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File Number: 69926-001

October 13, 2006

VIA E-Mail to: fdonaghue@state.pa.us
AND OVERNIGHT MAIL
Frank T. Donaghue
Chief Counsel
PENNSYLVANIA GAMING CONTROL BOARD
Bureau of Licensing
Fifth Floor - Verizon Tower
303 Walnut Street
Harrisburg, Pennsylvania 17101

Re: Category 2 License Application
Philadelphia Entertainment and Development Partners, L.P.,
d/b/a Foxwoods Casino Philadelphia
Docket Number: 1367

Dear Mr. Donaghue:

As you are aware, this firm represents Philadelphia Entertainment and Development Partners, L.P., d/b/a Foxwoods Casino Philadelphia ("Foxwoods Philadelphia") in connection with its Category 2 License Application currently pending before the Pennsylvania Gaming Control Board ("PGCB" or "the Board"). We write in response to your October 3, 2006 letter transmitting Edwards and Kelcey's ("EK") report dated, September 11, 2006.

We have serious concerns regarding EK's preparation of its report using the "Preliminary Traffic Impact Assessment" prepared by Orth-Rodgers Associates, Inc. ("Orth-Rodgers"), rather than the "Final Traffic Impact Assessment," despite the fact that the latter document had been filed with the Board on ***May 22, 2006.*** It is our understanding that EK's use of the Preliminary Assessment was due to the fact that Orth-Rodgers' Final Assessment was not timely provided to EK by the PGCB, and not posted on the PGCB website until sometime in August 2006.

EK's use of the Preliminary Assessment is problematic because many of the items and issues raised therein were, in fact, fully addressed in the Final Assessment. In addition, EK's report incorrectly states that it "did request the full traffic impact study directly from the preparer; however, it was not received in time for review." As noted above, Orth-Rodgers' Final Assessment was filed with the Board on May 22, 2006, well in advance of the Board's public announcement of its decision to engage EK to review the applicants' traffic studies on August 25, 2006. Moreover, EK was independently supplied with the Final Assessment by Orth-Rodgers immediately upon request.

We do not take issue with the reasons why this occurred as we recognize the volume of documents that the PGCB has had to address. However, in this contested license process, dissemination of EK's letter report of September 11, 2006 to the Board or the public unfairly characterizes our traffic assessment as incomplete and our attitude as uncooperative. Given the importance of the traffic mitigation issue, we are requesting that EK's September 11, 2006 report be stricken, and not disclosed publicly. Alternatively, we request that it be corrected to reflect accurate information. Any dissemination would unfairly prejudice Foxwoods Philadelphia by perpetuating misconceptions about its efforts to rectify future traffic conditions.

Notwithstanding the foregoing, we have immediately addressed the items noted in EK's report provided to us October 3, 2006, and have attached that response hereto. We would appreciate an opportunity to discuss this issue with you in greater detail. Thank you for your attention to this matter.

Very truly yours,

STEPHEN D. SCHRIER

Encl.

SDS/
Cc: Kevin Hayes, Esq. *(Via Overnight Mail)*
Jacqueline Atterbury-Minor *(Via E-Mail to: jatterbury@state.pa.us and Overnight Mail)*

Orth - Rodgers & Associates, Inc.
TRANSPORTATION ENGINEERS and PLANNERS

Response to the Review Letter by Edwards and Kelcey Dated September 11, 2006

Foxwoods-Philadelphia Proposed Slot Parlor/Casino Development on Columbus Boulevard between Reed and Tasker Streets

City of Philadelphia

October 11, 2006

Jeffrey Greene, P.E.
PE Number PE-019622-E

H. Richard Orth, P.E.
PE Number PE-037755-R

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Orth - Rodgers & Associates, Inc.
TRANSPORTATION ENGINEERS and PLANNERS

October 11, 2006

Mr. Stephen E. Cunningham
Edwards & Kelcey
3600 Horizon Boulevard, Suite 250
Trevose, Pennsylvania 19053-4900

Bureau of Licensing
Pennsylvania Gaming Control Board
Harrisburg, Pennsylvania 17106-9060

RE: Pennsylvania Gaming Control Board
Foxwoods Casino TIS Review
PennDOT Agreement E-00229, Work Order 14
EK Project No. 040015.038

Gentlemen:

This is in response to the review prepared by Edwards and Kelcey dated September 11, 2006 and the October 3, 2006 transmittal of the review by Frank T. Donaghue, Chief Counsel PGCB of the Foxwoods Casino-Philadelphia Traffic Impact Study Preliminary Traffic Impact Assessment dated March 3, 2006 prepared by this firm.

Before we address the substance of the comments, we would like to note that the Edwards and Kelcey review looked at our Preliminary Traffic Assessment and not our Final Traffic Report. In accordance with the PGCB filing requirements, we submitted a Final Traffic Report dated May 15, 2006 entitled Final Report, Foxwoods Casino-Philadelphia on May 22, 2006, long before the review process began. Accordingly, many of the comments generated by the review are already addressed in the Final Report.

<u>Before we discuss each of the comments, it is important to point out that none of the proposed transportation improvements proposed as part and designed to mitigate any impacts from the proposed casino require the acquisition of or purchase of any land not already in the public domain. Said another way, because no right of way for any of the proposed improvements is required, no eminent domain actions are needed.</u>

We have structured our response letter to contain the review comment first followed by our response in italics. Because only ten days are provided for submission of our response letter, items requiring additional analysis based upon data not in our possession are so noted along with a partial response with the data currently in our possession.

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Review of the submitted TIS for conformance with applicable standards

1. This study is for a gaming facility to be located just east of I-95 in downtown Philadelphia. The facility would include 3,000 slot machines in its initial development phase, with up to 2,000 additional machines available at final build-out. In addition to the slot machines, some restaurant and retail/entertainment activities are anticipated, along with a 500-room hotel and approximately 200 residential condominiums. The site is located on the east side of Christopher Columbus Boulevard between Reed Street and Tasker Street. Eight intersections with proximity to the subject site were reviewed.

   The Final Report analyzed the additional intersections of Morris Street/Swanson Street and Columbus Boulevard and Morris Street and Water Street. The need to expand the study area became apparent when considering the number of U-Turns at the intersections of Columbus Boulevard Dickinson Street and Columbus Boulevard and reed Street. The high number of U-Turns represented traffic originating south of Tasker Street desiring to entire the southbound lanes of I-95.

2. The overall approach and outline of the report is presented as preliminary analysis, as shown by the report title, "Preliminary Traffic Impact Assessment" and by the continued use of the phrase "preliminary analysis". However, the expectation of this review was for a full traffic impact study. The approach and information contained within this report is not faulty, but it lacks major components of a full transportation impact study.

   A Final Traffic Impact Study titled, "Final Report, Foxwoods-Philadelphia", dated May 15, 2006 was submitted to the PGCB on May 22, 2006. This report covers all the elements of a complete and full traffic impact study. Further, a Supplemental Traffic Analysis has been submitted to Edwards and Kelcey on October 4, 2006 modifying and increasing the level of improvement to the Columbus Boulevard and Tasker Street intersection. This additional improvement was suggested by representatives of the Philadelphia Streets Department and we ask that it be considered in the review of the traffic study.

Validation of the traffic data that has been presented

3. Existing traffic volumes were provided in the text of the report for the Friday afternoon period when the combination of existing traffic and expected site demand will be at its peak. The report states that additional periods will be analyzed in future.

No response required. See the next response for additional information.

Traffic Data

4. A single time period was analyzed for this preliminary assessment – Friday afternoon between 3:15pm and 4:15pm. The study indicates that this departure from a typical weekday period was deliberate and appropriate. Additional periods will be analyzed in a follow-up study.

   The Final Report analyzes two peak hours, Friday afternoon between 3:15 and 4:15 PM and Saturday afternoon between 1:15 PM and 2:15 PM. The peak periods for analysis were selected as a result of a deliberate analysis of the variation of traffic flow by hour along Columbus Boulevard and then surcharging the site traffic on the existing traffic volumes. By looking at the sum of the existing total intersection traffic volumes and distributed site traffic volumes, we were able to identify the highest total hours of traffic on the corridor. We chose the highest hours to be Friday between 3:15 PM and 4:15 PM and on Saturday between 1:15 PM and 2:15 PM. The Friday peak turned out to be the combination of the start of the afternoon commuter peak period and a late afternoon entering peak for Foxwoods Casino-Philadelphia. The early Saturday afternoon peak was due to an early entering peak at the casino and a peak period generated by the shopping centers to the south of the casino on Columbus Boulevard. Looking closer at the Friday data, we noticed that the combination of existing and casino traffic during the 5:00 PM to 6:00 PM peak hour was slightly lower than the Friday peak we chose to analyze. Similarly, activity at the casino is heavier later on in the evening on both Friday and Saturday nights but due to the significantly lower traffic volumes on Columbus Boulevard, an analysis would show better operating conditions than the hours we analyzed.

Trip Generation

5. A modal split of 30% public transit was described but not utilized in this preliminary report. The source of this modal split percentage should be cited. It would be appropriate to use the modal split in the full traffic analysis. However, due the volume of traffic generated by this site, the traffic estimated to use transit should not be eliminated from consideration. Instead, the transit trips should be assigned to the nearby bus or trolley stops and considered as pedestrian traffic between the casino and the transit stop. The pedestrian traffic may have an impact on the intersections between the transit stop and the casino.

   The report stated that the auto occupancy of employees is assumed to be 1.0 person per auto and that 30% of employees are assumed to take transit to work.

This estimate, which equates to 0.7 autos per employee, was selected by Orth-Rodgers & Associates, Inc. as being a reasonable percentage given the location of the project, the availability of transit service, and an expectation that the great majority of workers would be City residents.

Census 'journey to work' data is collected by location of residence and not the location of employment. In the City of Philadelphia, workers in some employment areas have been surveyed to determine their mode of travel to work (Center City, University City). However to our knowledge this type of survey data is not available for the Delaware River waterfront.

Journey to work data has been compiled from 2000 census data by FHWA for the largest metropolitan statistical areas (MSA) of the US. The Philadelphia metropolitan area includes Bucks, Montgomery, Delaware and Chester Counties in PA, Burlington, Camden, Gloucester, Salem, Cumberland, Atlantic and Cape May Counties in NJ, as well as New Castle County DE and Cecil County MD.

In the Philadelphia MSA, the percent of workers who 'Drove Alone' to work was 73%. Another 10% carpooled. If all the carpools consist of just 2 persons, the number of autos per worker is 0.78.

Workers who live in Philadelphia account for 20% of total workers in the MSA. The transit network within the City is convenient to a far higher percentage of workers than in the suburban counties. In addition, the mode of travel correlates with the income of the worker as well as the availability of transit. Assuming Foxwoods hires mostly City residents, the percent usage of transit will be higher than the statistic for the MSA and the percentage driving alone will be far lower. The ratio of 0.70 autos per worker used in the Traffic Impact Study is a very reasonable estimate.

In addition, the site plan calls for SEPTA bus service to be addressed two ways. There are four bus routes serving the site as shown in the following table:

Bus Routes Convenient to the Casino Site

Route	*Direction*	*Approx. Headway (min.)*	
		Weekday	*Weekends*
7	*Strawberry Mansion to Pier 70, Via 29th, 22nd and 23rd Streets*	*12-20*	*30*
25	*Columbus Crossing to Frankford Transportation Center, via Port Richmond, Northern Liberties and Bridesburg*	*30*	*30*
29	*South Philadelphia Cross-town, via Tasker-Morris*	*25*	*30*
64	*Parkside to Pier 70, via Washington Avenue*	*20*	*30*

The first way is that we propose to request that SEPTA locate a stop on the northbound lanes along the block between Dickinson Street and Reed Street so that patrons and employees using SEPTA can have a short walk to the door. The second way is to provide a layover spot in the internal bus loop provided on the site plan.

Finally, the E & K comments note a concern about pedestrians traveling to and from the bus stop locations. Of primary concern is crossing Columbus Boulevard. Given the site traffic, and the needed traffic related improvements, the placing of cross walks is important to the success of our design. At the present time, we have not designed the traffic signal improvements but we can say that the traffic signals at Reed Street which we anticipate to carry most of the pedestrians using SEPTA and coming from the neighborhoods and the movie complex will use the south cross walk and cross during the phase when the Reed Street has the green indication. The design we are proposing splits the cross street phase so that the only traffic opposing the Reed Street cross walk is a single right turn lane. As always, as the design progresses, we will insure sufficient walk time is provided at all intersections.

6. Trip Generation for the initial development phase was discussed briefly. More information is needed in order to validate the study assumptions, which were developed in cooperation with the Casino operator.

The review correctly points out that we prepared our trip generation estimates in conjunction with Foxwoods staff and their projections of the business they intend to do and the customers they believe the facility will attract. While this is *discussed in the Final Report and in the Technical Appendix to the Final Report, we've placed detailed spreadsheets documenting the process we followed. In essence, using the assumptions from Foxwoods of people entering the facility for each hour and the average stay of four hours also provided, we were able to develop 24 hour histograms documenting how we applied our assumptions shown in the table below:*

Estimates/Assumptions Used to Develop Phase I & II Traffic Generation Projections

Intersection	*Phase I*		*Phase II*	
	Friday	*Saturday*	*Friday*	*Saturday*
Total Number of Patrons	20,000	28,500	26,000	39,900
Average Duration of Stay	4 hours	4 hours	4 hours	4 hours
Number of Bus Trips	50	35	55	40
Patrons Arriving via Bus	2,000	1,400	2,200	1,600
Number of Employees	951	951	1,254	1,254
Employees Using Public Transit	30%	30%	30%	30%
Average Auto Occupancy				
Patrons	2.0	2.0	2.0	2.0
Employees	1.0	1.0	1.0	1.0

Applying the these assumptions for the peak hours noted in response No. 4, we were able to generate the following estimates of site traffic during the two peak hours analyzed.

Phase I Peak Hourly Vehicular Traffic

Intersection	*Friday*		
	In	*Out*	*Total*
Late Afternoon (around 3:00 P.M.)	440	210	650
Late Evening (around 10:00 P.M.)	875	760	1,635
	Saturday		
	In	*Out*	*Total*
Late Afternoon (around 1:00 P.M.)	690	425	1,115
Late Evening (around 10:00 P.M.)	1,000	960	1,960

Phase II Peak Hourly Vehicular Traffic

Intersection	*Friday*		
	In	*Out*	*Total*
Late Afternoon (around 3:00 P.M.)	*572*	*273*	*845*
Late Evening (around 10:00 P.M.)	*1,138*	*988*	*2,126*
	Saturday		
	In	*Out*	*Total*
Late Afternoon (around 1:00 P.M.)	*966*	*595*	*1,561*
Late Evening (around 10:00 P.M.)	*1,400*	*1,344*	*2,744*

The following table shows the comparison of the trip generation estimates used by the City and the estimates used in the Orth-Rodgers Report. For 3,000 slot positions:

Trip Generation Comparison
Foxwoods Casino

	Daily Friday[1]	*Daily Saturday*	*Friday Street*	*Friday Late Evening*	*Saturday Street*	*Saturday Late Evening*
City	*11,000*	*25,200*	*490*	*No data*	*No data*	*1,380*
ORA	*20,000*	*28,500*	*650*	*1,635*	*1,115*	*1,960*

As can be seen, the Orth-Rodgers estimates are significantly higher than the City's estimates for Phase I, all things considered. Interestingly, Mohegan Sun data collected by Buckhurst Fish & Jacquemart for a study entitled Bridgeport Casino Traffic Impacts on the South Western Region of Connecticut showed an actual rate for 5,700 gaming positions of 5.6 daily trips per gaming position. This yields 28,000 daily trips, almost exactly what the Foxwoods data estimated for 3,000 positions.

All things considered, when reviewing the trip generation estimates contained in the Foxwoods Final Traffic Analysis, it is clear that the site trip estimates represent a high side estimate.

[1] The City report looked at a typical weekday. The ORA report used Friday as the typical weekday.

7. Trip generation for future phases was not provided in this preliminary study, although it is indicated that those projections are being prepared.

   See above response. Both phases were analyzed in detail and a trip generation summary is provided above.

Analytical Approach / Tools Used

8. Intersection approach Levels of Service were presented at each of the study intersections. Future submittals should provide software output for each analysis. Without this information, we are unable to validate assumptions or review procedure for these analyses.

   A detailed Technical Appendix has been provided with the Final Report.

9. The report provides a detailed description for how future traffic might be distributed along the roadway and through the intersections, with a detailed graphic and adequate descriptions of the assumptions made.

   No response required. We made no changes to the model when preparing the Final Report.

10. Although trip distribution assumptions were provided, future trip volumes were not provided in this phase of the study. Any future submittals will be reviewed for consistency with these original assumptions as well as consideration of recommended improvements. Some of the improvements that were discussed in this preliminary assessment have the potential to alter traffic patterns and thus site trip distribution.

    The Final Report shows how traffic was assigned to the roadway network. It is interesting to note that throughout the Philadelphia area, given the design of the roadway network, many motorists have their choice of routes to and from the site. While the analysis was based upon a gravity model of population over the age of 21, the route of approach while begun with the use of MapQuest was refined through the actual driving habits of Orth-Rodgers staff, many of whom patronize the riverfront attractions, use the bridges across the Delaware River and the use the Pennsylvania expressway network.

Special Event and Opening Day Plans

11. The submitted report does not discuss plans for special traffic control needs on opening day or during special events.

Specific plans for special events and opening day have not been established yet. However, during the latter part of the design phase, Foxwoods commits to work with the Philadelphia Streets Department and the Philadelphia Police Department to develop a plan to accommodate extraordinary crowds and events. Please note that Orth-Rodgers assisted the Pennsylvania Convention Center develop a traffic management plan for the various types of conventions (trade and public shows) and in the process brought together SEPTA, the Philadelphia Police, the Convention Center Staff, local parking lot operators into a collaborative group that developed plans, established working groups, and operational protocols that are still in effect to this day.

Orth-Rodgers also worked with the Kimmel Center and Avenue of the Arts, Inc., the Center City District and the City to establish a plan to efficiently accommodate the patrons of the Kimmel Center and the other arts venues on South Broad Street (Avenue of the Arts) as well as providing for deliveries to the theaters (sets, etc.), arrangements for parking, valet drop-off/pick-up and taxi movements.

<u>Mitigation Measures</u>

12. Although future traffic volumes and levels of service were not reported or calculated, the study preparer was able to provide a preliminary assessment of traffic concerns and provide recommended actions. These actions are, presumably, developed based on the preparer's extensive knowledge of the surrounding area and experience with studies of this type and scope. Eight actions were outlined for mitigating the identified concerns. Further study and additional details are said to be forthcoming.

A detailed volume capacity analysis was completed for each intersection for the following cases for the Friday and Saturday Peak hours as described above:

- *Existing*
- *Phase I With Improvements*
- *Phase II With Improvements*

The Final Report included the No-Build case for the year 2008 for information only because our goal in developing our traffic mitigation plan was to make traffic flow better on Columbus Boulevard than it does today. In short, we made all comparisons against the existing conditions and not the no-build cases as is traditionally done. This mandate, dictated by Foxwoods, represents a commitment not only to government, but also to the citizens of South Philadelphia *who have brought the traffic issue forward. In addition, our observations of the traffic situation are that without improvements as recommended in the final report, Foxwoods customers would have a difficult time accessing the site. It is also important that improvements described in the Final Traffic Report have been modified as a result of a meeting with the Chief Engineer and Surveyor and Chief Traffic Engineer of the Philadelphia Streets Department. Their recommendations were designed to provide improved levels of service at the intersection of Columbus Boulevard and Tasker Street and provide improved access into the Pennsport Community as requested by neighborhood groups yet protecting the neighborhoods from casino traffic.*

Accordingly, an iterative analysis was conducted to develop a program of transportation improvements that meet the mandate. The following transportation improvements were identified by the analysis for Phase I, proposed to include 3,000 slot machines and be open by the year 2008:

- *Re-establish the coordinated traffic signal system on Columbus Boulevard and then update it to incorporate the latest technology to eliminate the constant stopping and starting of traffic experienced today;*
- *Construct a northbound double left turn lane on Columbus Boulevard at the I-676 ramp to eliminate the back-ups onto the through lanes of northbound Columbus Boulevard;*
- *Construct a northbound double left turn lane at Washington Avenue; in addition, re-stripe the eastbound Washington Avenue approach for a double left turn lane and revise the signal operation to provide sufficient walk time for a pedestrian to cross Columbus Boulevard without having to walk through turning traffic. Additionally, provide a southbound right-turn only lane by removing one of the through lanes. This is the most congested intersection in our study area and these improvements eliminate that congestion.*
- *Re-stripe the eastbound Reed Street approach for three lanes and allow left turns from the center and leftmost lane of the approach. Stripe two westbound lanes on this same block in order to provide room for westbound traffic to bypass movie theater traffic.*
- *Widen Tasker Street to provide two eastbound approach lanes at Columbus Boulevard; and*
- *Install a new signalized intersection at Morris Street and Columbus Boulevard in order to provide direct access from northbound*

Columbus Boulevard to the I-95 southbound on-ramp; northbound Columbus Boulevard traffic currently U-turns at Dickinson Street to reach the I-95 southbound on-ramp.

It should be noted that the Streets Department has re-established traffic signal coordination along Columbus Boulevard recently. However, Foxwoods still commits to improving the technology of the system to better accommodate the varying traffic volumes generated by the proposed casino.

As described above and based upon the meeting with the Department of Streets, we have modified the proposed improvements to the Tasker Avenue intersection as follows:

- *Provide an exclusive left turn lane in the northbound direction at the intersection of Tasker Street and Columbus Boulevard as requested by local residents and prohibit westbound left turns and through movements at the same intersection. The westbound movement at Tasker Street would only allow for right turns via two exclusive right turn lanes.*
- *Westbound vehicles intending to turn left onto Columbus Boulevard or continue west on Tasker Street will access their route via a proposed frontage road traveling parallel to Columbus Boulevard in the northbound direction. This proposed road will only allow for dual left turns just south of Dickinson Street onto southbound Columbus Boulevard.*
- *The signal located at this dual left turn lane will allow for simultaneous movement with the southbound left turn and westbound right turn movements at the intersection of Dickinson Street and Columbus Boulevard.*

The prohibiting of westbound left turns and through movements on Tasker Street eliminates one phase thus allowing more green time for the remaining phases and improving traffic conditions. The addition of the two exclusive left turn lanes south of Dickinson Street for vehicles on the frontage street will not require additional green time due to simultaneous green time with existing movements. A concept plan for the improvements suggested by the City is contained in our Supplemental Traffic Study already submitted to Edwards and Kelcey and PGCB.

Phase II recommendations, anticipated for the year 2010 includes two improvements. The first includes a proposed off-ramp from southbound I-95 to Dickinson Street. This improvement, described in detail in plan and profile views in the Final Report requires Dickinson Street to be reversed in direction between Front Street and Columbus Boulevard. It also requires a minor widening of the

Dickinson Street approach to Columbus Boulevard from its current two lanes to three lanes.

13. There is no discussion in this preliminary study of how or whether the recommended actions will improve traffic conditions.

The revised analysis confirms that the revised improvements improve traffic conditions when compared with the previously stated transportation improvement program. In addition, the revised improvements continue to improve traffic conditions when compared with existing conditions. The following tables summarize the comparisons of the levels of service for the revised improvements and existing conditions for Phase I and Phase II, respectively.

Comparison of Existing and Phase I Intersection Levels of Service along Columbus Boulevard

Intersection	*Existing*		*Phase I*	
	Friday	*Saturday*	*Friday*	*Saturday*
Lombard Circle/I-95 NB On-Ramp	*B (12)*	*B (16)*	*B (12)*	*B (19)*
I-676 On & I-676/95 SB Off Ramp	*C (22)*	*C (26)*	*B (20)*	*C (21)*
Christian Street	*C (30)*	*C (24)*	*C (23)*	*B (18)*
Washington Avenue	*F (105)*	*E (61)*	*D (36)*	*C (23)*
I-95 Ramp NB Off Ramp	*B (14)*	*B (14)*	*A (7)*	*A (8)*
Reed Street	*C (27)*	*D (44)*	*C (25)*	*D (39)*
Dickinson Street	*N/A*	*N/A*	*A (7)*	*A (9)*
Tasker Street	*A (9)*	*B (20)*	*B (15)*	*B (19)*
Morris Street	*N/A*	*N/A*	*A (5)*	*A (6)*
Sum Total Intersection Delay	***219***	***205***	***150***	***162***

As shown in the table, the Phase I overall intersection delay under the revised improvements decreases from 219 seconds per vehicle to 150 seconds per vehicles, a 32% improvement, during the Friday peak hour, and on Saturday from 205 seconds per vehicle to 162 seconds per vehicles, a 21% decrease, as compared with existing conditions.

Comparison of Existing and Phase II Intersection Levels of Service along Columbus Boulevard

Intersection	*Existing*		*2008 Build*	
	Friday	*Saturday*	*Friday*	*Saturday*
Lombard Circle/I-95 NB On-Ramp	*B (12)*	*B (16)*	*B (11)*	*B (19)*
I-676 On & I-676/95 SB Off Ramp	*C (22)*	*C (26)*	*B (19)*	*B (15)*
Christian Street	*C (30)*	*C (24)*	*B (18)*	*B (11)*
Washington Avenue	*F (105)*	*E (61)*	*C (23)*	*B (19)*
I-95 Ramp NB Off Ramp	*B (14)*	*B (14)*	*A (8)*	*A (9)*
Reed Street	*C (27)*	*D (44)*	*B (17)*	*C (32)*
Dickinson Street	*N/A*	*N/A*	*B (13)*	*B (15)*
Tasker Street	*A (9)*	*B (20)*	*B (18)*	*C (22)*
Morris Street	*N/A*	*N/A*	*A (3)*	*A (6)*
Sum Total Intersection Delay	***219***	***205***	***130***	***148***

Examination of the table reveals the Phase II with revised improvements levels of service show an increased improvement when compared against the existing conditions; a 41% decrease during the Friday peak hour, and on Saturday, a 28% improvement.

Detailed levels of service figures are provided in the Final Report ands the Supplemental Report for each intersection analyzed. Levels of service worksheets are provided in the technical appendices that accompany the reports.

Other Comments

14. The topics presented in this preliminary report are accurately represented.

Comment noted.

15. Certain components of a complete Transportation Impact Study are not represented in this Preliminary Study. Those components include:

a. Complete site plan showing building orientation, points of ingress/egress, parking, and internal circulation.

Attached

b. Additional details about the proposed development schedule and staging including anticipated opening date and completion dates for each major phase of development.

Two phases are proposed at this time. Phase I, consisting of 3,000 slot machines, is proposed to be open by 2008. This Phase will also consist of a 2,500 seat show room and supporting restaurant and other amenities, backroom facilities and 4,500 parking spaces. Phase II which will increase the number of slots to 5,000 will be completed by 2010. In addition, Phase II will also add 1,500 additional parking spaces for a total of 6,000 parking spaces and a 500 room hotel along with additional restaurants and amenities.

c. The report does not mention whether any improvement projects are planned on local (City) roadways or the adjacent highway system.

A check of PennDOT's TIP and with the City revealed no planned or proposed highway improvements on the adjacent highway system. However, it is noted that the coordinated traffic signal system, which was not in operation when the study process was begun has subsequently been returned to operation. Regardless, Foxwoods commits to improve the technology of the signal system to meet the future traffic demands of the Columbus Boulevard Corridor.

d. Crash data analysis or observed vehicular/pedestrian safety concerns.

Crash data will be addressed during the design phase as part of the design of the roadway improvements.

e. Improvements needed under existing conditions are not identified; although mention is made of the constraints on intersection widening that are imposed by the existing rail line. Further information is desired that explains the impact of that constraint on existing and future conditions. Further information is required regarding improvements that are necessary to mitigate existing system deficiencies.

Improvements to improve existing level of service deficiencies are not individually proposed in our analysis given the mandate described above that is designed to make traffic flow better than it does today. This mandate means that Foxwoods accepts the responsibility to not only mitigate the traffic impacts caused by the proposed casino but those caused by future non-site traffic and existing problems. On that basis, improvement programs were established for the two opening years and to mitigate the 2018 level of service deficiencies.

Relative to the rail line, except for the proposed grade crossing at Morris Street, we are proposing only modifications to existing grade crossings. Trains using the tracks along Columbus Boulevard are used by the remaining industries on the river side of Columbus Boulevard. All railroad customers except one are located south of the Foxwoods Philadelphia-Casino site. The trains proceed along Columbus Boulevard at "walk-speed" as they couple and de-couple cars and proceed in and out of customer's sidings and in and out of the area. The number of trains varies, depending upon the needs of the customers served by the line. Most of the rail operations are conducted at night or in the early morning hours due to the congestion on Columbus Boulevard. As with the shopping centers and other uses along Columbus Boulevard, Foxwoods Casino-Philadelphia considers the rail operations as a "fact of life" of operating in an urban environment and will work through the PUC process during the design phase of the project.

Currently along Columbus Boulevard, grade crossing protection is by traffic signal pre-emption and flaggers employed by the railroad. This arrangement was worked out between PennDOT, the City and Conrail, the operator of the line and has been successfully operating for some time. We anticipate that this arrangement will continue should the casino be approved. It should also be noted that the railroad right of way is owned by PennDOT and the railroad operates along an easement.

f. Future traffic volumes independent of the proposed development.

Attached to this letter is our analysis for year 2018 traffic volumes as per PennDOT Guidelines. We have selected the year 2018 for our analysis which represents a 10 year horizon after our planned 2008 opening. Both build and no-build traffic volumes for the build plus 10 year comparison are provided.

As indicated in the Supplemental Report containing the Build plus 10 year analysis, two additional roadway improvements beyond those discussed above are needed to offset the traffic increases projected for the year 2018. They are:

- *Signalize the intersection of Morris Street and Water Street which is currently a multi-way stop-controlled intersection.*

- *Prohibit U-turns at the intersection of Columbus Boulevard and Reed Street to allow a separate right turn arrow phase for eastbound Reed Street.*

g. Description of other planned developments within the study area and their inclusion in future traffic volume estimates.

While there is a significant amount of planned residential development proposed along the Columbus Boulevard corridor, most of it is well north of the proposed Foxwoods Philadelphia site and is covered in the background growth rate. The rate used between the years 2006 and 2008 is 2.1% and between 2008 and 2010 is 1.5%. For each year thereafter to 2018, a 1% rate was used. This translates to the following increases in existing traffic volumes:

- *2006 to 2008* *4.2%*
- *2006 to 2010* *7.4%*
- *2006 to 2018* *16.3%*

In addition, one residential project is proposed south of the Ben Franklin Bridge. This development, described in the Supplemental Report dated October 3, 2006 consists of Dockside, a 242 unit luxury high rise apartment building south of the Ben Franklin Bridge, which has zoning approval. It should be noted that it is not known whether this residential development will ever be constructed or what its access will be. This analysis used the data from the website of the development for the analysis. No traffic study has been prepared for the development as of this writing.

Table I illustrates the estimated trip generation for the Dockside Residences. Traffic from this residential development was added to the roadway network based upon existing traffic patterns.

Dockside Residences Trip Generation

	IN	*OUT*	*Total*
Friday Peak Hour	*64*	*41*	*105*
Saturday Peak Hour	*55*	*41*	*96*

It should be noted that access to the Dockside Residences is assumed to be opposite the I-676 signalized intersection. This is the worst case scenario for the access. It also is reasonable to expect the site would be limited to right turns in and out of the driveway.

h. Future capacity and level-of service analyses, independent of the proposed development.

See our response to Comment 'f' above.

i. Improvements needed to maintain acceptable level of service under future conditions without the subject development.

See our response to Comment 'e' above.

j. Future safety concerns independent of the proposed development.

See our response to Comment'd' above.

k. Future traffic volumes combined with traffic generated by the proposed development.

Our Final Report and the Supplemental Reports cover this analysis issue.

l. Future capacity and level-of service analyses, including the proposed development.

Our Final Report and the Supplemental Reports cover this analysis issue.

m. Improvements that are tied directly to the technical analysis.

Our proposed improvements are tied to the technical analysis. However, it bears repeating that our mandate was not to simply offset the traffic impact of the proposed Foxwoods Casino-Philadelphia; we were directed to make traffic flow better on Columbus Boulevard than it does today. We were also able to develop our improvement plans within the existing public right of way.

n. Recommended configuration of new access point intersections is discussed, but without the data to support the recommendations. Further information should be provided to justify the recommendations and confirm their adequacy.

Please refer to the attached site plan. It is currently anticipated that direct access to the site will be provided via three points on Columbus Boulevard:

- *At Reed Street*
- *Opposite Dickinson Street*
- *At Tasker Street*

Site access via Reed Street will most likely utilize two eastbound lanes, with the right lane directed to the porte-cochere and the left lane serving the Comcast Facility and, in the future, the proposed hotel and condominiums. Once into the site, the first decision point is some 400 feet from Columbus Boulevard and the first time a vehicle will need to stop is another 100 feet at the porte-cochere area.

At the Dickinson Street access, two lanes of traffic enter the site with both lanes destined either to the parking garage or to the porte-cochere. The parking garage is more than 200 feet into the site and the porte-cochere some 160 feet. The porte-cochere provides a total of seven lanes and is of sufficient width to accommodate the demand for valet parking.

Tasker Street will be widened to serve both site access and egress as well as bus traffic while also providing for service traffic at the site and at the adjacent retail center. Buses will enter and exit the site via Tasker Street and will have a separate parking area to the rear of the site as will service traffic. Traffic to the parking facility will enter the facility about 200 feet from Columbus Boulevard.

On-site parking will provide 4,500 spaces for Phase I and ultimately 6,000 spaces by completion of Phase II with the majority of patrons expected to enter and exit the parking garage via the Dickinson and Tasker access points. On-site circulation will permit movement between the casino porte-cochere, valet parking, the hotel lobby and the parking garage without using public streets.

o. Future safety concerns considering the impact of the proposed development.

We believe that through the design process, we will be able to address any safety concerns generated.

p. Feasibility of recommended improvements. Some of the recommended improvements require approval from the State, City, Railroad, Utility Commission, and even Federal authorities, and many require high levels of cooperation, funding, and construction effort. The feasibility of implementing these improvements should be discussed in detail.

The following agency approvals relative to the transportation improvements are required:

- *City of Philadelphia: Traffic improvements, site access, traffic signals, drainage, utilities*
- *PennDOT: Highway Occupancy Permits for transportation improvements, site access*
- *Federal Highway Administration (FHWA): Point of Access Study for the proposed ramp to Dickinson Street*
- *Public Utility Commission (PUC): Grade Crossing improvements*

The two issues that require attention are the proposed ramp to Dickinson Street and the grade crossings improvements.

<u>*Grade Crossing Improvements:*</u> *Coordination with the railroads and the PUC must wait approval of the PGCB. We believe that this approval is warranted as nothing is being asked of the railroads and the PUC that has not been approved for this line in previous cases (IKEA Shopping Center and the Home Depot/ Wal-Mart Shopping Center).*

<u>*Proposed I-95 Southbound Off-Ramp to Dickinson Street:*</u> *Concept plans and profiles for this ramp are shown in the Final Report. The plans show that the ramp can be constructed without any design exceptions. Currently, we have observed that the existing southbound I-95/I-676 Off-Ramp (the "double slide-under ramp") at times queues almost onto the southbound lanes of I-95. As traffic increases, this will become more of a problem although our analysis has shown that we can achieve acceptable levels of service. Nevertheless, the current situation puts all of the southbound access to Columbus Boulevard onto one ramp. This also affects key intersections along Columbus Boulevard. By providing a second access point from the southbound lanes of I-95 to Columbus Boulevard, we can ameliorate this issue. At the present time, all traffic to Columbus Boulevard must weave across I-676 traffic destined to Columbus Boulevard and I-676 traffic destined for southbound I-95. While this weave is fairly long, the conflicts that occur are typical of a*

weave. By providing a second way of getting to Columbus Boulevard, as we are recommending, I-95 southbound traffic will no longer need to weave across I-676 traffic. We project about 1,100 vehicles would be diverted to the proposed ramp in the peak hours analyzed. This provides measurable relief to the following intersections on Columbus Boulevard:

- *I-676/I-95 Off-Ramp*
- *Christian Street*
- *Washington Avenue*
- *I-95 Northbound Off-Ramp*
- *Reed Street*

Most important to the community is the opportunity to reduce cut-through traffic on Front and Second streets, an issue that has come up at our community meetings largely due to the existing congestion at the intersections of Washington Avenue and Columbus Boulevard and Christian Street and Columbus Boulevard.

There is the issue of the Consent Decree entered into between PennDOT and the Community Groups that set the existing ramp designs that are in place today. The Consent Decree merely dictated that the community and PennDOT work out an acceptable solution and receive court approval prior to implementation which was done. The Consent Decree did not eliminate revisiting the need for ramp additions and modifications, rather, the surviving parts of the Consent Decree required PennDOT work with the community once again. Foxwoods Casino-Philadelphia commits to meeting the spirit of the Consent decree and will work with PennDOT, the City and the involved communities to develop a concurrence as the Point of Access Study process unfolds.

In short, it is our opinion that the proposed ramp can be constructed as well as approved through the Point of Access study Process.

q. Signal warrant documentation, where appropriate.

New traffic signals are proposed for the intersection of Dickinson Street, Columbus Boulevard and the Site Driveway and at the intersection of Morris Street, Swanson Street and Columbus Boulevard. Attached is an analysis showing Warrant 1 is met upon opening of Phase 1 at the intersection of Dickinson Street, Columbus Boulevard and the Site Driveway. At the intersection of Morris Street, Swanson Street and Columbus Boulevard, it is noted that both Swanson and Morris Streets *both are designated as one-way streets traveling away from Columbus Boulevard. The intersection meets Warrant 2 because the volume of traffic turning left from northbound Columbus Boulevard is in excess of the side street minimum warranting volumes and the southbound Columbus Boulevard traffic is in excess of the minimum warranting volumes for main street traffic. Because these movements conflict and there is heavy turning traffic at the intersection of Tasker Street and Columbus Boulevard turning south, the number of gaps in traffic would not be sufficient to accommodate the left turn demand. It is therefore the opinion of Orth-Rodgers that a traffic signal should be installed at that location.*

Traffic signals are also proposed for the intersection of Morris Street and Water Street to correct a deficiency in the year 2018. Traffic signals are not needed until towards the end of the ten year analysis period and are anticipated to meet warrants at that time. Currently, the intersection operates as a multi-way stop controlled intersection.

r. Capacity and level-of-service analysis of future conditions with the recommended remedies.

Our Final Report and the Supplemental Reports cover this analysis issue.

s. Review of existing conditions at transit stops and pedestrian facilities including how they are configured and where are they located, in addition to their current and future conformance with ADA guidelines for accessibility. A map of the existing routes near the site should be provided.

See our response to Comment No. 5. As noted above, we will be working with SEPTA to refine the bus routes serving the site. For the purposes of our analysis, we assumed only employees will use public transportation to and from work. The site and all construction details within the public right of way will be ADA compliant. Maps of the four SEPTA bus routes are attached as requested.

For its customers, Foxwoods Casino-Philadelphia will be operating a bus program much like the Atlantic City casinos. Currently, it is estimated that the bus program will be running between 35 and 55 bus trips per day. Casino bound busses will be accessing the internal bus loop at the Tasker Street entrance located under the parking garage. Still to be arranged is where the busses will wait until it is time for the return trip.

t. Discussion of how special event traffic will be handled (such as opening day).

See comment 11 above.

We look forward to working with you to address these and any future comments that may arise relative to our work. If you have any questions, please do not hesitate to contact me.

Very truly yours,
ORTH-RODGERS & ASSOCIATES, INC.

Jeffrey L. Greene, PE, PTOE
Principal

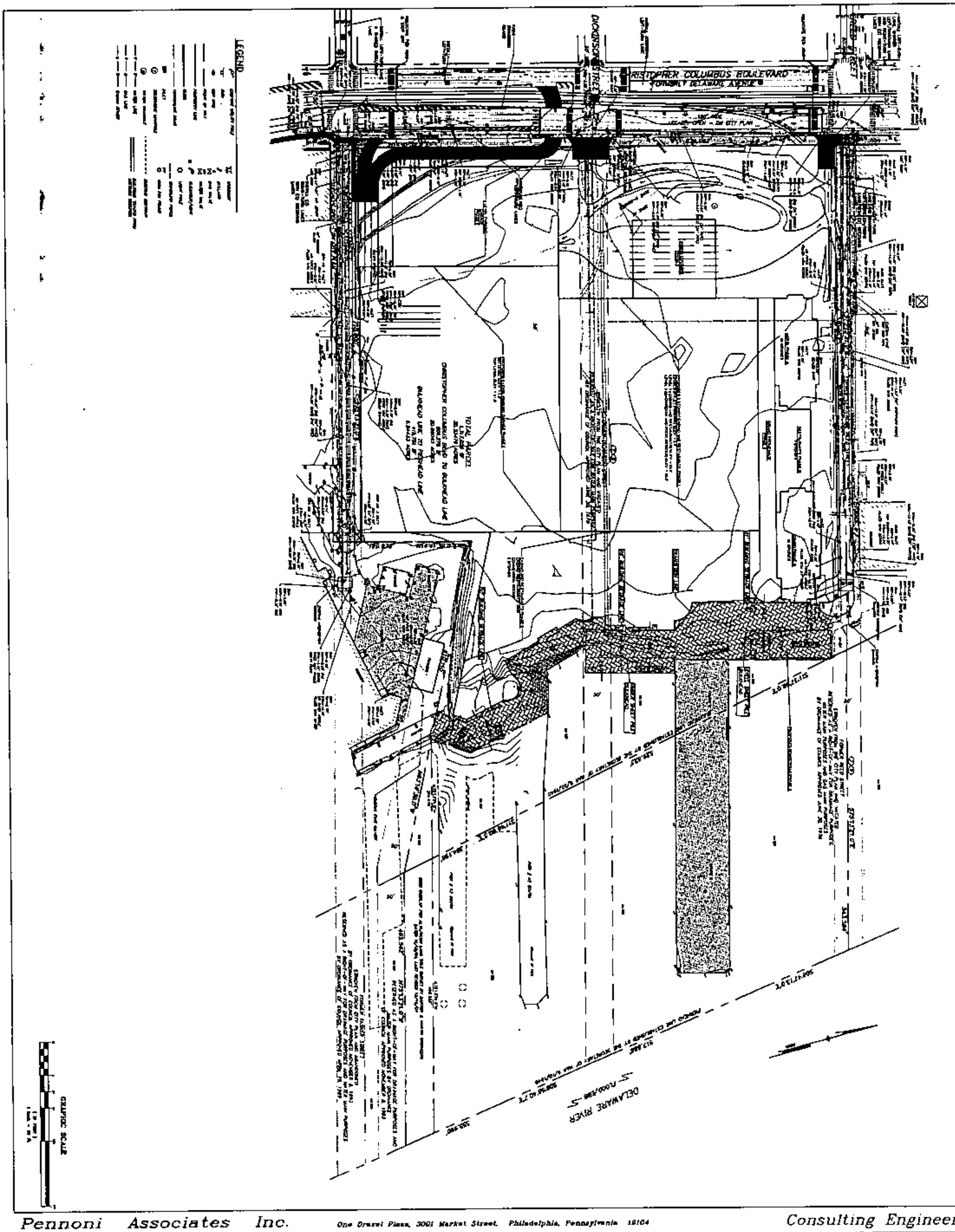
Attachments

cc: Gary Armentrout
Jim Dougherty
Stephen Schrier, Esq.
Jeffrey Rotwitt, Esq.

APPENDIX

TABLE OF CONTENTS

SITE PLAN



Pennoni Associates Inc. One Drexel Plaza, 3001 Market Street, Philadelphia, Pennsylvania 19104 — *Consulting Engineers*

FOXWOODS CASINO

PRELIMINARY SITE PLAN

FOXWOODS DEVELOPMENT COMPANY

C1000

Pennoni

SIGNAL WARRANT ANALYSIS

Warrants Summary

Information			
Analyst		Intersection	Columbus Blvd. & Dickinson St.
Agency/Co	ORA	Jurisdiction	
Date Performed	10/6/2006	Units	U.S. Customary
Project ID		Time Period Analyzed	Saturday 1:15 - 2:15 PM
East/West Street	Dickinson Street Site Driveway	North/South Street	Columbus Boulevard
File Name	Warrants1	Major Street	North-South

Project Description

General				Roadway Network	
Major Street Speed (mph)	30	☐	Population < 10,000	Two Major Routes	☐
Nearest Signal (ft)	422	☑	Coordinated Signal System	Weekend Count	☑
Crashes (per year)	0	☐	Adequate Trials of Alternatives	5-yr Growth Factor	0

Geometry and Traffic	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N	0	0	0	2	0	2	0	3	0	2	2	0
Lane usage				L		R		TR		L	TR	
Vehicle Volume Averages (vph)	0	0	0	237	0	178	0	1085	78	374	1408	28
Peds (ped/h) / Gaps (gaps/h)	--	/	--	--	/	--	--	/	--	--	/	--
Delay (s/veh) / (veh-hr)	--	/	--	--	/	--	--	/	--	--	/	--

Warrant 1: Eight-Hour Vehicular Volume	☑
1 A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	☑
1 B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	☑
1 80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	☑
Warrant 2: Four-Hour Vehicular Volume	☑
2 A. Four-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☑
Warrant 3: Peak Hour	☑
3 A. Peak-Hour Conditions (Minor delay --and-- minor volume --and-- total volume) --or--	☐
3 B. Peak- Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☑
Warrant 4: Pedestrian Volume	☐
4 A. Pedestrian Volumes (Four hours --or-- one hour) --and--	☐
4 B. Gaps Same Period (Four hours --or-- one hour)	☐
Warrant 5: School Crossing	☐
5. Student Volumes --and--	☐
5. Gaps Same Period	☐
Warrant 6: Coordinated Signal System	☑
6. Degree of Platooning (Predominant direction or both directions)	☑
Warrant 7: Crash Experience	☐
7 A. Adequate trials of alternatives, observance and enforcement failed --and--	☐
7 B. Reported crashes susceptible to correction by signal (12-month period) --and--	☐
7 C. 80% Volumes for Warrants 1A, 1B --or-- 4 are satisfied	☑

Warrant 8: Roadway Network	☐
8 A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2 or 3) --or--	☐
8 B. Weekend Volume (Five hours total)	☐

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Warrants Volume

Information

Analyst		Intersection	Columbus Blvd. & Dickinson St.
Agency/Co	ORA	Jurisdiction	
Date Performed	10/6/2006	Units	U.S. Customary
Project ID		Time Period Analyzed	Saturday 1:15 - 2:15 PM
East/West Street	Dickinson Street Site Driveway	North/South Street	Columbus Boulevard
File Name	Warrants1	Major Street	North-South

Project Description

Warrant 1

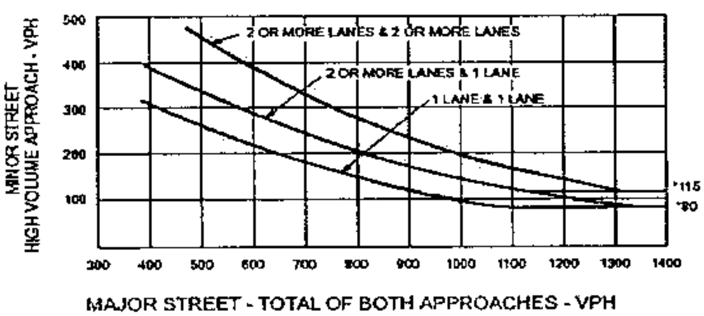
Condition A - Minimum Vehicular Volume

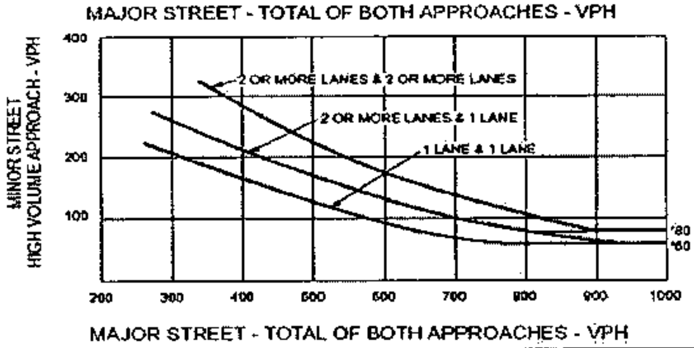
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)			Vehicles per hour on higher-volume minor-street approach (one direction only)		
Major Street	Minor Street	100%*	80%*	70%*	100%*	80%*	70%*
1............	1............	500	400	350	150	120	105
2 or more...	1............	600	480	420	150	120	105
2 or more...	2 or more...	600	480	420	200	160	140
1............	2 or more....	500	400	350	200	160	140

Condition B - Interruption of Continuous Traffic

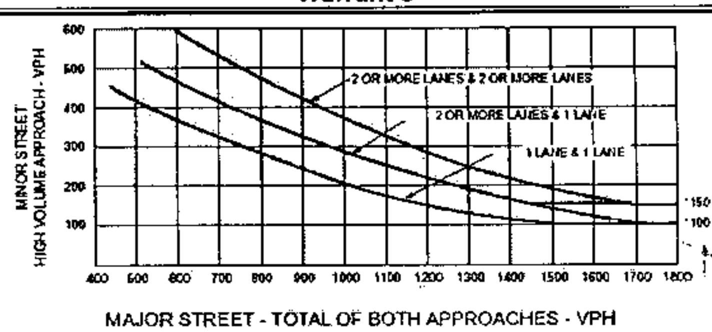
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)			Vehicles per hour on higher-volume minor-street approach (one direction only)		
Major Street	Minor Street	100%*	80%*	70%*	100%*	80%*	70%*
1............	1............	750	600	525	75	60	53
2 or more...	1............	900	720	630	75	60	53
2 or more...	2 or more...	900	720	630	100	80	70
1............	2 or more....	750	600	525	100	80	70

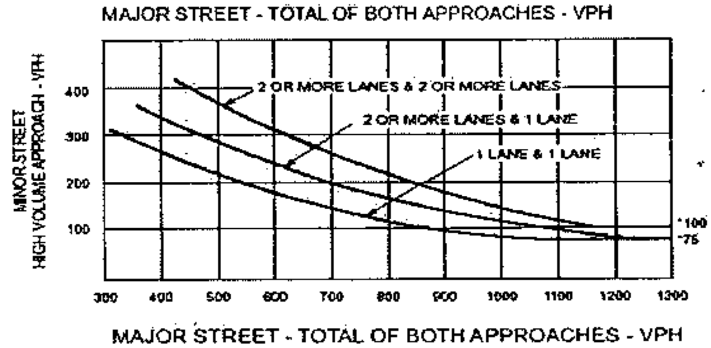
Warrant 2





Warrant 3





Volume Summary

Major Street Lanes 2+ | Minor Street Lanes 2+ | Speed 30 | Population 10000+

Hours	Major Volume	Minor Volume	Total Volume	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (100%)
01-02	3801	359	4160	Yes	Yes	Yes	Yes	Yes	No	Yes
02-03	3210	326	3536	Yes	Yes	Yes	Yes	Yes	No	Yes
03-04	3423	326	3749	Yes	Yes	Yes	Yes	Yes	No	Yes
04-05	3509	339	3848	Yes	Yes	Yes	Yes	Yes	No	Yes
05-06	3386	339	3725	Yes	Yes	Yes	Yes	Yes	No	Yes
06-07	3311	339	3650	Yes	Yes	Yes	Yes	Yes	No	Yes
07-08	3269	378	3647	Yes	Yes	Yes	Yes	Yes	No	Yes
08-09	3149	378	3527	Yes	Yes	Yes	Yes	Yes	No	Yes
09-10	2558	547	3105	Yes	Yes	Yes	Yes	Yes	No	Yes
10-11	2461	527	2988	Yes	Yes	Yes	Yes	Yes	No	Yes
11-12	2064	527	2591	Yes	Yes	Yes	Yes	Yes	No	Yes
12-13	1549	604	2153	Yes	Yes	Yes	Yes	Yes	No	Yes
Totals	35690	4989	40679	12	12	12	12	12	0	12

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Note: The northbound left turns at Columbus Boulevard and Morris Street were analyzed as a side street for the Traffic Signal Warrant Analysis.

Warrants Summary

Information			
Analyst		Intersection	Columbus Blvd. & Morris St.
Agency/Co	ORA	Jurisdiction	
Date Performed	10/10/2006	Units	U.S. Customary
Project ID		Time Period Analyzed	Friday
East/West Street	Morris St.	North/South Street	Columbus Boulevard
File Name	Warrants for 2008 Saturday at Morris	Major Street	North-South

Project Description

General				Roadway Network	
Major Street Speed (mph)	30	☐	Population < 10,000	Two Major Routes	☐
Nearest Signal (ft)	422	☐	Coordinated Signal System	Weekend Count	☐
Crashes (per year)	0	☐	Adequate Trials of Alternatives	5-yr Growth Factor	0

Geometry and Traffic	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N	0	0	0	0	1	0	0	3	0	0	3	1
Lane usage					T			T			T	R
Vehicle Volume Averages (vph)	0	0	0	0	104	0	0	839	0	0	1182	383
Peds (ped/h) / Gaps (gaps/h)	--	/	--	--	/	--	--	/	--	--	/	--
Delay (s/veh) / (veh-hr)	--	/	--	--	/	--	--	/	--	--	/	--

Warrant 1: Eight-Hour Vehicular Volume	☑
1 A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	☐
1 B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	☑
1 80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 2: Four-Hour Vehicular Volume	☑
2 A. Four-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☑
Warrant 3: Peak Hour	☑
3 A. Peak-Hour Conditions (Minor delay --and-- minor volume --and-- total volume) --or--	☐
3 B. Peak- Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☑
Warrant 4: Pedestrian Volume	☐
4 A. Pedestrian Volumes (Four hours --or-- one hour) --and--	☐
4 B. Gaps Same Period (Four hours --or-- one hour)	☐
Warrant 5: School Crossing	☐
5. Student Volumes --and--	☐
5. Gaps Same Period	☐
Warrant 6: Coordinated Signal System	☐
6. Degree of Platooning (Predominant direction or both directions)	☐
Warrant 7: Crash Experience	☐
7 A. Adequate trials of alternatives, observance and enforcement failed --and--	☐
7 B. Reported crashes susceptible to correction by signal (12-month period) --and--	☐
7 C. 80% Volumes for Warrants 1A, 1B --or-- 4 are satisfied	☑

Warrant 8: Roadway Network	☐
8 A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2 or 3) --or--	☐
8 B. Weekend Volume (Five hours total)	☐

Warrants Volume

Information

Analyst		Intersection	Columbus Blvd. & Morris St.
Agency/Co	ORA	Jurisdiction	
Date Performed	10/10/2006	Units	U.S. Customary
Project ID		Time Period Analyzed	Friday
East/West Street	Morris St.	North/South Street	Columbus Boulevard
File Name	Warrants for 2008 Saturday at Morris	Major Street	North-South

Project Description

Warrant 1

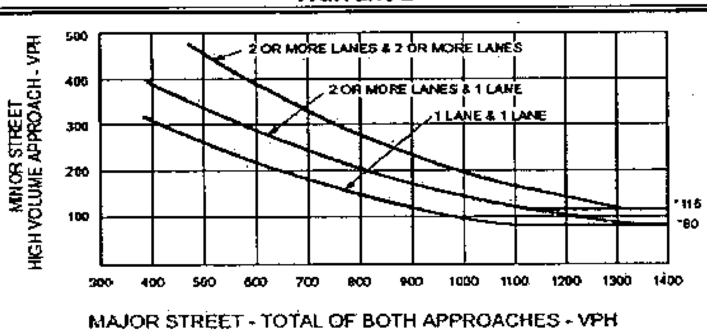
Condition A - Minimum Vehicular Volume

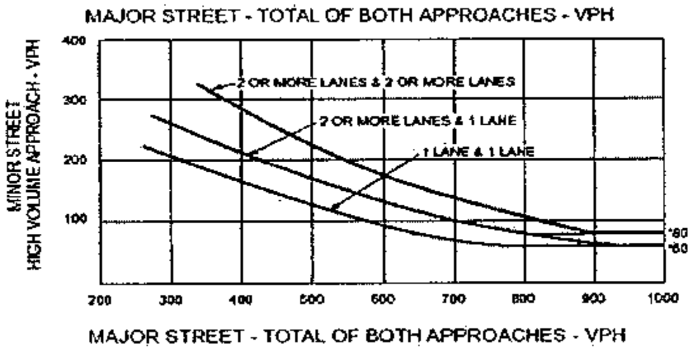
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)			Vehicles per hour on higher-volume minor-street approach (one direction only)		
Major Street	Minor Street	100%*	80%*	70%*	100%*	80%*	70%*
1	1	500	400	350	150	120	105
2 or more	1	600	480	420	150	120	105
2 or more	2 or more	600	480	420	200	160	140
1	2 or more	500	400	350	200	160	140

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)			Vehicles per hour on higher-volume minor-street approach (one direction only)		
Major Street	Minor Street	100%*	80%*	70%*	100%*	80%*	70%*
1	1	750	600	525	75	60	53
2 or more	1	900	720	630	75	60	53
2 or more	2 or more	900	720	630	100	80	70
1	2 or more	750	600	525	100	80	70

Warrant 2





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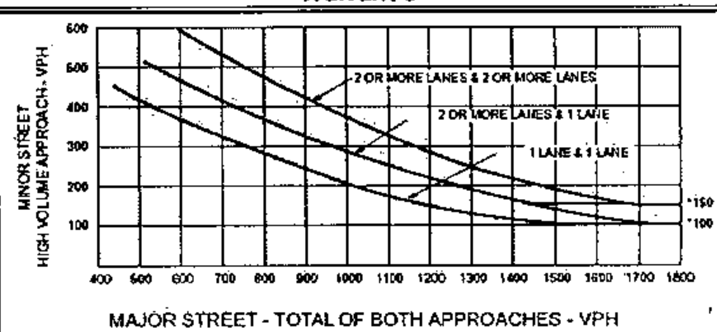

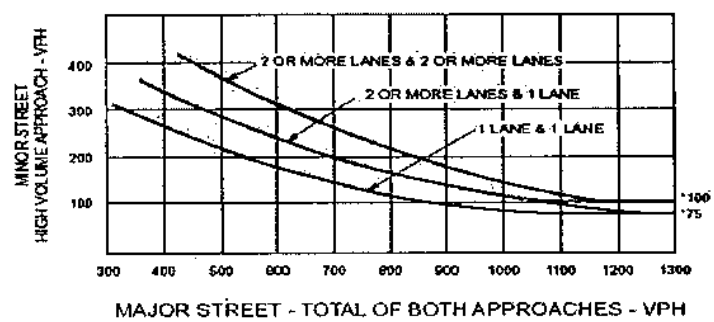

Volume Summary

Major Street Lanes 2+ | Minor Street Lanes 1 | Speed 30 | Population 10000+

Hours	Major Volume	Minor Volume	Total Volume	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (100%)
01-02	3253	166	3419	Yes	Yes	Yes	Yes	Yes	No	Yes
02-03	3968	173	4141	Yes	Yes	Yes	Yes	Yes	No	Yes
03-04	3833	177	4010	Yes	Yes	Yes	Yes	Yes	No	Yes
04-05	3712	170	3882	Yes	Yes	Yes	Yes	Yes	No	Yes
05-06	3751	167	3918	Yes	Yes	Yes	Yes	Yes	No	Yes
06-07	3537	157	3694	Yes	Yes	Yes	Yes	Yes	No	Yes
07-08	3596	133	3729	No	Yes	Yes	Yes	Yes	No	Yes
08-09	3201	108	3309	No	No	Yes	Yes	Yes	No	Yes
09-10	0	0	0	No	No	No	No	No	No	No
10-11	0	0	0	No	No	No	No	No	No	No
11-12	0	0	0	No	No	No	No	No	No	No
12-13	0	0	0	No	No	No	No	No	No	No
Totals	28851	1251	30102	6	7	8	8	8	0	8

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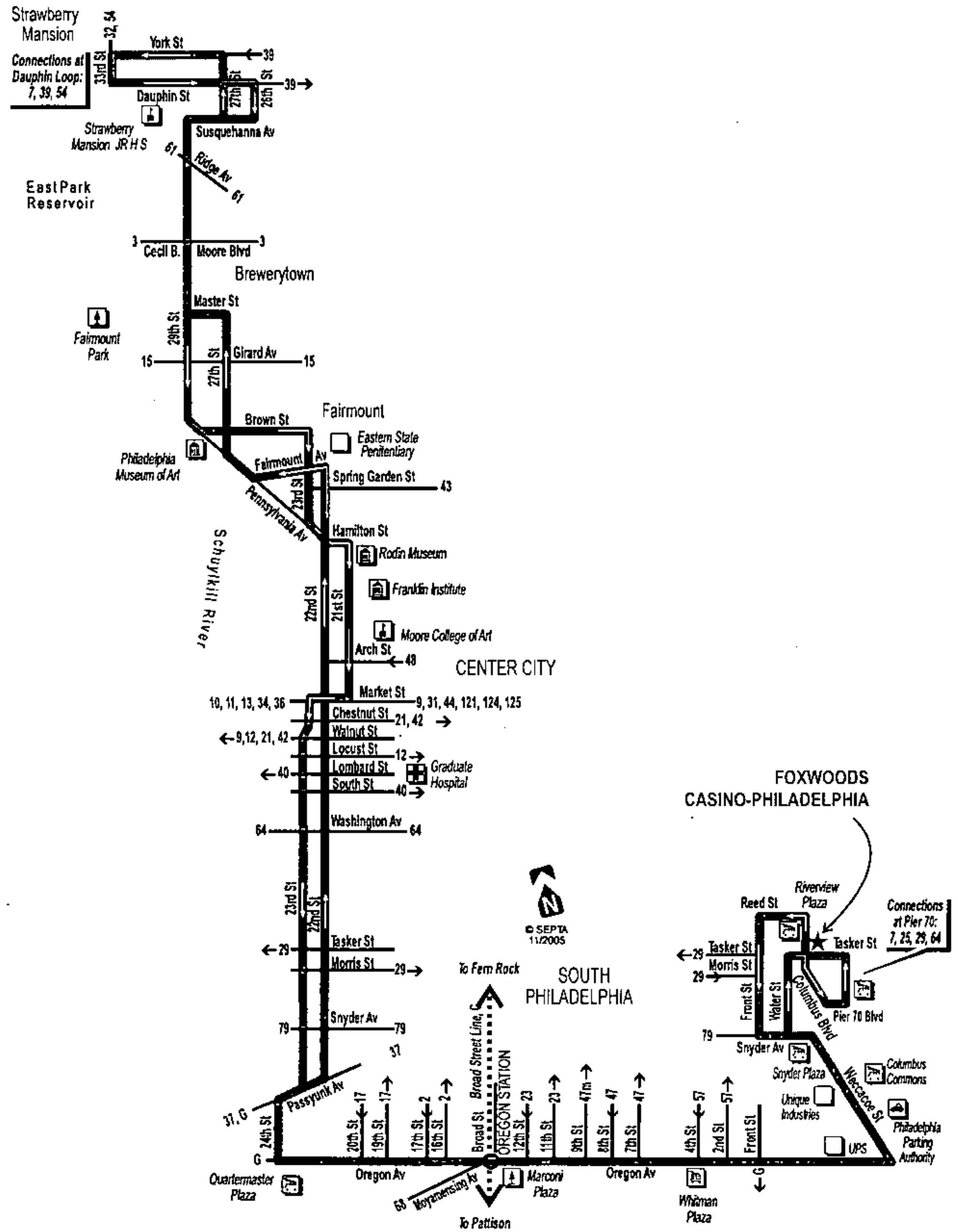
SEPTA BUS ROUTES

ORA Orth-Rodgers & Associates, Inc.
TRANSPORTATION PLANNERS & ENGINEERS

SEPTA Bus Route 7

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA



Orth-Rodgers & Associates, Inc.
TRANSPORTATION PLANNERS & ENGINEERS

SEPTA Bus Route 25

Foxwoods Casino - Philadelphia

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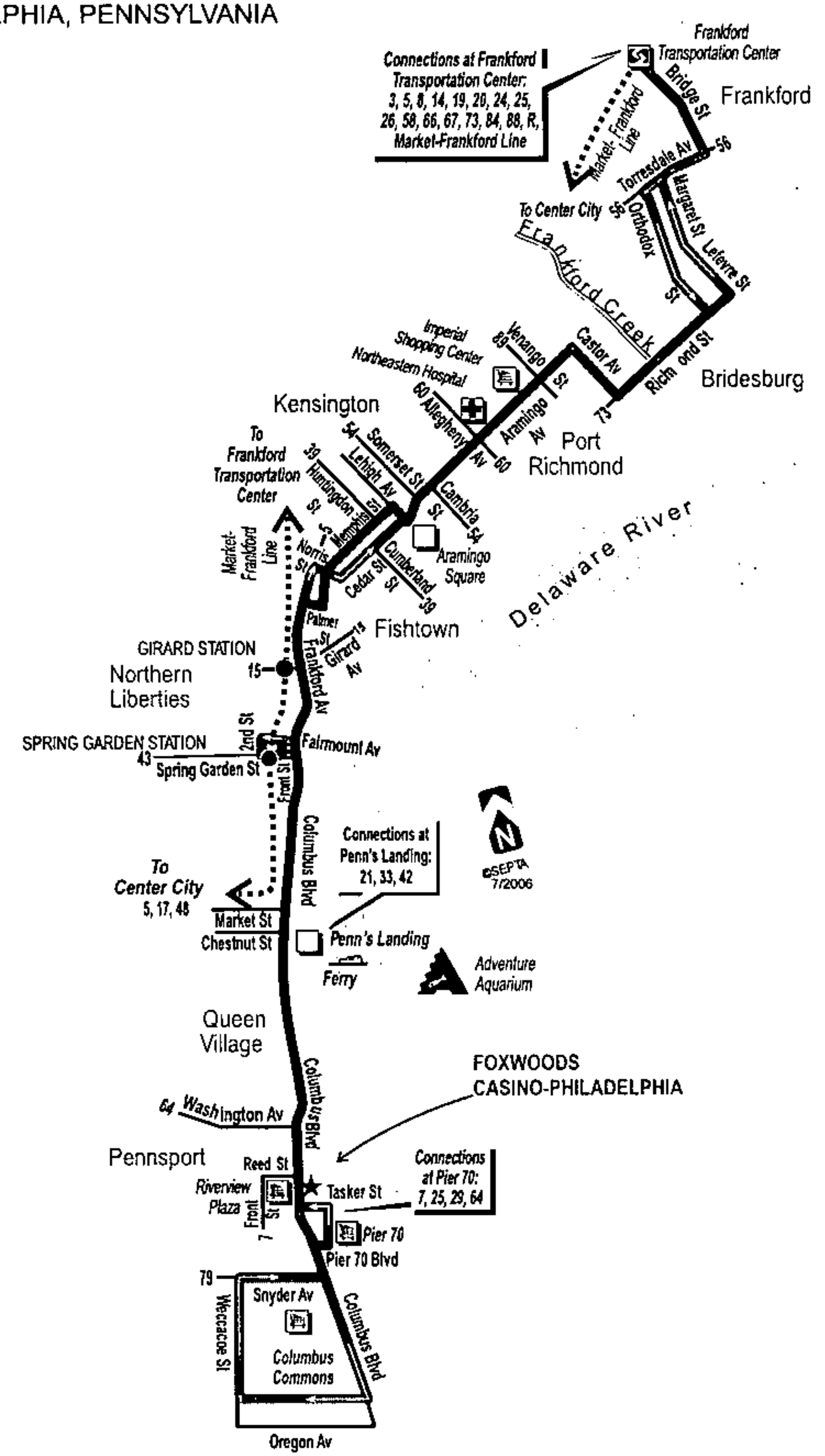

Orth-Rodgers & Associates, Inc.
TRANSPORTATION PLANNERS & ENGINEERS

SEPTA Bus Route 29

Foxwoods Casino - Philadelphia

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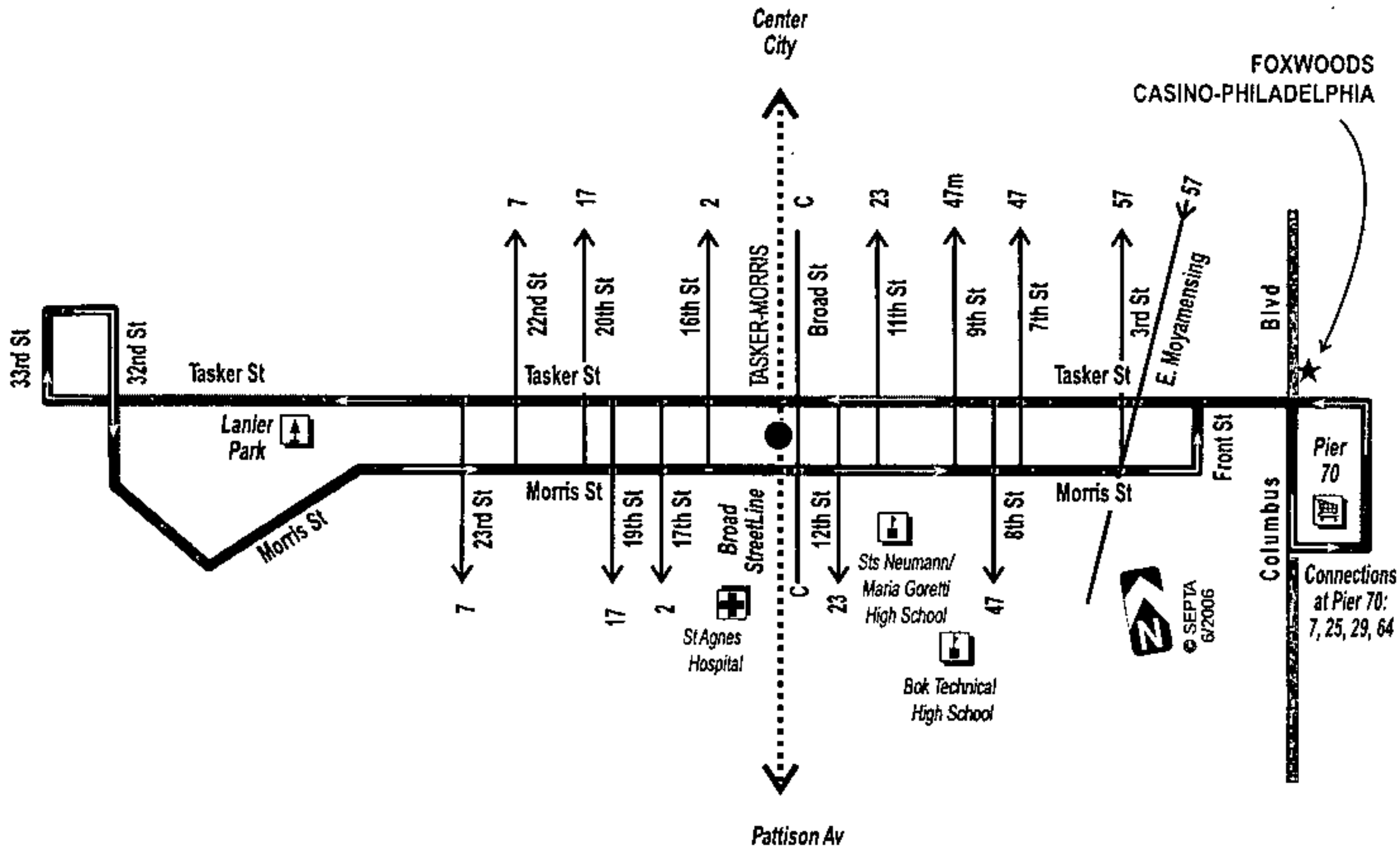
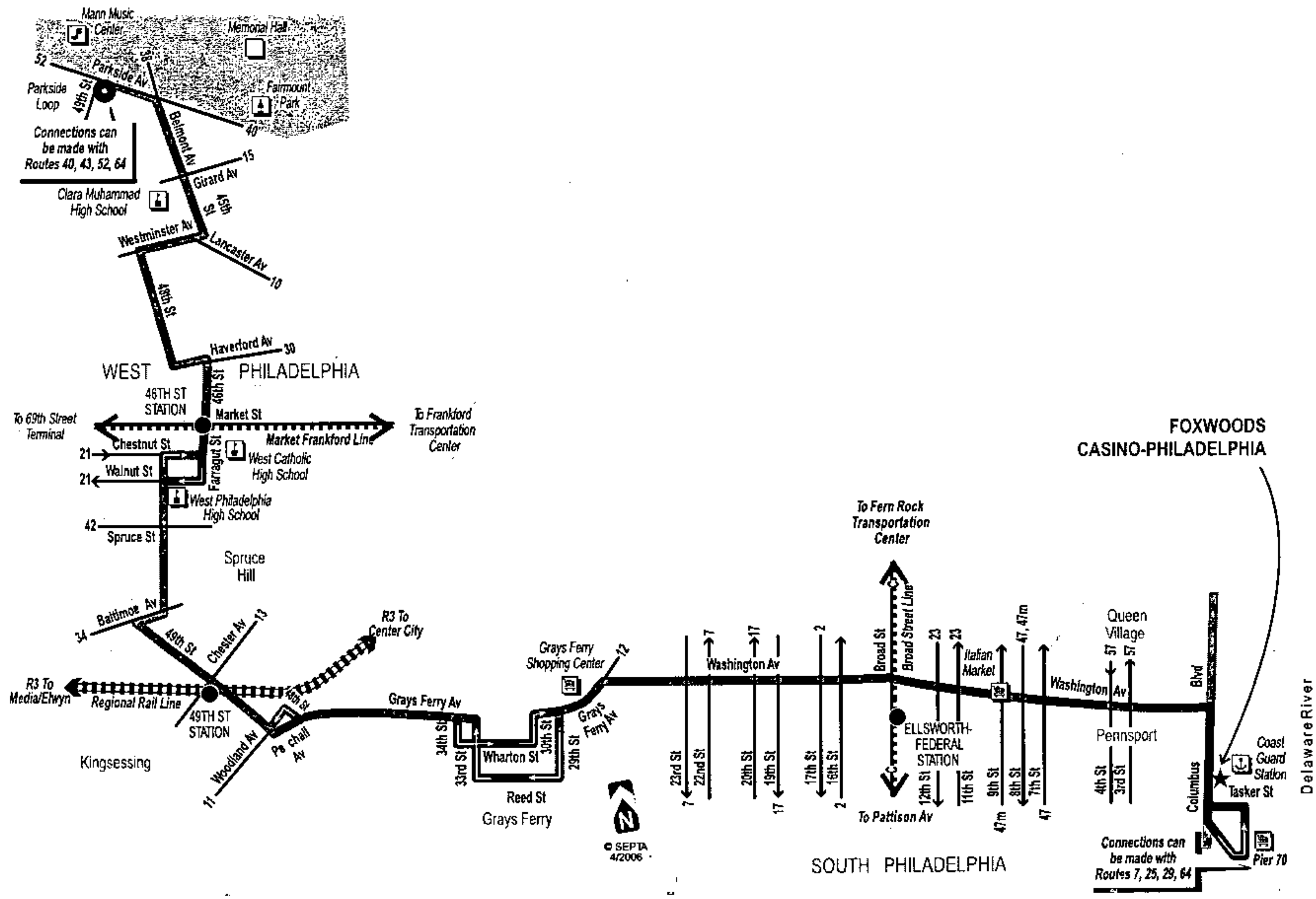


Orth-Rodgers & Associates, Inc.
TRANSPORTATION PLANNERS & ENGINEERS

SEPTA Bus Route 64

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA



Orth - Rodgers & Associates, Inc.
TRANSPORTATION ENGINEERS and PLANNERS

Supplemental Report
Build Plus 10 Year Analysis
Technical Appendix

Foxwoods-Philadelphia
Proposed Slot Parlor/Casino
Development
on
Columbus Boulevard
between
Reed and Tasker Streets

City of Philadelphia

October 10, 2006

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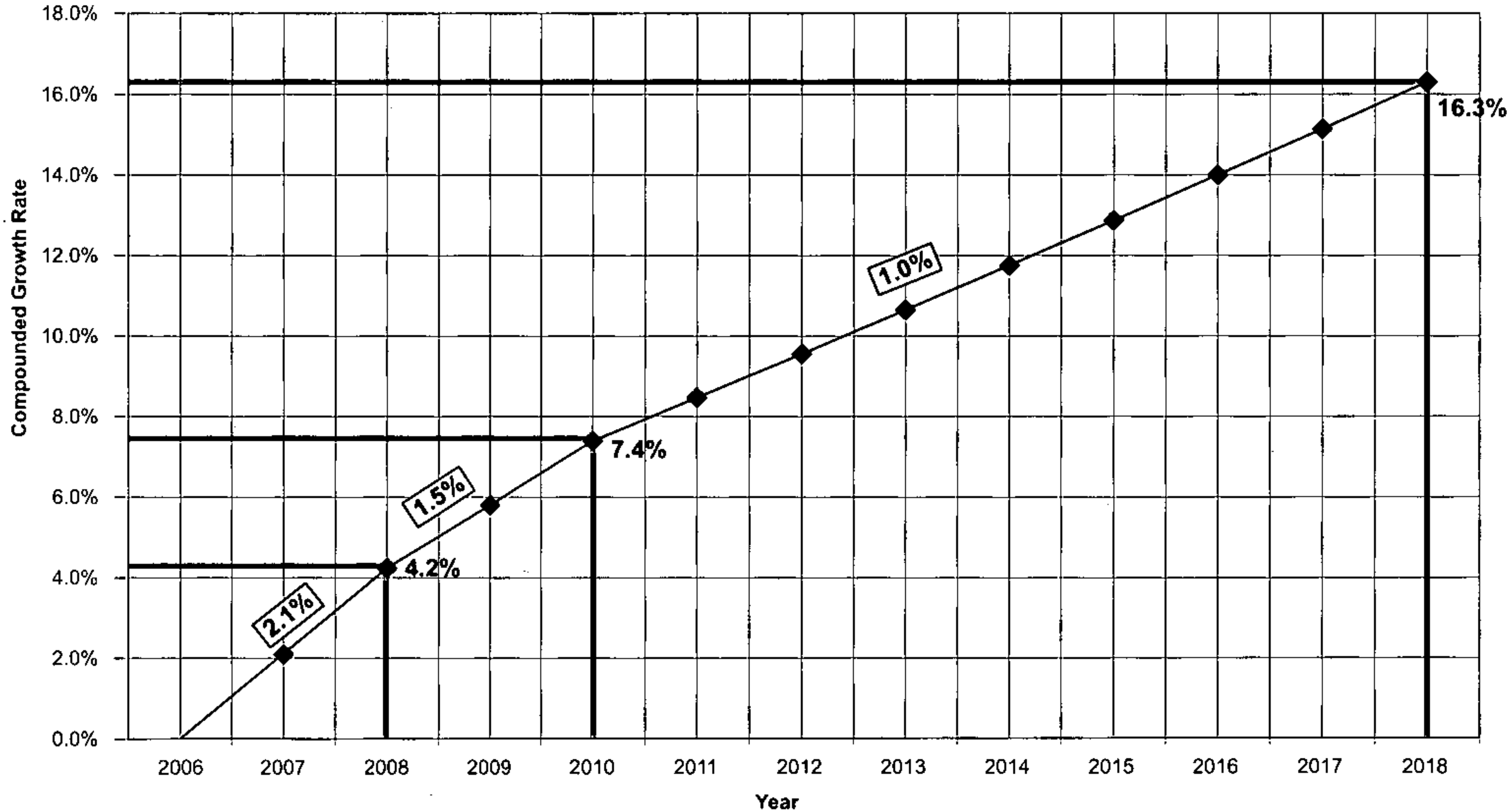
TABLE OF CONTENTS

PROJECTED BACKGROUND TRAFFIC GROWTH

Projected Background Traffic Growth



LEGEND:

x% ANNUALIZED BACKGROUND GROWTH RATE

CAPACITY ANALYSIS – 2018 NO-BUILD WITH DOCKSIDE RESIDENCES

1: I-95 NB On Ramp & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations					↰↑↱			↰	↑↑↱			↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0			4.0
Lane Util. Factor					0.95			1.00	0.91			1.00
Frt					0.94			1.00	1.00			1.00
Flt Protected					0.98			0.95	1.00			0.95
Satd. Flow (prot)					3270			1770	5074			1770
Flt Permitted					0.98			0.95	1.00			0.95
Satd. Flow (perm)					3270			1770	5074			1770
Volume (vph)	0	0	0	11	5	9	4	358	1784	26	5	18
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	12	5	10	4	389	1939	28	5	20
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	0	0	0	18	0	0	393	1966	0	0	25
Turn Type				Split			Prot	Prot			Prot	Prot
Protected Phases				8	8		1	1	6		5	5
Permitted Phases												
Actuated Green, G (s)					4.3			35.5	89.8			4.9
Effective Green, g (s)					6.3			36.5	90.8			5.9
Actuated g/C Ratio					0.05			0.32	0.79			0.05
Clearance Time (s)					6.0			5.0	5.0			5.0
Vehicle Extension (s)					3.0			3.0	3.0			3.0
Lane Grp Cap (vph)					179			562	4006			91
v/s Ratio Prot					c0.01			c0.22	0.39			0.01
v/s Ratio Perm												
v/c Ratio					0.10			0.70	0.49			0.27
Uniform Delay, d1					51.6			34.4	4.2			52.5
Progression Factor					1.00			0.64	0.19			1.00
Incremental Delay, d2					0.2			2.2	0.2			1.6
Delay (s)					51.9			24.3	1.0			54.1
Level of Service					D			C	A			D
Approach Delay (s)		0.0			51.9				4.9			
Approach LOS		A			D				A			

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: I-95 NB On Ramp & Chris Columbus Blvd.

Movement	SBT	SBR
Lane Configurations	↑↑↱	
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	5015	
Flt Permitted	1.00	
Satd. Flow (perm)	5015	
Volume (vph)	1446	147
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	1572	160
RTOR Reduction (vph)	9	0
Lane Group Flow (vph)	1723	0
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	59.2	
Effective Green, g (s)	60.2	
Actuated g/C Ratio	0.52	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	2625	
v/s Ratio Prot	c0.34	
v/s Ratio Perm		
v/c Ratio	0.66	
Uniform Delay, d1	19.9	
Progression Factor	1.00	
Incremental Delay, d2	1.3	
Delay (s)	21.2	
Level of Service	C	
Approach Delay (s)	21.7	
Approach LOS	C	

Intersection Summary

2: I-676 On & I-676/95 Off Ramp & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰	↰	↱↱		↰↑↱		↰	↑↑↑↱			↰	↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		0.95		1.00	0.91			1.00	0.91
Frt	1.00	1.00	0.85		0.96		1.00	1.00			1.00	0.98
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1681	1700	2787		3320		1736	4978			1763	4960
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1681	1700	2787		3320		1736	4978			1763	4960
Volume (vph)	155	18	1228	21	12	12	466	1977	34	12	18	1308
Peak-hour factor, PHF	0.81	0.92	0.92	0.92	0.92	0.92	0.80	0.76	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	20	1335	23	13	13	582	2601	37	13	20	1422
RTOR Reduction (vph)	0	0	297	0	12	0	0	1	0	0	0	12
Lane Group Flow (vph)	103	108	1038	0	37	0	582	2637	0	0	33	1570
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	2%	3%	2%	3%
Turn Type	Split		pt+ov	Split			Prot			Prot	Prot	
Protected Phases	4	4	4 1	8	8		1	6		5	5	2
Permitted Phases												
Actuated Green, G (s)	16.0	16.0	53.6		5.6		37.6	68.0			2.4	31.8
Effective Green, g (s)	18.0	18.0	57.6		7.6		39.6	70.0			3.4	33.8
Actuated g/C Ratio	0.16	0.16	0.50		0.07		0.34	0.61			0.03	0.29
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0			5.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	263	266	1396		219		598	3030			52	1458
v/s Ratio Prot	0.06	0.06	c0.37		c0.01		c0.34	0.53			0.02	c0.32
v/s Ratio Perm												
v/c Ratio	0.39	0.41	0.74		0.17		0.97	0.87			0.63	1.08
Uniform Delay, d1	43.6	43.7	22.8		50.7		37.2	18.7			55.2	40.6
Progression Factor	1.00	1.00	1.00		1.00		0.98	0.66			0.56	0.59
Incremental Delay, d2	1.0	1.0	2.2		0.4		25.6	2.9			18.6	45.2
Delay (s)	44.5	44.7	25.0		51.1		61.9	15.3			49.3	69.0
Level of Service	D	D	C		D		E	B			D	E
Approach Delay (s)		27.7			51.1			23.7				68.6
Approach LOS		C			D			C				E

Intersection Summary			
HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	123
Peak-hour factor, PHF	0.77
Adj. Flow (vph)	160
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	3%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

3: Christian St & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↑↑↱		↰	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.91		1.00	0.91	
Frt		0.96			1.00		1.00	1.00		1.00	0.98	
Flt Protected		0.96			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1731			1787		1770	5081		1770	5001	
Flt Permitted		0.77			0.78		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1386			1450		1770	5081		1770	5001	
Volume (vph)	279	0	104	16	3	0	205	2170	12	2	2292	284
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	0	113	17	3	0	223	2359	13	2	2491	309
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	404	0	0	20	0	223	2372	0	2	2786	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)		29.0			29.0		17.0	68.6		1.4	53.0	
Effective Green, g (s)		31.0			31.0		18.0	69.6		2.4	54.0	
Actuated g/C Ratio		0.27			0.27		0.16	0.61		0.02	0.47	
Clearance Time (s)		6.0			6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		374			391		277	3075		37	2348	
v/s Ratio Prot							0.13	c0.47		0.00	c0.56	
v/s Ratio Perm		c0.29			0.01							
v/c Ratio		1.08			0.05		0.81	0.77		0.05	1.19	
Uniform Delay, d1		42.0			31.1		46.8	16.8		55.2	30.5	
Progression Factor		1.00			1.00		0.83	0.70		1.15	0.63	
Incremental Delay, d2		69.9			0.1		1.6	0.2		0.3	85.8	
Delay (s)		111.9			31.2		40.5	11.9		63.8	105.1	
Level of Service		F			C		D	B		E	F	
Approach Delay (s)		111.9			31.2			14.4			105.0	
Approach LOS		F			C			B			F	

Intersection Summary			
HCM Average Control Delay	64.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

4: Washington Ave & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	12	12	12	12	12	10	13
Total Lost time (s)	4.0		4.0		4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00		1.00		1.00			1.00	0.91		1.00	0.91
Frt	1.00		0.85		0.98			1.00	1.00		1.00	0.95
Flt Protected	0.95		1.00		0.96			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1752		1583		2032			1770	5084		1652	4971
Flt Permitted	0.73		1.00		0.84			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1347		1583		1781			1770	5084		1652	4971
Volume (vph)	678	0	339	22	2	4	23	311	1702	4	3	1554
Peak-hour factor, PHF	0.80	0.92	0.92	0.69	0.69	0.69	0.92	0.92	0.92	0.92	0.89	0.89
Adj. Flow (vph)	848	0	368	32	3	6	25	338	1850	4	3	1746
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	0	0	0	88
Lane Group Flow (vph)	848	0	368	0	37	0	0	363	1854	0	3	2640
Heavy Vehicles (%)	3%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm		Free	Perm			Prot	Prot			Prot	
Protected Phases		8			4		1	1	6		5	2
Permitted Phases	8		Free	4								
Actuated Green, G (s)	44.0		115.0		44.0			15.0	50.0		5.0	40.0
Effective Green, g (s)	46.0		115.0		46.0			16.0	51.0		6.0	41.0
Actuated g/C Ratio	0.40		1.00		0.40			0.14	0.44		0.05	0.36
Clearance Time (s)	6.0				6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0				3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	539		1583		712			246	2255		86	1772
v/s Ratio Prot								c0.21	0.36		0.00	c0.53
v/s Ratio Perm	c0.63		0.23		0.02							
v/c Ratio	1.57		0.23		0.05			1.48	0.82		0.03	1.49
Uniform Delay, d1	34.5		0.0		21.1			49.5	28.0		51.8	37.0
Progression Factor	1.00		1.00		1.00			0.86	0.72		0.82	0.34
Incremental Delay, d2	266.8		0.3		0.0			231.9	3.0		0.0	220.7
Delay (s)	301.3		0.3		21.2			274.4	23.2		42.5	233.3
Level of Service	F		A		C			F	C		D	F
Approach Delay (s)		210.2			21.2				64.4			233.1
Approach LOS		F			C				E			F

Intersection Summary			
HCM Average Control Delay	166.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	122.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	874
Peak-hour factor, PHF	0.89
Adj. Flow (vph)	982
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

5: I-95 NB Off Ramp & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰↰		↱					↑↑↑↱			↶	↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0			4.0	4.0
Lane Util. Factor	0.97		1.00					0.91			1.00	0.91
Frt	1.00		0.85					1.00			1.00	1.00
Flt Protected	0.95		1.00					1.00			0.95	1.00
Satd. Flow (prot)	3433		1583					5085			1805	5036
Flt Permitted	0.95		1.00					1.00			0.95	1.00
Satd. Flow (perm)	3433		1583					5085			1805	5036
Volume (vph)	476	0	264	0	0	0	0	1537	0	9	0	1912
Peak-hour factor, PHF	0.94	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.44	0.92	0.97
Adj. Flow (vph)	506	0	278	0	0	0	0	1671	0	20	0	1971
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	506	0	278	0	0	0	0	1671	0	0	20	1971
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	3%
Turn Type	Prot		Free							Prot	Prot	
Protected Phases	3							6		5	5	2
Permitted Phases			Free									
Actuated Green, G (s)	32.0		115.0					63.8			3.2	72.0
Effective Green, g (s)	34.0		115.0					64.8			4.2	73.0
Actuated g/C Ratio	0.30		1.00					0.56			0.04	0.63
Clearance Time (s)	6.0							5.0			5.0	5.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	1015		1583					2865			66	3197
v/s Ratio Prot	c0.15							0.33			0.01	c0.39
v/s Ratio Perm			0.18									
v/c Ratio	0.50		0.18					0.58			0.30	0.62
Uniform Delay, d1	33.5		0.0					16.3			54.0	12.6
Progression Factor	1.00		1.00					0.45			0.67	0.21
Incremental Delay, d2	0.4		0.2					0.7			0.2	0.1
Delay (s)	33.8		0.2					8.0			36.2	2.7
Level of Service	C		A					A			D	A
Approach Delay (s)		21.9			0.0			8.0				3.1
Approach LOS		C			A			A				A

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	0
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

6: Reed St & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations	↰	↱			✥			↶	↑↑↱			↶
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	12	12	13	12	10	10	11	12	10	10
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			4.0
Lane Util. Factor	1.00	1.00			1.00			1.00	0.91			1.00
Frt	1.00	0.88			0.96			1.00	1.00			1.00
Flt Protected	0.95	1.00			0.98			0.95	1.00			0.95
Satd. Flow (prot)	1888	1689			1843			1626	4897			1620
Flt Permitted	0.66	1.00			0.85			0.95	1.00			0.95
Satd. Flow (perm)	1310	1689			1596			1626	4897			1620
Volume (vph)	243	32	143	34	37	25	21	91	1239	19	13	40
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.75	0.75	0.80	0.47	0.92	0.87
Adj. Flow (vph)	264	35	155	40	44	30	28	121	1549	40	14	46
RTOR Reduction (vph)	0	89	0	0	11	0	0	0	2	0	0	0
Lane Group Flow (vph)	264	101	0	0	103	0	0	149	1587	0	0	60
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	4%	2%	2%	4%	4%
Turn Type	Perm			Perm			Prot	Prot			Prot	Prot
Protected Phases		3			7		1	1	6		5	5
Permitted Phases	3			7								
Actuated Green, G (s)	32.0	32.0			32.0			10.0	59.8			7.2
Effective Green, g (s)	34.0	34.0			34.0			11.0	60.8			8.2
Actuated g/C Ratio	0.30	0.30			0.30			0.10	0.53			0.07
Clearance Time (s)	6.0	6.0			6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	387	499			472			156	2589			116
v/s Ratio Prot		0.06						c0.09	0.32			0.04
v/s Ratio Perm	c0.20				0.06							
v/c Ratio	0.68	0.20			0.22			0.96	0.61			0.52
Uniform Delay, d1	35.7	30.3			30.5			51.8	18.9			51.5
Progression Factor	1.00	1.00			1.00			0.97	1.25			0.54
Incremental Delay, d2	4.9	0.2			0.2			55.8	1.0			3.3
Delay (s)	40.6	30.5			30.7			106.2	24.7			31.0
Level of Service	D	C			C			F	C			C
Approach Delay (s)		36.4			30.7				31.7			
Approach LOS		D			C				C			

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑↱	
Ideal Flow (vphpl)	1900	1900
Lane Width	10	12
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.98	
Flt Protected	1.00	
Satd. Flow (prot)	4622	
Flt Permitted	1.00	
Satd. Flow (perm)	4622	
Volume (vph)	1876	246
Peak-hour factor, PHF	0.97	0.80
Adj. Flow (vph)	1934	308
RTOR Reduction (vph)	19	0
Lane Group Flow (vph)	2223	0
Heavy Vehicles (%)	3%	0%
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	57.0	
Effective Green, g (s)	58.0	
Actuated g/C Ratio	0.50	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	2331	
v/s Ratio Prot	c0.48	
v/s Ratio Perm		
v/c Ratio	0.95	
Uniform Delay, d1	27.2	
Progression Factor	0.20	
Incremental Delay, d2	9.3	
Delay (s)	14.6	
Level of Service	B	
Approach Delay (s)	15.1	
Approach LOS	B	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations									↰↑↑↑		↰	↑↑↑↱
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			0%
Volume (veh/h)	0	0	0	0	0	0	129	112	1368	0	0	2045
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.73	0.75	0.82	0.92	0.92	0.84
Hourly flow rate (vph)	0	0	0	0	0	0	0	149	1668	0	0	2435
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)									450			453
pX, platoon unblocked	0.63	0.63	0.56	0.63	0.63	0.85	0.00	0.56			0.85	
vC, conflicting volume	3307	4419	829	2778	4437	556	0	2470			1668	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2396	4148	0	1563	4176	113	0	2051			1427	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.2			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	0	0	100	0	0	100	0	0			100	
cM capacity (veh/h)	0	0	605	0	0	777	0	147			400	

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	483	667	667	0	974	974	523
Volume Left	149	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	36
cSH	147	1700	1700	1700	1700	1700	1700
Volume to Capacity	1.02	0.39	0.39	0.00	0.57	0.57	0.31
Queue Length 95th (ft)	191	0	0	0	0	0	0
Control Delay (s)	163.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F						
Approach Delay (s)	43.3			0.0			
Approach LOS							

Intersection Summary			
Average Delay	18.4		
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	SBR
Lane Configurations	
Sign Control	
Grade	
Volume (veh/h)	30
Peak Hour Factor	0.84
Hourly flow rate (vph)	36
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	

Direction, Lane #

9: Tasker St & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			↑↑↑↱			↑↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.91			0.91	
Frt		0.94			0.95			1.00			0.99	
Flt Protected		0.98			1.00			1.00			1.00	
Satd. Flow (prot)		1730			1770			5082			5053	
Flt Permitted		0.78			0.96			1.00			1.00	
Satd. Flow (perm)		1365			1713			5082			5053	
Volume (vph)	89	77	122	12	86	51	0	1461	6	0	1981	88
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99
Adj. Flow (vph)	100	87	137	13	93	55	0	1588	7	0	2001	89
RTOR Reduction (vph)	0	6	0	0	17	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	318	0	0	144	0	0	1595	0	0	2087	0
Turn Type	Perm			Perm								
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.7			28.7			75.3			75.3	
Effective Green, g (s)		30.7			30.7			76.3			76.3	
Actuated g/C Ratio		0.27			0.27			0.66			0.66	
Clearance Time (s)		6.0			6.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		364			457			3372			3353	
v/s Ratio Prot								0.31			c0.41	
v/s Ratio Perm		c0.23			0.08							
v/c Ratio		0.87			0.32			0.47			0.62	
Uniform Delay, d1		40.3			33.7			9.5			11.1	
Progression Factor		1.00			1.00			1.00			0.24	
Incremental Delay, d2		20.1			0.4			0.5			0.6	
Delay (s)		60.4			34.1			10.0			3.2	
Level of Service		E			C			A			A	
Approach Delay (s)		60.4			34.1			10.0			3.2	
Approach LOS		E			C			A			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑↑	↑↑↑	↗
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	1467	1634	481
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1595	1776	523
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)					229	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	2308	592	1776			
vC1, stage 1 conf vol			0			
vC2, stage 2 conf vol			0			
vCu, unblocked vol	2119	0	1443			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)			3.1			
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	34	852	676			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	532	532	532	592	592	592	523
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	523
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.31	0.31	0.31	0.35	0.35	0.35	0.31
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0			0.0			
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	0	466	15	57	435	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	507	16	62	473	0	0	0	0

Direction, Lane #	WB 1	NB 1
Volume Total (vph)	523	535
Volume Left (vph)	0	62
Volume Right (vph)	16	0
Hadj (s)	0.02	0.06
Departure Headway (s)	5.5	5.5
Degree Utilization, x	0.80	0.82
Capacity (veh/h)	634	640
Control Delay (s)	26.6	28.3
Approach Delay (s)	26.6	28.3
Approach LOS	D	D

Intersection Summary			
Delay	27.5		
HCM Level of Service	D		
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations					↰↑↱			↰	↑↑↑↱		↰	↑↑↑↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0		4.0	4.0
Lane Util. Factor					0.95			1.00	0.91		1.00	0.91
Frt					0.94			1.00	0.99		1.00	0.99
Flt Protected					0.98			0.95	1.00		0.95	1.00
Satd. Flow (prot)					3308			1788	5032		1736	5041
Flt Permitted					0.98			0.95	1.00		0.95	1.00
Satd. Flow (perm)					3308			1788	5032		1736	5041
Volume (vph)	0	0	0	11	3	10	6	475	1097	66	30	1279
Peak-hour factor, PHF	0.92	0.92	0.92	0.64	0.64	0.64	0.25	0.95	0.82	0.66	0.65	0.85
Adj. Flow (vph)	0	0	0	17	5	16	24	500	1338	100	46	1505
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	9	0	0	6
Lane Group Flow (vph)	0	0	0	0	23	0	0	524	1429	0	46	1606
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	1%	2%	2%	4%	2%
Turn Type				Split			Prot	Prot			Prot	
Protected Phases				8	8		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)					4.2			38.7	80.9		13.9	56.1
Effective Green, g (s)					6.2			39.7	81.9		14.9	57.1
Actuated g/C Ratio					0.05			0.35	0.71		0.13	0.50
Clearance Time (s)					6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)					3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)					178			617	3584		225	2503
v/s Ratio Prot					c0.01			c0.29	0.28		0.03	c0.32
v/s Ratio Perm												
v/c Ratio					0.13			0.85	0.40		0.20	0.64
Uniform Delay, d1					51.8			34.9	6.7		44.8	21.4
Progression Factor					1.00			0.88	0.20		1.00	1.00
Incremental Delay, d2					0.3			9.3	0.3		0.5	1.3
Delay (s)					52.2			40.0	1.6		45.2	22.7
Level of Service					D			D	A		D	C
Approach Delay (s)		0.0			52.2				11.9			23.3
Approach LOS		A			D				B			C

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

1: I-95 NB On Ramp & Chris Columbus Blvd.

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	89
Peak-hour factor, PHF	0.83
Adj. Flow (vph)	107
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

2: I-676 On & I-676/95 Off Ramp & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↱↱		↰↑↱		↰	↑↑↑↱		↰	↑↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	0.88		0.95		1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85		0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1665	1685	2814		3323		1787	5072		1770	5064	
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1665	1685	2814		3323		1787	5072		1770	5064	
Volume (vph)	151	16	1122	19	13	12	613	1477	28	16	1180	116
Peak-hour factor, PHF	0.81	0.92	0.90	0.92	0.92	0.92	0.94	0.84	0.92	0.92	0.93	0.89
Adj. Flow (vph)	186	17	1247	21	14	13	652	1758	30	17	1269	130
RTOR Reduction (vph)	0	0	301	0	12	0	0	1	0	0	11	0
Lane Group Flow (vph)	98	105	946	0	36	0	652	1787	0	17	1388	0
Heavy Vehicles (%)	3%	2%	1%	2%	2%	2%	1%	2%	2%	2%	1%	1%
Turn Type	Split		pt+ov	Split			Prot			Prot		
Protected Phases	4	4	4 1	8	8		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	16.0	16.0	52.6		5.6		36.6	67.8		1.6	32.8	
Effective Green, g (s)	18.0	18.0	56.6		7.6		38.6	69.8		3.6	34.8	
Actuated g/C Ratio	0.16	0.16	0.49		0.07		0.34	0.61		0.03	0.30	
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	261	264	1385		220		600	3078		55	1532	
v/s Ratio Prot	0.06	0.06	c0.34		c0.01		c0.36	0.35		0.01	c0.27	
v/s Ratio Perm												
v/c Ratio	0.38	0.40	0.68		0.16		1.09	0.58		0.31	0.91	
Uniform Delay, d1	43.5	43.6	22.3		50.7		38.2	13.7		54.5	38.5	
Progression Factor	1.00	1.00	1.00		1.00		0.49	0.42		0.48	0.50	
Incremental Delay, d2	0.9	1.0	1.4		0.4		48.6	0.3		2.5	7.6	
Delay (s)	44.4	44.6	23.7		51.0		67.3	6.0		28.8	27.0	
Level of Service	D	D	C		D		E	A		C	C	
Approach Delay (s)		26.6			51.0			22.4			27.0	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations		✥			✥		↰	↑↑↑↱			↰	↑↑↑↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.91			1.00	0.91
Frt		0.94			0.98		1.00	1.00			1.00	0.98
Flt Protected		0.97			0.96		0.95	1.00			0.95	1.00
Satd. Flow (prot)		1721			1774		1805	5080			1805	5015
Flt Permitted		0.82			0.72		0.95	1.00			0.22	1.00
Satd. Flow (perm)		1442			1329		1805	5080			422	5015
Volume (vph)	175	2	158	14	2	2	192	1924	11	5	17	1931
Peak-hour factor, PHF	0.82	0.25	0.89	0.60	0.50	0.50	0.87	0.84	0.56	0.62	0.31	0.95
Adj. Flow (vph)	213	8	178	23	4	4	221	2290	20	8	55	2033
RTOR Reduction (vph)	0	25	0	0	3	0	0	1	0	0	0	23
Lane Group Flow (vph)	0	374	0	0	28	0	221	2309	0	0	63	2387
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	0%	2%	0%	0%	0%	1%
Turn Type	Perm			Perm			Prot			custom	Prot	
Protected Phases		4			8		1	6			5	2
Permitted Phases	4			8						5		
Actuated Green, G (s)		28.0			28.0		14.0	54.0			17.0	57.0
Effective Green, g (s)		30.0			30.0		15.0	55.0			18.0	58.0
Actuated g/C Ratio		0.26			0.26		0.13	0.48			0.16	0.50
Clearance Time (s)		6.0			6.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		376			347		235	2430			66	2529
v/s Ratio Prot							0.12	c0.45				c0.48
v/s Ratio Perm		c0.26			0.02						0.15	
v/c Ratio		0.99			0.08		0.94	0.95			0.95	0.94
Uniform Delay, d1		42.4			32.1		49.6	28.7			48.1	27.0
Progression Factor		1.00			1.00		0.62	0.35			1.30	0.57
Incremental Delay, d2		44.7			0.1		23.4	4.7			69.0	5.6
Delay (s)		87.1			32.2		53.9	14.6			131.5	20.9
Level of Service		F			C		D	B			F	C
Approach Delay (s)		87.1			32.2			18.1				23.7
Approach LOS		F			C			B				C

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	366
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	377
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	1%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

4: Washington Ave & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	12	12	12	12	12	12	10
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	1.00		1.00			1.00	0.91			1.00
Frt	1.00	1.00	0.85		0.95			1.00	1.00			1.00
Flt Protected	0.95	1.00	1.00		0.99			0.95	1.00			0.95
Satd. Flow (prot)	1752	1925	1583		2019			1770	5082			1652
Flt Permitted	0.74	1.00	1.00		0.96			0.95	1.00			0.30
Satd. Flow (perm)	1358	1925	1583		1964			1770	5082			523
Volume (vph)	584	4	419	4	4	5	2	364	1533	3	6	0
Peak-hour factor, PHF	0.96	0.25	0.92	0.50	0.33	0.42	0.91	0.91	0.85	0.38	0.75	0.92
Adj. Flow (vph)	608	16	455	8	12	12	2	400	1804	8	8	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	1	0	0	0
Lane Group Flow (vph)	608	16	455	0	24	0	0	402	1811	0	0	8
Heavy Vehicles (%)	3%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm		Free	Perm			Prot	Prot			custom	Prot
Protected Phases		8			4		1	1	6			5
Permitted Phases	8		Free	4							5	
Actuated Green, G (s)	40.0	40.0	115.0		40.0			18.0	46.7			12.3
Effective Green, g (s)	42.0	42.0	115.0		42.0			19.0	47.7			13.3
Actuated g/C Ratio	0.37	0.37	1.00		0.37			0.17	0.41			0.12
Clearance Time (s)	6.0	6.0			6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	496	703	1583		717			292	2108			60
v/s Ratio Prot		0.01						c0.23	0.36			
v/s Ratio Perm	c0.45		0.29		0.01							0.02
v/c Ratio	1.23	0.02	0.29		0.03			1.38	0.86			0.13
Uniform Delay, d1	36.5	23.4	0.0		23.5			48.0	30.6			45.7
Progression Factor	1.00	1.00	1.00		1.00			0.84	0.65			0.82
Incremental Delay, d2	118.5	0.0	0.5		0.0			185.4	3.8			0.4
Delay (s)	155.0	23.4	0.5		23.5			225.6	23.6			37.6
Level of Service	F	C	A		C			F	C			D
Approach Delay (s)		87.9			23.5				60.2			
Approach LOS		F			C				E			

Intersection Summary			
HCM Average Control Delay	86.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900
Lane Width	13	12
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.96	
Flt Protected	1.00	
Satd. Flow (prot)	5067	
Flt Permitted	1.00	
Satd. Flow (perm)	5067	
Volume (vph)	1604	492
Peak-hour factor, PHF	0.92	0.90
Adj. Flow (vph)	1743	547
RTOR Reduction (vph)	50	0
Lane Group Flow (vph)	2240	0
Heavy Vehicles (%)	2%	2%
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	41.0	
Effective Green, g (s)	42.0	
Actuated g/C Ratio	0.37	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	1851	
v/s Ratio Prot	c0.44	
v/s Ratio Perm		
v/c Ratio	1.21	
Uniform Delay, d1	36.5	
Progression Factor	0.41	
Incremental Delay, d2	96.8	
Delay (s)	111.8	
Level of Service	F	
Approach Delay (s)	111.5	
Approach LOS	F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰↰		↱					↑↑↑↱			↶	↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0			4.0	4.0
Lane Util. Factor	0.97		1.00					0.91			1.00	0.91
Frt	1.00		0.85					1.00			1.00	1.00
Flt Protected	0.95		1.00					1.00			0.95	1.00
Satd. Flow (prot)	3433		1568					5085			1805	5136
Flt Permitted	0.95		1.00					1.00			0.95	1.00
Satd. Flow (perm)	3433		1568					5085			1805	5136
Volume (vph)	450	0	235	0	0	0	0	1414	0	27	0	2003
Peak-hour factor, PHF	0.76	0.92	0.72	0.92	0.92	0.92	0.92	0.92	0.92	0.26	0.26	0.96
Adj. Flow (vph)	592	0	326	0	0	0	0	1537	0	104	0	2086
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	592	0	326	0	0	0	0	1537	0	0	104	2086
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	2%	2%	2%	0%	0%	1%
Turn Type	Prot		Free							Prot	Prot	
Protected Phases	3							6		5	5	2
Permitted Phases			Free									
Actuated Green, G (s)	32.0		115.0					50.9			16.1	72.0
Effective Green, g (s)	34.0		115.0					51.9			17.1	73.0
Actuated g/C Ratio	0.30		1.00					0.45			0.15	0.63
Clearance Time (s)	6.0							5.0			5.0	5.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	1015		1568					2295			268	3260
v/s Ratio Prot	c0.17							c0.30			0.06	c0.41
v/s Ratio Perm			0.21									
v/c Ratio	0.58		0.21					0.67			0.39	0.64
Uniform Delay, d1	34.5		0.0					24.8			44.2	12.9
Progression Factor	1.00		1.00					1.27			0.59	0.19
Incremental Delay, d2	0.9		0.3					1.3			0.1	0.1
Delay (s)	35.3		0.3					32.9			26.0	2.5
Level of Service	D		A					C			C	A
Approach Delay (s)		22.9			0.0			32.9				3.6
Approach LOS		C			A			C				A

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	0
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

6: Reed St. & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations	↰	↱			✥			↶	↑↑↱			↶
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	12	12	13	12	10	10	11	12	10	10
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			4.0
Lane Util. Factor	1.00	1.00			1.00			1.00	0.91			1.00
Frt	1.00	0.87			0.96			1.00	1.00			1.00
Flt Protected	0.95	1.00			0.99			0.95	1.00			0.95
Satd. Flow (prot)	1888	1707			1852			1636	4896			1652
Flt Permitted	0.70	1.00			0.89			0.95	1.00			0.95
Satd. Flow (perm)	1398	1707			1675			1636	4896			1652
Volume (vph)	210	23	177	16	18	15	19	135	1185	22	2	23
Peak-hour factor, PHF	0.87	0.83	1.00	0.70	0.50	0.65	0.92	0.92	0.80	0.47	0.69	0.69
Adj. Flow (vph)	241	28	177	23	36	23	21	147	1481	47	3	33
RTOR Reduction (vph)	0	107	0	0	12	0	0	0	3	0	0	0
Lane Group Flow (vph)	241	98	0	0	70	0	0	168	1525	0	0	36
Heavy Vehicles (%)	2%	1%	0%	2%	0%	0%	3%	3%	2%	0%	2%	2%
Turn Type	Perm			Perm			Prot	Prot			Prot	Prot
Protected Phases		3			7		1	1	6		5	5
Permitted Phases	3			7								
Actuated Green, G (s)	32.0	32.0			32.0			13.0	62.8			4.2
Effective Green, g (s)	34.0	34.0			34.0			14.0	63.8			5.2
Actuated g/C Ratio	0.30	0.30			0.30			0.12	0.55			0.05
Clearance Time (s)	6.0	6.0			6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	413	505			495			199	2716			75
v/s Ratio Prot		0.06						c0.10	0.31			0.02
v/s Ratio Perm	c0.17				0.04							
v/c Ratio	0.58	0.19			0.14			0.84	0.56			0.48
Uniform Delay, d1	34.5	30.3			29.8			49.4	16.6			53.6
Progression Factor	1.00	1.00			1.00			0.78	0.62			1.36
Incremental Delay, d2	2.1	0.2			0.1			23.9	0.7			4.0
Delay (s)	36.6	30.4			29.9			62.5	10.9			76.7
Level of Service	D	C			C			E	B			E
Approach Delay (s)		33.8			29.9				16.1			
Approach LOS		C			C				B			

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑↱	
Ideal Flow (vphpl)	1900	1900
Lane Width	10	12
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.98	
Flt Protected	1.00	
Satd. Flow (prot)	4658	
Flt Permitted	1.00	
Satd. Flow (perm)	4658	
Volume (vph)	1979	252
Peak-hour factor, PHF	0.94	0.78
Adj. Flow (vph)	2105	323
RTOR Reduction (vph)	18	0
Lane Group Flow (vph)	2410	0
Heavy Vehicles (%)	2%	1%
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	54.0	
Effective Green, g (s)	55.0	
Actuated g/C Ratio	0.48	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	2228	
v/s Ratio Prot	c0.52	
v/s Ratio Perm		
v/c Ratio	1.08	
Uniform Delay, d1	30.0	
Progression Factor	0.18	
Incremental Delay, d2	44.1	
Delay (s)	49.6	
Level of Service	D	
Approach Delay (s)	50.0	
Approach LOS	D	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations									↰↑↑		↰	↑↑↱
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			0%
Volume (veh/h)	0	0	0	0	0	0	89	135	1362	0	1	2188
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.87	0.87	0.85	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	155	1602	0	1	2378
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)									450			453
pX, platoon unblocked	0.64	0.64	0.55	0.64	0.64	0.81	0.00	0.55			0.81	
vC, conflicting volume	3225	4293	793	2708	4293	534	0	2378			1602	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2038	3705	0	1232	3705	0	0	1865			1281	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	100	100	100	100	100	100	0	11			100	
cM capacity (veh/h)	5	0	594	20	0	882	0	175			437	

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	476	641	641	1	951	951	476
Volume Left	155	0	0	1	0	0	0
Volume Right	0	0	0	0	0	0	0
cSH	175	1700	1700	437	1700	1700	1700
Volume to Capacity	0.89	0.38	0.38	0.00	0.56	0.56	0.28
Queue Length 95th (ft)	162	0	0	0	0	0	0
Control Delay (s)	100.0	0.0	0.0	13.3	0.0	0.0	0.0
Lane LOS	F			B			
Approach Delay (s)	27.1			0.0			
Approach LOS							

Intersection Summary			
Average Delay	11.5		
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	SBR
Lane Configurations	
Sign Control	
Grade	
Volume (veh/h)	0
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	

Direction, Lane #

9: Tasker St. & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↑↑↑↱			↑↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.91			0.91	
Frt		0.94			0.97			1.00			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1735			1764			5079			5101	
Flt Permitted		0.77			0.90			1.00			1.00	
Satd. Flow (perm)		1357			1596			5079			5101	
Volume (vph)	101	105	134	19	112	52	0	1419	9	0	2188	95
Peak-hour factor, PHF	0.91	0.83	0.78	0.61	0.77	0.94	0.75	0.88	0.58	0.92	0.94	0.82
Adj. Flow (vph)	111	127	172	31	145	55	0	1612	16	0	2328	116
RTOR Reduction (vph)	0	2	0	0	11	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	408	0	0	220	0	0	1627	0	0	2440	0
Heavy Vehicles (%)	1%	0%	4%	2%	3%	6%	1%	2%	0%	0%	1%	0%
Turn Type	Perm			Perm								
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		35.7			35.7			68.3			68.3	
Effective Green, g (s)		37.7			37.7			69.3			69.3	
Actuated g/C Ratio		0.33			0.33			0.60			0.60	
Clearance Time (s)		6.0			6.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		445			523			3061			3074	
v/s Ratio Prot								0.32			c0.48	
v/s Ratio Perm		c0.30			0.14							
v/c Ratio		0.92			0.42			0.53			0.79	
Uniform Delay, d1		37.1			30.1			13.4			17.4	
Progression Factor		1.00			1.00			1.00			0.12	
Incremental Delay, d2		23.5			0.5			0.7			0.8	
Delay (s)		60.6			30.7			14.0			2.8	
Level of Service		E			C			B			A	
Approach Delay (s)		60.6			30.7			14.0			2.8	
Approach LOS		E			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑↑	↑↑↑	↱
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	0	1428	1819	522
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1552	1977	567
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)					229	
pX, platoon unblocked	0.66	0.66	0.66			
vC, conflicting volume	2495	659	2545			
vC1, stage 1 conf vol			0			
vC2, stage 2 conf vol			0			
vCu, unblocked vol	2229	0	2305			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)			3.1			
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	24	710	599			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	517	517	517	659	659	659	567
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	567
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.30	0.30	0.30	0.39	0.39	0.39	0.33
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0			0.0			
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

11: Morris St. & Water St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	0	506	16	82	759	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	550	17	89	825	0	0	0	0

Direction, Lane #	WB 1	NB 1
Volume Total (vph)	567	914
Volume Left (vph)	0	89
Volume Right (vph)	17	0
Hadj (s)	0.02	0.05
Departure Headway (s)	5.8	5.7
Degree Utilization, x	0.91	1.46
Capacity (veh/h)	617	631
Control Delay (s)	41.6	230.6
Approach Delay (s)	41.6	230.6
Approach LOS	E	F

Intersection Summary			
Delay	158.2		
HCM Level of Service	F		
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

CAPACITY ANALYSIS – 2018 BUILD WITH DOCKSIDE RESIDENCES

1: I-95 NB On Ramp & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations					↰↑↱			↰	↑↑↱			↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0			4.0
Lane Util. Factor					0.95			1.00	0.91			1.00
Frt					0.94			1.00	1.00			1.00
Flt Protected					0.98			0.95	1.00			0.95
Satd. Flow (prot)					3270			1770	5075			1770
Flt Permitted					0.98			0.95	1.00			0.95
Satd. Flow (perm)					3270			1770	5075			1770
Volume (vph)	0	0	0	11	5	9	4	412	1826	26	5	18
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	12	5	10	4	448	1985	28	5	20
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	0	0	0	18	0	0	452	2012	0	0	25
Turn Type				Split			Prot	Prot			Prot	Prot
Protected Phases				8	8		1	1	6		5	5
Permitted Phases												
Actuated Green, G (s)					4.2			32.2	77.8			2.0
Effective Green, g (s)					6.2			33.2	78.8			3.0
Actuated g/C Ratio					0.06			0.33	0.79			0.03
Clearance Time (s)					6.0			5.0	5.0			5.0
Vehicle Extension (s)					3.0			3.0	3.0			3.0
Lane Grp Cap (vph)					203			588	3999			53
v/s Ratio Prot					c0.01			c0.26	0.40			0.01
v/s Ratio Perm												
v/c Ratio					0.09			0.77	0.50			0.47
Uniform Delay, d1					44.2			30.0	3.7			47.7
Progression Factor					1.00			0.58	0.27			1.00
Incremental Delay, d2					0.2			3.5	0.3			6.5
Delay (s)					44.4			21.0	1.3			54.2
Level of Service					D			C	A			D
Approach Delay (s)		0.0			44.4				4.9			
Approach LOS		A			D				A			

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	5018	
Flt Permitted	1.00	
Satd. Flow (perm)	5018	
Volume (vph)	1533	147
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	1666	160
RTOR Reduction (vph)	10	0
Lane Group Flow (vph)	1816	0
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	47.6	
Effective Green, g (s)	48.6	
Actuated g/C Ratio	0.49	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	2439	
v/s Ratio Prot	c0.36	
v/s Ratio Perm		
v/c Ratio	0.74	
Uniform Delay, d1	20.7	
Progression Factor	1.00	
Incremental Delay, d2	2.1	
Delay (s)	22.8	
Level of Service	C	
Approach Delay (s)	23.2	
Approach LOS	C	

Intersection Summary

2: I-676 On & I-676/95 Off Ramp & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		0.95		0.97	0.91			1.00	0.91
Frt	1.00	1.00	0.85		0.96		1.00	1.00			1.00	0.99
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1681	1700	2787		3320		3367	4979			1763	4964
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1681	1700	2787		3320		3367	4979			1763	4964
Volume (vph)	155	18	860	21	12	12	521	2073	34	12	18	1394
Peak-hour factor, PHF	0.81	0.92	0.92	0.92	0.92	0.92	0.80	0.76	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	20	935	23	13	13	651	2728	37	13	20	1515
RTOR Reduction (vph)	0	0	470	0	12	0	0	1	0	0	0	12
Lane Group Flow (vph)	103	108	465	0	37	0	651	2764	0	0	33	1663
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	2%	3%	2%	3%
Turn Type	Split		pt+ov	Split			Prot			Prot	Prot	
Protected Phases	4	4	4 1	8	8		1	6		5	5	2
Permitted Phases												
Actuated Green, G (s)	8.0	8.0	37.8		4.3		29.8	61.7			3.0	33.9
Effective Green, g (s)	10.0	10.0	41.8		6.3		31.8	63.7			4.0	35.9
Actuated g/C Ratio	0.10	0.10	0.42		0.06		0.32	0.64			0.04	0.36
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0			5.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	168	170	1165		209		1071	3172			71	1782
v/s Ratio Prot	0.06	c0.06	0.17		c0.01		0.19	c0.56			0.02	c0.34
v/s Ratio Perm												
v/c Ratio	0.61	0.64	0.40		0.18		0.61	0.87			0.46	0.93
Uniform Delay, d1	43.1	43.2	20.3		44.4		28.8	14.8			47.0	30.9
Progression Factor	1.00	1.00	1.00		1.00		1.02	0.61			0.52	0.44
Incremental Delay, d2	6.5	7.5	0.2		0.4		0.7	2.8			3.6	8.3
Delay (s)	49.6	50.8	20.6		44.8		30.2	11.8			27.9	21.9
Level of Service	D	D	C		D		C	B			C	C
Approach Delay (s)		26.0			44.8			15.3				22.0
Approach LOS		C			D			B				C

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	123
Peak-hour factor, PHF	0.77
Adj. Flow (vph)	160
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	3%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.85			1.00		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1583			1787		1770	5081		1770	4991	
Flt Permitted	0.74	1.00			0.80		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1386	1583			1495		1770	5081		1770	4991	
Volume (vph)	279	0	104	16	3	0	205	2320	12	2	2008	284
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	0	113	17	3	0	223	2522	13	2	2183	309
RTOR Reduction (vph)	0	84	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	303	29	0	0	20	0	223	2535	0	2	2473	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	23.3	23.3			23.3		13.0	59.5		1.2	47.7	
Effective Green, g (s)	25.3	25.3			25.3		14.0	60.5		2.2	48.7	
Actuated g/C Ratio	0.25	0.25			0.25		0.14	0.60		0.02	0.49	
Clearance Time (s)	6.0	6.0			6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	351	400			378		248	3074		39	2431	
v/s Ratio Prot		0.02					0.13	c0.50		0.00	c0.50	
v/s Ratio Perm	c0.22				0.01							
v/c Ratio	0.86	0.07			0.05		0.90	0.82		0.05	1.02	
Uniform Delay, d1	35.7	28.4			28.3		42.3	15.6		47.9	25.6	
Progression Factor	1.00	1.00			1.00		0.69	0.29		1.38	0.45	
Incremental Delay, d2	19.2	0.1			0.1		16.6	1.2		0.4	19.2	
Delay (s)	54.9	28.5			28.3		45.8	5.7		66.3	30.6	
Level of Service	D	C			C		D	A		E	C	
Approach Delay (s)		47.7			28.3			8.9			30.6	
Approach LOS		D			C			A			C	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

4: Washington Ave. & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	12	12	12	12	12	10	13
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00			0.97	0.91		1.00	0.95
Frt	1.00	1.00	0.85		0.98			1.00	1.00		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.96			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1665	1720	1583		2032			3433	5084		1652	3657
Flt Permitted	0.95	0.95	1.00		0.96			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1665	1720	1583		2032			3433	5084		1652	3657
Volume (vph)	678	0	373	22	2	4	23	327	1852	4	3	1270
Peak-hour factor, PHF	0.80	0.92	0.92	0.69	0.69	0.69	0.92	0.92	0.92	0.92	0.89	0.89
Adj. Flow (vph)	848	0	405	32	3	6	25	355	2013	4	3	1427
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	0	0	0	0
Lane Group Flow (vph)	424	424	405	0	35	0	0	380	2017	0	3	1427
Heavy Vehicles (%)	3%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split		Free	Split			Prot	Prot			Prot	
Protected Phases	8	8		4	4		1	1	6		5	2
Permitted Phases			Free									
Actuated Green, G (s)	25.5	25.5	100.0		2.4			12.0	41.3		8.8	38.1
Effective Green, g (s)	27.5	27.5	100.0		4.4			13.0	42.3		9.8	39.1
Actuated g/C Ratio	0.28	0.28	1.00		0.04			0.13	0.42		0.10	0.39
Clearance Time (s)	6.0	6.0			6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	458	473	1583		89			446	2151		162	1430
v/s Ratio Prot	c0.25	0.25			0.02			0.11	c0.40		0.00	c0.39
v/s Ratio Perm			0.26									
v/c Ratio	0.93	0.90	0.26		0.40			0.85	0.94		0.02	1.00
Uniform Delay, d1	35.3	34.9	0.0		46.5			42.6	27.6		40.8	30.4
Progression Factor	1.00	1.00	1.00		1.00			0.79	0.95		0.60	0.40
Incremental Delay, d2	24.6	19.2	0.4		2.9			12.3	8.1		0.0	16.0
Delay (s)	59.9	54.1	0.4		49.4			45.9	34.4		24.4	28.2
Level of Service	E	D	A		D			D	C		C	C
Approach Delay (s)		38.7			49.4				36.2			17.1
Approach LOS		D			D				D			B

Intersection Summary

HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	874
Peak-hour factor, PHF	0.89
Adj. Flow (vph)	982
RTOR Reduction (vph)	0
Lane Group Flow (vph)	982
Heavy Vehicles (%)	2%
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	100.0
Effective Green, g (s)	100.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1583
v/s Ratio Prot	
v/s Ratio Perm	c0.62
v/c Ratio	0.62
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.9
Delay (s)	0.9
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰↰		↱					↑↑↑↱			↰	↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0			4.0	4.0
Lane Util. Factor	0.97		1.00					0.91			1.00	0.91
Frt	1.00		0.85					1.00			1.00	1.00
Flt Protected	0.95		1.00					1.00			0.95	1.00
Satd. Flow (prot)	3433		1583					5085			1805	5036
Flt Permitted	0.95		1.00					1.00			0.95	1.00
Satd. Flow (perm)	3433		1583					5085			1805	5036
Volume (vph)	476	0	378	0	0	0	0	1686	0	9	0	1663
Peak-hour factor, PHF	0.94	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.44	0.92	0.97
Adj. Flow (vph)	506	0	398	0	0	0	0	1833	0	20	0	1714
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	506	0	398	0	0	0	0	1833	0	0	20	1714
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	3%
Turn Type	Prot		Free							Prot	Prot	
Protected Phases	3							6		5	5	2
Permitted Phases			Free									
Actuated Green, G (s)	22.9		100.0					58.3			2.8	66.1
Effective Green, g (s)	24.9		100.0					59.3			3.8	67.1
Actuated g/C Ratio	0.25		1.00					0.59			0.04	0.67
Clearance Time (s)	6.0							5.0			5.0	5.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	855		1583					3015			69	3379
v/s Ratio Prot	c0.15							c0.36			0.01	c0.34
v/s Ratio Perm			0.25									
v/c Ratio	0.59		0.25					0.61			0.29	0.51
Uniform Delay, d1	33.1		0.0					13.0			46.8	8.2
Progression Factor	1.00		1.00					0.31			1.17	0.47
Incremental Delay, d2	1.1		0.4					0.6			1.4	0.3
Delay (s)	34.2		0.4					4.6			56.1	4.2
Level of Service	C		A					A			E	A
Approach Delay (s)		19.3			0.0			4.6				4.8
Approach LOS		B			A			A				A

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	0
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	12	12	13	12	10	11	12	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95		1.00	0.91			1.00	0.91
Frt	1.00	1.00	0.85	1.00	0.92		1.00	1.00			1.00	0.97
Flt Protected	0.95	0.97	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1793	1767	1583	1698	1696		1620	4899			1620	4605
Flt Permitted	0.95	0.97	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1793	1767	1583	1698	1696		1620	4899			1620	4605
Volume (vph)	243	43	143	48	42	50	174	1382	19	13	87	1664
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.75	0.80	0.47	0.92	0.87	0.97
Adj. Flow (vph)	264	47	155	57	50	60	232	1728	40	14	100	1715
RTOR Reduction (vph)	0	0	38	0	43	0	0	2	0	0	0	29
Lane Group Flow (vph)	154	157	117	57	67	0	232	1766	0	0	114	2031
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	4%	2%	2%	4%	4%	3%
Turn Type	Split		pt+ov	Split			Prot			Prot	Prot	
Protected Phases	3	3	3 1	7	7		1	6		5	5	2
Permitted Phases												
Actuated Green, G (s)	13.5	13.5	32.5	6.6	6.6		14.0	45.9			12.0	43.9
Effective Green, g (s)	15.5	15.5	34.5	8.6	8.6		15.0	46.9			13.0	44.9
Actuated g/C Ratio	0.16	0.16	0.34	0.09	0.09		0.15	0.47			0.13	0.45
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	278	274	546	146	146		243	2298			211	2068
v/s Ratio Prot	0.09	c0.09	0.07	0.03	c0.04		c0.14	0.36			0.07	c0.44
v/s Ratio Perm												
v/c Ratio	0.55	0.57	0.21	0.39	0.46		0.95	0.77			0.54	0.98
Uniform Delay, d1	39.1	39.2	23.2	43.2	43.5		42.2	22.0			40.7	27.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.69	0.50			0.77	0.31
Incremental Delay, d2	2.4	2.9	0.2	1.7	2.3		40.1	2.1			2.6	15.1
Delay (s)	41.4	42.1	23.4	44.9	45.8		69.3	13.2			33.9	23.6
Level of Service	D	D	C	D	D		E	B			C	C
Approach Delay (s)		35.6			45.5			19.7				24.2
Approach LOS		D			D			B				C

Intersection Summary			
HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	276
Peak-hour factor, PHF	0.80
Adj. Flow (vph)	345
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0		4.0		4.0	4.0	
Lane Util. Factor		0.91	0.91			0.88		0.91		0.97	0.95	
Frt		0.95	0.85			0.85		1.00		1.00	1.00	
Flt Protected		0.99	1.00			1.00		1.00		0.95	1.00	
Satd. Flow (prot)		3193	1441			2787		4966		3433	3539	
Flt Permitted		0.99	1.00			1.00		1.00		0.95	1.00	
Satd. Flow (perm)		3193	1441			2787		4966		3433	3539	
Volume (vph)	37	172	331	0	0	67	0	1469	50	93	1783	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.75	0.82	0.92	0.92	0.84	0.84
Adj. Flow (vph)	40	187	360	0	0	73	0	1791	54	101	2123	0
RTOR Reduction (vph)	0	65	180	0	0	64	0	3	0	0	0	0
Lane Group Flow (vph)	0	285	57	0	0	9	0	1842	0	101	2123	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Turn Type	Split		Perm			Over				Prot		
Protected Phases	4	4				1		2		1	2	
Permitted Phases			4									
Actuated Green, G (s)		12.9	12.9			10.8		59.3		10.8	59.3	
Effective Green, g (s)		14.9	14.9			12.8		60.3		12.8	60.3	
Actuated g/C Ratio		0.15	0.15			0.13		0.60		0.13	0.60	
Clearance Time (s)		6.0	6.0			6.0		5.0		6.0	5.0	
Vehicle Extension (s)		3.0	3.0			3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		476	215			357		2994		439	2134	
v/s Ratio Prot		c0.09				0.00		0.37		c0.03	c0.60	
v/s Ratio Perm			0.04									
v/c Ratio		0.60	0.27			0.03		0.62		0.23	0.99	
Uniform Delay, d1		39.8	37.7			38.1		12.5		39.2	19.7	
Progression Factor		1.00	1.00			1.00		0.16		0.88	0.29	
Incremental Delay, d2		2.0	0.7			0.0		0.9		0.2	13.8	
Delay (s)		41.8	38.4			38.2		2.8		34.6	19.5	
Level of Service		D	D			D		A		C	B	
Approach Delay (s)		40.4			38.2			2.8			20.2	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3433		5085			5085
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3433		5085			5085
Volume (vph)	184	0	1519	0	0	2115
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	200	0	1651	0	0	2299
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	200	0	1651	0	0	2299
Turn Type						
Protected Phases	1		2			2
Permitted Phases						
Actuated Green, G (s)	10.8		59.3			59.3
Effective Green, g (s)	12.8		60.3			60.3
Actuated g/C Ratio	0.13		0.60			0.60
Clearance Time (s)	6.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	439		3066			3066
v/s Ratio Prot	c0.06		0.32			c0.45
v/s Ratio Perm						
v/c Ratio	0.46		0.54			0.75
Uniform Delay, d1	40.4		11.7			14.4
Progression Factor	1.00		0.49			0.22
Incremental Delay, d2	0.8		0.6			0.6
Delay (s)	41.1		6.3			3.8
Level of Service	D		A			A
Approach Delay (s)	41.1		6.3			3.8
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95				0.88	1.00	0.91		1.00	0.95	
Frt		0.94				0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3274				2787	1770	5031		1770	3494	
Flt Permitted		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3274				2787	1770	5031		1770	3494	
Volume (vph)	89	88	122	0	0	126	30	1297	99	93	1928	178
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99
Adj. Flow (vph)	100	99	137	0	0	137	33	1410	108	101	1947	180
RTOR Reduction (vph)	0	119	0	0	0	122	0	8	0	0	6	0
Lane Group Flow (vph)	0	217	0	0	0	15	33	1510	0	101	2121	0
Turn Type	Split					Over	Prot			Prot		
Protected Phases	4	4				1	5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		11.0				10.3	5.0	62.7		10.3	68.0	
Effective Green, g (s)		13.0				11.3	6.0	63.7		11.3	69.0	
Actuated g/C Ratio		0.13				0.11	0.06	0.64		0.11	0.69	
Clearance Time (s)		6.0				5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0				3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		426				315	106	3205		200	2411	
v/s Ratio Prot		c0.07				0.01	0.02	c0.30		0.06	c0.61	
v/s Ratio Perm												
v/c Ratio		0.51				0.05	0.31	0.47		0.51	0.88	
Uniform Delay, d1		40.5				39.6	45.0	9.4		41.7	12.2	
Progression Factor		1.00				1.00	1.00	1.00		1.23	0.72	
Incremental Delay, d2		1.0				0.1	1.6	0.5		1.3	3.4	
Delay (s)		41.5				39.6	46.6	9.9		52.6	12.2	
Level of Service		D				D	D	A		D	B	
Approach Delay (s)		41.5			39.6			10.7			14.1	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↰	↑↑↑	↑↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			1.00	0.91	0.91	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			1770	5085	5085	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			1770	5085	5085	1583
Volume (vph)	0	0	185	1426	1584	466
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	201	1550	1722	507
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	201	1550	1722	507
Turn Type			Prot			Free
Protected Phases			5	2	6	
Permitted Phases						Free
Actuated Green, G (s)			25.0	100.0	65.0	100.0
Effective Green, g (s)			26.0	100.0	66.0	100.0
Actuated g/C Ratio			0.26	1.00	0.66	1.00
Clearance Time (s)			5.0	5.0	5.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			460	5085	3356	1583
v/s Ratio Prot			c0.11	0.30	c0.34	
v/s Ratio Perm						0.32
v/c Ratio			0.44	0.30	0.51	0.32
Uniform Delay, d1			30.9	0.0	8.7	0.0
Progression Factor			1.00	1.00	0.77	1.00
Incremental Delay, d2			0.7	0.2	0.3	0.3
Delay (s)			31.6	0.2	7.1	0.3
Level of Service			C	A	A	A
Approach Delay (s)	0.0			3.8	5.5	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	4.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					1.00			1.00				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					1835			1852				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					1835			1852				
Volume (vph)	0	0	0	0	580	71	57	435	0	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	630	77	62	473	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	704	0	0	530	0	0	0	0
Turn Type							Split					
Protected Phases					8		2	2				
Permitted Phases												
Actuated Green, G (s)					65.3			34.7				
Effective Green, g (s)					66.3			35.7				
Actuated g/C Ratio					0.60			0.32				
Clearance Time (s)					5.0			5.0				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)					1106			601				
v/s Ratio Prot					c0.38			c0.29				
v/s Ratio Perm												
v/c Ratio					0.64			0.88				
Uniform Delay, d1					14.1			35.1				
Progression Factor					1.00			1.00				
Incremental Delay, d2					2.8			14.2				
Delay (s)					16.9			49.3				
Level of Service					B			D				
Approach Delay (s)		0.0			16.9			49.3			0.0	
Approach LOS		A			B			D			A	

Intersection Summary			
HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations					↰↑↱			↶	↑↑↱		↰	↑↑↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0		4.0	4.0
Lane Util. Factor					0.95			1.00	0.91		1.00	0.91
Frt					0.94			1.00	0.99		1.00	0.99
Flt Protected					0.98			0.95	1.00		0.95	1.00
Satd. Flow (prot)					3308			1788	5036		1736	5046
Flt Permitted					0.98			0.95	1.00		0.95	1.00
Satd. Flow (perm)					3308			1788	5036		1736	5046
Volume (vph)	0	0	0	11	3	10	6	593	1186	66	30	1440
Peak-hour factor, PHF	0.92	0.92	0.92	0.64	0.64	0.64	0.25	0.95	0.82	0.66	0.65	0.85
Adj. Flow (vph)	0	0	0	17	5	16	24	624	1446	100	46	1694
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	12	0	0	5
Lane Group Flow (vph)	0	0	0	0	23	0	0	648	1534	0	46	1796
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	1%	2%	2%	4%	2%
Turn Type				Split			Prot	Prot			Prot	
Protected Phases				8	8		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)					4.2			46.0	70.0		29.8	53.8
Effective Green, g (s)					6.2			47.0	71.0		30.8	54.8
Actuated g/C Ratio					0.05			0.39	0.59		0.26	0.46
Clearance Time (s)					6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)					3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)					171			700	2980		446	2304
v/s Ratio Prot					c0.01			c0.36	0.30		0.03	c0.36
v/s Ratio Perm												
v/c Ratio					0.13			0.93	0.51		0.10	0.78
Uniform Delay, d1					54.3			34.8	14.4		34.1	27.5
Progression Factor					1.00			1.09	0.45		1.00	1.00
Incremental Delay, d2					0.4			15.9	0.5		0.1	2.7
Delay (s)					54.7			53.9	7.0		34.2	30.2
Level of Service					D			D	A		C	C
Approach Delay (s)		0.0			54.7				20.8			30.3
Approach LOS		A			D				C			C

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	89
Peak-hour factor, PHF	0.83
Adj. Flow (vph)	107
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	0.88		0.95		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85		0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1665	1685	2814		3323		3467	5074		1770	5071	
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00		0.10	1.00	
Satd. Flow (perm)	1665	1685	2814		3323		3467	5074		180	5071	
Volume (vph)	151	16	785	19	13	12	732	1685	28	16	1325	116
Peak-hour factor, PHF	0.81	0.92	0.90	0.92	0.92	0.92	0.94	0.84	0.92	0.92	0.93	0.89
Adj. Flow (vph)	186	17	872	21	14	13	779	2006	30	17	1425	130
RTOR Reduction (vph)	0	0	264	0	12	0	0	1	0	0	9	0
Lane Group Flow (vph)	98	105	608	0	36	0	779	2035	0	17	1546	0
Heavy Vehicles (%)	3%	2%	1%	2%	2%	2%	1%	2%	2%	2%	1%	1%
Turn Type	Split		pt+ov	Split			Prot			Perm		
Protected Phases	4	4	4 1	8	8		1	6			2	
Permitted Phases										2		
Actuated Green, G (s)	14.9	14.9	51.0		5.6		36.1	81.5		39.4	39.4	
Effective Green, g (s)	16.9	16.9	55.0		7.6		38.1	83.5		41.4	41.4	
Actuated g/C Ratio	0.14	0.14	0.46		0.06		0.32	0.70		0.34	0.34	
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	234	237	1290		210		1101	3531		62	1749	
v/s Ratio Prot	0.06	0.06	c0.22		c0.01		c0.22	0.40			c0.30	
v/s Ratio Perm										0.09		
v/c Ratio	0.42	0.44	0.47		0.17		0.71	0.58		0.27	0.88	
Uniform Delay, d1	47.1	47.2	22.5		53.2		36.0	9.3		28.4	37.0	
Progression Factor	1.00	1.00	1.00		1.00		0.73	0.52		0.47	0.44	
Incremental Delay, d2	1.2	1.3	0.3		0.4		1.1	0.4		7.1	4.8	
Delay (s)	48.3	48.6	22.7		53.6		27.6	5.2		20.5	21.0	
Level of Service	D	D	C		D		C	A		C	C	
Approach Delay (s)		27.6			53.6			11.4			21.0	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰	↱			✣		↰	↑↑↑↱			↰	↑↑↑↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91			1.00	0.91
Frt	1.00	0.86			0.98		1.00	1.00			1.00	0.97
Flt Protected	0.95	1.00			0.96		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1627			1774		1805	5080			1805	5004
Flt Permitted	0.78	1.00			0.74		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1458	1627			1370		1805	5080			1805	5004
Volume (vph)	175	2	158	14	2	2	192	2251	11	5	17	1740
Peak-hour factor, PHF	0.82	0.25	0.89	0.60	0.50	0.50	0.87	0.84	0.56	0.62	0.31	0.95
Adj. Flow (vph)	213	8	178	23	4	4	221	2680	20	8	55	1832
RTOR Reduction (vph)	0	143	0	0	3	0	0	0	0	0	0	26
Lane Group Flow (vph)	213	43	0	0	28	0	221	2700	0	0	63	2183
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	0%	2%	0%	0%	0%	1%
Turn Type	Perm			Perm			Prot			Prot	Prot	
Protected Phases		4			8		1	6		5	5	2
Permitted Phases	4			8								
Actuated Green, G (s)	21.9	21.9			21.9		22.1	74.6			7.5	60.0
Effective Green, g (s)	23.9	23.9			23.9		23.1	75.6			8.5	61.0
Actuated g/C Ratio	0.20	0.20			0.20		0.19	0.63			0.07	0.51
Clearance Time (s)	6.0	6.0			6.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	290	324			273		347	3200			128	2544
v/s Ratio Prot		0.03					0.12	c0.53			0.03	c0.44
v/s Ratio Perm	c0.15				0.02							
v/c Ratio	0.73	0.13			0.10		0.64	0.84			0.49	0.86
Uniform Delay, d1	45.1	39.5			39.3		44.6	17.5			53.7	25.7
Progression Factor	1.00	1.00			1.00		0.83	0.62			1.40	0.41
Incremental Delay, d2	9.3	0.2			0.2		2.5	1.9			1.9	2.7
Delay (s)	54.3	39.7			39.4		39.3	12.8			77.0	13.3
Level of Service	D	D			D		D	B			E	B
Approach Delay (s)		47.5			39.4			14.8				15.0
Approach LOS		D			D			B				B

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	366
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	377
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	1%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	12	12	12	12	12	12	10
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0	4.0			4.0
Lane Util. Factor	0.95	0.95	1.00		1.00			0.97	0.91			1.00
Frt	1.00	1.00	0.85		0.95			1.00	1.00			1.00
Flt Protected	0.95	0.95	1.00		0.99			0.95	1.00			0.95
Satd. Flow (prot)	1665	1730	1583		2019			3433	5083			1652
Flt Permitted	0.95	0.95	1.00		0.99			0.95	1.00			0.95
Satd. Flow (perm)	1665	1730	1583		2019			3433	5083			1652
Volume (vph)	584	4	477	4	4	5	2	400	1859	3	6	0
Peak-hour factor, PHF	0.96	0.25	0.92	0.50	0.33	0.42	0.91	0.91	0.85	0.38	0.75	0.92
Adj. Flow (vph)	608	16	518	8	12	12	2	440	2187	8	8	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	0	0
Lane Group Flow (vph)	304	320	518	0	21	0	0	442	2195	0	0	8
Heavy Vehicles (%)	3%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split		Free	Split			Prot	Prot			Prot	Prot
Protected Phases	8	8		4	4		1	1	6		5	5
Permitted Phases			Free									
Actuated Green, G (s)	23.8	23.8	120.0		4.6			19.9	64.6			5.0
Effective Green, g (s)	25.8	25.8	120.0		6.6			20.9	65.6			6.0
Actuated g/C Ratio	0.22	0.22	1.00		0.05			0.17	0.55			0.05
Clearance Time (s)	6.0	6.0			6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	358	372	1583		111			598	2779			83
v/s Ratio Prot	0.18	c0.19			0.01			c0.13	c0.43			0.00
v/s Ratio Perm			0.33									
v/c Ratio	0.85	0.86	0.33		0.19			0.74	0.79			0.10
Uniform Delay, d1	45.2	45.4	0.0		54.1			47.0	21.7			54.4
Progression Factor	1.00	1.00	1.00		1.00			0.89	1.19			0.81
Incremental Delay, d2	16.9	18.0	0.6		0.8			3.5	1.7			0.3
Delay (s)	62.1	63.3	0.6		54.9			45.3	27.5			44.2
Level of Service	E	E	A		D			D	C			D
Approach Delay (s)		34.5			54.9				30.5			
Approach LOS		C			D				C			

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑	↱
Ideal Flow (vphpl)	1900	1900
Lane Width	13	12
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3657	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3657	1583
Volume (vph)	1413	492
Peak-hour factor, PHF	0.92	0.90
Adj. Flow (vph)	1536	547
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	1536	547
Heavy Vehicles (%)	2%	2%
Turn Type		Free
Protected Phases	2	
Permitted Phases		Free
Actuated Green, G (s)	49.7	120.0
Effective Green, g (s)	50.7	120.0
Actuated g/C Ratio	0.42	1.00
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	1545	1583
v/s Ratio Prot	c0.42	
v/s Ratio Perm		c0.35
v/c Ratio	0.99	0.35
Uniform Delay, d1	34.5	0.0
Progression Factor	0.37	1.00
Incremental Delay, d2	16.5	0.4
Delay (s)	29.4	0.4
Level of Service	C	A
Approach Delay (s)	21.9	
Approach LOS	C	

Intersection Summary

5: I-95 NB Off Ramp & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰↰		↱					↑↑↑↱			↰	↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0			4.0	4.0
Lane Util. Factor	0.97		1.00					0.91			1.00	0.91
Frt	1.00		0.85					1.00			1.00	1.00
Flt Protected	0.95		1.00					1.00			0.95	1.00
Satd. Flow (prot)	3433		1568					5085			1805	5136
Flt Permitted	0.95		1.00					1.00			0.95	1.00
Satd. Flow (perm)	3433		1568					5085			1805	5136
Volume (vph)	450	0	428	0	0	0	0	1777	0	27	0	1871
Peak-hour factor, PHF	0.76	0.92	0.72	0.92	0.92	0.92	0.92	0.92	0.92	0.26	0.26	0.96
Adj. Flow (vph)	592	0	594	0	0	0	0	1932	0	104	0	1949
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	592	0	594	0	0	0	0	1932	0	0	104	1949
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	2%	2%	2%	0%	0%	1%
Turn Type	Prot		Free							Prot	Prot	
Protected Phases	3							6		5	5	2
Permitted Phases			Free									
Actuated Green, G (s)	25.3		120.0					66.8			11.9	83.7
Effective Green, g (s)	27.3		120.0					67.8			12.9	84.7
Actuated g/C Ratio	0.23		1.00					0.56			0.11	0.71
Clearance Time (s)	6.0							5.0			5.0	5.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	781		1568					2873			194	3625
v/s Ratio Prot	c0.17							c0.38			0.06	c0.38
v/s Ratio Perm			0.38									
v/c Ratio	0.76		0.38					0.67			0.54	0.54
Uniform Delay, d1	43.3		0.0					18.3			50.7	8.4
Progression Factor	1.00		1.00					0.28			1.37	0.18
Incremental Delay, d2	4.2		0.7					0.7			1.7	0.3
Delay (s)	47.5		0.7					5.8			71.3	1.8
Level of Service	D		A					A			E	A
Approach Delay (s)		24.1			0.0			5.8				5.3
Approach LOS		C			A			A				A

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	0
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰	↰↑	↱	↰	↑↱		↰	↑↑↑↱			↶↰	↑↑↑↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	12	12	13	12	10	11	12	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.91			1.00	0.91
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00			1.00	0.98
Flt Protected	0.95	0.97	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1793	1777	1615	1770	1775		1636	4900			1652	4657
Flt Permitted	0.95	0.97	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1793	1777	1615	1770	1775		1636	4900			1652	4657
Volume (vph)	210	42	177	47	30	69	215	1495	22	2	102	1961
Peak-hour factor, PHF	0.87	0.83	1.00	0.70	0.50	0.65	0.92	0.80	0.47	0.69	0.69	0.94
Adj. Flow (vph)	241	51	177	67	60	106	234	1869	47	3	148	2086
RTOR Reduction (vph)	0	0	27	0	52	0	0	3	0	0	0	17
Lane Group Flow (vph)	144	148	150	67	114	0	234	1913	0	0	151	2392
Heavy Vehicles (%)	2%	1%	0%	2%	0%	0%	3%	2%	0%	2%	2%	2%
Turn Type	Split		pt+ov	Split			Prot			Prot	Prot	
Protected Phases	3	3	3 1	7	7		1	6		5	5	2
Permitted Phases												
Actuated Green, G (s)	13.9	13.9	36.8	8.3	8.3		17.9	56.3			19.5	57.9
Effective Green, g (s)	15.9	15.9	38.8	10.3	10.3		18.9	57.3			20.5	58.9
Actuated g/C Ratio	0.13	0.13	0.32	0.09	0.09		0.16	0.48			0.17	0.49
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	238	235	522	152	152		258	2340			282	2286
v/s Ratio Prot	0.08	c0.08	0.09	0.04	c0.06		c0.14	0.39			0.09	c0.51
v/s Ratio Perm												
v/c Ratio	0.61	0.63	0.29	0.44	0.75		0.91	0.82			0.54	1.05
Uniform Delay, d1	49.1	49.3	30.3	52.1	53.6		49.7	26.9			45.4	30.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.72	0.61			0.78	0.44
Incremental Delay, d2	4.3	5.2	0.3	2.0	18.2		28.3	2.8			1.7	31.3
Delay (s)	53.4	54.5	30.6	54.2	71.8		64.0	19.0			37.0	44.6
Level of Service	D	D	C	D	E		E	B			D	D
Approach Delay (s)		45.1			66.7			23.9				44.1
Approach LOS		D			E			C				D

Intersection Summary			
HCM Average Control Delay	37.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	252
Peak-hour factor, PHF	0.78
Adj. Flow (vph)	323
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	1%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0		4.0		4.0	4.0	
Lane Util. Factor		0.91	0.91			0.88		0.91		0.97	0.95	
Frt		0.99	0.85			0.85		0.99		1.00	1.00	
Flt Protected		1.00	1.00			1.00		1.00		0.95	1.00	
Satd. Flow (prot)		3331	1441			2787		5049		3433	3539	
Flt Permitted		1.00	1.00			1.00		1.00		0.95	1.00	
Satd. Flow (perm)		3331	1441			2787		5049		3433	3539	
Volume (vph)	34	291	303	0	0	145	0	1552	85	238	1966	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.87	0.85	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	316	329	0	0	158	0	1826	92	259	2137	0
RTOR Reduction (vph)	0	6	187	0	0	135	0	4	0	0	0	0
Lane Group Flow (vph)	0	380	109	0	0	23	0	1914	0	259	2137	0
Turn Type	Split		Perm			Over				Prot		
Protected Phases	4	4				1		2		1	2	
Permitted Phases			4									
Actuated Green, G (s)		16.3	16.3			15.8		70.9		15.8	70.9	
Effective Green, g (s)		18.3	18.3			17.8		71.9		17.8	71.9	
Actuated g/C Ratio		0.15	0.15			0.15		0.60		0.15	0.60	
Clearance Time (s)		6.0	6.0			6.0		5.0		6.0	5.0	
Vehicle Extension (s)		3.0	3.0			3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		508	220			413		3025		509	2120	
v/s Ratio Prot		c0.11				0.01		0.38		c0.08	c0.60	
v/s Ratio Perm			0.08									
v/c Ratio		0.75	0.49			0.06		0.63		0.51	1.01	
Uniform Delay, d1		48.6	46.6			43.9		15.5		47.1	24.0	
Progression Factor		1.00	1.00			1.00		0.11		0.80	0.32	
Incremental Delay, d2		6.0	1.7			0.1		0.9		0.3	13.2	
Delay (s)		54.6	48.4			43.9		2.6		38.0	21.0	
Level of Service		D	D			D		A		D	C	
Approach Delay (s)		51.9			43.9			2.6			22.9	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰		↑↑↑			↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3433		5085			5085
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3433		5085			5085
Volume (vph)	322	0	1637	0	0	2269
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	350	0	1779	0	0	2466
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	350	0	1779	0	0	2466
Turn Type						
Protected Phases	1		2			2
Permitted Phases						
Actuated Green, G (s)	15.8		70.9			70.9
Effective Green, g (s)	17.8		71.9			71.9
Actuated g/C Ratio	0.15		0.60			0.60
Clearance Time (s)	6.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	509		3047			3047
v/s Ratio Prot	c0.10		0.35			c0.48
v/s Ratio Perm						
v/c Ratio	0.69		0.58			0.81
Uniform Delay, d1	48.5		14.8			18.7
Progression Factor	1.00		0.77			0.21
Incremental Delay, d2	3.8		0.7			0.7
Delay (s)	52.3		12.1			4.6
Level of Service	D		B			A
Approach Delay (s)	52.3		12.1			4.6
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	30.3
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱				↱↱	↰	↑↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95				0.88	1.00	0.91		1.00	0.95	
Frt		0.94				0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3290				2682	1787	4979		1805	3525	
Flt Permitted		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3290				2682	1787	4979		1805	3525	
Volume (vph)	101	124	134	0	0	215	34	1320	166	79	2297	219
Peak-hour factor, PHF	0.91	0.83	0.78	0.61	0.77	0.94	0.75	0.88	0.58	0.92	0.94	0.82
Adj. Flow (vph)	111	149	172	0	0	229	45	1500	286	86	2444	267
RTOR Reduction (vph)	0	64	0	0	0	139	0	22	0	0	7	0
Lane Group Flow (vph)	0	368	0	0	0	90	45	1764	0	86	2704	0
Heavy Vehicles (%)	1%	0%	4%	2%	3%	6%	1%	2%	0%	0%	1%	0%
Turn Type	Split					Over	Prot			Prot		
Protected Phases	4	4				1	5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		12.9				10.7	4.0	80.4		10.7	87.1	
Effective Green, g (s)		14.9				11.7	5.0	81.4		11.7	88.1	
Actuated g/C Ratio		0.12				0.10	0.04	0.68		0.10	0.73	
Clearance Time (s)		6.0				5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0				3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		409				261	74	3377		176	2588	
v/s Ratio Prot		c0.11				0.03	0.03	c0.35		0.05	c0.77	
v/s Ratio Perm												
v/c Ratio		0.90				0.34	0.61	0.52		0.49	1.04	
Uniform Delay, d1		51.8				50.6	56.5	9.6		51.3	16.0	
Progression Factor		1.00				1.00	1.00	1.00		1.21	0.36	
Incremental Delay, d2		21.9				0.8	13.0	0.6		1.2	27.2	
Delay (s)		73.7				51.4	69.5	10.2		63.2	32.9	
Level of Service		E				D	E	B		E	C	
Approach Delay (s)		73.7			51.4			11.6			33.9	
Approach LOS		E			D			B			C	

Intersection Summary			
HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

10: Morris St. & Chris Columbus Blvd.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↰	↑↑↑	↑↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			1.00	0.91	0.91	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			1770	5085	5085	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			1770	5085	5085	1583
Volume (vph)	0	0	157	1520	1890	541
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	171	1652	2054	588
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	171	1652	2054	588
Turn Type			Prot			Free
Protected Phases			5	2	6	
Permitted Phases						Free
Actuated Green, G (s)			35.0	120.0	75.0	120.0
Effective Green, g (s)			36.0	120.0	76.0	120.0
Actuated g/C Ratio			0.30	1.00	0.63	1.00
Clearance Time (s)			5.0	5.0	5.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			531	5085	3221	1583
v/s Ratio Prot			0.10	0.32	c0.40	
v/s Ratio Perm						c0.37
v/c Ratio			0.32	0.32	0.64	0.37
Uniform Delay, d1			32.5	0.0	13.5	0.0
Progression Factor			1.00	1.00	0.68	1.00
Incremental Delay, d2			0.4	0.2	0.1	0.1
Delay (s)			32.9	0.2	9.3	0.1
Level of Service			C	A	A	A
Approach Delay (s)	0.0			3.2	7.3	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

11: Morris St & Water St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					1.00			1.00				
Frt					0.98			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					1833			1854				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					1833			1854				
Volume (vph)	0	0	0	0	614	84	82	759	0	0	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	667	91	89	825	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	754	0	0	911	0	0	0	0
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					50.7			59.3				
Effective Green, g (s)					51.7			60.3				
Actuated g/C Ratio					0.43			0.50				
Clearance Time (s)					5.0			5.0				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)					790			932				
v/s Ratio Prot					c0.41							
v/s Ratio Perm								0.49				
v/c Ratio					0.95			0.98				
Uniform Delay, d1					33.0			29.2				
Progression Factor					0.99			1.00				
Incremental Delay, d2					21.9			23.7				
Delay (s)					54.6			52.9				
Level of Service					D			D				
Approach Delay (s)		0.0			54.6			52.9			0.0	
Approach LOS		A			D			D			A	

Intersection Summary			
HCM Average Control Delay	53.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

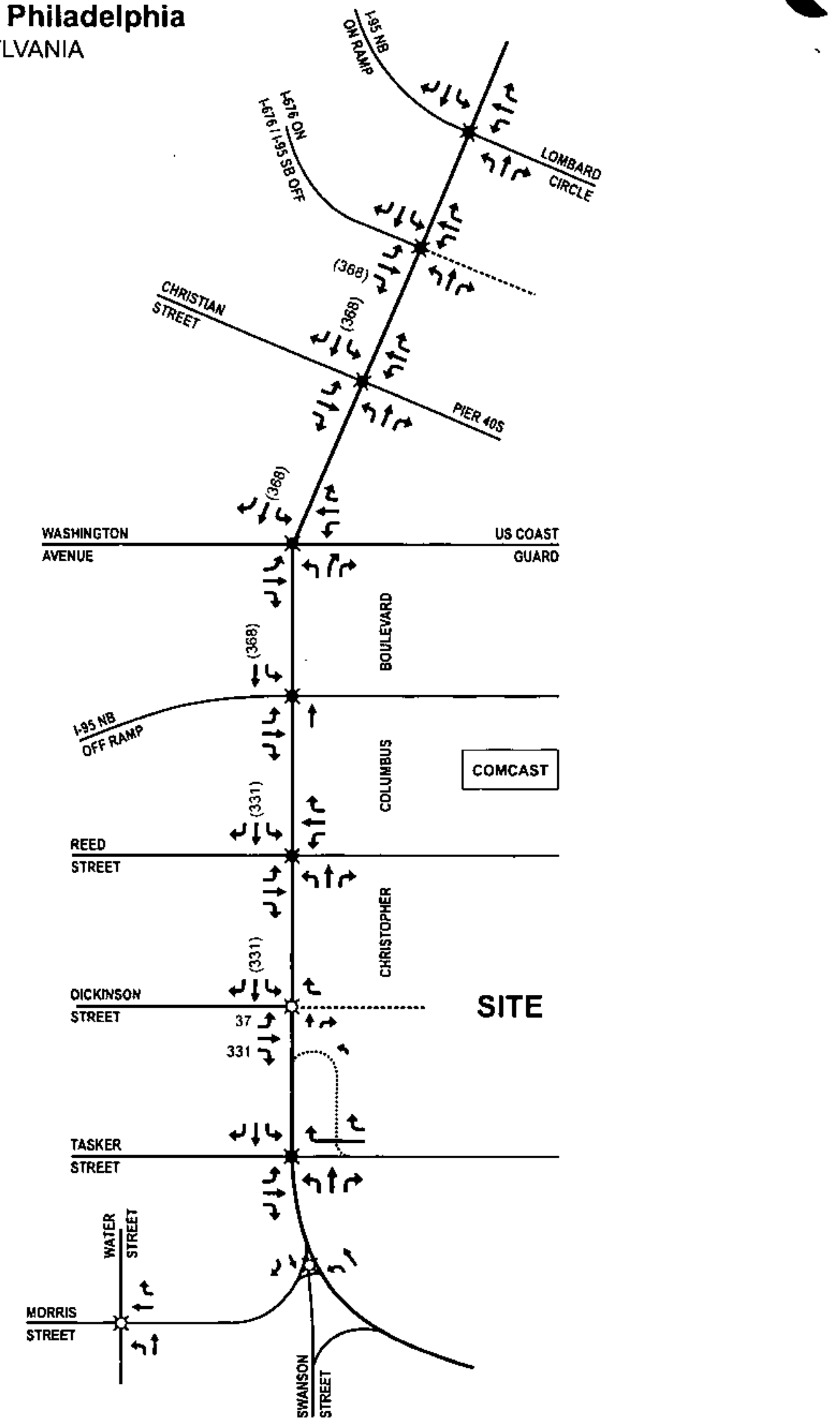
Orth - Rodgers & Associates, Inc.

FIGURE 5

2018 Build Late Friday Afternoon Peak Hour Ambient Traffic Reassignment due to Dickinson Street Ramp

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA



LEGEND
- EXISTING TRAFFIC SIGNAL
- PROPOSED TRAFFIC SIGNAL
- \# INCREASE IN VOLUME
- (#) DECREASE IN VOLUME

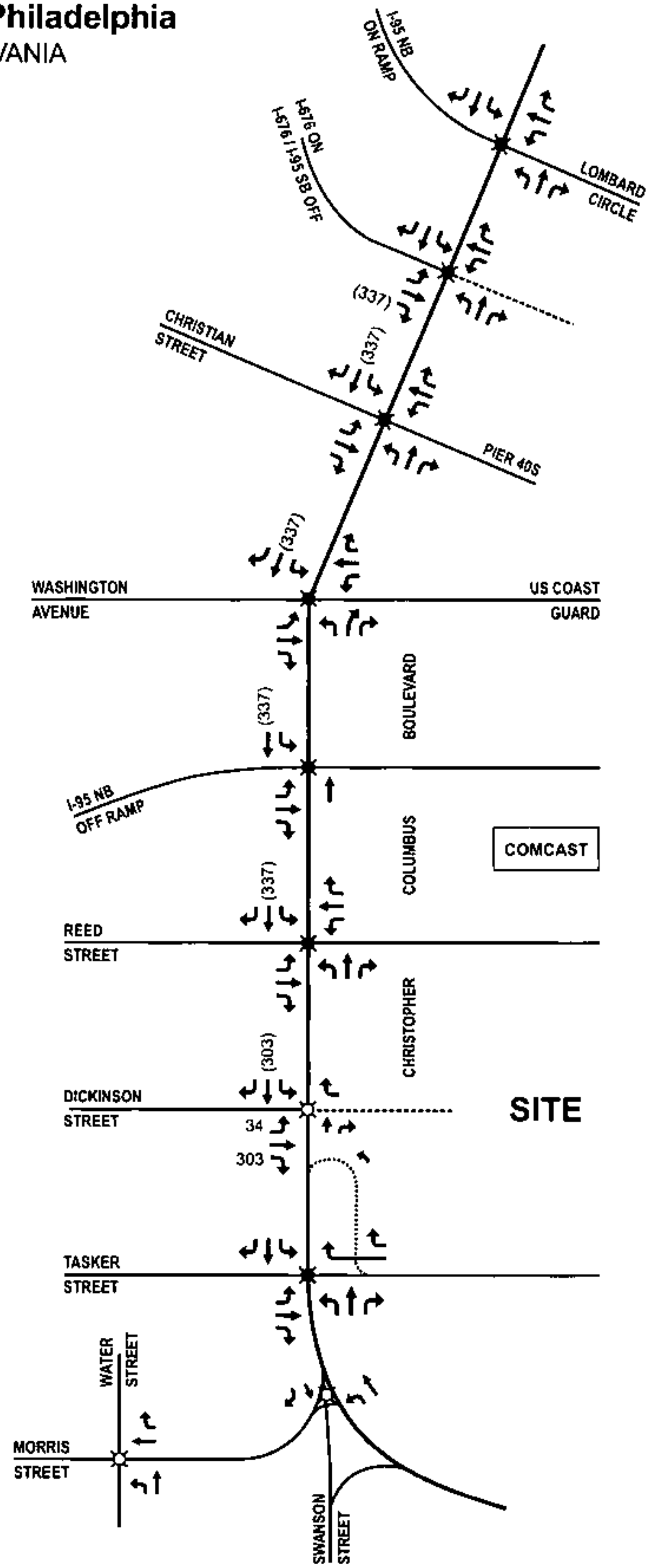
Orth - Rodgers & Associates, Inc.

FIGURE 6

2018 Build Early Saturday Afternoon Peak Hour Ambient Traffic Reassignment due to Dickinson Street Ramp

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA



LEGEND

- EXISTING TRAFFIC SIGNAL
- PROPOSED TRAFFIC SIGNAL
- # INCREASE IN VOLUME
- (#) DECREASE IN VOLUME

FIGURE 7

2018 Late Friday Afternoon Peak Hour Site Generated Traffic Reassignment due to Dickinson Street Ramp

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

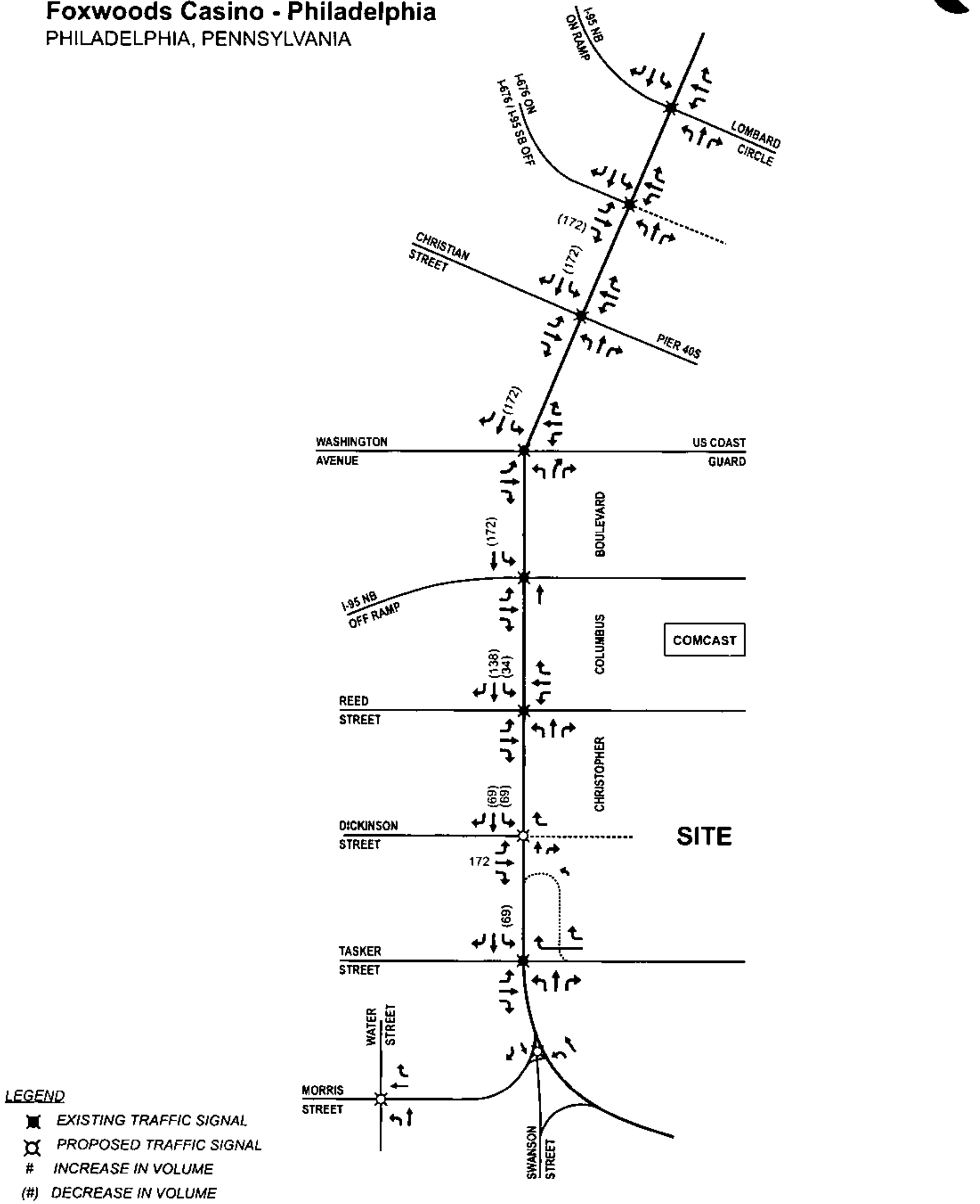
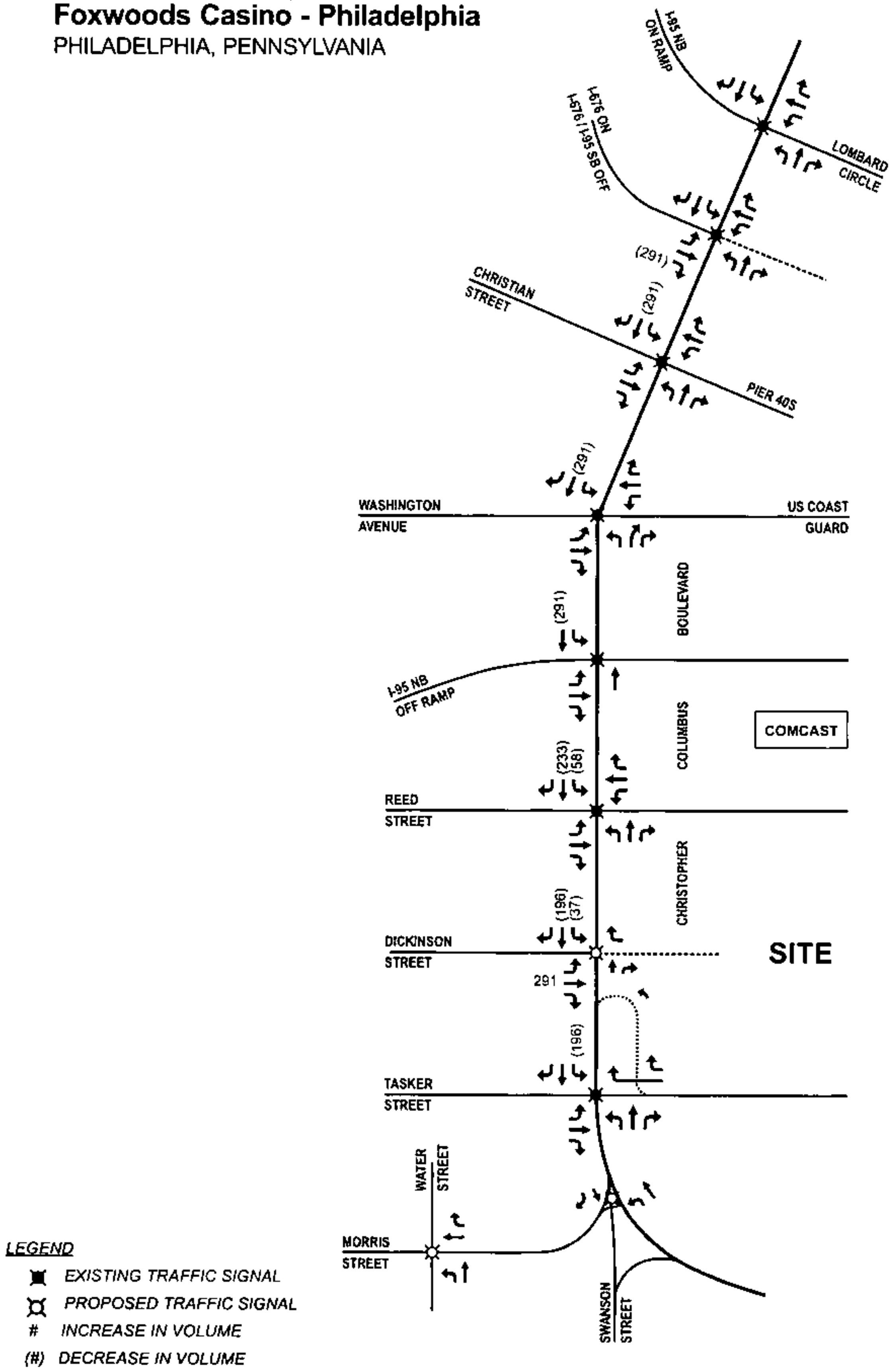


FIGURE 8

2018 Early Saturday Afternoon Peak Hour Site Generated Traffic Reassignment due to Dickinson Street Ramp

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA



Appendix C

Levels of Service Figures

Orth-Rodgers & Associates, Inc.

FIGURE 9

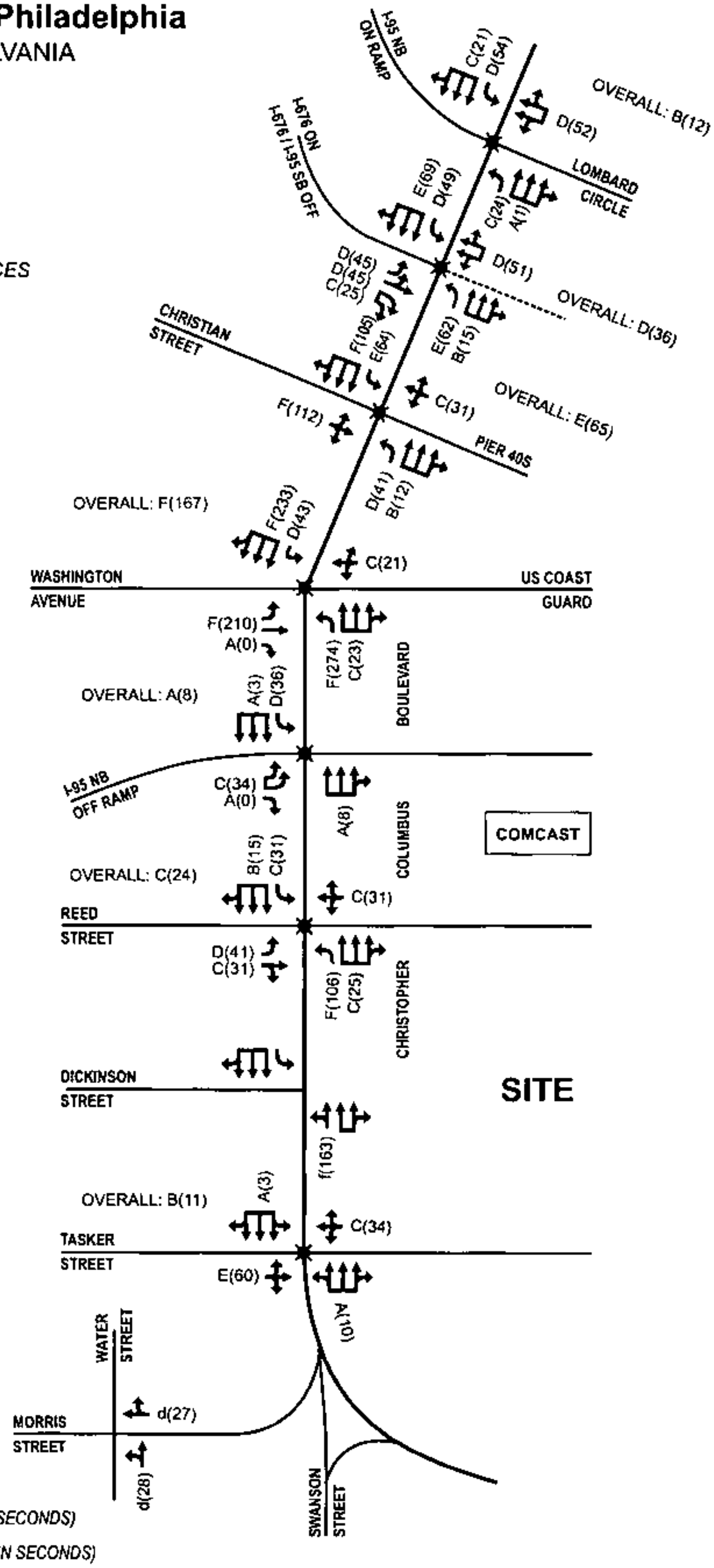
2018 No Build Late Friday Afternoon Peak Hour Levels of Service

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

NOTE

INCLUDES DOCKSIDE RESIDENCES



LEGEND

- EXISTING TRAFFIC SIGNAL

- PROPOSED TRAFFIC SIGNAL

A(#) - SIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

a(#) - UNSIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

FIGURE 10

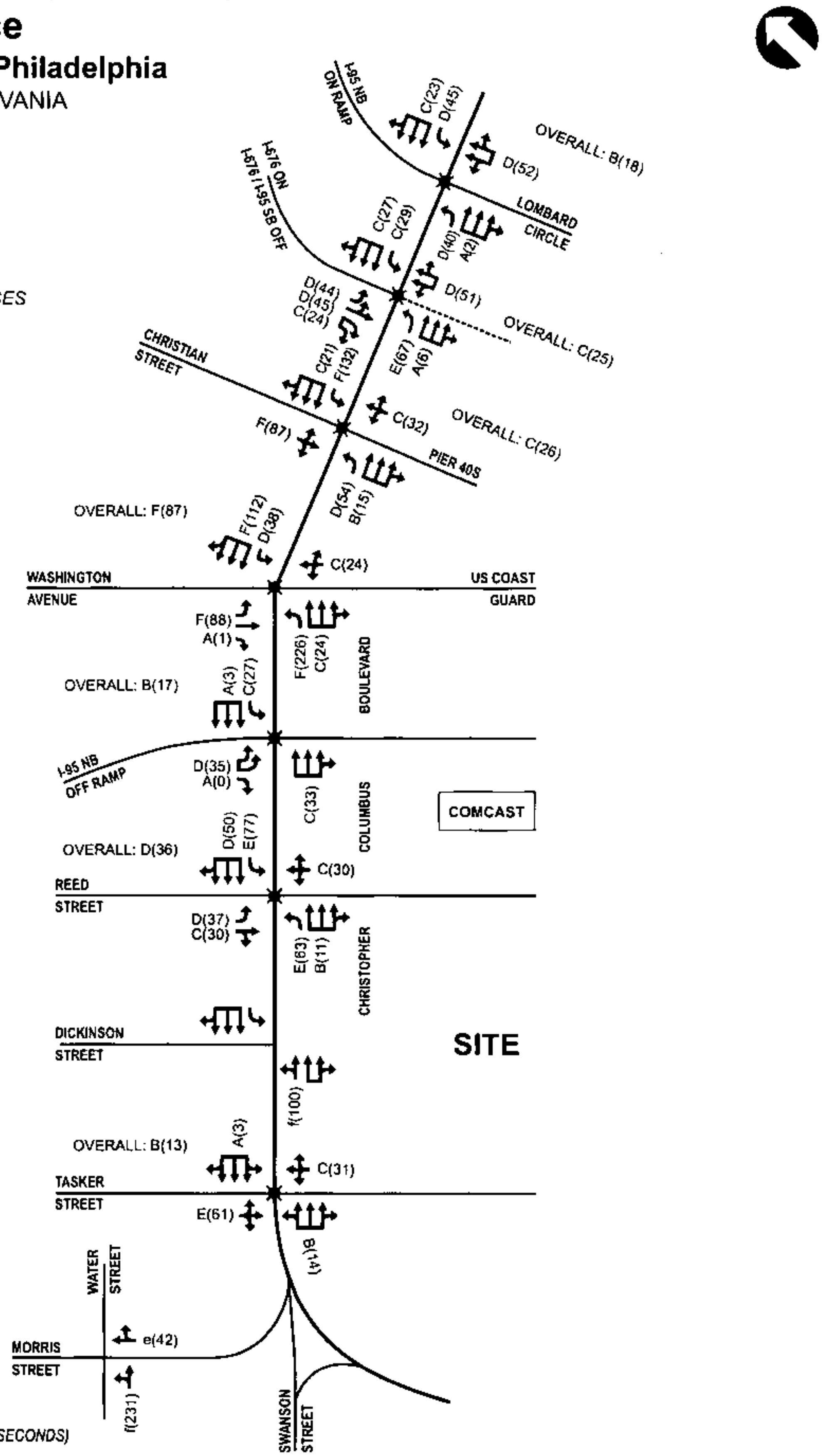
2018 No Build Early Saturday Afternoon Peak Hour Levels of Service

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

NOTE

INCLUDES DOCKSIDE RESIDENCES



LEGEND

- EXISTING TRAFFIC SIGNAL

- PROPOSED TRAFFIC SIGNAL

A(#) - SIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

a(#) - UNSIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

FIGURE 11

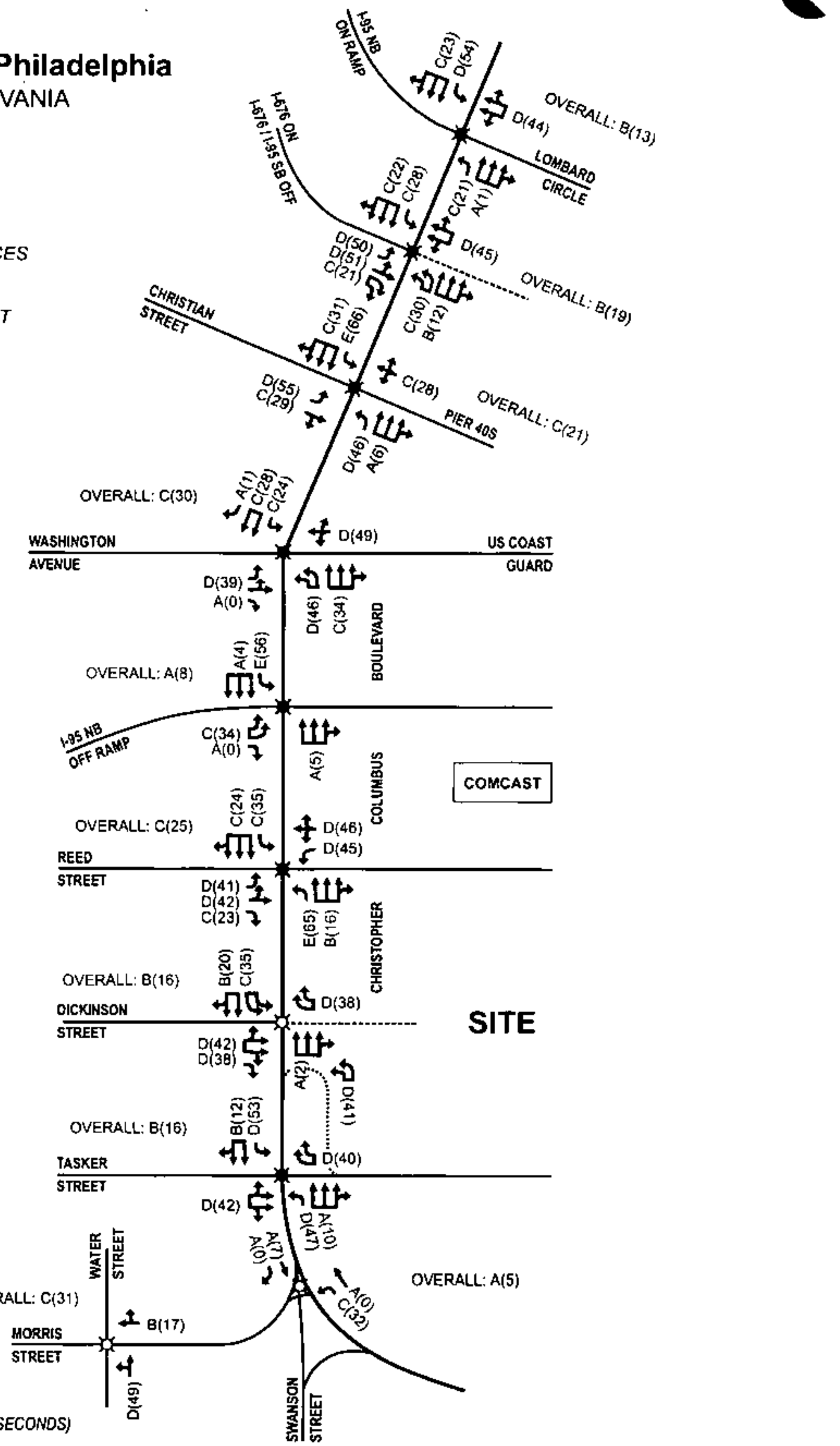
2018 Build Late Friday Afternoon Peak Hour Levels of Service w/ Dickinson Street Ramp & Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

NOTE

INCLUDES DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS AT TASKER STREET



LEGEND

- *EXISTING TRAFFIC SIGNAL*
- *PROPOSED TRAFFIC SIGNAL*

A(#) - SIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

a(#) - UNSIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

ORA Orth - Rodgers & Associates, Inc.

FIGURE 12

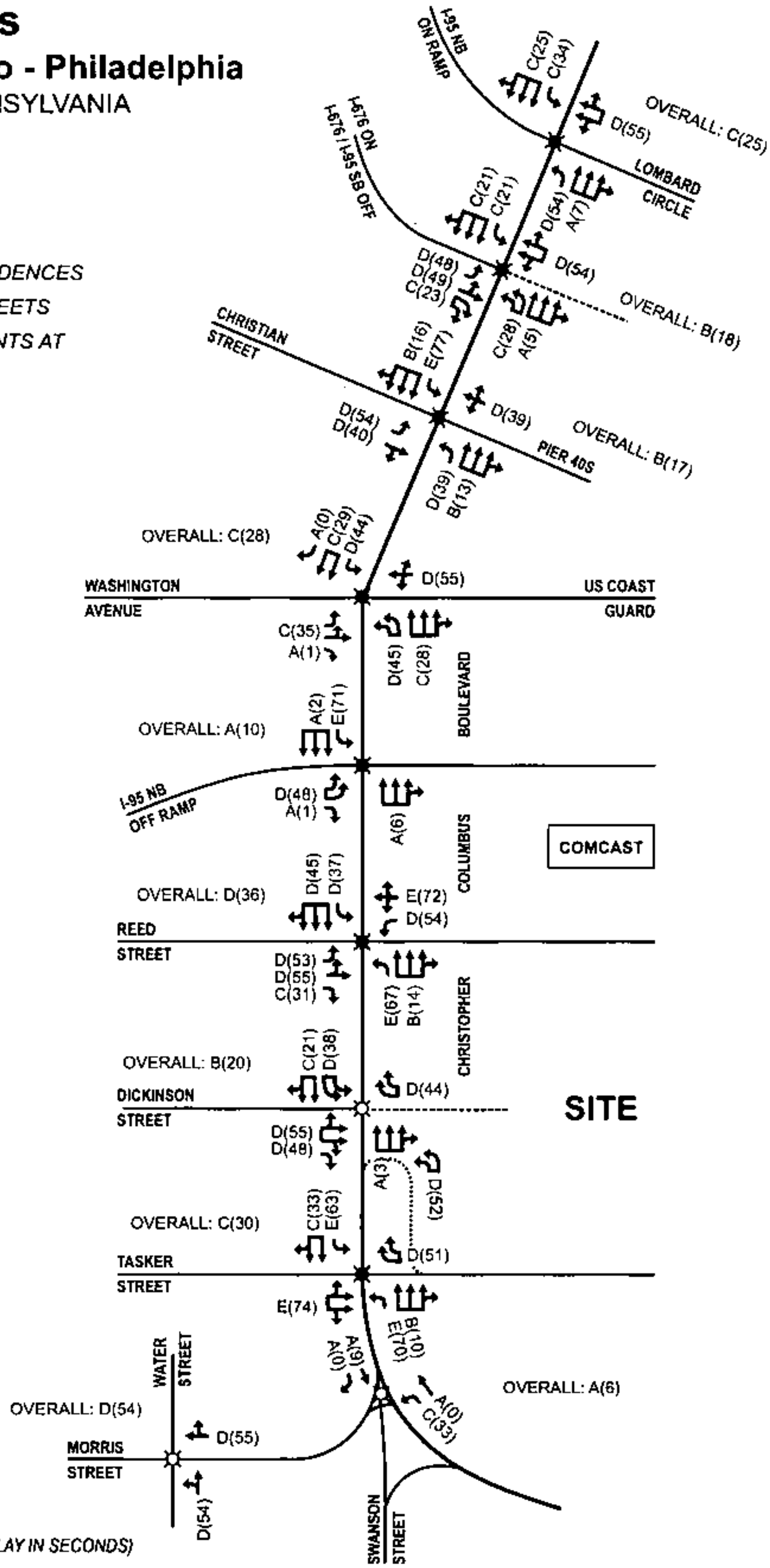
2018 Build Early Saturday Peak Hour Levels of Service w/ Dickinson Street Ramp & Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

<u>NOTE</u>

INCLUDES DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS AT TASKER STREET



<u>LEGEND</u>

◙ - EXISTING TRAFFIC SIGNAL

◻ - PROPOSED TRAFFIC SIGNAL

A(#) - SIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

a(#) - UNSIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

Appendix D

Levels of Service Matrix

Table II
Levels of Service Matrix

Intersection	Approach	Movement	2016 No Build Friday	2016 No Build Saturday	Improvement	2018 Build Friday	2018 Build Saturday
Morris Street and Water Street	WB	TR	d(27)	e(42)		B(17)	D(55)
	NB	LT	d(28)	f(231)		D(49)	D(54)
	Overall					C(31)	D(54)
Morris Street and Columbus Boulevard	NB	TTT			L	A(0)	A(0)
					TTT	C(32)	C(33)
	SB	TTT				A(7)	A(9)
		R				A(0)	A(0)
	Overall					A(5)	A(6)
Tasker Street and Columbus Boulevard	EB	LTR	E(60)	E(61)	LTTR	D(42)	E(74)
	WB	LTR	C(34)	C(31)	RR	D(40)	D(51)
	NB	TTTR	A(10)	B(14)	L	D(47)	E(70)
					TTTR	A(10)	B(10)
	SB	TTTR	A(3)	A(3)	L	D(53)	E(63)
					TTTR	B(12)	C(33)
	Overall		B(11)	B(13)		B(16)	C(30)
Tasker Street Extension	WB				LL	D(41)	D(52)
Dickinson Street and Columbus Boulevard	EB				LTTR	D(42)	D(55)
					R	D(38)	D(48)
	WB				RR	D(38)	D(44)
	NB	LT	f(163)	f(100)	TTTR	A(2)	A(3)
		TT					
	SB	L			LL	C(35)	D(38)
		TTTR			TT	B(20)	C(21)
	Overall					B(16)	B(20)
Reed Street and Columbus Boulevard	EB	L	D(41)	D(37)		D(41)	D(53)
					LT	D(42)	D(55)
		TR	C(31)	C(30)	R	C(23)	C(31)
	WB	LTR	C(31)	C(30)	L	D(45)	D(54)
					LTR	D(46)	E(72)
	NB	L	F(106)	E(63)		E(65)	E(67)
		TTTR	C(25)	B(11)		B(16)	B(14)
	SB	L	C(31)	E(77)		C(35)	D(37)
		TTTR	B(15)	D(50)		C(24)	D(45)
	Overall		C(24)	D(36)		C(25)	D(36)
I-95 NB Off-Ramp and Columbus Boulevard	EB	LL	C(34)	D(35)		C(34)	D(48)
		R	A(0)	A(0)		A(0)	A(1)
	NB	TTTR	A(8)	C(33)		A(5)	A(6)
	SB	L	D(36)	C(27)		E(56)	E(71)
		TTT	A(3)	A(3)		A(4)	A(2)
	Overall		A(8)	B(17)		A(8)	A(10)
Washington Street and Columbus Boulevard	EB	L	F(210)	F(88)	L	D(39)	C(35)
		T			LT		
		R	A(0)	A(1)		A(0)	A(1)
	WB	LTR	C(21)	C(24)		D(49)	D(55)
	NB	L	F(274)	F(226)	LL	D(46)	D(45)
		TTTR	C(23)	C(24)		C(34)	C(28)
	SB	L	D(43)	D(38)		C(24)	D(44)
		TTTR	F(233)	F(112)	TT	C(28)	C(29)
					R	A(1)	A(0)
	Overall		F(167)	F(87)		C(30)	C(28)
Christian Street and Columbus Boulevard	EB	LTR	F(112)	F(87)	L	D(55)	D(54)
					TR	C(29)	D(40)
	WB	LTR	C(31)	C(32)		C(28)	D(39)
	NB	L	D(41)	D(54)		D(46)	D(39)
		TTTR	B(12)	B(15)		A(6)	B(13)
	SB	L	E(64)	F(132)		E(66)	E(77)
		TTTR	F(105)	C(21)		C(31)	B(16)
	Overall		E(65)	C(26)		C(21)	B(18)
I-676 On & I-95 SB/I-676 Off and Columbus Boulevard	EB	L	D(45)	D(44)		D(50)	D(48)
		LT	D(45)	D(45)		D(51)	D(49)
		RR	C(25)	C(24)		C(21)	C(23)
	WB	LTTR	D(51)	D(51)		D(45)	D(54)
	NB	L	E(62)	E(67)	LL	C(30)	C(28)
		TTTR	B(15)	A(6)		B(12)	A(5)
	SB	L	D(49)	C(29)		C(28)	C(21)
		TTTR	E(69)	C(27)		C(22)	C(21)
	Overall		D(36)	C(25)		B(19)	B(18)
Lombard Street and Columbus Boulevard	WB	LTTR	D(52)	D(52)		D(44)	D(55)
	NB	L	C(24)	D(40)		C(21)	D(54)
		TTTR	A(1)	A(2)		A(1)	A(7)
	SB	L	D(54)	D(45)		D(54)	C(34)
		TTTR	C(21)	C(23)		C(23)	C(25)
	Overall		B(12)	B(18)		B(13)	C(25)

LEGEND
Level of Service Degradation

CITY OF PHILADELPHIA

STREETS DEPARTMENT
7th Floor - Municipal Services Building
1401 JFK Boulevard
Philadelphia, Pennsylvania 19102-1676

CLARENA I. W. TOLSON
Commissioner

September 28, 2006

Jeff Greene
Principal
Orth-Rodgers & Associates Inc.
230 S. Broad Street, 16th Floor
Philadelphia, PA 19102

RE: Foxwoods Site (Columbus Boulevard/Delaware Avenue)

Dear Mr. Green,

As we discussed in our telephone conversation on September 27, it appears that several of the suggestions made by our staff at our meeting on the referenced site on September 14 have proven to be useful alternatives. These included the northbound "jughandle" for left turns at the Columbus Boulevard/Dickinson Street intersection, the use of internal/on-site roadways to manage traffic at this location and the Columbus Boulevard/Tasker Street intersection, and several other slight modifications to proposed treatments.

We are pleased to have had the opportunity to assist in the development of solutions at this admittedly difficult site. Charles Denny and I will continue to work with you as needed to take this proposal to the next step insofar as revisions and improvements to the roadway system are concerned. We believe the recommendations will adequately address both the community's concerns and the needs of the proposed development.

Please advise us as necessary if any reviews, meetings, etc need to be scheduled.

Sincerely,

Robert M. Wright, P.E.
Chief Engineer & Surveyor

RMW/les

cc: C. Denny
RMW

Orth - Rodgers & Associates, Inc.
TRANSPORTATION ENGINEERS and PLANNERS

Supplemental Report
Modified Improvement Plan

Foxwoods-Philadelphia
Proposed Slot Parlor/Casino
Development
on
Columbus Boulevard
between
Reed and Tasker Streets

City of Philadelphia

October 3, 2006

Jeffrey Greene, P.E.
PE Number PE-019622-E

H. Richard Orth, P.E.
PE Number PE-037755-R

230 South Broad Street • Philadelphia, Pennsylvania 19102
Phone (215) 735-1932 • Fax (215) 735-5954
www.orth-rodgers.com

Introduction

The purpose of this supplemental traffic analysis is to analyze additions to the proposed improvements to Columbus Boulevard discussed in the report entitled, "Final Report, Foxwoods Casino – Philadelphia", dated May 15, 2006. In addition, the impact of a proposed residential developmental at the intersection of Columbus Boulevard and the I-676 Ramps was also analyzed. The revised improvements are as follows:

- an exclusive northbound left turn lane on Columbus Boulevard to turn left into Tasker Street
- prohibiting westbound left turns and through movements from the westbound approach to Columbus Boulevard at Tasker Street
- provide a frontage roadway along Columbus Boulevard for vehicles to make a u-turn at Dickinson Street via two exclusive left turn lanes to replace the prohibited left turn and through movement from the westbound approach to Tasker Street.

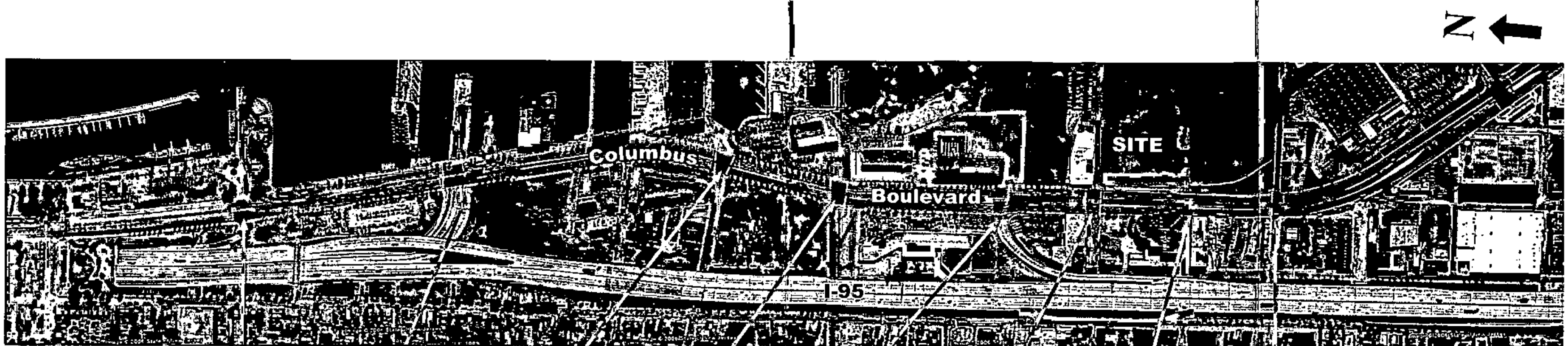
These improvements were brought forward by the City of Philadelphia Department of Streets as additional improvements designed to further improve traffic flow in the vicinity of the proposed Foxwoods-Philadelphia Development and address neighborhood traffic issues. Revised Figure ii shows the revised improvements.

In addition, as indicated above, the Dockside Residences with an entrance driveway located across from the I-676 On/Off Ramps were included in the base traffic volumes. It should be noted that it is not known whether this residential development will ever be constructed or what its access will be. This analysis used the data from the website of the development for the analysis. No traffic study has been prepared for the development as of this writing.

All figure numbers contained herein are retained for the May 15, 2006 report and noted as "revised" if changes were made due to the issues noted above.

Revised Figure ii
Proposed Traffic Improvements to the Columbus Boulevard Corridor

FOXWOODS CASINO - PHILADELPHIA



	I-95 NORTHBOUND ON-RAMP / LOMBARD CIRCLE	I-676 / I-95 RAMPS	CHRISTIAN STREET	WASHINGTON AVENUE	NB I-95 OFF-RAMP	REED STREET	DICKINSON STREET	TASKER AVENUE	MORRIS STREET / SOUTHBOUND I-95 ON-RAMP
PROPOSED IMPROVEMENTS	REVISE TRAFFIC SIGNAL TIMING.	CONSTRUCT NORTHBOUND DOUBLE LEFT-TURN LANE.	RESTRIPE EASTBOUND CHRISTIAN STREET TO PROVIDE A SEPARATE LEFT-TURN LANE AND A SHARED THROUGH AND RIGHT-TURN LANE.	RESTRIPE EASTBOUND WASHINGTON AVENUE APPROACH TO PROVIDE A SEPARATE LEFT-TURN LANE. CONSTRUCT A NORTH-BOUND DOUBLE LEFT TURN LANE. RESTRIPE THE SOUTHBOUND APPROACH TO PROVIDE TWO THROUGH LANES AND A SEPARATE RIGHT TURN LANE.	REVISE TRAFFIC SIGNAL TIMING.	RESTRIPE EASTBOUND REED STREET TO PROVIDE A SEPARATE LEFT-TURN LANE, A SHARED THROUGH AND LEFT-TURN LANE, AND A SEPARATE RIGHT-TURN LANE. RESTRIPE WESTBOUND REED STREET TO PROVIDE A SEPARATE LEFT-TURN LANE AND A SHARED RIGHT-TURN THROUGH AND LEFT-TURN LANE. REVISE TRAFFIC SIGNAL PHASING.	INSTALL NEW TRAFFIC SIGNAL. RESTRIPE SOUTHBOUND COLUMBUS BLVD. TO PROVIDE A DOUBLE LEFT-TURN AND TWO THROUGH LANES. CONSTRUCT A NEW SOUTHBOUND OFF-RAMP FROM I-95 TO PROVIDE DIRECT ACCESS TO THE SITE.	WIDEN THE EASTBOUND TASKER AVENUE APPROACH TO PROVIDE A SHARED LEFT-TURN AND THROUGH LANE AND A SHARED RIGHT-TURN AND THROUGH LANE. RESTRIPE SOUTHBOUND APPROACH TO PROVIDE TWO THROUGH LANES AND A SEPARATE LEFT-TURN LANE. PROHIBIT WESTBOUND LEFT TURNS AND THROUGH MOVEMENTS. REALIGN NORTHBOUND APPROACH TO PROVIDE EXCLUSIVE LEFT TURN.	WIDEN THE NORTHBOUND APPROACH TO PROVIDE THREE NORTHBOUND THROUGH LANES AND A SEPARATE LEFT-TURN LANE. CONSTRUCT A SIGNALIZED INTERSECTION AND AN AT-GRADE CROSSING TO PROVIDE A DIRECT LEFT-TURN TO THE I-95 SOUTHBOUND ON-RAMP.

PROVIDE A FRONTAGE ROADWAY ALONG COLUMBUS BOULEVARD FOR VEHICLES TO MAKE A U-TURN AT DICKINSON STREET VIA TWO EXCLUSIVE LEFT-TURN LANES.

ALSO: COORDINATE/UPGRADE TRAFFIC SIGNAL SYSTEM ALONG COLUMBUS BOULEVARD CORRIDOR.

LEGEND:

PROPOSED SOUTHBOUND OFF-RAMP FROM I-95

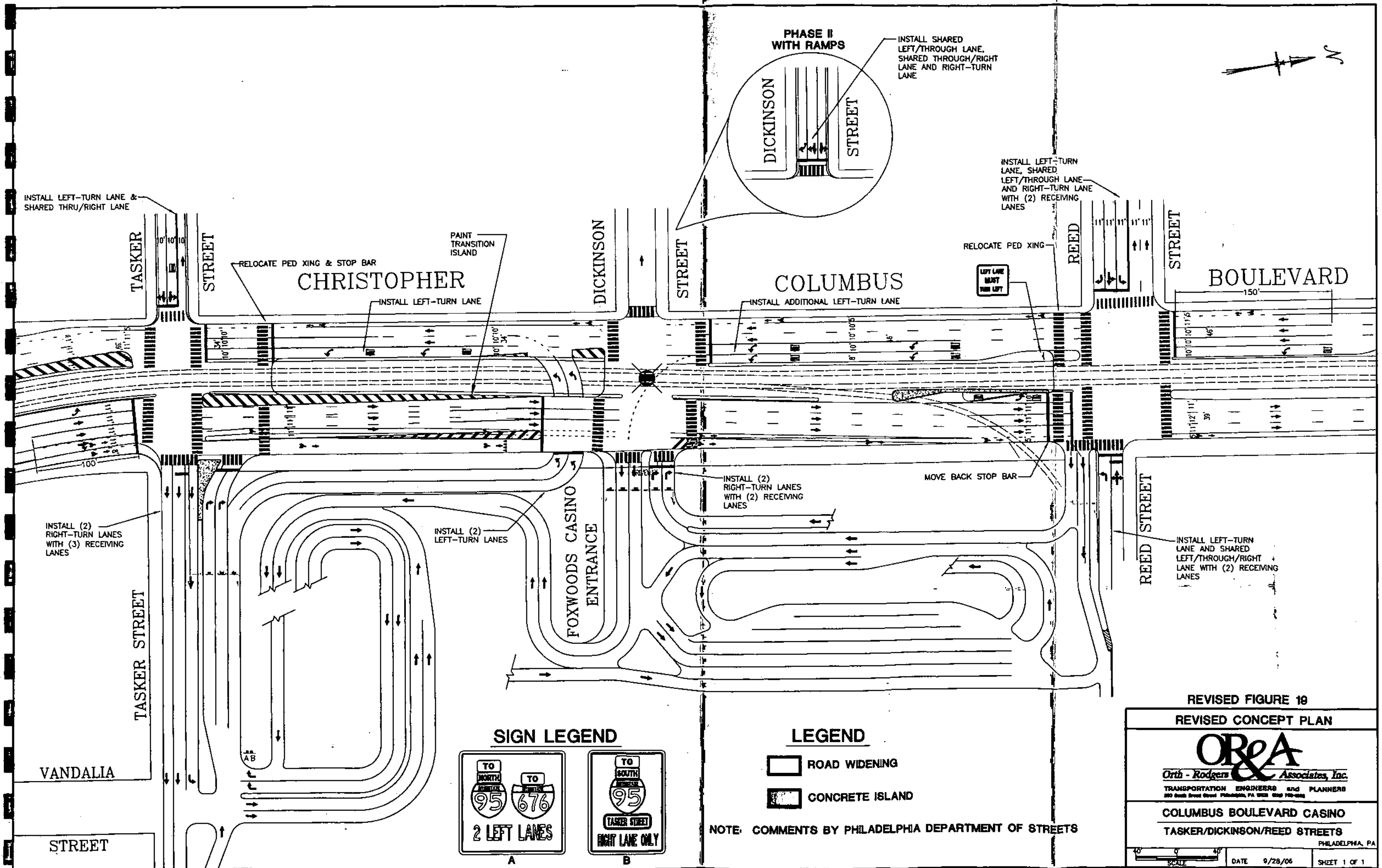
City of Philadelphia Department of Streets Suggested Improvements

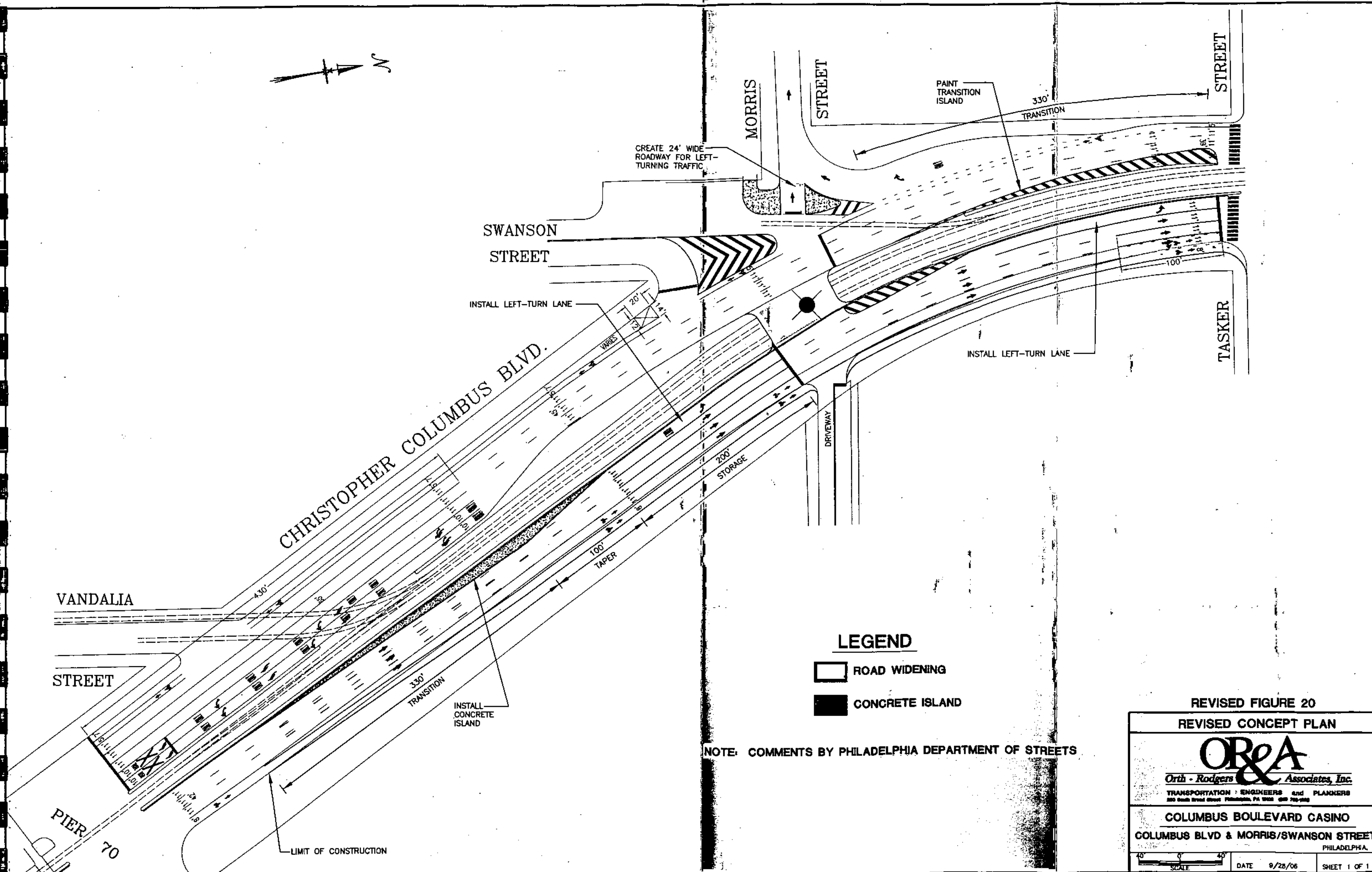
The City of Philadelphia Department of Streets suggested the following additional improvements at the intersection of Tasker Street and Columbus Boulevard to mitigate congestion in all future build scenarios and provide additional protection from vehicles leaving the casino development and traveling directly into the Pennsport community. The recommendations include an exclusive left turn lane in the northbound direction at the intersection of Tasker Street and Columbus Boulevard as requested by local residents at an earlier community meeting and prohibiting westbound left turns and through movements at the same intersection. The westbound movement at Tasker Street would only allow for right turns via two exclusive right turn lanes. Westbound vehicles intending to turn left onto Columbus Boulevard or continue west on Tasker Street will access their route via a proposed frontage road traveling parallel to Columbus Boulevard in the northbound direction as shown in Revised Figures 19 and 20. This proposed road will only allow for dual left turns just south of Dickinson Street onto southbound Columbus Boulevard. The signal located at this dual left turn lane will allow for simultaneous movement with the southbound left turn and westbound right turn movements at the intersection of Dickinson Street and Columbus Boulevard.

The prohibiting of westbound left turns and through movements on Tasker Street eliminates one traffic signal phase thus allowing more green time for the remaining phases and improving traffic conditions. The addition of the two exclusive left turn lanes south of Dickinson Street for vehicles on the frontage street will not require additional green time due to simultaneous green time with existing movements at the Dickinson Street signal.

In year 2010, eastbound Dickinson Street will be widened to add an exclusive right turn lane for traffic exiting southbound I-95 on the proposed Dickinson Street ramp.

Additionally, traffic generated from the Dockside Residences located across from the I-676 On/Off Ramps has been included in all analysis.


PHASE II WITH RAMPS
INSTALL SHARED LEFT/THROUGH LANE, SHARED THROUGH/RIGHT LANE AND RIGHT-TURN LANE
DICKINSON
STREET
INSTALL LEFT-TURN LANE & SHARED THRU/RIGHT LANE
TASKER
STREET
RELOCATE PED XING & STOP BAR
CHRISTOPHER
INSTALL LEFT-TURN LANE
PAINT TRANSITION ISLAND
DICKINSON
STREET
COLUMBUS
INSTALL ADDITIONAL LEFT-TURN LANE
INSTALL LEFT-TURN LANE, SHARED LEFT/THROUGH LANE AND RIGHT-TURN LANE WITH (2) RECEIVING LANES
RELOCATE PED XING
LEFT LANE MUST TURN LEFT
REED
STREET
BOULEVARD
150'
MOVE BACK STOP BAR
INSTALL (2) RIGHT-TURN LANES WITH (2) RECEIVING LANES
INSTALL (2) LEFT-TURN LANES
FOXWOODS CASINO ENTRANCE
INSTALL (2) RIGHT-TURN LANES WITH (3) RECEIVING LANES
TASKER STREET
VANDALIA
STREET
REED STREET
INSTALL LEFT-TURN LANE AND SHARED LEFT/THROUGH/RIGHT LANE WITH (2) RECEIVING LANES
SIGN LEGEND
TO NORTH 95
TO 676
2 LEFT LANES
A
TO SOUTH 95
TASKER STREET
RIGHT LANE ONLY
B
LEGEND
ROAD WIDENING
CONCRETE ISLAND
NOTE: COMMENTS BY PHILADELPHIA DEPARTMENT OF STREETS
REVISED FIGURE 19
REVISED CONCEPT PLAN
OR&A
Orth - Rodgers & Associates, Inc.
TRANSPORTATION ENGINEERS and PLANNERS
COLUMBUS BOULEVARD CASINO
TASKER/DICKINSON/REED STREETS
PHILADELPHIA, PA
SCALE
DATE 9/28/06
SHEET 1 OF 1



LEGEND

ROAD WIDENING

CONCRETE ISLAND

NOTE: COMMENTS BY PHILADELPHIA DEPARTMENT OF STREETS

REVISED FIGURE 20

REVISED CONCEPT PLAN

OR&A
Orth - Rodgers & Associates, Inc.
TRANSPORTATION ENGINEERS and PLANNERS

COLUMBUS BOULEVARD CASINO

COLUMBUS BLVD & MORRIS/SWANSON STREET

PHILADELPHIA, PA

SCALE	DATE 9/28/06	SHEET 1 OF 1

Table I illustrates the estimated trip generation for the Dockside Residences. Traffic from this residential development was added to the roadway based upon existing traffic patterns.

Table I
Dockside Residences Trip Generation

	IN	OUT	Total
Friday Peak Hour	64	41	105
Saturday Peak Hour	55	41	96

It should be noted that access to the Dockside Residences is assumed to be opposite the I-676 signalized intersection. This is the worst case scenario for the access. It also is reasonable to expect the site would be limited to right turns in and out of the driveway.

Projected 2008 and 2010 Traffic Volumes

Revised Figures 15 and 16 illustrate the Year 2008 Peak Hour Traffic Volumes and Revised Figures 29 and 30 illustrate the Year 2010 Peak Hour Traffic Volumes with the Department of Streets suggested improvements and Dockside Residences. The proposed Dickinson Street Ramp has also been included in the Year 2010 analysis. Volume figures can be found in Appendix A.

Performance of the Suggested Improvements

Revised Figures 21 and 22 illustrate the Year 2008 levels of service during the Friday and Saturday peak hours assuming the improvements have been implemented. The Year 2010 levels of service during the Friday and Saturday peak hours assuming the improvements have been implemented and the Dickinson Street Ramp has been built are shown in Revised Figures 31 and 32. Table II summarizes the levels of service comparisons between the revised improvements described earlier and improvements contained in the report dated May 15, 2006 for Phase I. Levels of service figures can be found in Appendix B.

Table II
Comparison of Phase I Revised Improvements and Report Dated May 15, 2006 Levels of Service along Columbus Boulevard

Intersection	Report Dated May 15, 2006		Revised Improvements	
	Friday	Saturday	Friday	Saturday
Lombard Circle/I-95 NB On-Ramp	B (13)	B (20)	B (12)	B (19)
I-676 On & I-676/95 SB Off Ramp	B (16)	B (16)	B (20)	C (21)
Christian Street	C (21)	B (19)	C (23)	B (18)
Washington Avenue	D (44)	C (27)	D (36)	C (23)
I-95 Ramp NB Off Ramp	A (9)	A (7)	A (7)	A (8)
Reed Street	C (20)	C (31)	C (25)	D (39)
Dickinson Street	A (3)	A (6)	A (7)	A (9)
Tasker Street	C (21)	D (44)	B (15)	B (19)
Morris Street	A (3)	A (3)	A (5)	A (6)
Sum Total Intersection Delay	**150**	**173**	**150**	**162**

As indicated, the Department of Streets suggested improvements will improve levels of service at Tasker Street from Level of Service 'C' to 'B' on Friday, an improvement of six seconds of delay per vehicle and on Saturday from Level of Service 'D' to 'B', an improvement of 25 seconds of delay per vehicle. Overall, Friday's corridor wide delay remains the same, but on Saturday, the highest traffic day, the improvement is significant at 11 seconds of delay per vehicle, an improvement of 6% over the improvements contained in the May 15, 2006 report.

Table III summarizes the results of the level of service analysis for Phase II with the revised improvements when compared with the report dated May 15, 2006.

Table III
Comparison of Phase II Revised Improvements and Report Dated May 15, 2006 Levels of Service along Columbus Boulevard

Intersection	Report Dated May 15, 2006		Revised Improvements	
	Friday	**Saturday**	**Friday**	**Saturday**
Lombard Circle/I-95 NB On-Ramp	B (12)	B (18)	B (11)	B (19)
I-676 On & I-676/95 SB Off Ramp	B (16)	B (15)	B (19)	B (15)
Christian Street	B (17)	B (17)	B (18)	B (11)
Washington Avenue	C (28)	C (21)	C (23)	B (19)
I-95 Ramp NB Off Ramp	A (8)	A (8)	A (8)	A (9)
Reed Street	C (20)	C (29)	B (17)	C (32)
Dickinson Street	A (9)	B (13)	B (13)	B (15)
Tasker Street	C (24)	E (71)	B (18)	C (22)
Morris Street	A (3)	A (4)	A (3)	A (6)
Sum Total Intersection Delay	137	195	130	148

As shown in the table, there is a dramatic improvement at Tasker Street with the Department of Streets suggested improvements. At that intersection the level of service improves from 'E' to 'C' during the Saturday peak hour. The overall total intersection delay is projected to decrease from 137 seconds per vehicle to 130 seconds per vehicle, (5%), during the Friday peak hour and from 195 seconds per vehicle to 148 seconds per vehicle, a 26% decrease, during the Saturday peak hour as compared with the report dated May 15, 2006. The Department of Streets recommended improvements further decrease the delay per vehicle at Tasker Street when compared with the previously stated transportation improvement program from the report dated May 15, 2006 and maintain improvements at the other intersections along Columbus Boulevard.

The revised analysis confirms that the revised improvements improve traffic conditions when compared with the previously stated transportation improvement program. In addition, the revised improvements continue to improve traffic conditions when compared with existing conditions. Revised Tables XII and XIV summarize the comparisons of the levels of service for the revised improvements and existing conditions for Phase I and Phase II, respectively.

Revised Table XII
Comparison of Existing and Phase I Intersection
Levels of Service along Columbus Boulevard

Intersection	Existing		Phase I	
	Friday	Saturday	Friday	Saturday
Lombard Circle/I-95 NB On-Ramp	B (12)	B (16)	B (12)	B (19)
I-676 On & I-676/95 SB Off Ramp	C (22)	C (26)	B (20)	C (21)
Christian Street	C (30)	C (24)	C (23)	B (18)
Washington Avenue	F (105)	E (61)	D (36)	C (23)
I-95 Ramp NB Off Ramp	B (14)	B (14)	A (7)	A (8)
Reed Street	C (27)	D (44)	C (25)	D (39)
Dickinson Street	N/A	N/A	A (7)	A (9)
Tasker Street	A (9)	B (20)	B (15)	B (19)
Morris Street	N/A	N/A	A (5)	A (6)
Sum Total Intersection Delay	**219**	**205**	**150**	**162**

As shown in the table, the Phase I overall intersection delay under the revised improvements decreases from 219 seconds per vehicle to 150 seconds per vehicles, a 32% improvement, during the Friday peak hour, and on Saturday from 205 seconds per vehicle to 162 seconds per vehicles, a 21% decrease, as compared with existing conditions.

Revised Table XIV
Comparison of Existing and Phase II Intersection
Levels of Service along Columbus Boulevard

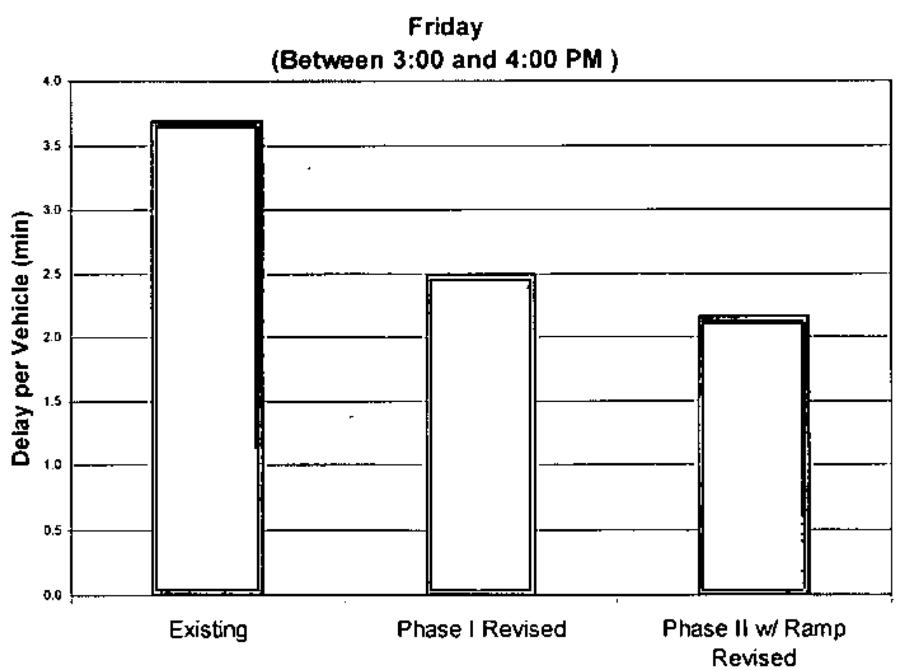
Intersection	Existing		Phase II	
	Friday	Saturday	Friday	Saturday
Lombard Circle/I-95 NB On-Ramp	B (12)	B (16)	B (11)	B (19)
I-676 On & I-676/95 SB Off Ramp	C (22)	C (26)	B (19)	B (15)
Christian Street	C (30)	C (24)	B (18)	B (11)
Washington Avenue	F (105)	E (61)	C (23)	B (19)
I-95 Ramp NB Off Ramp	B (14)	B (14)	A (8)	A (9)
Reed Street	C (27)	D (44)	B (17)	C (32)
Dickinson Street	N/A	N/A	B (13)	B (15)
Tasker Street	A (9)	B (20)	B (18)	C (22)
Morris Street	N/A	N/A	A (3)	A (6)
Sum Total Intersection Delay	**219**	**205**	**130**	**148**

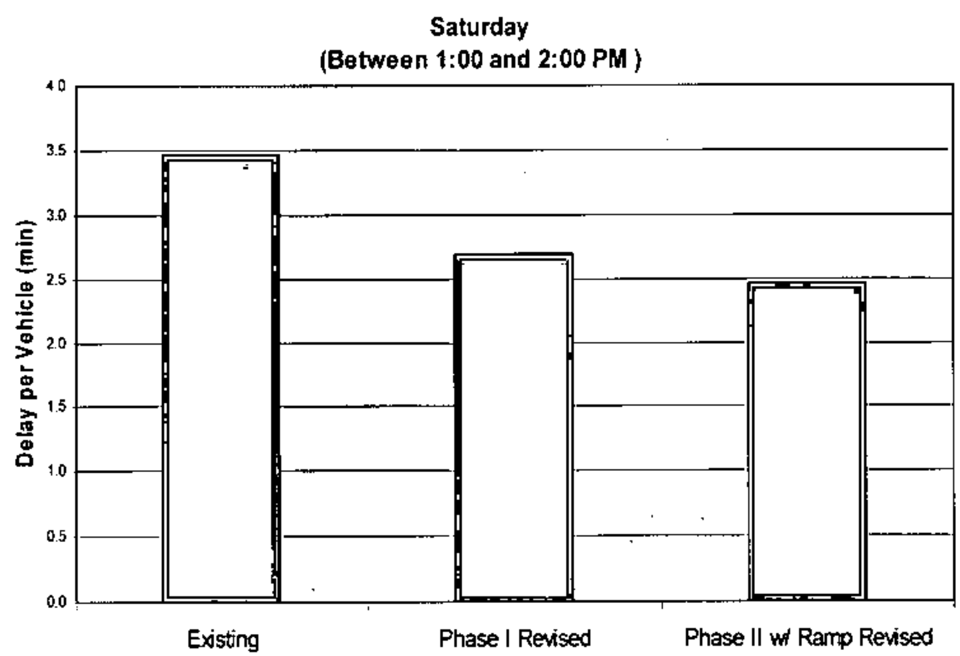
Examination of the table reveals the Phase II with revised improvements levels of service show an increased improvement when compared against the existing conditions; a 41% decrease during the Friday peak hour, and on Saturday, a 28% improvement.

Meeting the Mandate

Revised Figure 36 shows the improvement in traffic flow on Columbus Boulevard graphically. As shown, with the improvements, traffic flows with significantly less delay than it does today. This analysis has clearly shown that the Department of Streets suggested improvements continue to meet the mandate of improving traffic along the Columbus Boulevard 'corridor', to make traffic flow better than it does today.

Revised Figure 36
Overall Intersection Peak Hour Delay
Columbus Boulevard Corridor
between Lombard Circle and Morris Street





Appendix A

Traffic Volume Figures

REVISED FIGURE 15

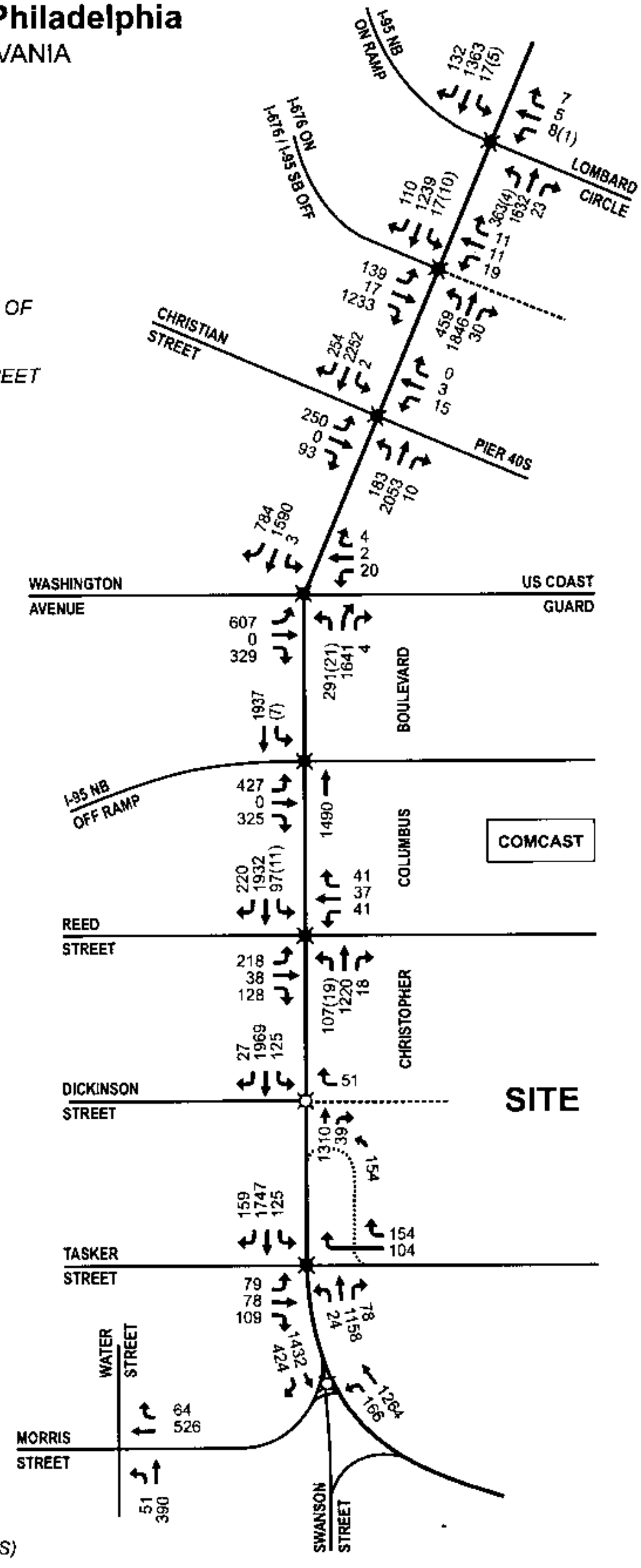
2008 Build Late Friday Afternoon Peak Hour Traffic Volumes w/ Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

NOTE

REVISED TO SHOW DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS AT TASKER STREET



LEGEND

EXISTING TRAFFIC SIGNAL

PROPOSED TRAFFIC SIGNAL

#(#) MOVEMENT VOLUMES(U-TURNS)

REVISED FIGURE 16

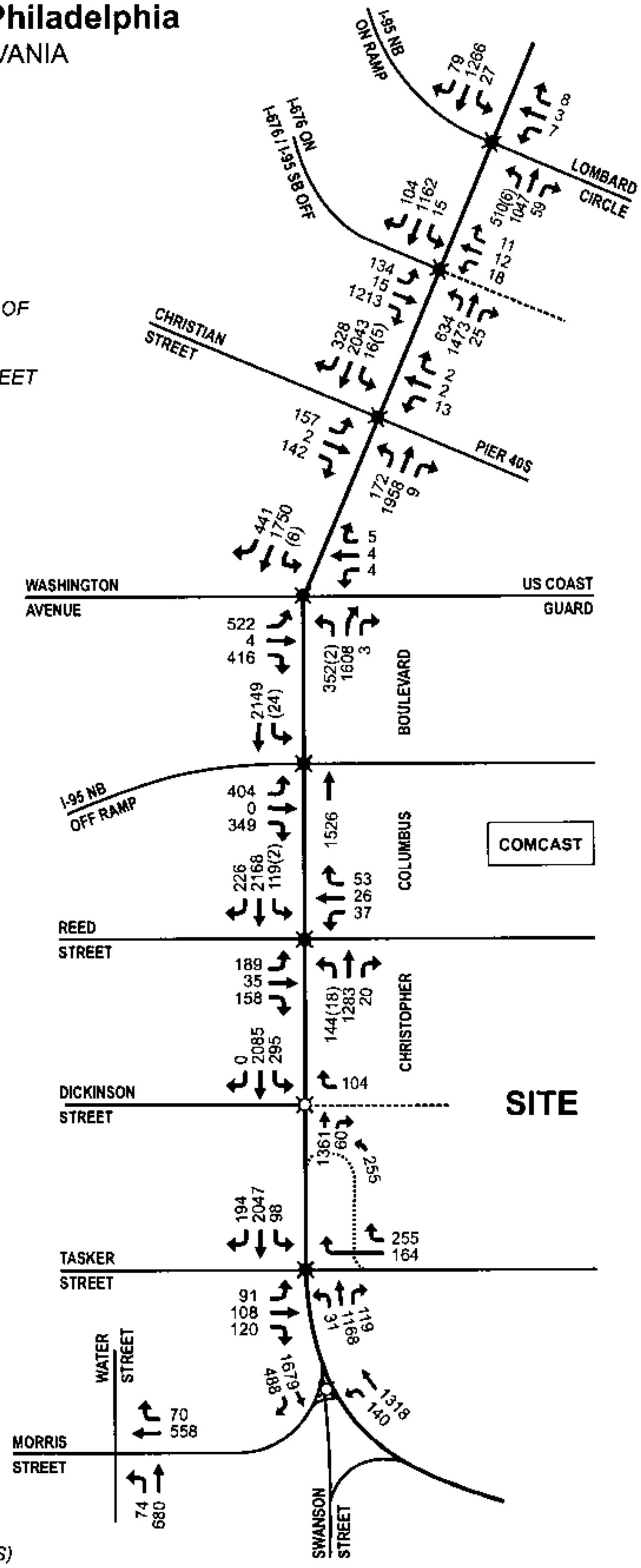
2008 Build Early Saturday Afternoon Peak Hour Traffic Volumes w/ Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

NOTE

REVISED TO SHOW DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS AT TASKER STREET



LEGEND

EXISTING TRAFFIC SIGNAL

PROPOSED TRAFFIC SIGNAL

#(#) MOVEMENT VOLUMES(U-TURNS)

REVISED FIGURE 29

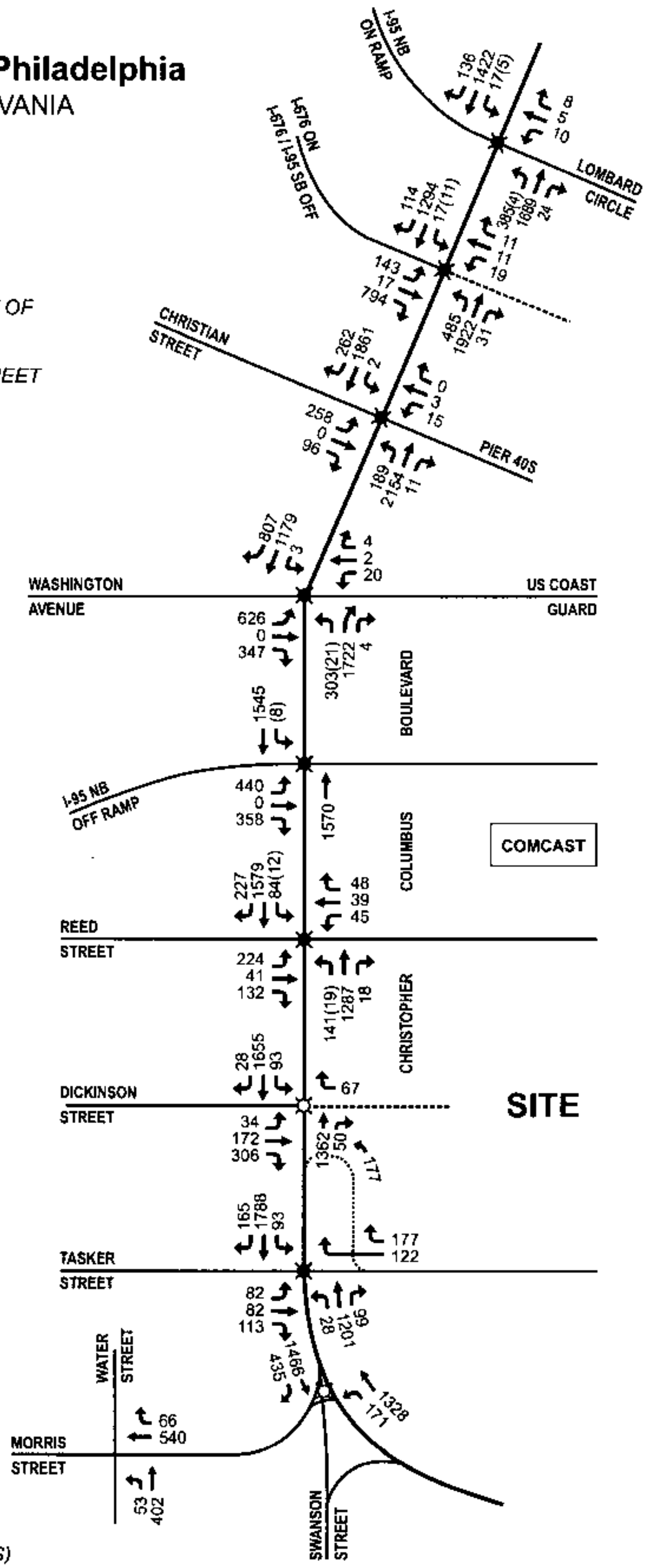
2010 Build Late Friday Afternoon Peak Hour Traffic Volumes w/ Dickinson Street Ramp & Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

NOTE

REVISED TO SHOW DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS AT TASKER STREET



LEGEND

EXISTING TRAFFIC SIGNAL

PROPOSED TRAFFIC SIGNAL

#(#) MOVEMENT VOLUMES(U-TURNS)

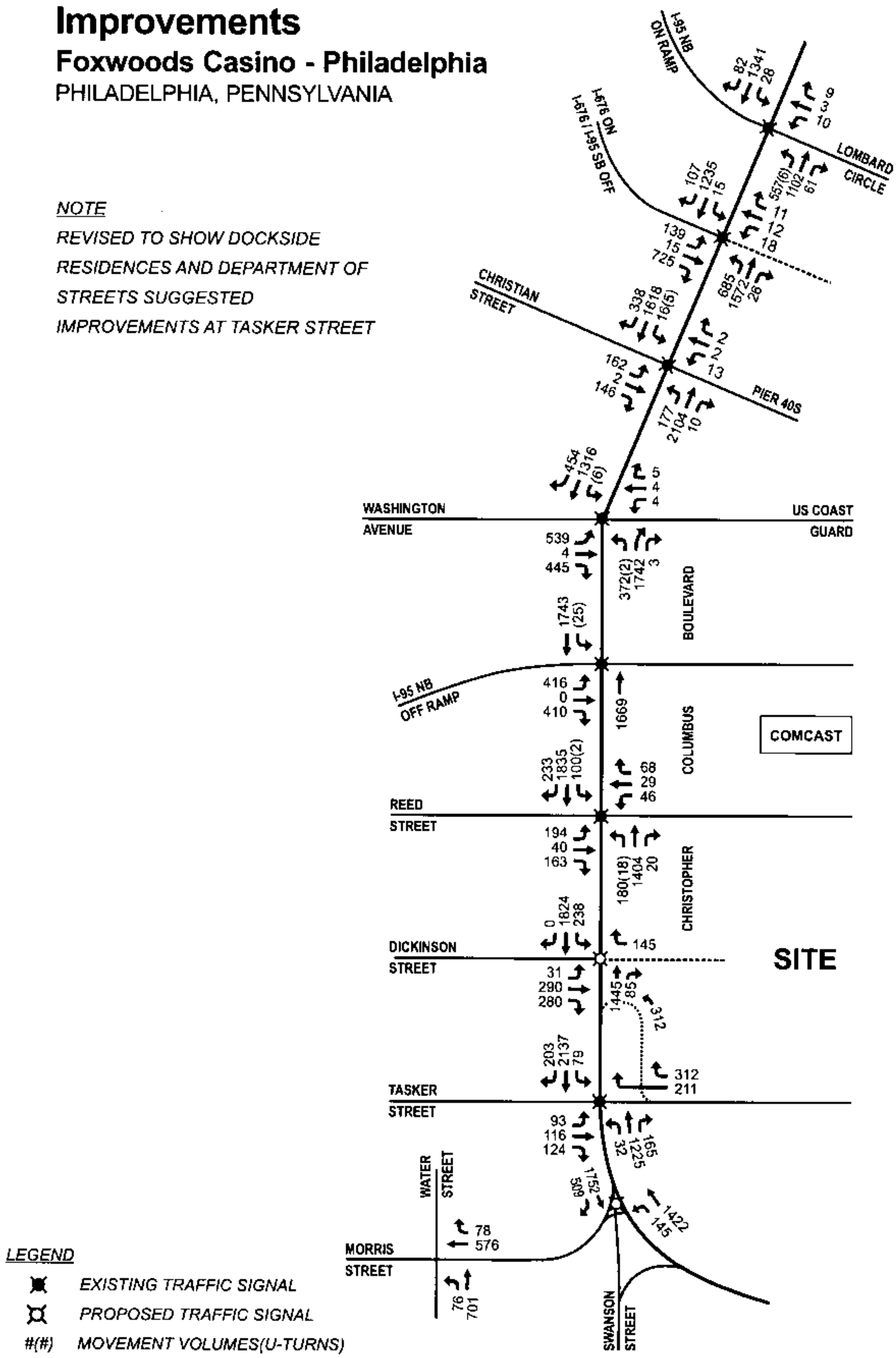
Orth - Rodgers & Associates, Inc.

REVISED FIGURE 30

2010 Build Early Saturday Afternoon Peak Hour Traffic Volumes w/ Dickinson Street Ramp & Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA



Appendix B

Levels of Service Figures

Orth - Rodgers & Associates, Inc.

REVISED FIGURE 21

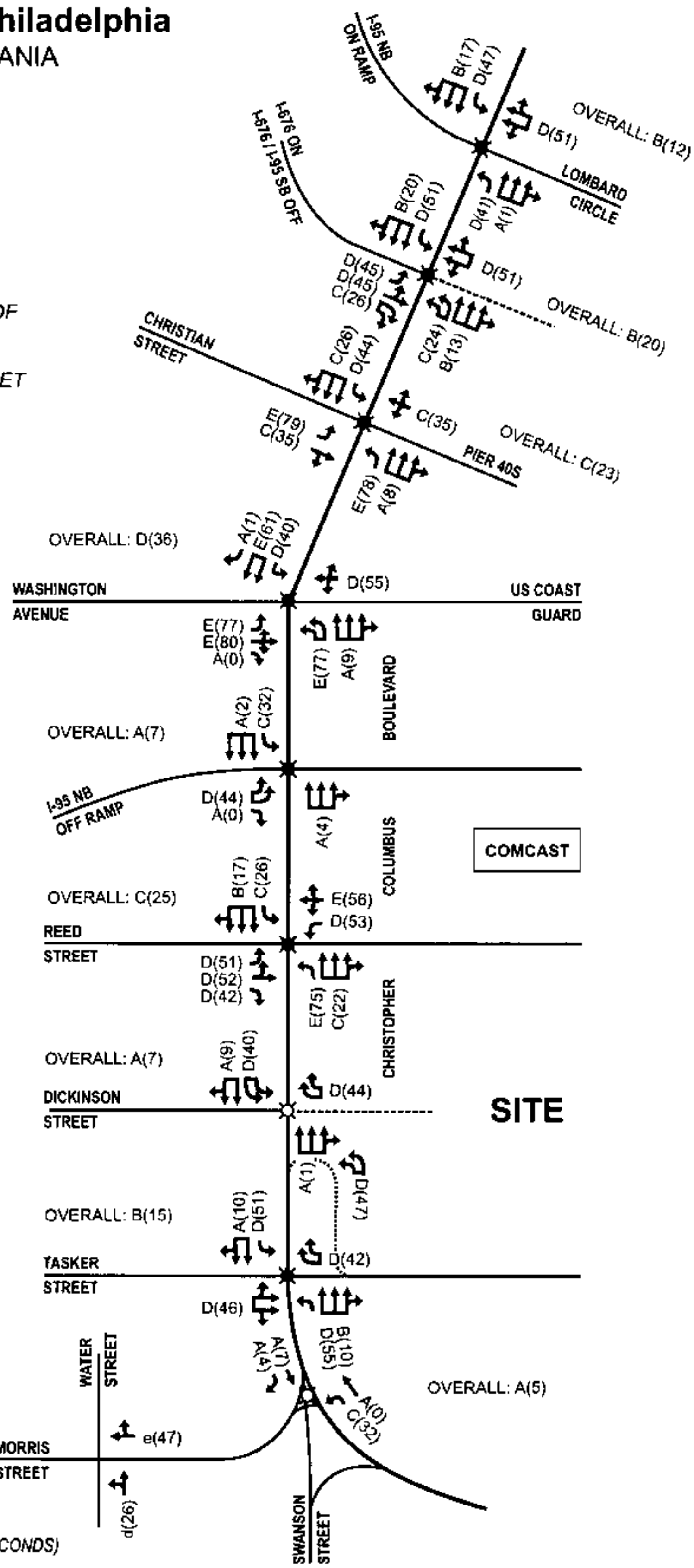
2008 Build Late Friday Afternoon Peak Hour Levels of Service w/ Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

NOTE

REVISED TO SHOW DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS AT TASKER STREET



LEGEND

- EXISTING TRAFFIC SIGNAL

- PROPOSED TRAFFIC SIGNAL

A(#) - SIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

a(#) - UNSIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

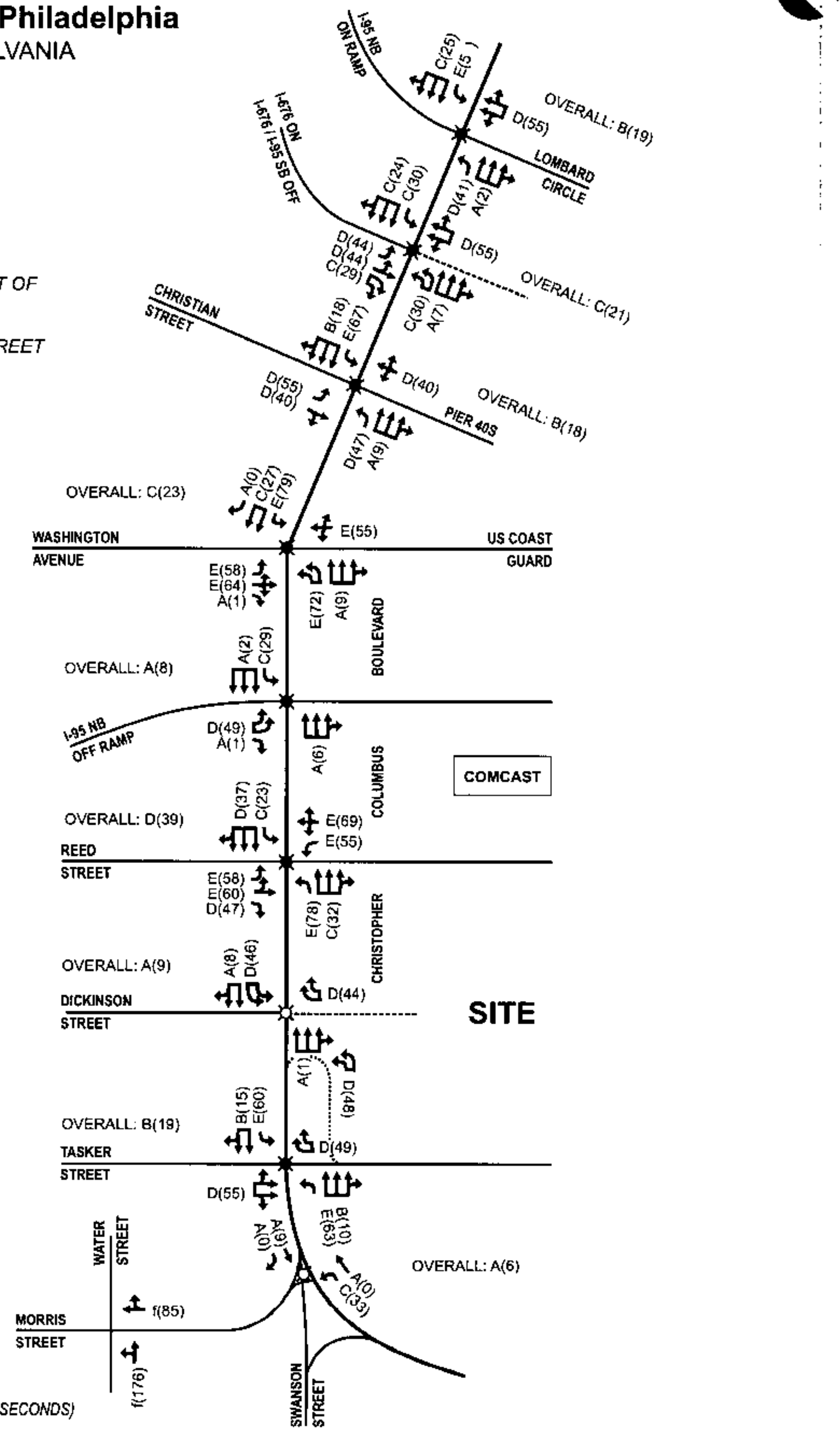
Orth - Rodgers & Associates, Inc.

REVISED FIGURE 22

2008 Build Early Saturday Afternoon Peak Hour Levels of Service w/ Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA



LEGEND

- EXISTING TRAFFIC SIGNAL
- PROPOSED TRAFFIC SIGNAL

A(#) - SIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

a(#) - UNSIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

REVISED FIGURE 31

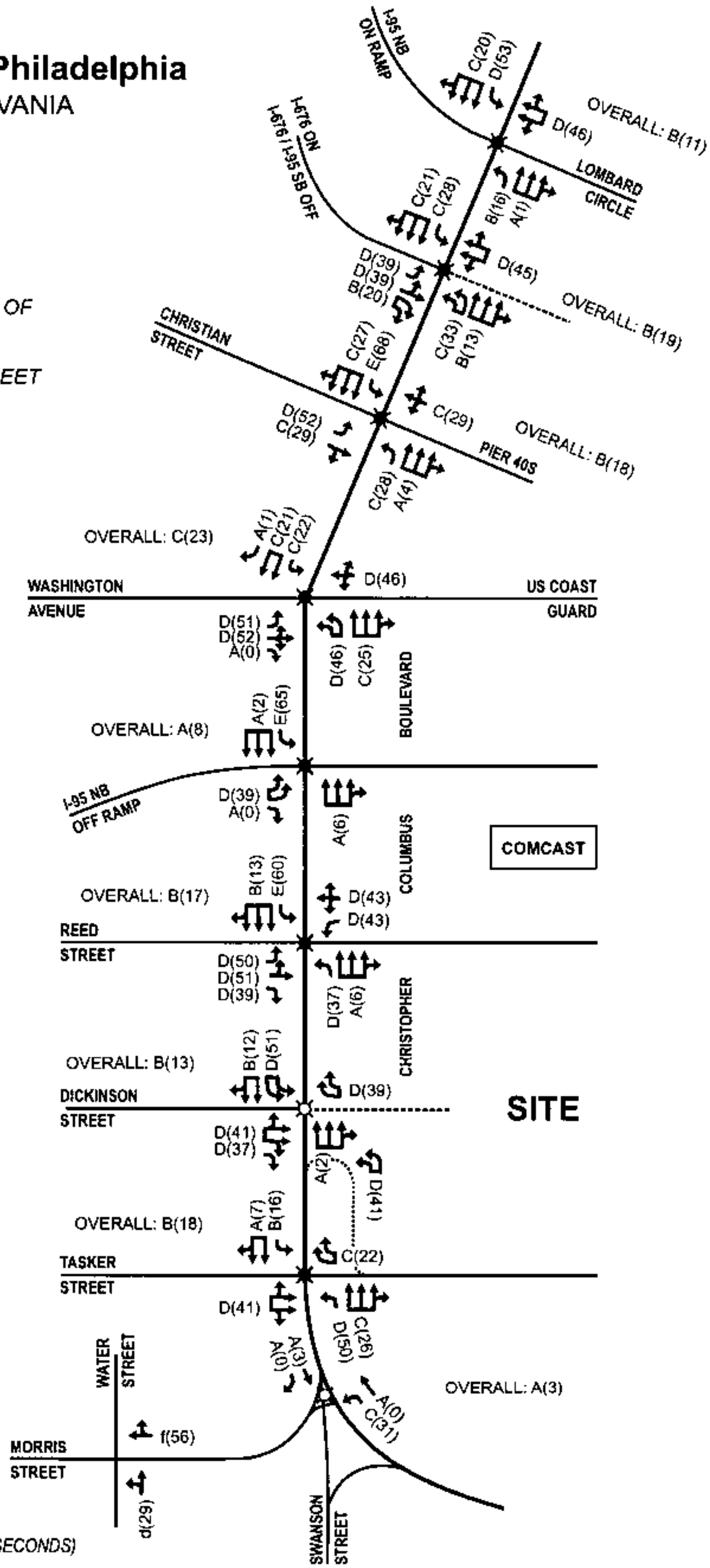
2010 Build Late Friday Afternoon Peak Hour Levels of Service w/ Dickinson Street Ramp & Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

NOTE

REVISED TO SHOW DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS AT TASKER STREET



LEGEND

- EXISTING TRAFFIC SIGNAL
- PROPOSED TRAFFIC SIGNAL

A(#) - SIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

a(#) - UNSIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

Orth - Rodgers & Associates, Inc.

REVISED FIGURE 32

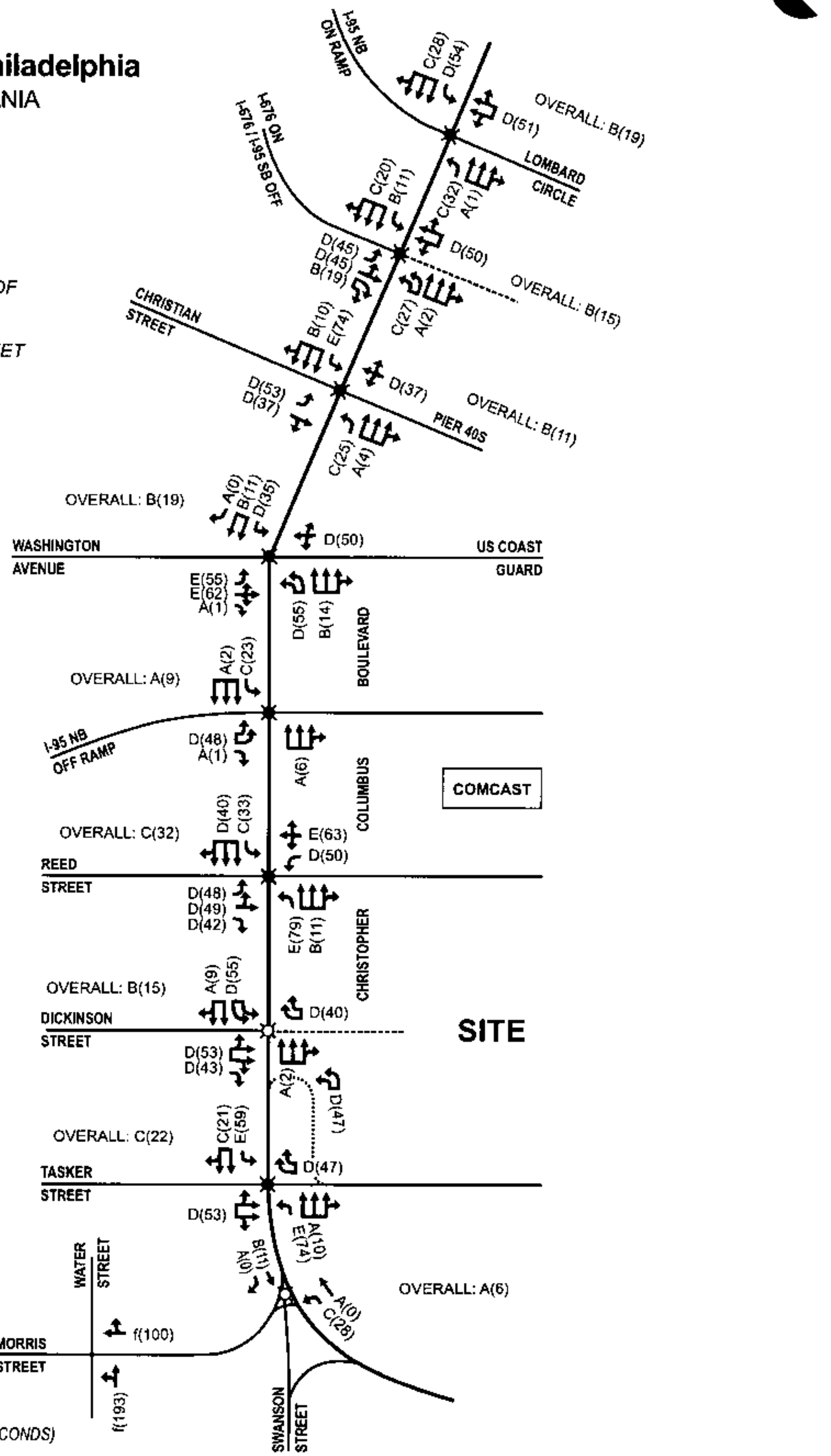
2010 Build Early Saturday Afternoon Peak Hour Levels of Service w/ Dickinson Street Ramp & Department of Streets Improvements

Foxwoods Casino - Philadelphia

PHILADELPHIA, PENNSYLVANIA

NOTE

REVISED TO SHOW DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS AT TASKER STREET



LEGEND

- *EXISTING TRAFFIC SIGNAL*
- *PROPOSED TRAFFIC SIGNAL*

A(#) - SIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

a(#) - UNSIGNALIZED LEVEL OF SERVICE (DELAY IN SECONDS)

Orth - Rodgers & Associates, Inc.
TRANSPORTATION ENGINEERS and PLANNERS

Supplemental Report
Modified Improvement Plan
Technical Appendix

Foxwoods-Philadelphia
Proposed Slot Parlor/Casino
Development
on
Columbus Boulevard
between
Reed and Tasker Streets

City of Philadelphia

October 4, 2006

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TABLE OF CONTENTS

CAPACITY ANALYSIS - PHASE I WITH DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)						4.0			4.0	4.0		
Lane Util. Factor						0.95			1.00	0.91		
Frt						0.95			1.00	1.00		
Flt Protected						0.98			0.95	1.00		
Satd. Flow (prot)						3283			1770	5075		
Flt Permitted						0.98			0.95	1.00		
Satd. Flow (perm)						3283			1770	5075		
Volume (vph)	0	0	0	1	8	5	7	4	363	1632	23	5
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1	9	5	8	4	395	1774	25	5
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	0	1	0	0
Lane Group Flow (vph)	0	0	0	0	0	15	0	0	399	1798	0	0
Turn Type				Split	Split			Prot	Prot			Prot
Protected Phases				8	8	8		1	1	6		5
Permitted Phases												
Actuated Green, G (s)						2.8			30.5	84.6		
Effective Green, g (s)						4.8			31.5	85.6		
Actuated g/C Ratio						0.04			0.29	0.78		
Clearance Time (s)						6.0			5.0	5.0		
Vehicle Extension (s)						3.0			3.0	3.0		
Lane Grp Cap (vph)						143			507	3949		
v/s Ratio Prot						c0.00			c0.23	0.35		
v/s Ratio Perm												
v/c Ratio						0.11			0.79	0.46		
Uniform Delay, d1						50.5			36.2	4.2		
Progression Factor						1.00			1.09	0.17		
Incremental Delay, d2						0.3			5.4	0.3		
Delay (s)						50.9			44.9	1.0		
Level of Service						D			D	A		
Approach Delay (s)		0.0				50.9				8.9		
Approach LOS		A				D				A		

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: I-95 NB On Ramp & Chris Columbus Blvd.

Movement	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	0.91	
Frt	1.00	0.99	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1770	5018	
Flt Permitted	0.95	1.00	
Satd. Flow (perm)	1770	5018	
Volume (vph)	17	1363	132
Peak-hour factor, PHF	0.92	0.92	0.92
Adj. Flow (vph)	18	1482	143
RTOR Reduction (vph)	0	7	0
Lane Group Flow (vph)	23	1618	0
Turn Type	Prot		
Protected Phases	5	2	
Permitted Phases			
Actuated Green, G (s)	6.6	60.7	
Effective Green, g (s)	7.6	61.7	
Actuated g/C Ratio	0.07	0.56	
Clearance Time (s)	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	122	2815	
v/s Ratio Prot	0.01	c0.32	
v/s Ratio Perm			
v/c Ratio	0.19	0.57	
Uniform Delay, d1	48.3	15.6	
Progression Factor	1.00	1.00	
Incremental Delay, d2	0.8	0.9	
Delay (s)	49.0	16.5	
Level of Service	D	B	
Approach Delay (s)		17.0	
Approach LOS		B	

Intersection Summary

2: I-676 On & I-676/95 Off Ramp & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		0.95		0.97	0.91			1.00	0.91
Frt	1.00	1.00	0.85		0.96		1.00	1.00			1.00	0.99
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1681	1700	2787		3320		3367	4979			1763	4963
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1681	1700	2787		3320		3367	4979			1763	4963
Volume (vph)	139	17	1233	19	11	11	459	1846	30	10	17	1239
Peak-hour factor, PHF	0.81	0.92	0.92	0.92	0.92	0.92	0.80	0.76	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	18	1340	21	12	12	574	2429	33	11	18	1347
RTOR Reduction (vph)	0	0	300	0	11	0	0	1	0	0	0	10
Lane Group Flow (vph)	93	97	1040	0	34	0	574	2461	0	0	29	1480
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	2%	3%	2%	3%
Turn Type	Split		pt+ov	Split			Prot			Prot	Prot	
Protected Phases	4	4	4 1	8	8		1	6		5	5	2
Permitted Phases												
Actuated Green, G (s)	12.4	12.4	51.4		4.3		33.0	66.2			5.1	37.3
Effective Green, g (s)	14.4	14.4	53.4		5.3		35.0	68.2			6.1	39.3
Actuated g/C Ratio	0.13	0.13	0.49		0.05		0.32	0.62			0.06	0.36
Clearance Time (s)	6.0	6.0			5.0		6.0	6.0			5.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	220	223	1353		160		1071	3087			98	1773
v/s Ratio Prot	0.06	0.06	c0.37		c0.01		0.17	c0.49			0.02	c0.30
v/s Ratio Perm												
v/c Ratio	0.42	0.43	0.77		0.21		0.54	0.80			0.30	0.83
Uniform Delay, d1	44.0	44.1	23.2		50.3		30.8	15.7			49.9	32.4
Progression Factor	1.00	1.00	1.00		1.00		0.79	0.70			1.00	0.49
Incremental Delay, d2	1.3	1.4	2.7		0.7		0.4	1.9			1.4	4.2
Delay (s)	45.3	45.4	25.9		51.0		24.9	13.0			51.1	20.0
Level of Service	D	D	C		D		C	B			D	B
Approach Delay (s)		28.3			51.0			15.2				20.6
Approach LOS		C			D			B				C

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	110
Peak-hour factor, PHF	0.77
Adj. Flow (vph)	143
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	3%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥		↰	↑↑↑↱		↰	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.85			1.00		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1583			1787		1770	5082		1770	5008	
Flt Permitted	0.75	1.00			0.80		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1388	1583			1491		1770	5082		1770	5008	
Volume (vph)	250	0	93	15	3	0	183	2053	10	2	2252	254
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	0	101	16	3	0	199	2232	11	2	2448	276
RTOR Reduction (vph)	0	80	0	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	272	21	0	0	19	0	199	2243	0	2	2712	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	21.0	21.0			21.0		13.0	72.0		1.0	60.0	
Effective Green, g (s)	23.0	23.0			23.0		14.0	73.0		2.0	61.0	
Actuated g/C Ratio	0.21	0.21			0.21		0.13	0.66		0.02	0.55	
Clearance Time (s)	6.0	6.0			6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	331			312		225	3373		32	2777	
v/s Ratio Prot		0.01					c0.11	0.44		0.00	c0.54	
v/s Ratio Perm	c0.20				0.01							
v/c Ratio	0.94	0.06			0.06		0.88	0.66		0.06	0.98	
Uniform Delay, d1	42.8	34.9			34.8		47.2	11.1		53.1	23.8	
Progression Factor	1.00	1.00			1.00		1.17	0.69		0.81	0.71	
Incremental Delay, d2	36.2	0.1			0.1		22.3	0.7		0.5	8.7	
Delay (s)	79.0	35.0			34.9		77.8	8.4		43.7	25.6	
Level of Service	E	C			C		E	A		D	C	
Approach Delay (s)		67.1			34.9			14.0			25.6	
Approach LOS		E			C			B			C	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰	✣	↱		✣			⮌↰	↑↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	12	12	12	12	12	10	13
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	0.95	0.91	0.95		1.00			0.97	0.91		1.00	0.95
Frt	1.00	1.00	0.85		0.98			1.00	1.00		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.96			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1665	1648	1504		2030			3433	5084		1652	3657
Flt Permitted	0.95	0.95	1.00		0.96			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1665	1648	1504		2030			3433	5084		1652	3657
Volume (vph)	607	0	329	20	2	4	21	291	1641	4	3	1590
Peak-hour factor, PHF	0.80	0.92	0.92	0.69	0.69	0.69	0.92	0.92	0.92	0.92	0.89	0.89
Adj. Flow (vph)	759	0	358	29	3	6	23	316	1784	4	3	1787
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	0	0	0	0
Lane Group Flow (vph)	380	379	358	0	32	0	0	339	1788	0	3	1787
Heavy Vehicles (%)	3%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split		Free	Split			Prot	Prot			Prot	
Protected Phases	8	8		4	4		1	1	6		5	2
Permitted Phases			Free									
Actuated Green, G (s)	24.0	24.0	110.0		2.4			10.0	55.8		5.8	51.6
Effective Green, g (s)	26.0	26.0	110.0		4.4			11.0	56.8		6.8	52.6
Actuated g/C Ratio	0.24	0.24	1.00		0.04			0.10	0.52		0.06	0.48
Clearance Time (s)	6.0	6.0			6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	394	390	1504		81			343	2625		102	1749
v/s Ratio Prot	0.23	c0.23			0.02			c0.10	0.35		0.00	c0.49
v/s Ratio Perm			0.24									
v/c Ratio	0.96	0.97	0.24		0.40			0.99	0.68		0.03	1.02
Uniform Delay, d1	41.5	41.6	0.0		51.5			49.4	19.8		48.5	28.7
Progression Factor	1.00	1.00	1.00		1.00			0.67	0.32		0.86	1.42
Incremental Delay, d2	35.8	37.9	0.4		3.2			41.8	1.3		0.0	19.6
Delay (s)	77.4	79.6	0.4		54.7			74.8	7.6		41.9	60.5
Level of Service	E	E	A		D			E	A		D	E
Approach Delay (s)		53.4			54.7				18.3			40.7
Approach LOS		D			D				B			D

Intersection Summary			
HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	784
Peak-hour factor, PHF	0.89
Adj. Flow (vph)	881
RTOR Reduction (vph)	0
Lane Group Flow (vph)	881
Heavy Vehicles (%)	2%
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	110.0
Effective Green, g (s)	110.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1583
v/s Ratio Prot	
v/s Ratio Perm	c0.56
v/c Ratio	0.56
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.6
Delay (s)	0.6
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰↰		↱					↑↑↑↱			↰	↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0			4.0	4.0
Lane Util. Factor	0.97		1.00					0.91			1.00	0.91
Frt	1.00		0.85					1.00			1.00	1.00
Flt Protected	0.95		1.00					1.00			0.95	1.00
Satd. Flow (prot)	3433		1583					5085			1805	5036
Flt Permitted	0.95		1.00					1.00			0.95	1.00
Satd. Flow (perm)	3433		1583					5085			1805	5036
Volume (vph)	427	0	325	0	0	0	0	1490	0	7	0	1937
Peak-hour factor, PHF	0.94	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.44	0.92	0.97
Adj. Flow (vph)	454	0	342	0	0	0	0	1620	0	16	0	1997
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	454	0	342	0	0	0	0	1620	0	0	16	1997
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	3%
Turn Type	Prot		Free							Prot	Prot	
Protected Phases	3							6		5	5	2
Permitted Phases			Free									
Actuated Green, G (s)	19.4		110.0					68.2			6.4	79.6
Effective Green, g (s)	21.4		110.0					69.2			7.4	80.6
Actuated g/C Ratio	0.19		1.00					0.63			0.07	0.73
Clearance Time (s)	6.0							5.0			5.0	5.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	668		1583					3199			121	3690
v/s Ratio Prot	c0.13							0.32			0.01	c0.40
v/s Ratio Perm			0.22									
v/c Ratio	0.68		0.22					0.51			0.13	0.54
Uniform Delay, d1	41.1		0.0					11.1			48.3	6.5
Progression Factor	1.00		1.00					0.22			0.64	0.27
Incremental Delay, d2	2.8		0.3					0.4			0.2	0.3
Delay (s)	43.9		0.3					2.8			31.1	2.0
Level of Service	D		A					A			C	A
Approach Delay (s)		25.2			0.0			2.8				2.3
Approach LOS		C			A			A				A

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	0
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	13	12	10	10	11	12	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0			4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95			1.00	0.91			1.00
Frt	1.00	1.00	0.85	1.00	0.92			1.00	1.00			1.00
Flt Protected	0.95	0.97	1.00	0.95	1.00			0.95	1.00			0.95
Satd. Flow (prot)	1625	1652	1531	1698	1701			1625	4898			1620
Flt Permitted	0.95	0.97	1.00	0.95	1.00			0.95	1.00			0.95
Satd. Flow (perm)	1625	1652	1531	1698	1701			1625	4898			1620
Volume (vph)	218	38	128	41	37	41	19	107	1220	18	11	97
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.75	0.75	0.80	0.47	0.92	0.87
Adj. Flow (vph)	237	41	139	49	44	49	25	143	1525	38	12	111
RTOR Reduction (vph)	0	0	121	0	37	0	0	0	4	0	0	0
Lane Group Flow (vph)	135	143	18	49	56	0	0	168	1559	0	0	123
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	4%	2%	2%	4%	4%
Turn Type	Split		Prot	Split			Prot	Prot			Prot	Prot
Protected Phases	3	3	3	7	7		1	1	6		5	5
Permitted Phases												
Actuated Green, G (s)	12.6	12.6	12.6	4.7	4.7			13.4	43.2			27.5
Effective Green, g (s)	14.6	14.6	14.6	6.7	6.7			14.4	44.2			28.5
Actuated g/C Ratio	0.13	0.13	0.13	0.06	0.06			0.13	0.40			0.26
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	216	219	203	103	104			213	1968			420
v/s Ratio Prot	0.08	c0.09	0.01	0.03	c0.03			0.10	c0.32			0.08
v/s Ratio Perm												
v/c Ratio	0.62	0.65	0.09	0.48	0.54			0.79	0.79			0.29
Uniform Delay, d1	45.1	45.3	41.9	50.0	50.2			46.3	28.9			32.7
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.16	1.00			0.63
Incremental Delay, d2	5.5	6.8	0.2	3.4	5.7			16.5	3.2			0.3
Delay (s)	50.7	52.1	42.1	53.4	55.8			70.3	32.2			20.8
Level of Service	D	D	D	D	E			E	C			C
Approach Delay (s)		48.3			55.0				35.9			
Approach LOS		D			D				D			

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑↱	
Ideal Flow (vphpl)	1900	1900
Lane Width	10	12
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.98	
Flt Protected	1.00	
Satd. Flow (prot)	4631	
Flt Permitted	1.00	
Satd. Flow (perm)	4631	
Volume (vph)	1932	220
Peak-hour factor, PHF	0.97	0.80
Adj. Flow (vph)	1992	275
RTOR Reduction (vph)	16	0
Lane Group Flow (vph)	2251	0
Heavy Vehicles (%)	3%	0%
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	57.3	
Effective Green, g (s)	58.3	
Actuated g/C Ratio	0.53	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	2454	
v/s Ratio Prot	c0.49	
v/s Ratio Perm		
v/c Ratio	0.92	
Uniform Delay, d1	23.6	
Progression Factor	0.46	
Incremental Delay, d2	6.2	
Delay (s)	17.1	
Level of Service	B	
Approach Delay (s)	17.3	
Approach LOS	B	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations						↱↱		↑↑↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)						4.0		4.0		4.0	4.0	
Lane Util. Factor						0.88		0.91		0.97	0.95	
Frt						0.85		1.00		1.00	1.00	
Flt Protected						1.00		1.00		0.95	1.00	
Satd. Flow (prot)						2787		4968		3433	3532	
Flt Permitted						1.00		1.00		0.95	1.00	
Satd. Flow (perm)						2787		4968		3433	3532	
Volume (vph)	0	0	0	0	0	51	0	1310	39	125	1969	27
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.75	0.82	0.92	0.92	0.84	0.84
Adj. Flow (vph)	0	0	0	0	0	55	0	1598	42	136	2344	32
RTOR Reduction (vph)	0	0	0	0	0	49	0	1	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	0	6	0	1639	0	136	2375	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Turn Type						Over				Prot		
Protected Phases						1		2		1	2	
Permitted Phases												
Actuated Green, G (s)						9.9		89.1		9.9	89.1	
Effective Green, g (s)						11.9		90.1		11.9	90.1	
Actuated g/C Ratio						0.11		0.82		0.11	0.82	
Clearance Time (s)						6.0		5.0		6.0	5.0	
Vehicle Extension (s)						3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)						302		4069		371	2893	
v/s Ratio Prot						0.00		0.33		c0.04	c0.67	
v/s Ratio Perm												
v/c Ratio						0.02		0.40		0.37	0.82	
Uniform Delay, d1						43.8		2.7		45.6	5.5	
Progression Factor						1.00		0.23		0.88	1.30	
Incremental Delay, d2						0.0		0.3		0.4	1.7	
Delay (s)						43.9		0.9		40.4	8.9	
Level of Service						D		A		D	A	
Approach Delay (s)		0.0			43.9			0.9			10.6	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰		↑↑↑			↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3433		5085			5085
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3433		5085			5085
Volume (vph)	154	0	1349	0	0	1969
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	167	0	1466	0	0	2140
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	167	0	1466	0	0	2140
Turn Type						
Protected Phases	1		2			2
Permitted Phases						
Actuated Green, G (s)	9.9		89.1			89.1
Effective Green, g (s)	11.9		90.1			90.1
Actuated g/C Ratio	0.11		0.82			0.82
Clearance Time (s)	6.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	371		4165			4165
v/s Ratio Prot	c0.05		0.29			c0.42
v/s Ratio Perm						
v/c Ratio	0.45		0.35			0.51
Uniform Delay, d1	46.0		2.5			3.1
Progression Factor	1.00		0.27			0.20
Incremental Delay, d2	0.9		0.2			0.2
Delay (s)	46.9		0.9			0.9
Level of Service	D		A			A
Approach Delay (s)	46.9		0.9			0.9
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	2.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱				↱↱	↰	↑↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95				0.88	1.00	0.91		1.00	0.95	
Frt		0.94				0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3274				2787	1770	5037		1770	3495	
Flt Permitted		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3274				2787	1770	5037		1770	3495	
Volume (vph)	79	78	109	0	0	104	24	1158	78	125	1747	159
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99
Adj. Flow (vph)	89	88	122	0	0	113	26	1259	85	136	1765	161
RTOR Reduction (vph)	0	107	0	0	0	99	0	6	0	0	4	0
Lane Group Flow (vph)	0	192	0	0	0	14	26	1338	0	136	1922	0
Turn Type	Split					Over	Prot			Prot		
Protected Phases	4	4				1	5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		11.5				13.1	3.4	69.4		13.1	79.1	
Effective Green, g (s)		13.5				14.1	4.4	70.4		14.1	80.1	
Actuated g/C Ratio		0.12				0.13	0.04	0.64		0.13	0.73	
Clearance Time (s)		6.0				5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0				3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		402				357	71	3224		227	2545	
v/s Ratio Prot		c0.06				0.01	0.01	0.27		c0.08	c0.55	
v/s Ratio Perm												
v/c Ratio		0.48				0.04	0.37	0.41		0.60	0.76	
Uniform Delay, d1		45.0				42.0	51.4	9.7		45.3	9.0	
Progression Factor		1.00				1.00	1.00	1.00		1.05	0.88	
Incremental Delay, d2		0.9				0.0	3.1	0.4		3.7	1.9	
Delay (s)		45.9				42.1	54.6	10.1		51.1	9.8	
Level of Service		D				D	D	B		D	A	
Approach Delay (s)		45.9			42.1			10.9			12.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↰	↑↑↑	↑↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			1.00	0.91	0.91	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			1770	5085	5085	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			1770	5085	5085	1583
Volume (vph)	0	0	166	1264	1432	424
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	180	1374	1557	461
RTOR Reduction (vph)	0	0	0	0	0	96
Lane Group Flow (vph)	0	0	180	1374	1557	365
Turn Type			Prot			Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			30.0	110.0	70.0	70.0
Effective Green, g (s)			31.0	110.0	71.0	71.0
Actuated g/C Ratio			0.28	1.00	0.65	0.65
Clearance Time (s)			5.0	5.0	5.0	5.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			499	5085	3282	1022
v/s Ratio Prot			c0.10	0.27	c0.31	
v/s Ratio Perm						0.23
v/c Ratio			0.36	0.27	0.47	0.36
Uniform Delay, d1			31.6	0.0	10.0	9.0
Progression Factor			1.00	1.00	0.69	0.36
Incremental Delay, d2			0.4	0.1	0.4	0.7
Delay (s)			32.0	0.1	7.2	3.9
Level of Service			C	A	A	A
Approach Delay (s)	0.0			3.8	6.5	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	5.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	0	526	64	51	390	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	572	70	55	424	0	0	0	0

Direction, Lane #	WB 1	NB 1
Volume Total (vph)	641	479
Volume Left (vph)	0	55
Volume Right (vph)	70	0
Hadj (s)	-0.03	0.06
Departure Headway (s)	5.4	5.8
Degree Utilization, x	0.96	0.77
Capacity (veh/h)	661	610
Control Delay (s)	47.4	25.8
Approach Delay (s)	47.4	25.8
Approach LOS	E	D

Intersection Summary			
Delay	38.1		
HCM Level of Service	E		
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

1: I-95 NB On Ramp & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations					↰↑↱			↰	↑↑↱		↰	↑↑↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0		4.0	4.0
Lane Util. Factor					0.95			1.00	0.91		1.00	0.91
Frt					0.94			1.00	0.99		1.00	0.99
Flt Protected					0.98			0.95	1.00		0.95	1.00
Satd. Flow (prot)					3313			1788	5036		1736	5045
Flt Permitted					0.98			0.95	1.00		0.95	1.00
Satd. Flow (perm)					3313			1788	5036		1736	5045
Volume (vph)	0	0	0	7	3	8	6	510	1047	59	27	1266
Peak-hour factor, PHF	0.92	0.92	0.92	0.64	0.64	0.64	0.25	0.95	0.82	0.66	0.65	0.85
Adj. Flow (vph)	0	0	0	11	5	12	24	537	1277	89	42	1489
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	5	0	0	5
Lane Group Flow (vph)	0	0	0	0	17	0	0	561	1361	0	42	1579
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	1%	2%	2%	4%	2%
Turn Type				Split			Prot	Prot			Prot	
Protected Phases				8	8		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)					4.2			42.6	92.6		7.2	57.2
Effective Green, g (s)					6.2			43.6	93.6		8.2	58.2
Actuated g/C Ratio					0.05			0.36	0.78		0.07	0.49
Clearance Time (s)					6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)					3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)					171			650	3928		119	2447
v/s Ratio Prot					c0.01			c0.31	0.27		0.02	c0.31
v/s Ratio Perm												
v/c Ratio					0.10			0.86	0.35		0.35	0.65
Uniform Delay, d1					54.2			35.4	4.0		53.4	23.2
Progression Factor					1.00			0.87	0.35		1.00	1.00
Incremental Delay, d2					0.2			10.0	0.2		1.8	1.3
Delay (s)					54.5			40.8	1.6		55.2	24.5
Level of Service					D			D	A		E	C
Approach Delay (s)		0.0			54.5				13.0			25.3
Approach LOS		A			D				B			C

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	79
Peak-hour factor, PHF	0.83
Adj. Flow (vph)	95
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	0.88		0.95		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85		0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1665	1686	2814		3324		3467	5074		1770	5070	
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1665	1686	2814		3324		3467	5074		1770	5070	
Volume (vph)	134	15	1213	18	12	11	634	1473	25	15	1162	104
Peak-hour factor, PHF	0.81	0.92	0.90	0.92	0.92	0.92	0.94	0.84	0.92	0.92	0.93	0.89
Adj. Flow (vph)	165	16	1348	20	13	12	674	1754	27	16	1249	117
RTOR Reduction (vph)	0	0	276	0	11	0	0	1	0	0	9	0
Lane Group Flow (vph)	88	93	1072	0	34	0	674	1780	0	16	1357	0
Heavy Vehicles (%)	3%	2%	1%	2%	2%	2%	1%	2%	2%	2%	1%	1%
Turn Type	Split		pt+ov	Split			Prot			Prot		
Protected Phases	4	4	4 1	8	8		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	18.5	18.5	53.9		5.6		35.4	70.1		3.8	37.5	
Effective Green, g (s)	20.5	20.5	57.9		6.6		37.4	72.1		4.8	39.5	
Actuated g/C Ratio	0.17	0.17	0.48		0.05		0.31	0.60		0.04	0.33	
Clearance Time (s)	6.0	6.0			5.0		6.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	284	288	1358		183		1081	3049		71	1669	
v/s Ratio Prot	0.05	0.06	c0.38		c0.01		0.19	0.35		0.01	c0.27	
v/s Ratio Perm												
v/c Ratio	0.31	0.32	0.79		0.18		0.62	0.58		0.23	0.81	
Uniform Delay, d1	43.6	43.7	26.0		54.1		35.3	14.7		55.8	36.9	
Progression Factor	1.00	1.00	1.00		1.00		0.83	0.43		0.51	0.55	
Incremental Delay, d2	0.6	0.7	3.1		0.5		0.8	0.6		1.3	3.6	
Delay (s)	44.2	44.3	29.1		54.6		30.0	7.0		29.7	23.7	
Level of Service	D	D	C		D		C	A		C	C	
Approach Delay (s)		30.9			54.6			13.3			23.8	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰	↱			✥		↰	↑↑↱			↰	↑↑↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91			1.00	0.91
Frt	1.00	0.86			0.98		1.00	1.00			1.00	0.98
Flt Protected	0.95	1.00			0.96		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1629			1774		1805	5081			1805	5031
Flt Permitted	0.74	1.00			0.77		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1374	1629			1413		1805	5081			1805	5031
Volume (vph)	157	2	142	13	2	2	172	1958	9	5	16	2043
Peak-hour factor, PHF	0.82	0.25	0.89	0.60	0.50	0.50	0.87	0.84	0.56	0.62	0.31	0.95
Adj. Flow (vph)	191	8	160	22	4	4	198	2331	16	8	52	2151
RTOR Reduction (vph)	0	129	0	0	3	0	0	0	0	0	0	15
Lane Group Flow (vph)	191	39	0	0	27	0	198	2347	0	0	60	2474
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	0%	2%	0%	0%	0%	1%
Turn Type	Perm			Perm			Prot			Prot	Prot	
Protected Phases		4			8		1	6		5	5	2
Permitted Phases	4			8								
Actuated Green, G (s)	21.1	21.1			21.1		16.9	75.8			7.1	66.0
Effective Green, g (s)	23.1	23.1			23.1		17.9	76.8			8.1	67.0
Actuated g/C Ratio	0.19	0.19			0.19		0.15	0.64			0.07	0.56
Clearance Time (s)	6.0	6.0			6.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	264	314			272		269	3252			122	2809
v/s Ratio Prot		0.02					0.11	c0.46			0.03	c0.49
v/s Ratio Perm	c0.14				0.02							
v/c Ratio	0.72	0.12			0.10		0.74	0.72			0.49	0.88
Uniform Delay, d1	45.5	40.1			39.9		48.8	14.4			54.0	23.0
Progression Factor	1.00	1.00			1.00		0.77	0.51			1.20	0.69
Incremental Delay, d2	9.4	0.2			0.2		7.6	1.1			1.8	2.6
Delay (s)	54.9	40.3			40.0		45.1	8.5			66.8	18.4
Level of Service	D	D			D		D	A			E	B
Approach Delay (s)		48.0			40.0			11.3				19.5
Approach LOS		D			D			B				B

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	328
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	338
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	1%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	12	12	12	12	12	12	10
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0	4.0			4.0
Lane Util. Factor	0.95	0.91	0.95		1.00			0.97	0.91			1.00
Frt	1.00	1.00	0.85		0.95			1.00	1.00			1.00
Flt Protected	0.95	0.95	1.00		0.99			0.95	1.00			0.95
Satd. Flow (prot)	1665	1657	1504		2019			3433	5082			1652
Flt Permitted	0.95	0.95	1.00		0.99			0.95	1.00			0.95
Satd. Flow (perm)	1665	1657	1504		2019			3433	5082			1652
Volume (vph)	522	4	416	4	4	5	2	352	1608	3	6	0
Peak-hour factor, PHF	0.96	0.25	0.92	0.50	0.33	0.42	0.91	0.91	0.85	0.38	0.75	0.92
Adj. Flow (vph)	544	16	452	8	12	12	2	387	1892	8	8	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	0	0
Lane Group Flow (vph)	273	287	452	0	21	0	0	389	1900	0	0	8
Heavy Vehicles (%)	3%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split		Free	Split			Prot	Prot			Prot	Prot
Protected Phases	8	8		4	4		1	1	6		5	5
Permitted Phases			Free									
Actuated Green, G (s)	22.5	22.5	120.0		4.2			13.0	66.1			5.2
Effective Green, g (s)	24.5	24.5	120.0		6.2			14.0	67.1			6.2
Actuated g/C Ratio	0.20	0.20	1.00		0.05			0.12	0.56			0.05
Clearance Time (s)	6.0	6.0			6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	340	338	1504		104			401	2842			85
v/s Ratio Prot	0.16	c0.17			0.01			c0.11	0.37			0.00
v/s Ratio Perm			0.30									
v/c Ratio	0.80	0.85	0.30		0.20			0.97	0.67			0.09
Uniform Delay, d1	45.5	46.0	0.0		54.5			52.8	18.6			54.2
Progression Factor	1.00	1.00	1.00		1.00			0.75	0.37			1.45
Incremental Delay, d2	12.8	17.7	0.5		0.9			31.7	1.0			0.3
Delay (s)	58.3	63.7	0.5		55.5			71.5	7.9			78.9
Level of Service	E	E	A		E			E	A			E
Approach Delay (s)		34.0			55.5				18.8			
Approach LOS		C			E				B			

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑	↱
Ideal Flow (vphpl)	1900	1900
Lane Width	13	12
Total Lost time (s)	4.0	4.0
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3850	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3850	1583
Volume (vph)	1750	441
Peak-hour factor, PHF	0.92	0.90
Adj. Flow (vph)	1902	490
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	1902	490
Heavy Vehicles (%)	2%	2%
Turn Type		Free
Protected Phases	2	
Permitted Phases		Free
Actuated Green, G (s)	58.3	120.0
Effective Green, g (s)	59.3	120.0
Actuated g/C Ratio	0.49	1.00
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	1903	1583
v/s Ratio Prot	c0.49	
v/s Ratio Perm		c0.31
v/c Ratio	1.00	0.31
Uniform Delay, d1	30.3	0.0
Progression Factor	0.38	1.00
Incremental Delay, d2	15.4	0.3
Delay (s)	27.1	0.3
Level of Service	C	A
Approach Delay (s)	21.8	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰↰		↱					↑↑↑↱			↰	↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0			4.0	4.0
Lane Util. Factor	0.97		1.00					0.91			1.00	1.00
Frt	1.00		0.85					1.00			1.00	1.00
Flt Protected	0.95		1.00					1.00			0.95	1.00
Satd. Flow (prot)	3433		1568					5085			1805	5644
Flt Permitted	0.95		1.00					1.00			0.95	1.00
Satd. Flow (perm)	3433		1568					5085			1805	5644
Volume (vph)	404	0	349	0	0	0	0	1526	0	24	0	2149
Peak-hour factor, PHF	0.76	0.92	0.72	0.92	0.92	0.92	0.92	0.92	0.92	0.26	0.26	0.96
Adj. Flow (vph)	532	0	485	0	0	0	0	1659	0	92	0	2239
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	532	0	485	0	0	0	0	1659	0	0	92	2239
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	2%	2%	2%	0%	0%	1%
Turn Type	Prot		Free							Prot	Prot	
Protected Phases	3							6		5	5	2
Permitted Phases			Free									
Actuated Green, G (s)	23.1		120.0					61.4			19.5	85.9
Effective Green, g (s)	25.1		120.0					62.4			20.5	86.9
Actuated g/C Ratio	0.21		1.00					0.52			0.17	0.72
Clearance Time (s)	6.0							5.0			5.0	5.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	718		1568					2644			308	4087
v/s Ratio Prot	c0.15							c0.33			0.05	c0.40
v/s Ratio Perm			0.31									
v/c Ratio	0.74		0.31					0.63			0.30	0.55
Uniform Delay, d1	44.4		0.0					20.5			43.5	7.6
Progression Factor	1.00		1.00					0.24			0.64	0.17
Incremental Delay, d2	4.1		0.5					0.7			0.3	0.3
Delay (s)	48.5		0.5					5.6			28.1	1.6
Level of Service	D		A					A			C	A
Approach Delay (s)		25.6			0.0			5.6				2.6
Approach LOS		C			A			A				A

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	0
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	13	12	10	10	11	12	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0			4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95			1.00	0.91			1.00
Frt	1.00	1.00	0.85	1.00	0.91			1.00	1.00			1.00
Flt Protected	0.95	0.97	1.00	0.95	1.00			0.95	1.00			0.95
Satd. Flow (prot)	1625	1659	1561	1681	1694			1636	4899			1652
Flt Permitted	0.95	0.97	1.00	0.95	1.00			0.95	1.00			0.95
Satd. Flow (perm)	1625	1659	1561	1681	1694			1636	4899			1652
Volume (vph)	189	35	158	37	26	53	18	144	1283	20	2	119
Peak-hour factor, PHF	0.87	0.83	1.00	0.70	0.50	0.65	0.92	0.92	0.80	0.47	0.69	0.69
Adj. Flow (vph)	217	42	158	53	52	82	20	157	1604	43	3	172
RTOR Reduction (vph)	0	0	139	0	47	0	0	0	3	0	0	0
Lane Group Flow (vph)	125	134	19	53	87	0	0	177	1644	0	0	175
Heavy Vehicles (%)	2%	1%	0%	2%	0%	0%	3%	3%	2%	0%	2%	2%
Turn Type	Split		Prot	Split			Prot	Prot			Prot	Prot
Protected Phases	3	3	3	7	7		1	1	6		5	5
Permitted Phases												
Actuated Green, G (s)	12.2	12.2	12.2	6.9	6.9			15.6	48.3			30.6
Effective Green, g (s)	14.2	14.2	14.2	8.9	8.9			16.6	49.3			31.6
Actuated g/C Ratio	0.12	0.12	0.12	0.07	0.07			0.14	0.41			0.26
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	192	196	185	125	126			226	2013			435
v/s Ratio Prot	0.08	c0.08	0.01	0.03	c0.05			0.11	c0.34			0.11
v/s Ratio Perm												
v/c Ratio	0.65	0.68	0.10	0.42	0.69			0.78	0.82			0.40
Uniform Delay, d1	50.5	50.7	47.2	53.1	54.2			50.0	31.3			36.4
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.24	1.15			0.62
Incremental Delay, d2	7.7	9.5	0.2	2.3	14.5			15.2	3.6			0.5
Delay (s)	58.2	60.2	47.4	55.4	68.7			77.4	39.8			23.1
Level of Service	E	E	D	E	E			E	D			C
Approach Delay (s)		54.8			65.0				43.4			
Approach LOS		D			E				D			

Intersection Summary			
HCM Average Control Delay	41.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900
Lane Width	10	12
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.98	
Flt Protected	1.00	
Satd. Flow (prot)	4672	
Flt Permitted	1.00	
Satd. Flow (perm)	4672	
Volume (vph)	2168	226
Peak-hour factor, PHF	0.94	0.78
Adj. Flow (vph)	2306	290
RTOR Reduction (vph)	13	0
Lane Group Flow (vph)	2583	0
Heavy Vehicles (%)	2%	1%
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	63.3	
Effective Green, g (s)	64.3	
Actuated g/C Ratio	0.54	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	2503	
v/s Ratio Prot	c0.55	
v/s Ratio Perm		
v/c Ratio	1.03	
Uniform Delay, d1	27.9	
Progression Factor	0.40	
Incremental Delay, d2	25.8	
Delay (s)	37.1	
Level of Service	D	
Approach Delay (s)	36.2	
Approach LOS	D	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations						↱↱		↑↑↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)						4.0		4.0		4.0	4.0	
Lane Util. Factor						0.88		0.91		0.97	0.95	
Frt						0.85		0.99		1.00	1.00	
Flt Protected						1.00		1.00		0.95	1.00	
Satd. Flow (prot)						2787		5056		3433	3539	
Flt Permitted						1.00		1.00		0.95	1.00	
Satd. Flow (perm)						2787		5056		3433	3539	
Volume (vph)	0	0	0	0	0	104	0	1361	60	295	2085	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.87	0.85	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	113	0	1601	65	321	2266	0
RTOR Reduction (vph)	0	0	0	0	0	70	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	43	0	1664	0	321	2266	0
Turn Type						Over				Prot		
Protected Phases						1		2		1	2	
Permitted Phases												
Actuated Green, G (s)						16.5		92.5		16.5	92.5	
Effective Green, g (s)						18.5		93.5		18.5	93.5	
Actuated g/C Ratio						0.15		0.78		0.15	0.78	
Clearance Time (s)						6.0		5.0		6.0	5.0	
Vehicle Extension (s)						3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)						430		3939		529	2757	
v/s Ratio Prot						0.02		0.33		c0.09	c0.64	
v/s Ratio Perm												
v/c Ratio						0.10		0.42		0.61	0.82	
Uniform Delay, d1						43.6		4.4		47.4	8.1	
Progression Factor						1.00		0.17		0.95	0.92	
Incremental Delay, d2						0.1		0.3		0.6	0.9	
Delay (s)						43.7		1.1		45.5	8.4	
Level of Service						D		A		D	A	
Approach Delay (s)		0.0			43.7			1.1			13.0	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3433		5085			5085
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3433		5085			5085
Volume (vph)	255	0	1421	0	0	2085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	277	0	1545	0	0	2266
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	277	0	1545	0	0	2266
Turn Type						
Protected Phases	1		2			2
Permitted Phases						
Actuated Green, G (s)	16.5		92.5			92.5
Effective Green, g (s)	18.5		93.5			93.5
Actuated g/C Ratio	0.15		0.78			0.78
Clearance Time (s)	6.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	529		3962			3962
v/s Ratio Prot	c0.08		0.30			c0.45
v/s Ratio Perm						
v/c Ratio	0.52		0.39			0.57
Uniform Delay, d1	46.7		4.2			5.3
Progression Factor	1.00		0.61			0.15
Incremental Delay, d2	0.9		0.3			0.3
Delay (s)	47.6		2.8			1.1
Level of Service	D		A			A
Approach Delay (s)	47.6		2.8			1.1
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	4.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱				↱↱	↰	↑↑↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95				0.88	1.00	0.91		1.00	0.95	
Frt		0.94				0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3288				2682	1787	4996		1805	3525	
Flt Permitted		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3288				2682	1787	4996		1805	3525	
Volume (vph)	91	108	120	0	0	164	31	1168	119	98	2047	194
Peak-hour factor, PHF	0.91	0.83	0.78	0.61	0.77	0.94	0.75	0.88	0.58	0.92	0.94	0.82
Adj. Flow (vph)	100	130	154	0	0	174	41	1327	205	107	2178	237
RTOR Reduction (vph)	0	69	0	0	0	157	0	16	0	0	7	0
Lane Group Flow (vph)	0	315	0	0	0	17	41	1516	0	107	2408	0
Heavy Vehicles (%)	1%	0%	4%	2%	3%	6%	1%	2%	0%	0%	1%	0%
Turn Type	Split					Over	Prot			Prot		
Protected Phases	4	4				1	5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		14.2				10.8	4.1	79.0		10.8	85.7	
Effective Green, g (s)		16.2				11.8	5.1	80.0		11.8	86.7	
Actuated g/C Ratio		0.13				0.10	0.04	0.67		0.10	0.72	
Clearance Time (s)		6.0				5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0				3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		444				264	76	3331		177	2547	
v/s Ratio Prot		c0.10				0.01	0.02	0.30		c0.06	c0.68	
v/s Ratio Perm												
v/c Ratio		0.71				0.06	0.54	0.46		0.60	0.95	
Uniform Delay, d1		49.6				49.1	56.3	9.6		51.9	14.6	
Progression Factor		1.00				1.00	1.00	1.00		1.06	0.49	
Incremental Delay, d2		5.1				0.1	7.0	0.4		4.8	7.7	
Delay (s)		54.8				49.2	63.3	10.0		59.8	14.8	
Level of Service		D				D	E	B		E	B	
Approach Delay (s)		54.8			49.2			11.4			16.7	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			1.00	0.91	0.91	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			1770	5085	5085	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			1770	5085	5085	1583
Volume (vph)	0	0	140	1318	1679	488
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	152	1433	1825	530
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	152	1433	1825	530
Turn Type			Prot			Free
Protected Phases			5	2	6	
Permitted Phases						Free
Actuated Green, G (s)			35.0	120.0	75.0	120.0
Effective Green, g (s)			36.0	120.0	76.0	120.0
Actuated g/C Ratio			0.30	1.00	0.63	1.00
Clearance Time (s)			5.0	5.0	5.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			531	5085	3221	1583
v/s Ratio Prot			0.09	0.28	c0.36	
v/s Ratio Perm						c0.33
v/c Ratio			0.29	0.28	0.57	0.33
Uniform Delay, d1			32.2	0.0	12.6	0.0
Progression Factor			1.00	1.00	0.70	1.00
Incremental Delay, d2			0.3	0.1	0.3	0.2
Delay (s)			32.5	0.1	9.0	0.2
Level of Service			C	A	A	A
Approach Delay (s)	0.0			3.2	7.1	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	0	558	70	74	680	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	607	76	80	739	0	0	0	0

Direction, Lane #	WB 1	NB 1
Volume Total (vph)	683	820
Volume Left (vph)	0	80
Volume Right (vph)	76	0
Hadj (s)	-0.03	0.05
Departure Headway (s)	5.7	5.8
Degree Utilization, x	1.09	1.33
Capacity (veh/h)	631	631
Control Delay (s)	85.1	176.3
Approach Delay (s)	85.1	176.3
Approach LOS	F	F

Intersection Summary			
Delay	134.9		
HCM Level of Service	F		
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

CAPACITY ANALYSIS - PHASE II WITH DOCKSIDE RESIDENCES AND DEPARTMENT OF STREETS SUGGESTED IMPROVEMENTS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations					↰↑↱			⮌↰	↑↑↱			⮌↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0			4.0
Lane Util. Factor					0.95			1.00	0.91			1.00
Frt					0.95			1.00	1.00			1.00
Flt Protected					0.98			0.95	1.00			0.95
Satd. Flow (prot)					3276			1770	5075			1770
Flt Permitted					0.98			0.95	1.00			0.95
Satd. Flow (perm)					3276			1770	5075			1770
Volume (vph)	0	0	0	10	5	8	4	385	1689	24	5	17
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	11	5	9	4	418	1836	26	5	18
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	0	0	0	16	0	0	422	1861	0	0	23
Turn Type				Split			Prot	Prot			Prot	Prot
Protected Phases				8	8		1	1	6		5	5
Permitted Phases												
Actuated Green, G (s)					2.8			32.2	79.2			2.0
Effective Green, g (s)					4.8			33.2	80.2			3.0
Actuated g/C Ratio					0.05			0.33	0.80			0.03
Clearance Time (s)					6.0			5.0	5.0			5.0
Vehicle Extension (s)					3.0			3.0	3.0			3.0
Lane Grp Cap (vph)					157			588	4070			53
v/s Ratio Prot					c0.01			c0.24	0.37			0.01
v/s Ratio Perm												
v/c Ratio					0.10			0.72	0.46			0.43
Uniform Delay, d1					45.5			29.3	3.1			47.7
Progression Factor					1.00			0.47	0.12			1.00
Incremental Delay, d2					0.3			2.5	0.2			5.6
Delay (s)					45.8			16.3	0.6			53.3
Level of Service					D			B	A			D
Approach Delay (s)		0.0			45.8				3.5			
Approach LOS		A			D				A			

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑↑	
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	5019	
Flt Permitted	1.00	
Satd. Flow (perm)	5019	
Volume (vph)	1422	136
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	1546	148
RTOR Reduction (vph)	10	0
Lane Group Flow (vph)	1684	0
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	49.0	
Effective Green, g (s)	50.0	
Actuated g/C Ratio	0.50	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	2510	
v/s Ratio Prot	c0.34	
v/s Ratio Perm		
v/c Ratio	0.67	
Uniform Delay, d1	18.8	
Progression Factor	1.00	
Incremental Delay, d2	1.4	
Delay (s)	20.3	
Level of Service	C	
Approach Delay (s)	20.7	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95	0.88		0.95		0.97	0.91			1.00	0.91
Frt	1.00	1.00	0.85		0.96		1.00	1.00			1.00	0.99
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1681	1700	2787		3320		3367	4979			1763	4964
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1681	1700	2787		3320		3367	4979			1763	4964
Volume (vph)	143	17	794	19	11	11	485	1922	31	11	17	1294
Peak-hour factor, PHF	0.81	0.92	0.92	0.92	0.92	0.92	0.80	0.76	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	18	863	21	12	12	606	2529	34	12	18	1407
RTOR Reduction (vph)	0	0	424	0	11	0	0	1	0	0	0	12
Lane Group Flow (vph)	95	100	439	0	34	0	606	2562	0	0	30	1543
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	2%	3%	2%	3%
Turn Type	Split		pt+ov	Split			Prot			Prot	Prot	
Protected Phases	4	4	4 1	8	8		1	6		5	5	2
Permitted Phases												
Actuated Green, G (s)	13.0	13.0	38.5		4.2		25.5	56.8			3.0	33.3
Effective Green, g (s)	15.0	15.0	42.5		6.2		27.5	58.8			4.0	35.3
Actuated g/C Ratio	0.15	0.15	0.42		0.06		0.28	0.59			0.04	0.35
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0			5.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	252	255	1184		206		926	2928			71	1752
v/s Ratio Prot	0.06	c0.06	0.16		c0.01		0.18	c0.51			0.02	c0.31
v/s Ratio Perm												
v/c Ratio	0.38	0.39	0.37		0.16		0.65	0.88			0.42	0.88
Uniform Delay, d1	38.3	38.4	19.6		44.4		32.0	17.5			46.9	30.4
Progression Factor	1.00	1.00	1.00		1.00		0.99	0.57			0.53	0.49
Incremental Delay, d2	0.9	1.0	0.2		0.4		1.4	3.3			3.3	5.6
Delay (s)	39.2	39.4	19.8		44.8		33.2	13.3			27.9	20.5
Level of Service	D	D	B		D		C	B			C	C
Approach Delay (s)		23.4			44.8			17.1				20.6
Approach LOS		C			D			B				C

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	114
Peak-hour factor, PHF	0.77
Adj. Flow (vph)	148
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	3%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.85			1.00		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1583			1787		1770	5081		1770	4991	
Flt Permitted	0.75	1.00			0.81		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1388	1583			1504		1770	5081		1770	4991	
Volume (vph)	258	0	96	15	3	0	189	2154	11	2	1861	262
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	280	0	104	16	3	0	205	2341	12	2	2023	285
RTOR Reduction (vph)	0	79	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	280	25	0	0	19	0	205	2353	0	2	2289	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	22.1	22.1			22.1		16.7	60.5		1.4	45.2	
Effective Green, g (s)	24.1	24.1			24.1		17.7	61.5		2.4	46.2	
Actuated g/C Ratio	0.24	0.24			0.24		0.18	0.62		0.02	0.46	
Clearance Time (s)	6.0	6.0			6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	335	382			362		313	3125		42	2306	
v/s Ratio Prot		0.02					0.12	c0.46		0.00	c0.46	
v/s Ratio Perm	c0.20				0.01							
v/c Ratio	0.84	0.07			0.05		0.65	0.75		0.05	0.99	
Uniform Delay, d1	36.1	29.3			29.2		38.3	13.8		47.7	26.7	
Progression Factor	1.00	1.00			1.00		0.67	0.22		1.43	0.47	
Incremental Delay, d2	16.3	0.1			0.1		2.6	0.9		0.3	14.1	
Delay (s)	52.4	29.3			29.2		28.3	4.0		68.3	26.7	
Level of Service	D	C			C		C	A		E	C	
Approach Delay (s)		46.1			29.2			5.9			26.7	
Approach LOS		D			C			A			C	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	12	12	12	12	12	10	13
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	0.95	0.91	0.95		1.00			0.97	0.91		1.00	0.95
Frt	1.00	1.00	0.85		0.98			1.00	1.00		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.96			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1665	1648	1504		2030			3433	5084		1652	3657
Flt Permitted	0.95	0.95	1.00		0.96			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1665	1648	1504		2030			3433	5084		1652	3657
Volume (vph)	626	0	347	20	2	4	21	303	1722	4	3	1179
Peak-hour factor, PHF	0.80	0.92	0.92	0.69	0.69	0.69	0.92	0.92	0.92	0.92	0.89	0.89
Adj. Flow (vph)	782	0	377	29	3	6	23	329	1872	4	3	1325
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	0	0	0	0
Lane Group Flow (vph)	391	391	377	0	32	0	0	352	1876	0	3	1325
Heavy Vehicles (%)	3%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split		Free	Split			Prot	Prot			Prot	
Protected Phases	8	8		4	4		1	1	6		5	2
Permitted Phases			Free									
Actuated Green, G (s)	25.1	25.1	100.0		4.2			12.0	41.7		7.0	36.7
Effective Green, g (s)	27.1	27.1	100.0		6.2			13.0	42.7		8.0	37.7
Actuated g/C Ratio	0.27	0.27	1.00		0.06			0.13	0.43		0.08	0.38
Clearance Time (s)	6.0	6.0			6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	451	447	1504		126			446	2171		132	1379
v/s Ratio Prot	0.23	c0.24			0.02			0.10	c0.37		0.00	c0.36
v/s Ratio Perm			0.25									
v/c Ratio	0.87	0.87	0.25		0.26			0.79	0.86		0.02	0.96
Uniform Delay, d1	34.7	34.8	0.0		44.7			42.2	26.0		42.4	30.4
Progression Factor	1.00	1.00	1.00		1.00			0.90	0.79		0.51	0.33
Incremental Delay, d2	15.9	17.1	0.4		1.1			7.9	4.3		0.0	10.4
Delay (s)	50.7	51.9	0.4		45.8			45.7	24.9		21.8	20.5
Level of Service	D	D	A		D			D	C		C	C
Approach Delay (s)		34.7			45.8				28.2			12.5
Approach LOS		C			D				C			B

Intersection Summary

HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Volume (vph)	807
Peak-hour factor, PHF	0.89
Adj. Flow (vph)	907
RTOR Reduction (vph)	0
Lane Group Flow (vph)	907
Heavy Vehicles (%)	2%
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	100.0
Effective Green, g (s)	100.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1583
v/s Ratio Prot	
v/s Ratio Perm	c0.57
v/c Ratio	0.57
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.8
Delay (s)	0.8
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0			4.0	4.0
Lane Util. Factor	0.97		1.00					0.91			1.00	0.91
Frt	1.00		0.85					1.00			1.00	1.00
Flt Protected	0.95		1.00					1.00			0.95	1.00
Satd. Flow (prot)	3433		1583					5085			1805	5036
Flt Permitted	0.95		1.00					1.00			0.95	1.00
Satd. Flow (perm)	3433		1583					5085			1805	5036
Volume (vph)	440	0	358	0	0	0	0	1570	0	8	0	1545
Peak-hour factor, PHF	0.94	0.92	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.44	0.92	0.97
Adj. Flow (vph)	468	0	377	0	0	0	0	1707	0	18	0	1593
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	468	0	377	0	0	0	0	1707	0	0	18	1593
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	3%
Turn Type	Prot		Free							Prot	Prot	
Protected Phases	3							6		5	5	2
Permitted Phases			Free									
Actuated Green, G (s)	18.4		100.0					64.0			1.6	70.6
Effective Green, g (s)	20.4		100.0					65.0			2.6	71.6
Actuated g/C Ratio	0.20		1.00					0.65			0.03	0.72
Clearance Time (s)	6.0							5.0			5.0	5.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	700		1583					3305			47	3606
v/s Ratio Prot	c0.14							c0.34			0.01	c0.32
v/s Ratio Perm			0.24									
v/c Ratio	0.67		0.24					0.52			0.38	0.44
Uniform Delay, d1	36.7		0.0					9.2			47.9	5.9
Progression Factor	1.00		1.00					0.51			1.29	0.29
Incremental Delay, d2	2.4		0.4					0.4			3.3	0.3
Delay (s)	39.1		0.4					5.2			65.3	1.9
Level of Service	D		A					A			E	A
Approach Delay (s)		21.8			0.0			5.2				2.7
Approach LOS		C			A			A				A

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	0
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	2%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations	↰	↰↑	↱	↰	↰↑↱			↶↰	↑↑↱			↶↰
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	12	12	13	12	10	10	11	12	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0			4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95			1.00	0.91			1.00
Frt	1.00	1.00	0.85	1.00	0.92			1.00	1.00			1.00
Flt Protected	0.95	0.97	1.00	0.95	1.00			0.95	1.00			0.95
Satd. Flow (prot)	1793	1768	1583	1698	1693			1624	4899			1620
Flt Permitted	0.95	0.97	1.00	0.95	1.00			0.95	1.00			0.95
Satd. Flow (perm)	1793	1768	1583	1698	1693			1624	4899			1620
Volume (vph)	224	41	132	45	39	48	19	141	1287	18	12	84
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.84	0.84	0.75	0.75	0.80	0.47	0.92	0.87
Adj. Flow (vph)	243	45	143	54	46	57	25	188	1609	38	13	97
RTOR Reduction (vph)	0	0	126	0	46	0	0	0	2	0	0	0
Lane Group Flow (vph)	143	145	17	54	57	0	0	213	1645	0	0	110
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	4%	2%	2%	4%	4%
Turn Type	Split		Prot	Split			Prot	Prot			Prot	Prot
Protected Phases	3	3	3	7	7		1	1	6		5	5
Permitted Phases												
Actuated Green, G (s)	10.0	10.0	10.0	8.0	8.0			15.2	49.5			10.5
Effective Green, g (s)	12.0	12.0	12.0	10.0	10.0			16.2	50.5			11.5
Actuated g/C Ratio	0.12	0.12	0.12	0.10	0.10			0.16	0.50			0.12
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	215	212	190	170	169			263	2474			186
v/s Ratio Prot	0.08	c0.08	0.01	0.03	c0.03			c0.13	0.34			0.07
v/s Ratio Perm												
v/c Ratio	0.67	0.68	0.09	0.32	0.34			0.81	0.66			0.59
Uniform Delay, d1	42.1	42.2	39.1	41.8	41.9			40.4	18.4			42.0
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.66	0.31			1.33
Incremental Delay, d2	7.5	8.8	0.2	1.1	1.2			14.6	1.2			4.7
Delay (s)	49.6	51.0	39.4	42.9	43.1			41.3	6.9			60.3
Level of Service	D	D	D	D	D			D	A			E
Approach Delay (s)		46.7			43.0				10.9			
Approach LOS		D			D				B			

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
	↓	↙
Lane Configurations	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900
Lane Width	10	12
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.98	
Flt Protected	1.00	
Satd. Flow (prot)	4615	
Flt Permitted	1.00	
Satd. Flow (perm)	4615	
Volume (vph)	1579	227
Peak-hour factor, PHF	0.97	0.80
Adj. Flow (vph)	1628	284
RTOR Reduction (vph)	23	0
Lane Group Flow (vph)	1889	0
Heavy Vehicles (%)	3%	0%
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	44.8	
Effective Green, g (s)	45.8	
Actuated g/C Ratio	0.46	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	2114	
v/s Ratio Prot	c0.41	
v/s Ratio Perm		
v/c Ratio	0.89	
Uniform Delay, d1	24.9	
Progression Factor	0.29	
Incremental Delay, d2	5.9	
Delay (s)	13.3	
Level of Service	B	
Approach Delay (s)	15.8	
Approach LOS	B	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱	↱			↱↱		↑↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0		4.0		4.0	4.0	
Lane Util. Factor		0.91	0.91			0.88		0.91		0.97	0.95	
Frt		0.95	0.85			0.85		1.00		1.00	1.00	
Flt Protected		0.99	1.00			1.00		1.00		0.95	1.00	
Satd. Flow (prot)		3199	1441			2787		4964		3433	3530	
Flt Permitted		0.99	1.00			1.00		1.00		0.95	1.00	
Satd. Flow (perm)		3199	1441			2787		4964		3433	3530	
Volume (vph)	34	172	306	0	0	67	0	1362	50	93	1655	28
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.75	0.82	0.92	0.92	0.84	0.84
Adj. Flow (vph)	37	187	333	0	0	73	0	1661	54	101	1970	33
RTOR Reduction (vph)	0	61	171	0	0	64	0	3	0	0	1	0
Lane Group Flow (vph)	0	279	46	0	0	9	0	1712	0	101	2002	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	2%	2%	2%
Turn Type	Split		Perm			Over				Prot		
Protected Phases	4	4				1		2		1	2	
Permitted Phases			4									
Actuated Green, G (s)		13.5	13.5			10.4		59.1		10.4	59.1	
Effective Green, g (s)		15.5	15.5			12.4		60.1		12.4	60.1	
Actuated g/C Ratio		0.16	0.16			0.12		0.60		0.12	0.60	
Clearance Time (s)		6.0	6.0			6.0		5.0		6.0	5.0	
Vehicle Extension (s)		3.0	3.0			3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		496	223			346		2983		426	2122	
v/s Ratio Prot		c0.09				0.00		0.34		c0.03	c0.57	
v/s Ratio Perm			0.03									
v/c Ratio		0.56	0.21			0.03		0.57		0.24	0.94	
Uniform Delay, d1		39.1	36.9			38.5		12.2		39.5	18.4	
Progression Factor		1.00	1.00			1.00		0.09		1.27	0.27	
Incremental Delay, d2		1.5	0.5			0.0		0.7		0.2	7.4	
Delay (s)		40.6	37.4			38.5		1.8		50.6	12.4	
Level of Service		D	D			D		A		D	B	
Approach Delay (s)		39.3			38.5			1.8			14.2	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	ኘኘ		↑↑↑			↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3433		5085			5085
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3433		5085			5085
Volume (vph)	177	0	1412	0	0	1961
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	0	1535	0	0	2132
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	192	0	1535	0	0	2132
Turn Type						
Protected Phases	1		2			2
Permitted Phases						
Actuated Green, G (s)	10.4		59.1			59.1
Effective Green, g (s)	12.4		60.1			60.1
Actuated g/C Ratio	0.12		0.60			0.60
Clearance Time (s)	6.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	426		3056			3056
v/s Ratio Prot	c0.06		0.30			c0.42
v/s Ratio Perm						
v/c Ratio	0.45		0.50			0.70
Uniform Delay, d1	40.6		11.4			13.7
Progression Factor	1.00		0.16			0.29
Incremental Delay, d2	0.8		0.5			0.6
Delay (s)	41.4		2.3			4.6
Level of Service	D		A			A
Approach Delay (s)	41.4		2.3			4.6
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	27.5
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

9: Tasker St. & Chris Columbus Blvd.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95				0.88	1.00	0.91		1.00	0.95	
Frt		0.94				0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3274				2787	1770	5027		1770	3494	
Flt Permitted		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3274				2787	1770	5027		1770	3494	
Volume (vph)	82	82	113	0	0	122	28	1201	99	93	1788	165
Peak-hour factor, PHF	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99
Adj. Flow (vph)	92	92	127	0	0	133	30	1305	108	101	1806	167
RTOR Reduction (vph)	0	95	0	0	0	88	0	10	0	0	7	0
Lane Group Flow (vph)	0	216	0	0	0	45	30	1403	0	101	1966	0
Turn Type	Split					Over	Prot			Prot		
Protected Phases	4	4				1	5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		11.3				33.0	3.4	39.7		33.0	69.3	
Effective Green, g (s)		13.3				34.0	4.4	40.7		34.0	70.3	
Actuated g/C Ratio		0.13				0.34	0.04	0.41		0.34	0.70	
Clearance Time (s)		6.0				5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0				3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		435				948	78	2046		602	2456	
v/s Ratio Prot		c0.07				0.02	0.02	c0.28		0.06	c0.56	
v/s Ratio Perm												
v/c Ratio		0.50				0.05	0.38	0.69		0.17	0.80	
Uniform Delay, d1		40.2				22.1	46.5	24.4		23.1	10.1	
Progression Factor		1.00				1.00	1.00	1.00		0.68	0.48	
Incremental Delay, d2		0.9				0.0	3.1	1.8		0.1	2.1	
Delay (s)		41.1				22.2	49.5	26.2		15.8	6.9	
Level of Service		D				C	D	C		B	A	
Approach Delay (s)		41.1			22.2			26.7			7.3	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↰	↑↑↑	↑↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			1.00	0.91	0.91	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			1770	5085	5085	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			1770	5085	5085	1583
Volume (vph)	0	0	171	1328	1466	435
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	186	1443	1593	473
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	186	1443	1593	473
Turn Type			Prot			Free
Protected Phases			5	2	6	
Permitted Phases						Free
Actuated Green, G (s)			25.0	100.0	65.0	100.0
Effective Green, g (s)			26.0	100.0	66.0	100.0
Actuated g/C Ratio			0.26	1.00	0.66	1.00
Clearance Time (s)			5.0	5.0	5.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			460	5085	3356	1583
v/s Ratio Prot			c0.11	0.28	c0.31	
v/s Ratio Perm						0.30
v/c Ratio			0.40	0.28	0.47	0.30
Uniform Delay, d1			30.6	0.0	8.4	0.0
Progression Factor			1.00	1.00	0.27	1.00
Incremental Delay, d2			0.6	0.1	0.3	0.3
Delay (s)			31.2	0.1	2.6	0.3
Level of Service			C	A	A	A
Approach Delay (s)	0.0			3.7	2.1	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	2.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↱			↰↑				
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	0	540	66	53	402	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	587	72	58	437	0	0	0	0

Direction, Lane #	WB 1	NB 1
Volume Total (vph)	659	495
Volume Left (vph)	0	58
Volume Right (vph)	72	0
Hadj (s)	-0.03	0.06
Departure Headway (s)	5.4	5.9
Degree Utilization, x	0.99	0.81
Capacity (veh/h)	657	609
Control Delay (s)	56.2	28.9
Approach Delay (s)	56.2	28.9
Approach LOS	F	D

Intersection Summary			
Delay	44.5		
HCM Level of Service	E		
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0	4.0		4.0	4.0
Lane Util. Factor					0.95			1.00	0.91		1.00	0.91
Frt					0.94			1.00	0.99		1.00	0.99
Flt Protected					0.98			0.95	1.00		0.95	1.00
Satd. Flow (prot)					3318			1788	5036		1736	5046
Flt Permitted					0.98			0.95	1.00		0.95	1.00
Satd. Flow (perm)					3318			1788	5036		1736	5046
Volume (vph)	0	0	0	10	3	9	6	557	1102	61	28	1341
Peak-hour factor, PHF	0.92	0.92	0.92	0.64	0.64	0.64	0.25	0.95	0.82	0.66	0.65	0.85
Adj. Flow (vph)	0	0	0	16	5	14	24	586	1344	92	43	1578
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	6	0	0	6
Lane Group Flow (vph)	0	0	0	0	22	0	0	610	1430	0	43	1671
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	1%	2%	2%	4%	2%
Turn Type				Split			Prot	Prot			Prot	
Protected Phases				8	8		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)					3.3			42.9	85.9		4.8	47.8
Effective Green, g (s)					5.3			43.9	86.9		5.8	48.8
Actuated g/C Ratio					0.05			0.40	0.79		0.05	0.44
Clearance Time (s)					6.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)					3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)					160			714	3978		92	2239
v/s Ratio Prot					c0.01			c0.34	0.28		0.02	c0.33
v/s Ratio Perm												
v/c Ratio					0.14			0.85	0.36		0.47	0.75
Uniform Delay, d1					50.2			30.1	3.4		50.6	25.5
Progression Factor					1.00			0.78	0.34		1.00	1.00
Incremental Delay, d2					0.4			8.7	0.2		3.7	2.3
Delay (s)					50.5			32.3	1.4		54.3	27.8
Level of Service					D			C	A		D	C
Approach Delay (s)		0.0			50.5				10.6			28.4
Approach LOS		A			D				B			C

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	↙
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	82
Peak-hour factor, PHF	0.83
Adj. Flow (vph)	99
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	0.88		0.95		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85		0.96		1.00	1.00		1.00	0.99	
Flt Protected	0.95	0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1665	1685	2814		3324		3467	5074		1770	5072	
Flt Permitted	0.95	0.96	1.00		0.98		0.95	1.00		0.11	1.00	
Satd. Flow (perm)	1665	1685	2814		3324		3467	5074		209	5072	
Volume (vph)	139	15	725	18	12	11	685	1572	26	15	1235	107
Peak-hour factor, PHF	0.81	0.92	0.90	0.92	0.92	0.92	0.94	0.84	0.92	0.92	0.93	0.89
Adj. Flow (vph)	172	16	806	20	13	12	729	1871	28	16	1328	120
RTOR Reduction (vph)	0	0	309	0	11	0	0	1	0	0	9	0
Lane Group Flow (vph)	91	97	497	0	34	0	729	1898	0	16	1439	0
Heavy Vehicles (%)	3%	2%	1%	2%	2%	2%	1%	2%	2%	2%	1%	1%
Turn Type	Split		pt+ov	Split			Prot			Perm		
Protected Phases	4	4	4 1	8	8		1	6			2	
Permitted Phases										2		
Actuated Green, G (s)	13.0	13.0	48.0		4.3		35.0	74.7		33.7	33.7	
Effective Green, g (s)	15.0	15.0	52.0		6.3		37.0	76.7		35.7	35.7	
Actuated g/C Ratio	0.14	0.14	0.47		0.06		0.34	0.70		0.32	0.32	
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	227	230	1330		190		1166	3538		68	1646	
v/s Ratio Prot	0.05	c0.06	0.18		c0.01		c0.21	0.37			c0.28	
v/s Ratio Perm										0.08		
v/c Ratio	0.40	0.42	0.37		0.18		0.63	0.54		0.24	0.87	
Uniform Delay, d1	43.4	43.5	18.6		49.4		30.7	8.1		27.2	35.0	
Progression Factor	1.00	1.00	1.00		1.00		0.85	0.24		0.20	0.43	
Incremental Delay, d2	1.2	1.2	0.2		0.4		0.6	0.4		5.8	5.0	
Delay (s)	44.6	44.8	18.7		49.8		26.7	2.3		11.2	20.0	
Level of Service	D	D	B		D		C	A		B	C	
Approach Delay (s)		23.7			49.8			9.1			19.9	
Approach LOS		C			D			A			B	

Intersection Summary

HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰	↱			✥		↰	↑↑↱			↰	↑↑↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.91			1.00	0.91
Frt	1.00	0.86			0.98		1.00	1.00			1.00	0.97
Flt Protected	0.95	1.00			0.96		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1628			1774		1805	5081			1805	5005
Flt Permitted	0.74	1.00			0.77		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1374	1628			1409		1805	5081			1805	5005
Volume (vph)	162	2	146	13	2	2	177	2104	10	5	16	1618
Peak-hour factor, PHF	0.82	0.25	0.89	0.60	0.50	0.50	0.87	0.84	0.56	0.62	0.31	0.95
Adj. Flow (vph)	198	8	164	22	4	4	203	2505	18	8	52	1703
RTOR Reduction (vph)	0	132	0	0	3	0	0	1	0	0	0	28
Lane Group Flow (vph)	198	40	0	0	27	0	203	2522	0	0	60	2023
Heavy Vehicles (%)	2%	0%	0%	2%	0%	0%	0%	2%	0%	0%	0%	1%
Turn Type	Perm			Perm			Prot			Prot	Prot	
Protected Phases		4			8		1	6		5	5	2
Permitted Phases	4			8								
Actuated Green, G (s)	19.3	19.3			19.3		21.4	68.2			6.5	53.3
Effective Green, g (s)	21.3	21.3			21.3		22.4	69.2			7.5	54.3
Actuated g/C Ratio	0.19	0.19			0.19		0.20	0.63			0.07	0.49
Clearance Time (s)	6.0	6.0			6.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	266	315			273		368	3196			123	2471
v/s Ratio Prot		0.02					0.11	c0.50			0.03	c0.40
v/s Ratio Perm	c0.14				0.02							
v/c Ratio	0.74	0.13			0.10		0.55	0.79			0.49	0.82
Uniform Delay, d1	41.8	36.7			36.5		39.3	15.0			49.4	23.7
Progression Factor	1.00	1.00			1.00		0.61	0.18			1.45	0.34
Incremental Delay, d2	10.7	0.2			0.2		1.2	1.3			2.2	2.3
Delay (s)	52.5	36.8			36.6		25.2	4.0			73.8	10.4
Level of Service	D	D			D		C	A			E	B
Approach Delay (s)		45.2			36.6			5.6				12.2
Approach LOS		D			D			A				B

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	338
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	348
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	1%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	16	12	12	12	12	12	12	10
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0	4.0			4.0
Lane Util. Factor	0.95	0.91	0.95		1.00			0.97	0.91			1.00
Frt	1.00	1.00	0.85		0.95			1.00	1.00			1.00
Flt Protected	0.95	0.95	1.00		0.99			0.95	1.00			0.95
Satd. Flow (prot)	1665	1657	1504		2019			3433	5082			1652
Flt Permitted	0.95	0.95	1.00		0.99			0.95	1.00			0.95
Satd. Flow (perm)	1665	1657	1504		2019			3433	5082			1652
Volume (vph)	539	4	445	4	4	5	2	372	1742	3	6	0
Peak-hour factor, PHF	0.96	0.25	0.92	0.50	0.33	0.42	0.91	0.91	0.85	0.38	0.75	0.92
Adj. Flow (vph)	561	16	484	8	12	12	2	409	2049	8	8	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	0	0
Lane Group Flow (vph)	281	296	484	0	21	0	0	411	2057	0	0	8
Heavy Vehicles (%)	3%	2%	2%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Split		Free	Split			Prot	Prot			Prot	Prot
Protected Phases	8	8		4	4		1	1	6		5	5
Permitted Phases			Free									
Actuated Green, G (s)	20.8	20.8	110.0		4.2			14.1	55.1			7.9
Effective Green, g (s)	22.8	22.8	110.0		6.2			15.1	56.1			8.9
Actuated g/C Ratio	0.21	0.21	1.00		0.06			0.14	0.51			0.08
Clearance Time (s)	6.0	6.0			6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	345	343	1504		114			471	2592			134
v/s Ratio Prot	0.17	c0.18			0.01			c0.12	c0.40			0.00
v/s Ratio Perm			c0.32									
v/c Ratio	0.81	0.86	0.32		0.18			0.87	0.79			0.06
Uniform Delay, d1	41.6	42.1	0.0		49.5			46.5	22.2			46.7
Progression Factor	1.00	1.00	1.00		1.00			0.93	0.46			0.76
Incremental Delay, d2	13.7	19.5	0.6		0.8			12.0	1.8			0.1
Delay (s)	55.3	61.6	0.6		50.2			55.2	12.1			35.6
Level of Service	E	E	A		D			E	B			D
Approach Delay (s)		32.1			50.2				19.3			
Approach LOS		C			D				B			

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations	↑↑	↱
Ideal Flow (vphpl)	1900	1900
Lane Width	13	12
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.95	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	3657	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	3657	1583
Volume (vph)	1316	454
Peak-hour factor, PHF	0.92	0.90
Adj. Flow (vph)	1430	504
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	1430	504
Heavy Vehicles (%)	2%	2%
Turn Type		Free
Protected Phases	2	
Permitted Phases		Free
Actuated Green, G (s)	48.9	110.0
Effective Green, g (s)	49.9	110.0
Actuated g/C Ratio	0.45	1.00
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	1659	1583
v/s Ratio Prot	c0.39	
v/s Ratio Perm		0.32
v/c Ratio	0.86	0.32
Uniform Delay, d1	27.0	0.0
Progression Factor	0.26	1.00
Incremental Delay, d2	4.1	0.3
Delay (s)	11.3	0.3
Level of Service	B	A
Approach Delay (s)	8.5	
Approach LOS	A	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↰↰		↱					↑↑↱			↰	↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0			4.0	4.0
Lane Util. Factor	0.97		1.00					0.91			1.00	0.91
Frt	1.00		0.85					1.00			1.00	1.00
Flt Protected	0.95		1.00					1.00			0.95	1.00
Satd. Flow (prot)	3433		1568					5085			1805	5136
Flt Permitted	0.95		1.00					1.00			0.95	1.00
Satd. Flow (perm)	3433		1568					5085			1805	5136
Volume (vph)	416	0	410	0	0	0	0	1669	0	25	0	1743
Peak-hour factor, PHF	0.76	0.92	0.72	0.92	0.92	0.92	0.92	0.92	0.92	0.26	0.26	0.96
Adj. Flow (vph)	547	0	569	0	0	0	0	1814	0	96	0	1816
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	547	0	569	0	0	0	0	1814	0	0	96	1816
Heavy Vehicles (%)	2%	2%	3%	2%	2%	2%	2%	2%	2%	0%	0%	1%
Turn Type	Prot		Free							Prot	Prot	
Protected Phases	3							6		5	5	2
Permitted Phases			Free									
Actuated Green, G (s)	20.0		110.0					54.1			19.9	79.0
Effective Green, g (s)	22.0		110.0					55.1			20.9	80.0
Actuated g/C Ratio	0.20		1.00					0.50			0.19	0.73
Clearance Time (s)	6.0							5.0			5.0	5.0
Vehicle Extension (s)	3.0							3.0			3.0	3.0
Lane Grp Cap (vph)	687		1568					2547			343	3735
v/s Ratio Prot	c0.16							c0.36			0.05	c0.35
v/s Ratio Perm			0.36									
v/c Ratio	0.80		0.36					0.71			0.28	0.49
Uniform Delay, d1	41.9		0.0					21.3			38.1	6.3
Progression Factor	1.00		1.00					0.47			0.45	0.29
Incremental Delay, d2	6.4		0.7					1.2			0.3	0.3
Delay (s)	48.2		0.7					11.1			17.4	2.2
Level of Service	D		A					B			B	A
Approach Delay (s)		24.0			0.0			11.1				2.9
Approach LOS		C			A			B				A

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

5: I-95 NB Off Ramp & Chris Columbus Blvd.

Movement	SBR
Lane Configurations	
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Volume (vph)	0
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	13	12	12	13	12	10	10	11	12	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0			4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95			1.00	0.91			1.00
Frt	1.00	1.00	0.85	1.00	0.90			1.00	1.00			1.00
Flt Protected	0.95	0.97	1.00	0.95	1.00			0.95	1.00			0.95
Satd. Flow (prot)	1793	1777	1615	1681	1685			1636	4900			1652
Flt Permitted	0.95	0.97	1.00	0.95	1.00			0.95	1.00			0.95
Satd. Flow (perm)	1793	1777	1615	1681	1685			1636	4900			1652
Volume (vph)	194	40	163	46	29	68	18	180	1404	20	2	100
Peak-hour factor, PHF	0.87	0.83	1.00	0.70	0.50	0.65	0.92	0.92	0.80	0.47	0.69	0.69
Adj. Flow (vph)	223	48	163	66	58	105	20	196	1755	43	3	145
RTOR Reduction (vph)	0	0	142	0	59	0	0	0	2	0	0	0
Lane Group Flow (vph)	133	138	21	66	104	0	0	216	1796	0	0	148
Heavy Vehicles (%)	2%	1%	0%	2%	0%	0%	3%	3%	2%	0%	2%	2%
Turn Type	Split		Prot	Split			Prot	Prot			Prot	Prot
Protected Phases	3	3	3	7	7		1	1	6		5	5
Permitted Phases												
Actuated Green, G (s)	12.4	12.4	12.4	7.6	7.6			14.0	53.4			14.6
Effective Green, g (s)	14.4	14.4	14.4	9.6	9.6			15.0	54.4			15.6
Actuated g/C Ratio	0.13	0.13	0.13	0.09	0.09			0.14	0.49			0.14
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			5.0	5.0			5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0			3.0
Lane Grp Cap (vph)	235	233	211	147	147			223	2423			234
v/s Ratio Prot	0.07	c0.08	0.01	0.04	c0.06			c0.13	0.37			0.09
v/s Ratio Perm												
v/c Ratio	0.57	0.59	0.10	0.45	0.71			0.97	0.74			0.63
Uniform Delay, d1	44.9	45.0	42.1	47.7	48.8			47.3	22.2			44.5
Progression Factor	1.00	1.00	1.00	1.00	1.00			0.69	0.39			0.62
Incremental Delay, d2	3.1	4.0	0.2	2.2	14.3			46.6	1.8			5.0
Delay (s)	48.0	49.0	42.3	49.9	63.1			79.1	10.4			32.8
Level of Service	D	D	D	D	E			E	B			C
Approach Delay (s)		46.2			59.3				17.8			
Approach LOS		D			E				B			

Intersection Summary

HCM Average Control Delay	32.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

	↓	↙
Movement	SBT	SBR
Lane Configurations	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900
Lane Width	10	12
Total Lost time (s)	4.0	
Lane Util. Factor	0.91	
Frt	0.98	
Flt Protected	1.00	
Satd. Flow (prot)	4658	
Flt Permitted	1.00	
Satd. Flow (perm)	4658	
Volume (vph)	1835	233
Peak-hour factor, PHF	0.94	0.78
Adj. Flow (vph)	1952	299
RTOR Reduction (vph)	19	0
Lane Group Flow (vph)	2233	0
Heavy Vehicles (%)	2%	1%
Turn Type		
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	54.0	
Effective Green, g (s)	55.0	
Actuated g/C Ratio	0.50	
Clearance Time (s)	5.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	2329	
v/s Ratio Prot	c0.48	
v/s Ratio Perm		
v/c Ratio	0.96	
Uniform Delay, d1	26.4	
Progression Factor	1.12	
Incremental Delay, d2	10.4	
Delay (s)	40.1	
Level of Service	D	
Approach Delay (s)	39.6	
Approach LOS	D	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱	↱			↱↱		↑↑↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0		4.0		4.0	4.0	
Lane Util. Factor		0.91	0.91			0.88		0.91		0.97	0.95	
Frt		1.00	0.85			0.85		0.99		1.00	1.00	
Flt Protected		1.00	1.00			1.00		1.00		0.95	1.00	
Satd. Flow (prot)		3374	1441			2787		5046		3433	3539	
Flt Permitted		1.00	1.00			1.00		1.00		0.95	1.00	
Satd. Flow (perm)		3374	1441			2787		5046		3433	3539	
Volume (vph)	31	290	280	0	0	145	0	1445	85	238	1824	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.87	0.85	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	315	304	0	0	158	0	1700	92	259	1983	0
RTOR Reduction (vph)	0	0	263	0	0	134	0	4	0	0	0	0
Lane Group Flow (vph)	0	349	41	0	0	24	0	1788	0	259	1983	0
Turn Type	Split		Prot			Over				Prot		
Protected Phases	4	4	4			1		2		1	2	
Permitted Phases												
Actuated Green, G (s)		12.9	12.9			14.7		65.4		14.7	65.4	
Effective Green, g (s)		14.9	14.9			16.7		66.4		16.7	66.4	
Actuated g/C Ratio		0.14	0.14			0.15		0.60		0.15	0.60	
Clearance Time (s)		6.0	6.0			6.0		5.0		6.0	5.0	
Vehicle Extension (s)		3.0	3.0			3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		457	195			423		3046		521	2136	
v/s Ratio Prot		c0.10	0.03			0.01		0.35		c0.08	c0.56	
v/s Ratio Perm												
v/c Ratio		0.76	0.21			0.06		0.59		0.50	0.93	
Uniform Delay, d1		45.9	42.3			39.9		13.4		42.8	19.7	
Progression Factor		1.00	1.00			1.00		0.12		1.27	0.23	
Incremental Delay, d2		7.4	0.5			0.1		0.7		0.3	4.2	
Delay (s)		53.3	42.9			40.0		2.4		54.7	8.7	
Level of Service		D	D			D		A		D	A	
Approach Delay (s)		48.4			40.0			2.4			14.0	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰		↑↑↑			↑↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	1.00		1.00			1.00
Flt Protected	0.95		1.00			1.00
Satd. Flow (prot)	3433		5085			5085
Flt Permitted	0.95		1.00			1.00
Satd. Flow (perm)	3433		5085			5085
Volume (vph)	312	0	1530	0	0	2104
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	339	0	1663	0	0	2287
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	339	0	1663	0	0	2287
Turn Type						
Protected Phases	1		2			2
Permitted Phases						
Actuated Green, G (s)	14.7		65.4			65.4
Effective Green, g (s)	16.7		66.4			66.4
Actuated g/C Ratio	0.15		0.60			0.60
Clearance Time (s)	6.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	521		3069			3069
v/s Ratio Prot	c0.10		0.33			c0.45
v/s Ratio Perm						
v/c Ratio	0.65		0.54			0.75
Uniform Delay, d1	43.9		12.8			15.7
Progression Factor	1.00		0.74			0.21
Incremental Delay, d2	2.9		0.6			0.7
Delay (s)	46.8		10.0			4.0
Level of Service	D		B			A
Approach Delay (s)	46.8		10.0			4.0
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0				4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95				0.88	1.00	0.91		1.00	0.95	
Frt		0.94				0.85	1.00	0.97		1.00	0.99	
Flt Protected		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3292				2682	1787	4973		1805	3525	
Flt Permitted		0.99				1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3292				2682	1787	4973		1805	3525	
Volume (vph)	93	116	124	0	0	211	32	1225	165	79	2137	203
Peak-hour factor, PHF	0.91	0.83	0.78	0.61	0.77	0.94	0.75	0.88	0.58	0.92	0.94	0.82
Adj. Flow (vph)	102	140	159	0	0	224	43	1392	284	86	2273	248
RTOR Reduction (vph)	0	73	0	0	0	153	0	18	0	0	7	0
Lane Group Flow (vph)	0	328	0	0	0	71	43	1658	0	86	2514	0
Heavy Vehicles (%)	1%	0%	4%	2%	3%	6%	1%	2%	0%	0%	1%	0%
Turn Type	Split					Over	Prot			Prot		
Protected Phases	4	4				1	5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		12.5				9.1	3.0	72.4		9.1	78.5	
Effective Green, g (s)		14.5				10.1	4.0	73.4		10.1	79.5	
Actuated g/C Ratio		0.13				0.09	0.04	0.67		0.09	0.72	
Clearance Time (s)		6.0				5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0				3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		434				246	65	3318		166	2548	
v/s Ratio Prot		c0.10				0.03	0.02	c0.33		0.05	c0.71	
v/s Ratio Perm												
v/c Ratio		0.76				0.29	0.66	0.50		0.52	0.99	
Uniform Delay, d1		46.0				46.6	52.3	9.1		47.6	14.7	
Progression Factor		1.00				1.00	1.00	1.00		1.21	0.62	
Incremental Delay, d2		7.3				0.6	22.0	0.5		1.8	11.7	
Delay (s)		53.4				47.2	74.3	9.7		59.2	20.9	
Level of Service		D				D	E	A		E	C	
Approach Delay (s)		53.4			47.2			11.3			22.1	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations			↰	↑↑↑	↑↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			1.00	0.91	0.91	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			1770	5085	5085	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			1770	5085	5085	1583
Volume (vph)	0	0	145	1422	1752	509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	158	1546	1904	553
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	158	1546	1904	553
Turn Type			Prot			Free
Protected Phases			5	2	6	
Permitted Phases						Free
Actuated Green, G (s)			35.0	110.0	65.0	110.0
Effective Green, g (s)			36.0	110.0	66.0	110.0
Actuated g/C Ratio			0.33	1.00	0.60	1.00
Clearance Time (s)			5.0	5.0	5.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			579	5085	3051	1583
v/s Ratio Prot			0.09	0.30	c0.37	
v/s Ratio Perm						c0.35
v/c Ratio			0.27	0.30	0.62	0.35
Uniform Delay, d1			27.3	0.0	14.1	0.0
Progression Factor			1.00	1.00	0.38	1.00
Incremental Delay, d2			0.3	0.2	0.3	0.2
Delay (s)			27.6	0.2	5.7	0.2
Level of Service			C	A	A	A
Approach Delay (s)	0.0			2.7	4.5	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	0	576	78	76	701	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	626	85	83	762	0	0	0	0

Direction, Lane #	WB 1	NB 1
Volume Total (vph)	711	845
Volume Left (vph)	0	83
Volume Right (vph)	85	0
Hadj (s)	-0.04	0.05
Departure Headway (s)	5.7	5.8
Degree Utilization, x	1.13	1.37
Capacity (veh/h)	633	622
Control Delay (s)	100.2	193.1
Approach Delay (s)	100.2	193.1
Approach LOS	F	F

Intersection Summary			
Delay	150.6		
HCM Level of Service	F		
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		

Exhibit B

<u>EXHIBIT "B"</u>

SEE ATTACHED

OVERSIZED EXHIBIT

Exhibit C

POTENTIAL RESIDENTIAL PROPERTY VALUE IMPACTS ASSOCIATED WITH THE PROPOSED FOXWOODS CASINO PHILADELPHIA AND ADJACENT DELAWARE RIVER WATERFRONT IMPROVEMENTS

2

PHILADELPHIA ENTERTAINMENT AND DEVELOPMENT PARTNERS, L.P.

D/B/A Foxwoods Casino Philadelphia

Submitted to Philadelphia Entertainment and Development Partners, L.P. by:

Econsult Corporation
6th Floor
3600 Market Street
Philadelphia, PA 19104

September 2006

EXECUTIVE SUMMARY

Potential economic impacts associated with the establishment of two slots casinos in Philadelphia must be considered when weighing the merits of the various competing proposals. Philadelphia Entertainment and Development Partners, doing business as Foxwoods Casino Philadelphia ("Foxwoods Philadelphia") has submitted a comprehensive impact assessment to the Pennsylvania Gaming Control Board, detailing a variety of anticipated impacts, along with plans to mitigate some potential negative amenities, such as traffic congestion and storm water run-off. The proposed plan is unique in that it combines the construction of the actual casino with the expansion of other retailing and dining options and significant improvements to the public spaces surrounding the development along the riverfront. The economic impact component of the assessment report submission suggested that the impacts on property values in the area surrounding the proposed casino would likely be positive, due to the waterfront improvement and access planned in the proposal; however no empirical estimates were undertaken or provided in that report.

Understandably, there is concern by neighborhood homeowners and community groups over what impact such a significant project could have on their quality of life and on property values. A report was issued in April 2006 that purported to estimate the potential aggregate loss in residential property values that could result from each of the five casinos proposed for Philadelphia, including Foxwoods Philadelphia. In "New casinos may harm Philadelphia home values," the author applied a particular estimate of the negative impact (4.6% average) of casinos on nearby housing values to the aggregate residential property values within a one-mile radius of each proposed casino. He also listed the calculated losses (in descending order) for both "Average loss per home" and "Total loss to community in homes values." The estimate was based on the results of an empirical econometric study conducted by UNLV professors in the mid 1990s using data from Henderson, Nevada, a large and fast-growing suburb of Las Vegas, and home to many casinos. This effect is typically attributed to the added congestions of people and vehicles that a casino creates, as well as a possible change in the local quality of life if the socioeconomic and demographic characteristics of the casino's patrons are significantly different from that of the local residents.

That report suggested that Foxwoods Philadelphia could cause an average decline of $6,627 in value for houses within a one-mile radius of the facility, and an aggregate loss of residential property value in the same area in excess of $109 million. The latter statistic was the highest of all the competing casino proposals, since the market value of surrounding residential properties is highest for Foxwoods Philadelphia.

These expected loss estimates were used by various individuals who testified before the Gaming Board in the public hearings held early April, and the numbers were cited uncritically in newspaper and other accounts of the hearings and in subsequent community discussions throughout the city.

Since Foxwoods Casino Philadelphia's economic impact analysis suggests implicitly that the impact on surrounding areas would be positive[1], it is helpful to

(1) critically examine the methodology and the assumptions used by Hallwatch.org to generate the estimates, and to officially respond to the published estimates of negative impacts on home values, and

(2) estimate the potential real estate property value impact of the proposed casino based not only on the Henderson study but also on other empirical findings with respect to riverfront improvements.

Using statistical techniques and applying parameters from empirical analyses, we estimate significant potential property value enhancements associated with the proposed Foxwoods Philadelphia development. We find that any potential negative impacts are likely to be much more than offset by the positive impacts of waterfront improvements.

In particular, we conclude:

1. The estimates of negative impacts on residential housing prices put forth by Hallwatch.org are likely exaggerated, and it is just as likely that the impacts – if any – would be positive.

[1] No specific forecast was developed for the casinos potential impact on nearby residential property values. Instead, it was noted that the casino would likely lead to improvements along the riverfront, which would increase the attractiveness of that area. Here is an excerpt from the Economic Impact Study:

> Foxwoods Casino Philadelphia will also act as a significant catalyst for the economic redevelopment of the central Delaware River waterfront. A major advantage of the PEDP site is that the planned development is consistent with the City's long-tem goal of economically reinvigorating activity along the southern portion of the riverfront.
>
> The proposed casino and entertainment use is compatible with the "Big Box" retail and the port related land uses along the riverfront to the south of the site, and can act as a strong buffer between those uses and the Penn's Landing's entertainment and residential uses north of the site.
>
> - Revitalization of a strategically important property that will serve as a catalyst for further development
> - Opportunity to open the riverfront further south from Penn's Landing from both the landside and riverside.
> - Reuse of vacant, former industrial land that has been underutilized for more than a decade and that pays little or no taxes to the city or school district treasury.
> - Expanded entertainment opportunities for residents and visitors.
> - Opportunity to market gaming as an added attraction to increase overall city and regional tourism.
> - Opportunity to address some existing infrastructure problems in the area.

The magnitude of the negative price impact of "proximity to casino" estimated in the Henderson study could well be exaggerated by the omission of other influencing factors, including radical changes in the housing markets due to the burgeoning population growth during the study period. In addition, changes in the Henderson housing market have generated both a supply production and price response, so the lower process could also be influenced by increased supply. Furthermore, the impact (whatever its magnitude) is not likely to be uniform over distance, which would exaggerate the impacts further from the casinos.

2. The results obtained in the Nevada study (where there are many casinos located throughout the community) are not suitable to forecast the potential impacts of one or two casinos in Philadelphia. Major differences in market dynamics and spatial barriers make the Henderson estimates practically useless.

3. Examining casino (congestion) impacts alone does not sufficiently describe the nature of the proposed project, which will include development of positive amenities associated with the improvement of currently underutilized, derelict, and inaccessible land.

4. **The total net effect of the proposed casino remains positive, regardless of whether a pessimistic or optimistic scenario is estimated. The total gain in housing wealth is estimated to be in the $96 million to $370 million range.**

Finally, we reiterate many additional qualitative benefits, which are likely to have positive impacts on nearby land values, but were not all included in our estimates.

In designing this proposed project, PEDP has made and continues to make every effort to identify and minimize or mitigate negative qualitative impacts while maximizing positive qualitative impacts.

Some key points include:

- This project would reuse vacant, formerly industrial land that has been underutilized for more than a decade and that currently generates little or no tax revenue for the city or school district treasuries.

- The revitalization of this strategically important property would serve as a catalyst for the economic redevelopment of the central Delaware Riverfront. A major advantage of the PEDP site is that the planned development is consistent with the City's long-tem goal of economically reinvigorating and activating the remainder of the riverfront. The project would create an opportunity to open the riverfront further south from Penn's Landing from both the landside and riverside.

- Furthermore, the proposed casino and entertainment use is compatible with the "Big Box" retail and the port related land uses along the riverfront to the south, and can act as a strong buffer between those uses and the more entertainment and residential uses north of the site.

- Foxwoods Casino Philadelphia would provide increased opportunities for city businesses to sell products and services, and expanded opportunities for employment at salary and benefit levels generally above the typical hospitality industry levels for the Philadelphia region.

- The PEDP project would present an opportunity to address some existing infrastructure problems in the area of the proposed site.

- In addition to stimulating economic development and jobs, Foxwoods Casino Philadelphia would provide expanded entertainment opportunities for residents and visitors and provide an important stimulus for city and regional tourism because it would be designed as a visitor attraction with significant orientation to the riverfront. It would also offer exciting non-casino activities in addition to a high-quality gaming experience.

- Given the opportunity to market gaming as an added attraction to increase overall city and regional tourism, PEDP intends to work closely with local and state tourism and convention officials to enhance their marketing efforts. Marketing will take advantage of the location near Center City and Penn's Landing, as well as the many nearby cultural, historical and entertainment tourist attractions, to boost tourism and convention attendance, generating significant additional business for the city and region's hospitality industry.

- Finally, the PEDP project would create an opportunity to channel a significant portion of casino profits into local charitable uses. To our knowledge, no other applicant for a Philadelphia casino license promises to create such an opportunity.

1.0 INTRODUCTION AND ISSUE

Potential economic impacts associated with the establishment of two slots casinos in Philadelphia must be considered when weighing the merits of the various competing proposals. Philadelphia Entertainment and Development Partners, dba Foxwoods Casino Philadelphia ("Foxwoods Philadelphia") has submitted a comprehensive impact assessment to the Pennsylvania Gaming Control Board, detailing a variety of anticipated impacts, along with plans to mitigate some potential negative amenities, such as traffic congestion and storm water run-off. The proposed plan is unique in that it combines the construction of the actual casino with an expansion of other retailing and dining options and significant improvements to the public spaces surrounding the development along the riverfront. The economic impact component of the submission suggested that the impacts on property values in the area surrounding the proposed casino would likely be positive due to the waterfront improvement and access planned in the proposal; however no empirical estimates were undertaken or provided.

Understandably, there is some concern by neighborhood homeowners and community groups over what impact such a significant project could have on their quality-of-life and property values. Hallwatch.org issued a report on April 3, 2006, that purported to estimate the potential aggregate loss in residential property values that it claims could result from each of the five casinos proposed for Philadelphia, including Foxwoods Philadelphia. In "New casinos may harm Philadelphia home values," author Ed Goppelt applied a particular estimate of the negative impact (4.6% average) of casinos on nearby housing values to the aggregate residential property values within 1-mile of each proposed casino, and listed the calculated losses (in descending order) for both "Average loss per home" and "Total loss to community in homes values." The estimate was based on the results of an empirical econometric study conducted by UNLV professors in the mid 1990s using data from Henderson, Nevada, a large and fast-growing suburb of Las Vegas, and home to many casinos. This affect is typically attributed to the added congestions of people and vehicles that a casino creates, as well as a possible change in the local quality-of-life if the socioeconomic/demographic characteristics of the casino's patrons are significantly different from the local residents.

Mr. Goppelt's application of the Henderson study findings suggested that the Foxwoods Philadelphia casino could cause an average decline of $6,627 in value for houses in a one-mile radius of the facility, and an aggregate loss of residential property value in the same area in excess of $109 million. The latter statistic was highest of all the competing casino proposals, since the market value of surrounding residential properties is highest for Foxwoods Philadelphia.

Mr. Goppelt's expected loss estimates were used by various individuals who testified before the Gaming Board in the public hearings held early April, and the numbers were cited uncritically in newspaper and other accounts of the hearings and in subsequent community discussions throughout the city.

Since Foxwoods Casino Philadelphia's economic impact analysis suggests implicitly that the impact on surrounding areas would be positive[2], it is helpful to (1) critically examine the methodology and the assumptions used by Hallwatch.org to generate the estimates, and to officially respond to the published estimates of negative impacts on home values, and (2) to estimate the potential real estate property value impact of the proposed casino based not only on the Henderson study but also on other empirical findings with respect to riverfront improvements.

Section 2 of this report examines the reasonableness of the assumptions and methodology used by Hallwatch.org to generate the impact estimates in the initial study. To do this, we examined first the soundness of the original empirical estimates from the Henderson, Nevada study, and second assess the applicability of those findings to the Foxwoods case.

Our review led us to conclude that there are some questions about the empirical study derived from the original study in Henderson, Nevada, that make empirical estimates suspect. And, more importantly, we conclude that those empirical estimates are not appropriately applicable to the Philadelphia case (for any of the proposed casinos), primarily because the conditions and environments are so radically different.

---

[2] No specific forecast was developed for the casinos potential impact on nearby residential property values. Instead, it was noted that the casino would likely lead to improvements along the riverfront, which would increase the attractiveness of that area. Here is an excerpt from the Economic Impact Study:

> Foxwoods Casino Philadelphia will also act as a significant catalyst for the economic redevelopment of the central Delaware River waterfront. A major advantage of the PEDP site is that the planned development is consistent with the City's long-tem goal of economically reinvigorating activity along the southern portion of the riverfront.
>
> The proposed casino and entertainment use is compatible with the "Big Box" retail and the port related land uses along the riverfront to the south of the site, and can act as a strong buffer between those uses and the Penn's Landing's entertainment and residential uses north of the site.
>
> - Revitalization of a strategically important property that will serve as a catalyst for further development
> - Opportunity to open the riverfront further south from Penn's Landing from both the landside and riverside.
> - Reuse of vacant, former industrial land that has been underutilized for more than a decade and that pays little or no taxes to the city or school district treasury.
> - Expanded entertainment opportunities for residents and visitors.
> - Opportunity to market gaming as an added attraction to increase overall city and regional tourism.
> - Opportunity to address some existing infrastructure problems in the area.

Section 3 presents estimates of the potential residential property value impacts of the entire proposed development, including the improvements to the waterfront and opening access.

Section 4 summarizes our findings.

2.0 THE INITIAL STUDY: HENDERSON, NEVADA

The initial study was conducted as an Economics Master Thesis, by Barbara Giannini at UNLV in 1996. She developed a hedonic price model and estimated it using a large residential sales database for Henderson over the period 1908-1995. She found statistically significant evidence that housing prices were lower closer to casinos than further away, after using certain statistical techniques to isolate the impacts of distance from casinos (i.e. accounting for all other factors that might influence housing prices.

The hedonic model technique is long established as a credible econometric technique, and its application has been used in court cases and business transactions, so the basic methodology was credible.

Ms. Giannini's thesis advisors (Professors Clauretie, Carroll and Daneshvary) used the data from her thesis in what was apparently an expanded econometric study on casino effects on housing prices. They sorted the sample into sales before a casino opened and after, to attempt to isolate the casino's separate impact. Their results were published in the ***Illinois Real Estate Letter***, Winter 1998 issue[3].

2.1 Review of Original Study: Strength of Empirical Findings

The original study concluded that the opening of a ("large") casino decreases residential values on homes within a 1-mile radius by "approximately 4.6%". No specific distance measures were reported, so it is implies the negative impact is the same for homes across the street as it is for homes 1 mile away.

<u>Are all other factors truly held constant?</u>

The quality of an empirical estimate of a factor's isolated impact on a variable (housing price) is crucially dependent upon controlling for all other factors that may also influence that variable. Even the most careful study, using the most sophisticated statistical techniques, is limited by both model specification (do you identify all of the factors?) and data quality and availability. Another key issue is whether the relationships among the variables remain constant over time (or hold for other locations).

If all other factors are not properly accounted for, then some of the impact of other factors could be attributed to the casino proximity factor, especially if omitted factors are similar.

How likely is it that the empirical work took all other factors into account?

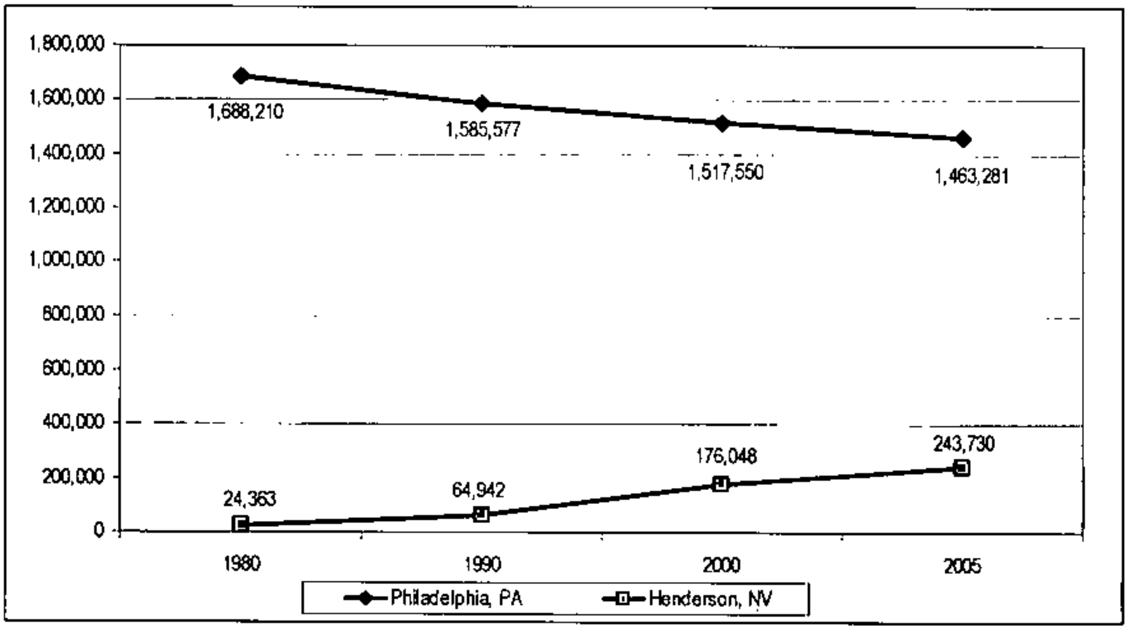
Authors note that, and say they take care of that by separating sales before and after casino, but question whether the distinction really does hold all other factors constant. It is possible (probable)

[3] Their result may have also been published elsewhere, too. Hallwatch.org cites this article, so we focused on it. The issue at the time in Illinois was a legislative debate about the potential expansion of gaming in that state.

that many conditions changed over the time period studied, so the assumption of constant relationship is not certain.

According to the US Census Bureau, Henderson, Nevada is the fastest-growing large city (over 150,000 pop.) in the United States is one of the fastest growing municipalities in Clark County, NV (and was so in the 1980s and 1990s):

Figure 2.1: Population Changes, 1980 – 2000
Henderson, NV and Philadelphia, PA



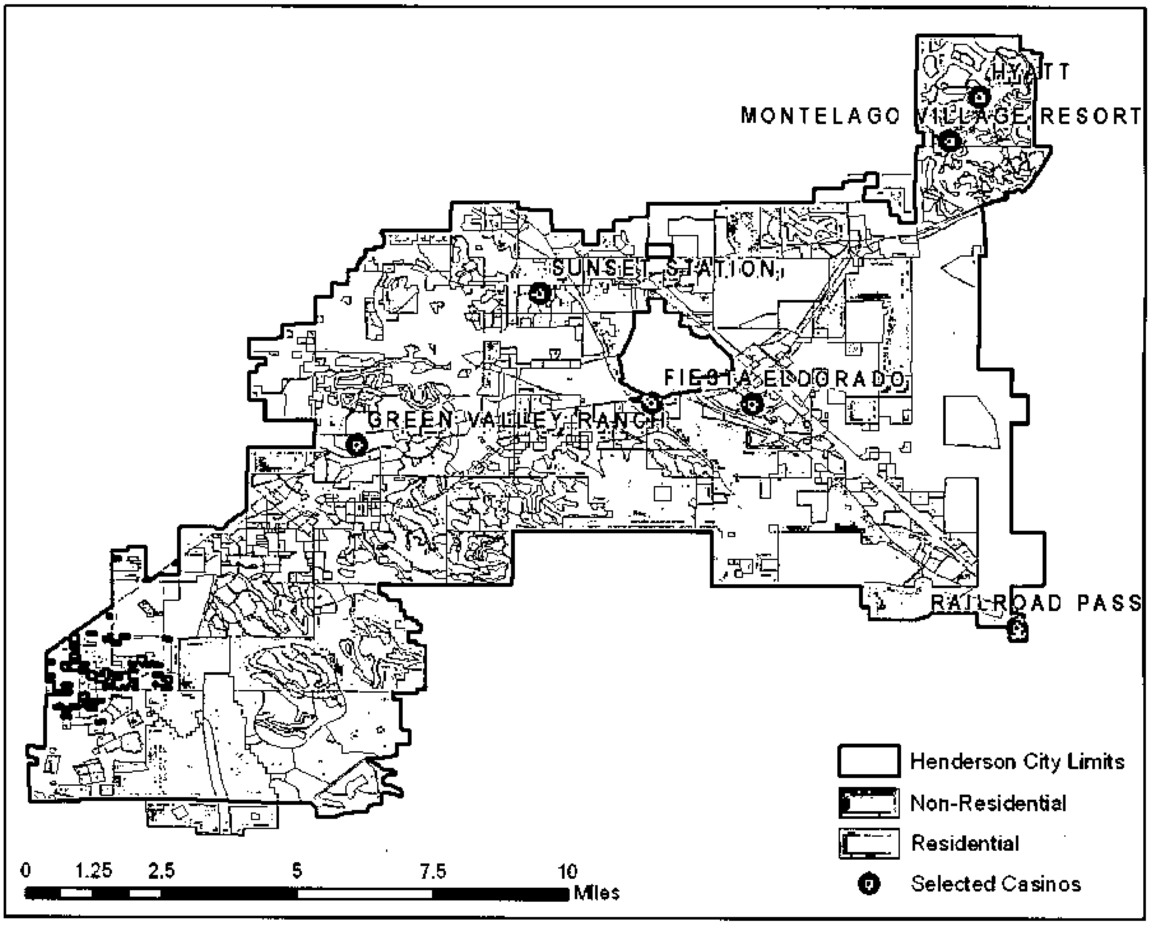
	Henderson, NV		Philadelphia, PA	
Year	Population*	% Change	Population**	% Change
1980	24,363	NA	1,688,210	NA
1990	64,942	167%	1,585,577	-6%
2000	176,048	171%	1,517,550	-4%
2005	243,730	38%	1,463,281	-4%

**Sources: US Census Bureau, Southern Nevada Consensus Population Estimate, July 2005*
***Sources: US Census Bureau, Pennsylvania State Data Center*

If there is any city in the US where one can say there were fundamental changes from 1980-1995, Henderson is a good candidate. This suggests the "before" and "after" classification of data points may not completely statistically isolate the impact of proximity.

This map shows the residential/non-residential land use in Henderson (2005). It includes selected casinos, and the newer build-out areas are to the east and south. Las Vegas is to the northwest.

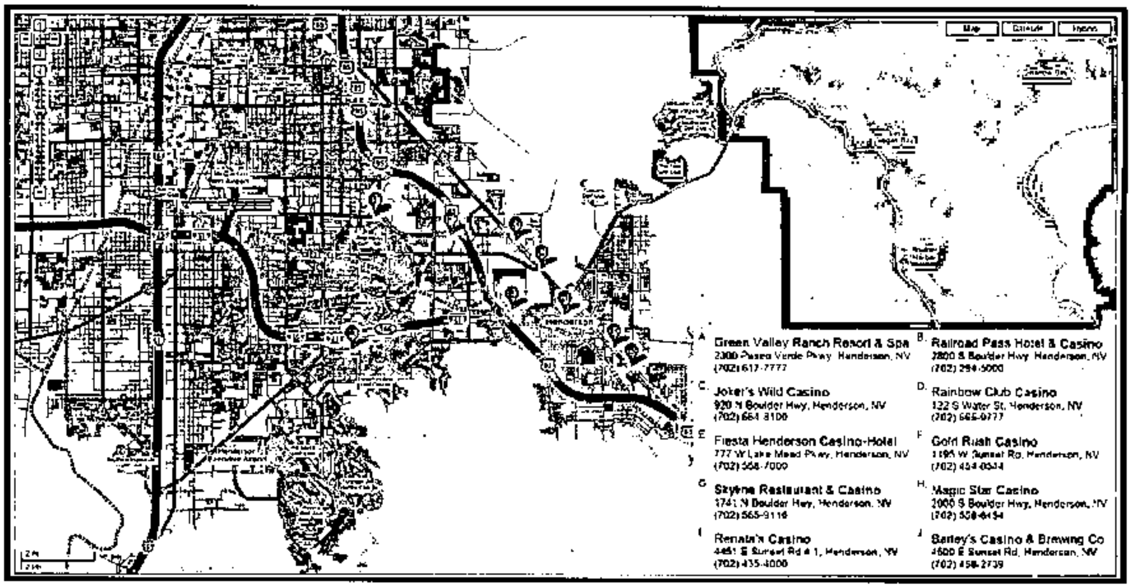
Residential and Non-Residential Land Use in Henderson

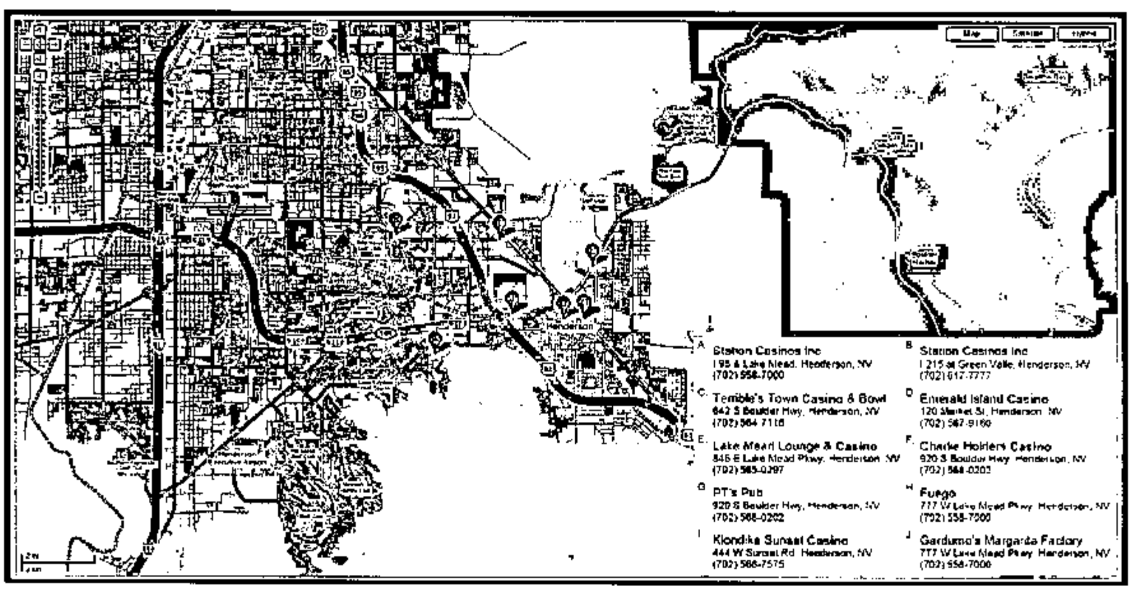


Sources: Econsult Corporation, Clark County GIS Management Office, City of Henderson Community Development Department

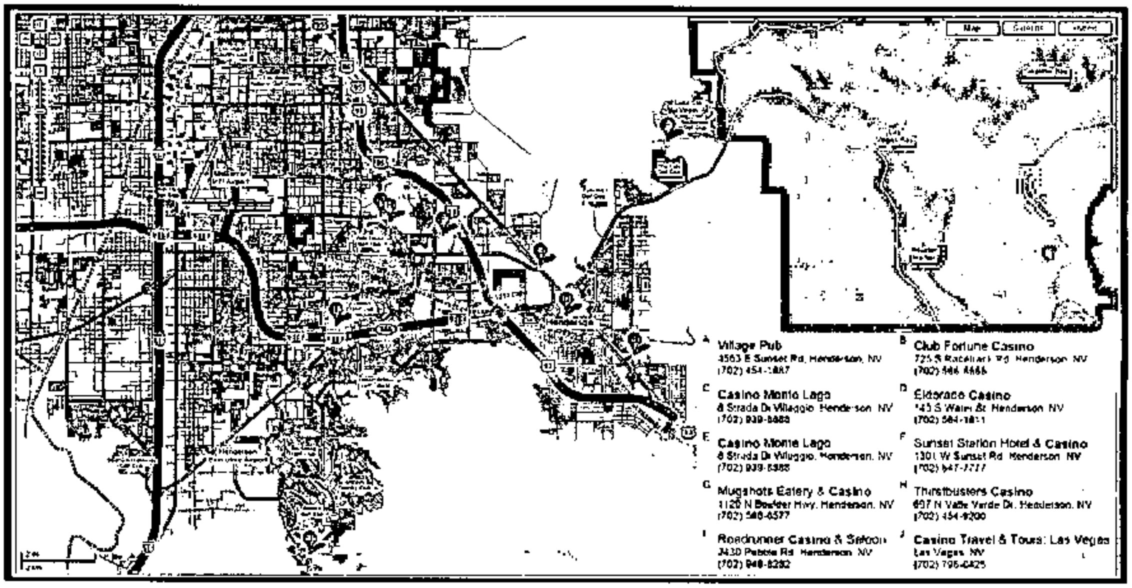
Henderson is also full of casinos. The following Google maps show the locations of 34 casinos in Henderson.[4] These may show that the casinos are located throughout the jurisdiction, with a cluster along Bolder Highway, which is the older center of city.

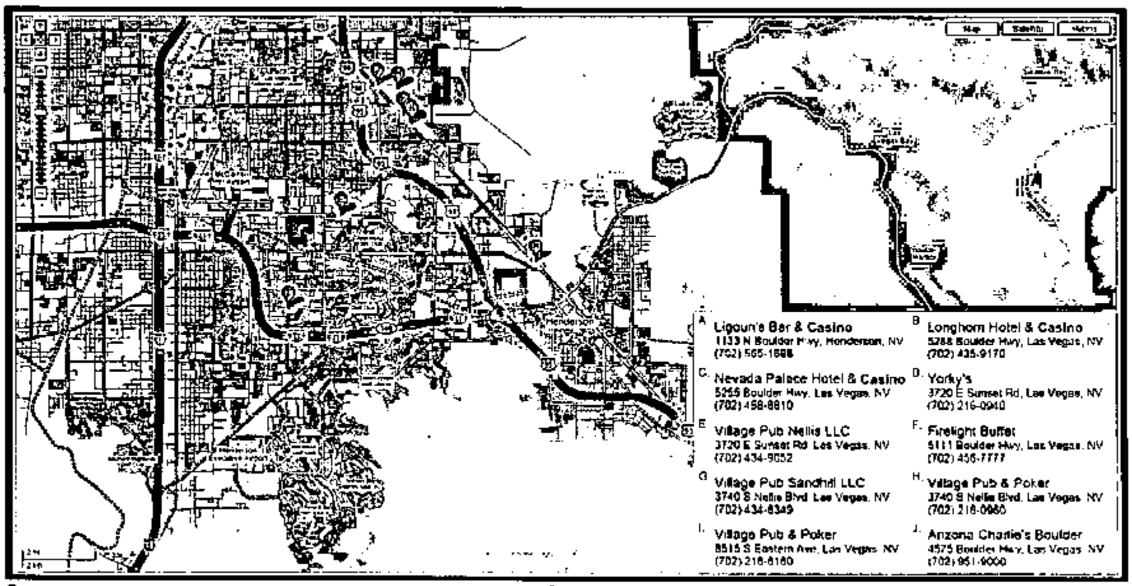
Casinos in Henderson





[4] These are some of the larger casinos, but there are many smaller casinos in Henderson not included on this map. However, the main cluster is still along Boulder Highway, which continues to the northwest into Las Vegas.

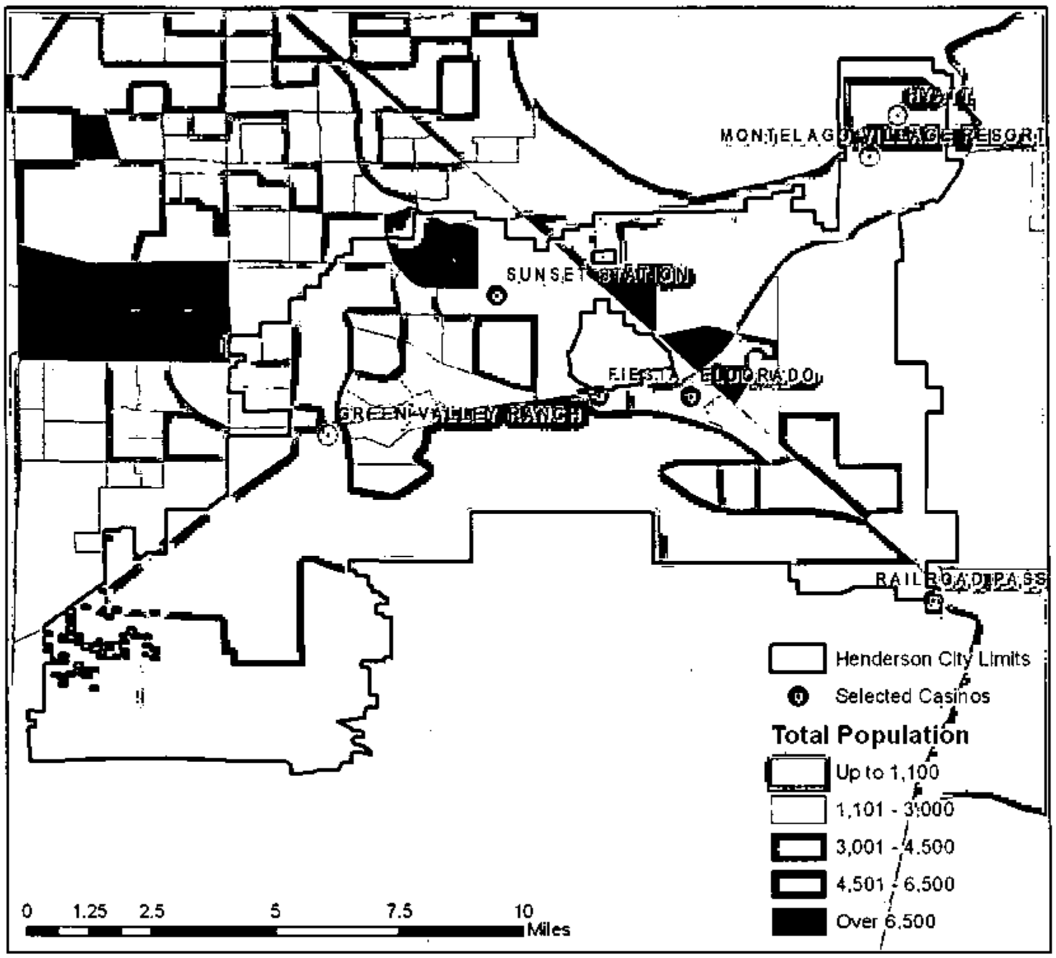




Source: Google Maps

The next set of maps show, for 2000, the spatial distribution of population, poverty, housing prices, and structure age across the city[5]. The age of structure map clearly shows the geographic expansion of this burgeoning city, and when combined with the other maps, we see that the older part of town (northern edge, closer to Las Vegas and along Boulder Highway) contains the older, commercial-oriented building and poorer population.

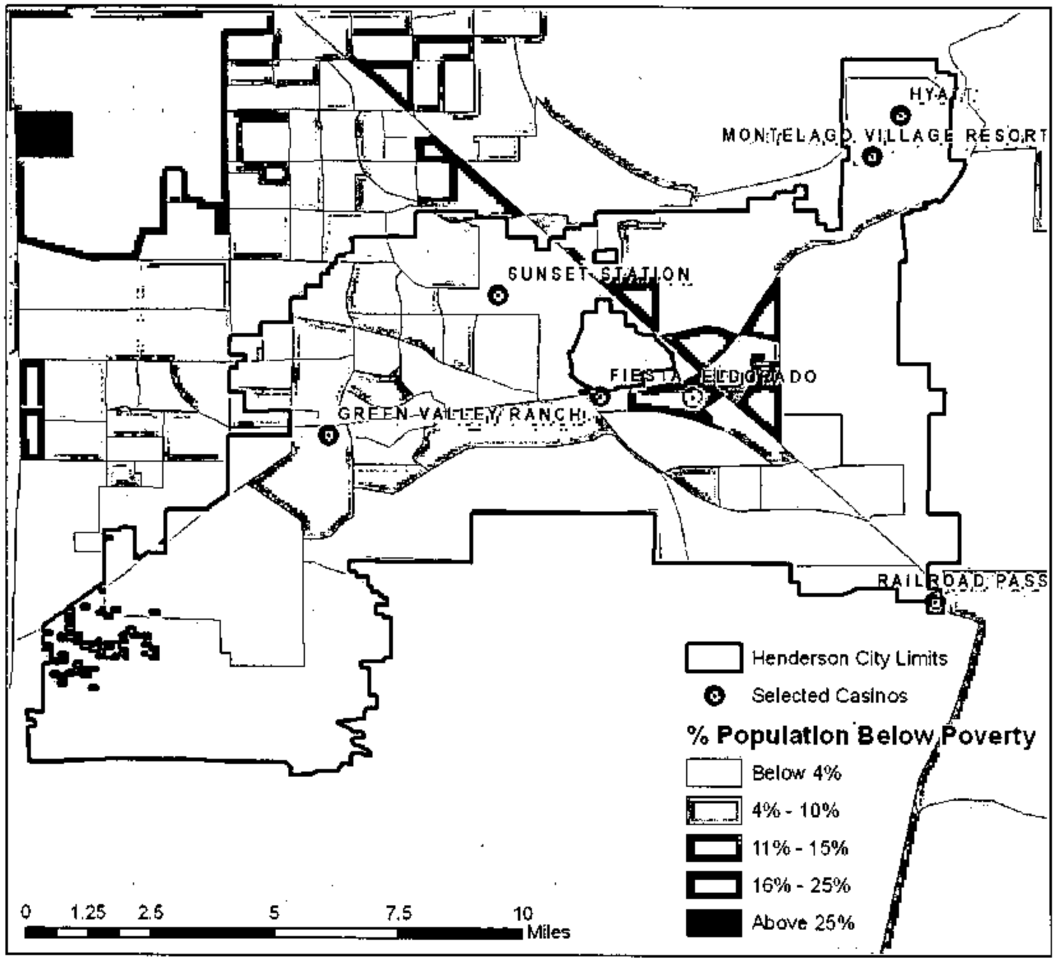
Total Population in Henderson



Source: Econsult Corporation, US Census Bureau

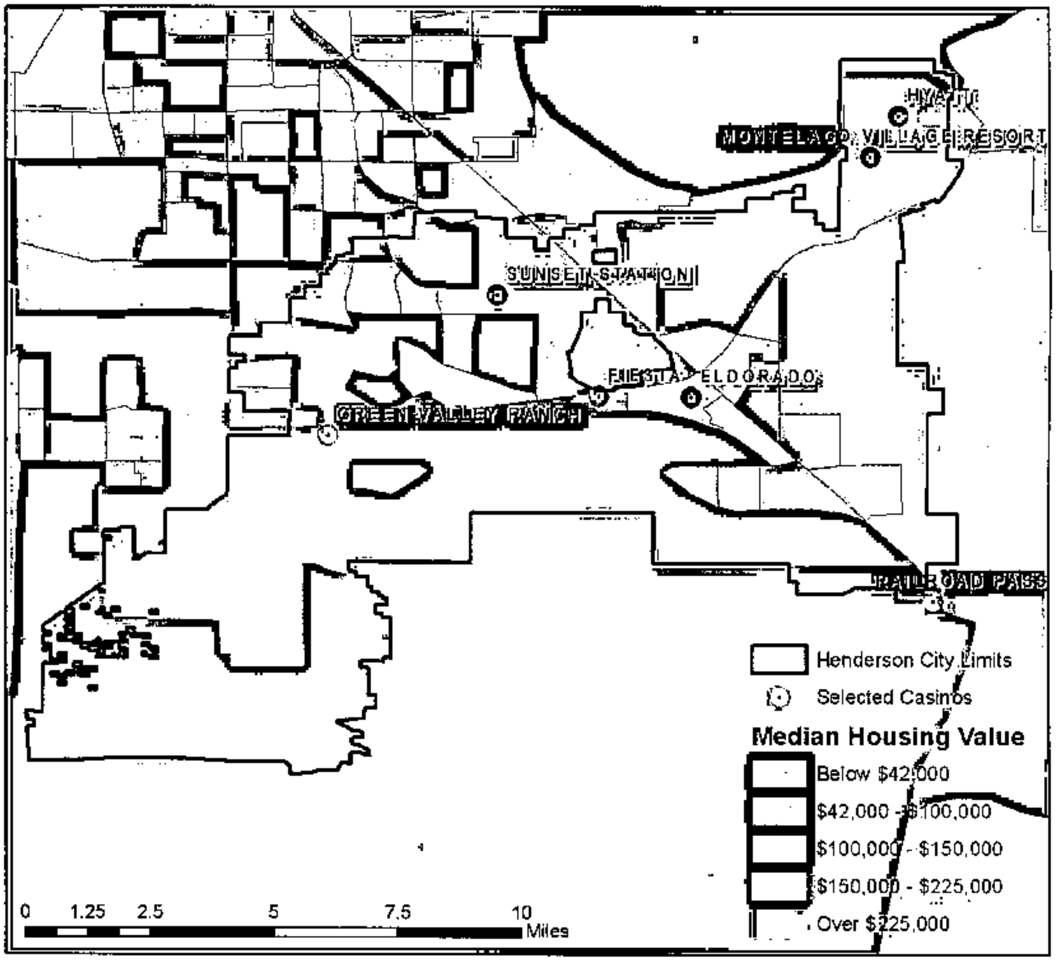
[5] Data was obtained from the 2000 Census Summary 3 File, U.S. Census Bureau

% Population Below Poverty Level in Henderson



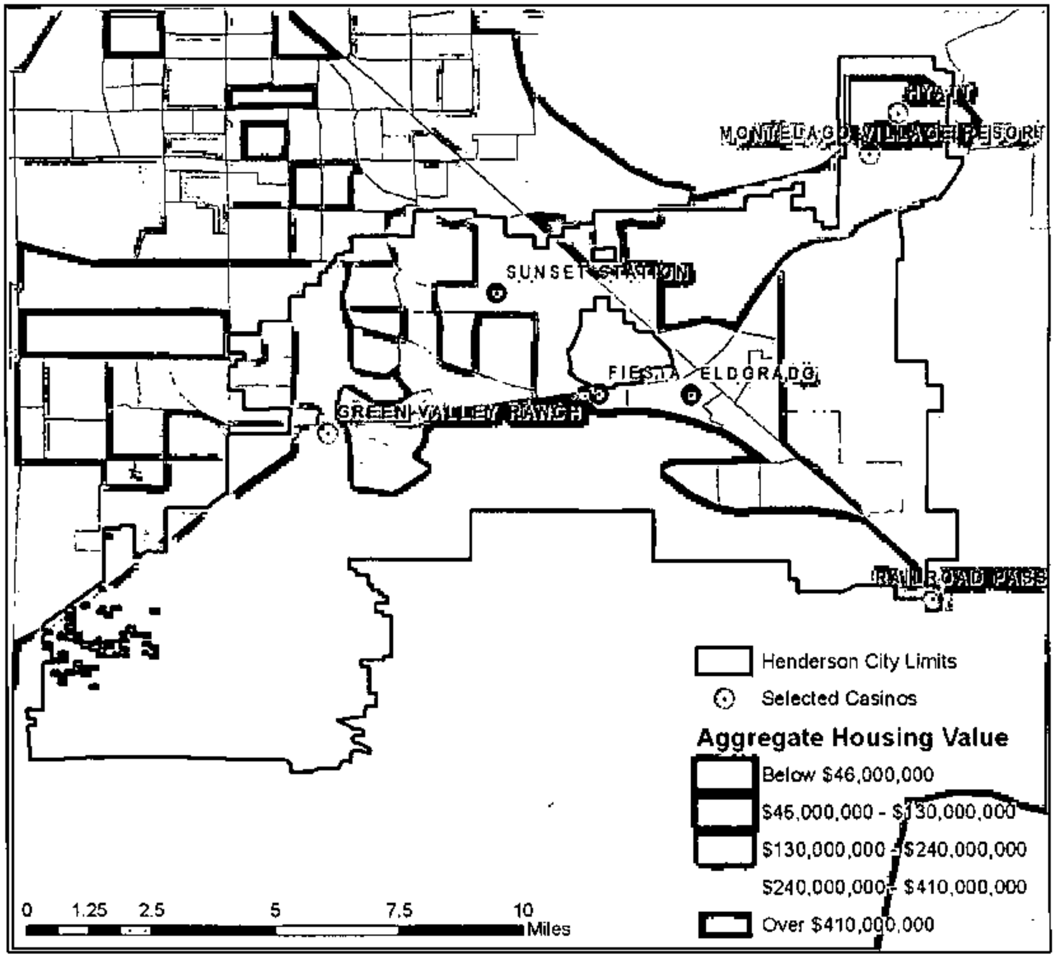
Source: Econsult Corporation, US Census Bureau

Median Housing Values in Henderson



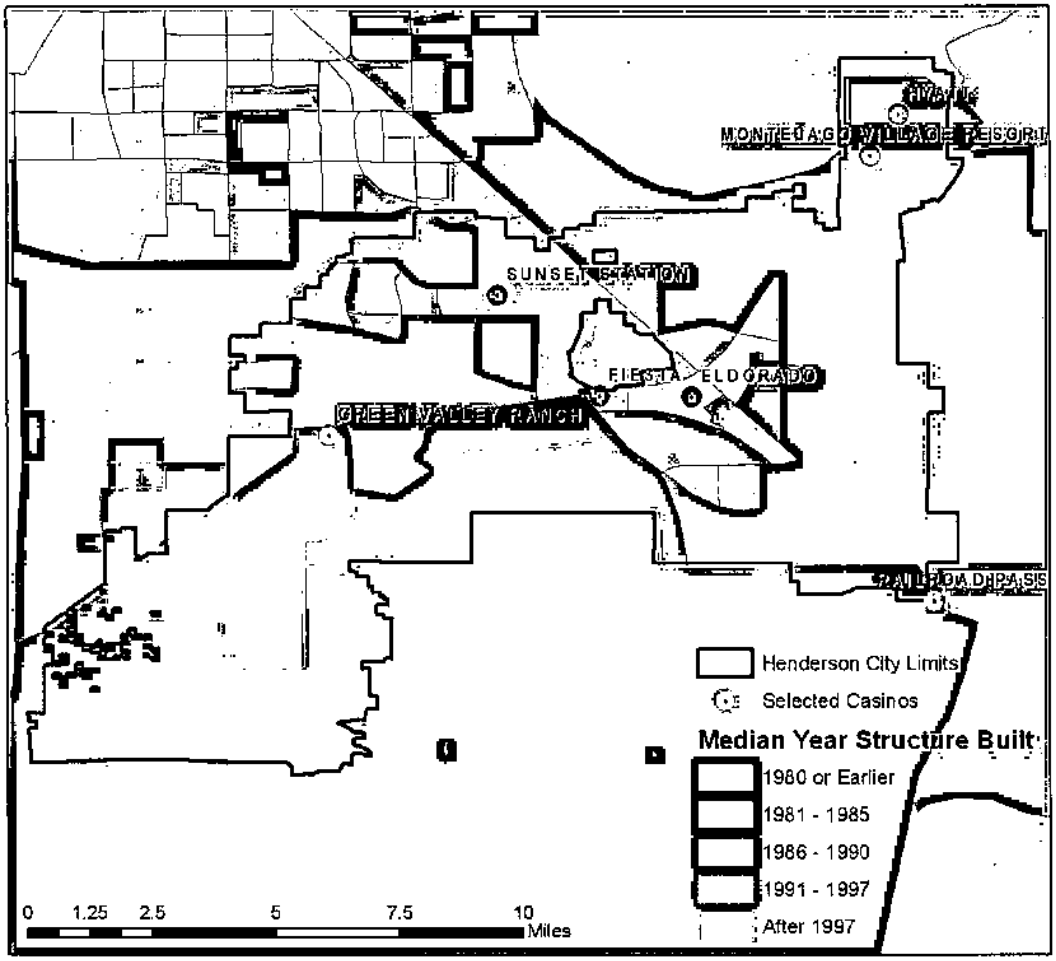
Source: Econsult Corporation, US Census Bureau

Aggregate Housing Values in Henderson



Source: Econsult Corporation, US Census Bureau

Median Structure Ages (Year Built) in Henderson



Source: Econsult Corporation, US Census Bureau

A separate residential jurisdiction is completely embedded inside the Henderson municipality boundaries, and it is not clear if those houses were included in the original study data. Nor do we find evidence that local schools (catchment areas within the school district) were factored into the model.

These maps generate an obvious question: What exactly does it mean, in Henderson, to be located within 1 mile of a casino? Newer, pricier housing may be further from the casinos, but it also is located further from the older, more commercial part of the city, as well as further from the Las Vegas commercial sprawl to the north.

As a result of these concerns, we conclude the empirical estimate of a negative 4.6% impact on housing prices within a 1-mile radius of "a large casino" is questionable.

2.2 Applicability to Foxwoods Casino Philadelphia and Environs:

Hallwatch.org implicitly used a view expressed in the Henderson study to apply those estimates to Philadelphia casino impacts.

> "Furthermore, since the economy of greater Las Vegas depends heavily on the gaming industry, we would expect that a finding of a *negative* (emphasis theirs) impact in that region could certainly be extrapolated to other areas where gambling would enjoy lower degrees of community acceptance." (p.8)

This comment suggests that the reason casinos exert a negative influence on residential property values (i.e. decreases demand) is the "opposition to gambling". We believe the more likely route of impact is via the traffic and congestion associated with any large project, especially in a large urban location with great population diversity.

We do not consider the residential real estate markets in Henderson and Philadelphia to be comparable. The environment is completely different: It is hard to picture two jurisdictions less comparable than Philadelphia and Henderson, Nevada.

Henderson is growing by leaps and bounds (see previous population comparisons).

Henderson has many casinos (see chart) and Philadelphia will see at most 2 in any part of the city; if Foxwoods Casino Philadelphia is selected it will be one casino in the entire 1-mile radius ring.

<u>Foxwoods Casino Philadelphia Case</u>:

This casino would actually eliminate blight and revitalize underutilized land. Location amidst other large non-residential users on underutilized and port-related riverfront and separated by a partially elevated highway from the nearest neighborhoods. Large industrial and big box retail separates the casino site from the residential neighborhoods to the west and southwest, and Penn's Landing and I-95 buffer the wealthier residential neighborhood to the northwest. These barriers, which are not found in Henderson, limit the negative impact on residential neighborhoods. The design will embrace the riverfront and water-borne transportation, and offer an attractive and exciting means of access to the waterfront for city residents.

In addition to good access, excellent visibility, strong compatibility with the city's tourism and waterfront development objectives, the site is sufficiently large to accommodate several planned project expansion phases, including a hotel and potential private residential condominium development on the site. Furthermore, in the public's eye, this site has been associated with gaming for over a decade, having been identified as a potential Riverboat Gaming site back in the early 1990s.

A key component of the project will be the Pier 60 Entertainment District, which will serve as a significant new attraction for the city, residents and visitors alike. As the southern anchor of the city's exciting waterfront, its riverfront orientation will undoubtedly strengthen the entire central riverfront as an attraction. It will serve as a catalyst for tourism marketing efforts to promote both sides of the river, including the "Two Cities, One River" marketing effort designed to increase the attractiveness and draw of the river and the Philadelphia and Camden waterfronts. The PEDP project site is the only applicant site that is directly across the river from the main entertainment part of Camden's riverfront. The location of the PEDP Site on the riverfront creates the possibility of tourist mobility improvements including connections by ferry or water-taxi to Penn's Landing and the Camden waterfront.

As detailed in the maps and charts that follow, in addition to being very close to Center City, the area within a 1-mile radius of the proposed site (the Area) is well populated, with over 55,000 people and over 22,000 households. The project should make certain areas along the Central Delaware Riverfront (primarily north) more attractive as housing locations, so there could be an increase in housing investment and supply induced by the project.

The Area within the 1-mile radius also shows a median family income of just under $33,000 (2000 Census), with a mix of lower to middle class households to the south and higher income households to the north.

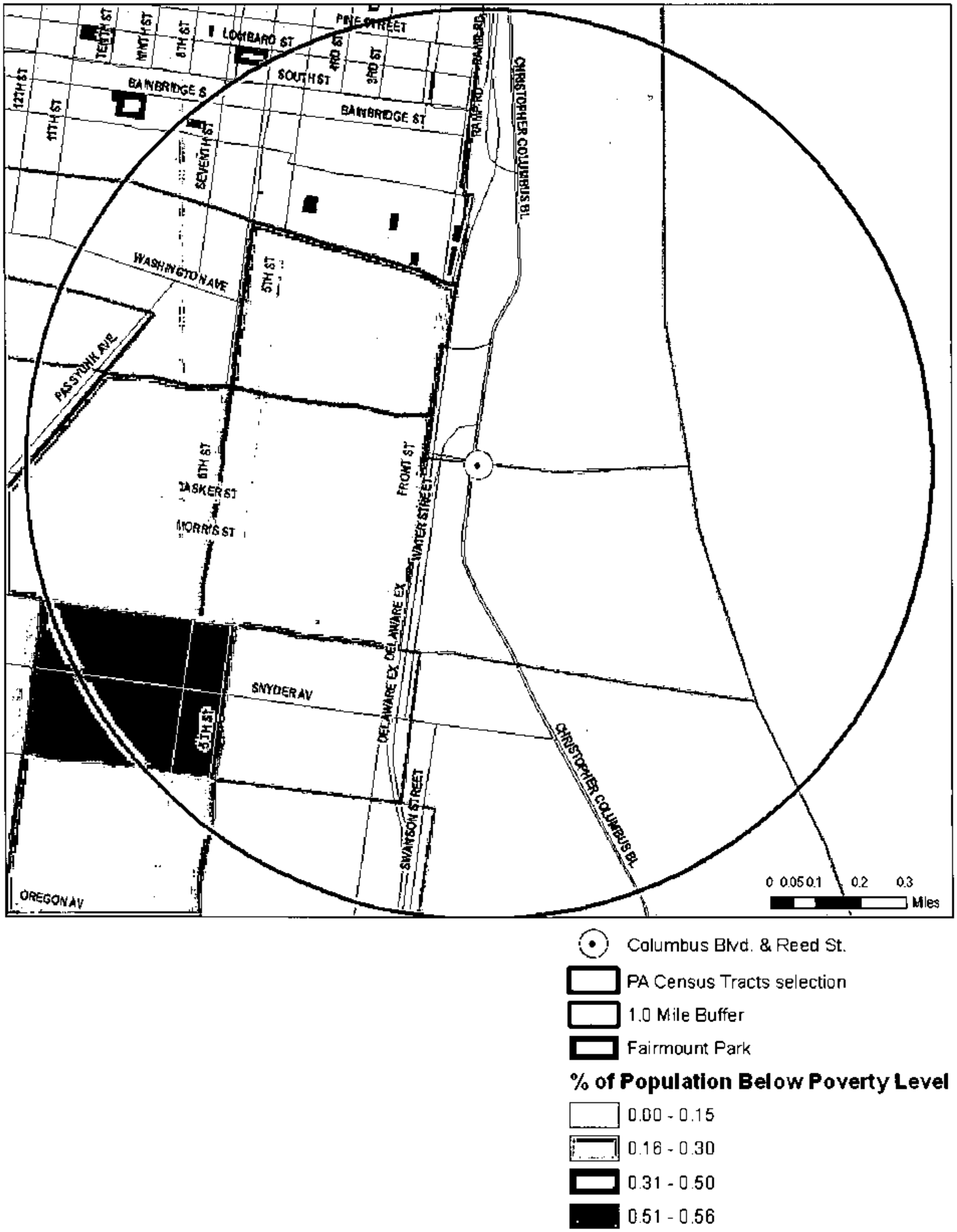
Total Population		55,191
Total Households		22,115
Family Households		13,343
Non-Family Households		8,772
Average Median Household Income	$	32,822
Aggregate Household Income	$	840,163,800
Total Housing Units		25,202
Occupied Housing Units		22,079
Owner Occupied		14,196
Renter Occupied		7,883
Vacant Housing Units		3,123
Average Median Number of Rooms		5.33
Aggregate Number of Rooms		132,898
Average Median Year Structure Built		1943
Aggregate Value of Owner-Occupied Housing Units	$	864,190,000

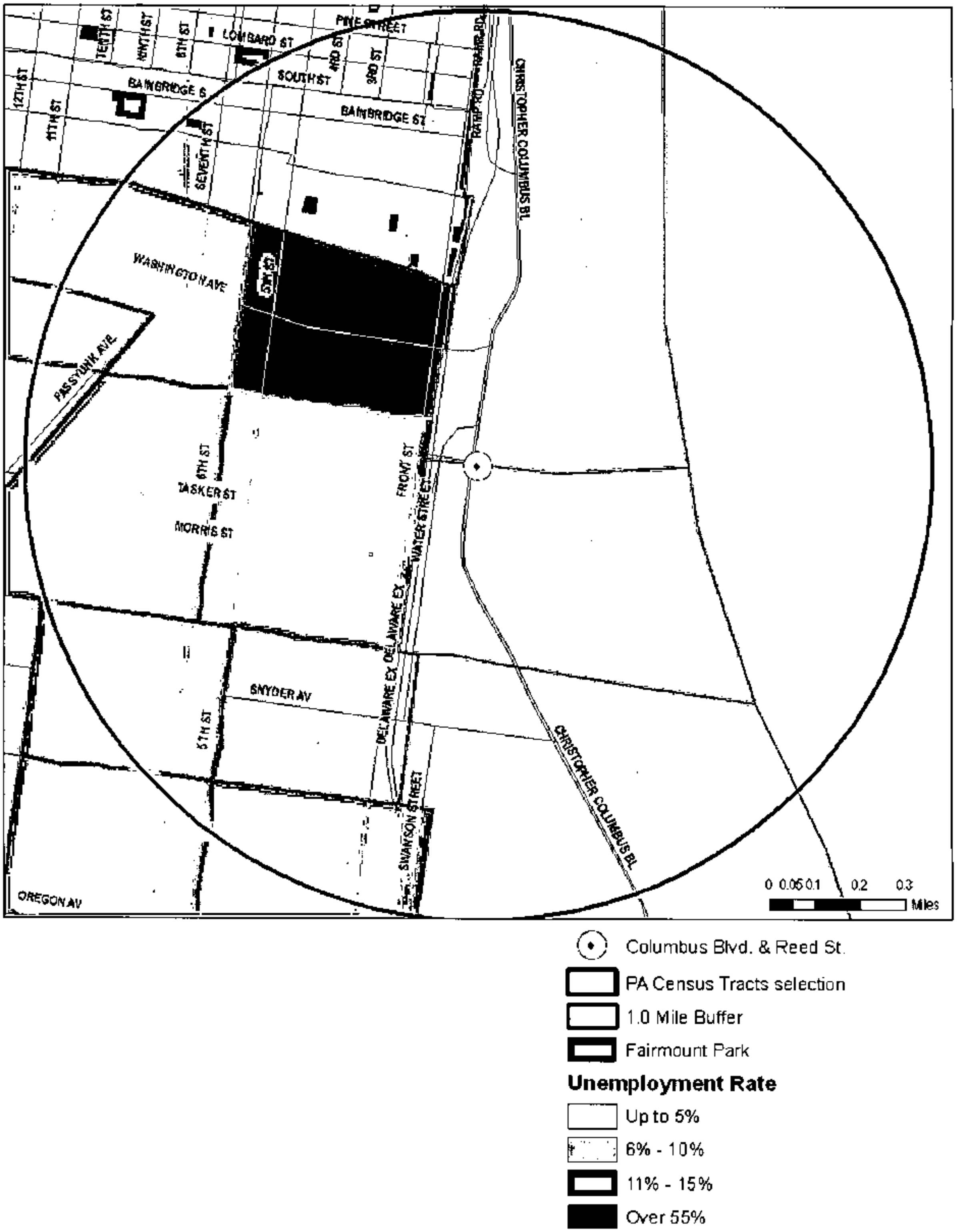
Columbus Blvd. & Reed St.

PA Census Tracts selection

1.0 Mile Buffer

Fairmount Park


TENTH ST
NINTH ST
8TH ST
LOMBARD ST
PINE STREET
4RD ST
3RD ST
SOUTH ST
12TH ST
11TH ST
BAINBRIDGE S
BAINBRIDGE ST
SEVENTH ST
RAMP RD
CHRISTOPHER COLUMBUS BL
WASHINGTON AVE
5TH ST
PASSYUNK AVE
6TH ST
TASKER ST
MORRIS ST
FRONT ST
WATER STREET
DELAWARE EX
SNYDER AV
SWANSON STREET
OREGON AV
0 0.05 0.1 0.2 0.3
Miles
Columbus Blvd. & Reed St.
PA Census Tracts selection
1.0 Mile Buffer
Fairmount Park
% of Population Below Poverty Level
0.00 - 0.15
0.16 - 0.30
0.31 - 0.50
0.51 - 0.56


PINE STREET
LOMBARD ST
SOUTH ST
BAINBRIDGE ST
TENTH ST
NINTH ST
8TH ST
4TH ST
3RD ST
12TH ST
11TH ST
SEVENTH ST
RAMP RD
CHRISTOPHER COLUMBUS BL
WASHINGTON AVE
5TH ST
PASSYUNK AVE
6TH ST
TASKER ST
MORRIS ST
FRONT ST
WATER STREET
DELAWARE EX
SNYDER AV
SWANSON STREET
OREGON AV
0 0.05 0.1 0.2 0.3
Miles
Columbus Blvd. & Reed St.
PA Census Tracts selection
1.0 Mile Buffer
Fairmount Park
Unemployment Rate
Up to 5%
6% - 10%
11% - 15%
Over 55%

Columbus Blvd. & Reed St.

PA Census Tracts selection

1.0 Mile Buffer

Fairmount Park

Select Amusement Locations


0 0.050.1 0.2 0.3
Miles
Columbus Blvd. & Reed St.
PA Census Tracts selection
1.0 Mile Buffer
Fairmount Park
Firehouses

3.0 OVERALL POTENTIAL IMPACTS

While this study may have some relevant implications for Philadelphia, it is incomplete. In particular, the project's opponents do not take into account the fact the proposed development would also add considerable public improvements to a currently de-industrialized waterfront site. According to Foxwood's Philadelphia plan, these improvements would take the form of remediating, landscaping, greening and adding park-like amenities to the site, as well as opening access to the riverfront. Since such improvements are, by definition, positive, it is reasonable to expect them to have a positive effect on nearby property values. By not taking into account this positive effect along with any possibly negative effect, community opponents are likely to have reached a downwardly biased conclusion.

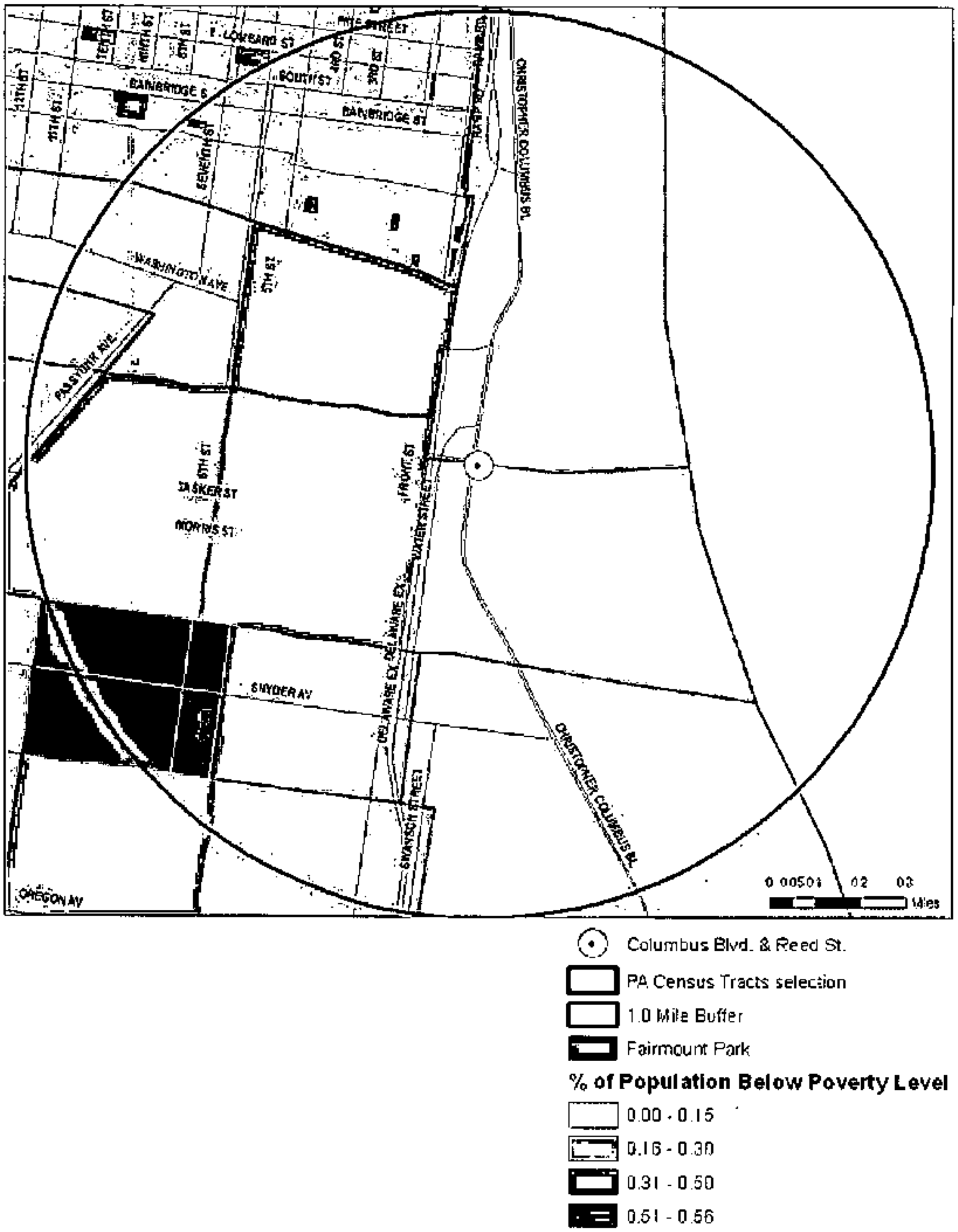
The purpose of this section is to investigate the potential net effect of the proposed casino development. We do this by essentially netting the negative forecast of the Henderson study against the implied positive forecast provided by the greening research from the city planning literature. The previous section argues that the Henderson findings are not directly applicable to the Philadelphia situation for a variety of reasons. The analysis in this section conservatively applies the Henderson results without any reduction.

This examination proceeds as follows:

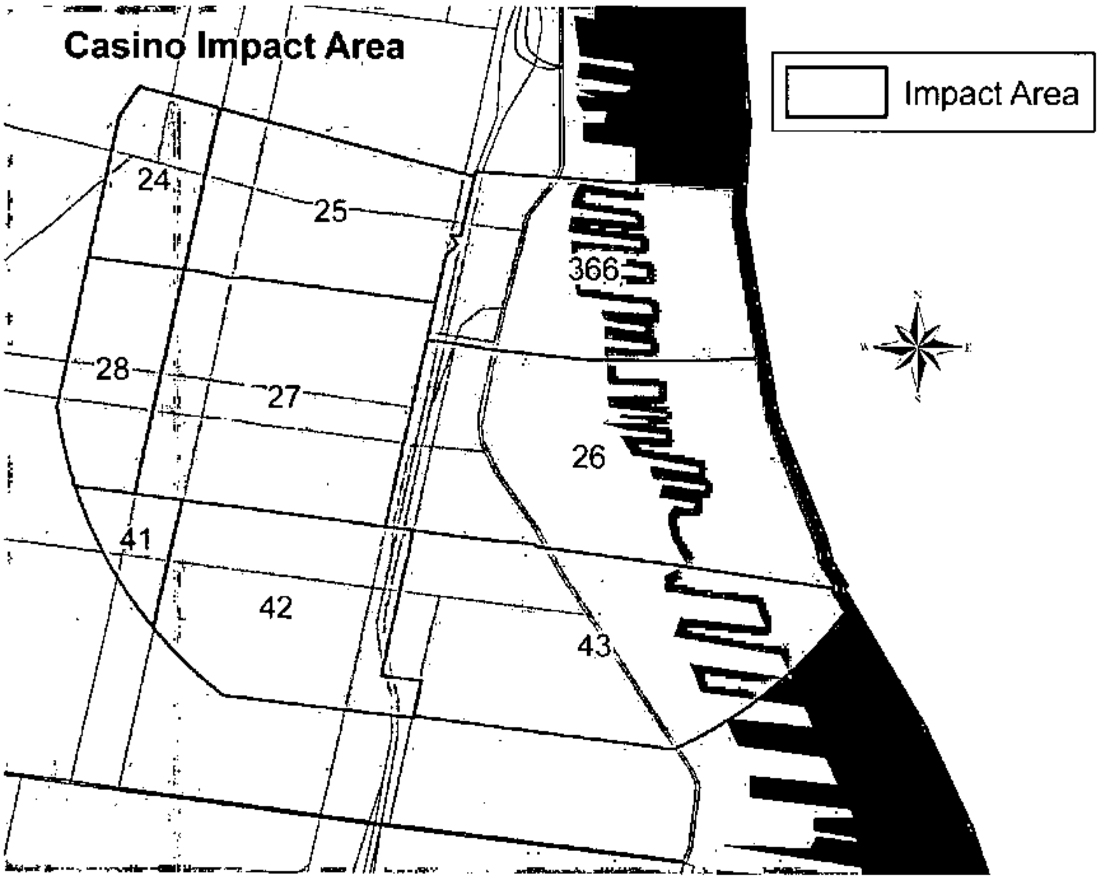
1) First, define the geographic boundaries of the affected target area near the casino.
2) Second, compute a current, as-of 2006 valuation of the housing stock in the target area.
3) Third, apply the results of the Henderson study to estimate the negative effects of the casino.
4) Fourth, apply the results of the greening literature to estimate the positive effects of improving the waterfront's public spaces.
5) Fifth, net these effects against each other to obtain the final net effect.

3.1 Define the geographic boundaries of the affected target area near the casino.

The Hallwatch analysis applied the Henderson parameters to the housing stock in a circle with a radius of 1 mile around the proposed site. This map was a map of which was included in the Foxwoods Philadelphia. The map was not included to show a property value "impact area" b, but rather to identify various characteristics of the area surrounding the project site. Since the Henderson study reported impact estimates on properties within one mile of a casino, this area seemed natural to fit the estimates overlaid with a map of Philadelphia Census tracts. A map of this is shown below, with the tract boundaries delineated by the red lines. Tracts are color-coded to denote the percent of the tract population living below the poverty level, with darker shades denoting higher tract poverty rates.

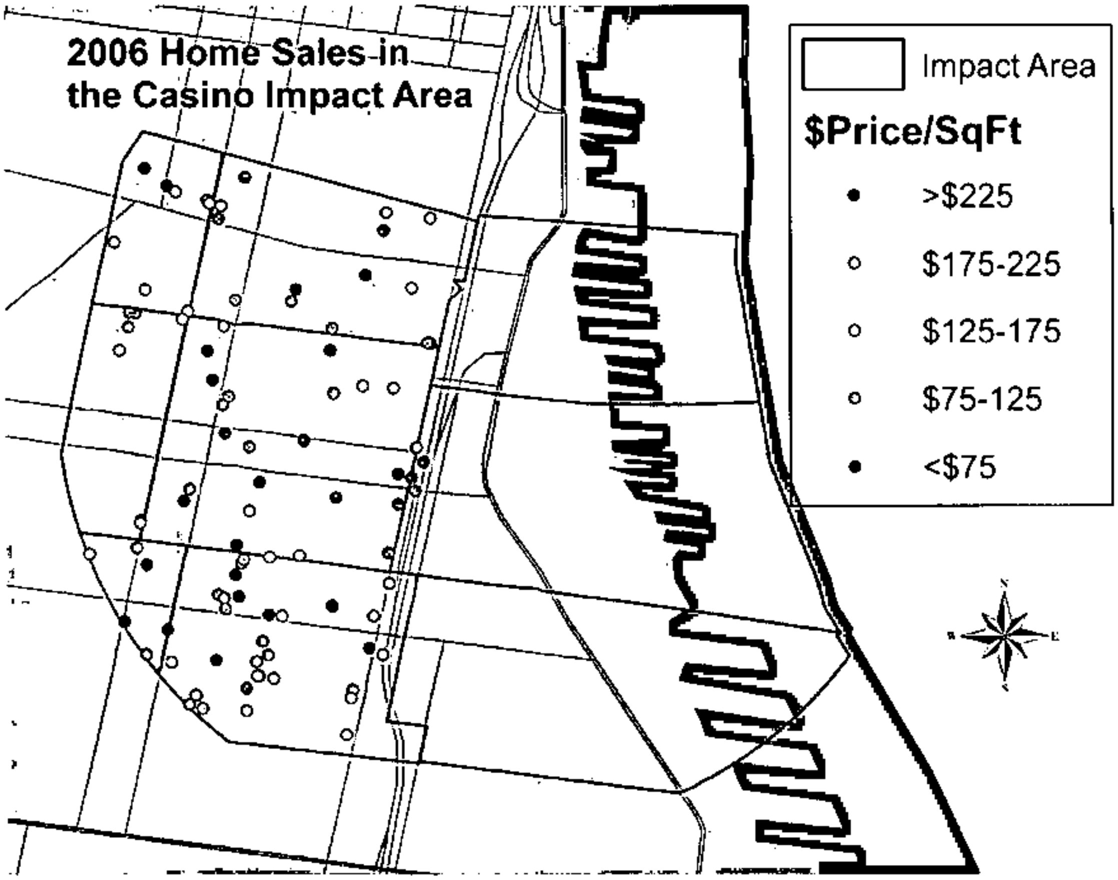


For potential property value impacts, the impact area must be delineated to take into account various physical boundaries, which would act to truncate the geographic expanse of the casino's impact. A map of this refined impact area is shown below. Since exact boundaries are somewhat arbitrary, we chose census tract boundaries with each tract labeled by its tract number:



3.2 Compute the current, as-of 2006 valuation of the housing stock in the target area.

Data on all arms-length home sales in Philadelphia in 2006 (to date) were purchased from First American Real Estate Solutions. Based upon their address, each sale was geo-coded with the assistance of ArcView software. The price per square foot of each structure was then computed by simply dividing each dwelling's transaction price by its square footage. The following map displays these home sales:



Home sales are color-coded by its price-per-sf, with hotter colors denoting relatively higher-priced properties and cooler colors doing likewise for relatively lower-priced properties. The distribution of price-per-sf is consistent with the submarket's perception as a working-to-middle class neighborhood of row homes. 80% of all dwellings transacted at a price less than $225/SF, while 20% traded at prices less than $75/SF. By contrast, condominiums in Center City, Philadelphia typically start at a minimum of $200/SF, which is at the upper end of this south Philadelphia submarket. And geographically, there appears to be no strong, global pattern to the spatial variation in house values. In general, dwellings near Front Street on the eastern border of the impact area, and near Passyunk Avenue, in the northwest corner of the submarket, appear to trade at relative premiums to housing in other parts of the impact area.

Next, using the actual Census, the housing stock in each tract is identified. For those tracts, which are geographically truncated, the count of the housing stock was truncated by the same percentage amount as the tract's geographic definition[6]. Table 1 gives a count of the housing stock in the impact area, by tract, as well as the mean price/SF from the sales data.

[6] For example, since only 20% of tract 28 is included in the defined impact area, only 20% of its housing stock is calculated. This method implicitly assumes a spatially uniform distribution of the housing stock, but this is largely true of this area of the city, which is dominated by single-family attached row homes.

Table 3.1 Number of Housing Units by Census Tract		
Tract	**No. of Housing Units**	**Avg. $Price/SF**
24	773	$202
25	1,640	$172
26	1	$237
27	3,505	$134
28	1,235	$118
41	89	$87
42	1,060	$98
43	0	N/A
Total	**8,303**	
Source: U.S. Census, First American RE Solutions		

Summing across tracts, and only including those areas that intersect with the impact area, the affected housing stock is estimated to be 8,303 housing units. Since the average row home has 1,260 SF, then multiplying this by the mean price of $157/SF gives an average valuation of $197,820. Total aggregate valuation of this housing stock then is $1.64bn.

3.3 Apply the results of the Henderson study to estimate the negative effects of the casino.

As noted in the previous section, the Henderson report estimates that dwellings located within 1 mile of the casino suffer an average decline in value of 4.6%. For the typical dwelling in our impact area, that would be a loss of $7.22/SFSF, for a total loss of $9,099.

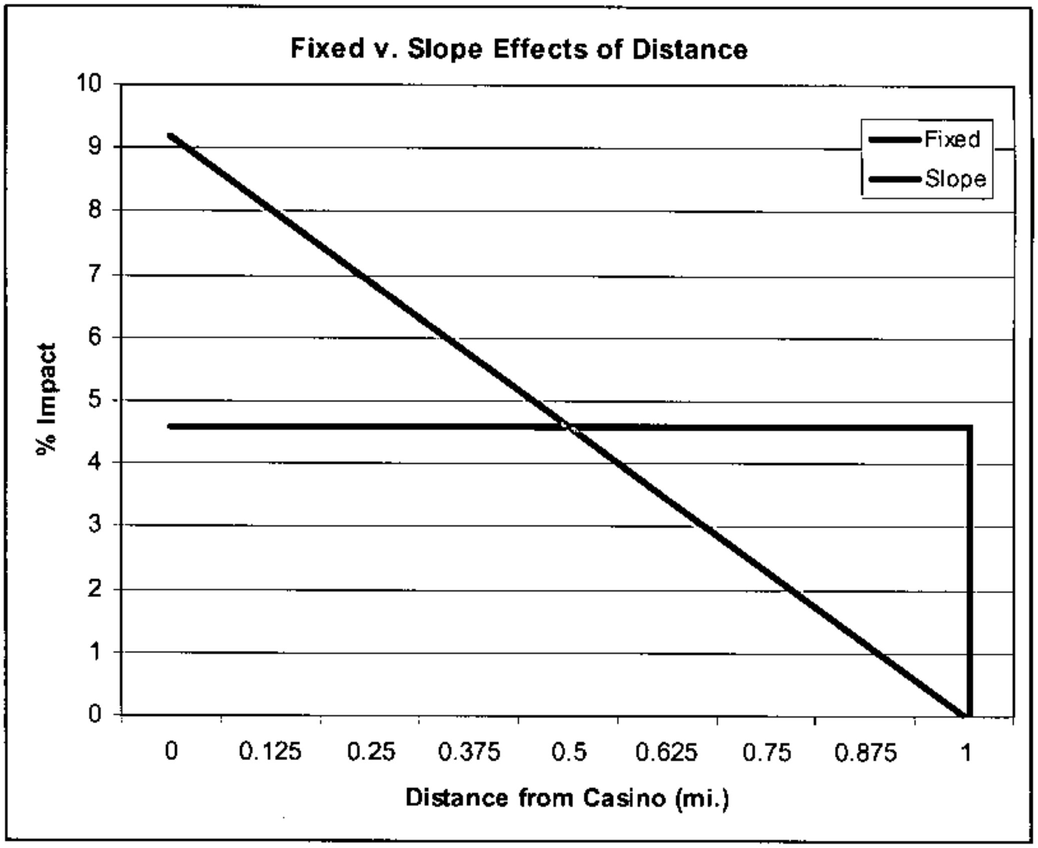
However, this study does take directly take into account the fact that the impact should decay with distance. That is, homes closer to the casino should suffer a larger hit, while homes further away should suffer less. The average may be a -4.6% decline across all housing units, but this should vary with distance.

With the assistance of a little algebra, we can translate Henderson's "fixed effect" into a "slope effect" that declines with distance from the casino. We do this for 2 scenarios:

- A relatively more plausible scenario (I) where the average loss is -3%;
- A relatively more conservative scenario (II) that uses Henderson's estimate of -4.6%

We rationalize the more optimistic scenario by the arguments presented in Section 2.0. We do not eliminate the potential negative impact estimated by Henderson, but scale it down.

To understand how to convert Henderson's fixed effect to a slope effect (that decays with distance)--while still maintaining its essential characteristic that the average decline is 4.6%--consider the following plot:



The horizontal blue line represents Henderson's fixed effect: all dwellings within 1 mile of the casino suffer the same, one-time negative impact of 4.6%, while all those beyond 1 mile remain unaffected. So, the distance gradient is horizontal at a value of 4.6, and it immediately goes to zero at a distance of 1 mile. Mathematically, the formula for this gradient is:

$$I(d) = -4.6 \quad \forall \mathrm{d} \leq 1 \quad (1)$$
$$I(d) = 0 \quad \forall \mathrm{d} > 1$$

Where "*I(d)*" is "the impact of the casino on house values at distance (miles) *d*".

The red line represents a distance gradient that decays with distance. The objective here is to compute the slope and intercept of this distance gradient, such that the average impact is still -4.6%. For this condition to remain true, the red distance gradient must cross the blue gradient at exactly its halfway point of ½ mile: homes at closer distance of ½ mile suffer a larger impact that 4.6% while homes further away suffer a smaller impact. Finally, both gradients meet at a distance of 1 mile, after which the impact is zero.

For this condition to hold, the area (or integral) under each of the gradients must be equal. The area of a rectangle is simply its base times its height. So, the area under the fixed-effect gradient is simply A=bh=1*4.6=4.6, since the gradient is 1 mile long and 4.6 units high.

The slope effect, however, is a triangle. The area of a triangle is A=1/2*b*h. Since the area under both gradients must equal 4.6, and the base of both gradients is 1 mile, we simply substitute these numbers into the formula and solve for h: 4.6=1/2*1*h, so h=9.2. This implies that homes which are right next to the casino (distance=0) suffer an impact of -9.2%, which is double the average impact of 4.6%.

Now, we need to solve for the slope of the distance gradient. The general form of a linear distance gradient is given by:

$$I(d) = \alpha - \beta d \qquad (2)$$

We've already solved for the value of alpha (9.2). We can now use the second condition of these distance gradients—that the casino's impact must be equal to zero at a distance of 1 mile—to solve for the slope, beta. This condition implies a formulation of:

$$0 = 9.2 - \beta(1) \qquad (3)$$

Solving (3) for beta yields a slope coefficient equal to the intercept coefficient: β=9.2. So, the final formulation of our converted distance gradient is:

$$I(d) = -9.2 + 9.2(d) \qquad (4)$$

In words, equation (4) states that homes immediately adjacent to the casino suffer a negative capitalization of -9.2% of value, but this impact decreases thereafter, reaching a value of 0 at 1 mile. For example, a home that is ¾ mile from the casino would only suffer an impact of -9.2+9.2(0.75)=-2.3% to its total value.

Finally, for the more optimistic scenario where the average decline is only -3%, the distance gradient given is:

$$I(d) = -6 + 6(d) \qquad (5)$$

Equation (5) states that homes immediately adjacent to the casino suffer an impact of only -6%, which is less than the -9.2% effect implicitly hypothesized by Henderson.

We can now apply these gradients to the average values of the homes in each of the impact areas' Census tracts to estimate the negative component of the Foxwoods' impact. Since we're working with average house values, we must also work with average distances. So the first step is to measure the average distance, by tract, of all homes within the impact area. This was done by computing individual distances for all homes, and then taking the average within each tract. Then, the distance gradients from equations (4) and (5) were applied to the average house value and average distance within each tract, to estimate the negative impact in percentage terms. This was then multiplied by the average home's value in each tract to convert the impact from percent terms to dollar figures. The results from scenario I are given in Table 3.2, while Table 3.3 gives the results from scenario II:

Table 3.2 Impact of Casino on House Values from Scenario I					
Tract	**# Homes**	**Avg. $Value**	**Avg. Distance**	**%Effect**	**$Effect**
24	773	$254,520	0.71	-1.74%	($4,429)
25	1,640	$216,720	0.44	-3.36%	($7,282)
26	1	$298,620	0.24	-4.56%	($13,617)
27	3,505	$168,840	0.39	-3.66%	($6,180)
28	1,235	$148,680	0.68	-1.92%	($2,855)
41	89	$109,620	0.76	-1.44%	($1,579)
42	1,060	$123,480	0.72	-1.68%	($2,074)
43	0	N/A	0.65	-2.10%	N/A
Total	**8,303**	**$1.469bn**			
Source: U.S. Census, First American RE Solutions					

According to the forecast estimates, the loss of house values ranges from a minimum of -$1,579 in tract 41 to a maximum of -$13,617 in tract 26. The average loss is -$5,431.

Summing these effects across all homes in each tract, and then across all tracts in the impact area yields a total estimated loss in housing wealth of -$42.9 million for Scenario I.

We now repeat the same exercise for Scenario II, which is given in Table 3.3:

Table 3.3 Impact of Casino on House Values from Scenario II					
Tract	**# Homes**	**Avg. $Value**	**Avg. Distance**	**%Effect**	**$Effect**
24	773	$254,520	0.71	-2.67%	($6,791)
25	1,640	$216,720	0.44	-5.15%	($11,165)
26	1	$298,620	0.24	-6.99%	($20,880)
27	3,505	$168,840	0.39	-5.61%	($9,475)
28	1,235	$148,680	0.68	-2.94%	($4,377)
41	89	$109,620	0.76	-2.21%	($2,420)
42	1,060	$123,480	0.72	-2.58%	($3,181)
43	0	N/A	0.65	-2.67%	N/A
Total	**8,303**	**$1.469bn**			
Source: U.S. Census, First American RE Solutions					

As expected, the forecast losses are larger. The forecast estimates indicate that loss of house values ranges from a minimum of -$3,181 in tract 41 to a maximum of -$20,880 in tract 26. The average loss is -$8,327.

Summing these effects across all homes in each tract, and then across all tracts in the impact area yields a total estimated loss in housing wealth of -$65.8 million for the pessimistic scenario.

3.4 Apply the results of the greening/riverfront improvement literature to estimate the positive effects of improving the waterfront's public spaces

We now repeat this same exercise to estimate the positive effects that improvements to the waterfront and public spaces will bring. Since the forecast of the negative impact considered two possible scenarios, we also consider two possible greenway scenarios for the positive forecast of improvements to the riverfront.

Our forecast parameters are from a recent impact study of a proposed greenway for the north Delaware riverfront[7]. This study comprehensively reviewed the greening literature and undertook a meta-analysis of the empirically measured effects of greenspace on property values. Based upon this meta-analysis, the report utilized the following two greening gradients as the best candidates to forecast the effects of an improved riverfront on nearby house values:

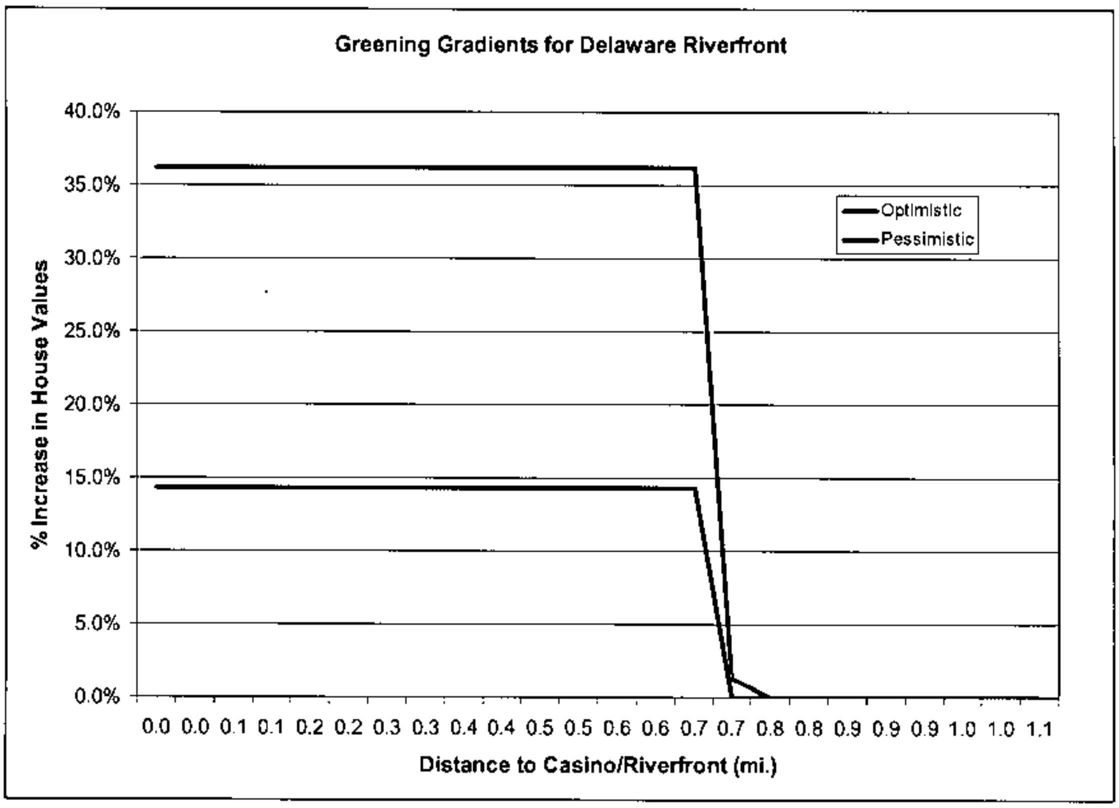
[7] Source: "North Delaware River Greenway Study: Potential Development Scenarios and Benefit-Cost Analysis," a report to the Pennsylvania Environmental Council Greenways Inc., and by Econsult Corporation 2005.

$$\left.\begin{array}{ll} G(d) = 14.3 & \text{for d} <= 0.7 \text{ miles} \\ G(d) = 14.3 - 1.95(d) & \text{for } 0.7 < \text{d} <= 1 \text{ mile} \end{array}\right\} \text{Pessimistic Scenario (6)}$$

$$\left.\begin{array}{ll} G(d) = 36.2 & \text{for d} <= 0.7 \text{ miles} \\ G(d) = 36.2 - 49.2(d) & \text{for } 0.7 < \text{d} <= 1 \text{ mile} \end{array}\right\} \text{Optimistic Scenario (7)}$$

The percent effect of improved greenspace on property values at distance "d" from the riverfront/casino is represented by G(d). Unlike the negative impact gradients, the research found that the positive effects of greenspace follow a stepwise function, where the fixed effect holds for a longer distance than with the linear gradients, and then declines thereafter. In this case, that threshold distance was found to be a little less than ¾ of a mile.

The intuition behind these gradients can perhaps be better understood by plotting the positive impact as a function of distance. The following figure displays how the positive effects of greenspace varies with distance, for both the optimistic and pessimistic gradients:



As the figures indicate, the positive effects of greenspace are constant over approximately ¾ mile, and then taper off dramatically. This threshold effect may be due to the fact that this is the maximum distance the average households can view or access the greenspace by walking.

Beyond that distance, its effective inaccessibly renders it essentially irrelevant—and thus value-less—to those households.

As in the negative impact forecast, these gradients are applied to the subject housing stock in the impact zone to generate the forecasts. The results for the pessimistic scenario are given in Table 3.4:

Table 3.4 Impact of Greenspace on House Values for Pessimistic Scenario

Tract	# Homes	Avg. $Value	Avg. Distance	%Effect	$Effect
24	773	$254,520	0.71	0%	$0
25	1,640	$216,720	0.44	14.3%	$30,991
26	1	$298,620	0.24	14.3%	$42,703
27	3,505	$168,840	0.39	14.3%	$24,144
28	1,235	$148,680	0.68	14.3%	$21,261
41	89	$109,620	0.76	0%	$0
42	1,060	$123,480	0.72	0%	$0
43	0	N/A	0.65	14.3%	N/A
Total	**8,303**	**$1.469bn**			

Source: U.S. Census, First American RE Solutions

The forecast estimates indicate that positive capitalization of an improved riverfront into house values ranges from a minimum of $21,261 in tract 28 to a maximum of $42,703 in tract 26. The average gain in housing wealth is $29,755.

Summing these effects across all homes in each tract, and then across all tracts in the impact area yields a total estimated gain in housing wealth of $161.8 million for the pessimistic scenario.

We now repeat the same exercise for the optimistic scenario, which is given in Table 3.5:

Table 3.5 Impact of Greenspace on House Values for Optimistic Scenario					
Tract	**# Homes**	**Avg. $Value**	**Avg. Distance**	**%Effect**	**$Effect**
24	773	$254,520	0.71	1.3%	$3,305
25	1,640	$216,720	0.44	36.2%	$78,453
26	1	$298,620	0.24	36.2%	$108,100
27	3,505	$168,840	0.39	36.2%	$61,120
28	1,235	$148,680	0.68	36.2%	$53,822
41	89	$109,620	0.76	0%	$0
42	1,060	$123,480	0.72	0.8%	$997
43	0	N/A	0.65	36.2%	N/A
Total	**8,303**	**$1.469bn**			
Source: U.S. Census, First American RE Solutions					

As would be expected, the forecasted gains for the optimistic scenario are larger. The estimates indicate that the increase in house values ranges from a minimum of $997 in tract 42 to a maximum of $108,100 in tract 26. The average gain is $50,966.

Summing these effects across all homes in each tract, and then across all tracts in the impact area yields a total estimated gain in housing wealth of $413 million for the optimistic scenario.

3.5 Net the positive effects against the negative effects to obtain the final net impact

Having forecast and parameterized the range of possible positive and negative impacts of the proposed casino, it remains to net them against each other to obtain a good-faith, final net impact forecast. Again, we choose to do this for two scenarios:

- The pessimistic scenario: this nets both pessimistic scenarios against each other;
- The optimistic scenario: this nets both optimistic scenarios against each other.

The pessimistic scenario forecasts an average loss in housing values of $8,327 due to increased congestion and traffic, but a countervailing average gain of $29,755 from an improved riverfront and additional greenspace. This implies that—even for the pessimistic scenario—the net average effect should be positive. Table 3.6 gives the results from computing the net effect by tract, by netting the average dollar loss in each tract against the comparable average dollar gain:

Table 3.6 Net Impact on House Values for Pessimistic Scenario					
Tract	# Homes	Avg. $Value	$Loss	$Gain	$Net
24	773	$254,520	($6,791)	$0	($6,791)
25	1,640	$216,720	($11,165)	$30,991	$19,826
26	1	$298,620	($20,880)	$42,703	$21,823
27	3,505	$168,840	($9,475)	$24,144	$14,669
28	1,235	$148,680	($4,377)	$21,261	$16,884
41	89	$109,620	($2,420)	$0	($2,420)
42	1,060	$123,480	($3,181)	$0	($3,181)
43	0	N/A	N/A	$0	N/A
Total	**8,303**	**$1.469bn**			
Source: U.S. Census, First American RE Solutions					

Across tracts, the results are split: for four tracts, there is a positive net gain, while for the other three tracts there is a net loss. The reason for this has to do with the fact that there are differential rates of "spatial decay" in the congestion-v-greening gradients. At short distances, the positive greening effect dominates the negative congestion effect, while the opposite is true at longer distances. The reason for this is likely because the greening affect really only affects homes within walking distance to the amenity, while the congestion from vehicular traffic has a further reach.

However, while the net effect may vary from tract to tract, it still remains positive across tracts. If the $Net in Table 3.6 is multiplied by the number of housing units in each tract, and then summed, the resulting net figure for the entire impact zone is $96.0m. This implies that, while there will be winners and losers among individual households, there will still be more winners than losers, and the dollar magnitude of the "wins" will exceed those of the "losses". Thus, even in the pessimistic scenario, the net gain to the city (and its tax base) is positive.

Table 3.7 gives the results of performing this same analysis for the optimistic scenario:

Table 3.7 Net Impact on House Values for Optimistic Scenario					
Tract	# Homes	Avg. $Value	$Loss	$Gain	$Net
24	773	$254,520	($4,429)	$3,305	($1,124)
25	1,640	$216,720	($7,282)	$78,453	$71,171
26	1	$298,620	($13,617)	$108,100	$94,483
27	3,505	$168,840	($6,180)	$61,120	$54,940
28	1,235	$148,680	($2,855)	$53,822	$50,967
41	89	$109,620	($1,579)	$0	($1,579)
42	1,060	$123,480	($2,074)	$997	($1,077)
43	0	N/A	N/A	N/A	N/A
Total	8,303	$1.469bn			
Source: U.S. Census, First American RE Solutions					

The optimistic scenario does not differ from the pessimistic one in that households in four of the tracts are net winners while three are still net losers. However, the magnitude of "wins" is now much larger than the magnitude of "losses". The net gains in housing wealth are in the $50,000-$95,000 range, while the net losses are only in the $1,000-$1,600 range.

As such, when these gains and losses are summed across households, the total net gain in housing wealth from the optimistic scenario is $370m.

4.0 CONCLUSION

We estimate significant potential property value enhancements associated with the proposed Foxwoods Philadelphia development. Potential negative impacts are likely to be much more than offset by the positive impacts of waterfront improvements.

In particular, we note the following conclusions:

1) We conclude that the estimates of negative impacts on residential housing prices put forth by Hallwatch.org are likely exaggerated, and it is just as likely that the impacts – if any – would be positive. The magnitude of the negative price impact of "proximity to casino" estimated in the Henderson study could well be exaggerated by the omission of other influencing factors, including radical changes in the housing markets, due to the burgeoning population growth during the study period. In addition, changes in the Henderson housing market have generated both a supply production and price response, so the lower process could be influenced by increased supply too. Furthermore, the impact (whatever its magnitude) is not likely to be uniform over distance, which would exaggerate the impacts further from the casinos.

2) We conclude that the results obtained in the Nevada study (where there are many casinos located throughout the community) are not suitable to forecast the potential impacts of one or two casinos in Philadelphia. Major differences in market dynamics, and spatial barriers make the Henderson estimates practically useless.

3) Examining casino (congestion) impacts alone does not sufficiently describe the nature of the proposed project, which will include development of positive amenities associated with the improvement of currently underutilized, derelict, and inaccessible land.

4) **The total net effect of the proposed casino remains positive, regardless of whether a pessimistic or optimistic scenario is estimated. The total gain in housing wealth is estimated to be in the $96 million to $370 million range.**

Finally, we reiterate many additional qualitative benefits, which are likely to have positive impacts on nearby land values, but were not all included in our estimates:

In designing this proposed project, PEDP has made, and continues to make, every effort to minimize potential negative qualitative impacts while maximizing positive qualitative impacts. Some key points include:

- This project would reuse vacant, formerly industrial land that has been underutilized for more than a decade and that currently generates little or no tax revenue for the city or school district treasuries.

- The revitalization of this strategically important property would serve as a catalyst for the economic redevelopment of the central Delaware Riverfront. A major advantage of the PEDP site is that the planned development is consistent with the City's long-tem goal of economically reinvigorating and activating the remainder of the riverfront. The project would create an opportunity to open the riverfront further south from Penn's Landing from both the landside and riverside.

- Furthermore, the proposed casino and entertainment use is compatible with the "Big Box" retail and the port related land uses along the riverfront to the south, and can act as a strong buffer between those uses and the more entertainment and residential uses north of the site.

- The Foxwoods Casino Philadelphia would provide increased opportunities for city businesses to sell products and services, and expanded opportunities for employment at salary and benefit levels generally above the hospitality industry levels for the Philadelphia region.

- The PEDP project would present an opportunity to address some existing infrastructure problems in the area of the proposed site.

- In addition to stimulating economic development and jobs, the Foxwoods Casino Philadelphia would provide expanded entertainment opportunities for residents and visitors and provide an important stimulus for city and regional tourism because it would be designed as a visitor attraction, with significant orientation to the riverfront. It would also offer exciting non-casino activities in addition to a high-quality gaming experience.

- Given the opportunity to market gaming as an added attraction to increase overall city and regional tourism, PEDP intends to work closely with local and state tourism and convention official to enhance their marketing efforts. Marketing will take advantage of the location near Center City and Penn's Landing, as well as the many nearby cultural, historical and entertainment tourist attractions, to boost tourism and convention attendance, generating significant additional business for the city and region's hospitality industry.

- Finally, the PEDP project would create an opportunity to channel a significant portion of casino profits into local charitable uses. To our knowledge, no other applicant for a Philadelphia casino license promises to create such an opportunity.

Exhibit D

ANALYSIS OF THE EFFECTS OF A TEMPORARY FACILITY

PHILADELPHIA ENTERTAINMENT AND DEVELOPMENT PARTNERS, L.P.

D/B/A FOXWOODS CASINO PHILADELPHIA

Submitted to Philadelphia Entertainment and Development Partners, L.P. by:

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October 2006

EXECUTIVE SUMMARY

The Pennsylvania Race Horse Development and Gaming Act permits a licensee to propose the opening of limited, temporary gaming facilities in advance of the building and operation of a permanent casino. While this may appear to be a reasonable way to advance revenues to the Commonwealth and ramp up the overall introduction of gaming and its spin-off benefits, a careful analysis reveals several factors that make a temporary facility less attractive for the city, the state, and the slot licensee. Our analysis suggests that opening a temporary casino is likely to lead to less, not more, revenues for the state. Furthermore, the estimated spin-off benefits and qualitative benefits may be significantly less than expected.

Based on the planned construction schedule, we conclude that building a temporary facility and staging the construction of the permanent casino, rather than developing the permanent casino as early as possible, could reduce the casino's expected win by over $100 million and the state's casino tax revenue by nearly $56 million, in the first four years following the award of a license. In other words, we conclude that opening a temporary 1,500-slot facility will not likely generate sufficient revenues to justify the costs, effects, and delay in developing a permanent 3,000-slot casino. Further, a temporary facility may detract from the patron's enjoyment leading to a negative experience that may affect the future revenues of the operator. If any negative impact from a temporary facility lingers for the permanent casino, the state could suffer an additional $20 million, or more, in reduced tax revenues in the opening year.

This finding is based on several key assumptions and impacts in the development of a temporary facility in advance of a permanent casino; these are described briefly below:

1. The construction of the temporary facility, expected to take 12 months, will delay the pace of construction (and hence the opening) of the permanent casino, which is otherwise expected to take 18 months to complete. Thus, the permanent casino would open 30 months out, rather than 18 months.

2. The shorter construction period for the temporary facility will mean less time is available to incorporate the traffic and other site improvements envisioned to be completed before the casino (temp or permanent) is open for business. This could lead to less favorable traffic and site-related environmental conditions.

3. A temporary facility is not likely to be competitive with Atlantic City or other permanent competitors that will already be serving the Philadelphia

market (e.g. Philadelphia Park and Chester Downs, in addition to Delaware racinos) in terms of ambiance and quality of the gaming experience.

4. A temporary will not have the range of non-gaming activities planned for the permanent casino (e.g. restaurants, retail, entertainment).

5. The nature of a temporary facility itself will likely reduce the quality of the customer's initial experience. The old adage "First impressions are lasting impressions" is especially true in the gaming industry. Neither the state nor the operator want a customer's first impression of gaming in Pennsylvania to be in an undersized, temporary facility, lacking amenities and located in the middle of a construction zone. These factors would all likely lead to a lower draw, and lower revenues per machine than estimated for the permanent casino, and could have a depressing effect on the estimated draw and win at the permanent casino once it is completed.

6. Constructing a temporary facility will require the phasing of construction of the permanent casino, requiring a longer construction period and increasing costs associated with construction around an open, operating temporary slots parlor. Infrastructure improvements, traffic mitigation, surface parking, engineering, training, water runoff engineering will all cost more than if they can all be done at once. Similarly, security and technology for a temporary facility must be the same as a permanent facility, thereby creating enormous extra costs for design and implementation. Ultimately, this is likely to lead to less money available to be spent on non-gaming amenities, thereby reducing the long-term attractiveness and the potential spin-off impacts of the permanent casino.

7. Finally, the spin-off economic development effect would be far less (arguably close to none) for the temporary facility, with ancillary development delayed by two (2) or more years, given the extended time frame until a permanent casino is built.

1.0 INTRODUCTION AND ISSUE

Acknowledging that the Gaming Act authorizes the opening of temporary slot casino facilities, we compared the beneifts associated with a proposed temporary casino to a permanent casino facility. Our goal was to assess the benefits and financial interests of the State and City, as well as the slot operator.

Our analysis suggests that opening a temporary casino is likely to create less, not more, revenues for the state. Furthermore, there may be smaller than previously estimated spin-off benefits, as well as certain qualitative benefit reductions.

The next section (Section 2) of this report presents a brief legal synopsis of the issue, provided by Stephen D. Schrier, Esq., of Obermayer Rebmann Maxwell and Hippel, LLP. Section 3 outlines the construction approach and schedule required for the temporary facility-then-permanent casino, as developed by Bertino & Associates, Inc.

Section 4 presents the analysis of the potential casino performance and state revenue impacts of the two alternative scenarios.

2.0 LEGAL ANALYSIS

Timeframe for Commencement of Operations Under Statute. Section 1210 of the Pennsylvania Race Horse Development and Gaming Act, 4 Pa.C.S. §1101 et seq., authorizes Category 2 slot machine licensees to operate up to 3,000 slot machines at any one licensed facility, and requires that a minimum of 1,500 machines be made available to play within one year of the issuance of a license by the Pennsylvania Gaming Control Board. Section 1210 further provides that a slot machine licensee may obtain an extension of the one-year deadline for an additional period not to exceed 24 months, for good cause shown.

Primary Objective of Pennsylvania Gaming is to Promote Revenue Growth and Economic Expansion. The Pennsylvania Legislature expressly articulated its policy objectives in enacting the Pennsylvania Race Horse Development and Gaming Act. The Legislature's main purpose in enacting the statute is to generate revenue for property tax relief, and to enhance economic growth in the Commonwealth. Specifically, Section 1102 of the Act provides, in relevant part:

...

(2) The authorization of limited gaming by the installation and operation of slot machines as authorized in this part is intended to enhance live horse racing, breeding programs, entertainment and employment in this Commonwealth.

(3) The authorization of limited gaming is intended to provide a significant source of new revenue to the Commonwealth to support property tax relief, wage tax reduction, economic development opportunities and other similar initiatives.

...

(5) The authorization of limited gaming is intended to provide broad economic opportunities to the citizens of this Commonwealth and shall be implemented in such a manner as to prevent possible monopolization by establishing reasonable restrictions on the control of multiple licensed gaming facilities in this Commonwealth.

(6) The authorization of limited gaming is intended to enhance the further development of the tourism market throughout this Commonwealth, including, but not limited to, year-round recreational and tourism locations in this Commonwealth. ...

Timing of Commencement of Operations Secondary to Objective of Revenue Maximization. The requirement that licensees operate and make available to play 1,500 machines within one year of licensure established in Section 1210(a) suggests a preference on the part of the Legislature to expedite the realization of tax revenues from casino gaming. At the same time however, Section 1210(a) creates a procedural mechanism whereby a licensee may apply for a 2 year extension of time to satisfy the 1,500 machine requirement. The Legislature's decision to permit exceptions to the 1,500 machine requirement where appropriate can reasonably be interpreted as an acknowledgement that the advantage of accessing gaming revenue in the near term may not necessarily serve the best interests of the Commonwealth.

The notion that the immediacy of access to gaming revenue may be secondary to longer-term economic benefit is further reinforced by Section 1210(b), which provides that casino licensees must seek approval from the Board to increase the total number of slot machines being operated from 3,000 to 5,000. In evaluating such applications, Section 1210(b) provides that the Board will consider the physical characteristics of the facility and convenience of the public, but also "may take into account the potential benefit to economic development, employment and tourism, enhanced revenues to the Commonwealth and other economic indicators it deems applicable in making its decision." The process of requiring Board approval prior to casino expansion shows that the Legislature's objective of promoting economic development in the Commonwealth through gaming does not necessarily equate to a strategy of compelling the commencement of operations in the shortest possible time frame.

In light of Econsult's analysis which shows that the construction of a temporary gaming facility will result in significantly less tax revenue for the Commonwealth, the Legislature's objectives may best be served by a slot machine licensee's decision to forego a temporary facility in favor of the faster construction of a permanent casino.

3.0 CONSTRUCTION/SITE ANALYSIS

This section, provided by Bertino & Associates, Inc., presents the construction approach and schedule required for the temporary facility-then-permanent casino.

Existing buildable site area -	Approx 17 Acres
Site coverage for Phase 1 -	Approx 12 Acres
Temporary Casino Requirements:	
Casino (1500 slots)	40,000 sf
Food and Beverage	10,000 sf
Support Services	10,000 sf
Total Building	*60,000 sf*
Parking (700 spaces at 300 sf/space)	210,000 sf
Total Area required	270,000 sf (6 Acres +/-)

***Construction Approach*:**

Since the site is not of sufficient size to accommodate both the permanent casino and a temporary facility simultaneously, the temporary facility will be located on a portion of the permanent casino's footprint. This necessitates a phased construction of the permanent casino.

The Construction sequence is planned as follows:

1) Construct Temporary Facility (Metal Building) on NE corner of site (approx. 60,000 sf). Utilize the front entry area including the Porte Cochere as well as the Phase 2 Parking Garage area for parking (approx 205,000 sf).

2) Construct Phase 1A of the Permanent Casino

3) Once Phase 1A is completed, demolish the Temp Casino and complete Phase 1B of the Permanent Casino.

Anticipated time frame:

Temporary Facility

Start Construction	3/07
Complete	12/07

Permanent Casino Phase 1A (used as temp when completed)

Start Construction	5/07
Complete Construction	2/09

Permanent Casino Phase 1B

Start Construction	2/09
Complete Construction	12/09

(See diagram attached as Exhibit A.)

Ramifications to Permanent Casino construction schedule

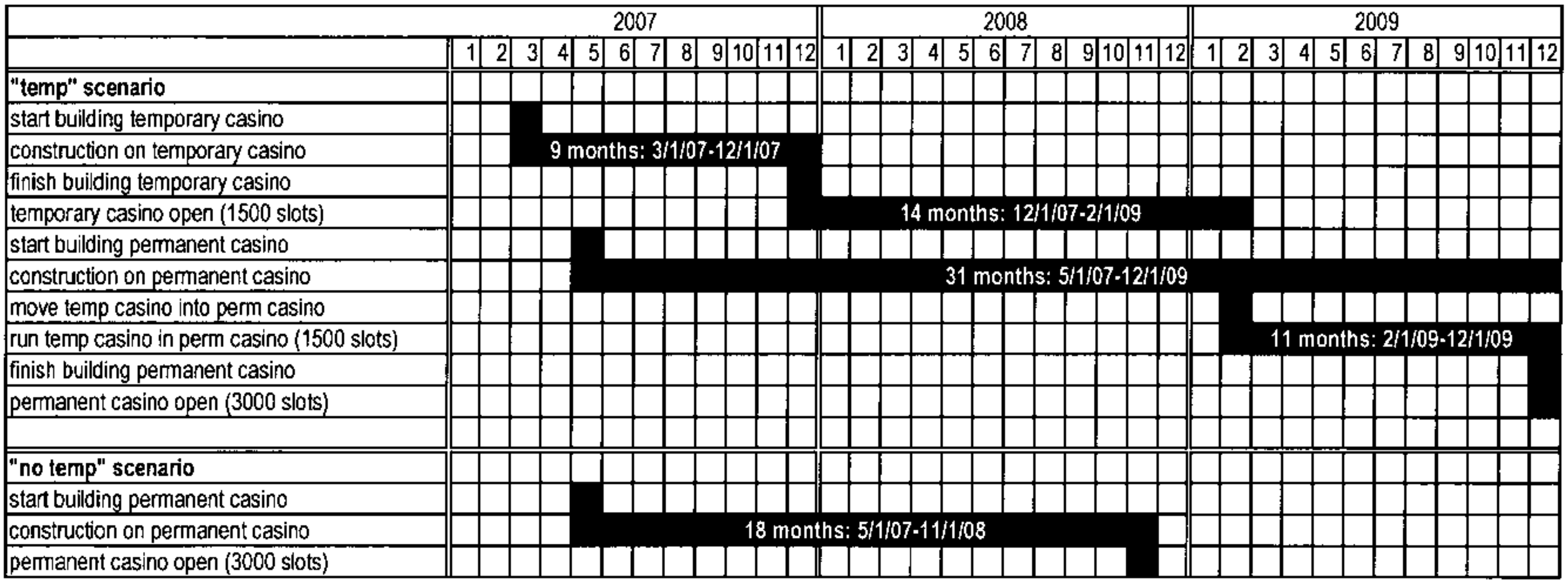
1) Construction will be more difficult working around an operating facility causing increased cost and construction duration.

2) Phasing the construction is more costly and the construction duration to complete entire building is considerably longer.

3) Access to Permanent Casino Phase 1A is from Self Park Garage only.

4) Upgrades to existing roads and intersections will take considerably longer and be much more costly with the temporary facility open.

The schedules for construction of each of the two scenarios is depicted in the time schedule graphic below:



4.0 ECONOMIC ANALYSIS

The relevant economic comparison is between a "temporary/delayed permanent casino" (TEMP) scenario versus a "permanent casino only" (NO TEMP) scenario for win revenue and state tax revenue, as examined in this section.

As noted in the construction analysis detailed in the preceding section, construction and opening a temporary facility will delay the construction and opening of the larger permanent casino. The construction of the temporary facility, expected to take 12 months, will delay the pace of construction (and hence the opening) of the permanent casino, which is otherwise expected to take 18 months to complete. Thus, the permanent casino would open 30 months out, rather than 18 months. The fundamental trade-off here is fewer slots earlier vs. more slots later, but there is also a potential dampening effect on slot machine win (performance) in a temporary facility.

In addition to the timing difference, we assume that there will be a loss in revenue if the TEMP alternative is pursued. Conservatively, we estimate that if a temporary casino is built, its daily win per slot will be 20% less than the $334/machine win anticipated in the permanent casino[1]. Meanwhile, the NO TEMP scenario that is used as a comparison retains the same financial assumption of $334 per slot per day per the established pro formas.

We estimate that by the end of 2009, the TEMP scenario would generate cumulative winnings of $324 million and state gaming tax revenues of $175 million. If the permanent casino only were built, we estimate by that date cumulative casino winnings would be $427 million and state tax revenues would be $231 million. This suggests going the TEMP route could mean a cumulative reduction in winnings of approximately $103 million and in state tax revenues of $56 million. Those estimates are illustrated in the table and graphs below.

The foregoing analysis suggests that undertaking the temporary facility scenario could actually lead to lower state revenues than if the permanent casino alone were developed, even though commencement of gaming activities would occur at a later date. We believe these findings are very conservative, because they assume no differential performance (win/slot machine) of the permanent casino whether it is developed directly or it is developed with a temporary facility. It is likely, for the same reasons noted in the analysis above, that the temporary

[1] Any reduction will be the result of fewer attendees, each spending fewer dollars at the temporary facility (relative to what they would have with a permanent casino). We consider a 20% reduction from the forecasted levels to be conservative, since the temporary facilities will lack the non-gaming amenities of the permanent casino, will have only limited parking availability, and the attendees will have to deal with a construction site.

facility would have a negative impact on the start up performance of the permanent casino.

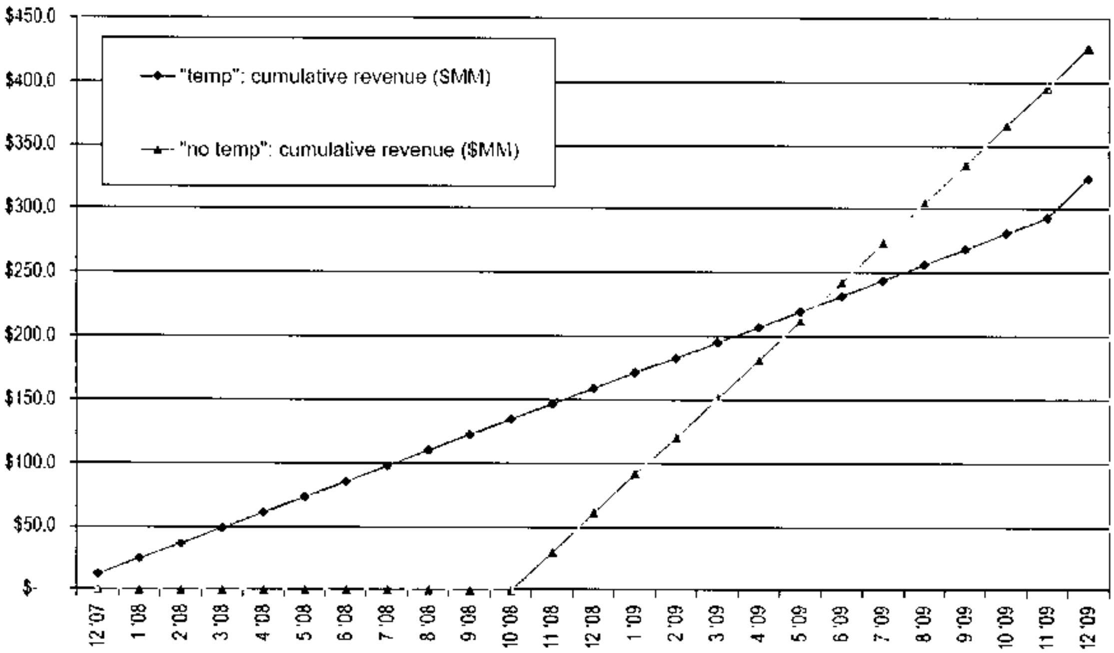
It is impossible to determine the exact magnitude of this potential negative impact, and Foxwoods Casino, Philadelphia would certainly take all measures necessary to ramp up its operations to the maximum as early as possible. Nevertheless, some initial negative impact it likely to occur. To illustrate the potential scale of this effect on the delayed permanent casino's performance, we note that if this negative effect reduces the anticipated win/slot machine by as little as 10% for the first full year of operation, the total win would be reduced by over $36 million, and the corresponding state revenues reduced by almost $20 million.

FOXWOODS TEMP VS NO TEMP CALCULATIONS

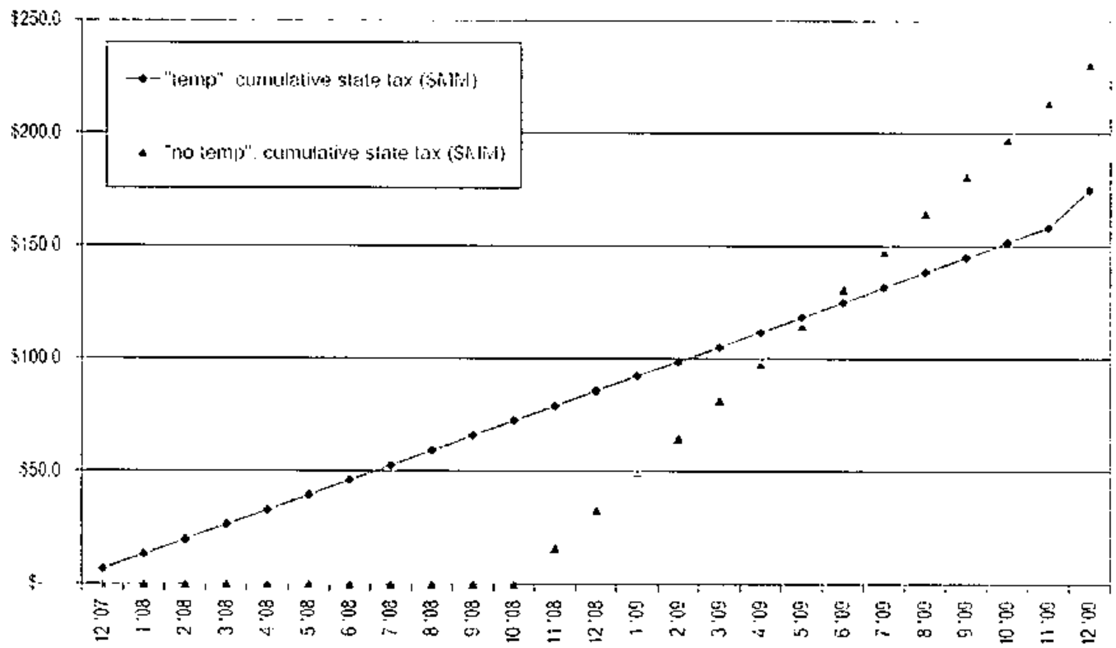
date	what's open		monthly revenue ($MM)		cumulative revenue ($MM)		monthly state tax ($MM)		cumulative state tax ($MM)		monthly revenue ($MM) "temp" minus "no temp"	cumulative revenue ($MM) "temp" minus "no temp"	monthly state tax ($MM) "temp" minus "no temp"	cumulative state tax ($MM) "temp" minus "no temp"
mo	"temp"	"no temp"	"temp"	"no temp"	"temp"	"no temp"	"temp"	"no temp"	"temp"	"no temp"				
12 '07	temp	nothing	$ 12.4	$ -	$ 12.4	$ -	$ 6.7	$ -	$ 6.7	$ -	$ 12.4	$ 12.4	$ 6.7	$ 6.7
1 '08	temp	nothing	$ 12.4	$ -	$ 24.8	$ -	$ 6.7	$ -	$ 13.4	$ -	$ 12.4	$ 24.8	$ 6.7	$ 13.4
2 '08	temp	nothing	$ 11.6	$ -	$ 36.5	$ -	$ 6.3	$ -	$ 19.7	$ -	$ 11.6	$ 36.5	$ 6.3	$ 19.7
3 '08	temp	nothing	$ 12.4	$ -	$ 48.9	$ -	$ 6.7	$ -	$ 26.4	$ -	$ 12.4	$ 48.9	$ 6.7	$ 26.4
4 '08	temp	nothing	$ 12.0	$ -	$ 60.9	$ -	$ 6.5	$ -	$ 32.9	$ -	$ 12.0	$ 60.9	$ 6.5	$ 32.9
5 '08	temp	nothing	$ 12.4	$ -	$ 73.3	$ -	$ 6.7	$ -	$ 39.6	$ -	$ 12.4	$ 73.3	$ 6.7	$ 39.6
6 '08	temp	nothing	$ 12.0	$ -	$ 85.4	$ -	$ 6.5	$ -	$ 46.1	$ -	$ 12.0	$ 85.4	$ 6.5	$ 46.1
7 '08	temp	nothing	$ 12.4	$ -	$ 97.8	$ -	$ 6.7	$ -	$ 52.8	$ -	$ 12.4	$ 97.8	$ 6.7	$ 52.8
8 '08	temp	nothing	$ 12.4	$ -	$ 110.2	$ -	$ 6.7	$ -	$ 59.5	$ -	$ 12.4	$ 110.2	$ 6.7	$ 59.5
9 '08	temp	nothing	$ 12.0	$ -	$ 122.2	$ -	$ 6.5	$ -	$ 66.0	$ -	$ 12.0	$ 122.2	$ 6.5	$ 66.0
10 '08	temp	nothing	$ 12.4	$ -	$ 134.7	$ -	$ 6.7	$ -	$ 72.7	$ -	$ 12.4	$ 134.7	$ 6.7	$ 72.7
11 '08	temp	perm	$ 12.0	$ 30.1	$ 146.7	$ 30.1	$ 6.5	$ 16.2	$ 79.2	$ 16.2	$ (18.0)	$ 116.6	$ (9.7)	$ 63.0
12 '08	temp	perm	$ 12.4	$ 31.1	$ 159.1	$ 61.1	$ 6.7	$ 16.8	$ 85.9	$ 33.0	$ (18.6)	$ 98.0	$ (10.1)	$ 52.9
1 '09	temp	perm	$ 12.4	$ 31.1	$ 171.5	$ 92.2	$ 6.7	$ 16.8	$ 92.6	$ 49.8	$ (18.6)	$ 79.4	$ (10.1)	$ 42.9
2 '09	temp	perm	$ 11.2	$ 28.1	$ 182.8	$ 120.2	$ 6.1	$ 15.2	$ 98.7	$ 64.9	$ (16.8)	$ 62.5	$ (9.1)	$ 33.8
3 '09	temp	perm	$ 12.4	$ 31.1	$ 195.2	$ 151.3	$ 6.7	$ 16.8	$ 105.4	$ 81.7	$ (18.6)	$ 43.9	$ (10.1)	$ 23.7
4 '09	temp	perm	$ 12.0	$ 30.1	$ 207.2	$ 181.4	$ 6.5	$ 16.2	$ 111.9	$ 97.9	$ (18.0)	$ 25.9	$ (9.7)	$ 14.0
5 '09	temp	perm	$ 12.4	$ 31.1	$ 219.6	$ 212.4	$ 6.7	$ 16.8	$ 118.6	$ 114.7	$ (18.6)	$ 7.2	$ (10.1)	$ 3.9
6 '09	temp	perm	$ 12.0	$ 30.1	$ 231.7	$ 242.5	$ 6.5	$ 16.2	$ 125.1	$ 130.9	$ (18.0)	$ (10.8)	$ (9.7)	$ (5.8)
7 '09	temp	perm	$ 12.4	$ 31.1	$ 244.1	$ 273.5	$ 6.7	$ 16.8	$ 131.8	$ 147.7	$ (18.6)	$ (29.5)	$ (10.1)	$ (15.9)
8 '09	temp	perm	$ 12.4	$ 31.1	$ 256.5	$ 304.6	$ 6.7	$ 16.8	$ 138.5	$ 164.5	$ (18.6)	$ (48.1)	$ (10.1)	$ (26.0)
9 '09	temp	perm	$ 12.0	$ 30.1	$ 268.5	$ 334.7	$ 6.5	$ 16.2	$ 145.0	$ 180.7	$ (18.0)	$ (66.1)	$ (9.7)	$ (35.7)
10 '09	temp	perm	$ 12.4	$ 31.1	$ 281.0	$ 365.7	$ 6.7	$ 16.8	$ 151.7	$ 197.5	$ (18.6)	$ (84.8)	$ (10.1)	$ (45.8)
11 '09	temp	perm	$ 12.0	$ 30.1	$ 293.0	$ 395.8	$ 6.5	$ 16.2	$ 158.2	$ 213.7	$ (18.0)	$ (102.8)	$ (9.7)	$ (55.5)
12 '09	perm	perm	$ 31.1	$ 31.1	$ 324.0	$ 426.9	$ 16.8	$ 16.8	$ 175.0	$ 230.5	$ -	$ (102.8)	$ -	$ (55.5)

PROJECTED LOST TAX REVENUE FOR STATE $ (55.5)

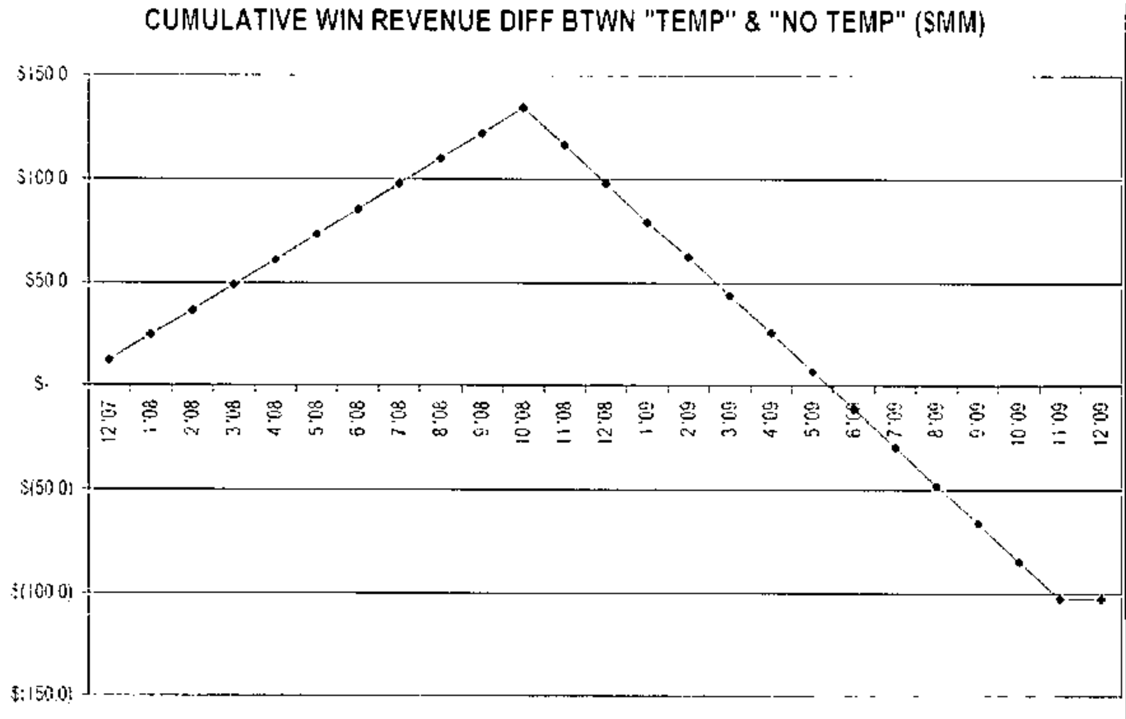
CUMULATIVE WIN REVENUE OVER 1ST 5 YEARS



CUMULATIVE STATE TAX OVER 1ST 5 YEARS



COMPARISON OF TEMPORARY FACILITY



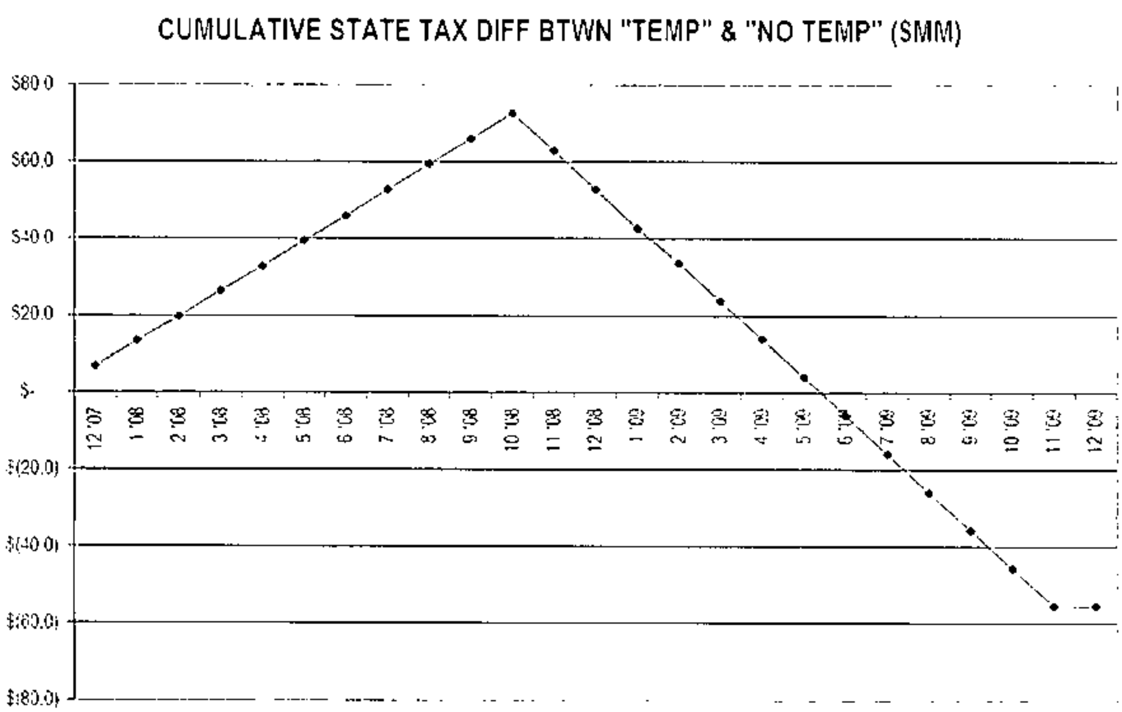
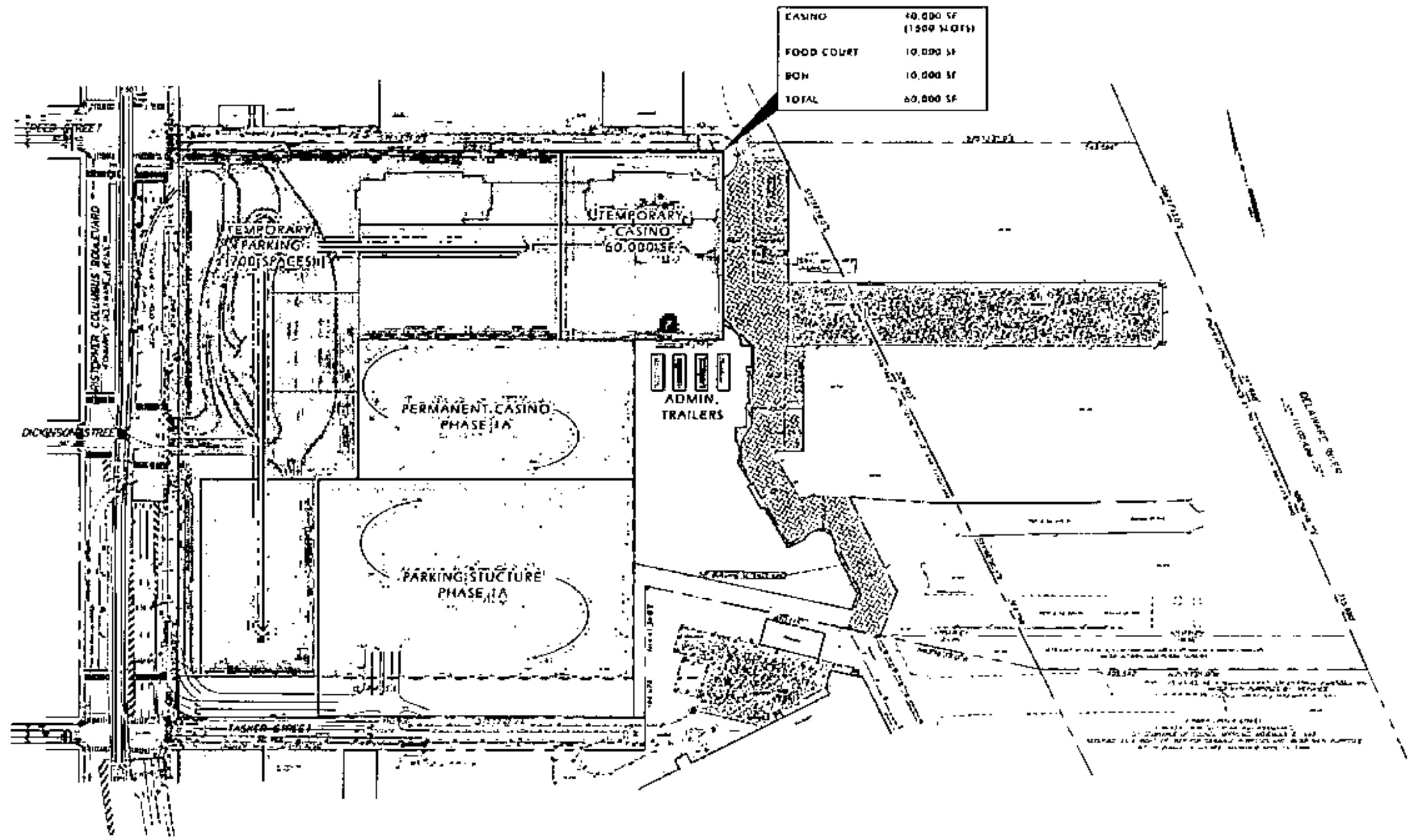


EXHIBIT A: ARCHITECTURAL RENDERING



FOXWOODS PHILADELPHIA - TEMPORARY CASINO SKETCH

OCTOBER 13, 2006

Exhibit E

CHAMBER *of* COMMERCE
EASTERN CONNECTICUT

August 30, 2006

Mr. Tad Decker
Chairman
PA Gaming Control Board
P.O. Box 69060
Harrisburg, PA 69060

Dear Mr. Decker,

Foxwoods Resort Casino opened its doors in 1992 and has become a vibrant part of our community and a good neighbor. As president and chief executive officer of the Eastern Connecticut Chamber of Commerce, one of the largest in our state, I have had an opportunity to view close up the operation of the casino and the other entities operated by the Mashantucket Pequot Tribal Nation, Foxwoods' owners. I can say without fear of contradiction that should Foxwoods Philadelphia become a reality it will carry on in the positive tradition established in Connecticut.

When Foxwoods opened in 1992, it quickly grew to become one of our largest employers, offering a competitive wage and benefit package to its employees. Its contributions to community charities have been substantial. The tribe itself also has taken steps to alleviate traffic congestion, a growing problem in our area and that of many communities. Published reports have noted that over the years, the tribe has spent nearly $30 million on road and road-related improvements near the casino. It also has a nearly $50 million highway improvement package that it will finance, pending before the state of Connecticut.

There are other things I could say about its sponsorship of charitable programs, its first-class health insurance program, its establishment of one of the premier museum and research centers devoted to Native American studies, and other aspects of its business and community life, but I will just leave you with the belief that Foxwoods Philadelphia would be a first-class entertainment complex that any city would be proud to have.

Sincerely,

Tony Sheridan
President

Cc: Gary Armentrout
1001 Craig Road, Suite 260
St. Louis, MO 63146

39 KINGS HIGHWAY • P.O. BOX 726 • GALES FERRY, CT 06335
PHONE 860.464.7373 • FAX 860.464.7374 • WWW.CHAMBERECT.COM

Exhibit F

11-15 North Second Street / Philadelphia, Pennsylvania 19106 / Tel 215-925-1198 / Fax 215-925-4058 / www.yaronproperties.com

October 4, 2006

Mr. Gary Armentrout
Chief Development Officer
Foxwood's Development Company
1001 Craig Rd. Suite 260
St. Louis, MI 63146

Dear Mr. Armentrout,

As the proprietor of Yaron Properties, Inc., the real estate management company responsible for the spearheading recent development and restoration in Philadelphia's Old City district, I am in full support of a dynamic resurgence to Philadelphia's waterfront entertainment district on Delaware Ave. As an investor in residential and commercial properties in the city, I believe Foxwoods Casino Philadelphia brings the necessary reputation and status for ultimate success in our local market.

With development projects throughout the city of Philadelphia, as well as, in New York and Florida, I have seen first-hand how strong investments by successful brands can influence the cultural and economic welfare of a community. Foxwoods Development Company is the premiere gaming operation for Philadelphia. With its vision for excellence, superior reputation in the industry, and commitment to community relations, first-rate service, and unparalleled facility structure, I warmly welcome Foxwoods Casino to the city in which proudly I work and develop.

As a real estate entrepreneur, I believe Philadelphia needs market players, such as Foxwoods Development Company, to develop and set the standards along the city's waterfront. My company, Yaron Properties, Inc., fully supports growth alongside the Delaware River and deems it a necessary step for Philadelphia's future. In building the Foxwoods Casino site on the southern end of Delaware Avenue, its presence will only bolster the development projects north of Penn's Landing, such as our Waterfront Square venture, and benefit the residents and neighbors of our real estate developments.

Through bringing their luxury, five-star resort to Philadelphia, Foxwoods Casino will channel a unique opportunity to Southern Philadelphia. With the appearance of this waterfront destination, the rebirth of Philadelphia waterfront will thrive. With great pride, I gladly share my support for Foxwoods Casino Philadelphia.

Sincerely,

Michael Yaron, Ph.D.

BATTLESHIP New Jersey

62 Battleship Place • Camden Waterfront • Camden, New Jersey 08103

October 6, 2006

Mr. Gary Armentrout
Chief Development Officer
Foxwood's Development Company
1001 Craig Road, Suite 260
St. Louis, MI 63146

We are delighted to learn of Foxwood's interest in the Delaware River Waterfront. After review of your plans we certainly believe that your presence will be a key factor in the continued development of the region and in the creation of a vibrant Waterfront community.

As President and CEO of the Battleship New Jersey Museum and Memorial we are dependent on the Waterfront experience as a whole and the growth of visitation that can create an economic impact on the varied attraction, museum, retail, restaurant and lodging institutions along the River. Foxwood's reputation for quality and customer service is well known and would be a welcome addition to the Riverfront.

When the Waterfront grows, we all grow and the time has come to create critical mass and brand the Waterfront as a premier national destination renowned for its experience, quality and fun. We look forward to welcoming you to our family in the near future.

Sincerely,

Troy M. Collins

TMC/sgv

Telephone: (856) 966-1652 x 126 * Fax: (856) 966-8228 * Email: t.collins@battleshipnewjersey.org

STEINER

October 1, 2006

Mr. Gary Armentrout
Chief Development Officer
Foxwood's Development Company
1001 Craig Rd. Suite 260
St. Louis, MI 63146

Dear Mr. Armentrout,

The Philadelphia Riverfront continues to be one of our vested development interests as we continue to move forward with Cooper's Crossing development. With the third largest excursion market being in Philadelphia, we recognize the importance and opportunity to create a premier waterfront, entertainment and heritage destination on the Delaware River.

We would welcome Foxwoods Casino Philadelphia as our waterfront neighbor. As President of Steiner + Associates, I have hopes that we can form a unique two-sided waterfront destination that provides world-class attractions and entertainment. I believe Foxwoods would bring the same quality and class to Philadelphia, as they have so successfully done in Connecticut. If Foxwoods Philadelphia becomes our waterfront neighbor it will be a first-class entertainment facility serving our community and town center in Camden. The potential for an active waterfront, with transportation on either side by water taxi's and ferries is a vision we have held for sometime.

In addition, I believe our two companies follow the same commitment to the communities in which we develop. Both Steiner and Foxwoods share the belief of creating sustainable communities with community programs and support networks that make our developments work and operate with success.

Foxwoods will change and bring economic vitality to South Philadelphia and we welcome those who share a waterfront vision that will change the face of Philadelphia's waterfront attractions.

Sincerely,

Barry Rosenberg
President

STEINER + ASSOCIATES, 4016 TOWNSFAIR WAY, SUITE 201, COLUMBUS, OHIO 43219 TEL 614.414.7300 FAX 614.414.7311 WWW.STEINER.COM

DNCA

Philadelphia's Newest Old Neighborhood

October 2, 2006

PA Gaming Control Board
PO Box 69060
Harrisburg, PA 17106-9060

Dear Commissioners:

On behalf of the Dickinson Narrows Civic Association, Inc., the neighborhood advisory council servicing the area of South Philadelphia from Washington Avenue to Mifflin Street and S. 4th Street to S. 6th Street, four blocks due west of I-95 and the Delaware River immediate to Foxwoods' proposed project at Columbus Boulevard and Dickinson Street, the Board of Directors would like to express its belief that Foxwoods Group is best capable of creating the kind of economic impact that this location has been missing for decades.

Unlike some other civic groups that have been petitioning the state recently, we have been actively listening to our neighbors on the matter. While many of us are aware that any project of this scale will create traffic growth, most feel that the opportunity for lasting employment that will provide a living wage is of tremendous value to all South Philadelphians - particularly those citizens from our neighborhood who have been closed out of the traditional trades jobs or are new arrivals to the USA. Here too, it is important to note that entertainment and hospitality companies have often been leaders in cultivating and maintaining a diverse workforce, unlike some trades that have done little to extend employment opportunities beyond their respective unions. Were the land in question designated solely as housing, the best hope for job growth would end at the short term with the construction guilds. These guilds find it hard to demonstrate that their restrictive memberships reflect the full demographics of our area or the city.

On May 8, 2006, Foxwoods Group met with our neighbors at our general community meeting and presented its vision for the 16 acre site in South Philadelphia. They also presented a detailed proposal of what might be done to alleviate traffic congestion as a result of the growth in vehicular activity. In fairness to the primary concerns of some, the prospect of more traffic, despite the plans to address it, will impact on the community at large. Some that hold this sentiment seem to want the city to become a suburban oasis. The truth is that we chose to reside in the 5th largest city in the nation, and that brings with it the realities of urban living, including traffic.

We wish Foxwoods Group success in its bid to create a valuable entertainment complex that will enliven our precious waterfront - one that will be an exhilarating resource for locals and visitors alike. Should testimony be needed, please let us know.

Sincerely,

Kirk Brown
Incorporator/President Pro Tempore
Dickinson Narrows Civic Association, Inc.

Dickinson Narrows Civic Association, Inc. 1505 South 5th Street, Philadelphia, Pennsylvania 19147
Tel 215.389.2800 Fax 215.551.6332

Camden Riversharks Baseball Club
Campbell's Field
401 N. Delaware Avenue
Camden, NJ 08102

Phone: 856.963.2600
FAX: 856.963.8534
Web: www.riversharks.com

October 11, 2006

Mr. Gary Armentrout
Chief Development Officer
Foxwoods Development Company
1001 Craig Rd., Suite 260
St. Louis, MI 63146

Dear Mr. Armentrout,

The Camden Riversharks Baseball Club and Campbell's Field are located on the Camden Waterfront just under the base of the Ben Franklin Bridge. The Riversharks pride themselves on providing a high caliber of baseball along with affordable family entertainment, serving both the South Jersey and Philadelphia area.

The Riversharks are credited as the cornerstone of Waterfront economic revitalization, along with our neighbors the Adventure Aquarium, Tweeter Center and the Battleship New Jersey. Foxwoods Casino Philadelphia would be welcomed as a neighbor across the river. As the General Manager of the Riversharks, I would hope we can build a partnership between ourselves similar to the ones already formed with our waterfront neighbors.

I believe our two companies follow the same commitment to developing the communities in which they operate in. As exhibited in your Connecticut property, Foxwoods will help boost economic development and employment opportunities in the entire area, providing jobs for both manual laborers during the construction process, all the way to card dealers working at casino tables. I gladly share my support for Foxwoods Casino Philadelphia.

Sincerely,

Adam Lorber
General Manager
Camden Riversharks

Campbell's Field

THE ANNUNCIATION OF OYUR BLESSED VIRGIN MARY ELEMENTARY SCHOOL
1150 WHARTON STREET, PHILADELPHIA, PA 19147 215-465-1416

OCTOBER 3, 2006

Mr. Gary Armentrout
C/O
Foxwoods Development Company
110 Pequot Trail
P.O. box 3130
Mashantucket, CT 06338

Dear Mr. Armentrout,

Allow me to introduce myself. My name is Fr. Gary Pacitti. I am in my fourth year as the Pastor of the ABVM Parish Community, which is located in the heart of South Philadelphia and just six minutes by car from the Foxwoods Philadelphia site.

In the short time that I have been a Pastor, I can tell you that a community such as South Philadelphia has a number of critical unmet needs. I would categorize as the most important and crucial needs as the following:

1-The need for family sustaining jobs

2-The need for more substantial funding of quality programs for children and youth

3-The need to provide quality and realistic services to our most vulnerable population: the Homebound, Frail, and Shut-in seniors

4-The tremendous need to transform the Philadelphia Waterfront from a fifty year empty wasteland to the thriving symbol of the rebirth of South Philadelphia, and the greatest city in the U.S. Philadelphia, PA

Mr. Armentrout, I support the proposed Foxwoods Philadelphia Initiative because it is my belief that Foxwoods can and will do the following:

A-Provide over a number of years those family sustaining jibs that will allow Consumers to Escape real poverty and empower themselves to become productive, energetic and Contributing citizens

B-As a Pastor, I have had the misfortune of president over the funerals of too many of our Most precious resource, our kids and youth. I believe that the incredible charitable Commitment of forty-two percent by Foxwoods to programs for the young is and will be a Tremendous step in reducing the violent crime that has plagued our people for too long

C-As A Pastor, I have had the honor to visit too many of our Senior Citizens who, for Whatever reasons, have not received any concrete, solid and much needed services for as

Long as fifteen years. These are Seniors who are Homebound, Shut-in, and frail. I firmly believe that the Foxwoods commitment to South Philadelphia can help these very special People who have committed a tremendous part of their lives to building the South Philadelphia Community.

D-As a Philadelphian and someone who brings a number of visitors to Philadelphia each year, I can tell you that I am ashamed and appalled with the condition of the Philadelphia Waterfront, especially in South Philadelphia. I firmly believe that the Foxwoods Philadelphia Complex will only improve the area, the environment, etc.

Mr. Armentrout, if you would like to speak further, please feel free to contact me at 215-837-7732. Thank you for your time and consideration in the most important Philadelphia 837-7733. issue in many years.

Respectfully,

Fr. Gary Pacitti

Fr. Gary Pacitti,
Pastor-ABVM Parish Community

September 20, 2006

Mr. Gary Armentrout
110 Pequot Trail
P. O. Box 3130

Dear Mr. Armentrout:

I am a long time resident of South Philadelphia and wanted to write this letter to let you know that I am in favor of Foxwoods building a casino on the Philadelphia waterfront.

I believe this venture will bring a much-needed boost to our City's economy. The influx of new jobs and tourism will help to bring our City to a new level. I, personally, would be interested in looking at one of the new proposed condos at this waterfront location for possible purchase.

I wish you luck in this new endeavor.

Sincerely,

AnnaMarie Rossi

AnnaMarie Rossi

2340 South Rosewood Street
Philadelphia, Pennsylvania 19145

October 3, 2006

Mr. Gary Armentrout
C/O
Foxwoods Development Company
110 Pequot Trail
P.O. Box 3130
Mashantucket, CT 06338

Dear Mr. Armentrout,

Allow me to introduce myself. My name is Nick Di Febbo. I was born and raised seven blocks from the Foxwoods site . I am a lifelong resident of South Philadelphia. I am one Hundred percent in support of Foxwoods Philadelphia for the following reasons:

1-South Philadelphia never progresses, Philadelphia is always behind the times. I am so disgusted with Philadelphia never really receiving the help that it needs.

2-We need real jobs down here on South Philadelphia. Too many people here have no jobs! No jobs or fewer jobs equal a lot of crime

3-We need millions of dollars pumped into our local community to spur job growth, real development, etc.

4-The Philadelphia Waterfront is a disaster! Politicians, developers have just given that area lip service for about forty-five years

5-Critics of Foxwoods say the casino will bring crime; we are the murder capital of the U.S.

6-Critics say the casino will bring prostitution. Have they seen the park located on 4th and Tasker?

7-Critics say the casino will bring drugs. Give me a break! My point is, all of the negatives just mentioned do and have been going on for many, many years, without a casino.

8- Philadelphia, with the exception of the Avenue of the Arts, has no other entertainment going on

Mr. Armentrout, Foxwoods has a lot more support in South Philadelphia. Foxwoods is going to be the anchor to one of the great comebacks, South Philadelphia. Thank you!

Sincerely,

Nick Di Febbo

Nick Di Febbo

FLORENCE GIORGIO
2407 South Garnet Street
Philadelphia, Pa. 19145

September 28, 2006

Dear Mr. Armentrout,

Allow me to introduce myself, My name is Florence Giorgio. My family and I are longtime residence of South Philadelphia. I am writing this letter to you to let you know that my family and I fully support the idea to put Fox wood Hotel and Casino resort in our City. There defiantly will be some glitches but overall we believe that it will be a positive thing for our community. We believe it will create many jobs for our community. Both for upcoming businesses and existing businesses. We talk about high crime rate in Philadelphia, well maybe if we put all this unemployed people to work and give them some self esteem that would cut down some of our problems. Also look at all the People from our city that take the bus tours to Atlantic City Casinos, now they will be able to enjoy these pleasures in their own back yard.

Sincerely,

Lois Bartella
1119 Linn Street
Philadelphia, PA 19147

Mr. Gary Armentrout
Foxwoods Development Coordinator
110 Pequot Trail
P.O. Box 3130

September 21, 2006

Dear Mr. Armentrout,

I am writing to you with regards to the proposed establishment of a Foxwoods Casino on Columbus Blvd. in Philadelphia.

I have been a resident of South Philadelphia for over fifty years, and I along with my family and friends am very excited at the opportunity to have a casino in our neighborhood.

I live in a community with many talented and hard working people who look forward to the opportunity of obtaining quality jobs at Foxwoods. Needless to say we all look forward to the fine entertainment and dining experiences that we know Foxwoods will bring to our community. In addition, the prospect of having a grand complex on Columbus Blvd. at Reed Street is most inviting to all of us who currently have a huge expanse of vacant land that is inundated with trash and weeds. How pleasant it will be too have a riverfront property that will assuredly be pleasing to all who visit our fine city.

Hoping to see construction on our riverfront begin soon. Please note that my mother of "91" years also welcomes the news that she will be able to hit the slots and enjoy great entertainment at a spectacular venue in her neighborhood.

Respectfully,

Lois Bartella

Lois Bartella

PHILADELPHIA CONSUMER COUNCIL

Established 1982

P.O. BOX 2547
10th & Dickinson Street
Philadelphia, PA. 19147
Phone 267-269 4046

AL BOCCELLA
Executive Director

10/10/2006

Having spent over 35 years in Consumer services, I have been able to form many imperative opinions concerning my observations on this vital service. One important correlation that is constant in both my government and non/profit experience, and that is that there exists a root cause that besets many consumers.

After resolving a single consumer problem, in many cases, there is a repetitiveness where other problems will ultimately be brought to my attention by the same individual. After careful observation of these repeat problems it is obvious to me that the main problem is financial. Unemployed, underemployed are at the base of these many consumer problems and only a long range cure can be the ultimate solution.

With this premise in mind it is only natural that I can support the coming of the Foxwood Casino to my service delivery area in South Philadelphia and the increase that they will provide in the area workforce by offering hundreds of jobs.

I strongly support Foxwood Casino for the job opportunities they will offer, the generous support to our local and State tax base and the humanitarian support that they will provide to essential Charitable Organizations.

Sincerely,

Al Boccella

Al Boccella
Executive Director

FALL, 2006

LETTER TO: Mr. Gary Armentrout
C/O
Foxwoods Development Company
110 Pequot Trail
P.O. Box 3130
Mashantucket , CT 06338

LETTER FROM: The CSEEP Collaborative
C/O
The ABVM Community School
1150 Wharton Street
Philadelphia, PA 19147

SUBJECT: Collaborative Letter of Support For Foxwoods Philadelphia

THE COMMUNITY SELF EMPOWRMENT & EMPLOYMENT PROGRAM
THE CSEEP COLLABORATIVE OF SOUTH PHILADELPHIA

FALL, 2006

Mr. Gary Armentrout
C/O
Foxwoods Development Company
110 Pequot Trail
P.O. Box 3130
Mashantucket, CT 06338

Dear Mr. Armentrout,

We, the Leadership of the CSEEP Collaborative support the proposed Foxwoods Philadelphia Complex to be developed in South Philadelphia on Columbus Boulevard Site from Tasker to Reed Streets for the following reasons:

1-The 3800 Family Sustaining jobs that Foxwoods can and will provide to South Philadelphia, the City of Philadelphia, and the Greater Philadelphia Region

2-The unprecedented commitment of forty-two percent to a Charitable Trust that will enhance and develop much needed initiatives for children and youth

3-The establishment of a Special Services District in the targeted Foxwoods areas of South Philadelphia that will provide much needed Quality of Life Services for the Residents, their families, and also jobs that will give neighborhood residents an Opportunity to be a direct part of the Foxwoods experience

4-Foxwoods will clean up and certainly improve what is a very unattractive waterfront area in South Philadelphia

5-From the beginning, it has been the opinion of the Collaborative leadership that the Foxwoods Corporation is not your typical gaming organization. It is our view that Foxwoods and their representatives truly care about South Philadelphia, its people, Families, and neighborhoods

Respectfully,

Dino L. Rossi

Dino L. Rossi-CSEEP

Reverend Edward Sparkman
Shiloh Baptist Church
South Philadelphia Baptist Association

Reverend Fr. Gary Pacitti
Annunciation of Our Blessed Virgin Mary

Reverend Fr. Nick Martarano
Saint Nicholas of Tolentine Parish

Mr. Clifton J. Williams
CORPP, Inc

Al Boccella

Mr. Al Boccella
Philadelphia Consumer Council

Mr. Vincent J. Termini
Termini Gold Medal Pastry

Mr. Vincent J. Termini
Mr. Joe's Café

Mr. Fred Hochman
PNC Bank-8th and Christian Street Branch

Mr. Dan Giorgio
Community Representative

Mr. Nick Di Febbo
Community Representative

Exhibit G

Community Outreach
Foxwoods Philadelphia

Submitted by Dave Coskey Associates
October 10, 2006

Foxwoods Philadelphia Community Outreach

Foxwoods Development Corporation, as part of their Philadelphia casino and entertainment project, has been actively involved in reaching out to the communities of South Philadelphia. Foxwoods has always prided itself on being a good neighbor. As such, it is our belief that part of being a good neighbor includes the desire to know and understand the needs and concerns of the residents who live in the area that surround our project.

We understand that, at the end of the day, philosophical differences may cause a neighbor to oppose our project. And we respect everyone's right to an opinion and to disagree. We believe however, that through our meetings, we have been able to clear up any misunderstandings or misconceptions that may exist regarding our project. Thus allowing neighbors to form their opinions on fact.

Our meetings were diverse in nature – they were anything from a formal community meeting in an auditorium - to gatherings on front stoops on a warm summer evening with a handful of neighbors – to breakfast at IHOP on Snyder Avenue on Mothers Day. The size of the group didn't matter. What did matter was the opportunity to better help our neighbors understand the facts about our plans and for Foxwoods to have an even greater appreciation for their concerns.

As we began to meet and speak with our neighbors, although concerns were varied, we found the following concerns to be the most consistent:

- Increased traffic congestion
- Increased neighborhood crime
- Decreased property values
- Adverse effect on area businesses

In many instances, Foxwoods anticipated neighborhood concerns and addressed them in our planning. For example, the number one concern in the area is the increased traffic flow along Columbus Blvd. That's why Foxwoods charged Orth-Rogers with finding a way to make traffic flow *better* along Columbus Blvd. than it is today. We also arranged for our traffic engineer to personally meet with any group interested in hearing a more detailed explanation of the mitigation plan.

As it relates to crime, we pointed out that the City's advisory task force on gaming found no correlation between legalized gaming and any increase in crime rates. As it pertains to the value of property – we commissioned Econsult, a respected Philadelphia area firm to study what effect, if any, that gaming has on property values. We plan to submit their findings to the PGCB.

We've heard from many residents that that they appreciated the frank and honest approach that we took in our meetings – and the fact that we were willing to listen to their concerns.

Historically, Foxwoods has a track record of mitigating traffic concerns in and around their Connecticut facility – Tony Sheridan, president of the Eastern Connecticut Chamber of Commerce has called Foxwoods' efforts in traffic mitigation, "...unprecedented."

It's fair to say that when it comes to traffic mitigation – it's a shared concern by Foxwoods and its neighbors. The people who live around the proposed Foxwoods location have asked, "How do you know that your plan will work?" That's a fair question – and one that we've been asked on numerous occasions. The answer is simple: The truth is – no one knows for sure – you can't until the project is finished. But this is how sure we are that our mitigation plan will work: We're betting over $500 million in the first phase of our project that it will. Because if it doesn't – our customers will go elsewhere. And with Atlantic City 40-minutes away, Delaware less than 30 minutes – in addition to the new facilities that will be licensed in Pennsylvania – they won't put up with traffic hassles. They will go to another facility.

Foxwoods wants to be a good neighbor and make traffic conditions better for our neighbors but we also need to make it better in order to make our facility thrive. That's how much we believe in Orth-Rogers plan.

It was through these conversations with neighbors that led Foxwoods to propose a special services district for our neighborhood – similar to that employed around the stadium zone in South Philadelphia.

We heard our neighbors talk about concerns that they had about quality of life in their neighborhoods. And we realize that only the citizens can control that. So we've proposed funding a special services district where our neighbors will have control of the funding – allowing them to control the quality of life in and around their homes. Our vision is that these dollars can be spent on any number of things that will have a positive effect on the community, including but not limited to: increased security, education, and care for senior citizens.

There were questions about employment, we've held several sessions with local residents to talk with them about the types of jobs that the casino industry will bring to Philadelphia and what the expectations are for employment in the casino industry.

In most cases we tried to answer the questions asked at the time that they were posed. In all cases we took the information that was learned during these meetings back to our planners for thoughtful analysis.

Although we have extended an offer to meet with any individual, group or organization interested in learning more about our project, unfortunately, we found it necessary to decline one invitation – because of a concern that we had with the restrictions that the group placed on the meeting. Our meetings have been open and frank – although we will remain open to meet with this organization – it can only occur as all of our meetings have – open and without restrictions.. (See attached letters)

Foxwoods will continue to meet with our neighbors, listen and try to understand the concerns and problems that face the residents of South Philadelphia. We are dedicated to using this knowledge to become a vibrant and valued part of the community.

Here are some of the efforts that we have made in this area:

- Employed a full time agency entrusted to interact with community organizations and members. This agency is charged with keeping an open line of communication between FDC and our neighbors and to continue to provide them with important information pertaining to our project.

- Developed a plan of action to assure that we touch as many different segments of our community as possible in an effort to educate, while continuing to learn from our neighbors.

- Employed a full time representative who goes out on behalf of FDC to answer questions and educate the community about the Foxwoods project.

- Met with key area politicians and civic leaders in order to better understand their concerns and to ask for their assistance in identifying key community groups that should be included in our efforts.

- Established a web presence that focuses solely on the Philadelphia project and includes key development information including site designs and plans; impact studies and detailed traffic mitigation plans. This website will be used on an on-going basis as a communications vehicle to provide new and updated information, in a timely manner, to people interested in the progress of the project.

- Developed a specific area of our website where interested parties can sign-up – and then automatically be notified of any changes or significant new developments that pertain to the project.

- Extended an invitation to more than 30 community groups to meet and provide them with the most up-to-date information while listening to their concerns.

- We'll continue to provide upon demand, informational packets that include power point and video presentations pertaining to the project to anyone with an interest in learning more about the project.

- Upon request, we have met with more than 20 business owners in the South Philadelphia area to discuss how the project may impact commerce in the surrounding area.

- Upon request, we have met with numerous civic organizations. These sessions are multi-purpose: First, they are an opportunity to learn from the residents of South Philadelphia about any concerns that they may have pertaining to our project; it is also an opportunity to fully review and explain our project and plans; finally – it is the perfect forum to answer any questions that residents have about gaming in general and this project in particular. It's important to note that the funding of a special services district, which is now included in our plan, is a direct response to meeting with our neighbors – as a way that we can assist them in addressing concerns that they have regarding safety, education and an aging population base.

- Our local neighborhood meetings have been as small as five people on the front step of a house – to more than 100 people gathered in the auditorium of a school.

- Reached out to qualified organizations capable of assisting with the recruitment and training of potential employees should we be awarded a license. It is our hope that these organizations can become a key to identifying, training and eventually employing local residents.

- Educated neighbors as to the kinds of employment opportunities that will be available should Foxwoods be awarded a license – through a series of informal seminars. Met with members of the media in an effort to explain the merits of our project in greater detail – with special emphasis placed on the charitable aspect of the plan.

We met with the following Civic Groups and Business Organizations to present our traffic mitigation study, as well as cover our site plans and casino operation.
This list does not include informal meetings with smaller groups or individuals.

- Queen Village Neighbors Association
- Pennsport
- Whitman Council
- South Street/Headhouse District
- Society Hill Civic Association
- Society Hill Towers
- Annunciation B.V.M. Parish
- Saint Nicholas Parish
- Saint Charles Parish
- South Philadelphia Baptist Churches Association
- Dickinson Narrows Civic Association
- Greenwich Square/ Weccacoe Development Corporation
- Girard Estates Area Residents
- Passayunk Square Civic Association
- Broad Street West Civic Association

- Community Self Empowerment Employment (CSEEP)
- CORPP Inc.
- Sunrise Inc.
- Philadelphia Consumer Council
- United Way of Southeast PA
- Programs for Exceptional People (PEP)
- Riverfront United Alliance- (pending date for presentation)
- Philadelphia Alliance for Community Improvement-(pending date for presentation)
- South Philadelphia Business Association
- Banknorth
- PNC Bank
- Citizens Bank
- Home Depot
- Hudson United Bank

Our response to meet with a community group that we felt imposed restrictions that were prohibitive in nature. (The original letter of request is attached at the end of this document).

FOXWOODS
Development Company

October 2, 2006

Ms. Rene Goodwin, Chair
Riverfront Communities United
118 Federal Street
Philadelphia, PA 19147

Dear Ms. Goodwin,

In response to your letter dated September 25, 2006, Foxwoods remains very interested in meeting with Riverfront Communities United. In fact, we were disappointed that the meeting we had planned for September 27 did not work out for your group. We have been attempting to get together since our letter of June 29, 2006.

As you may know, we have spent the last six months actively meeting with community groups and neighbors in South Philadelphia. These groups and individuals imposed no restrictions on our meetings. We have enjoyed an open dialogue and have fully responded to the questions we have been asked on a variety of issues. Foxwoods hopes to have the same opportunity to share our plans for our casino with Riverfront Communities United, including our efforts to provide public access to the waterfront and our traffic mitigation measures, so that your members have a thorough understanding of our project.

While we continue to be more than willing to meet with Riverfront Communities United, we are unable to abide by the restrictive conditions your organization has stipulated – particularly as they attempt to limit our ability to communicate fully with the Pennsylvania Gaming Control Board.

I hope that you will reconsider imposing such conditions on meeting with Foxwoods. We look forward to identifying new dates to meet and providing information to your membership so they can make informed decisions regarding our plans for South Philadelphia.

Sincerely,

Gary D. Armentrout
Chief Development Officer

39 Norwich – Westerly Road, Mashantucket, CT 06338 860.312.4838 FAX 860.312.3329
1001 Craig Road, Suite 260, St. Louis, MO 63146 314.569.9857 FAX 314.569.9867

Mashantucket Pequot Tribal Nation

RIVERFRONT COMMUNITIES UNITED

June 16, 2006

Via Fax: 215-735-7216
Mr. Gary Armentrout
Chief Development Officer
Philadelphia Entertainment and Development Partners, L.P.
c/o KB Consultants
1830 Rittenhouse Square, Suite 1C
Philadelphia, PA 19103-5842

Dear Mr. Armentrout,

This follows up on our discussions with KB Consultants about Philadelphia Entertainment and Development Partners, L.P.'s ("Foxwoods") request to provide a presentation of its traffic study to the leadership of the Riverfront Communities United coalition ("RCU"). Last week the RCU leadership met and agreed upon a number of terms we feel are required, as follows:

1. Foxwoods acknowledges that the sole purpose of the presentation is for Foxwoods to provide information to RCU. Therefore Foxwoods agrees that neither it, nor any of its employees or agents, will communicate directly or indirectly with the press or any member of any government (including the Gaming Control Board) about either the substance of the presentation or the fact of its occurrence.

2. Foxwoods should bring no more than five (5) people and inform us of the identity of its presentation team no later than two (2) days before the presentation; upon receiving this information RCU will inform you of the identity of RCU members who will attend, which we expect will be approximately 12 people. The presentation will last no more than one hour. The presentation will occur in the union hall at 3rd and Jackson Streets, where we have a large conference room table and audio-visual equipment.

From this date forward, and so long as Foxwoods has any type of application pending with the Gaming Control Board, Foxwoods agrees that whenever it submits non-confidential material to the Gaming Control Board, Foxwoods will send a contemporaneous copy to RCU, to 118 Federal Street, Philadelphia, PA 19147.

If you agree to these terms please countersign this letter below and return it to my attention. Then we can work with KB consultants to firm up the date and time.

Very truly yours,

Rene Goodwin, Chair
Riverfront Communities United

Goodwin address:
118 Federal Street
Philadelphia, PA 19147
(Fax: 215.271.0888)

On behalf of Foxwoods, (dated)
I, Gary Armentrout, agree
to the terms of this letter.

RIVERFRONT COMMUNITIES UNITED

September 25, 2006

Via Fax: 215-735-7216
Mr. Gary Armentrout
Chief Development Officer
Philadelphia Entertainment and Development Partners, L.P.
c/o KB Consultants
1830 Rittenhouse Square, Suite 1C
Philadelphia, PA 19103-5842

Dear Mr. Armentrout,

As we continue to make arrangements to hear Foxwoods' traffic presentation we note that we did not receive Foxwoods' countersignature on our June 2006 letter setting forth the terms of our agreement to participate. Accordingly, I resubmit the 3 terms and again ask for your countersignature. Please note that item #3 contains a second sentence to accommodate the passage of time.

1. Foxwoods acknowledges that the sole purpose of the presentation is for Foxwoods to provide information to RCU. Therefore Foxwoods agrees that neither it, nor any of its employees or agents, will communicate directly or indirectly with the press or any member of any government (including the Gaming Control Board) about either the substance of the presentation or the fact of its occurrence.

2. Foxwoods should bring no more than five (5) people and inform us of the identity of its presentation team no later than two (2) days before the presentation; upon receiving this information RCU will inform you of the identity of RCU members who will attend, which we expect will be approximately 12 people. The presentation will last no more than one hour. The presentation will occur in the union hall at 3rd and Jackson Streets, where we have a large conference room table and audio-visual equipment.

3. From this date forward, and so long as Foxwoods has any type of application pending with the Gaming Control Board, Foxwoods agrees that whenever it submits non-confidential material to the Gaming Control Board, Foxwoods will send a contemporaneous copy to RCU, to 118 Federal Street, Philadelphia, PA 19147. Furthermore, if Foxwoods has submitted any non-confidential material to the Board since June 30, 2006, Foxwoods will provide RCU with a copy of such material at least 2 days prior to the traffic presentation contemplated by this letter.

Thank you for your attention to this matter.

Very truly yours,

Rene Goodwin, Chair
Riverfront Communities United

Goodwin address:
118 Federal Street
Philadelphia, PA 19147
(Fax #: 215-271-0888)

On behalf of Foxwoods, (dated)
I, Gary Armentrout, agree
to the terms of this letter.