (after the completion of the new Girard Avenue Interchange) are illustrated in FIGURES 7A through 7C.
Future post-development volumes for the permanent Pinnacle Entertainment Project establishment for the year 2011 (after the completion of the new Girard Avenue Interchange) are illustrated in FIGURES 8A through 8C.

The HCM Levels of Service Analysis Reports are included in APPENDIX E. The Levels of Service for each analyzed scenarios are also summarized and tabulated in APPENDIX F.

8. B. Recommended Future Modifications to Existing Transit Facilities

The public transit system, including SEPTA’s Market–Frankford Line and the Route 15 Trolley Line would probably be utilized mostly by employees of the casino. To further enhance the convenience of the public transit system, a shuttle bus service could be implemented between the casino and either the nearest Route 15 trolley stop at Richmond Street and Girard Avenue or the Girard Avenue Station of the Market-Frankford Line. In addition, it may be beneficial to expand or extend certain SEPTA bus routes such that they terminate at proposed Pinnacle Entertainment site. This would facilitate public transit access to the site. In preliminary discussions, SEPTA officials were receptive to proposal however any firm decision regarding such alteration to the adjacent bus route will be deferred until after the casino licenses are granted and appropriate market studies and public hearing are conducted.

8. C. Recommended Site Access Configuration

Access to the Pinnacle Project, before to the completion of the new Girard Avenue Interchange will be provided via Dyott Street. This intersection will be re-configured and signalized. The proposed configuration will include a dedicated right turn lane, a dedicated shared left/right turn lane and a dedicated left turn. Additionally a right turn lane into the site will also be provided. See Image 17 below.

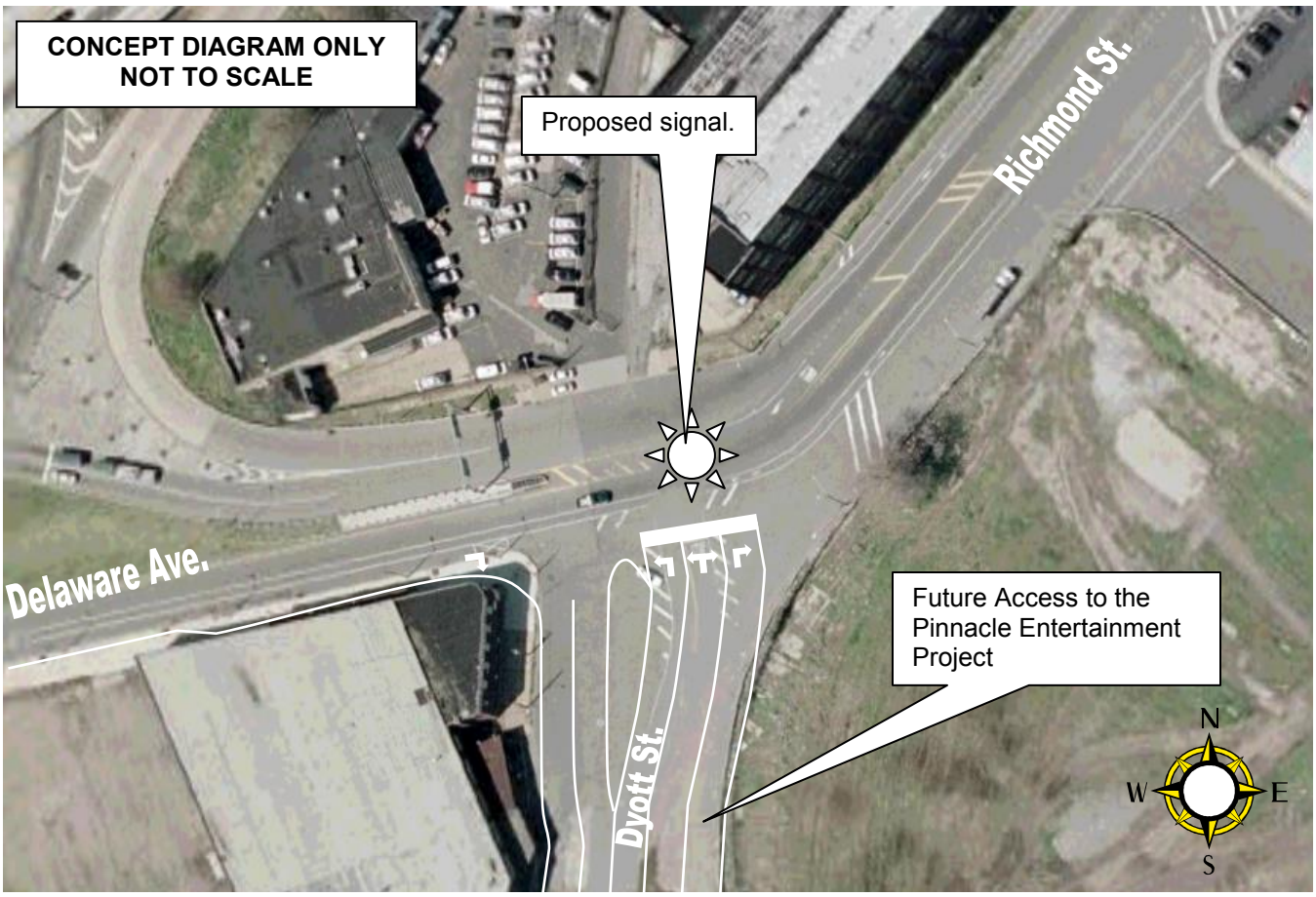


Image 18. The recommended configuration of the access to the proposed Pinnacle Entertainment Project for the Temporary Casino and Temporary Casino before the completion of the new Girard Avenue Interchange.

Access to the Pinnacle Project, after to the completion of the new Girard Avenue Interchange will be via a signalized driveway accessing Delaware Avenue opposite from the proposed Aramingo Avenue Extension that will provide direct access to and from southbound I-95. This is also illustrated in FIGURE 1B. This intersection will be re-configured and signalized. The proposed access driveway configuration will include a dedicated right turn lane, a dedicated shared left/right turn lane and a dedicated left turn.

8. D. Sight Distance Evaluation

It is also noted that there are no anticipated sight distance issues at the driveway access. Both the access to the proposed Temporary and Permanent development of the Pinnacle Entertainment Project will be via signalized intersections.

9. CONCLUSION

Based on the capacity analysis at the study intersections during the six primary scenarios described above, the worst case presents itself during the weekday evening peak hour (identified as any one-hour between 4:00 PM to 6:00 PM). This is due to the highest commuter-related traffic which also occurs at this time.

An article titled "Gaming Casino Traffic", published in the ITE Journal, March 1998, by Paul C. Box and William Bunte identify that the typical evening peak hour of a casino establishment during the weekday peak hour occurs later (6:00 PM) than the peak period of the commuter-based traffic. However, in order to be conservative, we have added the site-generated traffic onto the base peak hour volumes during the weekday evening peak hour; which was determined to at 5:00 PM based on the data collected from the field.

During the selected worst-case scenario, which is the weekday evening peak hour, capacity analyses at the study intersections indicate that all intersections will operate at overall LOS "D/d" or better with all movements also operating at LOS "D/d" or better with the exception of the following intersections:

1. Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010).
2. Richmond Street (S.R. 2001) and Dyott Street (This intersection will be the primary access to the Propose Pinnacle Entertainment Project prior to the completion of the New Girard Avenue Interchange). *This intersection will be reconfigured and signalized in the post-development conditions.*
3. Richmond Street (S.R. 2001) and Cumberland Street.
4. Aramingo Avenue (S.R. 2009) and Huntingdon Street and Belgrade Street.
5. Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access.
6. Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008).
7. Aramingo Avenue (S.R. 2009) and Cumberland Street.
8. Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010).

The Levels of Service at the impacted intersections are tabulated in APPENDIX G. The table will clarify the specific Scenarios in which the above intersections are impacted by the proposed Pinnacle Entertainment Project. The table will also show the Levels of Service *after* improvements.

The following are the mitigation measures which will be recommended for implementation at each of the above intersections.

At the intersection of Delaware Avenue (S.R. 2001) and Columbia Avenue (S.R. 2010):
- Provide a 75-feet long left turn lane storage bay for the southbound approach (on Columbia Avenue).
- Re-time the signal in order to accommodate the changes of traffic volume and pattern associated by the proposed Pinnacle Entertainment Project as well as the new Girard Avenue Interchange.

At the intersection of Richmond Street (S.R. 2001) and Dyott Street
- Install a new signal (pre-timed with pre-set programs for the peak hours, 60-second cycle length, 2-phase)
- Reconfiguration of Dyott Street approach to incorporate one left turn lane, one shared left and right turn lane and one right turn lane.
- Re-stripe the eastbound approach of Richmond Street (S.R. 2001) to incorporate 100' right turn lane bay.
- NOTE: Prior to the completion of the new Girard Avenue Interchange, primary access to the Proposed Pinnacle Entertainment Project will be taken at a new signalized intersection across from the proposed on- and off-ramps to the I-95 NB.

At the intersection of Richmond Street (S.R. 2001) and Cumberland Street:
- Install a new signal (pre-timed with pre-set programs for the peak hours, 60-second cycle length, 2-phase). Additionally, this new-signal should be evaluated and re-timed as necessary prior to the completion of the new Girard Avenue Interchange.

At the intersection of Aramingo Avenue (S.R. 2009) and Huntingdon Street and Belgrade Street:

- Re-time the signal in order to accommodate the changes of traffic volume and pattern associated by the proposed Pinnacle Entertainment Project as well as the new Girard Avenue Interchange.

At the intersection of Aramingo Avenue (S.R. 2009) and York Street/Port Richmond Shopping Center Access:

- Modify the existing signal timing/phasing. Provide a permitted-protected left turn phase for both the EB/WB and NB/SB approaches. The cycle length and the pedestrian-actuated scramble phase will remain.

At the intersection of Richmond Street (S.R. 2001) and Girard Avenue (S.R. 2008):

- Currently, at this unsignalized intersection, the southbound approach (Girard Avenue) operates at a LOS "f". **It is noted that currently, this intersection meets the requirement for a signal warrant during the weekday evening peak hour**.

At the intersection of Aramingo Avenue (S.R. 2009) and Cumberland Street:

- Provide three lanes on the eastbound (Cumberland Street) approach: one dedicated left turn lane (10'); one through lane (10') and one dedicated right turn lane (14'). Skip marks should be provided to facilitate the through movement into the receiving lane.
- Re-stripe the westbound (Cumberland Street) approach to clearly delineate the right turn lane and the left turn lane. This approach currently operates as such, but there are not pavement markings to define the designated lanes.

At the intersection of Girard Avenue (S.R. 2008) and Columbia Avenue (S.R. 2010):

- Provide protected-permitted left turn phase for the westbound left turn approach.

The location of the proposed Pinnacle Entertainment Project is within the local street network and along the Interstate 95 (I-95) corridor. Presently, there are four ramps that serve the project area:

- I-95 Northbound Exit Ramp to Delaware Avenue (S.R. 2001) (Ramp A);
- I-95 Southbound Entry Ramp from Aramingo Avenue (S.R. 2009) (Ramp B);
- I-95 Northbound Entry Ramp from Delaware Avenue (S.R. 2001) (Ramp C); and,
- I-95 Southbound Exit Ramp to Girard Avenue (S.R. 2008) (Ramp D).

These ramps serve as access points between I-95 and the local street network and currently facilitate more through traffic than actual destination bound vehicles.

Based on the preliminary CORSIM analysis assessment performed on the subject ramps, the proposed development does not appear to significantly impact freeway and ramp operations in the area

In conclusion, based on the capacity analysis of the fifteen intersections included in this Traffic Impact Study the proposed mitigation efforts outlined above will enable the existing roadway facilities to accommodate the new traffic drawn by the proposed Pinnacle Entertainment Project. It is important to note that for the pre-development scenarios, the analysis of individual intersections after the completion of the new Girard Avenue Interchange shows a marked improvement in traffic operations, due to the redesign of the interchange which in turn improves access to the I-95 as well as improving the interaction between the major arterials.

The improvements that are outlined above are primarily localized and can be accommodated within the currently available existing public right-of-way. Additionally, capacity analysis at the impacted intersections, after implementation of improvements indicates that the recommended mitigations are effective.