

LOWER HILL SITE
REDEVELOPMENT MASTER PLAN
TRANSPORTATION STUDY
City of Pittsburgh, Allegheny County, Pennsylvania

FINAL REPORT



Transportation Solutions for Today and Tomorrow

Prepared for:
PITTSBURGH ARENA REAL ESTATE REDEVELOPMENT, LP
Pittsburgh, Pennsylvania

Prepared by:
TRANS ASSOCIATES ENGINEERING CONSULTANTS, INC.
Pittsburgh, Pennsylvania

September 9, 2014



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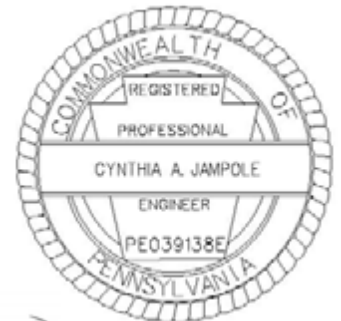
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TABLE OF CONTENTS

| | |
|--|-----------|
| 1.0 INTRODUCTION AND SUMMARY | 1 |
| 1.1 Purpose of Report and Study Objectives | 2 |
| 1.2 Executive Summary | 3 |
| 1.2.1 Site Location and Study Area | 3 |
| 1.2.2 Development Description | 5 |
| 1.2.3 Land Development Control Status | 6 |
| 1.2.4 Principal Findings and Recommendations | 6 |
| 2.0 PROPOSED DEVELOPMENT | 16 |
| 2.1 Summary of Development | 17 |
| 2.1.1 Location | 17 |
| 2.1.2 Development Plan | 17 |
| 2.2 Land Development Control Status | 18 |
| 2.2.1 Existing and Proposed Zoning | 18 |
| 2.2.2 Subdivision | 19 |
| 2.2.3 Other | 19 |
| 3.0 AREA CONDITIONS | 20 |
| 3.1 Study Area | 21 |
| 3.1.1 Area of Influence | 21 |
| 3.1.2 Area of Significant Traffic Impact | 21 |
| 3.2 Study Area Land Use | 22 |
| 3.2.1 Existing Land Use | 22 |
| 3.2.2 Anticipated Future Development | 23 |
| 3.2.3 Existing Zoning and Anticipated Changes | 23 |
| 3.2.4 Existing Travel Mode Splits | 23 |
| 3.3 Site Accessibility | 23 |
| 3.3.1 Public and Private Roadway Systems | 23 |
| 3.3.1.1 Existing Area Roadway Systems | 23 |
| 3.3.1.2 Future Area Roadway Systems | 24 |
| 3.3.2 Traffic Volumes and Conditions | 26 |
| 3.3.2.1 Data Collection | 26 |
| 3.3.2.2 Automatic Traffic Recorder Counts | 26 |
| 3.3.2.3 Peak Periods | 27 |
| 3.3.2.4 Peak Hour Traffic Volumes and Pedestrian Volumes | 27 |
| 3.3.2.5 2011 Existing Conditions – Intersection Levels of Service | 27 |
| 3.3.3 Transit Routes and Service | 28 |
| 3.3.4 Existing Relevant Transportation Systems Management (TSM) Programs | 28 |
| 3.3.5 Other Considerations | 28 |

| | |
|--|-----------|
| 3.3.5.1 Background Data | 28 |
| 3.3.5.2 Accident Data | 28 |
| 3.4 Parking Analysis | 28 |
| 3.4.1 2022 Projected Parking Demand | 29 |
| 3.4.2 Parking Control | 30 |
| 4.0 PROJECTED TRAFFIC VOLUMES AND INTERSECTION CAPACITY ANALYSIS | 31 |
| 4.1 Background Traffic (Base Traffic) | 32 |
| 4.1.1 Background Traffic Growth | 32 |
| 4.2 Year 2022 Base Conditions Traffic Volumes..... | 32 |
| 4.2.1 Design Year 2022 Base Conditions - Intersections Levels of Service..... | 32 |
| 4.3 Site-Generated Traffic | 33 |
| 4.3.1 Trip Generation..... | 33 |
| 4.3.2 Trip Arrival and Departure Distribution | 34 |
| 4.3.3 Trip Assignment – Determination of Site-Generated Traffic | 34 |
| 4.4 Combined Traffic Volumes (With Illustrative Master Plan Components) | 35 |
| 4.4.1 Year 2022 Combined Conditions Traffic Volumes (Build)..... | 35 |
| 4.4.2 2022 Combined Traffic Volumes - Intersections Levels of Service | 35 |
| 4.4.3 2022 Mitigated Combined Traffic Volumes - Intersections Levels of Service..... | 36 |
| 5.0 SUPPLEMENTARY TRAFFIC ANALYSIS | 45 |
| 5.1 Site Access | 46 |
| 5.2 Traffic Safety | 46 |
| 5.3 Traffic Signals..... | 47 |
| 5.4 Site Circulation and Parking | 47 |
| 5.4.1 Automobiles | 47 |
| 5.4.2 Loading Vehicles..... | 47 |
| 5.4.3 Emergency Vehicles | 47 |
| 5.4.4 Public Transit | 47 |
| 5.5 Sight Distance Evaluation | 47 |
| 5.6 Queuing Analysis | 47 |
| 6.0 IMPROVEMENT ANALYSIS | 49 |
| 6.1 Improvements to Accommodate Base Traffic and Site Traffic..... | 50 |
| 7.1 Site Accessibility..... | 52 |
| 7.2 Traffic Impacts..... | 52 |
| 7.3 Need for Improvements | 52 |

| | | |
|------------|--|-----------|
| 8.0 | RECOMMENDATIONS | 53 |
| 8.1 | Site Access/Circulation Plan..... | 54 |
| 8.2 | Roadway Improvements..... | 54 |
| 8.3 | Transportation Systems Management (TSM) Actions..... | 54 |
| 8.4 | Traffic Operations Plan..... | 54 |
| 8.5 | Truck Loading Management Plan..... | 54 |
| 8.6 | Construction Management Plan..... | 54 |
| 8.7 | Parking Management Plan | 54 |
| 8.8 | Event Management Plan | 55 |
| 9.0 | CONCLUSIONS | 56 |

Tables

| | |
|----------|--|
| Table 1 | Capacity Analysis Summary |
| Table 2 | Illustrative Master Plan Parking Supply and Demand Summary |
| Table 2A | Daytime Unassigned Off-Street Parking Summary |
| Table 2B | Evening and Weekend Event Off-Street Parking Summary |
| Table 2C | CONSOL Energy Center Parking Demand |
| Table 3 | Trip Generation Summary |
| Table 4 | Queue Length Summary |

Figures

| | |
|------------|--|
| Figure 1 | Site Location |
| Figure 2A | Site Plan Prepared by UDA |
| Figure 2 B | Sub Districts Diagram |
| Figure 2C | Specially Planned (SP) District |
| Figure 3 | Study Intersections |
| Figure 4 | Bus Stops and Bus Routes |
| Figure 5 | Street Plan Type |
| Figure 6A | Street Plan Type A Cross Section |
| Figure 6B | Street Plan Type B Cross Section |
| Figure 6C | Street Plan Type C Cross Section |
| Figure 6D | Street Plan Type D Cross Section |
| Figure 6E | Street Plan Type E Cross Section |
| Figure 6F | Street Plan Type F Cross Section |
| Figure 6G | Street Plan Type G Cross Section |
| Figure 7 | Centre Avenue Cross Section |
| Figure 8 | 2011 Existing AM Peak Hour Traffic Volumes and Levels of Service |
| Figure 9 | 2011 Existing PM Peak Hour Traffic Volumes and Levels of Service |
| Figure 10 | 2011 Existing Conditions Peak Hour Pedestrian Volumes |
| Figure 11 | Proposed Illustrative Master Plan Parking Locations |
| Figure 12 | Proposed On-Street Parking Locations |
| Figure 13 | 2022 Base AM Peak Hour Traffic Volumes and Levels of Service |
| Figure 14 | 2022 Base PM Peak Hour Traffic Volumes and Levels of Service |
| Figure 15 | Residential Trip Distribution Percentages |
| Figure 16 | Retail/Office/Hotel Trip Distribution Percentages |
| Figure 17 | Commuter Trip Distribution Percentages |
| Figure 18 | Site Generated AM Peak Hour Traffic Volumes |
| Figure 19 | Site Generated PM Peak Hour Traffic Volumes |
| Figure 20 | AM Peak Hour Commuter Traffic Volumes |
| Figure 21 | PM Peak Hour Commuter Traffic Volumes |
| Figure 22 | Site Generated Peak Hour Pedestrian Volumes |
| Figure 23 | 2022 Combined AM Peak Hour Traffic Volumes and Levels of Service |

| | |
|------------|--|
| Figure 24 | 2022 Combined PM Peak Hour Traffic Volumes and Levels of Service |
| Figure 25 | Off-Site Pedestrian Improvements |
| Figure 26 | 2022 Base and Combined Conditions AM Peak Hour 95 th Percentile Queue Lengths |
| Figure 27 | 2022 Base and Combined Conditions PM Peak Hour 95 th Percentile Queue Lengths |
| Figure 28 | Traffic and Pedestrian Control Improvements |
| Figure 29 | Recommended Improvements |
| Figure 30A | Centre Avenue Roadway Configuration and Recommended Improvements |
| Figure 30B | Centre and Crawford Public Improvements |
| Figure 31A | Event Management Plan (Maximum Size Event) |
| Figure 31B | Event Management Plan (Maximum Size Event) with Street 1 Closed |
| Figure 32 | Proposed Event Parking Locations (Shared Parking) |

Appendices

| | |
|------------|--|
| Appendix A | Form B and Approval Letter |
| Appendix B | Signal Plans |
| Appendix C | Turning Movement Counts and Pedestrian Counts |
| Appendix D | Level of Service Definition |
| Appendix E | 2011 Existing Condition Capacity Analysis |
| Appendix F | Parking Calculations |
| Appendix G | 2022 Base Condition Traffic Volume Development |
| Appendix H | 2022 Base Condition Capacity Analysis |
| Appendix I | Trip Generation Calculations |
| Appendix J | Pedestrian Calculations |
| Appendix K | 2022 Combined Condition Traffic Volume Development |
| Appendix L | 2022 Combined Condition Capacity Analysis |
| Appendix M | Signal Warrant Analysis |
| Appendix N | Queuing Analysis |
| Appendix O | Event Management Plans |

1.0 INTRODUCTION AND SUMMARY

1.1 Purpose of Report and Study Objectives

This report provides the results of the analysis of the traffic and parking analysis for the proposed Lower Hill Site Redevelopment Illustrative Master Plan (Illustrative Master Plan), the composition and location of which are detailed below. The study, as documented in this report, was performed in order to meet the study requirements established by the City of Pittsburgh Department of City Planning (DCP), and to provide appropriate traffic and parking mitigation measures.

The considerations studied in detail include the traffic and parking aspects of the proposed Illustrative Master Plan projects.

The study objectives were to identify impacts upon the considerations listed above, and to develop appropriate mitigation strategies as necessary. These objectives were accomplished through performance of the following tasks:

- Performance of existing (year 2011) traffic and pedestrian counts, and analysis of existing traffic conditions to identify existing problems;
- Determination of existing (year 2011) parking supply to establish existing parking supply and demand;
- Projection of future (year 2022) traffic volumes by projecting area-wide traffic growth;
- Assessment of traffic operations under 2022 base conditions (without development);
- Projection of future 2022 combined (with development) traffic volumes including all of the proposed Illustrative Master Plan development projects;
- Assessment of traffic operations under 2022 conditions (with development) and determination of mitigating actions required to address the impacts of the proposed Illustrative Master Plan development projects;
- Assessment of parking supply and demand conditions and parking allocation under 2022 future conditions with all of the proposed Illustrative Master Plan development projects in place;
- Development of a future (year 2022) parking allocation and management plan for the project;
- Completion of a transit analysis including locations of Port Authority of Allegheny County bus routes and stops; and

- Preparation of the Transportation Management Plan, including a Parking Management Plan.

The study, as documented in this report, was performed in order to determine the traffic, parking, bicycling, pedestrian, and loading impacts of the Illustrative Master Plan.

1.2 Executive Summary

An overview of the project description, principal findings resulting from the analysis, and recommended mitigation strategies is presented in this summary.

1.2.1 Site Location and Study Area

The proposed Illustrative Master Plan projects are to be located within the vicinity of the existing Lower Hill Site Redevelopment in the Central Business District (CBD) and Hill District neighborhoods of the City of Pittsburgh. Further details of the proposed new project developments are summarized in section 1.2.2 of this report.

The Lower Hill Site Redevelopment is bounded by Centre Avenue and CONSOL Energy Center and CONSOL garage to the south, Bedford Avenue to the north, Washington Place to the west, and Crawford Street to the east. The existing site currently includes the site of the former Civic Arena and approximately 2,440 parking spaces in surface lots surrounding the arena. It should be noted that subsequent to all observations and field data collection, the Civic Arena was demolished and interim parking is now available on that site. The interim parking provides approximately 862 parking spaces. Therefore the total number of available parking spaces for the entire former Civic Arena site is 3,302 spaces (2,440 + 862).

The site location of the existing Lower Hill Site Redevelopment is shown in Figure 1.

Based upon discussions with the City of Pittsburgh Department of Public Works and Department of Planning, the following intersections were selected for study:

- Washington Place and Bedford Avenue/Bigelow Boulevard/Seventh Avenue Ramp (existing signalized);
- Bedford Avenue and Mario Lemieux Place/HOV Lanes (existing signalized);
- Bedford Avenue and Crawford Street (existing signalized);
- Centre Avenue and Sixth Avenue (existing signalized);
- Centre Avenue and Washington Place/Liberty Bridge Ramp (existing signalized);
- Centre Avenue and Mario Lemieux Place (existing signalized);

- Centre Avenue and CONSOL Energy Center Parking Garage Driveway (existing unsignalized);
- Centre Avenue and Crawford Street (existing signalized);
- Crawford Street and Colwell Street (existing unsignalized);
- Fifth Avenue and Sixth Avenue (existing signalized);
- Fifth Avenue and Diamond Street (existing unsignalized);
- Fifth Avenue and Washington Place/Chatham Square (existing signalized);
- Fifth Avenue and Magee Street (existing signalized);
- Fifth Avenue and Stevenson Street (existing signalized);
- Fifth Avenue and Crawford Street (existing signalized);
- Sixth Avenue and Diamond Street (existing signalized);
- Forbes Avenue and Sixth Avenue (existing signalized);
- Forbes Avenue and Armstrong Tunnel (existing signalized);
- Forbes Avenue and Chatham Square (existing signalized);
- Forbes Avenue and Magee Street (existing signalized);
- Forbes Avenue and Stevenson Street (existing signalized);
- Forbes Avenue and Pride Street (existing signalized);
- Centre Avenue and Street 2 (proposed signalized);
- Centre Avenue and Street 3 (proposed unsignalized);
- Bedford Avenue and Street 2 (proposed unsignalized);
- Street 2 and Street 3 (proposed unsignalized);
- Street 2 and Street 4 (proposed unsignalized);
- Washington Place and Wylie Avenue (proposed unsignalized);
- Wylie Avenue and Street 1 (proposed unsignalized); and
- Wylie Avenue and Street 2 (proposed unsignalized).

The study area and study intersections are presented in Figure 3.

1.2.2 Development Description

The Illustrative Master Plan project consists of seven (7) new city blocks bounded by Centre Avenue, Bedford Avenue, Washington Place, and Crawford Street and an additional block of proposed park area bounded by Washington Place, Centre Avenue and the Crosstown Boulevard, and the CONSOL Energy Center and CONSOL garage. The proposed Illustrative Master Plan development component breakdown per block is as follows:

| Block | Development Component | | Number of Off-Street Parking Spaces | Number of On-Street Parking Spaces |
|--------------|-----------------------|-------------|-------------------------------------|------------------------------------|
| | Size | Component | | |
| A | 334 Units | Residential | 365 | 63 |
| | 13,390 s.f. | Retail | | |
| B | 224 Units | Residential | 247 | 41 |
| | 10,910 s.f. | Retail | | |
| C | 357 Units | Residential | 360 | 78 |
| D | 142 Units | Residential | 305 | 45 |
| | 42,200 s.f. | Retail | | |
| | 116,000 s.f. | Office | | |
| E | 125 Units | Residential | 480 | 39 |
| | 14,415 s.f. | Retail | | |
| | 108,370 s.f. | Office | | |
| F | 2,310 seats | Cineplex | 0 | 18 |
| | 24,350 s.f. | Retail | | |
| G | 89,836 s.f. | Retail | 700 | 31 |
| | 407,592 s.f. | Office | | |
| | 150 Room | Hotel | | |
| H | 5,000 s.f. | Retail | 0 | 0 |
| CONSOL | 18,000 seats | Arena | 500 | 0 |
| TOTAL | | | 2,957 | 315 |

The total Illustrative Master Plan will include approximately 2.5 million square feet of development. The preliminary land development plan (PLDP) indicates the density for the Specially Planned (SP) district is anticipated to range between 1.6 million to 4.4 million square feet of development. The proposed overall redevelopment for the entire site used to evaluate traffic and parking conditions for the site included the following:

- 1,192 residential units;
- 200,101 s.f. of retail;
- 691,962 s.f. of office;
- One (1) 150 room hotel;
- 2,310 seat Cineplex;
- CONSOL Energy Center;

- 2,957 off-street parking spaces; and
- 315 on-street parking spaces.

The location of each of the Illustrative Master Plan development components is presented in Figure 2A. The proposed Illustrative Master Plan sub districts are presented in Figure 2B.

1.2.3 Land Development Control Status

The Lower Hill Site is currently zoned GT-E. The site will be rezoned to a Specially Planned (SP) District in accordance with Section 909 of the Pittsburgh City Zoning Ordinance through coordination with the Department of City Planning. The proposed SP district is presented in Figure 2C.

It should be noted that the MOVEPGH project intends to recommend the creation of a transit district in Uptown. Assessment of Centre Avenue as part of the Downtown-to-Oakland work trips transit routing will be part of this assessment. If “others” bring in premium transit, then trips (modal split) could shift and a reduction in congestion could result. This better transit implemented by “others” could therefor result in increased traffic capacity as well as increased transit usage, allowing development on the Lower Hill site that would be greater than 2.5 million square feet.

1.2.4 Principal Findings and Recommendations

Parking Analysis

Parking conditions have been evaluated for the projected 2022 conditions with the Illustrative Master Plan components in place. Parking demand analysis was completed using the requirements developed as part of the SP District specifications.

Based on the Illustrative Master Plan, a total of 2,957 off-street parking spaces are to be provided. This includes 500 spaces in the CONSOL garage and 2,457 spaces on Blocks A-H of the Lower Hill site. The projected parking supply/demand comparison performed for the future 2022 conditions with the Illustrative Master Plan components indicates that at the peak period of the peak day, parking provided will be adequate to serve the needs of the proposed Illustrative Master Plan development components. Excluding the CONSOL Garage, based on the analysis, the parking supply (2,457 off-street parking spaces) is anticipated to be greater than the demand (1,884 off-street parking spaces). Therefore, an additional 355 unassigned off-street parking spaces, of the total 2,457 off-street parking spaces, are anticipated to be available site-wide (blocks A-h) during a typical weekday peak period. The unassigned 355 off-street parking spaces, of the total 2,457 off-street parking spaces, could be used by CONSOL employees or provide for development program flexibility and market conditions such as reserved spaces for office or other employees. In addition, 814 unassigned off-street parking spaces, of the total 2,457 off-street parking spaces on the site, will be available for evening and weekend events.

The on-street parking spaces will be restricted with a two (2) hour time limit during the period from 8:00 A.M. to 6:00 P.M., with payment provided via on-street parking control apparatuses. It should be noted that the hours of parking enforcement may vary based upon regulations enacted by Pittsburgh City Council. On-street parking controls will be implemented immediately after on-site streets are built. On-street parking prohibitions will occur during events. See Section 8.8.

Further details of the parking analysis are presented in Section 3.4 of this report.

Traffic Analysis

Results of the traffic analyses indicate that the following mitigation measures are required in order to minimize impacts on study intersections:

Washington Place and Bedford Avenue/Bigelow Boulevard

- Optimize signal timings.
- Install audible pedestrian pushbutton and countdown signal equipment.

Bedford Avenue and Street 1/HOV Lanes

- The Street 1 approach will be relocated as part of the development, with resultant intersection modifications.
- Construct Street 1 to provide two-lanes northbound and one-lane southbound at its intersection with Bedford Avenue. The northbound Street 1 approach should provide an exclusive left turn lane and a shared through/right turn lane. On-street parking is provided along the western side (southbound) Street 1 from Bedford Avenue to Wylie Avenue. Limited on-street parking will be provided on the southerly end of the east side of the block.
- Modify the traffic signal control.
- Install audible pedestrian pushbutton and countdown signal equipment.

Bedford Avenue and Street 2

- Construct Street 2 to provide two-lanes (one in each direction) with on-street parking on both sides from Centre Avenue to Bedford Avenue.
- The northbound Street 2 approach should provide one (1) lane for all movements onto Bedford Avenue.
- Open median on Bedford Avenue opposite Street 2.

- Install stop sign control on the northbound Street 2 approach, permitting both left and right turns onto Bedford Avenue.
- Install pedestrian crosswalks with handicap accessible ramps across the northbound Street 2 approach.

Bedford Avenue and Crawford Street

- Optimize signal timings.

Crawford Street and Wylie Avenue

- Construct an extension of Wylie Avenue from Crawford Street to Washington Place to provide two-lanes (one in either direction) with on-street parking on both sides. The eastbound Wylie Avenue approach at its intersection with Crawford should provide one (1) lane for all movements. Install stop sign control on the eastbound Wylie Avenue approach.
- Install pedestrian crosswalks with handicap accessible ramps across eastbound Wylie Avenue approach.

Centre Avenue from Washington Place to Crawford Street

- Restripe the traffic lanes on Centre Avenue to provide one outboard travel lane westbound that is 14 feet wide and will be designed as shared vehicle-bicycle lane with sharrow paint markings.
- Restripe the traffic lanes on Centre Avenue to provide one outboard travel lane eastbound that is 6 feet wide and will be designed as an exclusive bicycle lane with signage and paint markings.
- Maintain parking and loading lane on the south side of Centre Avenue from Washington Place to Crawford Street.
- Maintain parking and loading lane on the north side of Centre Avenue from Street 1 to Street 3, with parking prohibited at this location during events.

Centre Avenue and Washington Place

- Install audible pedestrian pushbutton and countdown signal equipment.
- Intersection and signal improvements to be completed as part of the City's CBD signal project.
- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue.

Centre Avenue and Street 1

- Construct relocated Street 1 to intersect with Centre Avenue. At this intersection, Street 1 should provide two (2) lanes southbound and one (1) northbound with an on-street parking lane on the eastern (northbound) side of Street 1, from Centre Avenue to Wylie Avenue. The two southbound Street 1 lanes should provide an exclusive left turn lane and an exclusive right turn lane onto Centre Avenue.
- Construct eastbound Centre Avenue approach to provide three (3) lanes (a shared left turn/through lane, an exclusive through lane, and an exclusive bicycle lane) and a drop-off loading area for event attendees along CONSOL Energy Center property frontage on the south side of Centre Avenue east of Street 1, with parking on the south side of Centre Avenue west of Street 1.
- Construct westbound Centre Avenue approach to provide two (2) lanes (an exclusive through lane and a shared vehicle-bicycle shared through/right turn lane) and an on-street parking lane.
- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue.
- Install new traffic signal.
- Optimize traffic signal timings to provide a three-phase signal, an exclusive eastbound advance phase with a southbound right turn overlap phase, an eastbound/westbound phase, and a southbound phase.
- Install audible pedestrian pushbutton and countdown signal equipment.
- Install painted crosswalks on all approaches with handicap accessible ramps.

Centre Avenue and Street 2/CONSOL Energy Center parking garage driveway

- Construct Street 2 opposite the existing CONSOL Energy Center parking garage driveway. Street 2 should provide one (1) lane shared left turn/through/right turn lane southbound with an on-street parking lane and one (1) northbound lane with an on-street parking lane.
- Construct eastbound Centre Avenue approach to provide three (3) lanes (a shared left turn/through lane, a shared through/right turn lane, and exclusive bicycle lane), and a drop-off loading area for event attendees along CONSOL Energy Center property frontage west of Street 2, with parking on the south side of Centre Avenue east of Street 2.
- Construct westbound Centre Avenue approach to provide two (2) lanes (a shared left turn/through lane and a shared vehicle-bicycle shared through/right turn lane) and an on-street parking lane.

- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue.
- Install new two-phase traffic signal.
- Install audible pedestrian pushbutton and countdown signal equipment.
- Install painted crosswalks on all approaches with handicap accessible ramps.

Centre Avenue and Street 3

- Construct Street 3 to provide two-lanes (one in each direction) with on-street parking on both sides from Centre Avenue to Street 2.
- The southbound Street 3 approach should provide an exclusive right turn lane only.
- Install stop sign control on the southbound Street 3 approach.
- Install No Left Turn signage for the southbound Street 3 approach.
- Construct a concrete median along Centre Avenue to prohibit the left turn movements into and out of Street 3.
- Construct eastbound Centre Avenue approach to provide three (3) lanes (dual through lanes and an exclusive bicycle lane) and an on-street parking and loading area,
- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue.
- Install pedestrian crosswalks with handicap accessible ramps across the southbound Street 3 approach.

Centre Avenue and Crawford Street

- Install audible pedestrian pushbutton and countdown signal equipment.
- Relocate the curb line on the south side of Centre Avenue 10 feet north to improve the alignment of Centre Avenue through lanes eastbound and westbound across Crawford Street.
- Modify the eastbound Centre Avenue approach to provide an exclusive left turn lane, a shared through/right turn lane, and an exclusive bicycle lane terminating in a bike box, in conjunction with the removal of the island on eastbound Centre Avenue at the right turn lane, and relocation of the bus shelter onto the sidewalk.
- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue

- Remove on-street parking on the west side of southbound Crawford Street to provide an exclusive left turn lane, mirrored by a northbound exclusive left turn lane on Crawford Street.
- Provide crosswalks on all approaches to the intersection.
- Upgrade the traffic signal to provide a three phase operation, adding a phase for northbound Crawford Street movements to run exclusively.

Washington Place and Wylie Avenue

- Construct Wylie Avenue extension, from Crawford Street Washington Place, to provide two-lanes (one in each direction) with on-street parking on both sides from Washington Place to Crawford Street.
- The westbound Wylie Avenue approach should provide an exclusive right turn lane only.
- Install stop sign control on the westbound Wylie Avenue approach.
- Install No Left Turn signage for the westbound Wylie Avenue approach.
- Construct a concrete median along Washington Place to prohibit left turn movements into and out of Wylie Avenue.
- Install pedestrian crosswalks with handicap accessible ramps across Wylie Avenue.

Wylie Avenue and Street 1

- Construct the eastbound and westbound Wylie Avenue approaches to provide a shared left turn/through/right turn lane with an on-street parking lane on each approach.
- Construct the northbound and southbound Street 1 approaches to provide a shared left turn/through/right turn lane with an on-street parking lane.
- Install stop sign control on all approaches. The proposed intersection will operate as a 4-way stop controlled intersection.
- Install pedestrian crosswalks with handicap accessible ramps on all approaches.

Wylie Avenue and Street 2

- Construct the eastbound and westbound Wylie Avenue approaches to provide a shared left turn/through/right turn lane with an on-street parking lane.
- Construct the northbound and southbound Street 2 approaches to provide a shared left turn/through/right turn lane with an on-street parking lane.

- Install stop sign control on all approaches. The proposed intersection will operate as a 4-way stop controlled intersection.
- Install pedestrian crosswalks with handicap accessible ramps on all approaches.

Street 2 and Street 3

- Construct the westbound Street 3 approach to provide a shared left turn/right turn lane with an on-street parking lane.
- Construct the northbound Street 2 approach to provide a shared through/right turn lane with an on-street parking lane.
- Construct the southbound Street 2 approach to provide a shared left turn/through lane with an on-street parking lane.
- Install stop sign control on the westbound Street 3 approach.
- Install pedestrian crosswalk with handicap accessible ramps on the westbound Street 3 approach.

Street 2 and Street 4

- Construct the westbound Street 4 approach to provide a shared left turn/right turn lane with an on-street parking lane.
- Construct the northbound Street 2 approach to provide a shared through/right turn lane with an on-street parking lane.
- Construct the southbound Street 2 approach to provide a shared left turn/through lane with an on-street parking lane.
- Install stop sign control on the westbound Street 4 approach.
- Install pedestrian crosswalk with handicap accessible ramps on the westbound Street 4 approach.

Fifth Avenue and Sixth Avenue

- Optimize signal timings.

Centre Avenue and Sixth Avenue

- Optimize signal timings.

Forbes Avenue and Armstrong Tunnel

- Optimize signal timings.

Sixth Avenue and Ross Street

- Signal optimization.
- Install audible pedestrian pushbutton and countdown signal equipment.
- Install pedestrian crosswalks.

Chatham Square and Bigelow Square/Bigelow Boulevard

- Signal optimization.
- Install audible pedestrian pushbutton and countdown signal equipment.
- Install pedestrian crosswalks.

It should be noted that intersections included in the CBD signal project, which will be designed and updated as part of the City's project, include the following:

- Ross Street/Sixth Street Avenue – new signal, no construction date yet;
- Chatham Square/Bigelow Square/Bigelow – new signal, no construction date yet;
- Washington Place/Centre Avenue – construction scheduled for 2014;
- Washington Place/Bedford Avenue – new signal, no construction date yet;
- Bedford Avenue/HOV Lane/Mario Lemieux Place (Street 1) – new signal, no construction date yet;
- Bedford Avenue/Crawford – new signal, no construction date yet; and
- Centre Avenue/Crawford – new signal, no construction date yet.

In addition to improvements presented, transportation conditions in this area can be significantly enhanced for several travel modes by implementation of the following measures:

- Providing public transit access by the Port Authority of Allegheny County (PAAC). Routes and stop locations will be further discussed with PAAC. Street 1 will be constructed to accommodate bus traffic between Bedford Avenue and Centre Avenue.
- Providing wide sidewalks with pedestrian crosswalks and handicap accessible ramps at all proposed new intersections.
- Provide bump outs on roadways within and surrounding the development site as indicated on Figures 28 and 29, to reduce pedestrian crossing distances and to improve visibility of pedestrians for motorists.
- Optimizing signalized intersection offsets times.

Event Management

On-street parking will be prohibited before, during, and after event as follows:

- On the east side of Street 1 between Centre Avenue and Bedford Avenue in order to provide two continuous northbound lanes exiting the area;
- On the west side of Street 1 between Bedford Avenue and Wylie Avenue in order to provide two continuous southbound lanes on Street 1
- On both sides of Street 2 between Centre Avenue and Bedford Avenue in order to provide two continuous lanes in both directions along Street 2;
- On the south side of Bedford Avenue between Street 1 and Street 2;
- On the north side of Centre Avenue between Crawford Street and Street 1; and
- On the north side of Bedford Avenue between Lemieux Street and Crawford Street.

A summary of the traffic and pedestrian control improvements are presented in Figure 28. The conceptual roadway improvements and configuration of the proposed Illustrative Master Plan site is presented in Figure 29. Detailed Centre Avenue roadway improvements are presented in Figure 30A and details improvements at the intersection of Centre Avenue with Crawford Street is presented in Figure 30B. A summary of the event management plan is presented on Figure 31A and Figure 31B.

Further details of the traffic analysis are presented in Sections 4.0 and 5.0 of this report.

Queuing Analysis

For dense urban conditions, queuing analyses are a better representation of the traffic flow rather than level of service designations. The 95th percentile queue lengths were calculated for the study intersections under the 2011 Existing, 2022 Base (without Illustrative Master Plan components), and 2022 combined (with Illustrative Master Plan components) conditions. Analyses were performed using the methodologies published in the *Highway Capacity Manual 2000*, by the Transportation Research Board using Synchro, Version 8 traffic analysis and simulation software.

Based on the results of the analysis, with the proposed mitigation measures in place, the study intersections are projected to have 95th percentile queue lengths that are similar to or better than the projected 2022 base conditions. Therefore, Trans Associates believes that with the proposed Illustrative Master Plan components and implementation of the recommended mitigation measures, there will be no significant degradation of traffic flow throughout the study area roadway network.

It should be noted that, the results of the queuing analysis indicate that the traffic generated by the proposed Illustrative Master Plan development appears to represent the maximum traffic volumes that can be accommodated within the roadway network, with mitigation measures as described in Section 4.4.3.

Further details of the queuing analysis are presented in Section 5.6 of this report.

2.0 PROPOSED DEVELOPMENT

2.1 Summary of Development

A description of the proposed Civic Arena site redevelopment Illustrative Master Plan is presented in this section.

2.1.1 Location

The proposed Illustrative Master Plan projects are to be located within the vicinity of the existing Lower Hill Site Redevelopment in the Central Business District and Hill District neighborhoods of the City of Pittsburgh. Further details of the proposed new project developments are summarized in section 2.1.2 of this report.

The Lower Hill Site Redevelopment is bounded by Centre Avenue and CONSOL Energy Center and CONSOL garage to the south, Bedford Avenue to the north, Washington Place to the west, and Crawford Street to the east. The existing site currently includes the site of the former Civic Arena and approximately 2,440 parking spaces in surface lots surrounding the arena. It should be noted that subsequent to all observations and field data collection, the Civic Arena was demolished and interim parking is now available on that site. The interim parking provides approximately 862 parking spaces. Therefore the total number of available parking spaces for the entire former Civic Arena site is 3,302 spaces (2,440 + 862).

The site location of the existing Lower Hill Site Redevelopment is shown in Figure 1.

2.1.2 Development Plan

The Illustrative Master Plan project consists of seven (7) new city blocks bounded by Centre Avenue, Bedford Avenue, Washington Place, and Crawford Street and an additional block of proposed park area bounded by Washington Place, Centre Avenue and the Crosstown Boulevard, as well as the CONSOL Energy Center and CONSOL garage. The proposed Illustrative Master Plan development component breakdown per block is as follows:

| Block | Development Component | | Number of Off-Street Parking Spaces | Number of On-Street Parking Spaces |
|-------|-----------------------|-------------|-------------------------------------|------------------------------------|
| | Size | Component | | |
| A | 334 Units | Residential | 365 | 63 |
| | 13,390 s.f. | Retail | | |
| B | 224 Units | Residential | 247 | 41 |
| | 10,910 s.f. | Retail | | |
| C | 357 Units | Residential | 360 | 78 |
| D | 142 Units | Residential | 305 | 45 |
| | 42,200 s.f. | Retail | | |
| | 116,000 s.f. | Office | | |
| E | 125 Units | Residential | 480 | 39 |
| | 14,415 s.f. | Retail | | |
| | 108,370 s.f. | Office | | |

| | | | | |
|--------------|--------------|----------|--------------|------------|
| F | 2,310 seats | Cineplex | 0 | 18 |
| | 24,350 s.f. | Retail | | |
| G | 89,836 s.f. | Retail | 700 | 31 |
| | 407,592 s.f. | Office | | |
| | 150 Room | Hotel | | |
| H | 5,000 s.f. | Retail | 0 | 0 |
| CONSOL | 18,000 seats | Arena | 500 | 0 |
| TOTAL | | | 2,957 | 315 |

The total Illustrative Master Plan will include approximately 2.5 million square feet of development. The preliminary land development plan (PLDP) indicates the density for the Specially Planned (SP) district is anticipated to range between 1.6 million to 4.4 million square feet of development. The proposed overall redevelopment for the entire site used to evaluate traffic and parking conditions for the site included the following:

- 1,192 residential units;
- 200,101 s.f. of retail;
- 691,962 s.f. of office;
- One (1) 150 room hotel;
- 2,310 seat Cineplex;
- CONSOL Energy Center;
- 2,957 off-street parking spaces; and
- 315 on-street parking spaces.

The location of each of the Illustrative Master Plan development components is presented in Figure 2A. The proposed Illustrative Master Plan sub districts are presented in Figure 2B.

It should be noted that the MOVEPGH project intends to recommend the creation of a transit district in Uptown. Assessment of Centre Avenue as part of the Downtown-to-Oakland work trips transit routing will be part of this assessment. If “others” bring in premium transit, then trips (modal split) could shift and a reduction in congestion could result. This better transit implemented by “others” could therefor result in increased traffic capacity as well as increased transit usage, allowing development on the Lower Hill site that would be greater than 2.5 million square feet.

2.2 Land Development Control Status

2.2.1 Existing and Proposed Zoning

The Lower Hill Site Redevelopment is currently zoned GT-E. The site will be rezoned to a Specially Planned (SP) District in accordance with Section 909 of the Pittsburgh City Zoning

Ordinance through coordination with the Department of City Planning. The proposed SP district is presented in Figure 2C.

2.2.2 Subdivision

No subdivision or lot consolidation is currently planned. However, at some point in the future, the entire site will likely be subdivided and/or consolidated as part of the Specially Planned District approval process.

2.2.3 Other

Not applicable.

3.0 AREA CONDITIONS

3.1 Study Area

The study area for the site has been determined based upon the area of influence and the area of significant traffic impact. The study area and study intersections have been approved by the City of Pittsburgh Department of City Planning (DCP) as part of the Scoping Form B process. The Form B and approval notice via email from the DCP are included in Appendix A to this report.

3.1.1 Area of Influence

The area of influence for the Civic Arena redevelopment site is shown in Figure 1.

3.1.2 Area of Significant Traffic Impact

The area of significant traffic impact will be on the streets immediately surrounding the development. Based upon discussions with the City of Pittsburgh Department of Public Works and Department of Planning, the following intersections were selected for study:

- Washington Place and Bedford Avenue/Bigelow Boulevard/Seventh Avenue Ramp (existing signalized);
- Bedford Avenue and Street 1/HOV Lanes (existing signalized);
- Bedford Avenue and Crawford Street (existing signalized);
- Centre Avenue and Sixth Avenue (existing signalized);
- Centre Avenue and Washington Place/Liberty Bridge Ramp (existing signalized);
- Centre Avenue and Street 1 (existing signalized);
- Centre Avenue and CONSOL Energy Center Parking Garage Driveway (existing unsignalized);
- Centre Avenue and Crawford Street (existing signalized);
- Crawford Street and Colwell Street (existing unsignalized);
- Fifth Avenue and Sixth Avenue (existing signalized);
- Fifth Avenue and Diamond Street (existing unsignalized);
- Fifth Avenue and Washington Place/Chatham Square (existing signalized);
- Fifth Avenue and Magee Street (existing signalized);

- Fifth Avenue and Stevenson Street (existing signalized);
- Fifth Avenue and Crawford Street (existing signalized);
- Sixth Avenue and Diamond Street (existing signalized);
- Forbes Avenue and Sixth Avenue (existing signalized);
- Forbes Avenue and Armstrong Tunnel (existing signalized);
- Forbes Avenue and Chatham Square (existing signalized);
- Forbes Avenue and Magee Street (existing signalized);
- Forbes Avenue and Stevenson Street (existing signalized);
- Forbes Avenue and Pride Street (existing signalized);
- Centre Avenue and Street 2 (proposed signalized);
- Centre Avenue and Street 3 (proposed signalized);
- Bedford Avenue and Street 2 (proposed unsignalized);
- Street 2 and Street 3 (proposed unsignalized);
- Street 2 and Street 4 (proposed unsignalized);
- Washington Place and Wylie Avenue (proposed unsignalized);
- Wylie Avenue and Street 1 (proposed unsignalized); and
- Wylie Avenue and Street 2 (proposed unsignalized).

The study intersections are presented in Figure 3.

3.2 Study Area Land Use

3.2.1 Existing Land Use

The existing land uses on the site include CONSOL Energy Center and CONSOL garage, with the remainder of the site formerly occupied by the Former Civic Arena and approximately 2,440 surface lot parking spaces. It should be noted that the Civic Arena was demolished and interim parking is now available on that site. The interim parking provides approximately 862 parking spaces. Therefore the total number of available parking spaces for the entire former Civic Arena site is 3,302 spaces (2,440 + 862).

3.2.2 *Anticipated Future Development*

See Section 2.1.2.

3.2.3 *Existing Zoning and Anticipated Changes*

See Section 2.2.1.

3.2.4 *Existing Travel Mode Splits*

The urban location of the site provides numerous opportunities for a variety of transportation modes. The site is well-located for pedestrian travel, as evident by the existing high level of pedestrian volumes, and for public transit use. In addition, bicycle travel is clearly evident in the area.

Port Authority of Allegheny County bus routes frequently traverse the immediate project area on Centre Avenue and Crawford Street. Existing bus routes and stop locations are presented in Figure 4.

3.3 *Site Accessibility*

3.3.1 *Public and Private Roadway Systems*

Site accessibility is greatly influenced by the roadway system adjacent to the site and within the study area. The existing roadway system, including traffic control devices, is documented in this section.

3.3.1.1 *Existing Area Roadway Systems*

The existing area roadway system is presented in Figure 1. The study area includes Fifth Avenue and Forbes Avenue, which are classified as urban principal arterial roadways; Centre Avenue and Washington Place, which are classified as urban minor arterial roadways; and Crawford Street and Bedford Avenue, which are classified as urban collector roadways. The remaining roadways are classified as local city owned streets.

The following study intersections are signalized:

- Washington Place and Bedford Avenue/Bigelow Boulevard/Seventh Avenue Ramp;
- Bedford Avenue and Mario Lemieux Place/HOV Lanes;
- Bedford Avenue and Crawford Street;
- Centre Avenue and Sixth Avenue;
- Centre Avenue and Washington Place/Liberty Bridge Ramp;

- Centre Avenue and Mario Lemieux Place;
- Centre Avenue and Crawford Street;
- Fifth Avenue and Sixth Avenue;
- Fifth Avenue and Washington Place/Chatham Square;
- Fifth Avenue and Magee Street;
- Fifth Avenue and Stevenson Street;
- Fifth Avenue and Crawford Street;
- Sixth Avenue and Diamond Street;
- Forbes Avenue and Sixth Avenue;
- Forbes Avenue and Armstrong Tunnel;
- Forbes Avenue and Chatham Square;
- Forbes Avenue and Magee Street;
- Forbes Avenue and Stevenson Street; and
- Forbes Avenue and Pride Street.

Further details of the study intersections can be obtained from the signal plans and field notes, are provided in Appendix B to this report. Copies of the signal plans were provided by the Department of Public Works.

3.3.1.2 Future Area Roadway Systems

The proposed Illustrative Master Plan project consists of incorporating seven (7) new city blocks bounded by Centre Avenue, Bedford Avenue, Washington Place, and Crawford Street, and an additional block of proposed park area bounded by Washington Place, Centre Avenue and the Crosstown Boulevard and CONSOL Energy Center and CONSOL garage.

The Illustrative Master Plan proposes to extend existing Wylie Avenue from Crawford Street to Washington Place. Wylie Avenue will provide two (2) lanes for vehicular traffic, one (1) eastbound and one (1) westbound, with on-street parking on both sides of the roadway.

Existing Mario Lemieux Place will be relocated and renamed Street 1, and extend from Bedford Avenue to Centre Avenue and will provide two (2) lanes for vehicular traffic, one (1) northbound and one (1) southbound. On-street parking is proposed along the western side of Street 1, from

Bedford Avenue to Wylie Avenue, and on the eastern side of Street 1, from Centre Avenue to Wylie Avenue. Limited on-street parking will be provided on the southerly end of the east side of the block. On-street parking will not be provided on the western side of Street 1 from Wylie Avenue to Centre Avenue in order to accommodate the proposed two (2) lane approach on Street 1 at its intersection with both Bedford Avenue and Centre Avenue.

Street 1 will intersect with Wylie Avenue to create a new four- legged intersection. The intersection will be 4-way stop controlled. In addition, the proposed intersections of Street 1 with both Bedford Avenue and Centre Avenue will be controlled by traffic signals.

Street 2 will extend from Bedford Avenue to Centre Avenue and will provide one (1) lane in each direction for vehicular traffic northbound and southbound, and on-street parking on both sides of the roadway. Street 2 will intersect with Wylie Avenue to create a new 4-way stop controlled intersection. In addition, the proposed intersection of Street 2 with Bedford Avenue will be stop controlled on the Street 2 approach, with a median in front of Street 2. The proposed intersection of Street 2 with Centre Avenue will be controlled with a traffic signal.

Street 3 will extend from Centre Avenue and connect to Street 2 and will provide two (2) lanes for vehicular traffic with on-street parking on both sides of the roadway. Street 3 will intersect with Street 2 to create a new three- legged intersection. The intersection of Street 3 with Street 2 will be stop controlled, with a stop sign on westbound Street 3. In addition, the proposed intersection of Street 3 with Centre Avenue will be controlled on the Street 3 approach, with a median on Centre Avenue in front of Street 3.

Likewise, Street 4 is a proposed cul-de-sac extending within the proposed residential block of the development, providing two (2) lanes for vehicular traffic with on-street parking on both sides of the roadway. Street 4 will intersect with Street 2 to create a new three-legged intersection. The intersection of Street 2 and Street 4 will be controlled with a stop sign on westbound Street 4.

In addition, concrete medians will be constructed along Centre Avenue from Street 1 to Crawford Street, permitting a median break at its intersection with Street 2, and along Washington Place from Bedford Avenue to Centre Avenue.

The proposed new street plan type is presented graphically on Figure 5. The anticipated cross sections of the proposed street plan types are presented on Figure 6A through Figure 6G.

The proposed street plan type for Centre Avenue is presented on Figure 7. Improvements to Centre Avenue include providing on-street loading area on the southern side of Centre Avenue, along the CONSOL Energy Center frontage. In addition, on-street parking will be provided on the northern side of Centre Avenue, between Crawford Street and Street 1. On the westbound side of Centre Avenue, the outboard travel lane will be 14 feet wide and will be designated as a shared vehicle-bicycle lane, with sharrow lane markings, from Crawford Street to Washington

Place. On the eastbound side of Centre Avenue, an exclusive bicycle lane will be provided from Washington Place to Crawford Street, with a bike box on the eastbound approach at Crawford Street.

It should be noted that the proposed future roadway names are intended names and the actual names of such roadways have not been determined by the City of Pittsburgh as of the date of the report.

3.3.2 Traffic Volumes and Conditions

Documentation of existing traffic volumes and conditions in the study area includes descriptions of the data collection effort and documentation of existing pedestrian and vehicular traffic patterns.

3.3.2.1 Data Collection

A data collection effort was previously organized and conducted by Trans Associates (TA) during July 2011. The data collection included the following items:

- Field reconnaissance of the study area, including roadway geometry, crosswalk locations, and existing traffic control;
- Acquisition of intersection as-built drawings, signal permit drawings and signal phasing and timing information from the City of Pittsburgh Department of Public Works;
- Performance of vehicle turning movement counts for the study intersections during the following peak periods:
 - Weekday AM peak period – 7:00 AM to 9:00 AM
 - Weekday PM peak period – 4:00 PM to 6:00 PM
- Performance of pedestrian counts at all study intersections;
- Identification of Port Authority bus routes and other shuttle bus routes adjacent to the site; and
- Review of a detailed development components of the proposed Illustrative Master Plan.

3.3.2.2 Automatic Traffic Recorder Counts

Not applicable.

3.3.2.3 Peak Periods

The traffic peak periods were determined to be as listed above in Section 3.3.2.1. Traffic volumes for all study intersections were compared to determine the study area peak hours within the peak periods.

3.3.2.4 Peak Hour Traffic Volumes and Pedestrian Volumes

Manual turning movement counts were performed by TA from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM during a typical weekday (Tuesday through Thursday) in July 2011. During the completion of these counts, construction and various road closures were on-going. Therefore, it was determined that various turning movement count data collected did not truly represent existing conditions. In order to accurately depict existing conditions within the study area, historical turning movement count data obtained from the already approved 6-month follow-up study and the approved CONSOL Energy Center Study were utilized in addition to the manual turning movement counts conducted in July 2011.

Summaries of the manual turning movement counts at each of the study intersections have been included in Appendix C to this report.

The 2011 existing peak hour traffic volumes for the A.M. and P.M. peak hour are presented in Figure 8 and Figure 9, respectively.

In addition, pedestrian volumes were obtained during the data collection. The results of the pedestrian counts were plotted on schematic diagrams. The existing peak hour pedestrian volumes are presented in Figure 10. Pedestrian count summaries are included in the Appendix C to this report.

3.3.2.5 2011 Existing Conditions – Intersection Levels of Service

Capacity calculations were performed for each of the existing study intersections using existing 2011 traffic volumes and conditions at the study intersections during the AM and PM peak hours using the methodologies published in the *Highway Capacity Manual 2000*, by the Transportation Research Board, 2000. This methodology determines how well an intersection, approach to an intersection, or movement at an intersection operates, and assigns to it a Level of Service (LOS) A through F, with LOS A representing the best operating conditions and LOS F, the worst. Detailed definitions of LOS have been included in Appendix D to this report.

Existing signal timings and operations were obtained from the City of Pittsburgh Department of Public Works (DPW) and were utilized in the 2011 existing conditions capacity analysis. The results of the overall intersection capacity calculations performed using existing 2011 traffic volumes and existing timings are presented in Figure 8 and Figure 9 for the AM and PM peak hours, respectively. Detailed LOS and delay for each movement, approach, and overall intersection for the A.M. and P.M. peak hour are summarized in Table 1.

Results of the 2011 existing conditions capacity analyses indicate that all overall intersections currently operate with levels of service of D or better with the following exceptions (detailed approach and movement levels of services are summarized in Table 1:

- Washington Place and Bedford Avenue – A.M. and P.M. Peak Hour
- Centre Avenue and Washington Place – A.M. and P.M. Peak Hour
- Fifth Avenue and Sixth Avenue – A.M. and P.M. Peak Hour
- Fifth Avenue and Washington Place/Chatham Square – A.M. Peak Hour
- Forbes Avenue and Armstrong Tunnel – A.M. Peak Hour
- Forbes Avenue and Chatham Square – A.M. and P.M. Peak Hour

Detailed capacity and levels of service printouts are provided in Appendix E to this report.

3.3.3 Transit Routes and Service

See Section 3.2.4.

3.3.4 Existing Relevant Transportation Systems Management (TSM) Programs

Not Applicable

3.3.5 Other Considerations

3.3.5.1 Background Data

Not Applicable.

3.3.5.2 Accident Data

Not applicable.

3.4 Parking Analysis

Parking analysis was conducted for future 2022 conditions with all the proposed Illustrative Master Plan developments in place.

The required number of spaces for each proposed Illustrative Master Plan development component has been estimated as follows:

- Residential: 1 spaces per dwelling unit
- Retail: 1 space per 500 square feet above the first 2,400 square feet

- Office: 1 space per 500 square feet above the first 2,400 square feet
- Cineplex: 1 space per 5 seats
- Hotel: 0.62 space per room

The parking demand rate for the hotel was calculated based on data provided for the Shadyside Courtyard Marriott and also approved for the One Grandview Center Hotel Study.

A reduction in the number of off-street parking spaces can be applied provided bicycle parking is incorporated within the development. The bicycle parking code indicates that the reduction in the number of off-street parking spaces shall be reduced by no more than thirty (30) percent of the total required spaces, excluding spaces for persons with disabilities. It should be noted that bicycle parking for hotels are based on the number of employees. Therefore, for this study it was assumed that the hotel could potentially have a staff of 21 to 80 employees, which would require two bicycle spaces.

Likewise, a multimodal parking reduction for the office and Cineplex development components was assumed to be 50 percent, based on the Pittsburgh Downtown Partnership Travel Mode Survey.

Parking demand for CONSOL Energy Center has been based on actual usage of the facility, with data supplied by CONSOL Energy Center.

3.4.1 2022 Projected Parking Demand

Based on the assumptions made, the proposed Illustrative Master Plan development components should provide a minimum of 1,884 parking spaces. The proposed Illustrative Master Plan is anticipated to provide 2,957 off-street parking spaces. In addition, approximately 330 on-street parking spaces will be provided within the new roadway network.

The proposed parking supply is presented graphically in Figure 11. A detailed parking supply and parking demand summary is presented in Table 2, Table 2A, Table 2B and Table 2C. Table 2 presents parking allocations for each block, as shown. Shared parking is an important concept in the site plan development. As part of the shared parking plan, 355 unassigned spaces, of the total 2,457 off-street parking spaces, will be available site-wide, and 814 spaces, of the total 2,457 off-street parking spaces (excluding the CONSOL Garage), will be available during evenings and weekends for events, as detailed in Tables 2A and 2B. The 355 unassigned spaces, of the total 2,457 off-street parking spaces, could be used by CONSOL employees or to provide for development program flexibility and market conditions such as reserved spaces for office or other employees.

Parking demand analysis calculations are provided in Appendix F to this report.

Table 2C presents a summary of CONSOL Energy Center event-related parkers, excluding non-box, non-season ticketholders. As shown, 500 parkers can be accommodated in the CONSOL garage. The remaining 1,421 parkers do not have assigned available parking once the Lower Hill property is redeveloped.

3.4.2 Parking Control

Parking conditions have been evaluated for projected 2022 conditions with the Illustrative Master Plan components in place. Off-street parking is to be controlled by parking equipment that will include magnetic card gates and parking ticketing equipment in various locations.

On-street parking will utilize parking control apparatuses. Therefore, an estimated total of approximately 32 parking apparatuses will be needed for the on-street parking spaces. The on-street parking locations are presented graphically in Figure 12.

On-street parking duration from 8:00 A.M. to 6:00 P.M. is intended to be restricted to a maximum of two (2) hours' duration. The parking equipment will be capable of adjustment to restriction periods and durations by the Parking Authority if City Council changes. It should be noted that on-street parking controls will be implemented immediately after on-site streets are built. On-street parking prohibitions will occur during events, as detailed in Section 8.8.

4.0 PROJECTED TRAFFIC VOLUMES AND INTERSECTION CAPACITY ANALYSIS

4.1 Background Traffic (Base Traffic)

4.1.1 Background Traffic Growth

An annual traffic growth factor was obtained from the Southwestern Pennsylvania Commission (SPC). According to the SPC, traffic in the Uptown/Lower Hill neighborhoods study area has a linear growth rate of 0.96% annually.

4.2 Year 2022 Base Conditions Traffic Volumes

In order to project year 2022 base traffic volumes, traffic currently utilizing the available surface parking lots at the former Civic Arena site were removed from the 2011 existing traffic volumes, resulting in the 2011 background traffic volumes. The growth rate as detailed in Section 4.1.1 was applied to the 2011 background traffic volumes to determine the 2022 background traffic volumes for the AM and PM peak hour. The resultant 2022 base (without development) traffic volumes was determined by applying the existing traffic currently utilizing the former Civic Arena surface lots to the 2022 background traffic volumes. The 2022 base (without development) traffic volumes are presented in Figure 13 and Figure 14 for the A.M. and P.M. peak hours, respectively.

Detailed 2022 base condition traffic volume development is provided to Appendix G to this report.

4.2.1 Design Year 2022 Base Conditions - Intersections Levels of Service

Using the analysis methodologies described in Section 3.3.2.5, intersection levels of service were determined at all of the study intersections under 2022 base conditions. It should be noted that the 2022 base conditions utilized existing signal timings and existing roadway conditions for this analysis. The results of the 2022 base conditions analysis are presented in Table 1 for both the A.M. and P.M. peak hour, and graphically in Figure 13 and Figure 14 for the A.M. and P.M. peak hours, respectively. It should be noted that traffic volumes related to the CONSOL garage are included in the base volumes.

Results of the 2022 base (without Illustrative Master Plan components) conditions capacity analyses indicate that all overall intersections currently operate with levels of service of D or better with following exceptions (detailed approach and movement levels of services are summarized in Table 1):

- Washington Place and Bedford Avenue/Bigelow Boulevard – A.M. and P.M. Peak Hour
- Bedford Avenue and Street 1/Ramps – P.M. Peak Hour
- Centre Avenue and Washington Place – A.M. Peak Hour

- Fifth Avenue and Sixth Avenue – A.M. and P.M. Peak Hour
- Fifth Avenue and Washington Place/Chatham Square – A.M. Peak Hour
- Forbes Avenue and Sixth Avenue – A.M. and P.M. Peak Hour
- Forbes Avenue and Armstrong Tunnels – A.M. Peak Hour
- Forbes Avenue and Washington Place/Chatham Square – A.M. and P.M. Peak Hour

Detailed capacity and levels of service printouts are provided in Appendix H to this report.

4.3 Site-Generated Traffic

4.3.1 Trip Generation

Vehicular trip generation for the proposed development was projected based upon data published by the Institute of Transportation Engineers (ITE) in their *Trip Generation*, Eighth Edition, 2008. Land Use Code 820, *Shopping Center*, was used to determine the anticipated trip generation of the proposed total 201,101 square feet of retail. Land Use Code 310, *Hotel*, was used to determine the anticipated trip generation of the proposed 150 room hotel. It should be noted that the hotel size was reduced subsequent to performance of the traffic analysis from 174 to 150 rooms. No change was made to the traffic analysis, resulting in a conservative analysis. Land Use Code 710, *General Office*, was used to determine the anticipated trip generation of the proposed total 631,962 square feet of office. Land Use Code 444, *Movie Theater with Matinee*, was used to determine the anticipated trip generation of the proposed total 2,310 seat Cineplex. Land Use Code 220, *Apartments*, was used to determine the anticipated trip generation of the proposed 1,148 residential apartment units. Land Use Code 230, *Condominium/Townhome*, was used to determine the anticipated trip generation of the proposed 44 residential townhome units.

In addition, a reduction of 50 percent was applied to the site generated trips associated with the retail, office, Cineplex, and residential (apartment and townhome) Illustrative Master Plan development components. This reduction is applied to account for trips to and from the proposed Illustrative Master Plan development that would use public transit, including the buses and T, walk or bike. The percentage was derived from the *Employee Transportation Needs Assessment* Presentation, prepared by the Pittsburgh Downtown Partnership in September 2010.

The proposed Illustrative Master Plan is anticipated to provide approximately 355 unassigned off-street parking spaces, of the total 2,457 non-CONSOL Garage off-street parking spaces. Trips generated by these spaces were conservatively modeled as unassigned commuter spaces with trips determined based on the existing commuter trips utilizing the 2,440 spaces provided at the Civic Arena. To determine the trip generation associated with commuter

parkers, commuter trip rates for the A.M. and P.M. peak hours were calculated per space and applied to the proposed 355 unassigned parking spaces available. Manual turning movement counts conducted at the existing former Civic Arena parking lot driveways are included in Appendix I to this report.

Using this methodology, the proposed Illustrative Master Plan development can be anticipated to generate a total of approximately 14,533 vehicular trips on an average weekday, with 1,093 of these trips occurring during the A.M. peak hour (718 trips entering/375 trips exiting) and 1,539 of these trips occurring during the P.M. peak hour (645 trips entering/894 trips exiting).

The total site generated trips for the proposed development are summarized in Table 3. Copies of the trip generation calculations and the breakdown of anticipated trip generation per block are included in Appendix I to this report.

4.3.2 Trip Arrival and Departure Distribution

Vehicular arrival/departure distributions were developed for the projected new trips for the proposed residential development component of the proposed Illustrative Master Plan based on existing traffic patterns on the surrounding roadway network. The resultant arrival/departure distribution for the proposed residential development is presented in Figure 15.

Vehicular arrival/departure distributions were developed for the projected new trips for the remaining development components of the proposed Illustrative Master Plan development (retail, office, hotel, and growth rates). The distribution was based on existing traffic patterns on the surrounding roadway network within the study area. The resultant arrival/departure distribution for the retail/office/hotel development is presented in Figure 16.

Vehicular arrival/departure distributions were developed for the projected new trips for the proposed unassigned (modeled as commuter) parking spaces provided. The distribution was based on existing commuter traffic patterns at the existing Civic Arena on-site parking. The resultant arrival/departure distribution for the commuter parking is presented in Figure 17.

4.3.3 Trip Assignment – Determination of Site-Generated Traffic

The projected new trips presented in Table 3 were broken down further by block and then applied to the corresponding arrival/departure distributions to produce a roadway network assignment of the site-generated trips per each development block.

New site generated trips for the Illustrative Master Plan are graphically presented in Figure 17 through Figure 21.

In addition, pedestrian trips to the proposed Illustrative Master Plan development were estimated per block. Pedestrian trips were estimated based on the total site generated trips destined to/from each block (before the aforementioned trip generation reduction was applied)

and applying an assumed auto occupancy rate per development component. The pedestrian trips were routed assuming approximately 30 percent of pedestrians would utilize transit along Centre Avenue, 50 percent of pedestrians would be destined to the CBD, and the remaining 20 percent of pedestrians were destined elsewhere south of the proposed site. The total estimated pedestrian trip generation was then rounded up to the next 25. The estimated site generated pedestrian trip for the A.M. and P.M. peak hour are presented in Figure 22.

Details of the per-block trip assignments are presented in Appendix J to this report.

4.4 Combined Traffic Volumes (With Illustrative Master Plan Components)

4.4.1 Year 2022 Combined Conditions Traffic Volumes (Build)

The 2022 combined conditions traffic volumes were determined by combining the projected new site generated trips (Figure 17 through Figure 21) with the aforementioned 2022 background traffic volumes (See Section 4.2) and rerouting existing CONSOL parking garage traffic due to the proposed configuration of the Centre Avenue and Street 2/CONSOL Garage intersection. The resultant 2022 combined conditions traffic volumes are presented in Figure 23 and Figure 24 for the A.M. and P.M. peak hour, respectively.

Detailed 2022 combined condition traffic volume development is provided to Appendix K to this report.

4.4.2 2022 Combined Traffic Volumes - Intersections Levels of Service

Using the methodologies described in Section 3.3.2.5, intersection levels of service were determined at all of the study intersections under 2022 combined conditions. It should be noted that existing signal timings and existing roadway conditions and modified roadway conditions at new intersection locations were used for analysis purposes. The results of the 2022 combined conditions analysis are presented in Table 1 for both the A.M. and P.M. peak hour.

Results of the future 2022 combined (with Illustrative Master Plan components) conditions capacity analyses (without optimized intersection signal timings and improvements) indicate that the proposed Street 2 is forecasted to operate at LOS F at its intersection with Centre Avenue when operating with as stop sign controlled.

Likewise, southbound Street 1 is forecasted to operate at LOS F at its intersection with Centre Avenue utilizing existing traffic signal timings. In addition, the intersection of Street 1 with Bedford Avenue is forecasted to operate at LOS F during the P.M. peak hour utilizing existing traffic signal timings and roadway configuration.

Detailed capacity and levels of service printouts are provided in the Technical Appendix L to this report.

4.4.3 2022 Mitigated Combined Traffic Volumes - Intersections Levels of Service

Under the 2022 combined conditions, the following mitigation measures are required in order to minimize impacts on intersection levels of service:

Traffic Analysis

Results of the traffic analyses indicate that the following mitigation measures are required in order to minimize impacts on study intersections:

Washington Place and Bedford Avenue/Bigelow Boulevard

- Optimize signal timings.
- Install audible pedestrian pushbutton and countdown signal equipment.

Bedford Avenue and Street 1/HOV Lanes

- The Street 1 approach will be relocated as part of the development, with resultant intersection modifications.
- Construct Street 1 to provide two-lanes northbound and one-lane southbound at its intersection with Bedford Avenue. The northbound Street 1 approach should provide an exclusive left turn lane and a shared through/right turn lane. On-street parking is provided along the western side (southbound) Street 1 from Bedford Avenue to Wylie Avenue. Limited on-street parking will be provided on the southerly end of the east side of the block.
- Modify the traffic signal control.
- Install audible pedestrian pushbutton and countdown signal equipment.

Bedford Avenue and Street 2

- Construct Street 2 to provide two-lanes (one in each direction) with on-street parking on both sides from Centre Avenue to Bedford Avenue.
- The northbound Street 2 approach should provide one (1) lane for all movements onto Bedford Avenue.
- Open median on Bedford Avenue opposite Street 2.
- Install stop sign control on the northbound Street 2 approach, permitting both left and right turns onto Bedford Avenue.

- Install pedestrian crosswalks with handicap accessible ramps across the northbound Street 2 approach.

Bedford Avenue and Crawford Street

- Optimize signal timings.

Crawford Street and Wylie Avenue

- Construct an extension of Wylie Avenue from Crawford Street to Washington Place to provide two-lanes (one in either direction) with on-street parking on both sides. The eastbound Wylie Avenue approach at its intersection with Crawford should provide one (1) lane for all movements. Install stop sign control on the eastbound Wylie Avenue approach.
- Install pedestrian crosswalks with handicap accessible ramps across eastbound Wylie Avenue approach.

Centre Avenue from Washington Place to Crawford Street

- Restripe the traffic lanes on Centre Avenue to provide one outboard travel lane westbound that is 14 feet wide and will be designed as shared vehicle-bicycle lane with sharrow paint markings.
- Restripe the traffic lanes on Centre Avenue to provide one outboard travel lane eastbound that is 6 feet wide and will be designed as an exclusive bicycle lane with signage and paint markings.
- Maintain parking and loading lane on the south side of Centre Avenue from Washington Place to Crawford Street.
- Maintain parking and loading lane on the north side of Centre Avenue from Street 1 to Street 3, with parking prohibited at this location during events.

Centre Avenue and Washington Place

- Install audible pedestrian pushbutton and countdown signal equipment.
- Intersection and signal improvements to be completed as part of the City's CBD signal project.
- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue.

Centre Avenue and Street 1

- Construct relocated Street 1 to intersect with Centre Avenue. At this intersection, Street 1 should provide two (2) lanes southbound and one (1) northbound with an on-street parking lane on the eastern (northbound) side of Street 1, from Centre

Avenue to Wylie Avenue. The two southbound Street 1 lanes should provide an exclusive left turn lane and an exclusive right turn lane onto Centre Avenue.

- Construct eastbound Centre Avenue approach to provide three (3) lanes (a shared left turn/through lane, an exclusive through lane, and an exclusive bicycle lane) and a drop-off loading area for event attendees along CONSOL Energy Center property frontage on the south side of Centre Avenue east of Street 1, with parking on the south side of Centre Avenue west of Street 1.
- Construct westbound Centre Avenue approach to provide two (2) lanes (an exclusive through lane and a shared vehicle-bicycle shared through/right turn lane) and an on-street parking lane.
- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue.
- Install new traffic signal.
- Optimize traffic signal timings to provide a three-phase signal, an exclusive eastbound advance phase with a southbound right turn overlap phase, an eastbound/westbound phase, and a southbound phase.
- Install audible pedestrian pushbutton and countdown signal equipment.
- Install painted crosswalks on all approaches with handicap accessible ramps.

Centre Avenue and Street 2/CONSOL Energy Center parking garage driveway

- Construct Street 2 opposite the existing CONSOL Energy Center parking garage driveway. Street 2 should provide one (1) lane shared left turn/through/right turn lane southbound with an on-street parking lane and one (1) northbound lane with an on-street parking lane.
- Construct eastbound Centre Avenue approach to provide three (3) lanes (a shared left turn/through lane, a shared through/right turn lane, and exclusive bicycle lane), and a drop-off loading area for event attendees along CONSOL Energy Center property frontage west of Street 2, with parking on the south side of Centre Avenue east of Street 2.
- Construct westbound Centre Avenue approach to provide two (2) lanes (a shared left turn/through lane and a shared vehicle-bicycle shared through/right turn lane) and an on-street parking lane.
- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue.
- Install new two-phase traffic signal.

- Install audible pedestrian pushbutton and countdown signal equipment.
- Install painted crosswalks on all approaches with handicap accessible ramps.

Centre Avenue and Street 3

- Construct Street 3 to provide two-lanes (one in each direction) with on-street parking on both sides from Centre Avenue to Street 2.
- The southbound Street 3 approach should provide an exclusive right turn lane only.
- Install stop sign control on the southbound Street 3 approach.
- Install No Left Turn signage for the southbound Street 3 approach.
- Construct a concrete median along Centre Avenue to prohibit the left turn movements into and out of Street 3.
- Construct eastbound Centre Avenue approach to provide three (3) lanes (dual through lanes and an exclusive bicycle lane) and an on-street parking and loading area,
- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue.
- Install pedestrian crosswalks with handicap accessible ramps across the southbound Street 3 approach.

Centre Avenue and Crawford Street

- Install audible pedestrian pushbutton and countdown signal equipment.
- Relocate the curb line on the south side of Centre Avenue 10 feet north to improve the alignment of Centre Avenue through lanes eastbound and westbound across Crawford Street.
- Modify the eastbound Centre Avenue approach to provide an exclusive left turn lane, a shared through/right turn lane, and an exclusive bicycle lane terminating in a bike box, in conjunction with the removal of the island on eastbound Centre Avenue at the right turn lane, and relocation of the bus shelter onto the sidewalk.
- Apply sharrow lane markings in the outboard travel lane on the north side of Centre Avenue
- Remove on-street parking on the west side of southbound Crawford Street to provide an exclusive left turn lane, mirrored by a northbound exclusive left turn lane on Crawford Street.

- Provide crosswalks on all approaches to the intersection.
- Upgrade the traffic signal to provide a three phase operation, adding a phase for northbound Crawford Street movements to run exclusively.

Washington Place and Wylie Avenue

- Construct Wylie Avenue extension, from Crawford Street Washington Place, to provide two-lanes (one in each direction) with on-street parking on both sides from Washington Place to Crawford Street.
- The westbound Wylie Avenue approach should provide an exclusive right turn lane only.
- Install stop sign control on the westbound Wylie Avenue approach.
- Install No Left Turn signage for the westbound Wylie Avenue approach.
- Construct a concrete median along Washington Place to prohibit left turn movements into and out of Wylie Avenue.
- Install pedestrian crosswalks with handicap accessible ramps across Wylie Avenue.

Wylie Avenue and Street 1

- Construct the eastbound and westbound Wylie Avenue approaches to provide a shared left turn/through/right turn lane with an on-street parking lane on each approach.
- Construct the northbound and southbound Street 1 approaches to provide a shared left turn/through/right turn lane with an on-street parking lane.
- Install stop sign control on all approaches. The proposed intersection will operate as a 4-way stop controlled intersection.
- Install pedestrian crosswalks with handicap accessible ramps on all approaches.

Wylie Avenue and Street 2

- Construct the eastbound and westbound Wylie Avenue approaches to provide a shared left turn/through/right turn lane with an on-street parking lane.
- Construct the northbound and southbound Street 2 approaches to provide a shared left turn/through/right turn lane with an on-street parking lane.
- Install stop sign control on all approaches. The proposed intersection will operate as a 4-way stop controlled intersection.

- Install pedestrian crosswalks with handicap accessible ramps on all approaches.

Street 2 and Street 3

- Construct the westbound Street 3 approach to provide a shared left turn/right turn lane with an on-street parking lane.
- Construct the northbound Street 2 approach to provide a shared through/right turn lane with an on-street parking lane.
- Construct the southbound Street 2 approach to provide a shared left turn/through lane with an on-street parking lane.
- Install stop sign control on the westbound Street 3 approach.
- Install pedestrian crosswalk with handicap accessible ramps on the westbound Street 3 approach.

Street 2 and Street 4

- Construct the westbound Street 4 approach to provide a shared left turn/right turn lane with an on-street parking lane.
- Construct the northbound Street 2 approach to provide a shared through/right turn lane with an on-street parking lane.
- Construct the southbound Street 2 approach to provide a shared left turn/through lane with an on-street parking lane.
- Install stop sign control on the westbound Street 4 approach.
- Install pedestrian crosswalk with handicap accessible ramps on the westbound Street 4 approach.

Fifth Avenue and Sixth Avenue

- Optimize signal timings.

Centre Avenue and Sixth Avenue

- Optimize signal timings.

Forbes Avenue and Armstrong Tunnel

- Optimize signal timings.

Sixth Avenue and Ross Street

- Signal optimization.
- Install audible pedestrian pushbutton and countdown signal equipment.
- Install pedestrian crosswalks.

Chatham Square and Bigelow Square/Bigelow Boulevard

- Signal optimization.
- Install audible pedestrian pushbutton and countdown signal equipment.
- Install pedestrian crosswalks.

It should be noted that intersections included in the CBD signal project, which will be designed and updated as part of the City's project, include the following:

- Ross Street/Sixth Street Avenue – new signal, no construction date yet;
- Chatham Square/Bigelow Square/Bigelow – new signal, no construction date yet;
- Washington Place/Centre Avenue – construction scheduled for 2014;
- Washington Place/Bedford Avenue – new signal, no construction date yet;
- Bedford Avenue/HOV Lane/Mario Lemieux Place (Street 1) – new signal, no construction date yet;
- Bedford Avenue/Crawford – new signal, no construction date yet; and
- Centre Avenue/Crawford – new signal, no construction date yet.

In addition to improvements presented, transportation conditions in this area can be significantly enhanced for several travel modes by implementation of the following measures:

- Providing public transit access by the Port Authority of Allegheny County (PAAC). Routes and stop locations will be further discussed with PAAC. Street 1 will be constructed to accommodate bus traffic between Bedford Avenue and Centre Avenue.
- Providing wide sidewalks with pedestrian crosswalks and handicap accessible ramps at all proposed new intersections.
- Provide bump outs on roadways within and surrounding the development site as indicated on Figures 28 and 29, to reduce pedestrian crossing distances and to improve visibility of pedestrians for motorists.
- Optimizing signalized intersection offsets times.

Event Management

On-street parking will be prohibited before, during, and after event as follows:

- On the east side of Street 1 between Centre Avenue and Bedford Avenue in order to provide two continuous northbound lanes exiting the area;
- On the west side of Street 1 between Bedford Avenue and Wylie Avenue in order to provide two continuous southbound lanes on Street 1
- On both sides of Street 2 between Centre Avenue and Bedford Avenue in order to provide two continuous lanes in both directions along Street 2;
- On the south side of Bedford Avenue between Street 1 and Street 2;
- On the north side of Centre Avenue between Crawford Street and Street 1; and
- On the north side of Bedford Avenue between Lemieux Street and Crawford Street.

A summary of the traffic and pedestrian control improvements are presented in Figure 28. The conceptual roadway improvements and configuration of the proposed Illustrative Master Plan site is presented in Figure 29. Detailed Centre Avenue roadway improvements are presented in Figure 30A and details improvements at the intersection of Centre Avenue with Crawford Street is presented in Figure 30B. A summary of the event management plan is presented on Figure 31A and Figure 31B.

With the implementation of the improvements listed above, the following intersections are forecasted to continue to operate at failure (LOS E or LOS F) with the proposed development, as they do under future base (without development) conditions:

- Washington Place and Bedford Avenue – A.M. and P.M. Peak Hour
- Centre Avenue and Washington Place – A.M. Peak Hour
- Fifth Avenue and Sixth Avenue – A.M. and P.M. Peak Hour
- Fifth Avenue and Washington Place/Chatham Square – A.M. Peak Hour
- Forbes Avenue and Sixth Avenue – A.M. and P.M. Peak Hour
- Forbes Avenue and Armstrong Tunnels – A.M. Peak Hour
- Forbes Avenue and Washington Place/McAnulty Drive – A.M. Peak Hour

The following intersections are forecasted to decrease level of service and operate at failure (LOS E or LOS F) with the proposed development:

- Centre Avenue and Washington Place – P.M. Peak Hour
- Centre Avenue and Crawford Street – P.M. Peak Hour
- Forbes Avenue and Armstrong Tunnels – P.M. Peak Hour

It should be noted that in a congested urban location, such as the project area, intersection function is better evaluated through queuing conditions, as discussed in Section 5.6.

Detailed capacity and levels of service printouts are provided in Appendix L to this report.

5.0 SUPPLEMENTARY TRAFFIC ANALYSIS

5.1 Site Access

Access to the off-street parking areas will be provided via driveways within the proposed development.

5.2 Traffic Safety

Traffic safety conditions within the study area will be maintained through additional traffic controls, as necessary. Stop signs should be placed on the minor approaches of the new, unsignalized intersections of Street 2/Bedford Avenue, Street 2/Street 4, Street 2/Street 3, Wylie Avenue/Crawford Street, Street 3/Centre Avenue, and Wylie Avenue/Washington Place.

The proposed new parking facility access driveways will be designed in such a manner as to meet the sight distance requirements of PennDOT/City of Pittsburgh. Landscape and streetscape elements will not interfere with required sight distances. In addition, pedestrian push button and audible countdown crossing equipment will be provided at the following intersections:

- Centre Avenue and Street 1
- Centre Avenue and Street 2/CONSOL Garage Driveway
- Centre Avenue and Crawford Street
- Centre Avenue and Washington Place (to be provided by CBD Signal Project)
- Washington Place and Bedford Avenue

Pedestrian amenities such as bulb outs, wide crosswalks, and lighting will be constructed.

In addition, safety conditions will be improved off-site to include audible pedestrian push button and countdown signal equipment and installation of cross walks at the following intersections:

- Sixth Avenue and Ross Street
- Bigelow Square and Chatham Square

It should be noted that intersections included in the CBD signal project, which will be designed and updated as part of the City's project, include the following:

- Ross Street/Sixth Street Avenue – new signal, no construction date yet;
- Chatham Square/Bigelow Square/Bigelow – new signal, no construction date yet;
- Washington Place/Centre Avenue – construction scheduled for 2014;
- Washington Place/Bedford Avenue – new signal, no construction date yet;

- Bedford Avenue/HOV Lane/Street 1 – new signal, no construction date yet;
- Bedford Avenue/Crawford – new signal, no construction date yet; and
- Centre Avenue/Crawford – new signal, no construction date yet.

Off-site improvements are presented on Figure 25.

5.3 Traffic Signals

The traffic signals have been previously described in Section 3.3.1.1.

Traffic signal warrant criteria were evaluated at all unsignalized study intersections for all conditions in accordance with criteria outlined in PENNDOT Publication 212 and the MUTCD:

Based upon the signal warrant analyses, Warrant 3 (Peak Hour Volume) was met for only the new intersection of Centre Avenue and Street 1.

Copies of the traffic signal warrant analysis are provided in Appendix M.

5.4 Site Circulation and Parking

5.4.1 Automobiles

See Section 5.1 of this report and Figure 2 for details.

5.4.2 Loading Vehicles

There is a loading area for CONSOL Energy Center on the south side of Centre Avenue, as shown in Figure 30.

5.4.3 Emergency Vehicles

Emergency (fire, paramedics, etc.) vehicles will have multiple access points to the site via the surrounding roadways.

5.4.4 Public Transit

Street 1 and Street 2 will be designed in such a manner to accommodate Port Authority buses. Bus stop/shelter locations will be the subject of continuing coordination with PAAC.

5.5 Sight Distance Evaluation

Not applicable.

5.6 Queuing Analysis

Queuing analyses were performed using *Synchro Traffic Signal Coordination Software*,

Version 8 to determine queuing at the study intersections. Based on the analysis, there are no significant increases in queue length under the combined conditions. The 95th percentile queue lengths are summarized in Table 4 for both the A.M. and P.M. peak hour.

For dense urban conditions, TA believes that queuing analyses are a better representation of the traffic flow rather than level of service designations. Therefore, Trans Associates calculated the 95th percentile queue lengths for the study intersections under the 2011 Existing, 2022 Base (without Illustrative Master Plan components), and 2022 combined (with Illustrative Master Plan components) conditions. Analyses were performed using the methodologies published in the *Highway Capacity Manual 2000*, by the Transportation Research Board using Synchro, Version 8 traffic analysis and simulation software.

Based on the results of the analysis, with the proposed mitigation measures in place, the study intersections are projected to have 95th percentile queue lengths that are similar to or better than the projected 2022 base conditions. Therefore, Trans Associates believes that with the implementation of the Illustrative Master Plan components and implementation of the recommended mitigation measures, there will be no significant degradation of traffic flow throughout the study area roadway network.

It should be noted that, the results of the queuing analysis indicate that the traffic generated by the proposed Illustrative Master Plan development appears to represent the maximum traffic volumes that can be accommodated within the roadway network, with mitigation measures as described in Section 4.4.3. Enhancements to the transportation network related to implementation of the MOVEPGH study recommendations could serve to reduce traffic volumes and improve congestion within the study area.

The calculated 95th percentile queue lengths are presented in Table 4 for both the A.M. and P.M. peak hour. In addition the 95th percentile queue lengths are graphically presented in Figure 26 for the AM peak hour and Figure 27 for the PM peak hour. Detailed Synchro queuing calculation printouts are presented in Appendix N to this report.

6.0 IMPROVEMENT ANALYSIS

6.1 Improvements to Accommodate Base Traffic and Site Traffic

See Section 4.4.3.

7.0 FINDINGS

7.1 Site Accessibility

See Section 5.1.

7.2 Traffic Impacts

See Section 4.2, 4.3 and 5.2.

7.3 Need for Improvements

See Section 4.4.3.

8.0 RECOMMENDATIONS

8.1 Site Access/Circulation Plan

See Section 5.4.

8.2 Roadway Improvements

See Section 4.4.3.

8.3 Transportation Systems Management (TSM) Actions

Not applicable.

8.4 Traffic Operations Plan

Not applicable.

8.5 Truck Loading Management Plan

Not required.

8.6 Construction Management Plan

Not required.

8.7 Parking Management Plan

Shared parking is an important concept in the site plan development. As part of the shared parking plan, 355 unassigned off-street parking spaces, of the total 2,457 non-CONSOL Garage off-street parking spaces, will be available site-wide, and 814 unassigned off-street parking spaces, of the total 2,457 off-street parking spaces, will be available during evenings and weekends for events.

Off-street parking is to be controlled by parking equipment that will include magnetic card gates and parking ticketing equipment in various locations.

On-street parking will utilize parking control apparatuses. An estimated total of approximately 30 parking apparatuses will be needed for the on-street parking spaces. The on-street parking locations are presented graphically in Figure 12.

On-street parking duration from 8:00 A.M. to 6:00 P.M. is intended to be restricted to a maximum of two (2) hours' duration. The parking equipment will be capable of adjustment to restriction periods and durations by the Parking Authority if City Council enacts changes.

On-street parking controls will be implemented immediately after on-site streets are built.

8.8 Event Management Plan

An event management plan was developed for CONSOL Energy Center for police control of intersections and parking restrictions. Details of this plan are provided in Appendix O.

In addition on-street parking will be prohibited before, during, and after event as follows:

- On the east side of Street 1 between Centre Avenue and Bedford Avenue in order to provide two continuous northbound lanes exiting the area;
- On the west side of Street 1 between Bedford Avenue and Wylie Avenue in order to provide two continuous southbound lanes on Street 1
- On both sides of Street 2 between Centre Avenue and Bedford Avenue in order to provide two continuous lanes in both directions along Street 2;
- On the south side of Bedford Avenue between Street 1 and Street 2;
- On the north side of Centre Avenue between Street 3 and Street 1; and
- On the north side of Bedford Avenue between Street 1 and Crawford Street.

The event plan is presented on Figure 31A and Figure 31B. Event parking locations are presented on Figure 32.

9.0 CONCLUSIONS

This study has been performed to determine the traffic, parking, pedestrian, and loading impacts of the proposed Illustrative Master Plan based upon the City of Pittsburgh's traffic impact study methodologies and to develop a program of recommended improvements.

A summary of the recommended improvements are presented in Figure 25 and Figures 28 – 30.

Provided these recommendations are implemented, the traffic, parking, loading, and pedestrian impacts of the proposed Illustrative Master Plan will be appropriately mitigated.