

TRANSPORTATION IMPACT STUDY
**THE RESIDENCES AT RIVER
CLUB DEVELOPMENT**

GARDEN CITY, IDAHO

January 2023 Update



The Residences at River Club Development TIS Garden City, Idaho

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CONTENTS

Executive Summary	1
Findings	1
recommendations	5
Introduction	8
Project Description	8
Scope of the Report	11
Study Area	11
Intersection Performance Measures	11
Traffic Analysis Methodology	12
Performance Measures	13
Existing Conditions	15
Site Conditions and Adjacent Land Uses	15
Transportation Facilities	15
Existing Traffic Operations	15
Crash History	18
Transportation Impact Analysis	20
Year 2027 Background Traffic Conditions	20
Proposed Development Plan	25
Year 2027 Total Traffic Conditions	33
Year 2027 Total Traffic Queuing	45
Mitigation Timing & Threshold Evaluation	49
Site Access Evaluation	51
Findings and Recommendations	57
Findings	57
recommendations	61
References	64

LIST OF FIGURES

Figure 1. Site Vicinity Map	9
Figure 2. Proposed Site Plan	10
Figure 3: Existing Lane Configurations, Traffic Control Devices, and Weekday Peak Hour Volumes ..	17
Figure 4: 2027 Background Conditions – Without ACHD Project	23
Figure 5: 2027 Background Conditions – With ACHD Project.....	24
Figure 6: Estimated Trip Distribution and Assignment	28
Figure 7: Access Scenario 1 Site Generated Trips.....	29
Figure 8: Access Scenario 2 Site Generated Trips	30
Figure 9: Access Scenario 3 Site Generated Trips	31
Figure 10: Plantation Drive Re-Routed Trips	32
Figure 11: Total Lane Configurations & Volumes Without ACHD Project -Access Scenario 1	35
Figure 12: Total Lane Configurations & Volumes With ACHD Project – Access Scenario 1	36
Figure 13: Total Lane Configurations & Volumes Without ACHD Project – Access Scenario 2	39
Figure 14: Total Lane Configurations & Volumes With ACHD Project – Access Scenario 2	40
Figure 15: Total Lane Configurations & Volumes Without ACHD Project – Access Scenario 3	43
Figure 16: Total Lane Configurations & Volumes With ACHD Project – Access Scenario 3	43

LIST OF TABLES

Table 1. Study Intersections and Corresponding Operational Standards.....	13
Table 2. Existing Study Transportation Facilities and Roadways	15
Table 3. Year 2022 Existing Intersection Operations.....	16
Table 4. Year 2022 Existing Roadway Segment Operations	18
Table 5. Study Intersection Crash Type and Severity Summary, 2017-2021	18
Table 6. Year 2027 Background Intersection Operations	22
Table 7. The Residences at River Club Development Estimated Trip Generation	26
Table 8. Year 2027 Total Traffic Intersection Operations – Access Option 1	34
Table 9. Year 2027 Total Traffic Intersection Operations – Access Scenario 2.....	38
Table 10. Year 2027 Total Traffic Intersection Operations – Access Scenario 3.....	42
Table 11. Year 2027 95th Percentile Queuing Analysis	47
Table 12. Mitigation Threshold Evaluation.....	49
Table 13. Site Access Turn Lane Analysis Results	50

APPENDICES

Appendix A	Proposed Scope of Work Memo and Confirmation Emails
Appendix B	Signal Timing Sheets
Appendix C	Year 2022 Existing Traffic Count Data
Appendix D	Year 2022 Existing Operations Worksheets
Appendix E	Crash Data
Appendix F	Year 2027 Background Re-Routing & Utilization Calcs with ACHD Project
Appendix G	Year 2027 Background Operations Worksheets

Appendix H	Year 2027 Total Traffic Operations Worksheets – Access Scenario 1
Appendix I	Year 2027 Total Traffic Operations Worksheets – Access Scenario 2
Appendix J	Year 2027 Total Traffic Operations Worksheets – Access Scenario 3
Appendix K	Year 2027 Mitigation Threshold Analysis Worksheets
Appendix L	Year 2027 Turn Lane Warrant Evaluation



Section 1

Executive Summary

EXECUTIVE SUMMARY

Kittelson & Associates, Inc. (Kittelson) has prepared a Transportation Impact Study (TIS) for The Residences at River Club Development. The Residences at River Club Development is located on the south side of State Street between Plantation Drive and Ellens Ferry Drive. The project site is located in the City of Garden City and will encompass approximately 22 acres. The development plan proposes to modify the existing golf course to provide for the proposed mixed-use development along the State Street frontage.

Access to the development is proposed via new north-south and east-west private streets that will re-route the existing Plantation Drive to form a new south approach to the Pierce Park Lane / State Street intersection, a right-in/right-out/left-in access on the east side of the development, and a right-in/right-out on the west side of the development at the existing location of Plantation Drive.

The development is planned to be fully built-out by the year 2027. This TIS addresses the existing conditions (2022), background conditions (2027), and the development's impacts in the build-out year 2027. The TIS resulted in the following findings and recommendations:

FINDINGS

YEAR 2022 EXISTING CONDITIONS

- All study intersections were found to operate acceptably during the existing weekday AM and PM peak hours.
- Crash data at the study intersections for the most recent five years (2017-2021) was analyzed to identify any existing crash trends and found the following:
 - Turning and angle crashes were the most common crash type at the study intersections accounting for approximately 38% of the reported crashes at the Pierce Park Lane / State Street intersection and both of the reported crashes at the Plantation Drive / State Street intersection.
 - There were no fatality crashes reported, however, injuries were reported in approximately 29% of the intersection crashes.

YEAR 2027 BACKGROUND TRAFFIC CONDITIONS

- ACHD has an improvement project at the Pierce Park Lane / State Street Intersection to reconstruct the approaches and install a new traffic signal. This will include widening State Street to provide three through lanes (six lanes plus a turn lane total) in each direction from Hertford Way to Ellens Ferry Drive. The ACHD Integrated Five Year Work Plan (IFYWP) has construction programmed in 2025. Therefore, the background and total traffic conditions evaluated studied the development assuming the existing five lane configuration of State Street and the future six/seven lane configuration that is planned for construction in 2025.
- All study intersections are expected to operate acceptably during the background weekday AM and PM peak hours under both the existing four/five lane configuration of State Street and the future six/seven lane configuration.

TRIP GENERATION & DISTRIBUTION

- The Residences at River Club Development, consisting of up to 750 multi-family units, approximately 15,000 square feet of retail uses, and approximately 15,000 square feet of restaurant uses is estimated to generate a total of approximately 4,945 daily trip ends. Of these, approximately 500 new trips will occur in the weekday AM peak hour (181 inbound / 319 outbound), and 408 new trips will occur in the weekday PM peak hour (254 inbound / 154 outbound).
- Three access scenarios were evaluated with and without the planned ACHD improvements that Pierce Park Lane / State Street intersection which include:
 - **Access Scenario 1 - No Additional Access Driveways:** North-South Street forming a south leg of the Pierce Park Lane / State Street intersection as the only access.
 - **Access Scenario 2 - Site Access A:** With the proposed eastern right-in/right-out/left-in site access on State Street approximately opposite the Zamzows driveway in addition to the North-South Street.
 - **Access Scenario 3 – Site Access A and Plantation Drive Access:** With the proposed western right-in/right-out access to State Street at the current location of Plantation Drive and the Site Access A on State Street, in addition to the North-South Street.

YEAR 2027 TOTAL TRAFFIC CONDITIONS

- Year 2027 total traffic analysis found that all study intersections are expected to operate acceptably during the weekday AM and PM peak hours, except for:
 - **Pierce Park Lane / State Street – Without ACHD Improvements**
 - Without the planned ACHD widening, the intersection V/C ratio reaches 0.97 for Access Scenarios 1 and 3 and 0.96 for Access Scenarios 2 and 3 which exceed the ACHD threshold of 0.90. Additionally, two lane group movements for Access Scenario 1 and one lane group movement for Access Scenarios 2 and 3 have a V/C ratio above the ACHD threshold of 1.00.
 - The intersection meets ACHD policy in the weekday shoulder peak hours.
 - Mitigation is needed in approximately 2024 with the rerouting of Plantation Drive to the signal and approximately 15% of the development (113 units and 4,500 square feet of commercial).
 - Two traditional mitigation options were identified:
 - **Option 1 - ACHD Planned Improvements:** ACHD has their intersection improvement project scheduled for construction in 2025 which will mitigate the operations.
 - **Option 2 – Add Turn Lanes:** Add the following turn lanes to the intersection under the existing two through lanes on State Street:
 - Additional southbound left-turn lane to create dual left-turn lanes. This would require changes to the north side of the intersection which may not be possible outside of the ACHD planned improvements.
 - Additional northbound left-turn lane to create dual left-turn lanes.

- Addition of an eastbound right-turn lane.
- Addition of a westbound right-turn lane.

These improvements were determined not to be feasible because of the need for right-of-way on the north side of State Street and on Pierce Park Lane.

- The following alternative mitigation measures were identified:
 - Addition of a multi-use sidewalk on the south side of State Street that will accommodate both pedestrians and bicycles.
- The queuing analysis identified the following locations where the projected 95th percentile vehicle queues are projected to extend beyond the provided vehicle storage.

○ **Pierce Park Lane / State Street – Without ACHD Improvements**

- **Northbound Through-Right (Scenario 1, AM):** The northbound through-right queue from the Pierce Park Lane / State Street intersection is projected to exceed the on-site storage distance between State Street and the new East-West Street under Access Scenario 1 during the AM peak hour.
 - With the other accesses at Site Access A and Plantation Drive, northbound right-turning queues will be accommodated and other alternatives for northbound right-turning vehicles will be available.
- **Southbound Left-Turn (Background & All Scenarios):** While no site traffic is added to this movement, it was found that the available storage is not adequate during both peak hours and under all three access scenarios. The existing conditions analysis and site observations identified that the striped queue storage distance of 80 feet is exceeded under existing conditions and the future planned storage distance proposed in the ACHD improvements of 140' is exceeded in 2027 background traffic conditions and all the site access scenarios. The storage distance is not negatively impacted by the site development.
 - For the southbound left-turn, the storage distance was designed by ACHD based on their evaluation of the storage needs for their design project and limitations with respect to right-of-way. Therefore, no mitigation is recommended.

○ **Pierce Park Lane / State Street – With ACHD Improvements**

- **Northbound Left-Turn (All Scenarios, AM):** The northbound left-turn queue is projected to exceed the on-site storage distance between State Street and the new East-West Street under all three access scenarios during the AM peak hour. But the queue is only projected to exceed the storage by approximately 15 feet. The following should be considered:
 - Extending the left-turn lane the entire length of the North-South Street.
 - Provision of additional median width to accommodate dual northbound left-turn lanes is recommended to provide additional storage if needed. Approximately 150 feet of queue storage is needed with dual northbound left-turn lanes.
- **Northbound Through-Right (Scenarios 1 & 2 AM):** The northbound through-right queue is projected to exceed the on-site storage distance between State Street and the new East-West Street under Access Scenarios 1 and 2 during the AM peak hour.

- With the other accesses at Site Access A and Plantation Drive, northbound right-turning vehicles will have other alternate routes with less queuing which are anticipated to result in less queuing during the short peak periods withing the peak hours than shown in the table.
- **Southbound Left-Turn and Right-Turn Lanes (Background & All Scenarios, AM & PM):**
While no site traffic is added to these movements, it was found these movements are projected to exceed the available storage during both peak hours and under all three access scenarios. The left-turn storage is exceeded with and without the ACHD planned improvements and the existing conditions analysis identified that the striped queue storage distance is exceeded under existing conditions for the existing left-turn lane. The storage distance is not negatively impacted by the site development.
 - For the southbound left-turn and right-turn lanes, the storage distance was designed by ACHD based on their evaluation of the storage needs for their design project and limitations with respect to right-of-way. Therefore, no mitigation is recommended.
- The following off-site turn lane warrants are met under total traffic conditions:
 - **Site Access A (Right-in/Right-out/Left-in):**
 - Westbound left-turn lane (note that an existing two-way-left-turn lane (TWLTL) exists)
 - Eastbound Right Turn Lane under the existing four-lane State Street configuration. A right-turn lane was not determined to be necessary under the planned six-lane configuration of State Street.

SITE ACCESS EVALUATION

- The review of the proposed site access with respect to ACHD policy identified the following:
 - **North-South Street / State Street:** This site access will be a private street and is already included in the ACHD design for the Pierce Park Lane / State Street intersection.
 - **Site Access A / Zamzows Access / State Street:** This right-in/right-out/left-in site access will be located approximately 975 feet east of the Pierce Park Lane and provide access to the eastern portion of the site. Based on the policy requirements and the results of the traffic operations analysis, the driveway should be approved for the following reasons:
 - The access driveway is planned to align with the existing Zamzows driveway and will not impact the overall access spacing on State Street.
 - Without this access, approximately 5,050 daily vehicle trips would be on the North-South Street.
 - The access is projected to serve approximately 880 daily trips decreasing the North-South Street access to approximately 4,170 daily trips.
 - Based on the operations analysis the access will result in a small improvement in traffic operations at the Pierce Park Lane / State Street intersection.
 - **Plantation Drive Site Access / State Street:** This right-in/right-out site access will be located approximately 535 feet west of Pierce Park Lane and will provide access to the eastern portion of the site. Similar to the existing location of Plantation Drive, the access will be approximately 155

feet east of Lakeside Drive. Based on the policy requirements and the results of the traffic operations analysis, the driveway should be approved for the following reasons:

- The access driveway is planned to be in the same location as the existing Plantation Drive intersection.
 - An eastbound right-turn lane was determined not to be required and therefore the spacing being Lakeside Drive and the Plantation Drive Access does not need to accommodate a right-turn lane.
 - Lakeside Drive is used to access a small residential area and therefore the volumes at Lakeside Drive and Plantation Drive will be low and also be restricted to right-in/right-out only which will reduce the issues with traffic conflicts occurring at closely spaced driveways.
 - Without this access or Site Access A, approximately 5,050 daily vehicle trips would be on the North-South Street.
- Adequate intersection sight distance is available at the proposed site accesses to State Street but will need to be re-checked once the widening of State Street is completed as part of the Pierce Park Lane / State Street intersection by ACHD. Following are recommendations with respect to the sight distance:
 - Remove miscellaneous vegetation and shrubbery, and potential obstructions along roadways as necessary to obtain and maintain adequate intersection sight distance.
 - Site accesses should match the existing grade of the connected roadway at the intersection and back at least one car length. Significant changes to the approach grade could impact the sight distances.
 - Shrubby, weeds, and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.
 - When widening occurs along State Street and any of the internal site access roads, care should be taken to ensure adequate grades and intersection sight distance is maintained.
 - Intersection sight distance should be analyzed as part of the final access design and roadway widening.

RECOMMENDATIONS

Based on the findings and conclusions, recommendations are provided for the buildout of The Residences at River Club Development.

YEAR 2027 TOTAL TRAFFIC CONDITIONS MITIGATIONS

The mitigations required to address the specific impacts under 2027 total traffic conditions are:

- **Pierce Park Lane / State Street (All Access Scenarios)**
 - If the project is constructed prior to the ACHD improvements, one of the following is recommended:
 - **Delay Development:** Delay development of the site until it will coincide with the ACHD improvements. The re-routing of Plantation Drive to the signal could still occur.

- **Limit Development:** Limit the amount of development to approximately 113 residential units and approximately 4,500 square feet of commercial. This would include re-routing Plantation Drive and modifying the existing traffic signal to accommodate the south leg of the intersection.
- **Widen the Intersection (may be infeasible due to right-of-way):** Add the following turn lanes to the intersection, in addition to re-routing Plantation Drive:
 - Addition of northbound and southbound dual-left-turn lanes.
 - Addition of eastbound and westbound right-turn lanes.
- **Alternative Mitigation:** Construct a multi-use sidewalk along the site frontage that is wide enough to accommodate pedestrians and bicycles. This would also include re-routing Plantation Drive and modifying the existing traffic signal to accommodate the south leg of the intersection.
- **North-South Street (Private Street)**
 - Design the North-South Street with the following lanes:
 - Two northbound lanes and one southbound lane between the East-West Street and State Street.
 - A wide median area that could be modified to provide for dual northbound left-turn lanes.
- **Site Accesses**
 - Approve the proposed Site Access A approximately opposite the Zamzows driveway as a right-in/right-out/left-in driveway with median channelization on State Street to restrict movements.
 - Approve the proposed Plantation Drive Access as a right-in/right-out driveway with median channelization on State Street to restrict movements.
 - Additionally, the following should be done to maintain adequate intersection sight distance the site driveway and internal intersections:
 - Remove miscellaneous vegetation and shrubbery, and potential obstructions along roadways as necessary to obtain and maintain adequate intersection sight distance.
 - Match the existing grade of the connected roadway at the intersection and back at least one car length. Significant changes to the approach grade could impact the sight distances.
 - Shrubby, weeds, and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.
 - When widening occurs along State Street and any of the internal site access roads, care should be taken to ensure adequate grades and intersection sight distance is maintained.
 - Intersection sight distance should be analyzed as part of the final access design and roadway widening.



Section 2

Introduction

INTRODUCTION

Kittelson & Associates, Inc. (Kittelson) has prepared a Transportation Impact Study (TIS) for a proposed mixed-use development named The Residences at River Club Development in Garden City, Idaho. The study was prepared in accordance with requirements of the Ada County Highway District's (ACHD) *Policy Manual Section 7106* (Reference 1). The TIS examines the current transportation network and addresses the transportation impacts associated with background growth and the proposed development.

PROJECT DESCRIPTION

The Residences at River Club Development is located on the south side of State Street between Plantation Drive and Ellens Ferry Drive, as shown in Figure 1. The site is currently part of the River Club Golf Club and consists of approximately 22 acres. The development plan proposes to modify the golf course to provide for the proposed mixed-use development along the State Street frontage. The development will include the following:

- Approximately 750 multi-family units
- Approximately 15,000 square feet of retail shops.
- Approximately 15,000 square feet of restaurant uses.

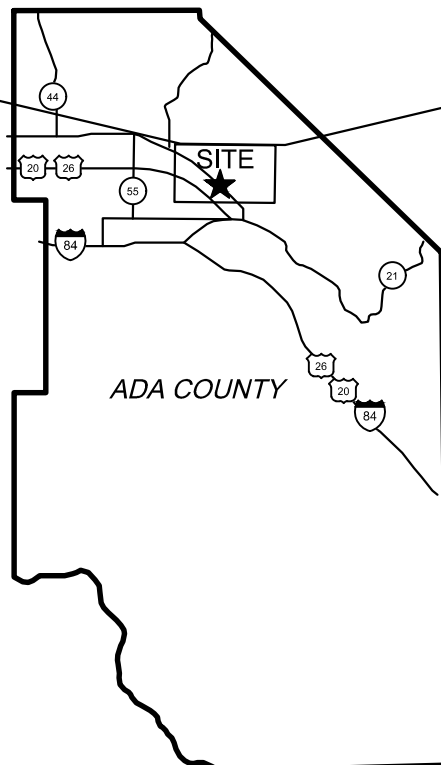
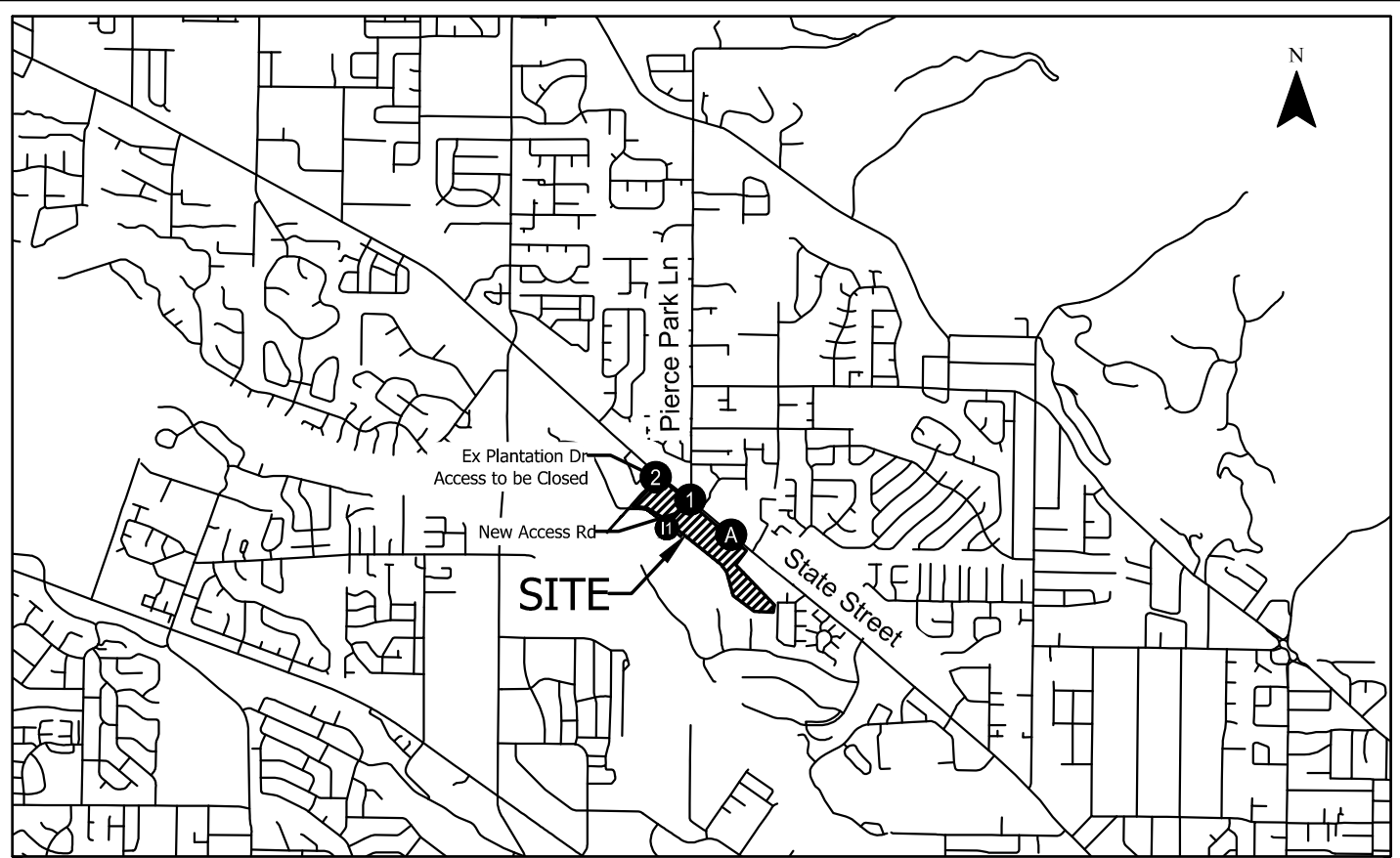
Figure 2 illustrates the proposed development site plan.

Three potential site access points have been identified:

- **North-South Street (N-S Street):** Primary full access at Pierce Park Lane/State Street signalized intersection via a new private north-south street that will re-route traffic from Plantation Drive. A south leg to the intersection is included in the Pierce Park Lane / State Street intersection improvement project and part of a development agreement with ACHD.
- **Site Access A:** A proposed right-in, right-out, left-in driveway on State Street approximately 975 feet east of Pierce Park Lane (with ACHD project) opposite the Zamzows driveway that is also proposed to be limited to right-in, right-out, left-in as part of the Pierce Park Lane/State Street project.
- **Plantation Drive Access:** A proposed right-in, right-out driveway on State Street approximately 525 feet west of Pierce Park Lane located at the existing Plantation Drive intersection.

The development is planned to be fully built-out and occupied by the year 2027. This TIS addresses the existing (2022), background (2027), and the development's impacts in the build-out year 2027 and necessary mitigation measures.

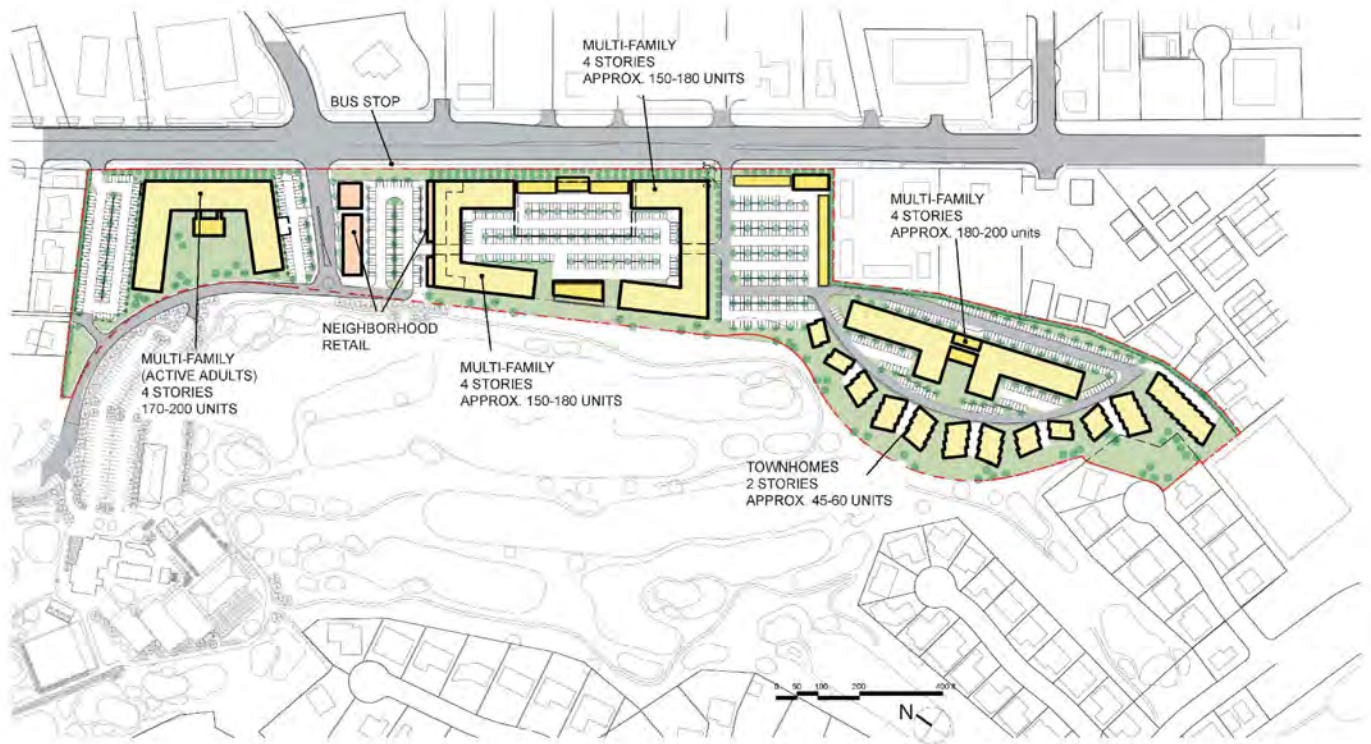
H:\27\27838 - River Club Mixed-Use Development\report\figs\27838 River Club Figures-Updated-Updated For Resp to Com.dwg Jan 20, 2023 - 1:22pm - jringert Layout: Tab: Fig 1 Site Vicinity



- ## - External Study Intersections
- - Internal Study Intersections

Site Vicinity Map
Garden City, Idaho

Figure
1



CONCEPT MASTERPLAN

LPCWEST
LINCOLN PROPERTY COMPANY

NOTE: Building footprints are approximate. Depending on market demands, design is expected to evolve during Design Review Application within the provisions in the approved Specific Area Plan.

RIVER CLUB RESIDENCES | SAP APPLICATION
NOV 11, 2022 CRTKL

Site Plan

Figure

2

Garden City, Idaho

SCOPE OF THE REPORT

ACHD reviewed and agreed with the scope, methodology and key assumptions within this TIS in September 2022. *Appendix A includes the Transportation Impact Study Scope and Assumptions memorandum and coordination emails from ACHD.*

This report evaluates these transportation issues:

- Existing land use and transportation system conditions, including intersections and roadways within the site vicinity for the typical weekday AM and PM peak hours.
- Estimated local and regional growth in the study area for future year background analyses based on an annual compounded growth rate applied to existing traffic volumes.
- Intersection analysis under year 2027 background traffic conditions (existing counts plus five years of regional growth but not including the project) during the weekday AM and PM peak hours.
- Trip generation and distribution estimates for the proposed project.
- Intersection analysis under year 2027 total traffic conditions (year 2027 background traffic plus site-generated trips) during the weekday AM and PM peak hours.
- Identified transportation mitigations at the study intersections under existing, year 2027 background and year 2027 total traffic conditions.
- Evaluation of site access intersections.
- Summary of findings and recommendations.

STUDY AREA

The following study intersections and roadways were identified during the scoping process and included in the analysis:

- Existing Intersections
 - State Street / Pierce Park Lane
 - State Street / Plantation Drive (existing full access and future right-in/right-out only)
- Future Intersections:
 - Proposed Site Access A on State Street
 - Internal “T” intersection of North-South Street / East-West Street south of State Street / Pierce Park Lane
 - Roadway Segments: Note that no roadway segments were identified based on ACHD staff comments and because the internal streets will be private.

INTERSECTION PERFORMANCE MEASURES

Intersection performance measures reported in this study include level of service (LOS), volume-to-capacity ratio (V/C), delay and 95th percentile queues.

The performance measures are used to gauge the performance of the transportation system and overall quality of the travel experience through an intersection or roadway segment as it is perceived by the traveler:

- **Level-of-service (LOS)** is currently the most commonly used performance measure. LOS uses an “A” to “F” ranking based on the average control delay experienced by motorists. LOS “A” conditions have very low vehicles delay times (10 seconds or less), while LOS “F” conditions have high delay times (over 80 seconds on average per vehicle at the signalized intersection) that are considered unacceptable to most drivers.
- **Volume-to-capacity (V/C)** compares the volume of traffic to the theoretical capacity of the facility to accommodate traffic. A V/C ratio of 1.0 indicates an intersection, or movement at an intersection, is operating at capacity. A V/C ratio over 1.0 indicates the intersection’s capacity is exceeded.
- **95th percentile queue** is the queue length that has only a 5% probability of being exceeded during the analysis time-period. It is used to help determine turn lane storage, but not what the typical driver would experience. This performance measure is helpful in assessing access spacing from adjacent unsignalized and signalized intersections.

Overall intersection performance is calculated for signalized intersections. For two-way stop-controlled intersections, performance measures are reported for the critical movement.

TRAFFIC ANALYSIS METHODOLOGY

The intersection operational analysis was performed using the *Highway Capacity Manual (HCM) 6th Edition* analysis procedures (Reference 2). To ensure that this analysis is based on a reasonable worst-case scenario, the peak 15-minute flow rate during all peak hours was used in the evaluation of all intersection LOS and V/C ratios. This analysis reflects conditions that are only likely to occur for 15-minutes out of each average peak hour. The transportation system will likely operate better than the conditions described in this report during all other time periods. The intersection operations analyses conducted for the TIS were prepared using Synchro 11.

The roadway segment analysis was performed using the ACHD Street Capacity Guidelines Table in ACHD’s *Policy Manual* (Reference 1) for all ACHD roadways.

The *HCM 2000* (Reference 4) was utilized due to the ability to report overall intersection V/C ratios for a signalized intersection as required by ACHD Policy Manual, since the *HCM 6th Edition* does not report overall intersection V/C ratio.

Additionally, the guidance in the *Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition* (Reference 5) was used for signal warrant analyses when determining the appropriate mitigation for an impacted study intersection.

SIGNAL TIMING AND OTHER PARAMETERS

ACHD provided current signal timing via signal timing sheets. *Appendix B contains the signal timing sheets.* ACHD required values were used for the ideal saturation flow rate (1800 vehicles per hour per lane), while other inputs were gathered from field data including truck percentages, peak hour factors, posted speeds, and storage lengths.

Per ACHD Policy Manual, peak hour factor adjustments were input for each intersection by approach under existing conditions. This is not consistent with HCM procedures (which outlines one peak hour factor for the overall intersection) but is outlined in the ACHD policy manual for existing conditions analysis. Inputting peak hour factors by approach models a scenario that does not actually occur in the field and, as such, the existing conditions analysis may reflect operations that are worse than occurs on the system today.

PERFORMANCE MEASURES

The operating standards contained within the ACHD Policy Manual were used to assess the traffic operations of the study intersections and roadways.

ACHD INTERSECTION AND ROADWAY STANDARDS

The analysis was performed in accordance with the methodologies stated in Section 7106.6 of the *ACHD Policy Manual* (Reference 1). Intersection and segment LOS are reported per ACHD thresholds.

ACHD requires that signalized intersections operate at a minimum of LOS E for Principal Arterials and Minor Arterials and LOS D for Collectors. The acceptable V/C ratio for signalized intersection is 0.90 for the overall intersection and 1.00 for each lane group. The acceptable V/C ratio is 1.00 for the critical lane group at unsignalized intersections. All unsignalized intersections that have a projected LOS D or worse shall be evaluated to determine if a signal or roundabout is warranted.

Table 1 summarizes the LOS standards for the study area intersections (signalized and unsignalized).

Table 1. Study Intersections and Corresponding Operational Standards

ID	Study Intersection	Agency	Traffic Control	ACHD Operating Standard ¹
1	Pierce Park Lane / State Street / N-S Site Access Road	ACHD	Traffic Signal	• LOS E or better • Intersection v/c $\leq$ 0.90 • Lane Group v/c $\leq$ 1.00
2	Plantation Drive (Site Access) / State Street	ACHD	Two-Way Stop-Controlled	• LOS E or better • Critical movement v/c $\leq$ 1.00 • Evaluate signal warrants if $\leq$ LOS D
A	Site Access A / State Street	ACHD	Two-Way Stop-Controlled	• LOS E or better • Critical movement v/c $\leq$ 1.00 • Evaluate signal warrants if $\leq$ LOS D
I1	N-S Site Access Road / E-W Site Access Road	Private	All-Way Stop-Controlled Assumed	• No Operating Standard Required



Section 3

Existing Conditions

EXISTING CONDITIONS

The existing conditions analysis identifies the site conditions and current operational and geometric characteristics of the roadways within the study area. These conditions will be compared with future conditions later in this report. Information regarding site conditions, adjacent land uses, existing traffic operations and transportation facilities in the study area was collected in the spring and summer of 2022.

SITE CONDITIONS AND ADJACENT LAND USES

The site is currently a golf course and is surrounded by single-family developments to the south and west and commercial development to the north and east along State Street.

TRANSPORTATION FACILITIES

The transportation system inventory identifies the current characteristics of roadways within the study area. Major roadways within the study area were identified and catalogued, including transit facilities and pedestrian and bicycle infrastructure.

ROADWAY FACILITIES

Table 2 provides a summary of the existing roadway facilities included in this study within the site vicinity.

Table 2. Existing Study Transportation Facilities and Roadways

Roadway	Functional Classification ¹	Number of Lanes	Posted Speed (MPH ²)	Sidewalks	Bicycle Lanes	On-Street Parking
State Street	Principal Arterial	5	40	Partial	Partial/Shoulder	No
Plantation Drive	Local Street	2	Not Posted	No	No	No

¹ Per Ada County Long Range Highway & Street Map 2040 Functional Street Classification Map. ² MPH represents miles per hour.

As shown in Table 2, State Street does not currently have continuous sidewalks and bicycle lanes. Along the site frontage, a shoulder and curb-separated pathway are provided. Sidewalks are included in the design of the Pierce Park intersection improvements which is programed for construction by ACHD in 2025 (CIP IN2020-820).

EXISTING TRAFFIC OPERATIONS

Peak hour turning movement counts were collected in October 2022 during the AM peak (6:30 AM – 9:30 AM) and PM peak (3:30 PM – 6:30 PM) periods. *Appendix C includes the weekday AM and PM period counts utilized at each of the study intersections and roadways.*

WEEKDAY AM AND PM PEAK HOUR INTERSECTION OPERATIONS

Existing peak hour traffic operations were analyzed for a typical mid-weekday AM peak period and PM peak period. The AM peak hour was found to generally start at 7:45 AM with the exception of the Zamzows driveway intersection which was found to start at 7:30 AM. The PM peak hour was found to start at 4:30 PM for all the intersections. The individual peak hours for each intersection based on the traffic count data were used to provide a conservative analysis.

Per ACHD Policy Manual, peak hour factors were input for each intersection by approach for the existing conditions analysis. This is not consistent with HCM procedures (which outlines one peak hour factor for the overall intersection) but is outlined in the ACHD policy manual for existing conditions analysis. Inputting peak hour factors by approach models a scenario that does not actually occur in the field and, as such, the existing conditions analysis may reflect operations that are worse than occurs on the system today.

Table 3 presents the traffic operation results for each intersection and its corresponding lane groups during existing weekday AM and PM peak periods. Figure 3 presents existing lane configurations, traffic control devices and AM and PM peak hour traffic volumes at each of the study intersections, respectively. *Appendix D includes the year 2022 existing conditions Synchro worksheets.*

Table 3. Year 2022 Existing Intersection Operations

No.	Intersection	Intersection Control	Intersection AM / PM			Lane Group	Weekday AM Peak Hour			Weekday PM Peak Hour		
			V/C	LOS	Delay		V/C	LOS	Delay	V/C	LOS	Delay
1	Pierce Park Lane / State Street	Traffic Signal	0.67 / 0.87	C / D	25.1 / 36.0	SBL	0.76	E	63.6	0.54	E	67.5
						SBR	0.93	F	87.4	0.89	F	91.2
						EBL	0.35	B	11.1	0.92	F	104.4
						EBT	0.60	B	12.1	0.45	A	5.9
						NBT	0.40	B	16.0	0.89	D	38.8
						NBR	0.40	B	16.0	0.92	D	41.4
2	Plantation Drive / State Street	TWSC	- / -	- / -	0.3 / 0.3	NBL	0.10	D	25.7	0.12	C	22.6
						WBL	0.05	B	14.3	0.06	B	13.0
A	Zamzows Driveway / State Street	TWSC	- / -	- / -	0.0 / 0.9	EBL	0.00	A	9.5	0.06	C	16.3
						SBLR	0.01	B	11.1	0.31	E	38.8

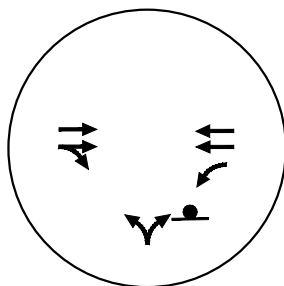
V/C ratio is defined as vehicle-to-capacity ratio, which calculates the number of vehicles divided by the capacity of the roadway/intersection during the peak 15 minutes of the peak hour. LOS stand for Level of Service. Delay is reported in seconds per vehicle. Cells in the table above that are **bolded**, *italicized*, and **highlighted** indicate an intersection and/or lane group operating below the jurisdictional standards.

Based on existing intersection operations, all study intersections operate acceptably during the existing weekday AM and PM peak hours.

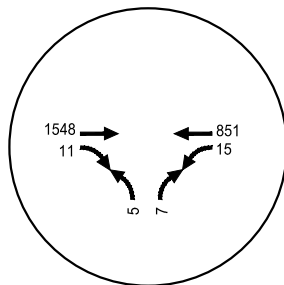


Plantation Dr
/ State St

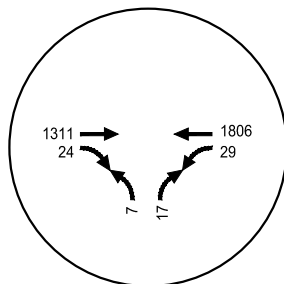
Lane Configuration



AM Peak Hour

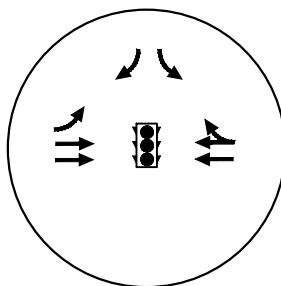


PM Peak Hour

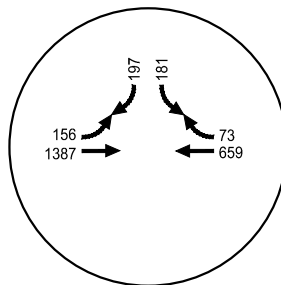


Pierce Park Ln
/ State St / N-S Street

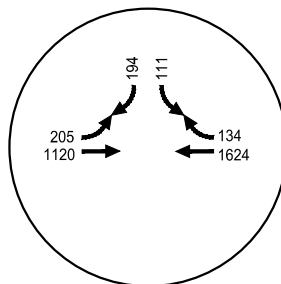
Lane Configuration



AM Peak Hour

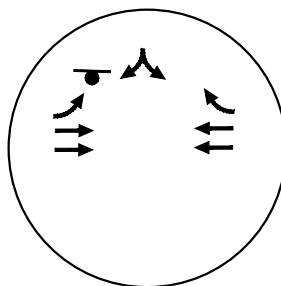


PM Peak Hour

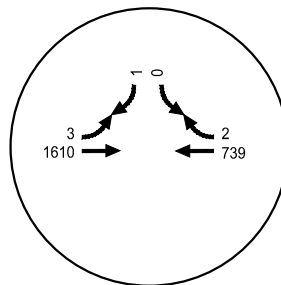


Zamzows
/ State St

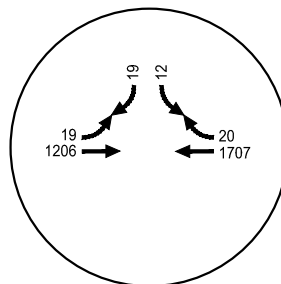
Lane Configuration



AM Peak Hour



PM Peak Hour



2022 Existing Conditions - Without ACHD Project

Garden City, Idaho

Figure
3

EXISTING CONDITIONS ROADWAY SEGMENT ANALYSIS

While ACHD did not require roadway segment volumes be evaluated for this analysis, new segment data was collected for Plantation Drive south of State Street due to Plantation Drive being closed and re-routed to the Pierce Park / State Street intersection. The peak hour roadway segment volumes were collected in October 2022. The daily roadway segment volumes per ACHD Policy Manual 7106.4.1 for the existing Plantation Drive are summarized in Table 4.

Table 4. Year 2022 Existing Roadway Segment Operations

Roadway Segment	Classification ¹	Travel Lanes ²	Two Way ADT	ACHD Policy Volume for Local Streets	Weekday AM Peak Hour		Weekday PM Peak Hour	
					One-Way Volume/ Direction	Meets Std.	One-Way Volume/ Direction	Meets Std.
Plantation Drive (South of State Street)	Local Street	2	941 (10/5/2022)	2,000 ADT	Not Applicable			

¹Per COMPASS 2040 Functional Street Classification Map (Reference 6) ²Travel lanes include the total number of lanes across the roadway's respective cross section ³.

As shown in Table 4, the current daily volume on Plantation Drive is 941, which is approximately half of the ACHD maximum policy volume for a local street.

CRASH HISTORY

Crash data for the study intersections was provided by the Idaho Transportation Department (ITD) for the previous five years on record (2017-2021). This data was used to evaluate and document any potential crash trends occurring at study intersections and along study roadways. *Appendix E contains the crash data reports provided by ITD.*

Table 5 presents the number of crashes, by crash type and severity, at each study intersection.

Table 5. Study Intersection Crash Type and Severity Summary, 2017-2021

Intersection	Crash Type						Total	Severity			Crash Rate (Crashes / MEV)
	Rear -End	Fixed Object	Turning (Angle & Head-on)	Side Swipe	Angle	Other		PDO	Injury	Fatality	
Pierce Park Lane / State Street	8	2	10	7	1	1	29	22	7	-	0.37
Plantation Drive / State Street	-	-	2	-	-	-	2	-	2	-	0.03
Total	8	2	12	7	1	1	31	22	9	-	-

As shown in Table 5 the most common crash types were turning, side swipe and rear-end crashes. The intersection of Pierce Park Lane / State Street experiences the highest crash rate of approximately 0.37 which is considered acceptable for the signalized intersection.



Section 4

Transportation Impact Analysis

TRANSPORTATION IMPACT ANALYSIS

The transportation impact analysis identifies how the study area's transportation system will operate in the year the proposed development is expected to be fully built and occupied, which is estimated to be year 2027. An evaluation of the impact of traffic generated by the proposed project during the typical weekday AM and PM peak hours as follows:

- Transportation improvements planned in the site vicinity were identified.
- Background weekday AM and PM peak hour traffic conditions for build-out year 2027 were analyzed at each of the study intersections.
- Background conditions were developed by applying a percent annual compounded growth rate on roadways to account for anticipated regional growth in the site vicinity between 2022 and 2027.
- Site-generated trips under each of the were estimated for the build-out of the site.
- Site trip distribution patterns under three alternative access scenarios were estimated for the site-generated trips based on the existing traffic patterns, the major trip origins and destinations in the Treasure Valley area, and COMPASS modeling.
- The build-out year 2027 total traffic conditions were analyzed at each of the study intersections and site-access points during the weekday AM and PM peak hours for three access scenarios.
- Site-access operations were evaluated.

YEAR 2027 BACKGROUND TRAFFIC CONDITIONS

The year 2027 background traffic analysis identifies how the study area's transportation system will operate in the future year without The Residences at River Club Development in place. This analysis includes traffic attributed to planned developments within the study area and to general growth in the region but does not include traffic from the proposed development.

PLANNED INTERSECTION AND ROADWAY IMPROVEMENTS

Based on a review of the ACHD's Capital Improvement Plan (CIP) (Reference 3), ACHD's Integrated Five Year Work Plan (2022-2027, Reference 7), and ITD's Statewide Transportation Improvement Program (ITIP, Reference 8), the following improvements are planned in the study area:

- **IN2020-0820: State Street / Pierce Park Intersection (2026-2030)** – Reconstruct the approaches and signal. This will include widening State Street from Hertford Way to Ellens Ferry Drive. The ACHD Integrated Five Year Work Plan (IFYWP) has construction programmed in 2025. Exhibit 1 shows the proposed ACHD intersection and roadway configure that will be constructed.

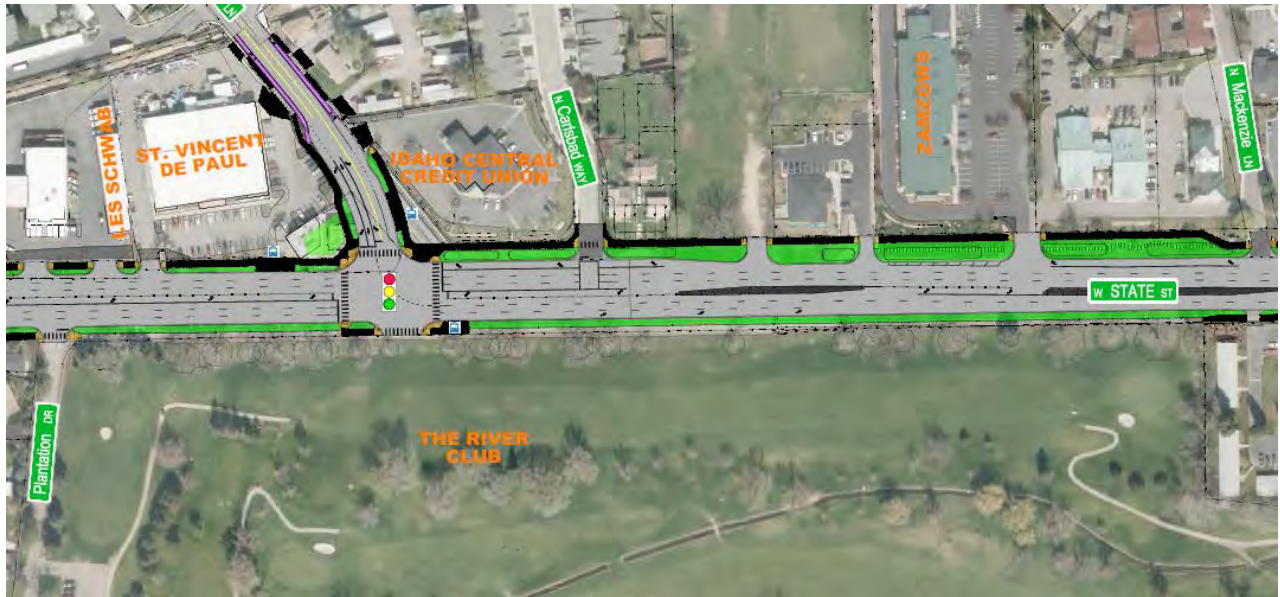


Exhibit 1. ACHD State Street / Pierce Park Concept Design with Proposed Site Accesses Noted

- **RD 2020-1230 & 1232: State Street Widening (2031-2035)** – Widen State Street to seven lanes between Glenwood Street and Collister Drive.

Due to the Pierce Park Lane intersection improvement being planned to coincide with the development, ACHD requested two lane configuration alternatives be assumed under the 2027 background and total traffic conditions analysis in the event that the intersection project gets delayed. The two alternatives include:

- **Without the ACHD Project:** Addition of the south leg of the intersection to the existing intersection lane configuration.
- **With the ACHD Project:** Addition of the south leg of the intersection with the lane configuration as proposed in Exhibit 1.

BACKGROUND GROWTH

The year 2027 background traffic volumes reflect existing traffic counts plus five years of annual background growth. COMPASS maintains base year and 2030 future year regional travel demand models, which were used to assess growth in the study area. From review of the model volumes and historical traffic volumes and studies in the area, and as confirmed by the agencies, a growth rate of 1.3% per year (compounded) was assumed for development of 2027 background traffic volumes.

Additionally, with the ACHD improvements that are planned for construction in 2025, the existing Plantation Drive will be converted to right-in/right-out and the Zamzows driveway will be converted to right-in/right-out/left-in per the concept in Exhibit 1. Therefore, two sets of background volumes were developed, one assuming the existing roadway configuration and one assuming the ACHD planned configuration, both of which do not include The Residences at River Club Development. *Appendix F includes the re-routing of the 2027 background traffic volumes associated with the ACHD project.*

YEAR 2027 BACKGROUND TRAFFIC VOLUMES & ANALYSIS

Year 2027 background traffic volumes reflect existing traffic counts plus five years of growth. Per the ACHD Policy Manual, intersections with an existing peak hour factor of less than 0.90 were adjusted up to 0.90 in the future year analysis to account for the likely increase in traffic throughout the entire peak hour in the future.

Additionally, with the future widening of State Street by ACHD to include three through lanes in each direction in the vicinity of the Pierce Park Lane intersection, a lane utilization adjustment for the eastbound and westbound through lanes of 0.82 was included the analysis of the Pierce Park Lane / State Street intersection analysis of the “Ultimate” conditions with the proposed ACHD widening project. The reduced utilization factor is appropriate to include because research has shown that drivers utilize auxiliary additional through lanes less than continuous through lanes and was determined using the NCHRP 03-98 procedure. *Appendix F includes the NCHRP 03-98 worksheets.*

YEAR 2027 BACKGROUND INTERSECTION OPERATIONS

Table 6 presents the traffic operations results for each study intersection and its lane groups under year 2027 background conditions during the weekday AM and PM peak hours under the existing lane configuration alternative and under the ACHD project lane configurations (ACHD Config). Figure 4 and Figure 5 present the weekday AM and PM 2027 background traffic volumes at the study intersections under the existing lane configurations and with the planned ACHD project that includes the Pierce Park intersection improvements, respectively. *Appendix G includes the year 2027 background conditions Synchro worksheets.*

Table 6. Year 2027 Background Intersection Operations

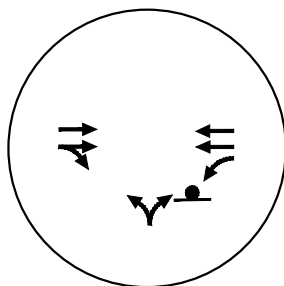
No.	Intersection	Intersection Control	Intersection AM/PM			Lane Group	Weekday AM Peak Hour			Weekday PM Peak Hour		
			V/C	LOS	Delay		V/C	LOS	Delay	V/C	LOS	Delay
1	Pierce Park Lane / State Street	Traffic Signal (Existing Lane Config)	0.71 / 0.89	C / D	20.5 / 38.6	SBL	0.74	E	64.1	0.53	E	66.7
						SBR	0.90	F	81.8	0.89	F	92.8
						EBL	0.40	B	9.6	0.92	F	104.9
						EBT	0.65	B	11.0	0.46	A	6.3
						WBT	0.39	B	13.7	0.92	D	42.9
						WBR	0.39	B	13.7	0.94	D	46.4
		Traffic Signal (ACHD Config)	0.58 / 0.70	B / C	18.6 / 27.2	SBL	0.74	E	64.1	0.53	E	66.7
						SBR	0.90	F	81.8	0.89	F	92.8
						EBL	0.38	A	8.5	0.94	F	110.3
						EBT	0.51	A	8.5	0.35	A	5.4
						WBT	0.28	B	11.8	0.67	C	23.0
						WBR	0.09	B	10.3	0.16	B	14.7
2	Plantation Drive / State Street	TWSC	- / -	- / -	- / -	WBL	0.04	C	16.2	0.07	B	13.3
		TWSC (ACHD Config) (Rin/Rout)	- / -	- / -	- / -	EBL	0.08	D	30.2	0.11	C	23.0
						NBR	0.06	C	20.9	0.08	C	17.7
A	Zamzows Driveway / State Street	TWSC	- / -	- / -	- / -	EBL	0.00	A	9.6	0.07	C	17.1
						SBR	0.00	B	11.2	0.25	E	39.3
		TWSC (ACHD Config) (Rin/Rout/Lin)	- / -	- / -	0 / 0.4	EBL	0.01	B	12.8	0.14	D	33.9
						SBR	0.00	B	12.3	0.09	C	22.1

V/C ratio is defined as vehicle-to-capacity ratio, which calculates the number of vehicles divided by the capacity of the roadway/intersection during the peak 15 minutes of the peak hour. LOS stand for Level of Service. Delay is reported in seconds per vehicle. Cells in the table above that are **bolded**, *italicized*, and **highlighted** indicate an intersection and/or lane group operating below the jurisdictional standards.

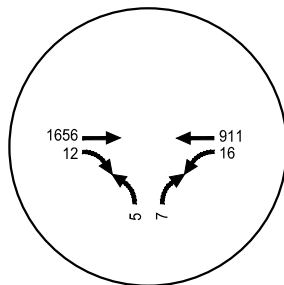


Plantation Dr
/ State St

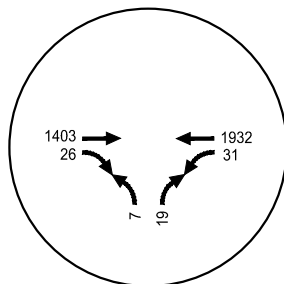
Lane Configuration



AM Peak Hour

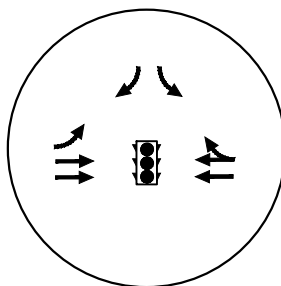


PM Peak Hour

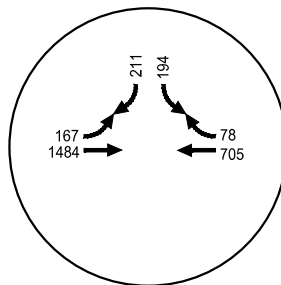


Pierce Park Ln
/ State St / N-S Street

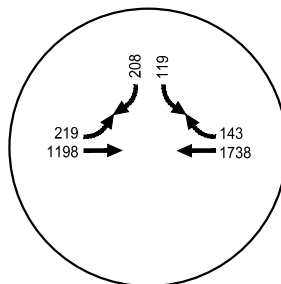
Lane Configuration



AM Peak Hour

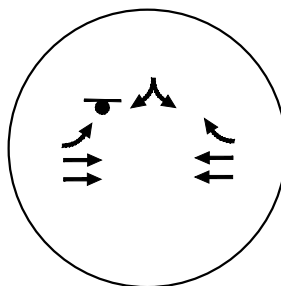


PM Peak Hour

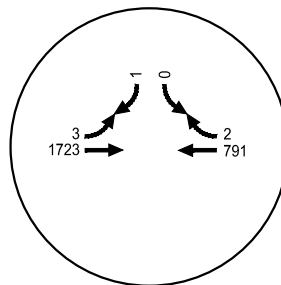


Zamzows
/ State St

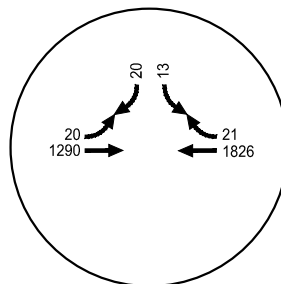
Lane Configuration



AM Peak Hour



PM Peak Hour



2027 Background Conditions - Without ACHD Project

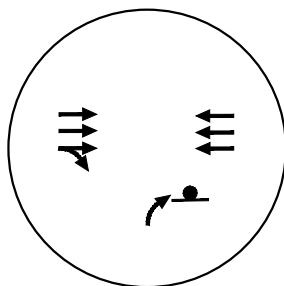
Garden City, Idaho

Figure
4

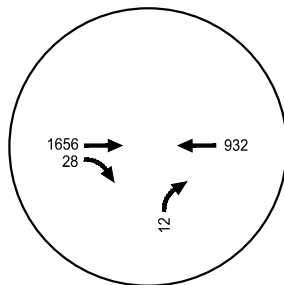


Plantation Dr
/ State St

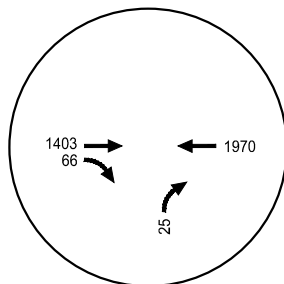
Lane Configuration



AM Peak Hour

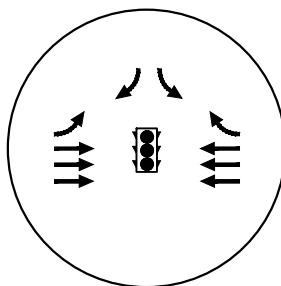


PM Peak Hour

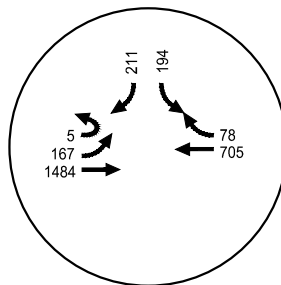


Pierce Park Ln
/ State St / N-S Street

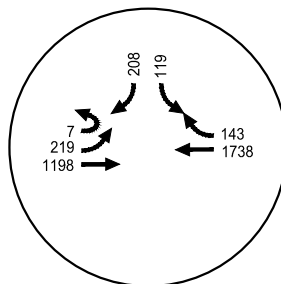
Lane Configuration



AM Peak Hour

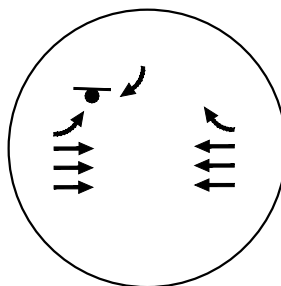


PM Peak Hour

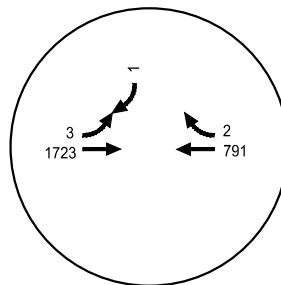


Zamzows
/ State St

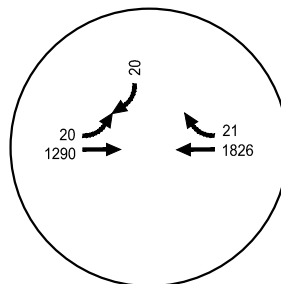
Lane Configuration



AM Peak Hour



PM Peak Hour



2027 Background Conditions - With ACHD Project

Garden City, Idaho

Figure
5

PROPOSED DEVELOPMENT PLAN

The Residences at River Club Development is located on the south side of State Street between Plantation Drive and Ellens Ferry Drive. The project site is located in the City of Garden City and will consist of approximately 22 acres. The development plan proposes to modify the existing golf course to provide for the proposed mixed-use development along the State Street frontage. On the City of Garden City's Future Land Use Map (Reference 9) the site is zoned as Residential Low Density with a Neighborhood/Destination Activity Node.

The development will include the following:

- Approximately 750 multi-family with a mixture of approximately 290 low-rise units and 460 mid-rise units.
- Approximately 15,000 square feet of retail shops.
- Approximately 15,000 square feet of restaurant uses including two sit down/casual restaurants and a coffee shop without a drive-through window.

TRIP GENERATION

The projected weekday daily, a.m., and p.m. peak hour vehicle trips for the proposed development were estimated based on ITE's Trip Generation Manual, 11th Edition (Reference 10).

Standard practice is to recognize that not all trips to and from a business will be "new" trips on the adjacent roadway system. Some trips will come from other uses internal to the site and some will consist of "pass-by" trips from motorists who are already traveling on the surrounding roadways. These internal and pass-by trips were calculated using data and procedures provided in the ITE Trip Generation Handbook, 3rd Edition (Reference 11).

Due to the limited data in the ITE Trip Generation Handbook on pass-by trip percentages and because the new 11th Edition of the Trip Generation Manual split up the shopping center land use category into different land-uses based on the size, pass-by rates were not available for some of the land-uses even though the land-uses will generate pass-by trips from State Street. Additionally, the ITE data includes pass-by percentages for some uses, such as a coffee shop, which may not be applicable for the particular type of coffee shop proposed for this development. For these land-uses, pass-by percentages from other similar land-uses contained in the ITE Trip Generation Handbook were used in order to acknowledge that pass-by trips will occur for these uses and to ensure the trips estimates are as accurate as possible. Each of these uses is described below:

- **Strip Retail Plaza (ITE Code 822):** This land-use is new to the recent edition of the Trip Generation Manual and is based on separating the previous Shopping Center (ITE Code 820) land-use into multiple land-uses based on the size of the shopping center. Therefore, the ITE shopping center (ITE Code 820) pass-by percentages were utilized.
- **Fast Casual Restaurant (ITE Code 930):** This land-use is new to the Trip Generation Manual with very limited data but is similar to the high-turnover sit-down restaurant except for being smaller with faster service. Therefore, the same pass-by percentages as the High-Turnover Sit-Down Restaurant were utilized.
- **Coffee/Donut Shop without Drive Through (ITE Code 936):** While the ITE Trip Generation Handbook has an average pass-by percentage of 89% for a Coffee/Donut shop, closer review of the data identified that the specific shops included in the ITE data did not have customer seating. The lack of customer seating could potentially result in potentially higher pass-by percentages than a shop with seating. Based on a review of other land-uses with morning and evening peaks and indoor seating, it was determined that the fast-food restaurant pass-by rate 49% in the weekday AM peak hour and 50% in the weekday PM peak hour provided a reasonably similar land-use and therefore was used for the Coffee Shop.

Table 7 summarizes the estimated trip generation for The Residences at River Club Development.

Table 7. The Residences at River Club Development Estimated Trip Generation

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Residential Uses									
Townhouses/Apmts (Multi-Family Low-Rise)	220	290	1,934	113	27	86	145	91	54
Townhouses/Apmts (Multi-Family Mid-Rise)	221	460	2,148	191	44	147	180	110	70
Residential Internal Trips				(46)	(5)	(41)	(31)	(24)	(7)
Residential External & Net New Trips				253	66	192	294	177	117
Retail Uses									
Shopping Center (Strip Retail Plaza)	822	15,000	863	38	23	15	104	52	52
Shopping Center Internal Trips				(7)	(4)	(3)	(54)	(28)	(26)
Shopping Center External Trips				31	19	12	50	24	26
Pass-By Trips (0% AM, 34% PM, 26% SAT)				-	-	-	(18)	(9)	(9)
Retail Net New External Trips				31	19	12	32	15	17
Restaurant Uses									
High Turn-Over Sit-Down Restaurant (Two)	932	10,000	1,072	96	53	43	91	56	35
Fast Casual Restaurant	930	2,000	194	3	2	1	25	14	11
Coffee/Donut Shop without Drive-Through	936	3,000	601	279	142	137	97	48	49
Restaurant Sub-Total				378	197	181	213	118	95
Restaurant Internal Trips				(47)	(41)	(6)	(59)	(20)	(39)
Restaurant External Trips				331	156	175	154	98	56
Pass-By Trips Sit Down Rest (43% PM)				-	-	-	(36)	(18)	(18)
Pass-By Trips Coffee Shop (49% AM, 50% PM)				(120)	(60)	(60)	(36)	(18)	(18)
Restaurant Net New Trips				211	96	115	83	63	21
Development Total									
Total Trips			4,945	720	291	429	642	371	271
Internal Trips				(100)	(50)	(50)	(144)	(72)	(72)
Total External Trips (Driveway Trips)				620	241	379	498	299	199
Total Pass-By Trips				(120)	(60)	(60)	(90)	(45)	(45)
BUILDOUT NET NEW TRIPS				500	181	319	408	254	154

As shown in Table 7, The Residences at River Club Development is estimated to generate approximately 4,945 daily trips, with 500 new weekday AM peak hour trips (181 inbound / 319 outbound), and 408 new weekday PM peak hour trips (254 inbound / 154 outbound).

TRIP DISTRIBUTION/TRIP ASSIGNMENT

The trip distribution patterns are based on the access connections to and from the proposed development and their attraction/destination characteristics. The distribution of site generated trips onto the roadway system was based on the area of impact model runs by COMPASS, review of the roadway system, and knowledge of travel patterns in the area. Figure 6 shows the estimated site generated trip distribution pattern used for this analysis as well as the trip assignment for build out of the project (assumed year 2027).

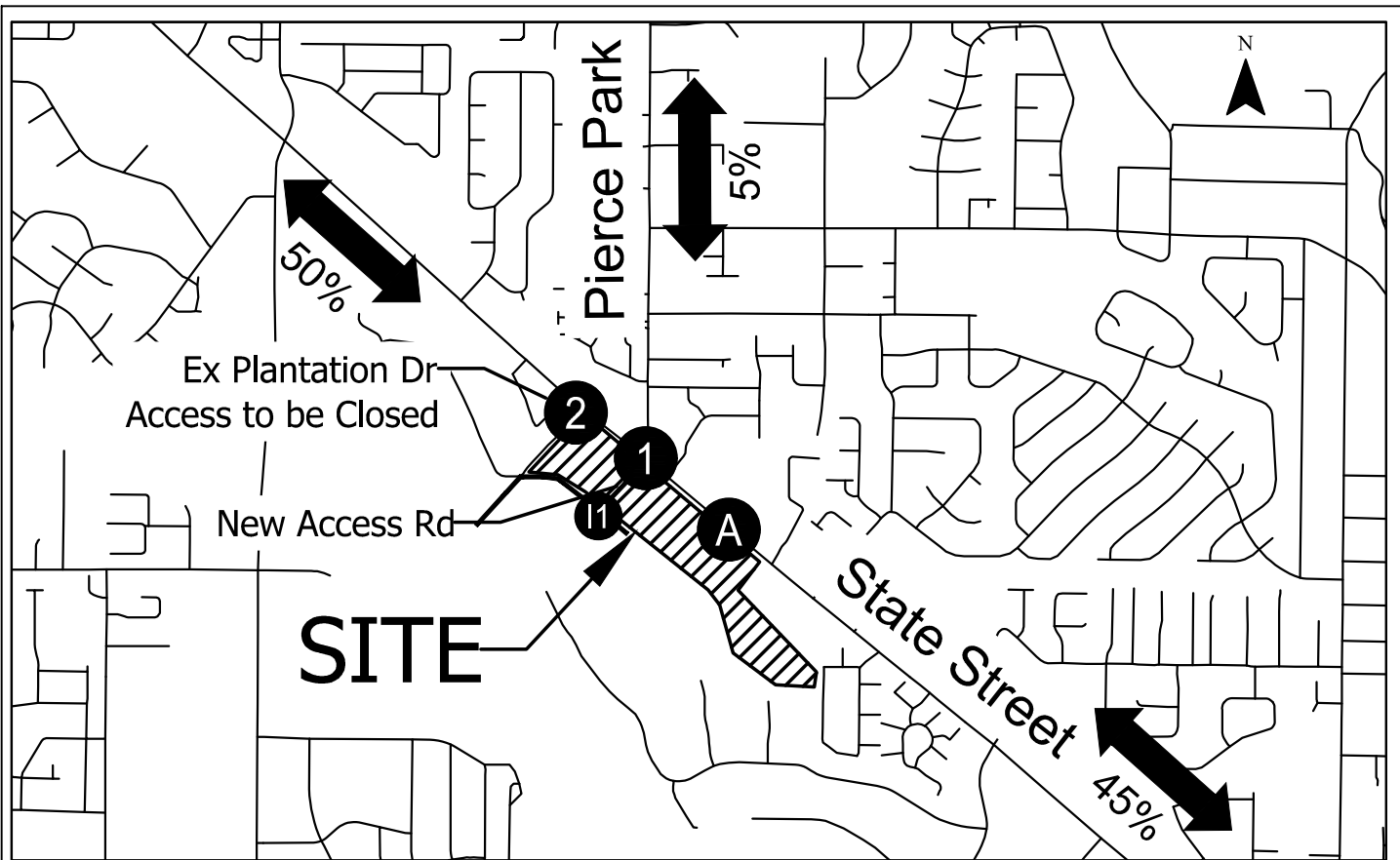
Figures 7, 8, and 9 show the site-generated trips at the study intersections for the three access scenarios:

- **Access Scenario 1 – No Additional Access Driveways:** Pierce Park Lane access only via the new North-South Street.
- **Access Scenario 2 – With Site Access A:** With the proposed eastern right-in/right-out/left-in site access on State Street approximately opposite the Zamzows driveway on State Street.
- **Access Scenario 3 – Site Access A and the Plantation Drive:** With the proposed western right-in/right-out access at the approximate location of the existing Plantation Drive and the proposed Site Access A.

RE-ROUTING OF EXISTING TRIPS ON PLANTATION DRIVE

With the proposed development, traffic from the golf club and other residential traffic using Plantation Drive will be rerouted to the Pierce Park Lane / State Street intersection via the East-West Street and North-South Street connections. Figure 10 shows the re-routed trips.

H:\27\27838 - River Club Mixed-Use Development\report\figs\27838 River Club Figures-Updated-Updated For Resp to Com.dwg Jan 20, 2023 - 1:51pm - jringert Layout Tab: Figure 6 Trip Dist



- ## - External Study Intersections
- ## - Internal Study Intersections

Estimated Trip Distribution Pattern

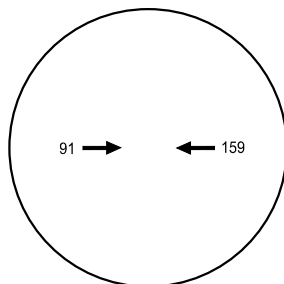
Garden City, Idaho

Figure
6

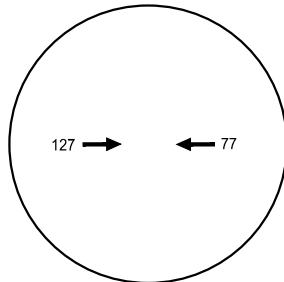


Plantation Dr
/ State St

AM Peak Hour

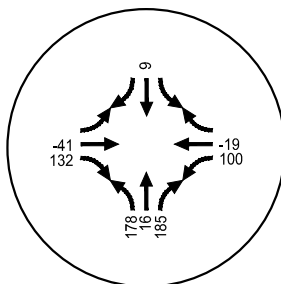


PM Peak Hour

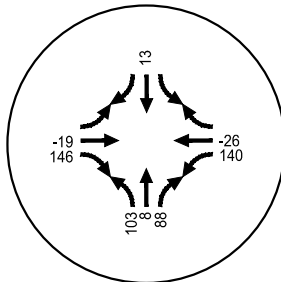


Pierce Park Ln
/ State St / N-S Street

AM Peak Hour

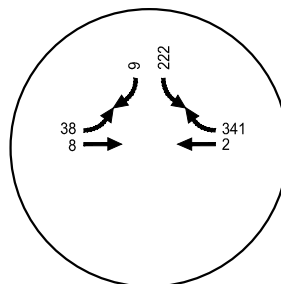


PM Peak Hour

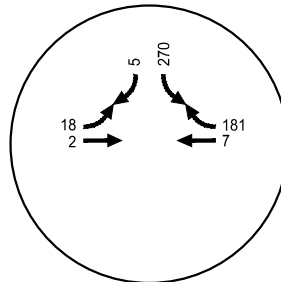


N-S Street
/ E-W Street

AM Peak Hour

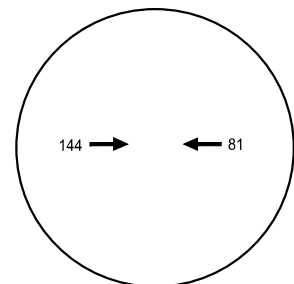


PM Peak Hour

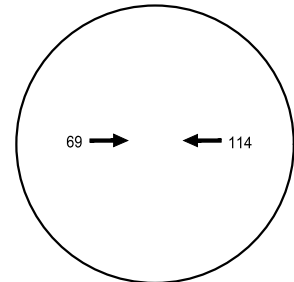


Zamzows
/ State St

AM Peak Hour



PM Peak Hour



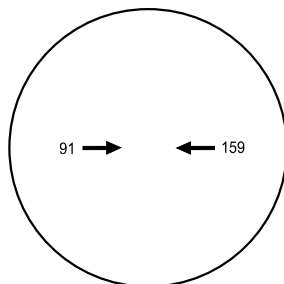
Site Generated Trips
Access Scenario 1
Garden City, Idaho

Figure
7

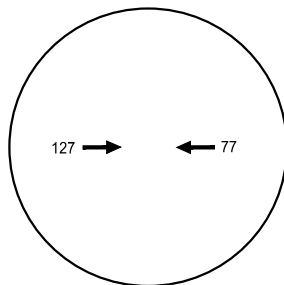


Plantation Dr
/ State St

AM Peak Hour

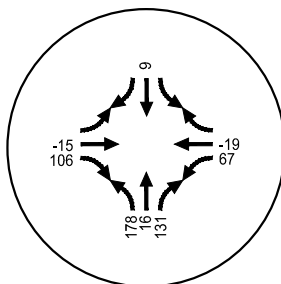


PM Peak Hour

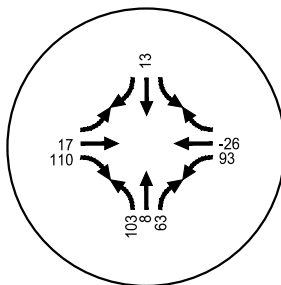


Pierce Park Ln
/ State St / N-S Street

AM Peak Hour

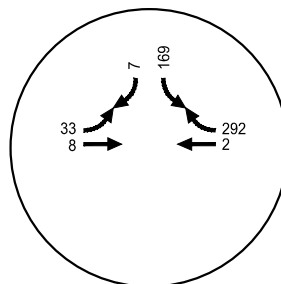


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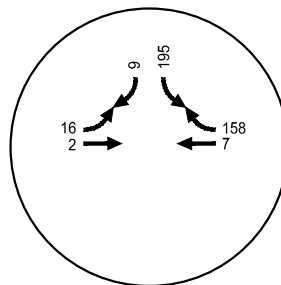


N-S Street
/ E-W Street

AM Peak Hour

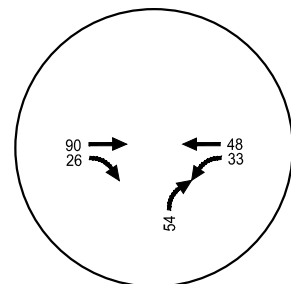


PM Peak Hour

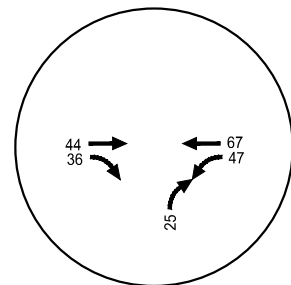


Zamzows
/ State St / Site Access A

AM Peak Hour



PM Peak Hour

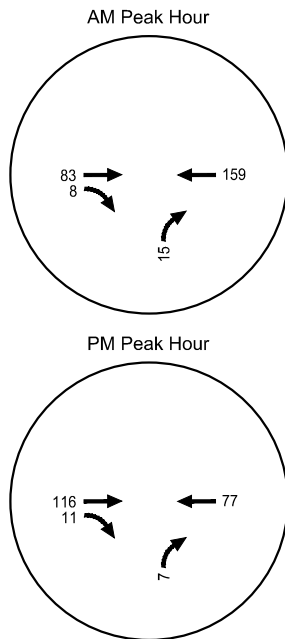


Site Generated Trips
Access Scenario 2
Garden City, Idaho

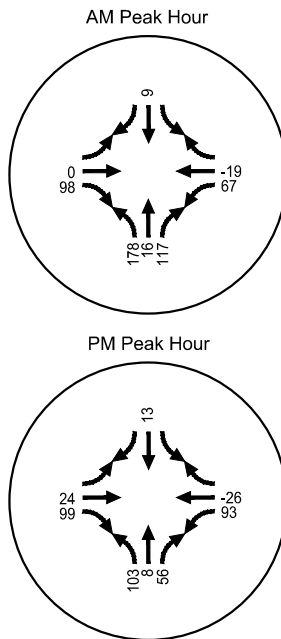
Figure
8



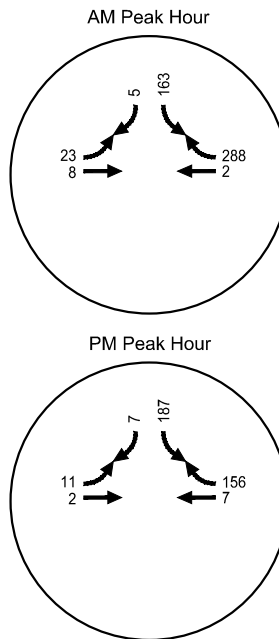
Plantation Dr Access
/ State St



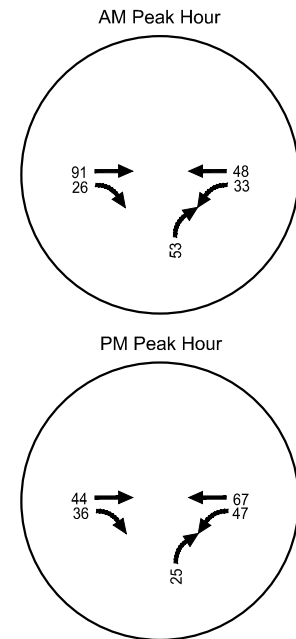
Pierce Park Ln
/ State St / N-S Street



N-S Street
/ E-W Street



Zamzows
/ State St / Site Access A



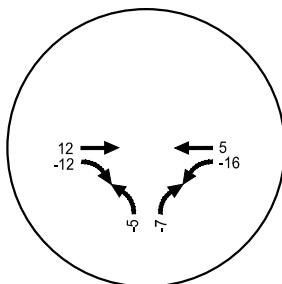
Site Generated Trips
Access Scenario 3
Garden City, Idaho

Figure
9

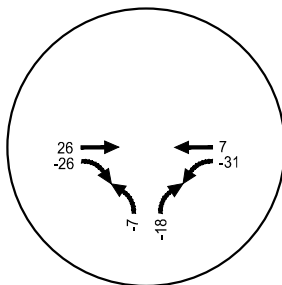


Plantation Dr
/ State St

AM Peak Hour

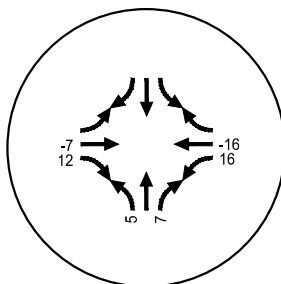


PM Peak Hour

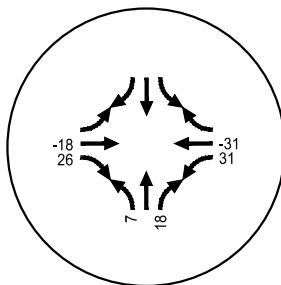


Pierce Park Ln
/ State St / N-S Street

AM Peak Hour

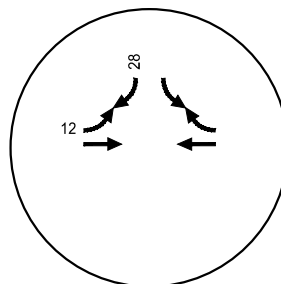


PM Peak Hour

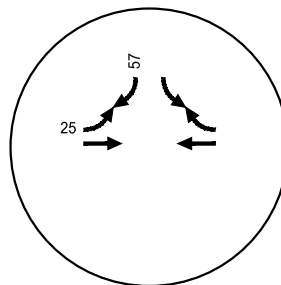


N-S Street
/ E-W Street

AM Peak Hour

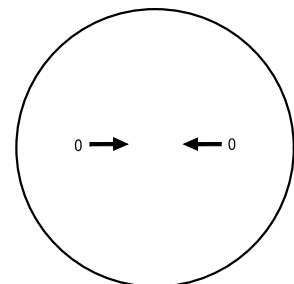


PM Peak Hour

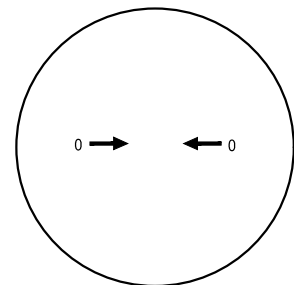


Zamzows
/ State St

AM Peak Hour



PM Peak Hour



Plantation Drive Rerouted Trips
To New North-South Street
Garden City, Idaho

Figure
10

YEAR 2027 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate with the traffic generated by The Residences at River Club Development. The 2027 background traffic volumes (Figure 4 and Figure 5) were added to the site-generated traffic (Figures 7-9) and the re-routed Plantation Drive trips (Figure 10) to arrive at the Year 2027 total traffic.

YEAR 2027 TOTAL TRAFFIC CONDITIONS INTERSECTION OPERATIONS

This section presents the traffic operations results for three access scenarios that were evaluated.

- **Access Scenario 1 – No Additional Access:** Pierce Park Lane Access Only
- **Access Scenario 2 – With Site Access A:** With the proposed eastern right-in/right-out/left-in site access on State Street, approximately opposite the Zamzows driveway.
- **Access Scenario 3 – Plantation Drive and Site Access A:** With the proposed western right-in/right-out access at the existing Plantation Drive and the proposed Site Access A.

Access Scenario 1 – No Additional Access Driveways

Table 8 presents the traffic operations results for each study intersection and its corresponding lane groups under 2027 total traffic conditions for Access Scenario 1 during the weekday AM and PM peak hours. Figure 11 and Figure 12 present the weekday AM and PM 2027 total traffic volumes for the existing lane configurations and ACHD planned lane configurations on State Street, respectively. In both lane configuration scenarios traffic on Plantation Drive is assumed to be re-routed to the new North-South Street to access the Pierce Park/State Street intersection which is proposed as part of the development. *Appendix H contains the Year 2027 total traffic conditions Synchro worksheets.*

As Table 8 shows, all study intersections operate acceptably during the year 2027 total traffic weekday AM and PM peak hours except for:

- **Pierce Park Lane / State Street (AM & PM peak hours – Existing Lane Configuration):**
 - The overall intersection V/C ratio exceeds the ACHD threshold of 0.90 during both the weekday AM and PM peak hours.
 - The eastbound through-right lane group operates with V/C ratio that exceeds the ACHD threshold for lane groups of 1.0 during the weekday AM peak hour.
 - The eastbound left-turn movement operates with a V/C ratio that exceeds the ACHD threshold for lane groups of 1.0 during the weekday PM peak hour. This movement V/C ratio can be mitigated through signal timing split adjustments to provide more green time for the eastbound left-turn movement.
 - The intersection operates acceptably in the shoulder peak hours. The shoulder peak hours are further discussed in the mitigations section.

Table 8. Year 2027 Total Traffic Intersection Operations – Access Option 1

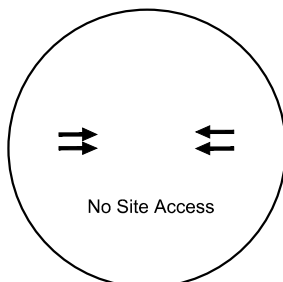
No.	Intersection	Intersection Control	Intersection AM/PM			Lane Group	Weekday AM Peak Hour			Weekday PM Peak Hour		
			V/C	LOS	Delay		V/C	LOS	Delay	V/C	LOS	Delay
1	Pierce Park Lane / State Street	Traffic Signal (Existing Lane Configuration)	0.97 / 0.95	E / D	61.2 / 41.2	NBL	0.96	F	103.6	0.36	D	49.9
						NBTR	0.71	E	71.0	0.40	E	61.3
						SBL	0.87	F	80.7	0.30	D	42.4
						SBTR	0.89	F	92.2	0.50	E	56.1
						EBL	0.48	B	19.4	1.50	F	329.1
						EBT	0.99	E	63.8	0.57	B	13.9
						EBTR	1.01	F	68.7	0.57	B	13.4
						WBL	0.93	F	99.8	0.54	B	12.9
						WBT	0.49	C	26.9	0.81	C	25.9
			WBR	0.49	C	26.9	0.83	C	27.0			
			Shoulder Peak Hours (6:45-7:45 AM & 5:30-6:30 PM) – With Timing Split Adjustments									
			0.78 / 0.86	D / D	38.8 / 43.9	NBL	0.71	E	58.1	0.70	E	79.9
						NBTR	0.44	E	71.0	0.47	E	69.1
						SBL	0.44	D	49.6	0.52	E	71.8
						SBTR	0.59	E	65.4	0.71	F	81.4
						EBL	0.32	B	17.0	0.98	F	126.5
						EBT	0.77	D	36.9	0.63	C	23.4
						EBR	0.78	D	37.2	0.63	C	23.5
						WBL	0.48	C	34.7	0.58	C	21.0
						WBT	0.37	C	23.3	0.84	D	41.4
			WBR	0.37	C	23.3	0.84	D	41.9			
			Mitigated – NB & SB Dual Left Turn Lanes / EB & WB Right Turn Lanes									
			0.85 / 0.86	D / E	52.5 / 41.7	NBL	0.83	F	86.6	0.91	F	129.5
						NBTR	0.71	E	71.0	0.43	E	64.0
						SBL	0.89	F	98.6	0.97	F	149.9
						SBTR	0.86	F	86.9	0.72	E	77.6
						EBL	0.91	F	104.5	0.95	F	114.3
						EBT	0.92	D	42.6	0.54	B	16.3
						EBR	0.21	C	20.5	0.18	B	11.7
						WBL	0.80	E	58.5	0.48	B	15.5
						WBT	0.49	C	30.6	0.90	D	38.8
			WBR	0.13	C	24.8	0.17	B	17.6			
		Traffic Signal (ACHD Config)	0.82 / 0.75	D / D	41.6 / 40.5	NBL	0.46	D	43.3	0.35	D	53.1
						NBTR	0.78	E	75.7	0.42	E	62.6
						SBL	0.72	D	51.2	0.45	E	55.7
						SBTR	0.03	D	47.5	0.04	D	53.2
						SBR	0.74	E	64.9	0.74	E	71.2
						EBL	0.47	C	21.6	0.92	F	96.9
						EBT	0.81	D	39.8	0.54	C	24.6
						EBTR	0.81	D	43.4	0.54	C	25.6
						WBL	0.72	D	41.4	0.58	C	23.4
		WBT	0.38	C	28.2	0.83	D	41.1				
		WBR	0.13	C	24.8	0.21	C	25.6				
2	Plantation Drive / State Street – No Access at this Intersection Under this Scenario											
A	Zamzows Driveway / State Street – No Access at this Intersection Under this Scenario											
11	N-S Street / E-W Street	AWSC		B / B	11.1 / 10.8	SBL	0.41	B	12.9	0.47	B	13.2
						SBR	0.06	A	7.8	0.09	A	7.6
						EBLT	0.10	A	9.0	0.08	A	8.8
						WBTR	0.45	B	10.7	0.26	A	8.9

V/C ratio is defined as vehicle-to-capacity ratio, which calculates the number of vehicles divided by the capacity of the roadway/intersection during the peak 15 minutes of the peak hour. LOS stand for Level of Service. Delay is reported in seconds per vehicle. Cells in the table above that are **bolded**, *italicized*, and **highlighted** indicate an intersection and/or lane group operating below the jurisdictional standards.

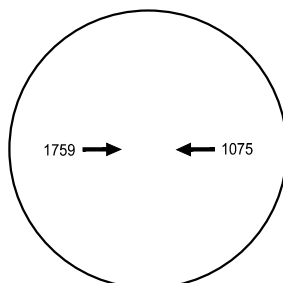


Plantation Dr
/ State St

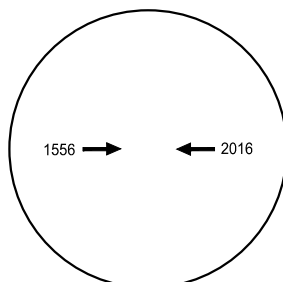
Lane Configuration



AM Peak Hour

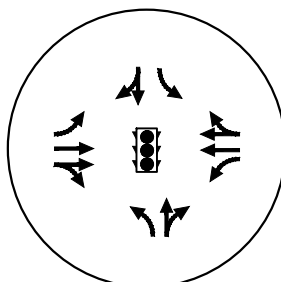


PM Peak Hour

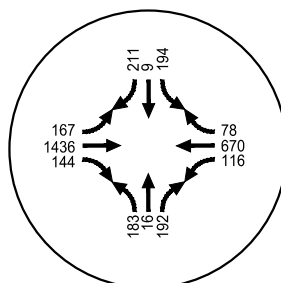


Pierce Park Ln
/ State St / N-S Street

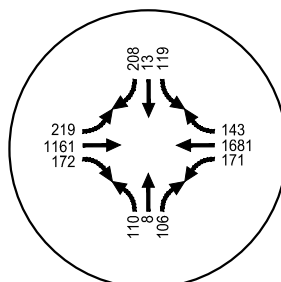
Lane Configuration



AM Peak Hour

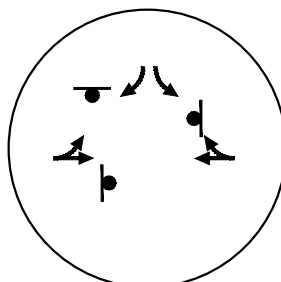


PM Peak Hour

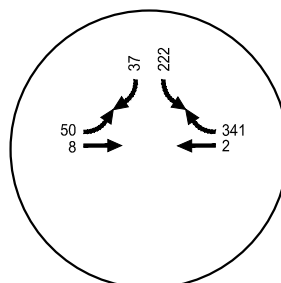


N-S Street
/ E-W Street

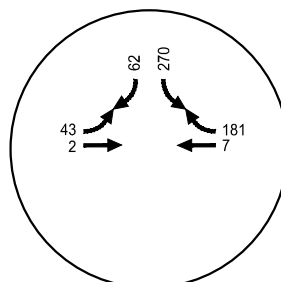
Lane Configuration



AM Peak Hour

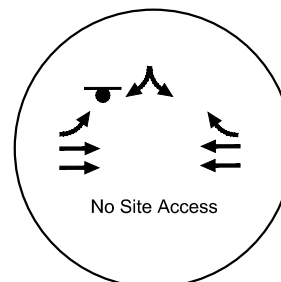


PM Peak Hour

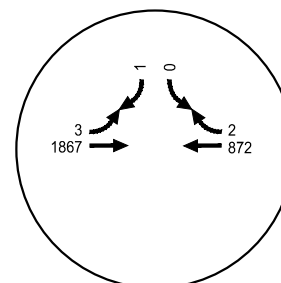


Zamzows
/ State St

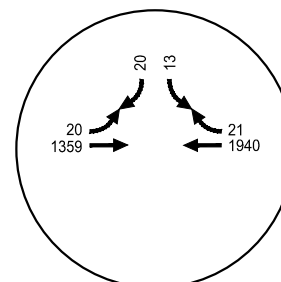
Lane Configuration



AM Peak Hour



PM Peak Hour



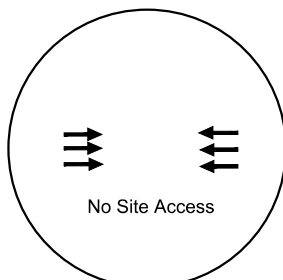
2027 Total Lane Configurations & Volumes - Without ACHD Project
Access Scenario 1
Garden City, Idaho

Figure
11

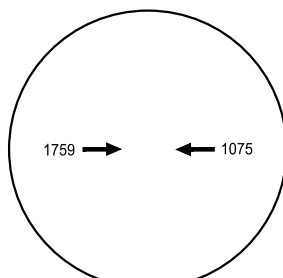


Plantation Dr
/ State St

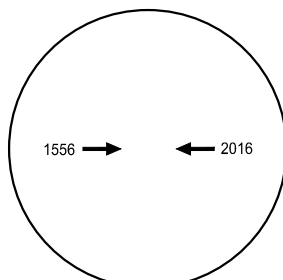
Lane Configuration



AM Peak Hour

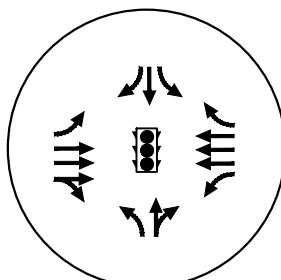


PM Peak Hour

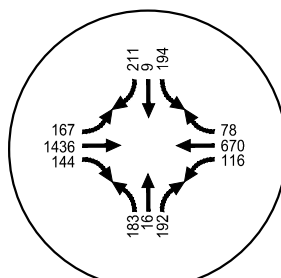


Pierce Park Ln
/ State St / N-S Street

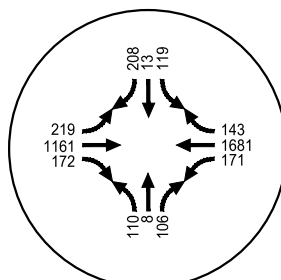
Lane Configuration



AM Peak Hour

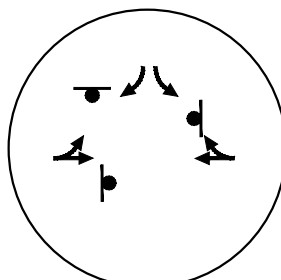


PM Peak Hour

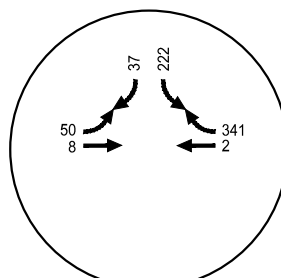


N-S Street
/ E-W Street

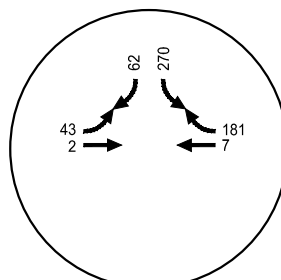
Lane Configuration



AM Peak Hour

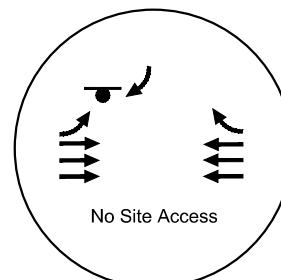


PM Peak Hour

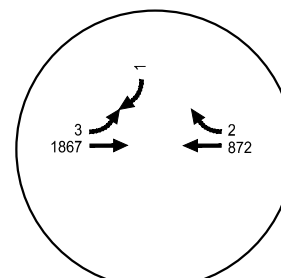


Zamzows
/ State St

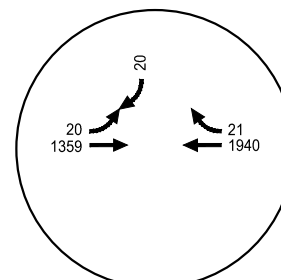
Lane Configuration



AM Peak Hour



PM Peak Hour



2027 Total Lane Configurations & Volumes - With ACHD Project
Access Scenario 1
Garden City, Idaho

Figure
12

Access Scenario 1 Mitigations

Pierce Park Lane / State Street – Existing Lane Configuration on State Street

To meet ACHD policy during the weekday peak hours, the following improvements were determined to mitigate the intersection operations:

- Addition of northbound and southbound dual-left-turn lanes.
- Addition of eastbound and westbound right-turn lanes.

With these improvements and adjusting the splits to allow for more green time for the eastbound left-turn movement in the weekday PM peak hour, the intersection meets ACHD policy with respect to traffic operations.

Alternatively, the proposed improvements to the Pierce Park Lane / State Street intersection that are scheduled for construction in 2025 will mitigate the intersection operations as shown in Table 8.

Access Scenario 2 – Eastern Driveway Rin/Rout/Lin

Table 9 presents the traffic operations results for each study intersection and its corresponding lane groups under 2027 total traffic conditions for Access Scenario 2 during the weekday AM and PM peak hours. Figure 13 and Figure 14 present the weekday AM and PM 2027 total traffic volumes for the existing lane configurations and ACHD planned lane configurations on State Street, respectively. *Appendix I contains the Year 2027 total traffic conditions Synchro worksheets.*

Under the “With ACHD Project” alternative shown in Figure 14, the southbound left-turn movements that currently use the Zamzows (Eastern Driveway) driveway intersection were assumed to re-route through the adjacent development to Mackenzie Lane. This route was determined to be more likely for drivers to take than turning right onto State Street and making a U-turn at Pierce Park Lane. This only affects the 13 southbound left-turning vehicles in the weekday PM peak hour at the Zamzows Driveway.

Similar to Access Scenario 1, all study intersections operate acceptably during the year 2027 total traffic weekday AM and PM peak hours except for:

- **Pierce Park Lane / State Street (AM & PM peak hours - Existing Lane Configuration):**
 - The overall intersection V/C ratio exceeds the ACHD threshold of 0.90 during both the weekday AM and PM peak hours.
 - The eastbound left-turn movement operates with a V/C ratio that exceeds the ACHD threshold for lane groups of 1.0 during the weekday PM peak hour. This movement V/C ratio can be mitigated through signal timing split adjustments to provide more green time for the eastbound left-turn movement.
 - The intersection operates acceptably in the shoulder peak hours. The shoulder peak hours are further discussed in the mitigations section.

It should be noted that ACHD policy requires the evaluation of traffic signal warrants at unsignalized intersections that operate at LOS D or worse during the peak hour. While the Zamzows / State Street / Site Access A intersection has movements that operate below LOS D, the ACHD improvement project at the Pierce Park Lane / State Street intersection includes installation of a median restricting left-turn movements from the side streets. Additionally, a signal at this location would not meet ACHD policy. Therefore, signal warrants at the intersection were not evaluated.

Table 9. Year 2027 Total Traffic Intersection Operations – Access Scenario 2

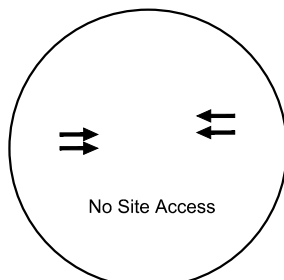
No.	Intersection	Intersection Control	Intersection AM/PM			Lane Group	Weekday AM Peak Hour			Weekday PM Peak Hour		
			V/C	LOS	Delay		V/C	LOS	Delay	V/C	LOS	Delay
1	Pierce Park Lane / State Street	Traffic Signal (Existing Lane Configuration)	0.96 / 0.95	D / D	53.5 / 41.1	NBL	0.96	F	114.7	0.36	D	49.9
						NBTR	0.50	E	60.8	0.32	E	59.0
						SBL	0.71	F	60.8	0.28	D	41.9
						SBTR	0.89	F	96.8	0.50	E	56.1
						EBL	0.48	B	19.9	1.50	F	329.1
						EBT	0.96	F	61.4	0.55	B	12.4
						EBR	0.98	F	65.8	0.56	B	12.4
						WBL	0.76	F	60.2	0.40	B	11.1
						WBT	0.49	C	27.4	0.81	C	25.9
						WBR	0.49	C	27.4	0.83	C	27.0
			Shoulder Peak Hours (6:45-7:45 AM & 5:30-6:30 PM) – With Timing Split Adjustments									
			0.76 / 0.86	D / D	36.2 / 44.3	NBL	0.71	E	58.1	0.62	E	68.4
						NBTR	0.50	E	60.7	0.34	E	61.3
						SBL	0.46	D	47.1	0.43	E	62.6
						SBTR	0.59	E	65.4	0.66	E	73.5
						EBL	0.32	B	17.0	0.99	F	127.9
						EBT	0.77	C	34.5	0.63	C	23.3
						EBR	0.78	C	34.7	0.63	C	23.3
						WBL	0.48	C	27.4	0.45	C	20.2
			WBT	0.37	C	23.3	0.86	D	44.7			
			WBR	0.37	C	23.3	0.87	D	45.3			
		Mitigated – NB & SB Dual-Left Turn Lanes / EB & WB Right Turn Lanes										
		0.82 / 0.86	D / C	50.7 / 41.2	NBL	0.83	F	86.6	0.91	F	129.5	
					NBTR	0.50	E	60.7	0.34	E	61.3	
					SBL	0.89	F	98.6	0.97	F	149.9	
					SBTR	0.86	F	86.9	0.72	E	78.1	
					EBL	0.91	F	104.5	0.95	F	114.3	
					EBT	0.91	D	41.0	0.54	B	15.2	
					EBR	0.16	B	19.0	0.14	B	10.3	
					WBL	0.64	D	42.1	0.38	B	14.9	
		WBT	0.49	C	30.6	0.90	D	38.0				
		WBR	0.13	C	24.8	0.17	B	17.3				
		Traffic Signal (ACHD Config)	0.77 / 0.74	D / C	38.6 / 39.8	NBL	0.46	D	43.3	0.35	D	53.1
						NBR	0.58	E	62.8	0.33	E	60.1
						SBL	0.61	D	45.1	0.41	E	54.8
						SBT	0.03	D	47.5	0.04	D	53.2
						SBR	0.74	E	64.9	0.74	E	71.2
						EBL	0.47	C	21.6	0.92	E	96.9
						EBT	0.79	D	37.4	0.52	C	23.0
						EBR	0.79	D	40.4	0.52	C	23.9
						WBL	0.56	C	32.9	0.45	B	21.9
						WBT	0.38	C	28.2	0.83	C	41.1
						WBR	0.13	C	24.8	0.21	C	25.6
2	Plantation Drive / State Street - No Access at this Intersection Under this Scenario											
A	Zamzows Driveway / State Street / Site Access A	TWSC (Site Access Rin/Rout/Lin) (Zamzows Full Access)	- / -	- / -	- / -	NBR	0.24	C	24.0	0.07	C	15.0
						WBL	0.12	C	19.0	0.10	B	13.1
						EBL	0.00	A	9.8	0.07	C	17.9
						SBLRT	0.00	B	11.5	0.38	F	69.3
		TWSC (ACHD Config) (Rin/Rout/Lin)	- / -	- / -	- / -	NBR	0.27	D	28.3	0.08	C	16.8
						WBL	0.27	E	42.8	0.19	C	22.5
						EBL	0.01	B	13.3	0.15	E	36.6
						SBR	0.00	B	12.6	0.09	C	23.1
11	N-S Street / E-W Street	AWSC	- / -	A / A	9.7 / 9.3	SBL	0.31	B	11.1	0.33	B	11.0
						SBR	0.05	A	7.6	0.09	A	7.5
						EBLT	0.08	A	8.6	0.07	A	8.4
						WBTR	0.37	A	9.4	0.21	A	8.3

V/C ratio is defined as vehicle-to-capacity ratio, which calculates the number of vehicles divided by the capacity of the roadway/intersection during the peak 15 minutes of the peak hour. LOS stand for Level of Service. Delay is reported in seconds per vehicle. Cells in the table above that are **bolded**, *italicized*, and **highlighted** indicate an intersection and/or lane group operating below the jurisdictional standards.

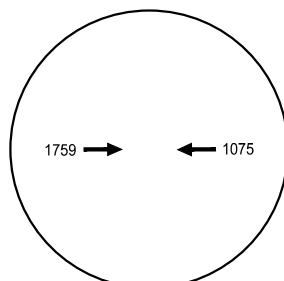


Plantation Dr
/ State St

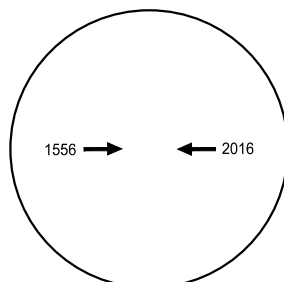
Lane Configuration



AM Peak Hour

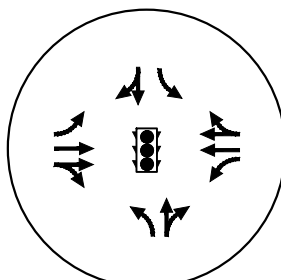


PM Peak Hour

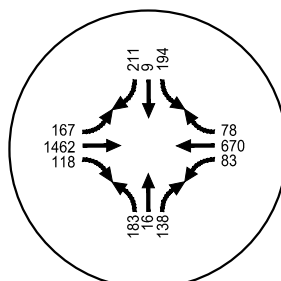


Pierce Park Ln
/ State St / N-S Street

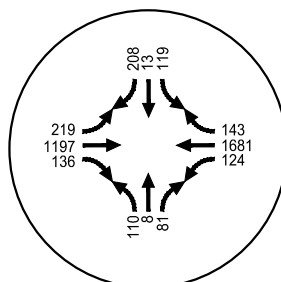
Lane Configuration



AM Peak Hour

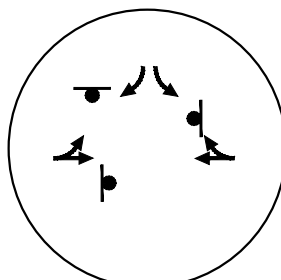


PM Peak Hour

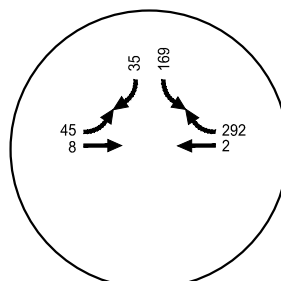


N-S Street
/ E-W Street

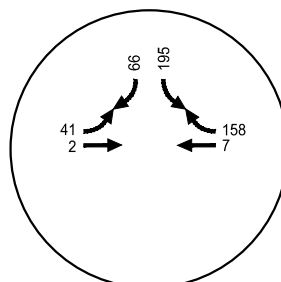
Lane Configuration



AM Peak Hour

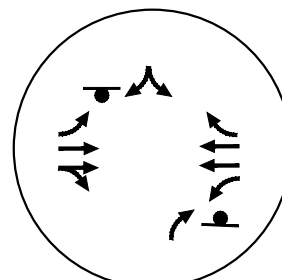


PM Peak Hour

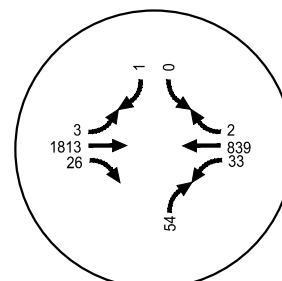


Zamzows
/ State St / Site Access A

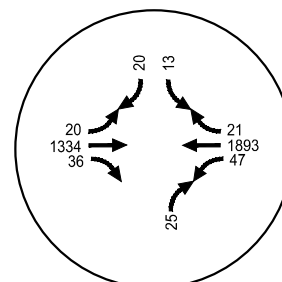
Lane Configuration



AM Peak Hour



PM Peak Hour



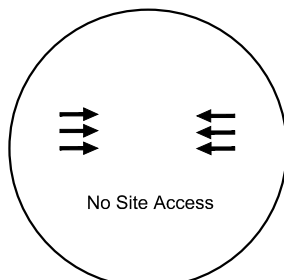
2027 Total Lane Configurations & Volumes - Without ACHD Project
Access Scenario 2
Garden City, Idaho

Figure
13

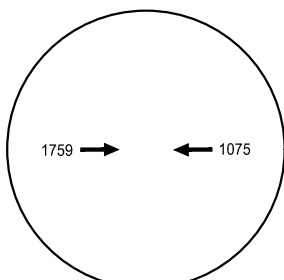


Plantation Dr
/ State St

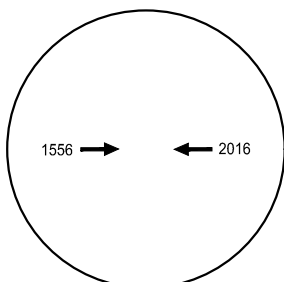
Lane Configuration



AM Peak Hour

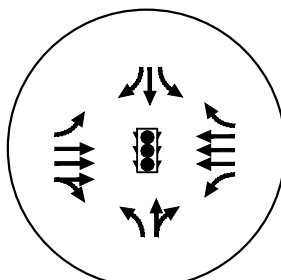


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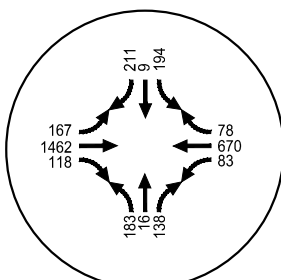


Pierce Park Ln
/ State St / N-S Street

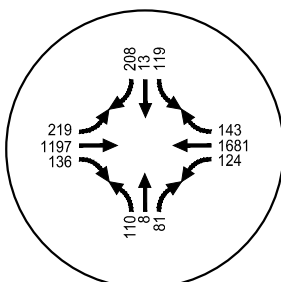
Lane Configuration



AM Peak Hour

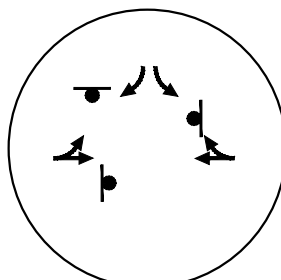


PM Peak Hour

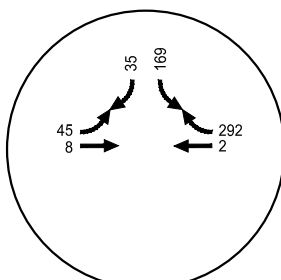


N-S Street
/ E-W Street

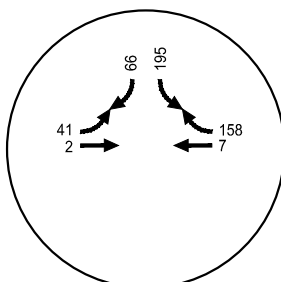
Lane Configuration



AM Peak Hour

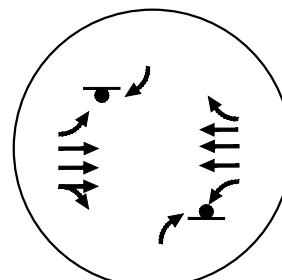


PM Peak Hour

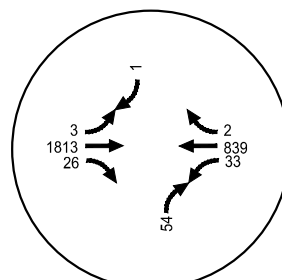


Zamzows
/ State St / Site Access A

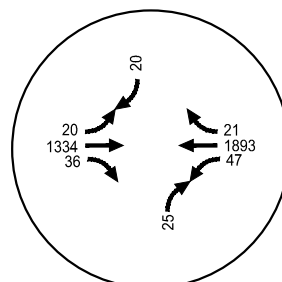
Lane Configuration



AM Peak Hour



PM Peak Hour



2027 Total Lane Configurations & Volumes - With ACHD Project
Access Scenario 2
Garden City, Idaho

Figure
14

Access Scenario 2 Mitigations

Pierce Park Lane / State Street – Existing Lane Configuration on State Street

Similar to Access Scenario 1, the following improvements were determined to mitigate the intersection operations during the weekday peak hours:

- Addition of northbound and southbound dual-left-turn lanes.
- Addition of eastbound and westbound right-turn lanes.

With these improvements and adjusting the splits to allow for more green time for the eastbound left-turn movement in the weekday PM peak hour, the intersection meets ACHD policy with respect to traffic operations.

Alternatively, the proposed improvements to the Pierce Park Lane / State Street intersection that are scheduled for construction in 2025 will mitigate the intersection operations as shown in Table 9.

Access Scenario 3 – Eastern Driveway Rin/Rout/Lin & Plantation Dr Rin/Rout

Table 10 presents the traffic operations results for each study intersection and its corresponding lane groups under 2027 total traffic conditions for Access Scenario 3 during the weekday AM and PM peak hours. Figure 15 and Figure 16 present the weekday AM and PM 2027 total traffic volumes for the existing lane configurations and ACHD planned lane configurations on State Street, respectively. *Appendix J contains the Year 2027 total traffic conditions Synchro worksheets.*

As Table 10 shows, and similar to Access Scenarios 2 and 3, all study intersections operate acceptably during the year 2027 total traffic weekday AM and PM peak hours except for:

- **Pierce Park Lane / State Street (AM & PM peak hours – Existing Lane Configuration):**
 - The overall intersection V/C ratio exceeds the ACHD threshold of 0.90 during both the weekday AM and PM peak hours.
 - The eastbound left-turn movement operates with a V/C ratio that exceeds the ACHD threshold for lane groups of 1.0 during the weekday PM peak hour. This movement V/C ratio can be mitigated through signal timing split adjustments to provide more green time for the eastbound left-turn movement.
 - The intersection operates acceptably in the shoulder peak hours. The shoulder peak hours are further discussed in the mitigations section.

Similar to Access Scenario 2, traffic signal warrants were not evaluated at the Zamzows / State Street / Site Access A intersection because the ACHD improvement project at the Pierce Park Lane / State Street intersection includes installation of a median restricting left-turn movements from the side streets.

Access Scenario 3 Mitigations

Pierce Park Lane / State Street – Existing Lane Configuration on State Street

Similar to Access Scenarios 1 and 2, the following improvements were determined to mitigate the intersection operations:

- Addition of northbound and southbound dual-left-turn lanes.
- Addition of eastbound and westbound right-turn lanes.

With these improvements and adjusting the splits to allow for more green time for the eastbound left-turn movement in the weekday PM peak hour, the intersection meets ACHD policy with respect to traffic operations.

Alternatively, the proposed improvements to the Pierce Park Lane / State Street intersection that are scheduled for construction in 2025 will mitigate the intersection operations as shown in Table 10.

Table 10. Year 2027 Total Traffic Intersection Operations – Access Scenario 3

No.	Intersection	Intersection Control	Intersection AM/PM			Lane Group	Weekday AM Pk Hour			Weekday PM Pk Hour		
			V/C	LOS	Delay		V/C	LOS	Delay	V/C	LOS	Delay
1	Pierce Park Lane / State Street	Traffic Signal (Existing Lane Configuration)	0.97 / 0.95	E / D	53.7 / 41.0	NBL	0.96	F	103.6	0.36	D	49.9
						NBTR	0.44	E	59.0	0.29	E	58.4
						SBL	0.68	E	57.0	0.28	D	41.8
						SBTR	0.89	F	92.2	0.51	E	56.3
						EBL	0.48	B	19.4	1.50	F	329.1
						EBT	0.96	E	56.5	0.55	B	12.4
						EBR	0.98	E	59.6	0.56	B	12.4
						WBL	0.76	D	53.0	0.40	B	11.1
						WBT	0.49	C	26.9	0.81	C	25.9
						WBR	0.49	C	26.9	0.83	C	27.0
			Shoulder Peak Hours (6:45-7:45 AM & 5:30-6:30 PM) – With Timing Split Adjustments									
			0.76 / 0.86	D / D	36.0 / 43.5	NBL	0.71	E	58.1	0.66	E	71.9
						NBTR	0.44	E	59.0	0.32	E	61.8
						SBL	0.44	D	46.9	0.43	E	63.3
						SBTR	0.59	E	65.4	0.69	E	76.6
						EBL	0.32	B	17.0	0.99	F	127.9
						EBT	0.77	C	34.6	0.62	C	22.5
						EBR	0.78	C	34.7	0.62	C	22.5
						WBL	0.48	C	27.5	0.44	B	19.6
						WBT	0.37	C	23.3	0.85	D	43.0
						WBR	0.37	C	23.4	0.86	D	43.6
			Mitigated – NB & SB Dual-Left Turn Lanes / EB & WB Right Turn Lanes									
		0.81 / 0.86	D / D	51.8 / 41.2	NBL	0.83	F	86.6	0.91	F	129.5	
					NBTR	0.44	E	59.0	0.31	E	60/6	
					SBL	0.89	F	98.6	0.97	F	149.9	
					SBR	0.86	F	86.9	0.72	E	78.1	
					EBL	0.96	F	120.7	0.95	F	114.3	
					EBT	0.92	D	42.0	0.55	B	15.2	
					EBR	0.15	B	18.8	0.13	B	10.2	
					WBL	0.65	D	43.3	0.38	B	15.0	
					WBT	0.48	C	29.8	0.90	D	38.0	
					WBR	0.13	C	24.2	0.17	B	17.3	
		Traffic Signal (ACHD Config)	0.77 / 0.74	D / D	38.4 / 39.8	NBL	0.46	D	43.4	0.35	D	53.1
						NBR	0.52	E	60.8	0.30	E	59.5
						SBL	0.58	D	44.3	0.41	D	54.5
						SBT	0.03	D	47.5	0.04	D	53.2
						SBR	0.74	E	64.9	0.74	E	71.2
						EBL	0.47	C	21.6	0.92	F	96.9
						EBT	0.79	D	37.5	0.52	C	23.0
						EBR	0.79	D	40.6	0.52	C	23.8
						WBL	0.56	C	33.1	0.44	C	21.9
						WBT	0.38	C	28.2	0.83	D	41.1
						WBR	0.13	C	24.8	0.21	C	25.6
2	Plantation Drive / State	TWSC (Ex Config & Rin/Rout)	- / -	- / -	- / -	NBR	0.06	C	19.7	0.02	C	16.0
			- / -	- / -	- / -	NBR	0.07	C	22.2	0.03	C	17.9
A	Zamzows Driveway / State Street / Site Access	TWSC (Site Access Rin/Rout/Lin) (Zamzows Full Access)	- / -	- / -	- / -	NBR	0.23	C	23.9	0.07	C	15.0
						WBL	0.12	C	19.0	0.10	B	13.1
						EBL	0.00	A	9.8	0.08	C	17.9
						SBLRT	0.00	B	11.5	0.38	F	69.3
		TWSC (ACHD Config) (Rin/Rout/Lin)	- / -	- / -	0.6 / 0.9	NBR	0.27	D	28.1	0.08	C	16.8
						WBL	0.27	E	42.8	0.19	C	22.5
EBL	0.01					B	13.3	0.15	E	36.6		
SBR	0.00					B	12.6	0.09	C	23.1		
11	N-S Street / E-W Street	AWSC	- / -	A / A	9.6 / 9.2	SBL	0.29	B	10.9	0.32	B	10.8
						SBR	0.05	A	7.6	0.09	A	7.4
						EBLT	0.07	A	8.4	0.06	A	8.4
						WBTR	0.36	A	9.2	0.21	A	8.2

V/C ratio is defined as vehicle-to-capacity ratio, which calculates the number of vehicles divided by the capacity of the roadway/intersection during the peak 15 minutes of the peak hour. LOS stand for Level of Service. Delay is reported in seconds per vehicle. Cells in the table above that are **bolded**, *italicized*, and **highlighted** indicate an intersection and/or lane group operating below the jurisdictional standards.



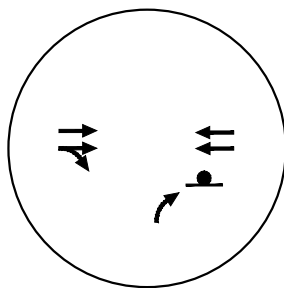
Plantation Dr Access
/ State St

Pierce Park Ln
/ State St / N-S Street

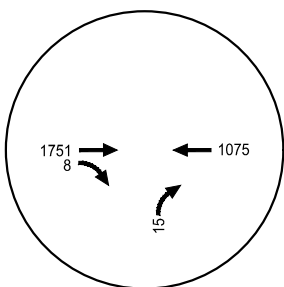
N-S Street
/ E-W Street

Zamzows
/ State St / Site Access A

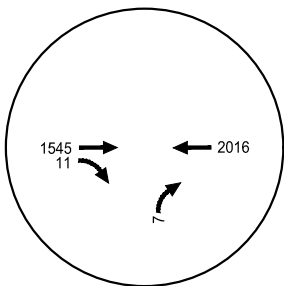
Lane Configuration



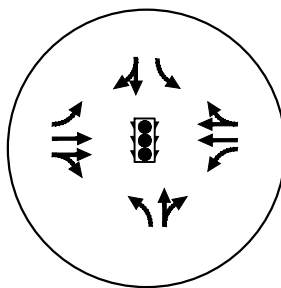
AM Peak Hour



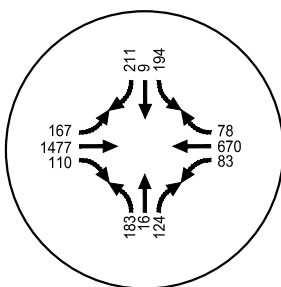
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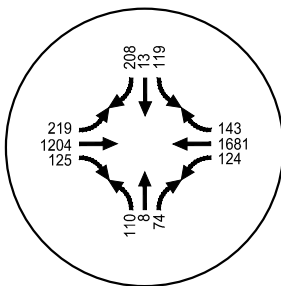
Lane Configuration



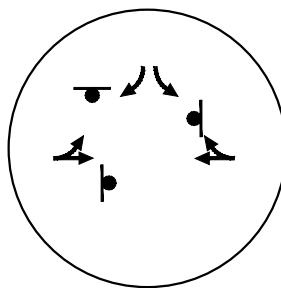
AM Peak Hour



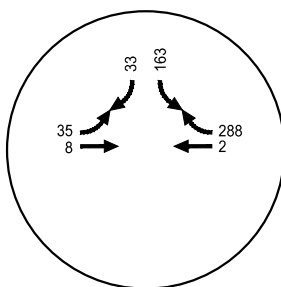
PM Peak Hour



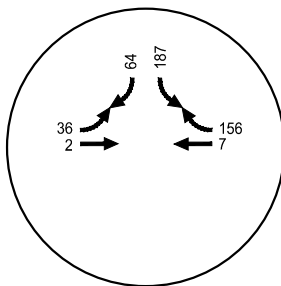
Lane Configuration



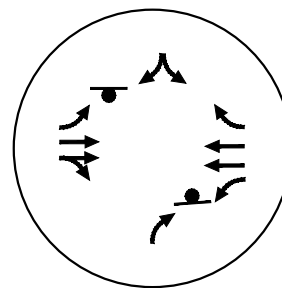
AM Peak Hour



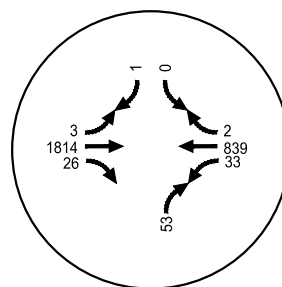
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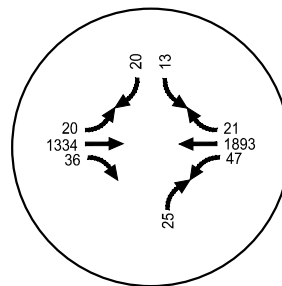
Lane Configuration



AM Peak Hour



PM Peak Hour



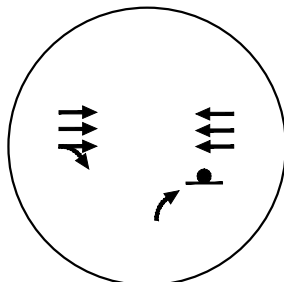
2027 Total Lane Configurations & Volumes - Without ACHD Project
Access Scenario 3
Garden City, Idaho

Figure
15

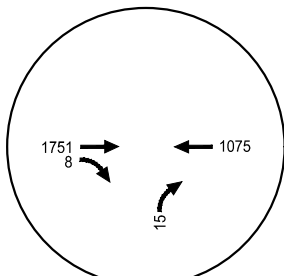


Plantation Dr Access
/ State St

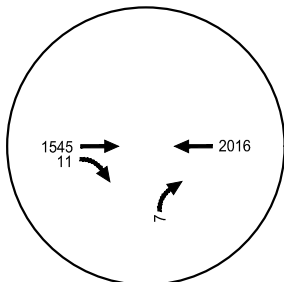
Lane Configuration



AM Peak Hour

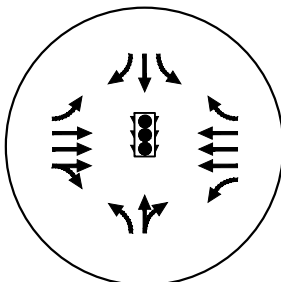


PM Peak Hour

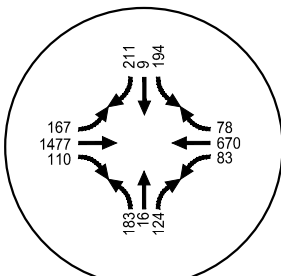


Pierce Park Ln
/ State St / N-S Street

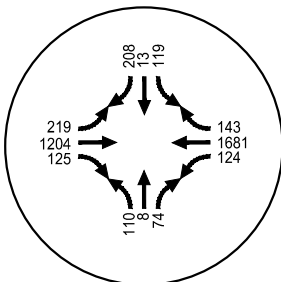
Lane Configuration



AM Peak Hour

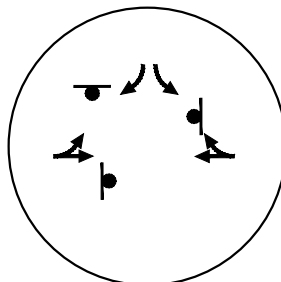


PM Peak Hour

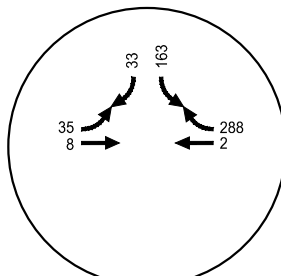


N-S Street
/ E-W Street

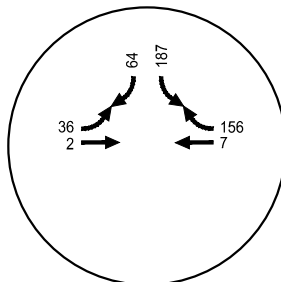
Lane Configuration



AM Peak Hour

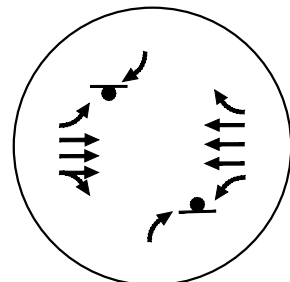


PM Peak Hour

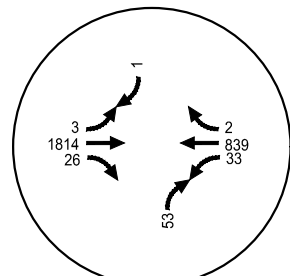


Zamzows
/ State St / Site Access A

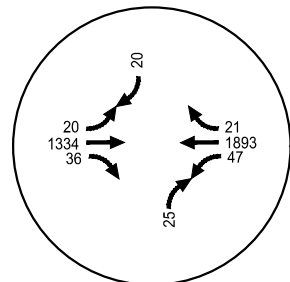
Lane Configuration



AM Peak Hour



PM Peak Hour



2027 Total Lane Configurations & Volumes - With ACHD Project
Access Scenario 3
Garden City, Idaho

Figure
16

ALTERNATIVE MITIGATION EVALUATION

ACHD Policy Manual, Section 7106.7.1 provides guidance for determining mitigation measures. Mitigation can include construction of feasible improvements, revising the phasing plan to coincide with the ACHD capital projects, or alternative mitigations if standard mitigations are determined not to be feasible.

Feasibility of Mitigations

Due to the mitigations identified above impacting properties not owned by the River Club, the mitigations described in the previous section were determined to not be feasible to construct by River Club without ACHD acquiring right-of-way. The existing north leg of Pierce Park Lane would require widening for the additional southbound left-turn lane and the northwest quadrant of the intersection would be impacted by the addition of the westbound right-turn lane.

Additionally, the lane configuration proposed in the mitigations is different than the proposed configuration in the ACHD improvement project and therefore, would result in the interim widening being removed in a brief time.

Alternative Mitigation Measures

In the case of mitigations being infeasible to construct by a private development, Section 7106.7.3 of the ACHD Policy Manual states the following:

- If the impacted roadway segments and/or intersections are programmed in the Integrated Five-Year Work Plan (IFYWP) or the Capital Improvements Plan (CIP); no alternative mitigation is required.
- If the impacted roadway segments and/or intersections are not programmed in either the IFYWP or the CIP; the applicant may (i) analyze the shoulder hour and (ii) provide a safety analysis to determine alternative mitigation requirements.
 - If the impacted roadway segments and intersections meet the minimum acceptable level of service planning thresholds in the shoulder hour the applicant may suggest feasible alternative mitigation such as: sidewalks, bike facilities, connectivity, safety improvements; etc. within 1.5 miles of the proposed development.
 - If the shoulder hour planning thresholds are exceeded the applicant may request to enter into a Development Agreement and pay into the Priority Corridor Fund an amount determined by the ACHD to offset impacts from the project.

While the proposed improvements to the Pierce Park Lane / State Street intersection are scheduled in the IFYWP for construction in 2025 and will mitigate the intersection operations as shown in Table 8, Table 9 and Table 10, ACHD has indicated that the IFYWP project is subject to change and therefore should not be assumed as being constructed in 2025 as shown in the program. Therefore, ACHD has requested an evaluation of alternative mitigations.

As shown in Table 8, Table 9 and Table 10, the intersection operates acceptably in the shoulder peak hours which therefore allows for the applicant to suggest feasible alternative mitigations such as sidewalks, bike facilities, connectivity, and safety improvements. Based a review of alternative mitigations, the most significant need in this area of State Street is a wider and separated multi-use sidewalk or path.

Exhibit 2 shows a photo of the current multi-use pathway which is narrow and close to the traffic lanes on State Street. A bicycle and pedestrian walking opposite directions were observed on this section of pathway and the pedestrian was forced off the pathway into the grass by the bicycle.

Therefore, as an alternative mitigation, construction of a multi-use sidewalk that is at least 10-feet wide with a buffer from the State Street travel lanes is recommended.



Exhibit 2. Existing Multi-Use Pathway Along Site Frontage

YEAR 2027 TOTAL TRAFFIC CONDITIONS ROADWAY SEGMENT ANALYSIS

No roadway segments were studied based on discussion during the scoping process with ACHD.

YEAR 2027 TOTAL TRAFFIC QUEUING

An analysis of the 95th percentile queuing at the study intersections and site accesses was prepared to identify locations where intersection queues may extend beyond the available storage distance. Table 11 shows the projected 95th percentile queue lengths under 2027 total traffic conditions. *Queuing worksheets are provided with the total traffic conditions analysis worksheets in Appendices H-K.*

Table 11. Year 2027 95th Percentile Queuing Analysis

No.	Intersection	Lane Group	Storage Available (ft)	95 th Queue (ft) AM/PM			
				Background	Scenario 1	Scenario 2	Scenario 3
Without ACHD Improvements at Pierce Park Lane / State Street Intersection							
1	Pierce Park Lane / State Street	NBL	260' (Prop) ¹	NA	225' / 175'	225' / 175'	225' / 175'
		NBTR	260' (Prop) ¹	NA	350' / 200'	250' / 175'	225' / 150'
		SBL	80'	325' / 225'	225' / 175'	150' / 175'	150' / 175'
		SBTR	NA	400' / 350'	450' / 300'	450' / 300'	450' / 300'
		EBL	105' (TWLTL)	100' / 425'	150' / 675'	150' / 675'	150' / 675'
		WBL	TWLTL	NA	300' / 100'	100' / 75'	100' / 75'
2	Plantation Drive / State Street	NBR	50' (Prop)	25' /	NA	NA	25' /25'
A	Site Access A / Zamzows / State Street	NBR	200'dist	NA	NA	25' / 25'	25' / 25'
		WBL	TWLTL	NA	NA	25' / 25'	25' / 25'
		EBL	TWLTL	NA	NA	25' / 25'	25 / 25'
I1	N-S Street / E-W Street	WBLT	NA	NA	NA	50' / 25'	50' / 25'
		EBTR	NA	NA	NA	25' / 25'	25' / 25'
		SBL	50' (Prop)	NA	NA	50' / 50'	50' / 50'
		SBR	260' ¹	NA	NA	25' / 25'	25' / 25'
With ACHD Improvements at Pierce Park Lane / State Street Intersection							
1	Pierce Park Lane / State Street	NBL	260' (Prop) ¹	NA	275' / 175'	275' / 175'	275' / 175'
		NBTR	260' (Prop) ¹	NA	275' / 225'	275' / 175'	250' / 150'
		SBL	140'	325' / 225'	300' / 75'	275' / 75'	275' / 50'
		SBR	150'	400' / 350'	375' / 350'	375' / 350'	350' / 350'
		EBL	500'	100' / 450'	175' / 425'	175' / 425'	175' / 425'
		WBL	280'	NA	150' / 175'	100' / 125'	100' / 125'
		WBR	200'	50' / 125'	100' / 175'	100' / 175'	100' / 175'
2	Plantation Drive / State Street	NBR	50' (Prop)	NA	NA	NA	25' /25'
A	Site Access A / Zamzows / State Street	NBR	200'	NA	NA	50' / 25'	50' / 25'
		WBL	100' (Prop)	NA	NA	50' / 25'	50' / 25'
		EBL	150'	NA	NA	25' / 25'	25' / 25'
I1	N-S Street / E-W Street	WBLT	NA	NA	NA	50' / 25'	50' / 25'
		EBTR	NA	NA	NA	25' / 25'	25' / 25'
		SBL	50' (Prop)	NA	NA	50' / 50'	50' / 50'
		SBR	260' ¹	NA	NA	25' / 25'	25' / 25'

-Queues assume 25' vehicle length and queues rounded up to the nearest whole vehicle

-Cells in the table above that are **bolded**, *italicized*, and **highlighted** indicate an intersection and/or lane group operating below the jurisdictional standards.

¹ Storage Length reported is distance to adjacent intersection.

As shown in Table 11, the following queues are not accommodated based on the existing lane configuration of State Street without the planned ACHD improvements at the Pierce Park Lane / State Street intersection:

Pierce Park Lane/State Street Intersection (Without ACHD Improvements):

- **Northbound Through-Right (Scenario 1, AM):** The northbound through-right queue is projected to exceed the on-site storage distance between State Street and the new East-West Street under Access Scenario 1 during the AM peak hour.

- **Southbound Left-Turn (Background & All Scenarios):** While no site traffic is added to this movement, it was found that the queue lengths exceed the available storage during both peak hours and under all three access scenarios. The existing conditions analysis identified that the striped queue storage distance is exceeded under existing conditions as well. The storage distance is not negatively impacted by the site development.

Pierce Park Lane/State Street Intersection (With ACHD Improvements):

- **Northbound Left-Turn (All Scenarios, AM):** The northbound left-turn queue is projected to exceed the on-site storage distance between State Street and the new East-West Street under all three access scenarios during the AM peak hour. But the queue is only projected to exceed the storage by only approximately 15 feet (275 feet vs 260 feet of distance) assuming the left-turn lane extends the distance between State Street and the new East-West Street.
- **Northbound Through-Right (Scenarios 1 & 2, AM):** The northbound through-right queue is projected to exceed the on-site storage distance between State Street and the new East-West Street under Access Scenarios 1 and 2 during the AM peak hour. But with the other accesses at Site Access A and Plantation Drive, northbound right-turning vehicles will have other alternate routes with much less queuing which is anticipated to result in less queueing due to other alternatives being available during the peak periods.
- **Southbound Left-Turn (Background & All Scenarios, AM & PM):** While no site traffic is added to this movement, the projected queue length was found to exceed the planned available storage during both peak hours and under all three access scenarios. The existing conditions analysis identified that the existing striped queue storage distance is exceeded under existing conditions which will only be increased from 80 feet to 140 feet with the ACHD project. The storage distance is not negatively impacted by the site development.
- **Southbound Right-Turn (Background & All Scenarios, AM & PM):** While no site traffic is added to this movement, it was found that the queue is projected to exceed the available storage during both peak hours and under all three access scenarios. While the right-turn queue indicates the need for 375 feet, that distance likely will be shorter due to the impacts of right-turns on red. But it is likely to still exceed the planned storage in the ACHD design of 150 feet. The storage distance is not negatively impacted by the site development.

For the southbound left-turn and right-turn lanes, the storage distance was designed by ACHD based on their evaluation of the storage needs for their design project and limitations with respect to right-of-way. Mitigation would require significantly increasing the lengths of the southbound left-turn lane and southbound right-turn lane. But that would require significant additional right-of-way for ACHD to acquire for their project. Therefore, because the development does not negatively impact the southbound storage needs and it is assumed ACHD studied the intersection in more detail than in this TIS and had right-of-way constraints, additional mitigation is not proposed.

For the northbound left-turn and through-right queuing, only the left-turn queuing slightly exceeds the available storage under the proposed Access Scenario 3. Since the queue only exceeds the storage by 15' during the peak 15 minutes of the PM peak hour, mitigation may not be necessary. But in order to ensure the development has flexibility in the future, the following is recommended:

- **Pierce Park Lane / State Street:** Design the northbound approach to include separate left-turn and through-right lanes that extend the length of the North-South Street and include a wide enough median to accommodate dual-left turn lanes if they are needed in the future. This will provide flexibility to work with ACHD in the future if dual northbound left-turn lanes are determined to be needed and beneficial to the intersection operations. An analysis of dual northbound left-turn lanes determined that the 95th percentile queue will be approximately 150 feet with two left turn lanes. Exhibit 2 shows an illustration of the proposed design layout.

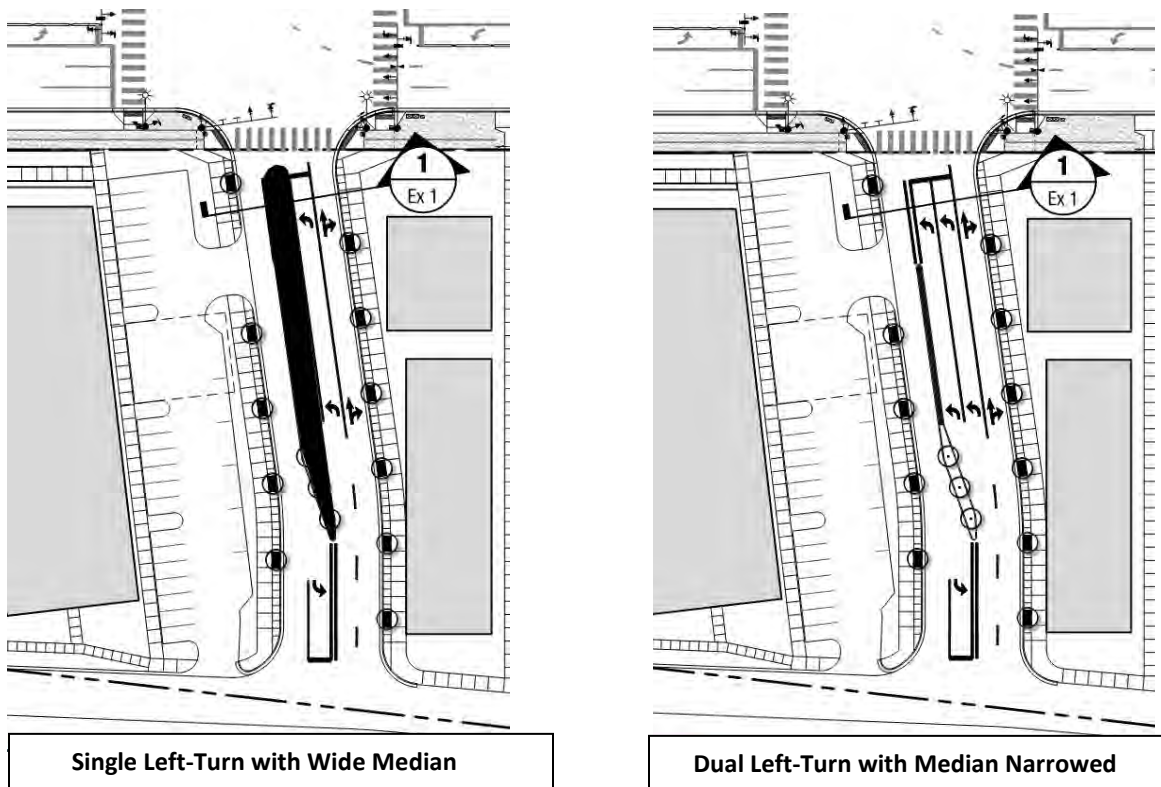


Exhibit 3. North-South Street Design for Future Dual NB Lefts if Needed in Future

MITIGATION TIMING & THRESHOLD EVALUATION

For each of the mitigations identified, the percentage of site trips at the intersection was evaluated, the threshold with respect to the amount site development was estimated and approximate year of need for the mitigation was estimated. Table 12 shows the recommended mitigations and thresholds.

Table 12. Mitigation Threshold Evaluation

Intersection or Roadway	Ex. Need?	Bkgd Need?	In ACHD CIP?	Percent of Site Traffic at Buildout ¹	Mitigation Need	Proposed Mitigation	Approx. Year of Need	Addl. Peak Hour Trips (TEV)	Estimated Amount of (Dev % / #Units)
Without ACHD Pierce Park / State Street Project									
Pierce Park Lane / State Street	No	No	IFYWP 2025	Scenario 1 16.4% AM / 11.0% PM Scenario 2 14.2% AM / 9.4% PM Scenario 3 14.0% AM / 9.2% PM	Add NB & SB Dual Left-Turn plus EB & WB RT Lanes OR ACHD Project	Wait for ACHD to Complete the Intersection Project or Alternative Mitigation	2024	139 / 155	15% / 113

¹ **Bold** indicates that segment volume exceeds ACHD policy during the respective peak hour.

² Presented percentage is average of AM and PM peak hours.

As described in the operations analysis sections, the Pierce Park Lane / State Street intersection is projected to operate with a V/C ratio 0.87 during the weekday PM peak hour under existing traffic conditions and 0.89 during

the weekday PM peak hour under 2027 background traffic conditions. Therefore, the intersection is projected to be within approximately 3% and 1% of the ACHD V/C threshold of 0.90 under existing conditions and 2027 background traffic conditions, respectively. A sensitivity analysis was done to determine the level of development that could be accommodated beyond the re-routing of Plantation Drive to the Pierce Park Lane / State Street intersection. It was found that approximately 15% of the development (113 units and 4,500 square feet of commercial) can be accommodated while meeting ACHD V/C ratio thresholds for the intersection and the critical eastbound left-turn and westbound through movements.

Based on the small amount of development that can be accommodated without intersection improvements and the feasibility challenges with implementing the interim improvements that would be needed, it was determined that the best option is to wait for the ACHD project before starting development or obtain ACHD approval for an alternative mitigation. Even if an alternative mitigation is allowed, the re-routing of Plantation Drive to the signal would still require significant intersection and signal improvements. Assuming the proposed ACHD intersection improvement project that is planned for construction in 2025 stays on schedule, the development should be able to coincide with the ACHD improvements without significant delay to the project.

TURN LANE WARRANT ANALYSIS

Turn lane warrants were analyzed for the site accesses. The warrant analysis used the ACHD guidelines as presented in Section 7106.4.4 of the *ACHD Policy Manual*. Because State Street is being widened to have three through lanes in each direction (six lanes), the ACHD turn lane figures do not fully apply since they only go up to two through lanes in each direction (four lanes). In order to evaluate the need for turn lanes for the six-lane configuration on State Street planned by ACHD with the Pierce Park Lane/State Street intersection, the through traffic volumes were reduced to 66.7% of total traffic to account for the traffic in the third lane and the four-lane analysis procedure was used.

Table 13 shows the results of the turn lane analysis at the site access locations and intersections assuming State Street as a four-lane and six-lane roadway. *Appendix L contains the worksheets for the turn lane warrant analysis.*

Table 13. Site Access Turn Lane Analysis Results

Site Access	Proposed Access Type	Turn Lane	Warranted
Site Access A / State Street	Right-in/Right-out/Left-in	WB Left-Turn Lane (Existing TWLTL) EB Right-Turn Lane	Yes for 4 & 6 Lanes (Existing Turn Lane) Yes for 4-Lanes & No for 6-Lanes
Plantation Dr Access	Right-in/Right-out	EB Right-Turn Lane	No for 4 & 6 Lanes

As shown in Table 13, based on ACHD's Policy Manual turn lanes are warranted at the following site access locations:

- **Zamzows / State Street / Site Access A:**
 - Westbound left-turn lane (current TWLTL exists)
 - Eastbound right-turn lane if State Street remains with four lanes (two through lanes in each direction)

SITE ACCESS EVALUATION

This section evaluates the access location and intersection sight distance with respect to ACHD Policy Manual. All analyses and evaluation in this section is based on full build-out of the site in Year 2027.

SITE ACCESS SPACING

Site accesses were reviewed for spacing as per *ACHD Policy 7207.4.6* which outlines criteria for approving local streets and private driveway along arterials located away from signalized intersections. Exhibit 3 shows the location of the site accesses with respect to the planned ACHD improvement project.

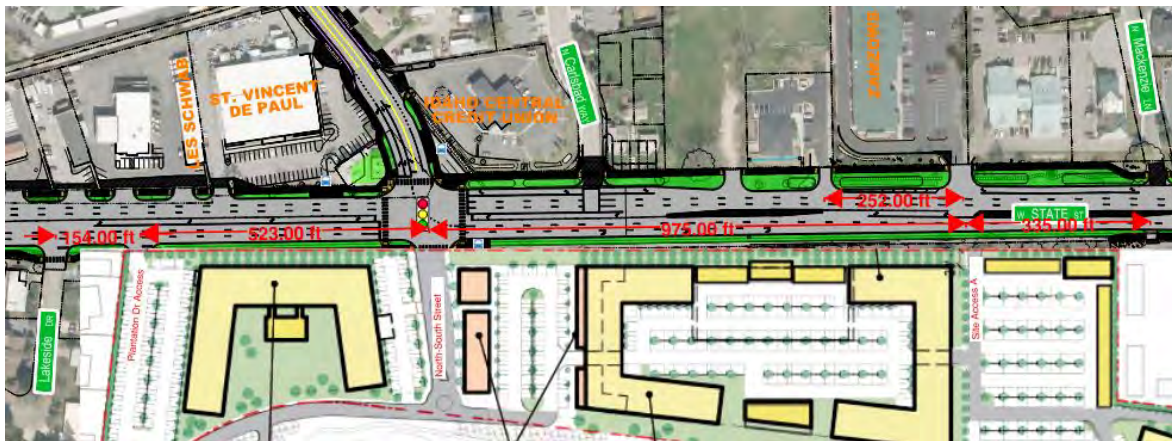


Exhibit 4. Site Access Locations and Spacing

North-South Street / State Street

This proposed site access will be a private street located at the Pierce Park / State Street intersection. The access will be constructed by ACHD as part of the improvement project at the intersection. With the proposed development, this new street will serve as the re-route for Plantation Drive traffic. It is our understanding that an easement will be provided for access to properties that currently use Plantation Drive for access.

Due to this access being included in the ACHD design of the intersection and in an agreement between ACHD and the River Club, no analysis was conducted to justify the access.

Site Access A / Zamzows Access / State Street

This proposed right-in/right-out/left-in site access driveway is located along State Street approximately 975 feet east of Pierce Park Lane and approximately 335 feet west of nearest private driveway to the west. This access will provide access to the residential buildings on the east end of the site and the ability to access the commercial uses through the development.

The driveway is proposed to generally be opposite the Zamzows access driveway on the north side of State Street but may be offset the east slightly to ensure the left-turn movements to the site and Zamzows can be properly channelized with a raised median.

ACHD policy generally does not allow private access to a principal arterial roadway. But ACHD provides guidance on when additional driveways may be considered. ACHD policy identifies additional driveways can be considered when one or more of the following conditions are met:

- The daily volume using one driveway exceeds 5,000 vehicles (total volume for entering and exiting traffic).
- Traffic using one driveway exceeds the volume to capacity ratio (V/C) equal to or greater than 1.0 of a STOP controlled intersection during either the peak hour of the street or the peak hour of the site traffic generation.
- A District approved traffic impact study and analysis determines that conditions warrant additional driveways.

Additionally, The ACHD minimum spacing for access on a principal arterial roadway is 1,320 feet for a public street and 400 feet for a right-in/right-out driveway based on the 40 mph posted speed.

The nearest adjacent driveways are approximately 250 feet to the west (on the north side of State Street) and approximately 335' to the east (on the south side of State Street). With the ACHD intersection improvement project at Pierce Park, the driveways to east and west will be restricted to right-in/right-out. Based on a review of the ACHD policy requirements, the driveway does not meet ACHD spacing requirements due to the spacing of existing driveways on State Street. But due to the driveway aligning with the existing Zamzows driveway, overall access spacing on State Street will not be affected with Site Access A. Additionally, the restrictions in movements at the driveways included with the ACHD project will reduce interactions of traffic movements between driveways.

The projected traffic volumes indicate that the daily traffic volume on the new North-South Street will be approximately 5,050 for the development assuming no additional access. This indicates that, without this driveway or the Plantation Drive driveway, the traffic volume traffic on the North-South Street will exceed the ACHD 5,000 daily trip threshold described above.

Therefore, based on the policy requirements and the results of the traffic operations analysis, the driveway should be approved for the following reasons:

- The access driveway is planned to align with the existing Zamzows driveway and will not impact the overall access spacing on State Street.
- Without this access, approximately 5,050 daily vehicle trips would be on the North-South Street.
- The access is projected to serve approximately 880 daily trips decreasing the North-South Street access to approximately 4,170 daily trips.
- Based on the operations analysis the access will result in a small improvement in traffic operations at the Pierce Park Lane/State Street intersection.

Plantation Drive Site Access / State Street

This proposed site access is located at the existing Plantation Drive intersection near the site's western boundary and is located approximately 525 feet west of Pierce Park Lane and approximately 155 feet east of Lakeside Drive. This access will provide access to the residential building on the west side of the development and allow for better on-site circulation and for access by deliveries and trash service.

ACHD policy generally does not allow private access to a principal arterial roadway. ACHD policy guidance is similar to previously presented which identifies that additional driveways may be considered when one or more of the following conditions are met:

- The daily volume using one driveway exceeds 5,000 vehicles (total volume for entering and exiting traffic).

- Traffic using one driveway exceeds the volume to capacity ratio (V/C) equal to or greater than 1.0 of a STOP controlled intersection during either the peak hour of the street or the peak hour of the site traffic generation.
- A District approved traffic impact study and analysis determines that conditions warrant additional driveways.

Additionally, The ACHD minimum spacing for a private driveway on a principal arterial roadway of 400 feet for a right-in/right-out driveway based on the 40mph posted speed.

Based on a review of the ACHD policy requirements, the driveway does not meet ACHD spacing requirements due to the spacing of existing driveways on State Street. But the driveway will not impact the existing access spacing since Plantation Drive exists today and is not planned for closure with the ACHD improvement project. An eastbound right-turn lane also was determined not to be required and therefore, the spacing being Lakeside Drive and the Plantation Drive Access does not need to accommodate a right-turn lanes east of Lakeside Drive.

The projected traffic volumes indicate the daily traffic volume on the new North-South Street will be approximately 5,050 without Site Access A and approximately 4,170 with Site Access A. Therefore, the trips would not meet the ACHD 5,000 daily trip threshold assuming Site Access A is approved.

Due to the driveway being only right-in/right-out only, the operations analysis indicated that the access does not have an impact on the operations of the Pierce Park Lane / State Street intersection.

Therefore, based on the policy requirements and the results of the traffic operations analysis, the driveway should be approved for the following reasons:

- The access driveway is planned to be in the same location as the existing Plantation Drive intersection.
- An eastbound right-turn lane was determined not to be required and therefore the spacing being Lakeside Drive and the Plantation Drive Access does not need to accommodate a right-turn lane.
- Lakeside Drive is used to access a small residential area and therefore the volumes at Lakeside Drive and Plantation Drive will be low and also be restricted to right-in/right-out only which will reduce many of the issues with traffic conflicts occurring at closely spaced driveways.
- Without this access or Site Access A, approximately 5,050 daily vehicle trips would be on the North-South Street.

INTERSECTION SIGHT DISTANCE

Intersection sight distance was evaluated at the proposed site access locations.

Site Access A / State Street

From Site Access A on State Street, site distance to both the east and west is over 1,000 feet. Site distance in both directions meet the requirements for intersection site distance on a roadway for 40 mph of 385 feet for the left-in and right-out movements. Exhibit E provides the view to the east and west along State Street from the approximate location of the planned Site Access A.

Looking West Along State Street



Looking East Along State Street



Exhibit E. Sight Distance at the Proposed Site Access A / State Street Intersection

Plantation Drive Access / State Street

From the Plantation Drive Site Access, site distance to the east is over 1,000 feet but limited to approximately 600 feet to the west due to a fence. It is assumed that the fence will be removed with the widening of State Street by the ACHD project. Therefore, sight distance in both directions meets the requirements for intersection site distance for a right-out driveway on a roadway for 40 mph (385 feet). Exhibit F provides the view to the east and west along State Street from the approximate location of the planned access.

Looking West Along State Street



Looking East Along State Street



Exhibit F. Site Distance at the Proposed Plantation Drive Access / State Street Intersection

General Recommendations for All Site Accesses

In addition to the above sight distance evaluation, the following recommendations have been identified to ensure adequate safety and operations at the site access points, internal intersections, and roadways:

- Remove miscellaneous vegetation and shrubbery, and potential obstructions along roadways as necessary to obtain and maintain adequate intersection sight distance.

- Site accesses are assumed to match the existing grade of the connected roadway at the intersection and back at least one car length. Significant changes to the approach grade could impact the sight distances.
- Shrubbery, weeds, and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.
- When widening occurs along State Street or any of the internal site access roads, care should be taken to ensure adequate grades and intersection sight distance is maintained.
- Intersection sight distance should be analyzed as part of the final access design and roadway widening.



Section 5

Findings and Recommendations

FINDINGS AND RECOMMENDATIONS

The results of the traffic impact analysis indicate that The Residences at River Club Development can be constructed while maintaining acceptable levels of service and safety on the surrounding transportation system if the appropriate mitigations are in place. The findings of this analysis and recommendations are discussed below.

FINDINGS

YEAR 2022 EXISTING CONDITIONS

- All study intersections were found to operate acceptably during the existing weekday AM and PM peak hours.
- Crash data at the study intersections for the most recent five years (2017-2021) was analyzed to identify any existing crash trends and found the following:
 - Turning and angle crashes were the most common crash type at the study intersections accounting for approximately 38% of the reported crashes at the Pierce Park Lane / State Street intersection and both of the reported crashes at the Plantation Drive / State Street intersection.
 - There were no fatality crashes reported, however, injuries were reported in approximately 29% of the intersection crashes.

YEAR 2027 BACKGROUND TRAFFIC CONDITIONS

- ACHD has an improvement project at the Pierce Park Lane / State Street Intersection to reconstruct the approaches and install a new traffic signal. This will include widening State Street to provide three through lanes (six lanes plus a turn lane total) in each direction from Hertford Way to Ellens Ferry Drive. The ACHD Integrated Five Year Work Plan (IFYWP) has construction programmed in 2025. Therefore, the background and total traffic conditions evaluated studied the development assuming the existing four/five lane configuration of State Street and the future six/seven lane configuration that is planned for construction in 2025.
- All study intersections are expected to operate acceptably during the background weekday AM and PM peak hours under both the existing four/five lane configuration of State Street and the future six/seven lane configuration.

TRIP GENERATION & DISTRIBUTION

- The Residences at River Club Development, consisting of up to 750 multi-family units, approximately 15,000 square feet of retail uses, and approximately 15,000 square feet of restaurant uses is estimated to generate a total of approximately 4,945 daily trip ends. Of these, approximately 500 new trips will occur in the weekday AM peak hour (181 inbound / 319 outbound), and 408 new trips will occur in the weekday PM peak hour (254 inbound / 154 outbound).
- Three access scenarios were evaluated with and without the planned ACHD improvements that Pierce Park Lane / State Street intersection which include:
 - **Access Scenario 1 - No Additional Access Driveways:** North-South Street forming a south leg of the Pierce Park Lane / State Street intersection as the only access.

- **Access Scenario 2 - Site Access A:** With the proposed eastern right-in/right-out/left-in site access on State Street approximately opposite the Zamzows driveway in addition to the North-South Street.
- **Access Scenario 3 – Site Access A and Plantation Drive Access:** With the proposed western right-in/right-out access to State Street at the current location.

YEAR 2027 TOTAL TRAFFIC CONDITIONS

- Year 2027 total traffic analysis found that all study intersections are expected to operate acceptably during the weekday AM and PM peak hours, except for:
 - **Pierce Park Lane / State Street – Without ACHD Improvements**
 - Without the planned ACHD widening, the intersection V/C ratio reaches 0.97 for Access Scenarios 1 and 3 and 0.96 for Access Scenarios 2 and 3 which exceed the ACHD threshold of 0.90. Additionally, two lane group movements for Access Scenario 1 and one lane group movement for Access Scenarios 2 and 3 have a V/C ratio above the ACHD threshold of 1.00.
 - The intersection meets ACHD policy in the weekday shoulder peak hours.
 - Mitigation is needed in approximately 2024 with the rerouting of Plantation Drive to the signal and approximately 15% of the development (113 units and 4500 square feet of commercial).
 - Two traditional mitigation options were identified:
 - **Option 1 - ACHD Planned Improvements:** ACHD has their intersection improvement project scheduled for construction in 2025 which will mitigate the operations.
 - **Option 2 – Add Turn Lanes:** Add the following turn lanes to the intersection under the existing two through lanes on State Street:
 - Additional southbound left-turn lane to create dual left-turn lanes. This would require changes to the north side of the intersection which may not be possible outside of the ACHD planned improvements.
 - Additional northbound left-turn lane to create dual left-turn lanes.
 - Addition of an eastbound right-turn lane.
 - Addition of a westbound right-turn lane.

These improvements were determined not to be feasible because of the need for right-of-way on the north side of State Street and on Pierce Park Lane.
 - The following alternative mitigation measures were identified:
 - Addition of a multi-use sidewalk on the south side of State Street that will accommodate both pedestrians and bicycles.
 - The queuing analysis identified the following locations where the projected 95th percentile vehicle queues are projected to extend beyond the provided vehicle storage.
 - **Pierce Park Lane / State Street – Without ACHD Improvements**

- **Northbound Through-Right (Scenario 1, AM):** The northbound through-right queue from the Pierce Park Lane / State Street intersection is projected to exceed the on-site storage distance between State Street and the new East-West Street under Access Scenario 1 during the AM peak hour.
 - With the other accesses at Site Access A and Plantation Drive, northbound right-turning queues will be accommodated and other alternatives for northbound right-turning vehicles will be available.
- **Southbound Left-Turn (Background & All Scenarios):** While no site traffic is added to this movement, it was found that the available storage is not adequate during both peak hours and under all three access scenarios. The existing conditions analysis and site observations identified that the striped queue storage distance of 80 feet is exceeded under existing conditions and the future planned storage distance proposed in the ACHD improvements of 140' is exceeded in 2027 background traffic conditions and all the site access scenarios. The storage distance is not negatively impacted by the site development.
 - For the southbound left-turn, the storage distance was designed by ACHD based on their evaluation of the storage needs for their design project and limitations with respect to right-of-way. Therefore, no mitigation is recommended.

O Pierce Park Lane / State Street – With ACHD Improvements

- **Northbound Left-Turn (All Scenarios, AM):** The northbound left-turn queue is projected to exceed the on-site storage distance between State Street and the new East-West Street under all three access scenarios during the AM peak hour. But the queue is only project to exceed the storage by approximately 15 feet. The following should be considered:
 - Extending the left-turn lane the entire length of the North-South Street.
 - Provision of additional median width to accommodate dual northbound left-turn lanes is recommended to provide additional storage if needed. Approximately 150 feet of queue storage is needed with dual northbound left-turn lanes.
- **Northbound Through-Right (Scenarios 1 & 2 AM):** The northbound through-right queue is projected to exceed the on-site storage distance between State Street and the new East-West Street under Access Scenarios 1 and 2 during the AM peak hour.
 - With the other accesses at Site Access A and Plantation Drive, northbound right-turning vehicles will have other alternate routes with much less queuing which are anticipated to result in less queueing during the short peak periods withing the peak hours than shown in the table.
- **Southbound Left-Turn and Right-Turn Lanes (Background & All Scenarios, AM & PM):** While no site traffic is added to these movements, it was found these movements are projected to exceed the available storage during both peak hours and under all three access scenarios. The left-turn storage is exceeded with and without the ACHD planned improvements and the existing conditions analysis identified that the striped queue storage distance is exceeded under existing conditions for the existing left-turn lane. The storage distance is not negatively impacted by the site development.
 - For the southbound left-turn and right-turn lanes, the storage distance was designed by ACHD based on their evaluation of the storage needs for their design

project and limitations with respect to right-of-way. Therefore, no mitigation is recommended.

- The following off-site turn lane warrants are met under total traffic conditions:
 - **Site Access A (Right-in/Right-out/Left-in):**
 - Westbound left-turn lane (note that an existing two-way-left-turn lane (TWLTL) exists)
 - Eastbound Right Turn Lane under the existing four-lane State Street configuration. A right-turn lane was not determined to be necessary under the planned six-lane configuration of State Street.

SITE ACCESS EVALUATION

- The review of the proposed site access with respect to ACHD policy identified the following:
 - **North-South Street / State Street:** This site access will be a private street and is already included in the ACHD design for the Pierce Park Lane / State Street intersection.
 - **Site Access A / Zamzows Access / State Street:** This right-in/right-out/left-in site access will be located approximately 975 feet east of the Pierce Park Lane and provide access to the eastern portion of the site. Based on the policy requirements and the results of the traffic operations analysis, the driveway should be approved for the following reasons:
 - The access driveway is planned to align with the existing Zamzows driveway and will not impact the overall access spacing on State Street.
 - Without this access, approximately 5,050 daily vehicle trips would be on the North-South Street.
 - The access is projected to serve approximately 880 daily trips decreasing the North-South Street access to approximately 4,170 daily trips.
 - Based on the operations analysis the access will result in a small improvement in traffic operations at the Pierce Park Lane / State Street intersection.
 - **Plantation Drive Site Access / State Street:** This right-in/right-out site access will be located approximately 535 feet west of Pierce Park Lane and will provide access to the eastern portion of the site. Similar to the existing location of Plantation Drive, the access will be approximately 155 feet east of Lakeside Drive. Based on the policy requirements and the results of the traffic operations analysis, the driveway should be approved for the following reasons:
 - The access driveway is planned to be in the same location as the existing Plantation Drive intersection.
 - An eastbound right-turn lane was determined not to be required and therefore the spacing being Lakeside Drive and the Plantation Drive Access does not need to accommodate a right-turn lane.
 - Lakeside Drive is used to access a small residential area and therefore the volumes at Lakeside Drive and Plantation Drive will be low and also be restricted to right-in/right-out only which will reduce the issues with traffic conflicts occurring at closely spaced driveways.
 - Without this access or Site Access A, approximately 5,050 daily vehicle trips would be on the North-South Street.

- Adequate intersection sight distance is available at the proposed site accesses to State Street but will need to be re-checked once the widening of State Street is completed as part of the Pierce Park Lane / State Street intersection by ACHD. Following are recommendations with respect to the sight distance:
 - Remove miscellaneous vegetation and shrubbery, and potential obstructions along roadways as necessary to obtain and maintain adequate intersection sight distance.
 - Site accesses should match the existing grade of the connected roadway at the intersection and back at least one car length. Significant changes to the approach grade could impact the sight distances.
 - Shrubby, weeds, and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.
 - When widening occurs along State Street and any of the internal site access roads, care should be taken to ensure adequate grades and intersection sight distance is maintained.
 - Intersection sight distance should be analyzed as part of the final access design and roadway widening.

RECOMMENDATIONS

Based on the findings and conclusions, recommendations are provided for the buildout of The Residences at River Club Development.

YEAR 2027 TOTAL TRAFFIC CONDITIONS MITIGATIONS

The mitigations required to address the specific impacts under 2027 total traffic conditions are:

- **Pierce Park Lane / State Street (All Access Scenarios)**
 - If the project is constructed prior to the ACHD improvements, one of the following is recommended:
 - **Delay Development:** Delay development of the site until it will coincide with the ACHD improvements. The re-routing of Plantation Drive to the signal could still occur.
 - **Limit Development:** Limit the amount of development to approximately 113 residential units and approximately 4500 square feet of commercial. This would include re-routing Plantation Drive and modifying the existing traffic signal to accommodate the south leg of the intersection.
 - **Widen the Intersection (may be infeasible due to right-of-way):** Add the following turn lanes to the intersection:
 - Addition of northbound and southbound dual-left-turn lanes.
 - Addition of eastbound and westbound right-turn lanes.
 - **Alternative Mitigation:** Construct a multi-use sidewalk along the site frontage that is wide enough to accommodate pedestrians and bicycles. This would also include re-routing Plantation Drive and modifying the existing traffic signal to accommodate the south leg of the intersection.
- **North-South Street (Private Street)**

- Design the North-South Street with the following lanes:
 - Two northbound lanes and one southbound lane between the East-West Street and State Street.
 - A wide median area that could be modified to provide for dual northbound left-turn lanes.
- **Site Accesses**
 - Approve the proposed Site Access A approximately opposite the Zamzows driveway as a right-in/right-out/left-in driveway with median channelization on State Street to restrict movements.
 - Approve the proposed Plantation Drive Access as a right-in/right-out driveway with median channelization on State Street to restrict movements.
 - Additionally, the following should be done to maintain adequate intersection sight distance the site driveway and internal intersections:
 - Remove miscellaneous vegetation and shrubbery, and potential obstructions along roadways as necessary to obtain and maintain adequate intersection sight distance.
 - Match the existing grade of the connected roadway at the intersection and back at least one car length. Significant changes to the approach grade could impact the sight distances.
 - Shrubby, weeds, and landscaping near the internal intersections and site access points should be maintained to ensure adequate sight distance.
 - When widening occurs along State Street and any of the internal site access roads, care should be taken to ensure adequate grades and intersection sight distance is maintained.
 - Intersection sight distance should be analyzed as part of the final access design and roadway widening.



Section 6 References

REFERENCES

1. Ada County Highway District. *Policy Manual Section 7106*. December 16, 2020.
2. Transportation Research Board. *Highway Capacity Manual, 6th Edition*. April 2016.
3. Ada County Highway District. *ACHD 2020 Capital Improvements Plan*. Amended August 19, 2020.
4. Transportation Research Board. *Highway Capacity Manual 2000*. 2000
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7. Ada County Highway District. *Integrated Five Year Work Plan*. January 26, 2022.
8. Idaho Transportation Department. Idaho's Statewide Transportation Improvement Program. January 2016.
9. City of Garden City. *City of Garden City Future Land Use Map*. July 8, 2019.
10. Institute of Transportation Engineers. *Trip Generation Manual, 11th Edition*. September 2021.
11. Institute of Transportation Engineers. *Trip Generation Handbook*, 3rd Edition. Institute of Transportation Engineers, Washington, D.C. September 2017.



Appendix A

Proposed Scope of Work Memo and Confirmation Emails

MEMORANDUM

Date:	September 22, 2022	Project #: 27838
To:	Paige Bankhead & Mindy Wallace, ACHD Regan Hansen & Vincent Trimboli, ITD	
From:	John Ringert, P.E.	
Project:	River Club Mixed-Used Development	
Subject:	Transportation Impact Study Scope and Assumptions	

This memorandum updates the previously approved scope of work for the transportation impact study (TIS) for the River Club Mixed-Use Development due to the most recent site plan including an additional right-in/right-out driveway on State Street located at the current location of Plantation Drive. The new driveway was added to provide better access for residents and for garbage pick-up for the parcel west of the Pierce Park Lane intersection.

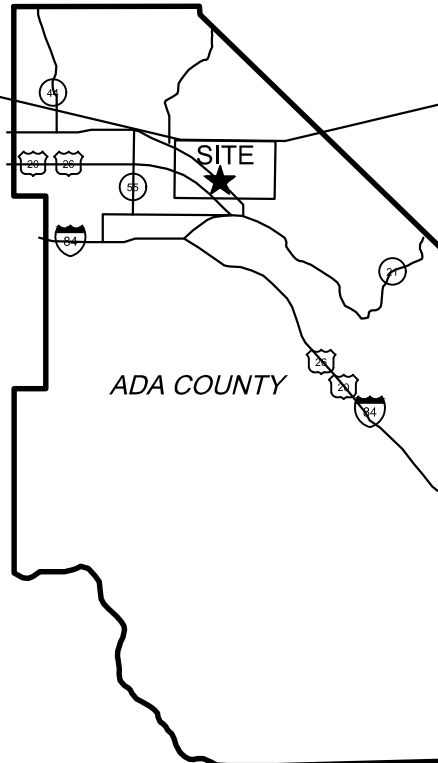
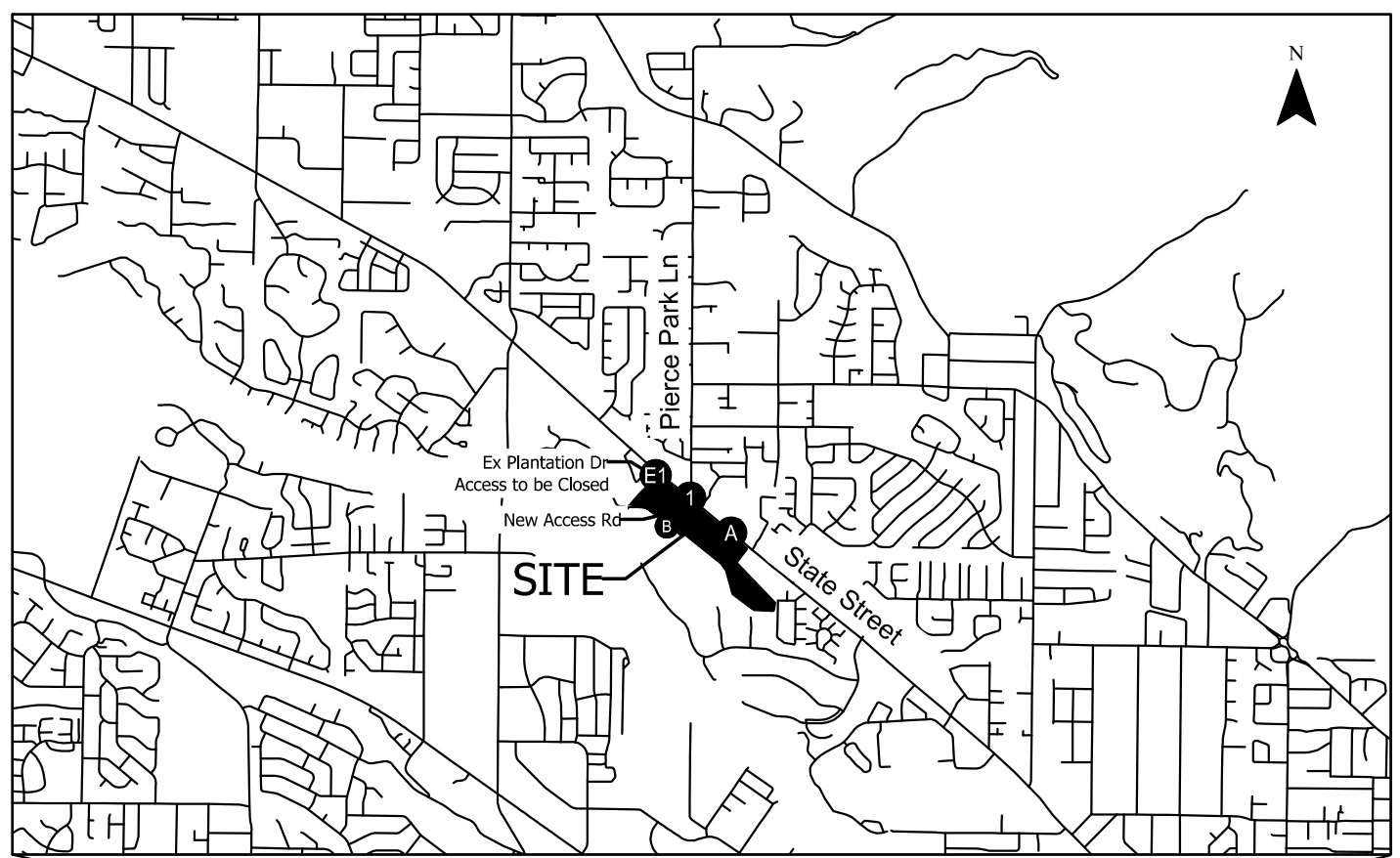
The information presented in this memorandum was developed based on conversations with the Lincoln Property Company, correspondence with ACHD and COMPASS, and a Teams meeting with the Ada County Highway District (ACHD) on August 2, 2022. Figure 1 shows the site vicinity of the proposed.

This memorandum addresses the following items:

- Project Description
- Estimated Trip Generation and Distribution
- Analysis Scenarios and Study Assumptions
- Analysis Tools and Operating Standards
- Background Growth and In-process Developments
- Background Roadway Improvement Projects
- Access Evaluation

PROJECT DESCRIPTION

The Lincoln Property Company is proposing the River Club Mixed-Use Development which will include up to approximately 750 multi-family units (comprised of approximately 290 low-rise apartments and townhomes and approximately 460 mid-rise apartments) and approximately 30,000 square feet of retail and restaurant uses. Figure 2 shows the conceptual site plan for the development.



- ## - External Study Intersections
- ## - Internal Study Intersections

Site Vicinity Map
Boise, Idaho

Figure
1



Site Plan
Boise, Idaho

Figure
2

With the new development, the existing Plantation Drive access to State Street will be converted into a right-in/right-out access and a new private street connection will be constructed that will form a south leg to the State Street / Pierce Park Lane intersection. This new street has already been planned by ACHD as part of the State Street / Pierce Park Lane intersection improvement project (CIP# IN2020-820) and is included in an agreement between the River Club and ACHD. Additionally, a new access to State Street is proposed on the eastern side of the site, approximately opposite the existing Zamzows driveway. A concept design of the intersection improvements provided by ACHD with the proposed access site locations noted is shown in Exhibit 1.

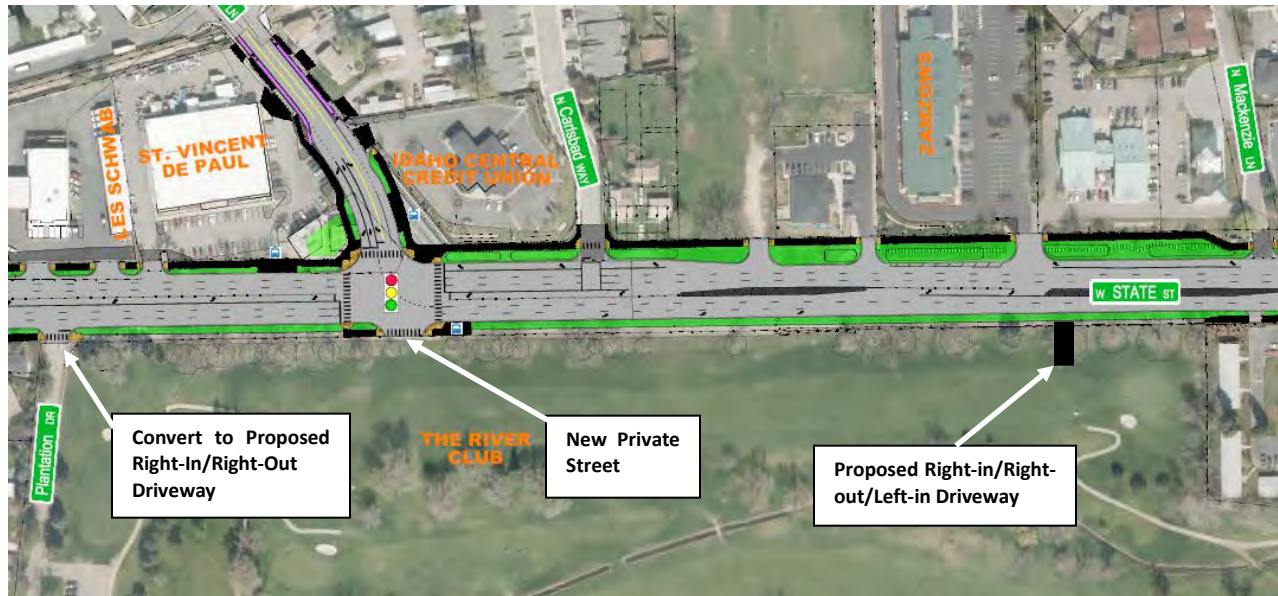


Exhibit 1. ACHD State Street / Pierce Park Concept Design with Proposed Site Accesses Noted

Easements will be provided for a couple townhomes that currently access Plantation Drive.

ESTIMATED TRIP GENERATION

The projected weekday daily, a.m., and p.m. peak hour vehicle trips for the proposed development were estimated based on ITE's *Trip Generation Manual*, 11th Edition (Reference 1).

Standard practice is to recognize that not all trips to and from a business will be “new” trips on the adjacent roadway system. Some trips will come from other uses internal to the site and some will consist of “pass-by” trips from motorists who are already traveling on the surrounding roadways. These internal and pass-by trips were calculated using data and procedures provided in the ITE *Trip Generation Handbook*, 3rd Edition (Reference 2).

Based on discussions with the development team, the commercial land-uses will include up to approximately 15,000 square feet of retail space and approximately 15,000 square feet of restaurant uses. The specific restaurant uses are not known at this time, but it is envisioned they may include two

sit-down restaurants, a coffee shop, and a sandwich shop. None of the restaurant uses are planned to include drive-through service.

Due to the limited data in the ITE Trip Generation Handbook on pass-by trip percentages and because the new 11th Edition of the Trip Generation Manual split up the shopping center land use category into different land-uses based on the size, pass-by rates were not available for the some of the land-uses even though the land-uses will generate pass-by trips from State Street. Additionally, the ITE data includes pass-by percentages for some uses, such as a coffee shop, that may not be applicable for the particular type of coffee shop proposed for this development. For these land-uses, pass-by percentages from other similar land-uses contained in the ITE Trip Generation Handbook are proposed to be used in order to acknowledge that pass-by trips will be occur for these uses and to ensure the trips estimates are as accurate as possible. Each of these uses is described below:

- **Strip Retail Plaza (ITE Code 822):** This land-use is new to the recent edition of the Trip Generation Manual and is based on separating the previous Shopping Center (ITE Code 820) land-use into multiple land-uses based on the size of the shopping center. Therefore, the ITE shopping center (ITE Code 820) pass-by percentages were utilized.
- **Fast Casual Restaurant (ITE Code 930):** This land-use is new to the Trip Generation Manual with very limited data but is similar to the high-turnover sit-down restaurant except for being smaller with faster service. Therefore, the same pass-by percentages as the High-Turnover Sit-Down Restaurant were utilized.
- **Coffee/Donut Shop without Drive Through (ITE Code 936):** While the ITE Trip Generation Handbook has an average pass-by percentage of 89 percent for a Coffee/Donut shop, closer review of the data identified that the specific shops included in the ITE data did not have customer seating. The lack of customer seating could potentially result in potentially higher pass-by percentages than a shop with seating. Based on a review of other land-uses with morning and evening peaks and indoor seating, it was determined that the fast-food restaurant pass-by rate 49% in the weekday AM peak hour and 50% in the weekday PM peak hour provided a reasonably similar land-use and therefore was used for the Coffee Shop.

Table 1 summarizes the estimated trip generation for the River Club Mixed-Use Development.

Table 1. Phase 3 Estimated Trip Generation

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Residential Uses									
Townhouses/Apmts (Multi-Family Low-Rise)	220	290	1,934	113	27	86	145	91	54
Townhouses/Apmts (Multi-Family Mid-Rise)	221	460	2,148	191	44	147	180	110	70
Residential Internal Trips				(46)	(5)	(41)	(31)	(24)	(7)
Residential External & Net New Trips				253	66	192	294	177	117
Retail Uses									
Shopping Center (Strip Retail Plaza)	822	15,000	863	38	23	15	104	52	52
Shopping Center Internal Trips				(7)	(4)	(3)	(54)	(28)	(26)
Shopping Center External Trips				31	19	12	50	24	26
Pass-By Trips (0% AM, 34% PM, 26% SAT)				-	-	-	(18)	(9)	(9)
Retail Net New External Trips				31	19	12	32	15	17
Restaurant Uses									
High Turn-Over Sit-Down Restaurant (Two)	932	10,000	1,072	96	53	43	91	56	35
Fast Casual Restaurant	930	2,000	194	3	2	1	25	14	11
Coffee/Donut Shop without Drive-Through	936	3,000	601	279	142	137	97	48	49
Restaurant Sub-Total				378	197	181	213	118	95
Restaurant Internal Trips				(47)	(41)	(6)	(59)	(20)	(39)
Restaurant External Trips				331	156	175	154	98	56
Pass-By Trips Sit Down Rest (43% PM)				-	-	-	(36)	(18)	(18)
Pass-By Trips Coffee Shop (49% AM, 50% PM)				(120)	(60)	(60)	(28)	(14)	(14)
Restaurant Net New Trips				211	96	115	90	66	24
Development Total									
Total Trips			4,945	720	291	429	642	371	271
Internal Trips				(100)	(50)	(50)	(144)	(72)	(72)
Total External Trips (Driveway Trips)				620	241	379	498	299	199
Total Pass-By Trips				(120)	(60)	(60)	(46)	(23)	(23)
BUILDOUT NET NEW TRIPS				500	181	319	452	276	176

Calculation error - should also be 36 with 18in/18out

As shown in Table 1, the development is estimated to generate a total of 4,945 daily trips, with 500 new weekday a.m. peak hour trips (181 inbound / 319 outbound), and 452 new weekday p.m. peak hour trips (276 inbound / 176 outbound).

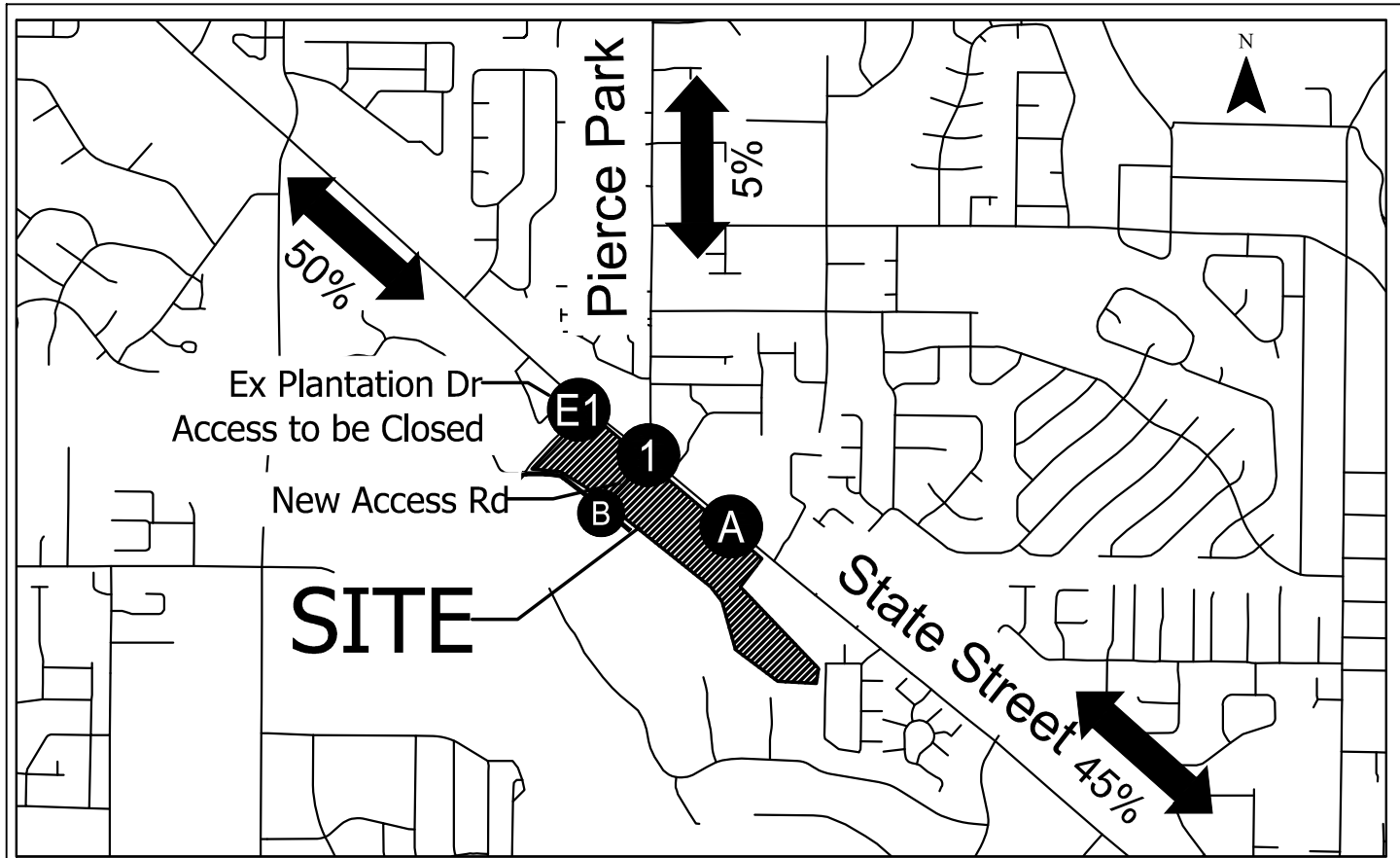
Should be 408 with 254 in/154 out

Note - Pass-By Trips are actually 90 with 45 in/45out

TRIP DISTRIBUTION

The distribution of site generated trips onto the roadway system was based on the site's connections to nearby arterials, existing traffic counts, and an area of influence analysis using an updated select zone assignment provided by the Community Planning Association of Southwest Idaho (COMPASS).

Overall, the trip distribution for new trips is estimated to be approximately 50 percent to the west on State Street, 45 percent to the east on State Street, and 5 percent to the north on Pierce Park Lane. Figure 3 illustrates the proposed trip distribution pattern for the proposed development. *Attachment "A" includes the updated select zone analysis summary provided by COMPASS.*



- ## - External Study Intersections
- ## - Internal Study Intersections

Estimated Trip Distribution Pattern
Boise, Idaho

Figure
3

ANALYSIS SCENARIOS & STUDY ASSUMPTIONS

The proposed TIS assumptions for the analysis include:

- Time Periods:
 - Weekday AM Peak Hour (7:00 – 9:00 a.m.)
 - Weekday PM Peak Hour (4:00 – 6:00 p.m.)
- Study Intersections: The study intersections are listed below and shown on the Figure 4.
 - State Street / Pierce Park Lane
 - State Street / Plantation Drive (existing full access and future right-in/right-out only)
 - Proposed Site Access on State Street
 - Internal “T” intersection south of State Street / Pierce Park Lane
- Study Segments:
 - No study roadway segments are proposed based on ACHD staff comments and because the internal streets will be private.
- Study Scenarios:
 - Three access scenarios under total traffic conditions
 - **No Additional Access Driveways:** Pierce Park Lane Access Only
 - **Eastern Access Driveway:** With the proposed eastern right-in/right-out/left-in site access on State Street.
 - **Eastern and Western (Plantation Drive) Access Driveways:** With the proposed western right-in/right-out access and the proposed eastern right-in/right-out/left-in site access on State Street.
 - Two lane-configuration scenarios at the State Street/Pierce Park intersection under background and total traffic conditions:
 - Addition of the south leg of the intersection to the existing intersection lane configuration.
 - Addition of the south leg of the intersection with the intersection lane configuration as proposed in the ACHD construction plans.
- Counts: Traffic counts will be conducted in September after school has begun.
 - Roadway Segments (48 hour counts for new segment counts):
 - Plantation Drive (South of State Street) - (New Count – Last ACHD count in 2018)
 - Intersections (3-hour counts 6:30-9:30 and 3:30-6:30 pm):

- State Street / Pierce Park Lane (New Count)
- State Street / Plantation Drive (New Count – this will identify traffic for re-routing to the Pierce Park Lane intersection (via the new private street forming a south leg) since intersection will be modified to be a private driveway to a residential portion of the development).
- Study Years
 - Year 2022 existing traffic conditions (with State Street / Plantation Drive intersection)
 - Year 2027 background traffic conditions (includes regional growth and in-process developments, but no site development traffic).
 - Year 2027 total traffic conditions with buildout of the proposed development including changing the existing Plantation Drive access to State Street to be a right-in/right-out driveway, the new south leg access at the State Street / Pierce Park intersection, and the new right-in/right-out/left-in access at the eastern side of the site (see study scenarios).
- Improvement Triggers/Phasing
 - Percentage of site-generated traffic at all the study intersections will be estimated.
 - For any mitigated improvements identified in the buildout year, the approximate number of trips will be estimated to determine an approximate trigger/time frame for the needed improvement. This will include the following:
 - The deficiency.
 - The mitigation necessary.
 - The projected number of units and site trips prior to the deficiency estimated based on the trip generation and the background traffic growth.

ANALYSIS TOOLS AND OPERATING STANDARDS

The intersection operational analysis will be performed using the *Highway Capacity Manual (HCM)*, 6th Edition analysis procedures (Reference 3). To ensure that this analysis is based on a reasonable worst-case scenario, the peak 15-minute flow rate during the weekday a.m. and p.m. peak hours will be used in the evaluation of all intersection level of service (LOS) and vehicle-to-capacity (V/C) ratios. The signalized and stop-controlled intersection operations analyses presented in this report will be completed using *Synchro 11 software*, and if needed for supplemental analysis, HCS 2010 software (version 6.90). For a signalized intersection's overall V/C ratios, the *HCM 2000* procedure will be utilized because the *HCM 6th Edition* procedure doesn't produce an intersection V/C ratio. Sidra 6.1 will be used to evaluate the operations of a roundabout if an unsignalized, study intersection is found to operate

below acceptable LOS standards. If applicable, roundabout intersection analyses will be completed in accordance with *ACHD Roundabout Policy 5108* for roundabout analysis.

The operational analysis of study intersections will be performed in accordance with the methodologies stated in Section 7106.6 of the *ACHD Policy Manual* (Reference 5) and include consideration of separate left-and right-turn lanes as well as queuing impacts. Intersection and segment level of service will be reported per *ACHD 2016 CIP* thresholds.

ACHD requires that signalized intersections operate at a minimum of LOS E for Principal Arterials and Minor Arterials and LOS D for Collectors. All unsignalized intersections that have a projected level of service D or worse shall be evaluated to determine if a signal or roundabout is warranted. The acceptable volume-to-capacity ratio for signalized intersections is 0.90 for the overall intersection and 1.0 for each lane group. The acceptable volume-to-capacity ratio is 1.0 for the critical lane group at unsignalized intersections (Reference 4).

BACKGROUND GROWTH AND IN-PROCESS DEVELOPMENTS

Background traffic growth will be estimated to account for general growth and buildout of unknown developments along each of the study roadway and intersection. The growth rates derived from COMPASS Regional Travel Demand Model indicate a 1.3 percent yearly growth rate on State Street along the site frontage and 1.1 percent on Pierce Park Lane. Growth rates to the east and west of the site on State Street ranged from 0.9 percent to 1.5 percent. Therefore, based on our review of the data, we propose to use a growth rate of 1.3 percent per year for use in the TIS

Background In-Process Developments

As mentioned previously, the second element to background growth is the effect of buildout of in-process developments within close proximity to the proposed development. Based on discussions with ACHD staff, no significant background projects were identified that would generate traffic above the traffic growth resulting from the yearly growth rate.

BACKGROUND ROADWAY IMPROVEMENT PROJECTS

The *2020 ACHD Capital improvement Plan (2020 CIP)* (Reference 5), for future roadway improvement projects to be assumed within the study area. Based on our review of ACHD's *2020 CIP*, several future roadway improvement projects were found in the study area.

- **State Street / Pierce Park Lane - CIP# IN2020-820 (2026-2030):** Reconstruct the approaches and signal. This will include widening State Street from Hertford Way to Ellens Ferry Drive. The ACHD Integrated Five Year Work Plan (IFYWP) has construction programmed in 2025.

- *Due to this improvement being planned at the same timeframe and in conjunction with the development, two lane configuration scenarios will be assumed under the 2027 background and total traffic conditions:*
 - *Without the ACHD project: Addition of the south leg of the intersection to the existing intersection lane configuration.*
 - *With the ACHD project: Addition of the south leg of the intersection with the lane configuration as proposed in the ACHD construction plans.*
- **State Street Widening CIP# RD2020-1232 & 1230 (2031-2035):** Widen State Street to seven lanes between Glenwood Street and Collister Drive.
 - This improvement will not be assumed in the 2027 background and total traffic analysis.

ACCESS EVALUATION

For the site access locations, the following will be reviewed:

- Access spacing versus ACHD criteria.
- Whether the access meets ACHD criteria for granting an additional access.
- Projected daily traffic demand at build-out for each access location and comparison to the ACHD policy ADT for that roadway classification.
- Intersection sight distance and new access locations to existing streets.

Additionally, the preliminary site plan will be reviewed with respect to the street layout and ACHD local street spacing requirements.

NEXT STEPS

We request ACHD review this scoping memo and provide a response on the assumptions so that we can move forward with the study. Please contact John Ringert (208.472.9802, jringert@kittelson.com) if you have any questions or comments on the information presented in this memorandum.

REFERENCES

1. Institute of Transportation Engineers. *Trip Generation Manual, 11th Edition*. Institute of Transportation Engineers, Washington, D.C.
2. Institute of Transportation Engineers. *Trip Generation Handbook, 3rd Edition*. Institute of Transportation Engineers, Washington, D.C. September 2017.
3. Transportation Research Board. *Highway Capacity Manual, 6th Edition*. Washington D.C. 2010.
4. Ada County Highway District. *Policy Manual*. Ordinance 247, 12/16/20.
5. Ada County Highway District. *Capital Improvements Plan*. August 19, 2020.

Attachment A: Compass Area of Influence Analysis

Attachment B: Internal Trip Calculation Summary

ATTACHMENT A

COMPASS AREA OF INFLUENCE ANALYSIS

River Club Proposed Development

The following summarizes the results of an area of influence model run for a proposed redevelopment generally located south of the intersection of State St and Pierce Park Ln. The proposed development shown in Figure 1 will consist of 750 multifamily units and 30,000 ft² of retail space. Buildout is estimated by 2030.

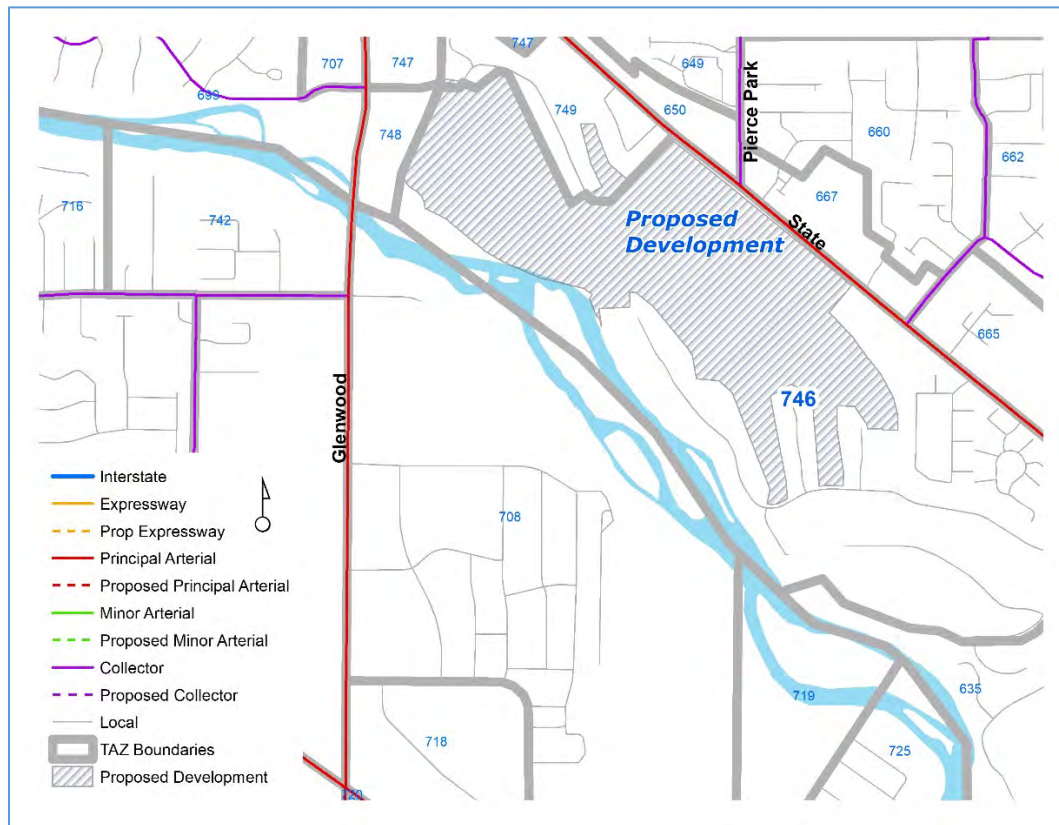


Figure 1

Table 1 provides the existing demographics for TAZ 746 and the proposed development's demographics used for the area of influence model run. A temporary TAZ was used to isolate the impact of the proposed development.

Table 1

	2022		2030 (Proposed)		2050	
	HH	Jobs	HH	Jobs	HH	Jobs
TAZ 746	365	150	426	180	774	235
Temp TAZ	n/a	n/a	750	50	n/a	n/a
Surrounding TAZs	274	655	416	750	809	950
Total	639	805	1,592	980	1,583	1,185

Figure 2: Area of Influence (percent contribution to the total peak hour demand)

Figure 3: Peak Hour Demand with Proposed Development

Figure 4: Peak Hour Demand without Proposed Development

Figure 5: Surrounding Area TAZs

Figure 6, Figure 7, Figure 8: Compounded Annual Growth Rates

Note to Reviewers: The primary purpose of this report is to help agencies determine the scope of a Traffic Impact Study (TIS) and to assist TIS preparers in establishing trip distributions. New demand forecasted by the regional model for a proposed development may not match ITE Trip Generation estimates and they are not intended to replace the trip generation process of the TIS.

Disclaimer Regarding Updated Model: The results documented in this report are based on the latest regional model, maintained by COMPASS, released in October of 2021, and based on the COMPASS 2050 Vision adopted in August 2021. Due to changes in demographics, TAZs, model network and model parameters, results should not be compared to those provided prior to October of 2021.

Figure 2: Area of Influence (percent contribution to the total peak hour demand)

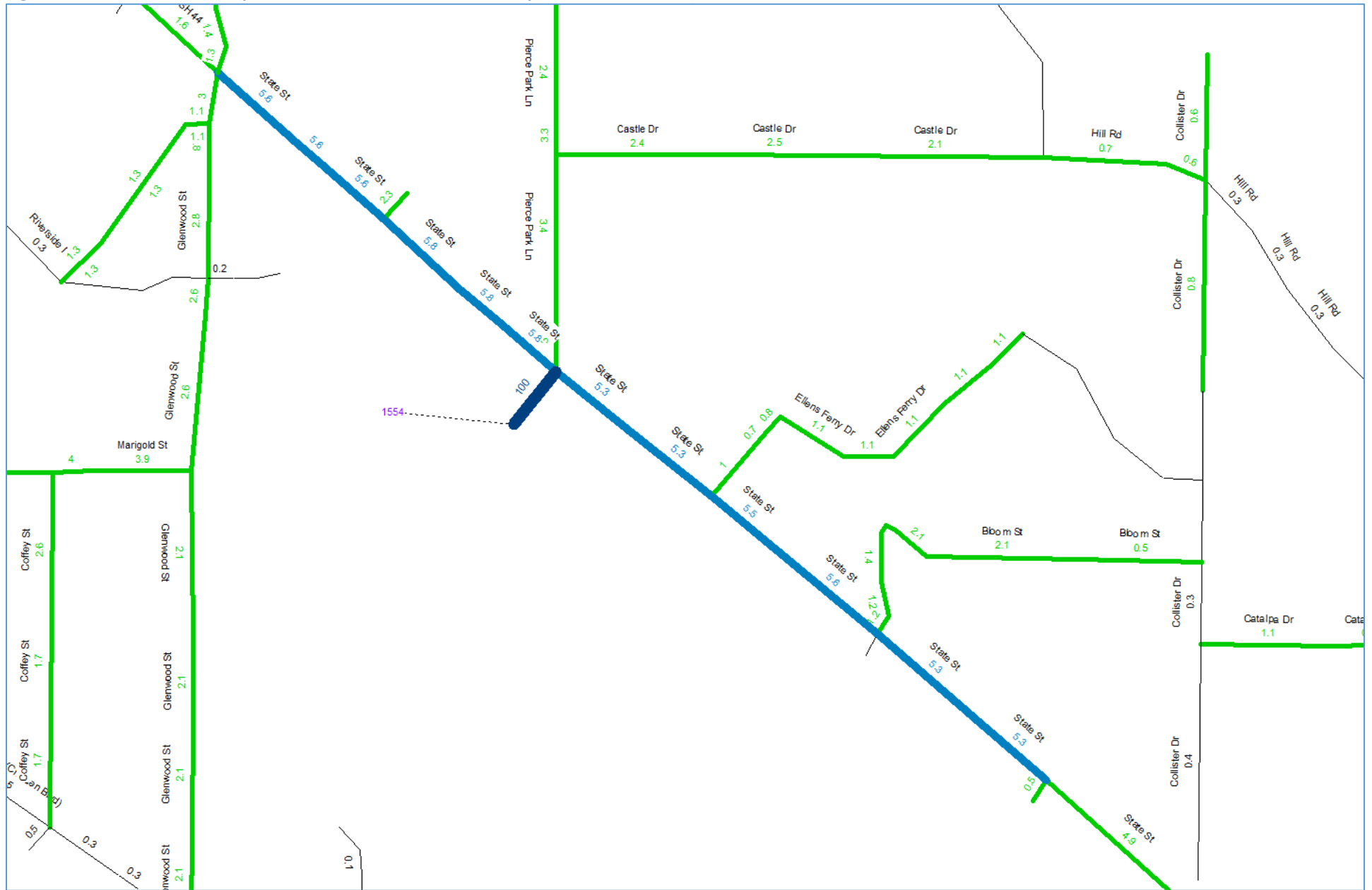
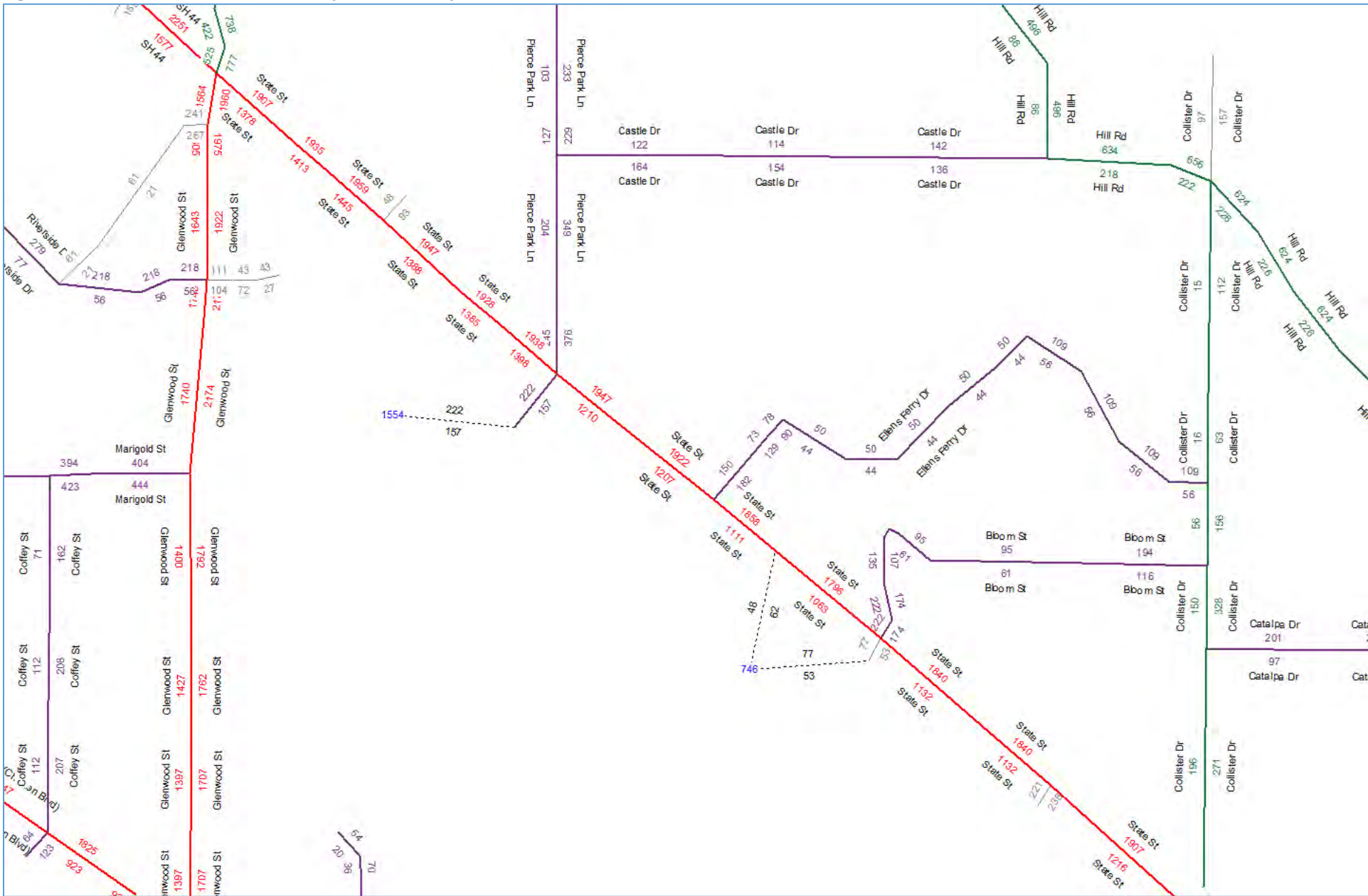


Figure 3: Peak Hour Demand with Proposed Development



[illegible]

Figure 5: Surrounding Area TAZs

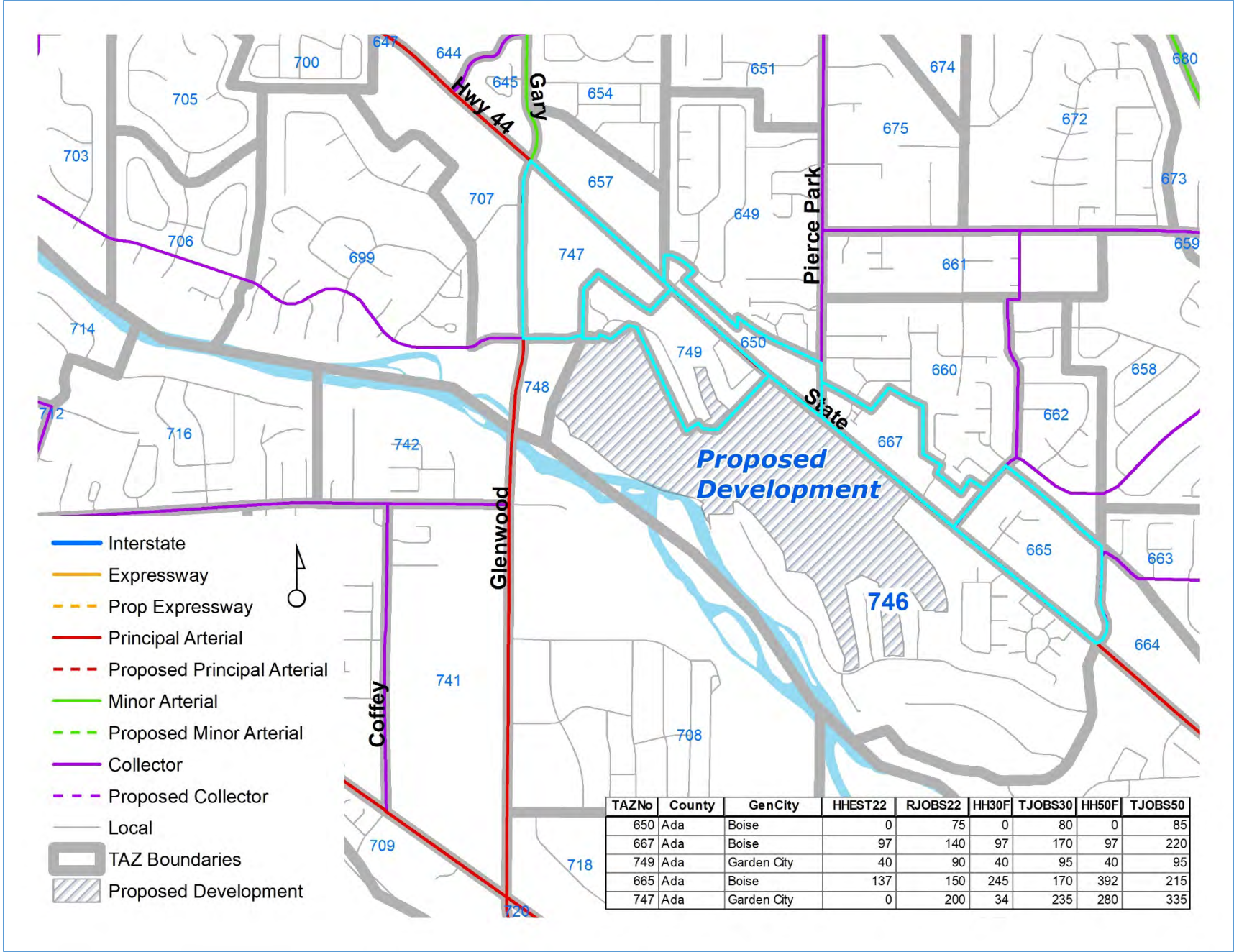


Figure 6: 2022 to 2030 Compounded Annual Growth Rates

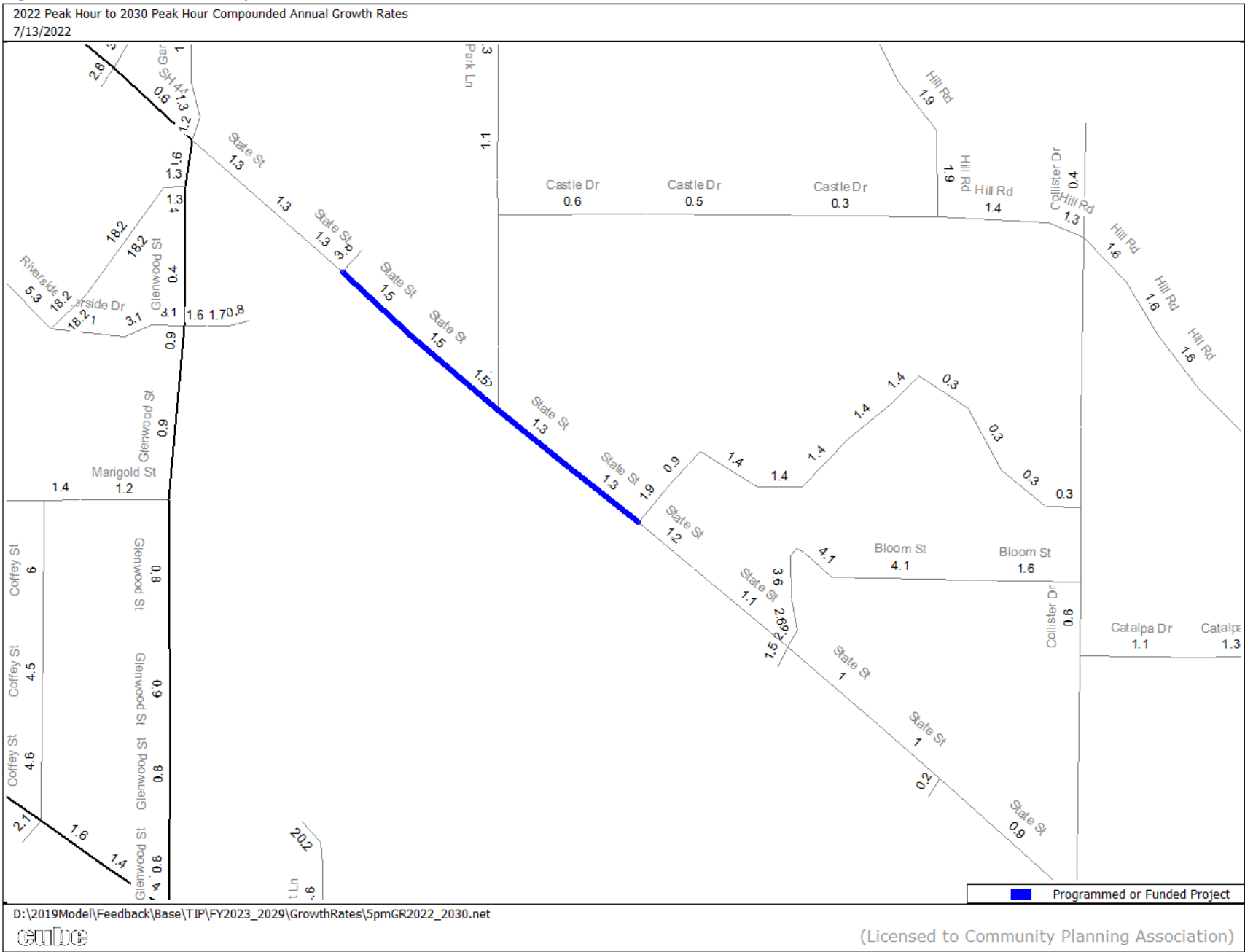


Figure 7: 2030 to 2040 Compounded Annual Growth Rates

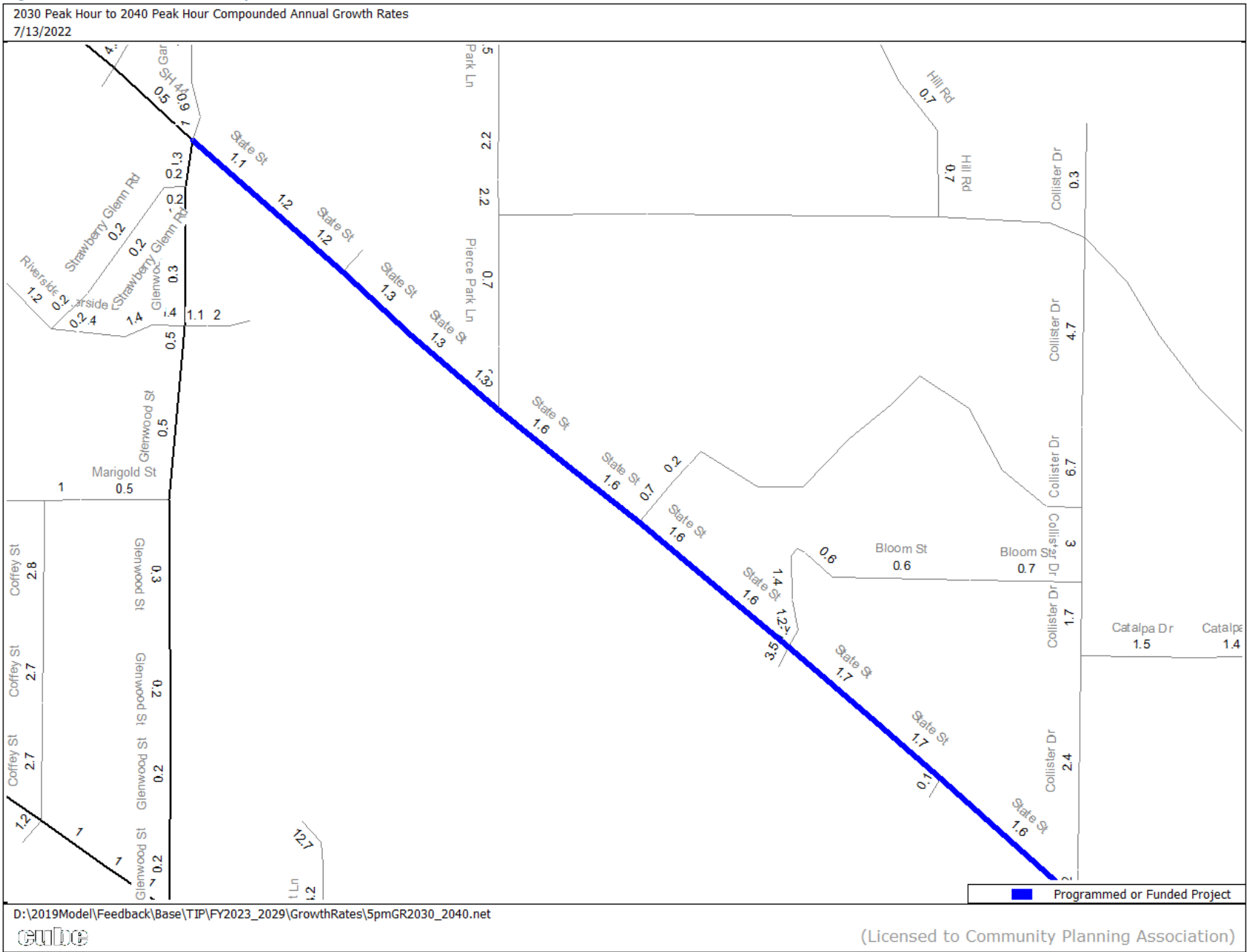
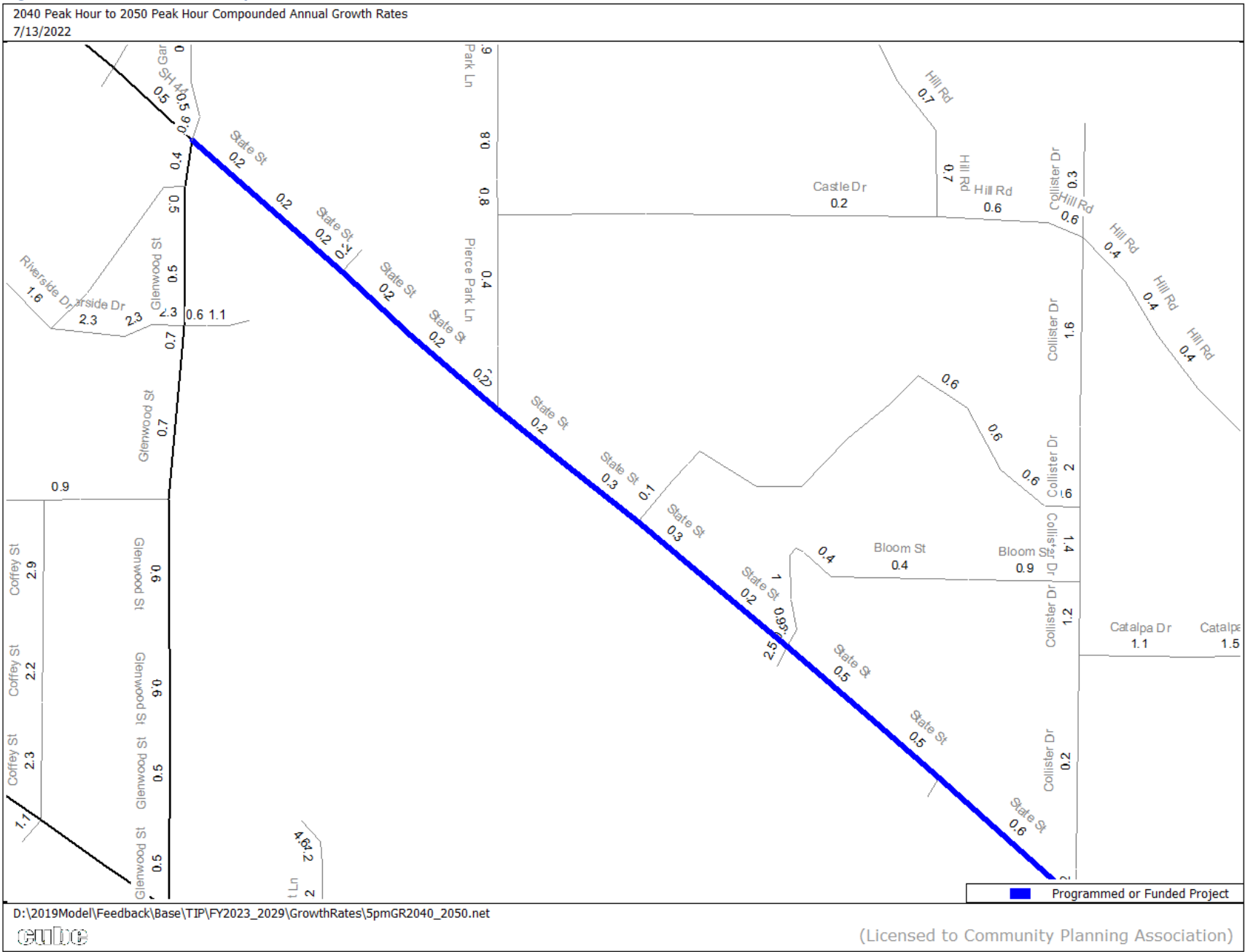


Figure 8: 2040 to 2050 Compounded Annual Growth Rates



ATTACHMENT B

INTERNAL TRIP CALCULATION SUMMARY

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	River Club			Organization:	Kittelson & Associates
Project Location:	Boise ID			Performed By:	JFR
Scenario Description:	Buildout			Date:	8/12/2022
Analysis Year:	NA			Checked By:	
Analysis Period:	AM Street Peak Hour			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0	0	0
Retail				38	23	15
Restaurant				378	197	181
Cinema/Entertainment				0		
Residential				304	71	233
Hotel				0		
All Other Land Uses ²				0	0	0
				720	291	429

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses ²	1.00	0%	0%	1.00	0%	0%

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		2	0	1	0
Restaurant	0	2		0	4	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	2	39	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	720	291	429
Internal Capture Percentage	14%	17%	12%
External Vehicle-Trips ⁵	620	241	379
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	17%	20%
Restaurant	21%	3%
Cinema/Entertainment	N/A	N/A
Residential	7%	18%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	River Club
Analysis Period:	AM Street Peak Hour

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	23	23	1.00	15	15
Restaurant	1.00	197	197	1.00	181	181
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	71	71	1.00	233	233
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	4		2	0	2	0
Restaurant	56	25		0	7	5
Cinema/Entertainment	0	0	0		0	0
Residential	5	2	47	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		7	45	0	0	0
Retail	0		99	0	1	0
Restaurant	0	2		0	4	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	4	39	0		0
Hotel	0	1	12	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	4	19	23	19	0	0
Restaurant	41	156	197	156	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	5	66	71	66	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	3	12	15	12	0	0
Restaurant	6	175	181	175	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	41	192	233	192	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	River Club			Organization:	Kittelston
Project Location:	Boise, Idaho			Performed By:	JFR
Scenario Description:	Buildout			Date:	8/12/2022
Analysis Year:	NA			Checked By:	
Analysis Period:	PM Street Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				104	52	52
Restaurant				213	118	95
Cinema/Entertainment				0	0	0
Residential				325	201	124
Hotel				0	0	0
All Other Land Uses ²				0		
				642	371	271

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses ²	1.00	0%	0%	1.00	0%	0%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1500	1500		1500	
Retail					1500	
Restaurant					1500	
Cinema/Entertainment						
Residential		2000	2000			
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		15	0	11	0
Restaurant	0	26		0	13	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	2	5	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	642	371	271
Internal Capture Percentage	22%	19%	27%
External Vehicle-Trips ⁵	498	299	199
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	54%	50%
Restaurant	17%	41%
Cinema/Entertainment	N/A	N/A
Residential	12%	6%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	River Club
Analysis Period:	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	52	52	1.00	52	52
Restaurant	1.00	118	118	1.00	95	95
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	201	201	1.00	124	124
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	1		15	2	11	3
Restaurant	3	39		8	13	7
Cinema/Entertainment	0	0	0		0	0
Residential	5	17	8	0		4
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	1	0	8	0
Retail	0		34	0	92	0
Restaurant	0	26		0	32	0
Cinema/Entertainment	0	2	4		8	0
Residential	0	2	5	0		0
Hotel	0	1	6	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	28	24	52	24	0	0
Restaurant	20	98	118	98	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	24	177	201	177	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	0	0	0	0	0	0
Retail	26	26	52	26	0	0
Restaurant	39	56	95	56	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	7	117	124	117	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

John Ringert

From: Paige Bankhead <pbankhead@achdidaho.org>
Sent: Monday, September 26, 2022 3:46 PM
To: John Ringert
Cc: Mindy Wallace; Vincent Trimboli; Regan Hansen
Subject: RE: River Club - TIS Scope of Work Memo

[External Sender]

Hi John,

Thank you for letting us know. That is fine to include that additional scenario for evaluation.

Paige Bankhead, PE
Civil Engineer

Ada County Highway District
Development Services
1301 N. Orchard St. Ste. 200
Phone: (208) 387-6293



I will be transitioning from my current position as Traffic Engineer to a Civil Engineer position with the Design Group at ACHD starting in October. I will still be reviewing traffic impact studies for the time being, however, I will not be reviewing development applications, writing staff reports or taking "Planner of the day" calls starting in October.

From: John Ringert <JRINGERT@kittelsohn.com>
Sent: Friday, September 23, 2022 1:41 PM
To: Paige Bankhead <pbankhead@achdidaho.org>
Cc: Mindy Wallace <Mwallace@achdidaho.org>; Vincent Trimboli <Vincent.Trimboli@itd.idaho.gov>; Regan Hansen <Regan.Hansen@itd.idaho.gov>
Subject: RE: River Club - TIS Scope of Work Memo

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Hi Paige,

Based on discussions with the development team for the River Club project, they are proposing to also include a right-in/right-out access at the existing Plantation Drive intersection. Due to the change, I have updated the scope of work memo (attached) to include a third access scenario that includes adding that right-in, right-out access in addition to the

previous two scenarios with and without the east access. I also added a figure (shown below) to make it easier to see what they are proposing for access with respect to the ACHD intersection design project.



Please get back to me if you have any questions and if the updated scope looks OK.

Have a nice weekend!

Thanks,

John

John F. Ringert, P.E.
Senior Principal Engineer
Kittelson & Associates, Inc.
101 South Capitol Boulevard, Suite 600
Boise, Idaho 83702
www.kittelson.com
jringert@kittelson.com
208.472.9802 (direct)
208.863.0201 (cell)

From: Paige Bankhead <pbankhead@achdidaho.org>

Sent: Friday, September 9, 2022 9:14 AM

To: John Ringert <JRINGERT@kittelson.com>

Cc: Mindy Wallace <Mwallace@achdidaho.org>; Vincent Trimboli <Vincent.Trimboli@itd.idaho.gov>; Regan Hansen <Regan.Hansen@itd.idaho.gov>

Subject: RE: River Club - TIS Scope of Work Memo

[External Senders]

Hi John,

Thank you. This is acceptable.

Have a nice weekend!

Paige Bankhead, PE
Traffic Engineer

Ada County Highway District
Development Services
1301 N. Orchard St. Ste. 200
Phone: (208) 387-6293



From: John Ringert <JRINGERT@kittelson.com>
Sent: Thursday, September 8, 2022 1:17 PM
To: Paige Bankhead <pbankhead@achdidaho.org>
Cc: Mindy Wallace <Mwallace@achdidaho.org>; Vincent Trimboli <Vincent.Trimboli@itd.idaho.gov>; Regan Hansen <Regan.Hansen@itd.idaho.gov>
Subject: RE: River Club - TIS Scope of Work Memo

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Hi Paige,

Attached is the updated the scoping memo for the River Club. I added evaluating the Pierce Park Ln/State Street intersection assuming the existing lane configuration (with new south leg) as well as the planned ACHD configuration. Even though you indicated that the ACHD project lane configuration could be evaluated "if necessary," I think the development team will be interested to see how the intersection operates with the ACHD project anyway. So, we will evaluate both lane configurations under 2027 conditions.

I also attached the additional pages for the internal trip.

Get back to me if you have any additional questions or comments.

Thanks,

John

John F. Ringert, P.E.
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From: Paige Bankhead <pbankhead@achdidaho.org>
Sent: Thursday, September 1, 2022 2:25 PM
To: John Ringert <JRINGERT@kittelton.com>; Regan Hansen <Regan.Hansen@itd.idaho.gov>
Cc: Mindy Wallace <Mwallace@achdidaho.org>; Vincent Trimboli <Vincent.Trimboli@itd.idaho.gov>
Subject: RE: River Club - TIS Scope of Work Memo

[External Senders]

Hi John,

I have the following comments:

- Please provide the 2nd page of the NCHRP 684 worksheets.
- We discussed the Pierce Park Lane/State Street improvements with the project manager Rachel Speer. She indicated that it may be close for when the improvements are completed in relation to the development completion. Please evaluate the intersection in its current configuration first and, if necessary, determine if the ACHD improvements at that intersection would be adequate mitigation.

Thanks!

Paige Bankhead, PE
Traffic Engineer

Ada County Highway District
Development Services
1301 N. Orchard St. Ste. 200
Phone: (208) 387-6293



From: John Ringert <JRINGERT@kittelton.com>
Sent: Monday, August 29, 2022 4:08 PM
To: Paige Bankhead <pbankhead@achdidaho.org>; Regan Hansen <Regan.Hansen@itd.idaho.gov>
Cc: Mindy Wallace <Mwallace@achdidaho.org>; Vincent Trimboli <Vincent.Trimboli@itd.idaho.gov>
Subject: River Club - TIS Scope of Work Memo

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Hi Paige & Regan,

Attached is the TIS scoping memo for the River Club Development.

Please review the memo and email or call me with any comments. Also, please respond if the proposed approach in the scoping memo looks acceptable.

Thanks,

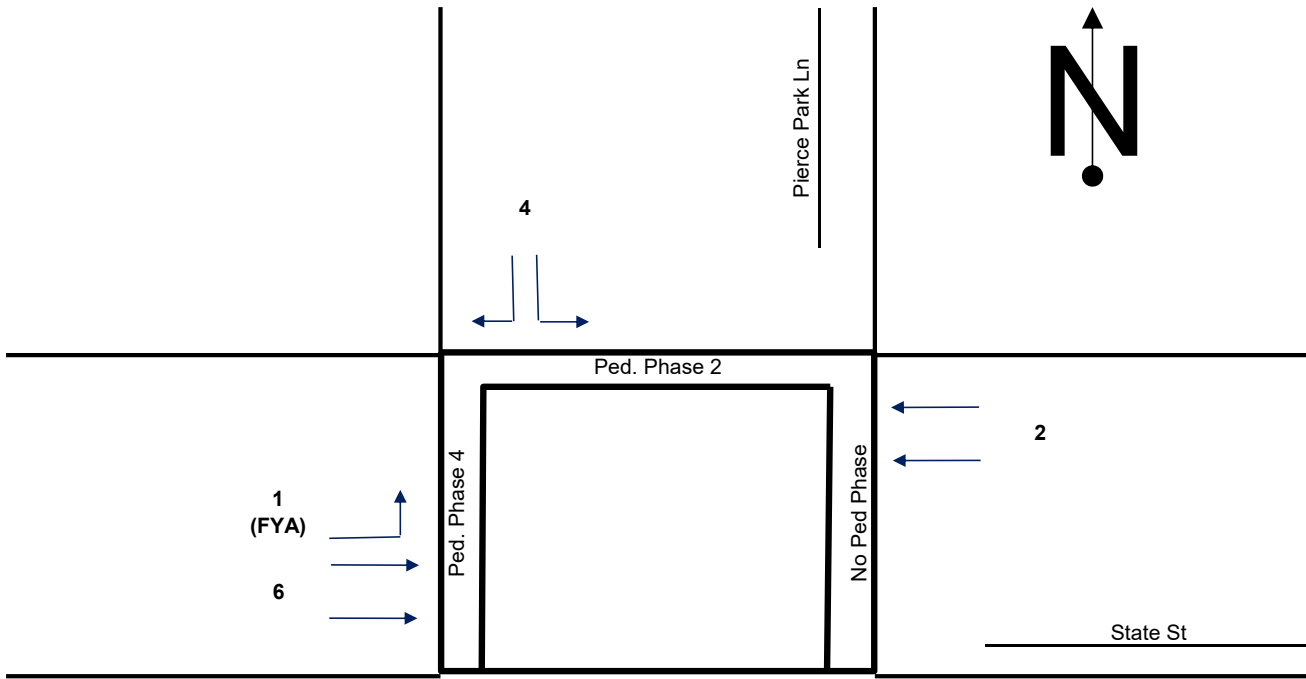
John

John F. Ringert, P.E.
Senior Principal Engineer
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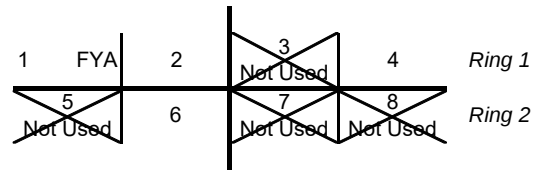


Appendix B

Signal Timing Sheets



ACHD Standard Phasing
Diagram



Location: State & Pierce Park (#262)

Controller Database Timing Sheet



Station: 262 - State & Pierce Park-Scout v85.3.1 980 ATC (Standard-10/19/2022 5:51:45 AM)

Type: Scout Ethernet v85.3

Firmware: 85.3.1

Created By: NTDomain\jcollins

Modified By:

Reviewed By:

Phase Times and Options(1.1.1/1.1.2/1.1.4)								
	1	2	3	4	5	6	7	8
Table - 1								
MIN GRN	5	5	0	6	0	10	0	0
Gap Ext	2	4	0	3	0	4	0	0
MAX 1	20	55	0	30	0	55	0	0
Max 2	30	80	0	40	0	80	0	0
Yel Clr	5	5	0	4	0	5	0	0
Red Clr	2	2	0	2	0	1	0	0
Walk	0	5	0	5	0	0	0	0
Ped Clr	0	23	0	22	0	0	0	0
Red Revt	0	0	0	0	0	0	0	0
Add Init	0	0	0	0	0	0	0	0
Max Init	0	0	0	0	0	0	0	0
Gap Reduce Time B4	0	0	0	0	0	0	0	0
Gap Reduce Cars B4 Reduce	0	0	0	0	0	0	0	0
Gap Reduce Time To	0	0	0	0	0	0	0	0
Gap Reduce ReduceBy	0	0	0	0	0	0	0	0
Gap Reduce Min Gap	0	0	0	0	0	0	0	0
DyMaxLim	0	0	0	0	0	0	0	0
Max Step	0	0	0	0	0	0	0	0
Enable P	X	X	.	X	.	X	.	.
Min Recall	.	X	.	.	.	X	.	.
Max Recall	.	.	.	.	.	.	.	.
Ped Recall	.	.	.	.	.	.	.	.
Soft Recall	.	.	.	.	.	.	.	.
Lock Calls	.	.	.	.	.	.	.	.

Phase Times and Options(1.1.1/1.1.2/1.1.4)								
	1	2	3	4	5	6	7	8
Auto Flash Entry	.	X	.	.	.	X	.	.
Auto Flash Exit	.	X	.	.	.	X	.	.
Dual Entry	.	X	.	X	.	X	.	X
Enable Simul Gap	X	X	X	X	X	X	X	X
Guarantd Passage	.	.	.	.	.	.	.	.
Rest In Walk	.	.	.	.	.	.	.	.
Condit'l Service	.	.	.	.	.	.	.	.
Non-Actuated 1	.	.	.	.	.	.	.	.
Non-Actuated 2	.	.	.	.	.	.	.	.
Added Init Calc	S	S	S	S	S	S	S	S
Hold to Max	.	.	.	.	.	.	.	.
Ring	1	1	1	1	2	2	2	2
Startup	RED	WALK	RED	RED	RED	GREEN	RED	RED
C 1	5	5	7	7	1	1	3	3
C 2	6	6	8	8	2	2	4	4
C 3	0	0	0	0	0	0	0	0
C 4	0	0	0	0	0	0	0	0
C 5	0	0	0	0	0	0	0	0
C 6	0	0	0	0	0	0	0	0
C 7	0	0	0	0	0	0	0	0
C 8	0	0	0	0	0	0	0	0
C 9	0	0	0	0	0	0	0	0
C 10	0	0	0	0	0	0	0	0
C 11	0	0	0	0	0	0	0	0
C 12	0	0	0	0	0	0	0	0
C 13	0	0	0	0	0	0	0	0
C 14	0	0	0	0	0	0	0	0
C 15	0	0	0	0	0	0	0	0
C 16	0	0	0	0	0	0	0	0
C 17	0	0	0	0	0	0	0	0
C 18	0	0	0	0	0	0	0	0
C 19	0	0	0	0	0	0	0	0
C 20	0	0	0	0	0	0	0	0
C 21	0	0	0	0	0	0	0	0
C 22	0	0	0	0	0	0	0	0
C 23	0	0	0	0	0	0	0	0

Phase Times and Options(1.1.1/1.1.2/1.1.4)								
	1	2	3	4	5	6	7	8
C 24	0	0	0	0	0	0	0	0
C 25	0	0	0	0	0	0	0	0
C 26	0	0	0	0	0	0	0	0
C 27	0	0	0	0	0	0	0	0
C 28	0	0	0	0	0	0	0	0
C 29	0	0	0	0	0	0	0	0
C 30	0	0	0	0	0	0	0	0
C 31	0	0	0	0	0	0	0	0
C 32	0	0	0	0	0	0	0	0

Ring Sequences(1.2.4)		
	1	2
Table - 1		
1	1	5
2	2	6
3	3	7
4	4	8
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 2		
1	1	6
2	2	5

Ring Sequences(1.2.4)		
	1	2
3	3	7
4	4	8
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 3		
1	2	5
2	1	6
3	3	7
4	4	8
5	0	0

Ring Sequences(1.2.4)		
	1	2
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 4		
1	2	6
2	1	5
3	3	7
4	4	8
5	0	0
6	0	0
7	0	0
8	0	0

Ring Sequences(1.2.4)		
	1	2
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 5		
1	1	5
2	2	6
3	3	8
4	4	7
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0

Ring Sequences(1.2.4)		
	1	2
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 6		
1	1	6
2	2	5
3	3	8
4	4	7
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0

Ring Sequences(1.2.4)		
	1	2
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 7		
1	2	5
2	1	6
3	3	8
4	4	7
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0

Ring Sequences(1.2.4)		
	1	2
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 8		
1	2	6
2	1	5
3	3	8
4	4	7
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0

Ring Sequences(1.2.4)		
	1	2
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 9		
1	1	5
2	2	6
3	4	7
4	3	8
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0

Ring Sequences(1.2.4)		
	1	2
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 10		
1	1	6
2	2	5
3	4	7
4	3	8
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0

Ring Sequences(1.2.4)		
	1	2
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 11		
1	2	5
2	1	6
3	4	7
4	3	8
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0

Ring Sequences(1.2.4)		
	1	2
30	0	0
31	0	0
32	0	0
Table - 12		
1	2	6
2	1	5
3	4	7
4	3	8
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0

Ring Sequences(1.2.4)		
	1	2
Table - 13		
1	1	5
2	2	6
3	4	8
4	3	7
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 14		
1	1	6
2	2	5

Ring Sequences(1.2.4)		
	1	2
3	4	8
4	3	7
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 15		
1	2	5
2	1	6
3	4	8
4	3	7
5	0	0

Ring Sequences(1.2.4)		
	1	2
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
Table - 16		
1	2	6
2	1	5
3	4	8
4	3	7
5	0	0
6	0	0
7	0	0
8	0	0

Ring Sequences(1.2.4)																																
	1																2															
9	0																0															
10	0																0															
11	0																0															
12	0																0															
13	0																0															
14	0																0															
15	0																0															
16	0																0															
17	0																0															
18	0																0															
19	0																0															
20	0																0															
21	0																0															
22	0																0															
23	0																0															
24	0																0															
25	0																0															
26	0																0															
27	0																0															
28	0																0															
29	0																0															
30	0																0															
31	0																0															
32	0																0															
Patterns(2.4)																																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Table - 1																																
Cycle	150	130	160	120	150	120	130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	
Offset	106	75	55	97	55	97	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0	0	
Split	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
seqnc	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

Splits Expanded(2.7.X.1)								
	1	2	3	4	5	6	7	8
Table - 1								
Time	21	89	0	40	0	110	0	40
Coord Phase	.	.	.	.	.	X	.	.
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON
Table - 2								
Time	24	72	0	34	0	96	0	34
Coord Phase	.	.	.	.	.	X	.	.
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON
Table - 3								
Time	30	96	0	34	0	126	0	34
Coord Phase	.	.	.	.	.	X	.	.
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON
Table - 4								
Time	21	65	0	34	0	86	0	34
Coord Phase	.	.	.	.	.	X	.	.
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON
Table - 5								
Time	25	91	0	34	0	116	0	34
Coord Phase	.	.	.	.	.	X	.	.
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON
Table - 6								
Time	21	65	0	34	0	86	0	34
Coord Phase	.	.	.	.	.	X	.	.
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON
Table - 7								
Time	24	72	0	34	0	96	0	34
Coord Phase	.	.	.	.	.	X	.	.
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON
Table - 8								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 9								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 10								

Splits Expanded(2.7.X.1)								
	1	2	3	4	5	6	7	8
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 11								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 12								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 13								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 14								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 15								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 16								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 17								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 18								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 19								
Time	0	0	0	0	0	0	0	0

Splits Expanded(2.7.X.1)								
	1	2	3	4	5	6	7	8
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 20								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 21								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 22								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 23								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 24								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NON	NON	NON	NON	NON	NON	NON	NON
Table - 25								
Time	12	104	0	34	0	116	0	34
Coord Phase	.	.	.	.	.	X	.	.
Mode	NON	MAX	NON	NON	NON	MAX	NON	NON
Table - 26								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NVD	NVD	NVD	NVD	NVD	NVD	NVD	NVD
Table - 27								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.
Mode	NVD	NVD	NVD	NVD	NVD	NVD	NVD	NVD
Table - 28								
Time	0	0	0	0	0	0	0	0
Coord Phase	.	.	.	.	.	.	.	.

Splits Expanded(2.7.X.1)																				
	1		2		3		4		5		6		7		8					
Mode	NVD		NVD		NVD		NVD		NVD		NVD		NVD		NVD					
Table - 29																				
Time	0		0		0		0		0		0		0		0					
Coord Phase	.		.		.		.		.		.		.		.					
Mode	NVD		NVD		NVD		NVD		NVD		NVD		NVD		NVD					
Table - 30																				
Time	0		0		0		0		0		0		0		0					
Coord Phase	.		.		.		.		.		.		.		.					
Mode	NVD		NVD		NVD		NVD		NVD		NVD		NVD		NVD					
Table - 31																				
Time	0		0		0		0		0		0		0		0					
Coord Phase	.		.		.		.		.		.		.		.					
Mode	NVD		NVD		NVD		NVD		NVD		NVD		NVD		NVD					
Table - 32																				
Time	30		140		0		20		0		115		0		20					
Coord Phase	.		.		.		.		.		.		.		.					
Mode	NON		MAX		NON		NON		NON		MAX		NON		NON					
Adv Schedule(4.3)																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Table - 1																				
Sun	.	.	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
Mon	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
Tue	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
Wed	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
Thu	X	.	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
Fri	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
Sat	.	X	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
Jan	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Feb	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Mar	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Apr	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
May	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jun	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jul	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Aug	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Sep	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Adv Schedule(4.3)																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Oct	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nov	X	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Dec	X	X	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
01	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
02	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
03	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
04	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
05	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
06	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
07	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
08	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
09	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
10	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
11	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
12	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
13	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
14	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
15	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
16	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
17	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
18	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
19	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
20	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
21	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
22	X	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
23	X	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24	X	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
25	X	X	X	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
26	X	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
27	X	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28	X	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
29	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
30	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
31	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Plan	1	2	3	1	1	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1
Day Plan(4.4)																				

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Table - 1																				
Hour	0	6	9	11	14	16	18	19	0	0	0	0	0	0	0	0	0	0	0	0
Minute	0	30	0	0	15	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0
Action	33	1	4	2	5	3	4	33	0	0	0	0	0	0	0	0	0	0	0	0
Table - 2																				
Hour	0	9	11	17	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minute	0	15	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Action	33	6	7	6	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Table - 3																				
Hour	0	10	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minute	0	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Action	33	6	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Table - 4																				
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minute	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Action	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Table - 5																				
Hour	0	10	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minute	0	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Action	33	6	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Table - 6																				
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minute	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Action	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Table - 7																				
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minute	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Action	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Table - 8																				
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minute	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Action	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Table - 9																				
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minute	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Action	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Table - 10																				
Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Day Plan(4.4)																																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20													
Minute	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Action	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Actions(4.5)																																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Table - 1																																	
Pattern	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	254
Aux 1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Aux 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Aux 3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Special 1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Special 2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Special 3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Special 4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Special 5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Special 6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Special 7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Special 8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
Pre1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pre2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



Appendix C

Year 2022 Existing Traffic Count Data

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Intersection: Pierce Park Ln / State St

City, State: Boise, Idaho

Control: Signalized

File Name : Pierce Park Ln & State St

Site Code : 00000000

Start Date : 10/4/2022

Page No : 1

Groups Printed- General Traffic - 3+ Axle Heavy Traffic

Start Time	State Street From Northwest				Pierce Park Lane From North				State Street From Southeast				Int. Total
	Thru	Hard Left	Peds	App. Total	Hard Right	Bear Left	Peds	App. Total	Bear Right	Thru	Peds	App. Total	
06:30 AM	217	12	0	229	21	14	1	36	9	85	0	94	359
06:45 AM	201	19	0	220	23	16	0	39	8	76	0	84	343
Total	418	31	0	449	44	30	1	75	17	161	0	178	702
07:00 AM	250	4	0	254	30	25	0	55	8	128	0	136	445
07:15 AM	303	18	0	321	30	34	0	64	7	141	0	148	533
07:30 AM	383	26	0	409	39	48	0	87	13	193	0	206	702
07:45 AM	373	23	0	396	43	45	0	88	13	174	0	187	671
Total	1309	71	0	1380	142	152	0	294	41	636	0	677	2351
08:00 AM	327	41	0	368	28	34	0	62	15	149	0	164	594
08:15 AM	342	40	0	382	44	45	0	89	20	154	0	174	645
08:30 AM	345	52	0	397	82	57	0	139	25	182	0	207	743
08:45 AM	324	43	0	367	46	40	0	86	22	173	2	197	650
Total	1338	176	0	1514	200	176	0	376	82	658	2	742	2632
09:00 AM	270	39	0	309	26	28	0	54	23	190	0	213	576
09:15 AM	270	35	1	306	49	32	0	81	20	194	0	214	601

Total	540	74	1	615	75	60	0	135	43	384	0	427	1177

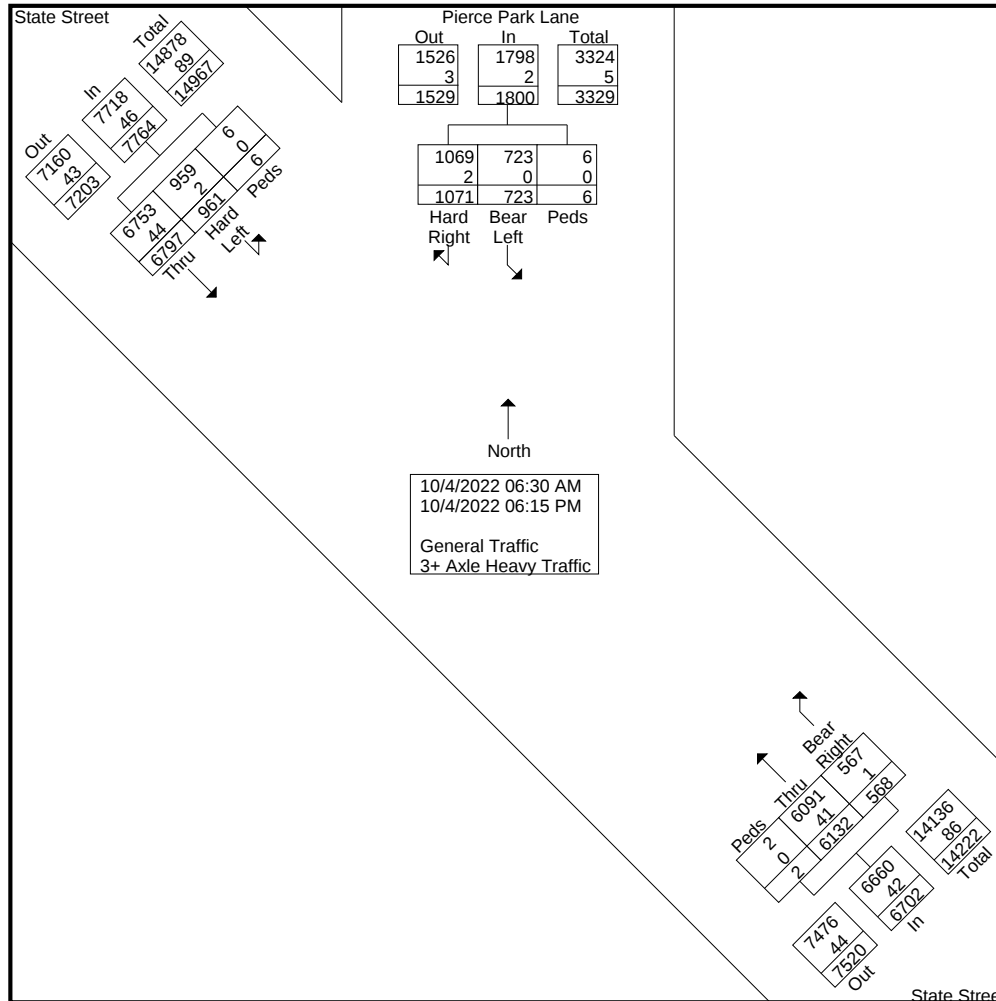
03:30 PM	259	48	0	307	69	26	0	95	24	342	0	366	768
03:45 PM	279	38	0	317	61	30	1	92	39	307	0	346	755
Total	538	86	0	624	130	56	1	187	63	649	0	712	1523
04:00 PM	249	52	1	302	40	27	0	67	44	338	0	382	751
04:15 PM	252	56	0	308	51	24	0	75	34	330	0	364	747
04:30 PM	308	48	0	356	48	27	1	76	30	399	0	429	861
04:45 PM	267	55	0	322	53	24	0	77	28	420	0	448	847
Total	1076	211	1	1288	192	102	1	295	136	1487	0	1623	3206
05:00 PM	286	52	0	338	55	26	0	81	36	373	0	409	828
05:15 PM	259	50	0	309	38	34	1	73	40	432	0	472	854
05:30 PM	265	60	2	327	59	28	0	87	28	334	0	362	776
05:45 PM	276	53	0	329	55	17	0	72	33	407	0	440	841
Total	1086	215	2	1303	207	105	1	313	137	1546	0	1683	3299
06:00 PM	248	51	0	299	41	20	2	63	27	355	0	382	744
06:15 PM	244	46	2	292	40	22	0	62	22	256	0	278	632
Grand Total	6797	961	6	7764	1071	723	6	1800	568	6132	2	6702	16266
Apprch %	87.5	12.4	0.1		59.5	40.2	0.3		8.5	91.5	0		
Total %	41.8	5.9	0	47.7	6.6	4.4	0	11.1	3.5	37.7	0	41.2	
General Traffic	6753	959	6	7718	1069	723	6	1798	567	6091	2	6660	16176
% General Traffic	99.4	99.8	100	99.4	99.8	100	100	99.9	99.8	99.3	100	99.4	99.4
3+ Axle Heavy Traffic	44	2	0	46	2	0	0	2	1	41	0	42	90
% 3+ Axle Heavy Traffic	0.6	0.2	0	0.6	0.2	0	0	0.1	0.2	0.7	0	0.6	0.6

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292
Intersection: Pierce Park Ln / State St
City, State: Boise, Idaho
Control: Signalized

File Name : Pierce Park Ln & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 2



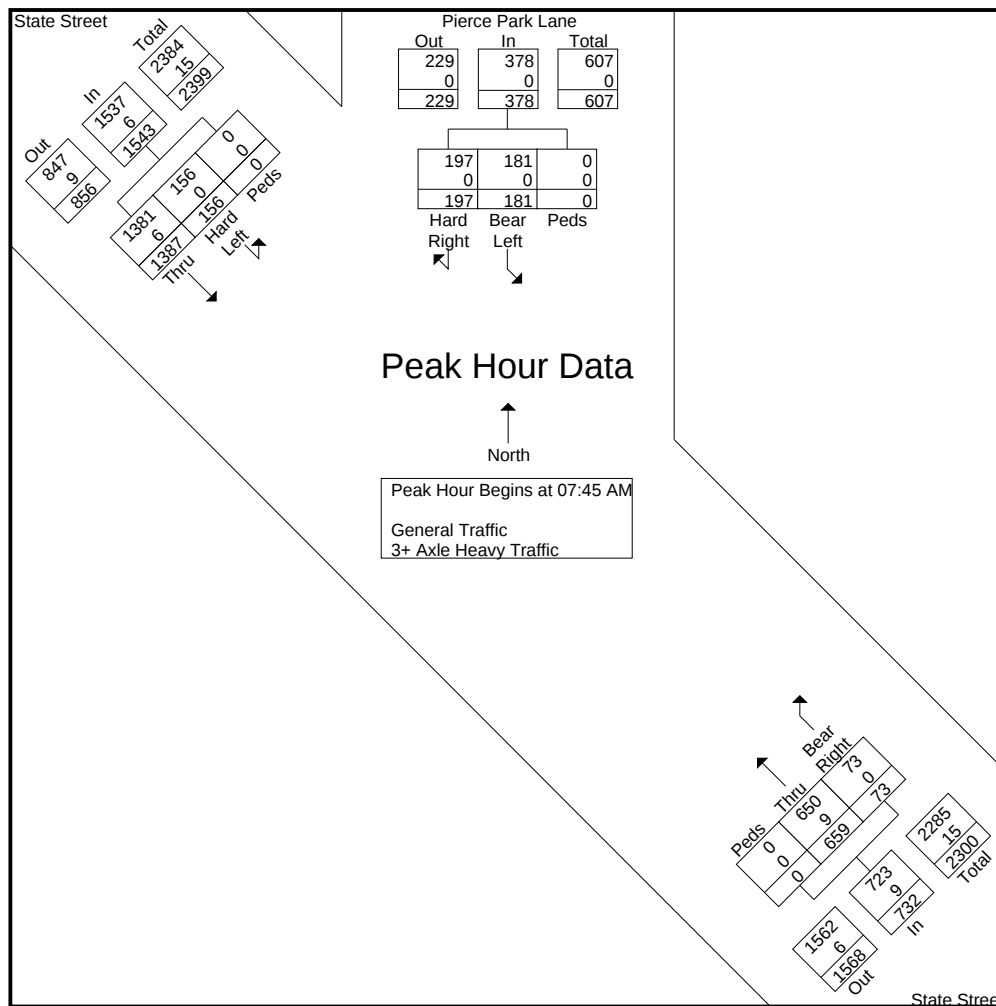
L2 Data Collection

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Idaho (208) 860-7554 Utah (801) 413-2993

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Intersection: Pierce Park Ln / State St
City, State: Boise, Idaho
Control: Signalized

File Name : Pierce Park Ln & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 3

	State Street From Northwest				Pierce Park Lane From North				State Street From Southeast				
Start Time	Thru	Hard Left	Peds	App. Total	Hard Right	Bear Left	Peds	App. Total	Bear Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	373	23	0	396	43	45	0	88	13	174	0	187	671
08:00 AM	327	41	0	368	28	34	0	62	15	149	0	164	594
08:15 AM	342	40	0	382	44	45	0	89	20	154	0	174	645
08:30 AM	345	52	0	397	82	57	0	139	25	182	0	207	743
Total Volume	1387	156	0	1543	197	181	0	378	73	659	0	732	2653
% App. Total	89.9	10.1	0		52.1	47.9	0		10	90	0		
PHF	.930	.750	.000	.972	.601	.794	.000	.680	.730	.905	.000	.884	.893
General Traffic	1381	156	0	1537	197	181	0	378	73	650	0	723	2638
% General Traffic	99.6	100	0	99.6	100	100	0	100	100	98.6	0	98.8	99.4
3+ Axle Heavy Traffic	6	0	0	6	0	0	0	0	0	9	0	9	15
% 3+ Axle Heavy Traffic	0.4	0	0	0.4	0	0	0	0	0	1.4	0	1.2	0.6



L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Intersection: Pierce Park Ln / State St

City, State: Boise, Idaho

Control: Signalized

File Name : Pierce Park Ln & State St

Site Code : 00000000

Start Date : 10/4/2022

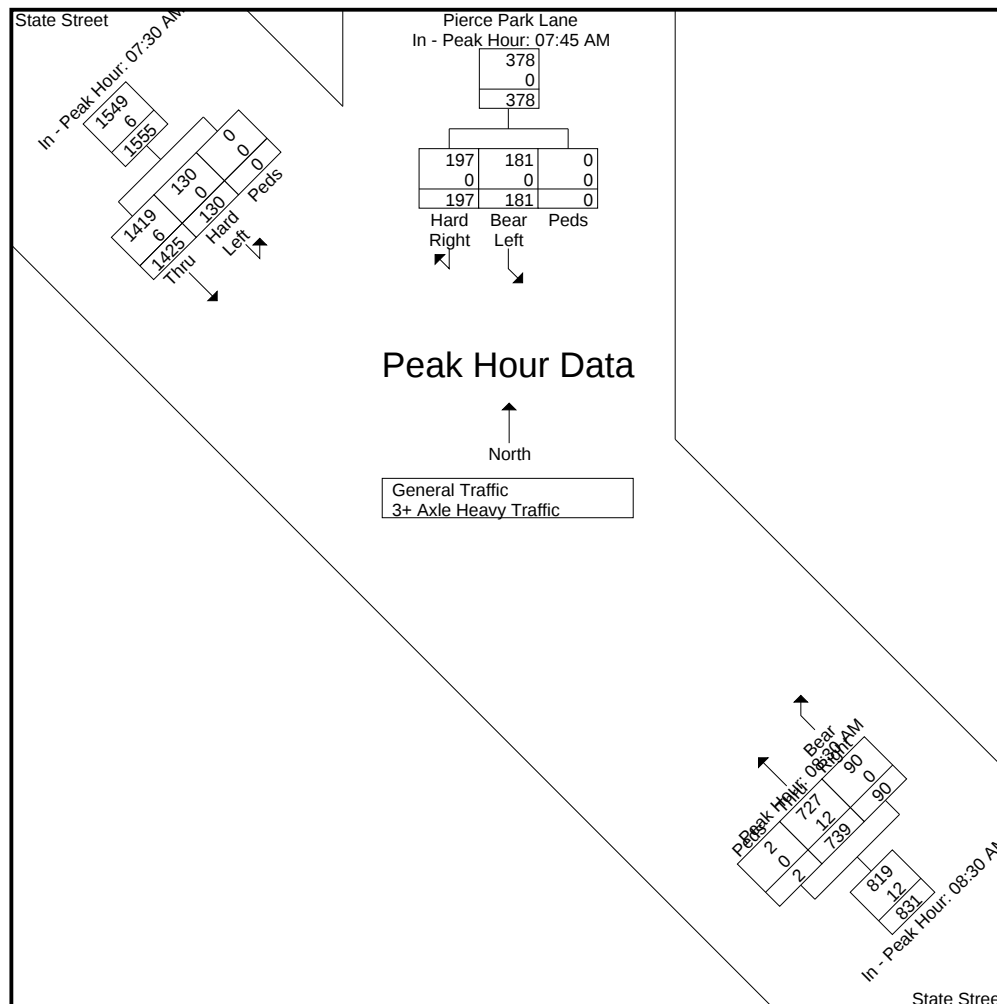
Page No : 4

	State Street From Northwest				Pierce Park Lane From North				State Street From Southeast				
Start Time	Thru	Hard Left	Peds	App. Total	Hard Right	Bear Left	Peds	App. Total	Bear Right	Thru	Peds	App. Total	Int. Total

Peak Hour Analysis From 06:30 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM				07:45 AM				08:30 AM			
+0 mins.	383	26	0	409	43	45	0	88	25	182	0	207
+15 mins.	373	23	0	396	28	34	0	62	22	173	2	197
+30 mins.	327	41	0	368	44	45	0	89	23	190	0	213
+45 mins.	342	40	0	382	82	57	0	139	20	194	0	214
Total Volume	1425	130	0	1555	197	181	0	378	90	739	2	831
% App. Total	91.6	8.4	0		52.1	47.9	0		10.8	88.9	0.2	
PHF	.930	.793	.000	.950	.601	.794	.000	.680	.900	.952	.250	.971
General Traffic	1419	130	0	1549	197	181	0	378	90	727	2	819
% General Traffic	99.6	100	0	99.6	100	100	0	100	100	98.4	100	98.6
3+ Axle Heavy Traffic	6	0	0	6	0	0	0	0	0	12	0	12
% 3+ Axle Heavy Traffic	0.4	0	0	0.4	0	0	0	0	0	1.6	0	1.4



L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Intersection: Pierce Park Ln / State St

City, State: Boise, Idaho

Control: Signalized

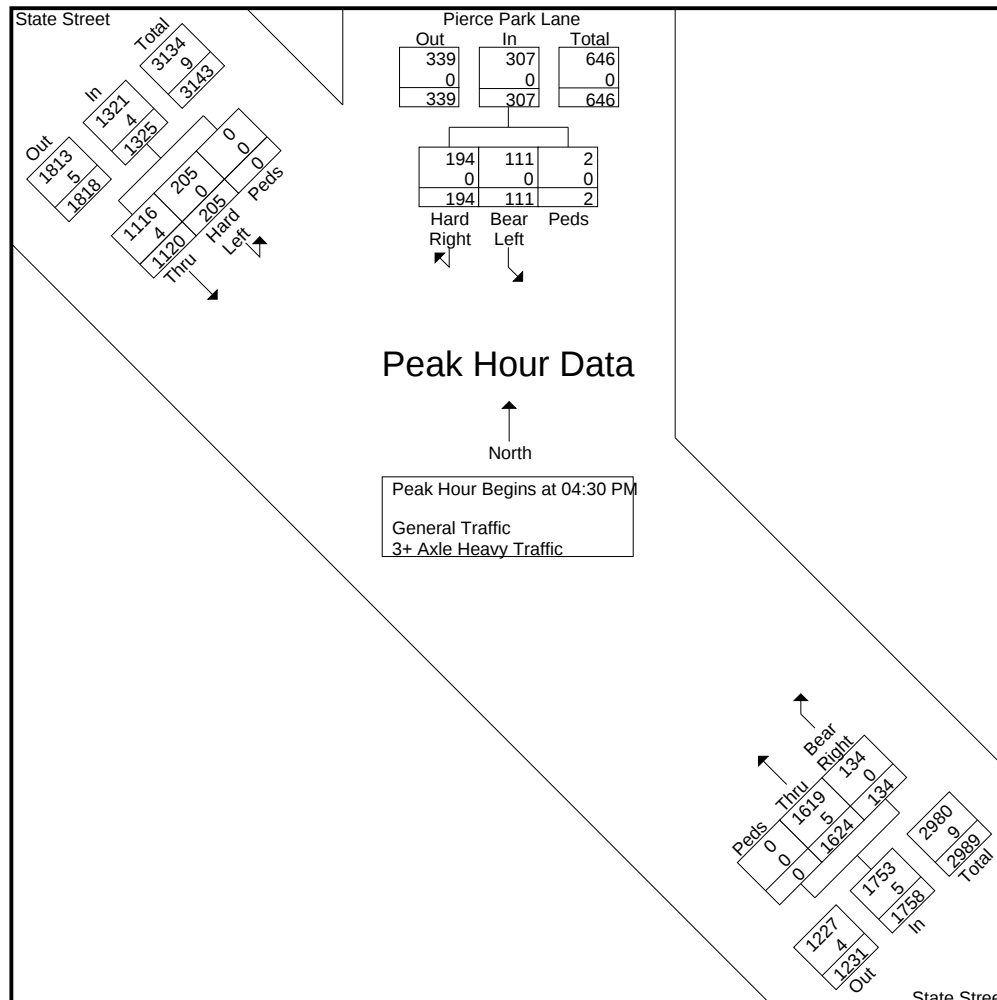
File Name : Pierce Park Ln & State St

Site Code : 00000000

Start Date : 10/4/2022

Page No : 5

	State Street From Northwest				Pierce Park Lane From North				State Street From Southeast				
Start Time	Thru	Hard Left	Peds	App. Total	Hard Right	Bear Left	Peds	App. Total	Bear Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	308	48	0	356	48	27	1	76	30	399	0	429	861
04:45 PM	267	55	0	322	53	24	0	77	28	420	0	448	847
05:00 PM	286	52	0	338	55	26	0	81	36	373	0	409	828
05:15 PM	259	50	0	309	38	34	1	73	40	432	0	472	854
Total Volume	1120	205	0	1325	194	111	2	307	134	1624	0	1758	3390
% App. Total	84.5	15.5	0		63.2	36.2	0.7		7.6	92.4	0		
PHF	.909	.932	.000	.930	.882	.816	.500	.948	.838	.940	.000	.931	.984
General Traffic	1116	205	0	1321	194	111	2	307	134	1619	0	1753	3381
% General Traffic	99.6	100	0	99.7	100	100	100	100	100	99.7	0	99.7	99.7
3+ Axle Heavy Traffic	4	0	0	4	0	0	0	0	0	5	0	5	9
% 3+ Axle Heavy Traffic	0.4	0	0	0.3	0	0	0	0	0	0.3	0	0.3	0.3



L2 Data Collection

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Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292
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Start Date : 10/4/2022
Page No : 7

Image 1



L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Intersection: Plantation Dr / State St

City, State: Boise, Idaho

Control: Stop Sign

File Name : Plantation Dr & State St

Site Code : 00000000

Start Date : 10/4/2022

Page No : 1

Groups Printed- General Traffic - 3+ Axle Heavy Traffic

	State Street From Northwest				State Street From Southeast				Plantation Drive From Southwest				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
06:30 AM	1	228	0	229	108	3	0	111	1	0	0	1	341
06:45 AM	2	223	0	225	102	1	0	103	0	1	0	1	329
Total	3	451	0	454	210	4	0	214	1	1	0	2	670
07:00 AM	1	263	0	264	151	0	0	151	3	0	0	3	418
07:15 AM	1	346	0	347	173	2	0	175	1	0	0	1	523
07:30 AM	6	404	0	410	228	1	0	229	0	1	0	1	640
07:45 AM	1	403	0	404	220	2	0	222	1	4	0	5	631
Total	9	1416	0	1425	772	5	0	777	5	5	0	10	2212
08:00 AM	4	368	0	372	179	6	0	185	2	0	0	2	559
08:15 AM	3	383	0	386	192	3	0	195	3	1	1	5	586
08:30 AM	3	394	0	397	260	4	0	264	1	0	0	1	662
08:45 AM	3	361	0	364	225	2	1	228	6	0	2	8	600
Total	13	1506	0	1519	856	15	1	872	12	1	3	16	2407
09:00 AM	7	304	0	311	212	7	0	219	3	0	1	4	534
09:15 AM	6	307	0	313	243	7	0	250	3	1	0	4	567

Total	13	611	0	624	455	14	0	469	6	1	1	8	1101

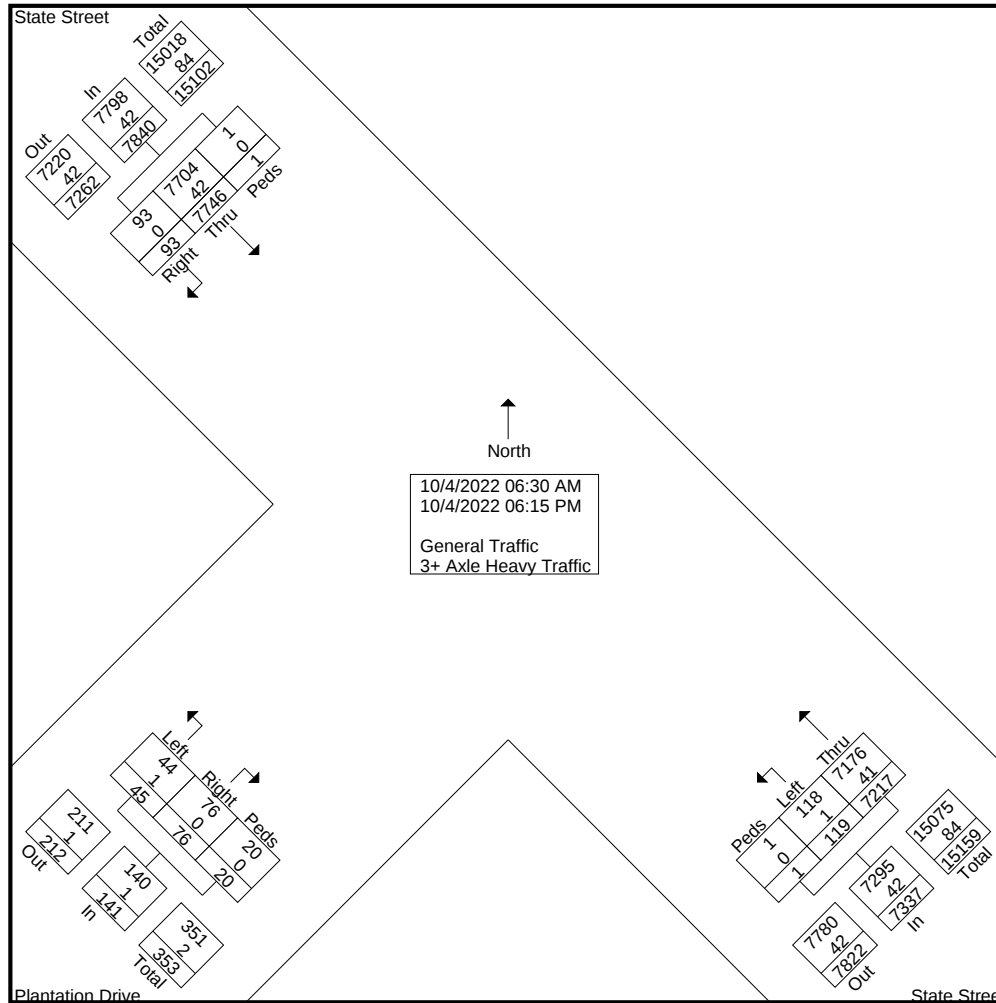
03:30 PM	6	299	0	305	416	2	0	418	5	6	2	13	736
03:45 PM	3	311	0	314	383	4	0	387	3	2	0	5	706
Total	9	610	0	619	799	6	0	805	8	8	2	18	1442
04:00 PM	7	323	1	331	366	4	0	370	4	2	3	9	710
04:15 PM	2	295	0	297	396	7	0	403	4	3	2	9	709
04:30 PM	3	351	0	354	450	3	0	453	4	3	2	9	816
04:45 PM	4	312	0	316	461	6	0	467	2	3	3	8	791
Total	16	1281	1	1298	1673	20	0	1693	14	11	10	35	3026
05:00 PM	8	335	0	343	436	7	0	443	3	0	1	4	790
05:15 PM	9	313	0	322	459	13	0	472	8	1	0	9	803
05:30 PM	4	320	0	324	391	11	0	402	1	2	2	5	731
05:45 PM	5	319	0	324	466	16	0	482	4	7	0	11	817
Total	26	1287	0	1313	1752	47	0	1799	16	10	3	29	3141
06:00 PM	3	291	0	294	380	5	0	385	7	6	0	13	692
06:15 PM	1	293	0	294	320	3	0	323	7	2	1	10	627
Grand Total	93	7746	1	7840	7217	119	1	7337	76	45	20	141	15318
Apprch %	1.2	98.8	0		98.4	1.6	0		53.9	31.9	14.2		
Total %	0.6	50.6	0	51.2	47.1	0.8	0	47.9	0.5	0.3	0.1	0.9	
General Traffic	93	7704	1	7798	7176	118	1	7295	76	44	20	140	15233
% General Traffic	100	99.5	100	99.5	99.4	99.2	100	99.4	100	97.8	100	99.3	99.4
3+ Axle Heavy Traffic	0	42	0	42	41	1	0	42	0	1	0	1	85
% 3+ Axle Heavy Traffic	0	0.5	0	0.5	0.6	0.8	0	0.6	0	2.2	0	0.7	0.6

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292
Intersection: Plantation Dr / State St
City, State: Boise, Idaho
Control: Stop Sign

File Name : Plantation Dr & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 2



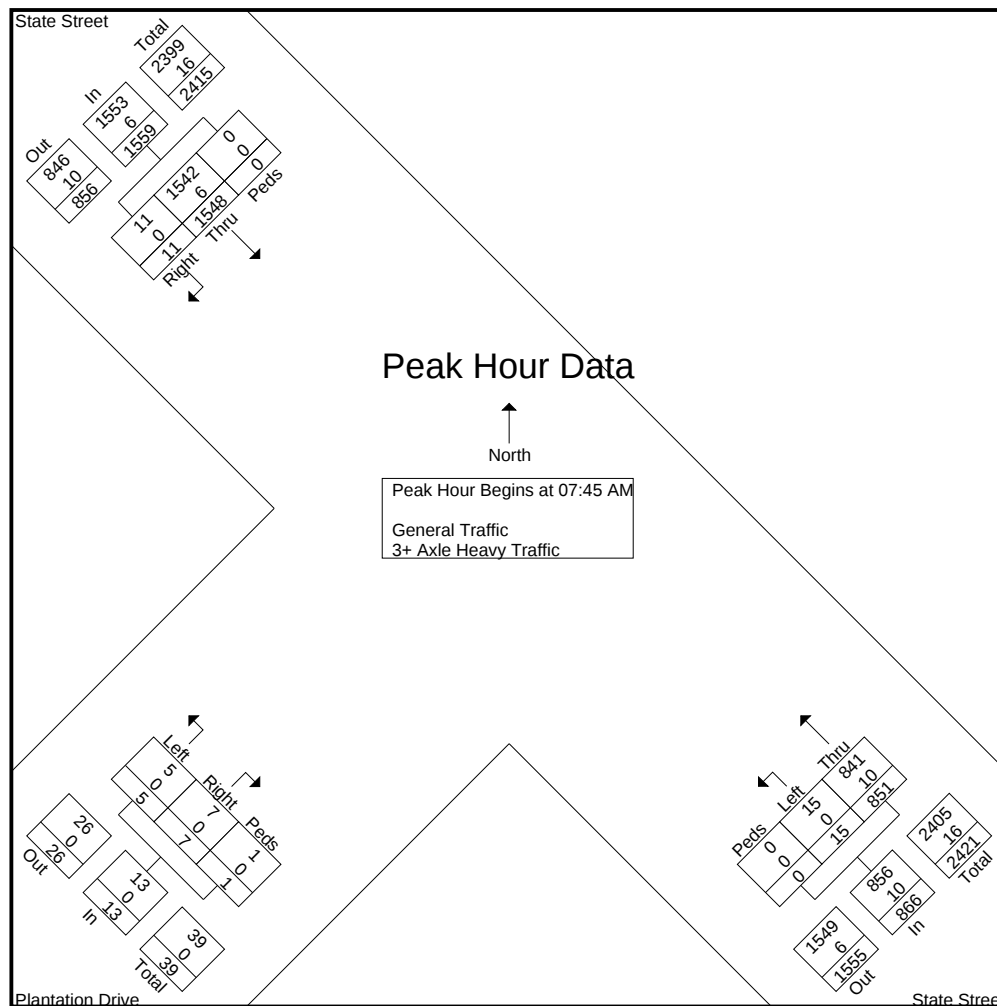
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292
Intersection: Plantation Dr / State St
City, State: Boise, Idaho
Control: Stop Sign

File Name : Plantation Dr & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 3

	State Street From Northwest				State Street From Southeast				Plantation Drive From Southwest				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	1	403	0	404	220	2	0	222	1	4	0	5	631
08:00 AM	4	368	0	372	179	6	0	185	2	0	0	2	559
08:15 AM	3	383	0	386	192	3	0	195	3	1	1	5	586
08:30 AM	3	394	0	397	260	4	0	264	1	0	0	1	662
Total Volume	11	1548	0	1559	851	15	0	866	7	5	1	13	2438
% App. Total	0.7	99.3	0		98.3	1.7	0		53.8	38.5	7.7		
PHF	.688	.960	.000	.965	.818	.625	.000	.820	.583	.313	.250	.650	.921
General Traffic	11	1542	0	1553	841	15	0	856	7	5	1	13	2422
% General Traffic	100	99.6	0	99.6	98.8	100	0	98.8	100	100	100	100	99.3
3+ Axle Heavy Traffic	0	6	0	6	10	0	0	10	0	0	0	0	16
% 3+ Axle Heavy Traffic	0	0.4	0	0.4	1.2	0	0	1.2	0	0	0	0	0.7



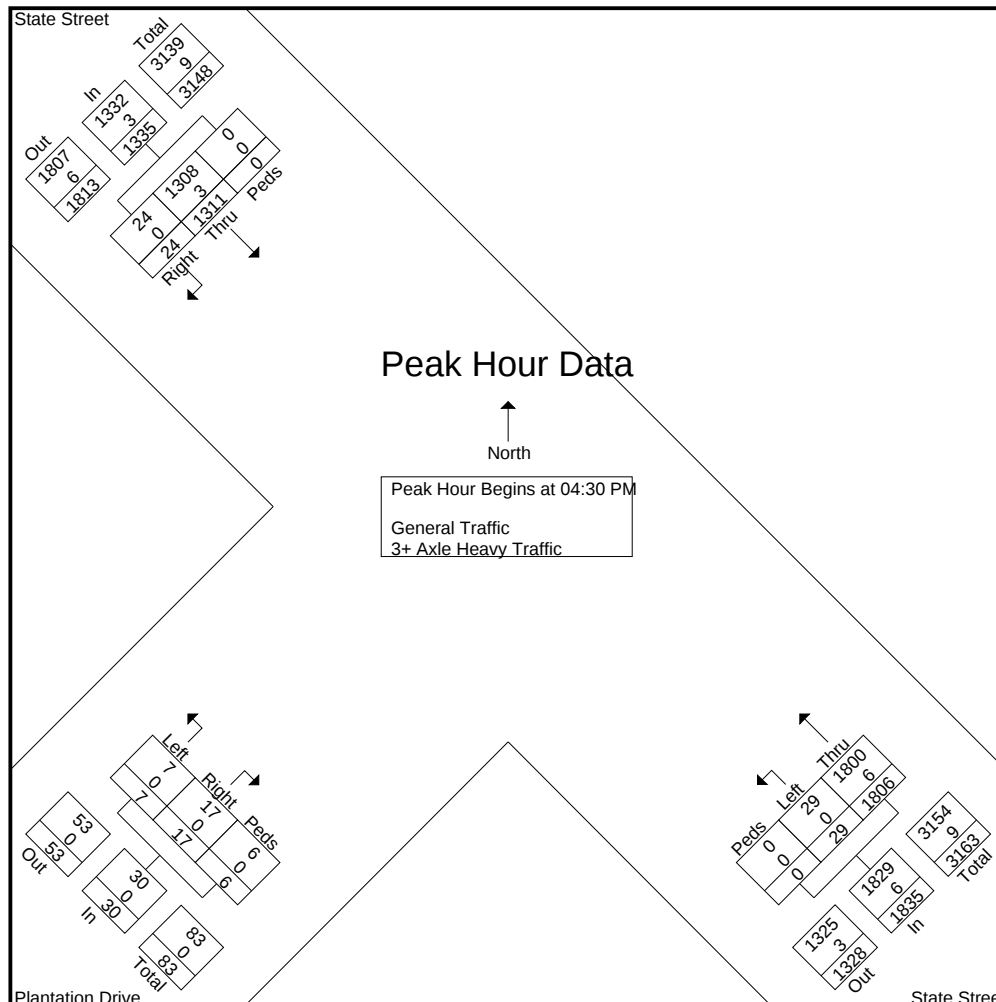
L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292
Intersection: Plantation Dr / State St
City, State: Boise, Idaho
Control: Stop Sign

File Name : Plantation Dr & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 5

	State Street From Northwest				State Street From Southeast				Plantation Drive From Southwest				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	3	351	0	354	450	3	0	453	4	3	2	9	816
04:45 PM	4	312	0	316	461	6	0	467	2	3	3	8	791
05:00 PM	8	335	0	343	436	7	0	443	3	0	1	4	790
05:15 PM	9	313	0	322	459	13	0	472	8	1	0	9	803
Total Volume	24	1311	0	1335	1806	29	0	1835	17	7	6	30	3200
% App. Total	1.8	98.2	0		98.4	1.6	0		56.7	23.3	20		
PHF	.667	.934	.000	.943	.979	.558	.000	.972	.531	.583	.500	.833	.980
General Traffic	24	1308	0	1332	1800	29	0	1829	17	7	6	30	3191
% General Traffic	100	99.8	0	99.8	99.7	100	0	99.7	100	100	100	100	99.7
3+ Axle Heavy Traffic	0	3	0	3	6	0	0	6	0	0	0	0	9
% 3+ Axle Heavy Traffic	0	0.2	0	0.2	0.3	0	0	0.3	0	0	0	0	0.3



L2 Data Collection

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Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292
Intersection: Plantation Dr / State St
City, State: Boise, Idaho
Control: Stop Sign

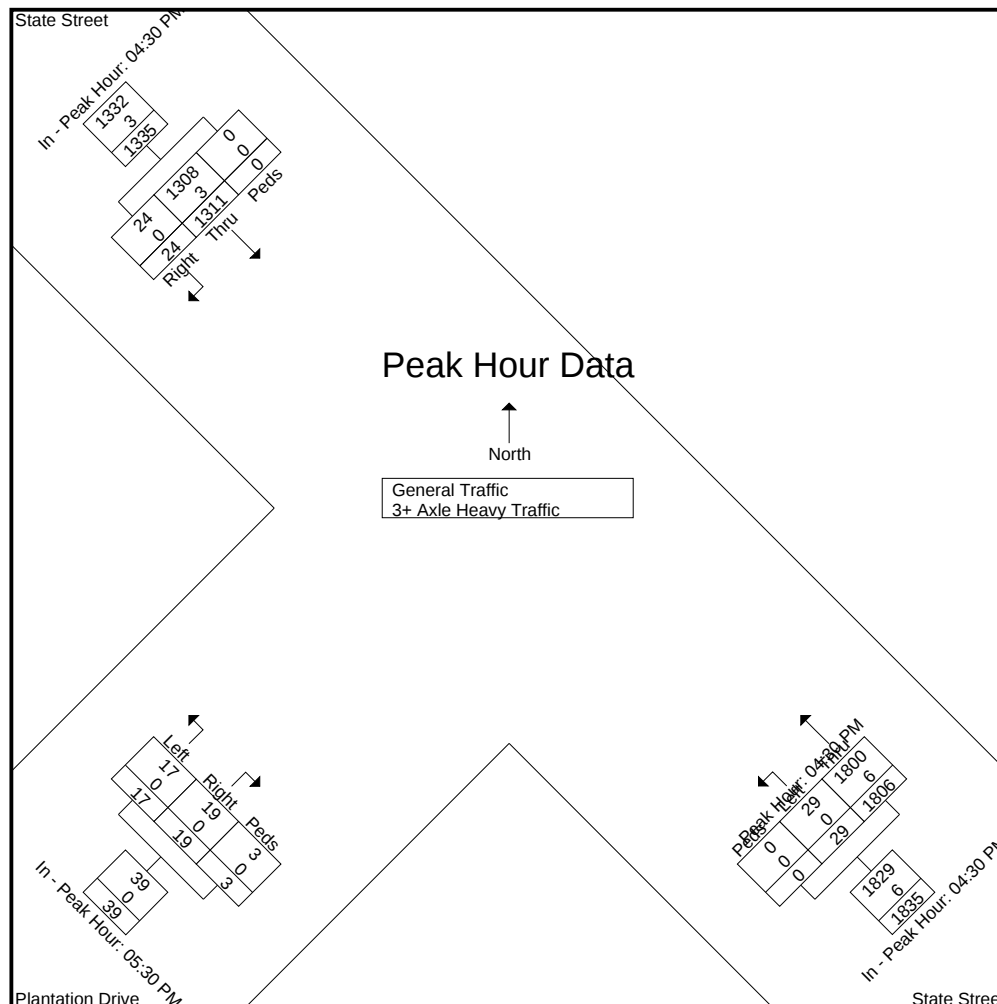
File Name : Plantation Dr & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 6

	State Street From Northwest				State Street From Southeast				Plantation Drive From Southwest				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total

Peak Hour Analysis From 12:00 PM to 06:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				05:30 PM			
+0 mins.	3	351	0	354	450	3	0	453	1	2	2	5
+15 mins.	4	312	0	316	461	6	0	467	4	7	0	11
+30 mins.	8	335	0	343	436	7	0	443	7	6	0	13
+45 mins.	9	313	0	322	459	13	0	472	7	2	1	10
Total Volume	24	1311	0	1335	1806	29	0	1835	19	17	3	39
% App. Total	1.8	98.2	0		98.4	1.6	0		48.7	43.6	7.7	
PHF	.667	.934	.000	.943	.979	.558	.000	.972	.679	.607	.375	.750
General Traffic	24	1308	0	1332	1800	29	0	1829	19	17	3	39
% General Traffic	100	99.8	0	99.8	99.7	100	0	99.7	100	100	100	100
3+ Axle Heavy Traffic	0	3	0	3	6	0	0	6	0	0	0	0
% 3+ Axle Heavy Traffic	0	0.2	0	0.2	0.3	0	0	0.3	0	0	0	0



L2 Data Collection

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Study: KITT0292
Intersection: Plantation Dr / State St
City, State: Boise, Idaho
Control: Stop Sign

File Name : Plantation Dr & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 7

Image 1



L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Intersection: Zamzows / State Street

City, State: Boise, Idaho

Control: Stop Sign

File Name : Zamzows Driveway & State St

Site Code : 00000000

Start Date : 10/4/2022

Page No : 1

Groups Printed- General Traffic - 3+ Axle Heavy Traffic

Start Time	State Street From Northwest				Zamzows Driveway From Northeast				State Street From Southeast				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
06:30 AM	228	0	0	228	0	0	1	1	0	99	0	99	328
06:45 AM	224	0	0	224	0	0	0	0	0	94	0	94	318
Total	452	0	0	452	0	0	1	1	0	193	0	193	646
07:00 AM	269	0	0	269	0	0	0	0	1	124	0	125	394
07:15 AM	353	0	0	353	0	0	0	0	0	145	0	145	498
07:30 AM	427	1	0	428	0	0	0	0	1	205	0	206	634
07:45 AM	428	0	0	428	0	0	0	0	0	194	0	194	622
Total	1477	1	0	1478	0	0	0	0	2	668	0	670	2148
08:00 AM	371	0	0	371	0	0	0	0	0	166	0	166	537
08:15 AM	384	2	0	386	1	0	0	1	1	174	0	175	562
08:30 AM	406	2	0	408	0	0	0	0	0	207	0	207	615
08:45 AM	354	3	0	357	0	0	1	1	2	190	0	192	550
Total	1515	7	0	1522	1	0	1	2	3	737	0	740	2264
09:00 AM	303	0	0	303	1	0	1	2	0	232	0	232	537
09:15 AM	291	1	0	292	1	0	0	1	1	209	0	210	503
-----	Total	594	1	595	2	0	1	3	1	441	0	442	1040

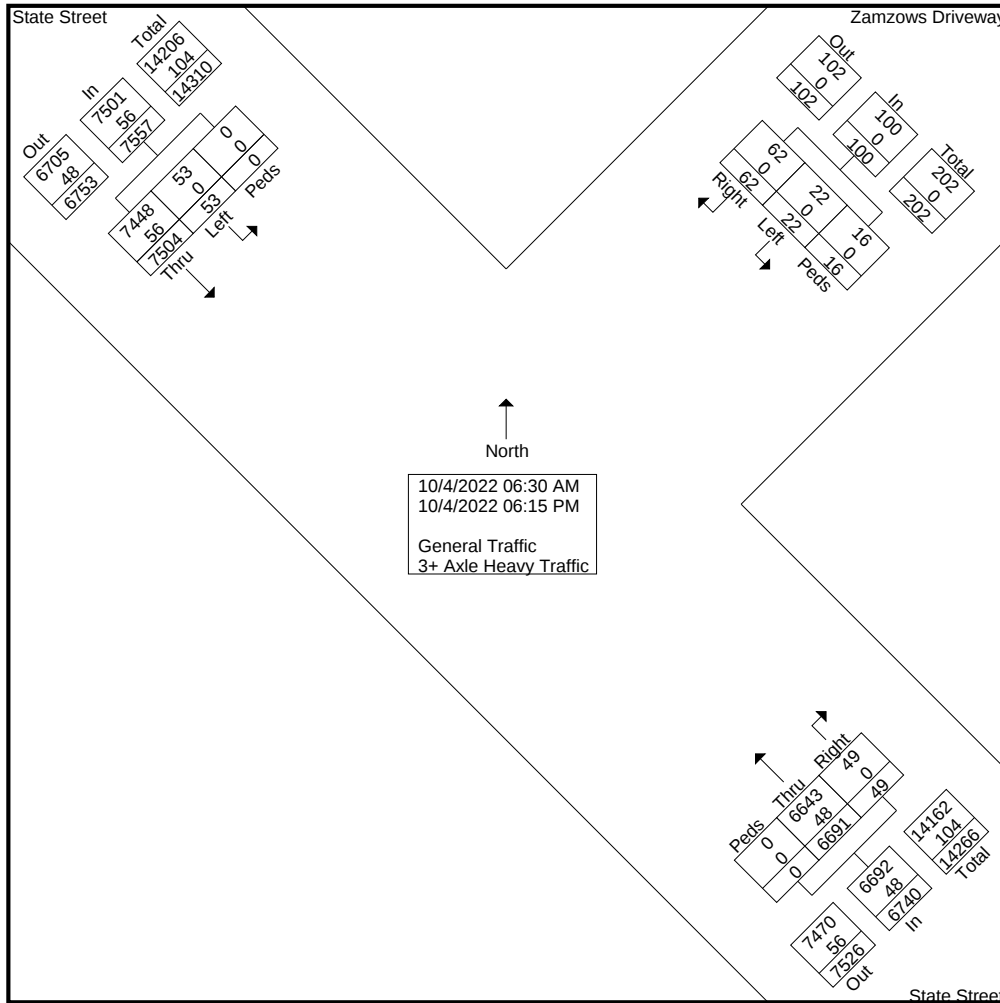
03:30 PM	284	2	0	286	2	1	1	4	2	375	0	377	667
03:45 PM	301	7	0	308	6	2	1	9	4	332	0	336	653
Total	585	9	0	594	8	3	2	13	6	707	0	713	1320
04:00 PM	271	2	0	273	3	2	0	5	3	388	0	391	669
04:15 PM	278	1	0	279	3	1	1	5	1	394	0	395	679
04:30 PM	329	5	0	334	3	1	0	4	10	395	0	405	743
04:45 PM	279	6	0	285	5	2	1	8	2	451	0	453	746
Total	1157	14	0	1171	14	6	2	22	16	1628	0	1644	2837
05:00 PM	310	7	0	317	6	6	1	13	5	424	0	429	759
05:15 PM	288	1	0	289	5	3	1	9	3	437	0	440	738
05:30 PM	289	6	0	295	11	0	1	12	4	384	0	388	695
05:45 PM	300	2	0	302	6	2	1	9	5	399	0	404	715
Total	1187	16	0	1203	28	11	4	43	17	1644	0	1661	2907
06:00 PM	271	2	0	273	8	1	2	11	3	370	0	373	657
06:15 PM	266	3	0	269	1	1	3	5	1	303	0	304	578
Grand Total	7504	53	0	7557	62	22	16	100	49	6691	0	6740	14397
Apprch %	99.3	0.7	0		62	22	16		0.7	99.3	0		
Total %	52.1	0.4	0	52.5	0.4	0.2	0.1	0.7	0.3	46.5	0	46.8	
General Traffic	7448	53	0	7501	62	22	16	100	49	6643	0	6692	14293
% General Traffic	99.3	100	0	99.3	100	100	100	100	100	99.3	0	99.3	99.3
3+ Axle Heavy Traffic	56	0	0	56	0	0	0	0	0	48	0	48	104
% 3+ Axle Heavy Traffic	0.7	0	0	0.7	0	0	0	0	0	0.7	0	0.7	0.7

L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292
Intersection: Zamzows / State Street
City, State: Boise, Idaho
Control: Stop Sign

File Name : Zamzows Driveway & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 2



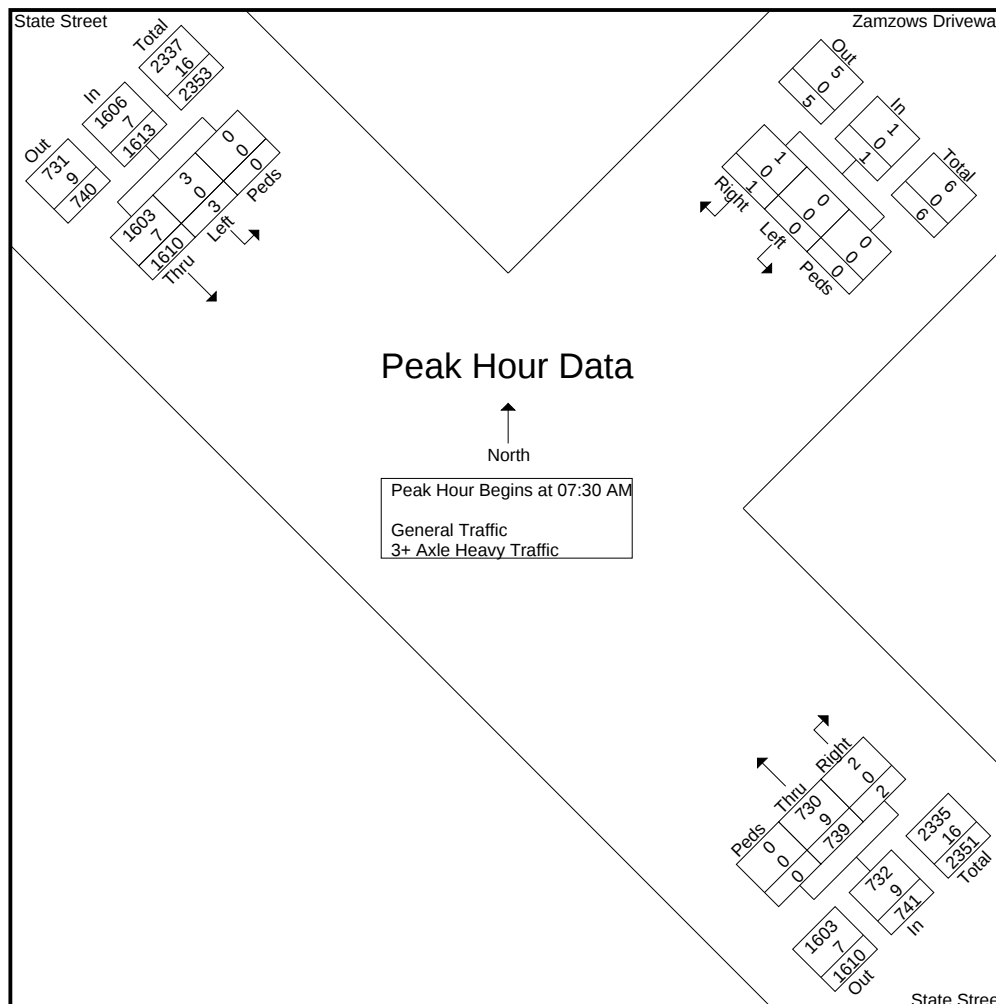
L2 Data Collection

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Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292
Intersection: Zamzows / State Street
City, State: Boise, Idaho
Control: Stop Sign

File Name : Zamzows Driveway & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 3

	State Street From Northwest				Zamzows Driveway From Northeast				State Street From Southeast				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	427	1	0	428	0	0	0	0	1	205	0	206	634
07:45 AM	428	0	0	428	0	0	0	0	0	194	0	194	622
08:00 AM	371	0	0	371	0	0	0	0	0	166	0	166	537
08:15 AM	384	2	0	386	1	0	0	1	1	174	0	175	562
Total Volume	1610	3	0	1613	1	0	0	1	2	739	0	741	2355
% App. Total	99.8	0.2	0		100	0	0		0.3	99.7	0		
PHF	.940	.375	.000	.942	.250	.000	.000	.250	.500	.901	.000	.899	.929
General Traffic	1603	3	0	1606	1	0	0	1	2	730	0	732	2339
% General Traffic	99.6	100	0	99.6	100	0	0	100	100	98.8	0	98.8	99.3
3+ Axle Heavy Traffic	7	0	0	7	0	0	0	0	0	9	0	9	16
% 3+ Axle Heavy Traffic	0.4	0	0	0.4	0	0	0	0	0	1.2	0	1.2	0.7



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Intersection: Zamzows / State Street

City, State: Boise, Idaho

Control: Stop Sign

File Name : Zamzows Driveway & State St

Site Code : 00000000

Start Date : 10/4/2022

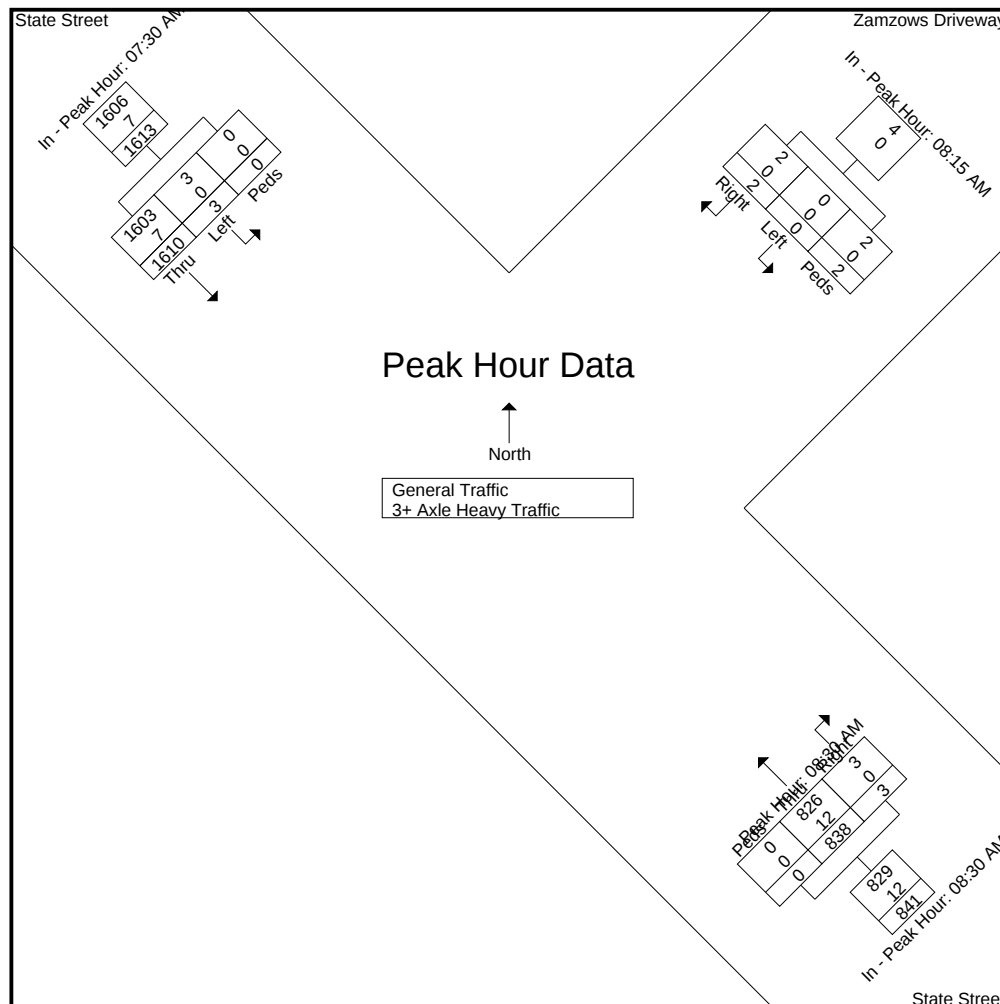
Page No : 4

	State Street From Northwest				Zamzows Driveway From Northeast				State Street From Southeast				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total

Peak Hour Analysis From 06:30 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM				08:15 AM				08:30 AM			
+0 mins.	427	1	0	428	1	0	0	1	0	207	0	207
+15 mins.	428	0	0	428	0	0	0	0	2	190	0	192
+30 mins.	371	0	0	371	0	0	1	1	0	232	0	232
+45 mins.	384	2	0	386	1	0	1	2	1	209	0	210
Total Volume	1610	3	0	1613	2	0	2	4	3	838	0	841
% App. Total	99.8	0.2	0		50	0	50		0.4	99.6	0	
PHF	.940	.375	.000	.942	.500	.000	.500	.500	.375	.903	.000	.906
General Traffic	1603	3	0	1606	2	0	2	4	3	826	0	829
% General Traffic	99.6	100	0	99.6	100	0	100	100	100	98.6	0	98.6
3+ Axle Heavy Traffic	7	0	0	7	0	0	0	0	0	12	0	12
% 3+ Axle Heavy Traffic	0.4	0	0	0.4	0	0	0	0	0	1.4	0	1.4



L2 Data Collection

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Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Intersection: Zamzows / State Street

City, State: Boise, Idaho

Control: Stop Sign

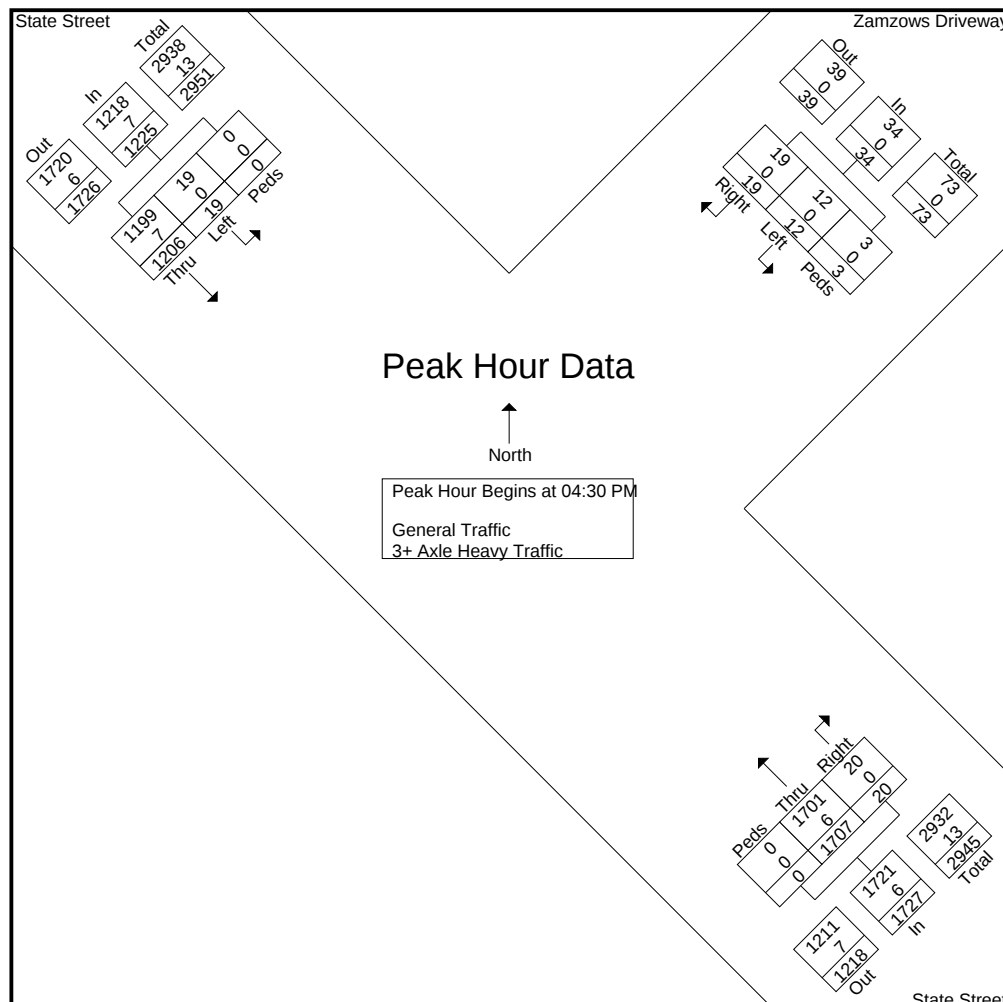
File Name : Zamzows Driveway & State St

Site Code : 00000000

Start Date : 10/4/2022

Page No : 5

	State Street From Northwest				Zamzows Driveway From Northeast				State Street From Southeast				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 06:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	329	5	0	334	3	1	0	4	10	395	0	405	743
04:45 PM	279	6	0	285	5	2	1	8	2	451	0	453	746
05:00 PM	310	7	0	317	6	6	1	13	5	424	0	429	759
05:15 PM	288	1	0	289	5	3	1	9	3	437	0	440	738
Total Volume	1206	19	0	1225	19	12	3	34	20	1707	0	1727	2986
% App. Total	98.4	1.6	0		55.9	35.3	8.8		1.2	98.8	0		
PHF	.916	.679	.000	.917	.792	.500	.750	.654	.500	.946	.000	.953	.984
General Traffic	1199	19	0	1218	19	12	3	34	20	1701	0	1721	2973
% General Traffic	99.4	100	0	99.4	100	100	100	100	100	99.6	0	99.7	99.6
3+ Axle Heavy Traffic	7	0	0	7	0	0	0	0	0	6	0	6	13
% 3+ Axle Heavy Traffic	0.6	0	0	0.6	0	0	0	0	0	0.4	0	0.3	0.4



L2 Data Collection

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Study: KITT0292

Intersection: Zamzows / State Street

City, State: Boise, Idaho

Control: Stop Sign

File Name : Zamzows Driveway & State St

Site Code : 00000000

Start Date : 10/4/2022

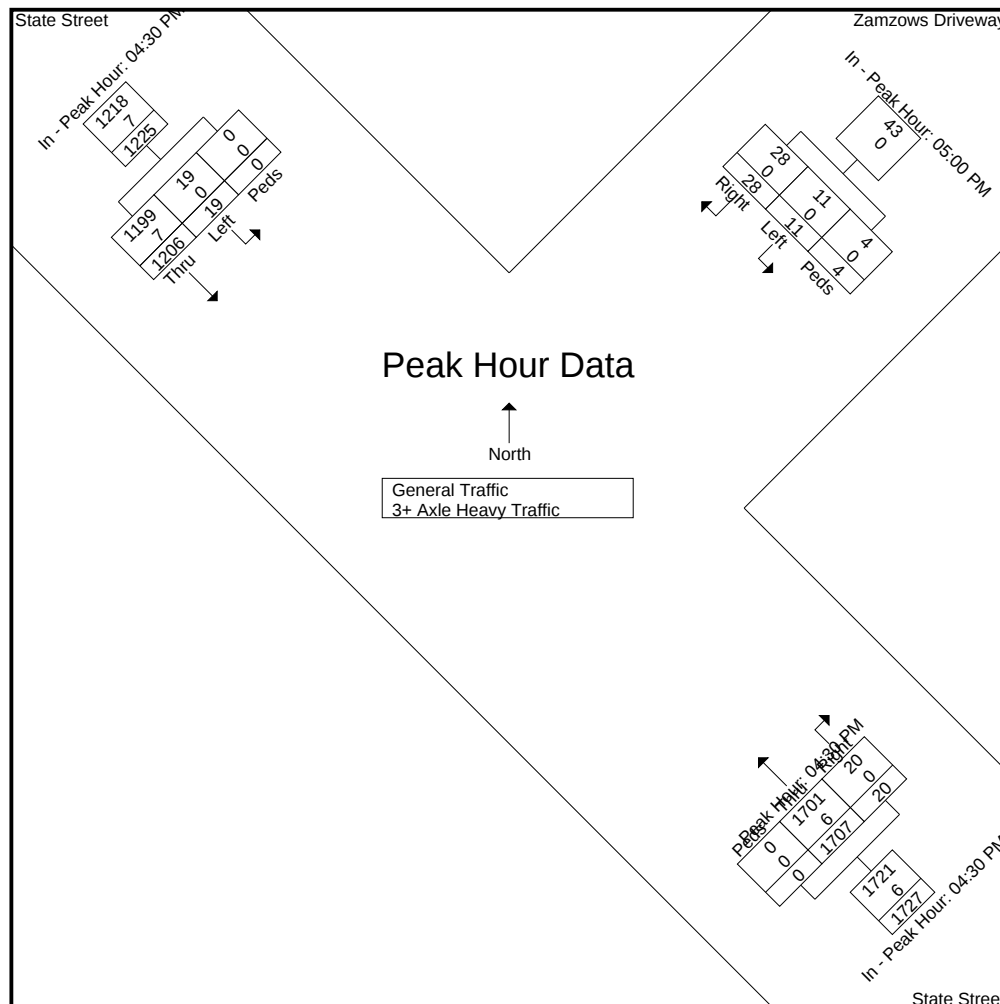
Page No : 6

	State Street From Northwest				Zamzows Driveway From Northeast				State Street From Southeast				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total

Peak Hour Analysis From 12:00 PM to 06:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:30 PM				05:00 PM				04:30 PM			
+0 mins.	329	5	0	334	6	6	1	13	10	395	0	405
+15 mins.	279	6	0	285	5	3	1	9	2	451	0	453
+30 mins.	310	7	0	317	11	0	1	12	5	424	0	429
+45 mins.	288	1	0	289	6	2	1	9	3	437	0	440
Total Volume	1206	19	0	1225	28	11	4	43	20	1707	0	1727
% App. Total	98.4	1.6	0		65.1	25.6	9.3		1.2	98.8	0	
PHF	.916	.679	.000	.917	.636	.458	1.000	.827	.500	.946	.000	.953
General Traffic	1199	19	0	1218	28	11	4	43	20	1701	0	1721
% General Traffic	99.4	100	0	99.4	100	100	100	100	100	99.6	0	99.7
3+ Axle Heavy Traffic	7	0	0	7	0	0	0	0	0	6	0	6
% 3+ Axle Heavy Traffic	0.6	0	0	0.6	0	0	0	0	0	0.4	0	0.3



L2 Data Collection

L2DataCollection.com
Idaho (208) 860-7554 Utah (801) 413-2993

Study: KITT0292
Intersection: Zamzows / State Street
City, State: Boise, Idaho
Control: Stop Sign

File Name : Zamzows Driveway & State St
Site Code : 00000000
Start Date : 10/4/2022
Page No : 7

Image 1



L2 Data Collection

L2DataCollection.com

Idaho: (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Type: Volume / Direction

Tech: Judd / Klaren / Macoob

Count: Axle Hits / 2

Plantation Dr S of State St

Start Date: 10/4/2022

End Date: 10/5/2022

Plantation Drive south of State

Street

Boise, Idaho

10/4/2022	Southbound	Northbound	Total
Time			
12:00 AM	0	0	0
12:15	0	0	0
12:30	0	0	0
12:45	4	2	6
1:00	0	0	0
1:15	0	0	0
1:30	0	0	0
1:45	0	1	1
2:00	0	0	0
2:15	0	0	0
2:30	0	0	0
2:45	1	0	1
3:00	0	0	0
3:15	0	1	1
3:30	1	1	2
3:45	0	1	1
4:00	0	0	0
4:15	0	0	0
4:30	0	0	0
4:45	1	1	2
5:00	0	0	0
5:15	2	0	2
5:30	4	0	4
5:45	6	1	7
6:00	1	2	3
6:15	2	2	4
6:30	4	1	5
6:45	4	1	5
7:00	1	3	4
7:15	3	2	5
7:30	7	2	9
7:45	3	6	9
8:00	10	2	12
8:15	6	4	10
8:30	8	1	9
8:45	7	7	14
9:00	12	2	14
9:15	16	4	20
9:30	10	12	22
9:45	7	1	8
10:00	12	10	22
10:15	12	2	14
10:30	8	10	18
10:45	12	7	19
11:00	9	8	17
11:15	15	3	18
11:30	11	5	16
11:45	12	7	19
Total	211	112	323
Percent	65.3%	34.7%	
Peak	10:45	10:00	10:00
Volume	47	29	73
Peak Factor	0.783	0.725	0.830

L2 Data Collection

L2DataCollection.com

Idaho: (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Type: Volume / Direction

Tech: Judd / Klaren / Macoob

Count: Axle Hits / 2

Plantation Dr S of State St

Start Date: 10/4/2022

End Date: 10/5/2022

Plantation Drive south of State

Street

Boise, Idaho

10/4/2022	Southbound	Northbound	Total
Time			
12:00 PM	6	9	15
12:15	6	6	12
12:30	8	4	12
12:45	13	9	22
1:00	4	8	12
1:15	7	6	13
1:30	8	10	18
1:45	4	12	16
2:00	3	5	8
2:15	6	15	21
2:30	9	18	27
2:45	12	10	22
3:00	1	12	13
3:15	6	5	11
3:30	8	11	19
3:45	7	6	13
4:00	11	8	19
4:15	10	9	19
4:30	6	6	12
4:45	12	6	18
5:00	14	3	17
5:15	23	10	33
5:30	16	5	21
5:45	21	10	31
6:00	8	13	21
6:15	3	11	14
6:30	3	13	16
6:45	5	12	17
7:00	1	8	9
7:15	3	13	16
7:30	2	11	13
7:45	4	13	17
8:00	1	11	12
8:15	1	8	9
8:30	0	9	9
8:45	2	11	13
9:00	0	4	4
9:15	2	4	6
9:30	0	6	6
9:45	0	1	1
10:00	1	0	1
10:15	0	2	2
10:30	1	3	4
10:45	0	1	1
11:00	0	0	0
11:15	0	0	0
11:30	1	1	2
11:45	1	0	1
Total	260	358	618
Percent	42.1%	57.9%	
Peak	5:00	2:15	5:15
Volume	74	55	106
Peak Factor	0.804	0.764	0.803

L2 Data Collection

L2DataCollection.com

Idaho: (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Type: Volume / Direction

Tech: Judd / Klaren / Macoob

Count: Axle Hits / 2

Plantation Dr S of State St

Start Date: 10/4/2022

End Date: 10/5/2022

Plantation Drive south of State

Street

Boise, Idaho

10/5/2022 Time	Southbound	Northbound	Total
12:00 AM	0	0	0
12:15	0	0	0
12:30	1	0	1
12:45	0	0	0
1:00	0	0	0
1:15	0	1	1
1:30	1	1	2
1:45	0	0	0
2:00	0	1	1
2:15	3	2	5
2:30	0	0	0
2:45	0	0	0
3:00	1	0	1
3:15	0	1	1
3:30	0	0	0
3:45	0	0	0
4:00	0	0	0
4:15	0	0	0
4:30	1	0	1
4:45	1	0	1
5:00	0	0	0
5:15	4	2	6
5:30	6	0	6
5:45	5	2	7
6:00	0	1	1
6:15	3	3	6
6:30	1	0	1
6:45	3	0	3
7:00	4	0	4
7:15	2	3	5
7:30	3	0	3
7:45	8	2	10
8:00	2	4	6
8:15	3	5	8
8:30	6	2	8
8:45	8	4	12
9:00	24	2	26
9:15	23	2	25
9:30	9	4	13
9:45	5	5	10
10:00	7	6	13
10:15	5	9	14
10:30	2	5	7
10:45	7	13	20
11:00	5	8	13
11:15	4	8	12
11:30	5	4	9
11:45	15	13	28
Total	177	113	290
Percent	61.0%	39.0%	
Peak	8:45	10:15	8:45
Volume	64	35	76
Peak Factor	0.667	0.673	0.731

L2 Data Collection

L2DataCollection.com

Idaho: (208) 860-7554 Utah (801) 413-2993

Study: KITT0292

Type: Volume / Direction

Tech: Judd / Klaren / Macoob

Count: Axle Hits / 2

Plantation Dr S of State St

Start Date: 10/4/2022

End Date: 10/5/2022

Plantation Drive south of State

Street

Boise, Idaho

10/5/2022 Time	Southbound	Northbound	Total
12:00 PM	10	1	11
12:15	14	8	22
12:30	14	7	21
12:45	10	12	22
1:00	12	3	15
1:15	9	10	19
1:30	6	8	14
1:45	11	4	15
2:00	5	12	17
2:15	8	7	15
2:30	5	12	17
2:45	4	14	18
3:00	9	9	18
3:15	2	6	8
3:30	6	7	13
3:45	7	7	14
4:00	8	8	16
4:15	14	9	23
4:30	7	5	12
4:45	6	9	15
5:00	10	12	22
5:15	17	7	24
5:30	11	11	22
5:45	3	5	8
6:00	4	12	16
6:15	0	9	9
6:30	2	6	8
6:45	2	12	14
7:00	2	10	12
7:15	2	10	12
7:30	0	9	9
7:45	2	8	10
8:00	1	8	9
8:15	1	5	6
8:30	2	6	8
8:45	1	4	5
9:00	0	0	0
9:15	2	2	4
9:30	2	4	6
9:45	2	0	2
10:00	1	1	2
10:15	0	2	2
10:30	2	1	3
10:45	1	3	4
11:00	0	0	0
11:15	1	0	1
11:30	0	0	0
11:45	0	0	0
Total	238	305	543
Percent	43.8%	56.2%	
Peak	12:15	2:00	4:45
Volume	50	45	83
Peak Factor	0.893	0.804	0.865
Grand Total	886	888	1774
Percent	49.9%	50.1%	
AADT		AADT: 887	



Appendix D

Year 2022 Existing Operations Worksheets

HCM Signalized Intersection Capacity Analysis

3: State St & Pierce Park Ln

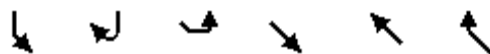
Existing AM Peak Hour
11/10/2022

						
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (vph)	181	197	156	1387	659	73
Future Volume (vph)	181	197	156	1387	659	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0	7.0	6.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1710	1530	1693	3386	3335	
Flt Permitted	0.95	1.00	0.28	1.00	1.00	
Satd. Flow (perm)	1710	1530	491	3386	3335	
Peak-hour factor, PHF	0.68	0.68	0.97	0.97	0.88	0.88
Adj. Flow (vph)	266	290	161	1430	749	83
RTOR Reduction (vph)	0	236	0	0	5	0
Lane Group Flow (vph)	266	54	161	1430	827	0
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Turn Type	Prot	Prot	pm+pt	NA	NA	
Protected Phases	4	4	1	6	2	
Permitted Phases			6			
Actuated Green, G (s)	27.8	27.8	110.2	110.2	92.2	
Effective Green, g (s)	27.8	27.8	110.2	110.2	92.2	
Actuated g/C Ratio	0.19	0.19	0.73	0.73	0.61	
Clearance Time (s)	6.0	6.0	7.0	6.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	316	283	440	2487	2049	
v/s Ratio Prot	c0.16	0.04	0.02	c0.42	0.25	
v/s Ratio Perm			0.24			
v/c Ratio	0.84	0.19	0.37	0.57	0.40	
Uniform Delay, d1	59.0	51.6	7.4	9.1	14.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.0	0.3	0.5	1.0	0.6	
Delay (s)	77.0	51.9	7.9	10.1	15.4	
Level of Service	E	D	A	B	B	
Approach Delay (s)	63.9			9.9	15.4	
Approach LOS	E			A	B	
Intersection Summary						
HCM 2000 Control Delay			21.5		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.67			
Actuated Cycle Length (s)			150.0		Sum of lost time (s)	20.0
Intersection Capacity Utilization			61.1%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

3: State St & Pierce Park Ln

Existing AM Peak Hour
11/10/2022



Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	181	197	156	1387	659	73
Future Volume (veh/h)	181	197	156	1387	659	73
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1800	1786	1786	1786	1786
Adj Flow Rate, veh/h	266	290	161	1430	749	83
Peak Hour Factor	0.68	0.68	0.97	0.97	0.88	0.88
Percent Heavy Veh, %	0	0	1	1	1	1
Cap, veh/h	352	313	455	2403	1887	209
Arrive On Green	0.21	0.21	0.05	0.71	0.61	0.61
Sat Flow, veh/h	1714	1525	1701	3483	3169	341
Grp Volume(v), veh/h	266	290	161	1430	412	420
Grp Sat Flow(s),veh/h/ln	1714	1525	1701	1697	1697	1725
Q Serve(g_s), s	21.9	28.0	5.1	31.9	18.7	18.7
Cycle Q Clear(g_c), s	21.9	28.0	5.1	31.9	18.7	18.7
Prop In Lane	1.00	1.00	1.00			0.20
Lane Grp Cap(c), veh/h	352	313	455	2403	1040	1057
V/C Ratio(X)	0.76	0.93	0.35	0.60	0.40	0.40
Avail Cap(c_a), veh/h	389	346	531	2403	1040	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	58.5	10.6	11.0	14.9	14.9
Incr Delay (d2), s/veh	7.5	28.9	0.5	1.1	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	15.4	19.2	3.4	16.8	11.7	11.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	63.6	87.4	11.1	12.1	16.0	16.0
LnGrp LOS	E	F	B	B	B	B
Approach Vol, veh/h	556			1591	832	
Approach Delay, s/veh	76.0			12.0	16.0	
Approach LOS	E			B	B	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.3	98.9		36.8		113.2
Change Period (Y+Rc), s	7.0	7.0		6.0		* 7
Max Green Setting (Gmax), s	14.0	82.0		34.0		* 1E2
Max Q Clear Time (g_c+I1), s	7.1	20.7		30.0		33.9
Green Ext Time (p_c), s	0.2	5.8		0.8		15.8

Intersection Summary

HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	0.3					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑		↖	↑↑	↘	
Traffic Vol, veh/h	1548	11	15	851	5	7
Future Vol, veh/h	1548	11	15	851	5	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	82	82	65	65
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1596	11	18	1038	8	11

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1607	0	2157	804
Stage 1	-	-	-	-	1602	-
Stage 2	-	-	-	-	555	-
Critical Hdwy	-	-	4.12	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.21	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	407	-	42	330
Stage 1	-	-	-	-	154	-
Stage 2	-	-	-	-	544	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	407	-	40	330
Mov Cap-2 Maneuver	-	-	-	-	121	-
Stage 1	-	-	-	-	154	-
Stage 2	-	-	-	-	520	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0.2	25.7
HCM LOS			D

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	192	407	-	-	-
HCM Lane V/C Ratio	0.096	0.045	-	-	-
HCM Control Delay (s)	25.7	14.3	-	-	-
HCM Lane LOS	D	B	-	-	-
HCM 95th %tile Q(veh)	0.3	0.1	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	3	1610	739	2	0	1
Future Vol, veh/h	3	1610	739	2	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	90	90	25	25
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	3	1713	821	2	0	4
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	823	0	-	0	1684	411
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	863	-
Critical Hdwy	4.12	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.21	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	809	-	-	-	85	590
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	373	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	809	-	-	-	85	590
Mov Cap-2 Maneuver	-	-	-	-	213	-
Stage 1	-	-	-	-	391	-
Stage 2	-	-	-	-	373	-
Approach	SE	NW		SW		
HCM Control Delay, s	0	0		11.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1	
Capacity (veh/h)	-	-	809	-	590	
HCM Lane V/C Ratio	-	-	0.004	-	0.007	
HCM Control Delay (s)	-	-	9.5	-	11.1	
HCM Lane LOS	-	-	A	-	B	
HCM 95th %tile O(veh)	-	-	0	-	0	

HCM Signalized Intersection Capacity Analysis

3: State St & Pierce Park Ln

Existing PM Peak Hour

01/16/2023

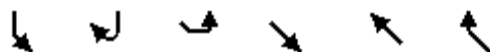
						
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (vph)	111	194	205	1120	1624	134
Future Volume (vph)	111	194	205	1120	1624	134
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0	7.0	6.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1710	1530	1693	3386	3347	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1710	1530	1693	3386	3347	
Peak-hour factor, PHF	0.95	0.95	0.93	0.93	0.93	0.93
Adj. Flow (vph)	117	204	220	1204	1746	144
RTOR Reduction (vph)	0	183	0	0	4	0
Lane Group Flow (vph)	117	21	220	1204	1886	0
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Turn Type	Prot	Prot	Prot	NA	NA	
Protected Phases	4	4	1	6	2	
Permitted Phases						
Actuated Green, G (s)	16.3	16.3	26.6	131.7	97.1	
Effective Green, g (s)	16.3	16.3	26.6	131.7	97.1	
Actuated g/C Ratio	0.10	0.10	0.17	0.82	0.61	
Clearance Time (s)	6.0	6.0	7.0	6.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	174	155	281	2787	2031	
v/s Ratio Prot	c0.07	0.01	c0.13	0.36	c0.56	
v/s Ratio Perm						
v/c Ratio	0.67	0.13	0.78	0.43	0.93	
Uniform Delay, d1	69.3	65.4	63.9	3.9	28.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.8	0.4	13.3	0.5	9.0	
Delay (s)	79.1	65.8	77.2	4.4	37.4	
Level of Service	E	E	E	A	D	
Approach Delay (s)	70.6			15.6	37.4	
Approach LOS	E			B	D	
Intersection Summary						
HCM 2000 Control Delay			31.8		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	20.0
Intersection Capacity Utilization			87.0%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

3: State St & Pierce Park Ln

Existing PM Peak Hour

01/16/2023



Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	111	194	205	1120	1624	134
Future Volume (veh/h)	111	194	205	1120	1624	134
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1800	1786	1786	1786	1786
Adj Flow Rate, veh/h	117	172	220	1204	1746	144
Peak Hour Factor	0.95	0.95	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	1	1	1	1
Cap, veh/h	218	194	239	2687	1930	157
Arrive On Green	0.13	0.13	0.14	0.79	0.61	0.61
Sat Flow, veh/h	1714	1525	1701	3483	3267	259
Grp Volume(v), veh/h	117	172	220	1204	922	968
Grp Sat Flow(s),veh/h/ln	1714	1525	1701	1697	1697	1739
Q Serve(g_s), s	10.2	17.8	20.4	18.3	74.8	78.8
Cycle Q Clear(g_c), s	10.2	17.8	20.4	18.3	74.8	78.8
Prop In Lane	1.00	1.00	1.00			0.15
Lane Grp Cap(c), veh/h	218	194	239	2687	1031	1057
V/C Ratio(X)	0.54	0.89	0.92	0.45	0.89	0.92
Avail Cap(c_a), veh/h	300	267	245	2687	1031	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.4	68.7	67.9	5.4	27.0	27.8
Incr Delay (d2), s/veh	2.1	22.5	36.5	0.5	11.9	13.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.1	12.8	16.7	9.6	41.1	44.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	67.5	91.2	104.4	5.9	38.8	41.4
LnGrp LOS	E	F	F	A	D	D
Approach Vol, veh/h	289			1424	1890	
Approach Delay, s/veh	81.6			21.1	40.2	
Approach LOS	F			C	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	29.5	104.2		26.3		133.7
Change Period (Y+Rc), s	7.0	7.0		6.0		* 7
Max Green Setting (Gmax), s	23.0	89.0		28.0		* 1.2E2
Max Q Clear Time (g_c+I1), s	22.4	80.8		19.8		20.3
Green Ext Time (p_c), s	0.0	6.7		0.6		11.7

Intersection Summary

HCM 6th Ctrl Delay	36.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	0.3					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑		↖	↑↑	↘	
Traffic Vol, veh/h	1311	24	29	1806	7	17
Future Vol, veh/h	1311	24	29	1806	7	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	97	97	83	83
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1395	26	30	1862	8	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1421	0	2399	711
Stage 1	-	-	-	-	1408	-
Stage 2	-	-	-	-	991	-
Critical Hdwy	-	-	4.12	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.21	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	480	-	29	380
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	325	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	480	-	27	380
Mov Cap-2 Maneuver	-	-	-	-	120	-
Stage 1	-	-	-	-	195	-
Stage 2	-	-	-	-	305	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0.2		22.6	
HCM LOS	C					
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER	
Capacity (veh/h)	233	480	-	-	-	
HCM Lane V/C Ratio	0.124	0.062	-	-	-	
HCM Control Delay (s)	22.6	13	-	-	-	
HCM Lane LOS	C	B	-	-	-	
HCM 95th %tile Q(veh)	0.4	0.2	-	-	-	

Intersection						
Int Delay, s/veh	0.7					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	19	1206	1707	20	12	19
Future Vol, veh/h	19	1206	1707	20	12	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	95	95	65	65
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	21	1311	1797	21	18	29
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1818	0	-	0	2495	899
Stage 1	-	-	-	-	1797	-
Stage 2	-	-	-	-	698	-
Critical Hdwy	4.12	-	-	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	2.21	-	-	-	3.51	3.31
Pot Cap-1 Maneuver	338	-	-	-	24	284
Stage 1	-	-	-	-	119	-
Stage 2	-	-	-	-	457	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	338	-	-	-	23	284
Mov Cap-2 Maneuver	-	-	-	-	88	-
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	457	-
Approach	SE	NW		SW		
HCM Control Delay, s	0.3	0		38.8		
HCM LOS	E					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1	
Capacity (veh/h)	-	-	338	-	153	
HCM Lane V/C Ratio	-	-	0.061	-	0.312	
HCM Control Delay (s)	-	-	16.3	-	38.8	
HCM Lane LOS	-	-	C	-	E	
HCM 95th %tile O(veh)	-	-	0.2	-	1.2	



Appendix E

Crash Data

Crashes:	29	Total Fatalities:	0
Total Units:	63	Total Injuries:	10
Total People:	90		

[illegible]

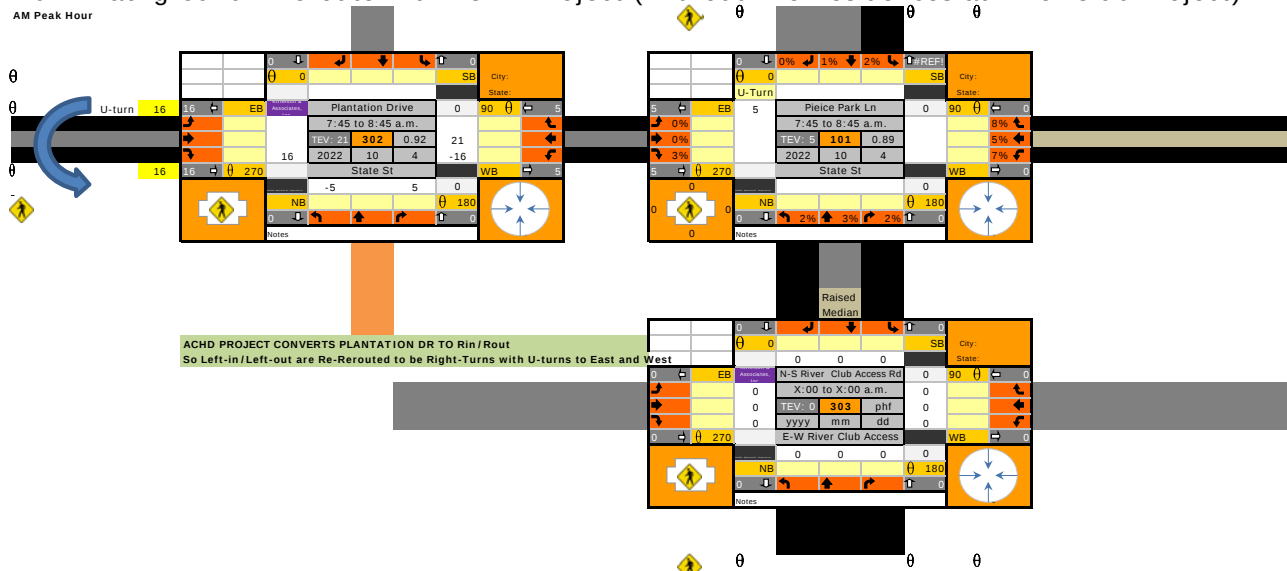


Appendix F

Year 2027 Background Re-Routing & Utilization Calcs with ACHD Project

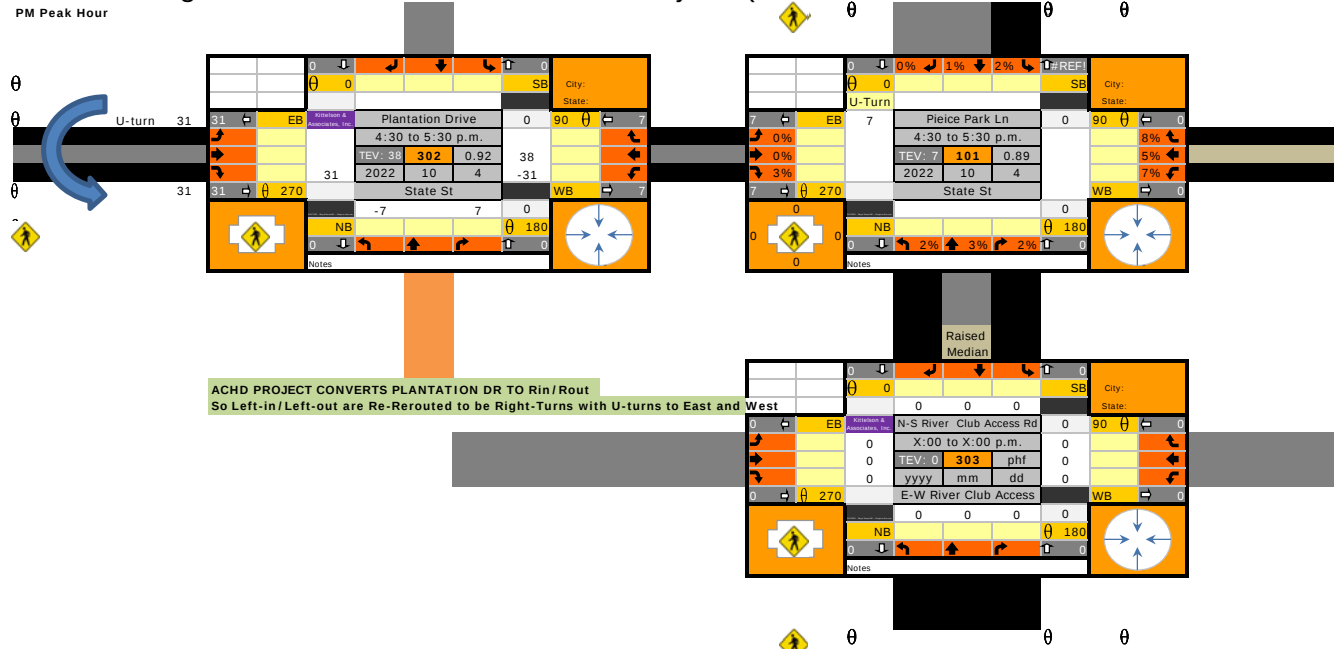
2027 Background - Reroute with ACHD Project (Without The Residences at River Club Project)

AM Peak Hour



2027 Background - Reroute with ACHD Project (Without The Residences at River Club)

PM Peak Hour



NCHRP 3-98 GUIDELINES FOR AUXILIARY THROUGH LANES AT SIGNALIZED INTERSECTIONS COMP ENGINE FOR ESTIMATING ATL UTILIZATION AND LENGTH FOR 1- AND 2-CTL APPROACHES

State St/Pierce Pk Ln
EBTH - AM ACCESS SCENARIO 3
2027 W ACHD 3RD LANE
AM Peak Hour - ALT3
OTHER

I. GEOMETRIC CONFIGURATION AND SIGNAL TIMING

	Scenario 1	Scenario 2
1 Number of CTLs (1 OR 2)	2	2
2 ATL (Y/N)?	Y	Y
3 Exclusive right-turn lane (Y/N)?	N	N
4 Effective green time for through movement(s) (sec)=	69	69
5 Cycle length (sec) =	150	150

II. APPROACH CHARACTERISTICS

	User Input (Applies to Both Scenarios)	Comment
6 Total approach through volume (vph) =	1518	Add sat flow across both lanes for 2 CTL approaches
7 Total saturation flow rate for CTL(s) (vph) =	1800	
8 Right-turn volume (vph) =	110	
9 Right-turn lane saturation flow rate (vph) =	1800	
10 Prevailing approach speed (mph) =	40	Speed at which vehicles approach intersection during green phase
11 Average vehicle spacing at stop bar (ft) =	25	Default value = 25 ft
12 Average acceleration rate from stop bar (ft/sec/sec) =	10	Default value = 10.0 ft/sec/sec
13 Intersection width measured from stop bar to far curb (ft) =	150	
14 Critical gap in adjacent CTL (sec) =	6	Default value = 6.0 seconds
15 Driver reaction time (sec) =	1	Default value = 1.0 seconds
16 Confidence level for calculation of downstream length =	0.85	Express as decimal between .85 and .95

III. LANE-BY-LANE RESULTS

Lane	Configuration	TH Vol (vph)	RT Vol (vph)	TH + RT Vol (vph)	XALL	Avg. Delay (sec/veh)	LOS	95th % Queue (ft)
Scenario 1								
1	CTL	619	0	619	1.57	303.2	F	1800
2	CTL	619	0	619	1.57	303.2	F	1800
3	SHARED ATL	280	110	390	0.81	48.3	D	600
4								
TOTAL		1518	110	1628				
Scenario 2								
1	CTL	619	0	619	1.57	303.2	F	1800
2	CTL	619	0	619	1.57	303.2	F	1800
3	SHARED ATL	280	110	390	0.81	48.3	D	600
4								
TOTAL		1518	110	1628				

IV. APPROACH RESULTS

	Avg. Delay (sec/veh)	LOS	ATL Utilization (ATL TH/Total TH)	Estimated Min. ATL Length	
				Upstream ATL (ft)	Downstream ATL (ft)
Scenario 1	242.16	F	0.184453228	NA	760
Scenario 2	242.16	F	18%	1800	760

Notes:

CTL = Continuous Through Lane

ATL = Auxiliary Through Lane

RTL = Right-turn Lane

Shared = Right-turn movements allowed with through movements

Minimum ATL Length estimates do not include taper lengths

Utilization Factor
0.82

RELEASE DATE SEPTEMBER 2011

VERSION 2.2

NCHRP 3-98 GUIDELINES FOR AUXILIARY THROUGH LANES AT SIGNALIZED INTERSECTIONS COMP ENGINE FOR ESTIMATING ATL UTILIZATION AND LENGTH FOR 1- AND 2-CTL APPROACHES

State St/Pierce Pk Ln
WBTH - AM ACCESS SCENARIO 3
2027 W ACHD 3RD LANE
AM Peak Hour - ALT3
OTHER

I. GEOMETRIC CONFIGURATION AND SIGNAL TIMING

		Scenario 1	Scenario 2
1	Number of CTLs (1 OR 2)	2	2
2	ATL (Y/N)?	Y	Y
3	Exclusive right-turn lane (Y/N)?	Y	Y
4	Effective green time for through movement(s) (sec)=	65	65
5	Cycle length (sec) =	150	150

II. APPROACH CHARACTERISTICS

		User Input (Applies to Both Scenarios)	Comment
6	Total approach through volume (vph) =	689	Add sat flow across both lanes for 2 CTL approaches
7	Total saturation flow rate for CTL(s) (vph) =	1800	
8	Right-turn volume (vph) =	80	
9	Right-turn lane saturation flow rate (vph) =	1800	Speed at which vehicles approach intersection during green phase
10	Prevailing approach speed (mph) =	40	
11	Average vehicle spacing at stop bar (ft) =	25	
12	Average acceleration rate from stop bar (ft/sec/sec) =	10	Default value = 10.0 ft/sec/sec
13	Intersection width measured from stop bar to far curb (ft) =	150	Default value = 6.0 seconds
14	Critical gap in adjacent CTL (sec) =	6	
15	Driver reaction time (sec) =	1	
16	Confidence level for calculation of downstream length =	0.85	Express as decimal between .85 and .95

III. LANE-BY-LANE RESULTS

Lane	Configuration	TH Vol (vph)	RT Vol (vph)	TH + RT Vol (vph)	XALL	Avg. Delay (sec/veh)	LOS	95th % Queue (ft)
Scenario 1								
1	CTL	270.5	0	270.5	0.73	41.4	D	400
2	CTL	270.5	0	270.5	0.73	41.4	D	400
3	ATL	148	0	148	0.38	31.6	C	200
4	RT		80	80	0.10	25.5	C	90
TOTAL		689	80	769				
Scenario 2								
1	CTL	270.5	0	270.5	0.73	41.4	D	400
2	CTL	270.5	0	270.5	0.73	41.4	D	400
3	ATL	148	0	148	0.38	31.6	C	200
4	RT		80	80	0.10	25.5	C	90
TOTAL		689	80	769				

IV. APPROACH RESULTS

	Avg. Delay (sec/veh)	LOS	ATL Utilization (ATL TH/Total TH)	Estimated Min. ATL Length	
				Upstream ATL (ft)	Downstream ATL (ft)
Scenario 1	37.84	D	0.214804064	NA	310
Scenario 2	37.84	D	21%	400	310

Notes:

CTL = Continuous Through Lane

ATL = Auxiliary Through Lane

RTL = Right-turn Lane

Shared = Right-turn movements allowed with through movements

Minimum ATL Length estimates do not include taper lengths

Utilization Factor
0.85

RELEASE DATE SEPTEMBER 2011

VERSION 2.2

NCHRP 3-98 GUIDELINES FOR AUXILIARY THROUGH LANES AT SIGNALIZED INTERSECTIONS COMP ENGINE FOR ESTIMATING ATL UTILIZATION AND LENGTH FOR 1- AND 2-CTL APPROACHES

State St/Pierce Pk Ln
EBTH - PM ACCESS SCENARIO 3
2027 W ACHD 3RD LANE
AM Peak Hour - ALT3
OTHER

I. GEOMETRIC CONFIGURATION AND SIGNAL TIMING

		Scenario 1	Scenario 2
1	Number of CTLs (1 OR 2)	2	2
2	ATL (Y/N)?	Y	Y
3	Exclusive right-turn lane (Y/N)?	N	N
4	Effective green time for through movement(s) (sec)=	89	89
5	Cycle length (sec) =	160	160

II. APPROACH CHARACTERISTICS

		User Input (Applies to Both Scenarios)	Comment
6	Total approach through volume (vph) =	1228	Add sat flow across both lanes for 2 CTL approaches
7	Total saturation flow rate for CTL(s) (vph) =	1800	
8	Right-turn volume (vph) =	134	
9	Right-turn lane saturation flow rate (vph) =	1800	
10	Prevailing approach speed (mph) =	40	Speed at which vehicles approach intersection during green phase
11	Average vehicle spacing at stop bar (ft) =	25	Default value = 25 ft
12	Average acceleration rate from stop bar (ft/sec/sec) =	10	Default value = 10.0 ft/sec/sec
13	Intersection width measured from stop bar to far curb (ft) =	150	
14	Critical gap in adjacent CTL (sec) =	6	Default value = 6.0 seconds
15	Driver reaction time (sec) =	1	Default value = 1.0 seconds
16	Confidence level for calculation of downstream length =	0.85	Express as decimal between .85 and .95

III. LANE-BY-LANE RESULTS

Lane	Configuration	TH Vol (vph)	RT Vol (vph)	TH + RT Vol (vph)	XALL	Avg. Delay (sec/veh)	LOS	95th % Queue (ft)
Scenario 1								
1	CTL	499	0	499	1.05	77.6	E	900
2	CTL	499	0	499	1.05	77.6	E	900
3	SHARED ATL	230	134	364	0.59	27.8	C	400
4								
TOTAL		1228	134	1362				
Scenario 2								
1	CTL	499	0	499	1.05	77.6	E	900
2	CTL	499	0	499	1.05	77.6	E	900
3	SHARED ATL	230	134	364	0.59	27.8	C	400
4								
TOTAL		1228	134	1362				

IV. APPROACH RESULTS

	Avg. Delay (sec/veh)	LOS	ATL Utilization (ATL TH/Total TH)	Estimated Min. ATL Length	
				Upstream ATL (ft)	Downstream ATL (ft)
Scenario 1	64.32	E	0.187296417	NA	470
Scenario 2	64.32	E	19%	900	470

Notes:

CTL = Continuous Through Lane

ATL = Auxiliary Through Lane

RTL = Right-turn Lane

Shared = Right-turn movements allowed with through movements

Minimum ATL Length estimates do not include taper lengths

Utilization Factor
0.82

RELEASE DATE SEPTEMBER 2011

VERSION 2.2

NCHRP 3-98 GUIDELINES FOR AUXILIARY THROUGH LANES AT SIGNALIZED INTERSECTIONS COMP ENGINE FOR ESTIMATING ATL UTILIZATION AND LENGTH FOR 1- AND 2-CTL APPROACHES

State St/Pierce Pk Ln
WBTH - PM ACCESS SCENARIO 3
2027 W ACHD 3RD LANE
AM Peak Hour - ALT3
OTHER

I. GEOMETRIC CONFIGURATION AND SIGNAL TIMING

	Scenario 1	Scenario 2
1 Number of CTLs (1 OR 2)	2	2
2 ATL (Y/N)?	Y	Y
3 Exclusive right-turn lane (Y/N)?	Y	Y
4 Effective green time for through movement(s) (sec)=	76	76
5 Cycle length (sec) =	160	160

II. APPROACH CHARACTERISTICS

	User Input (Applies to Both Scenarios)	Comment
6 Total approach through volume (vph) =	1740	Add sat flow across both lanes for 2 CTL approaches
7 Total saturation flow rate for CTL(s) (vph) =	1800	
8 Right-turn volume (vph) =	147	
9 Right-turn lane saturation flow rate (vph) =	1800	Speed at which vehicles approach intersection during green phase
10 Prevailing approach speed (mph) =	40	
11 Average vehicle spacing at stop bar (ft) =	25	
12 Average acceleration rate from stop bar (ft/sec/sec) =	10	Default value = 10.0 ft/sec/sec
13 Intersection width measured from stop bar to far curb (ft) =	150	Default value = 6.0 seconds
14 Critical gap in adjacent CTL (sec) =	6	
15 Driver reaction time (sec) =	1	
16 Confidence level for calculation of downstream length =	0.85	Express as decimal between .85 and .95

III. LANE-BY-LANE RESULTS

Lane	Configuration	TH Vol (vph)	RT Vol (vph)	TH + RT Vol (vph)	XALL	Avg. Delay (sec/veh)	LOS	95th % Queue (ft)
Scenario 1								
1	CTL	705	0	705	1.73	376.5	F	2300
2	CTL	705	0	705	1.73	376.5	F	2300
3	ATL	330	0	330	0.77	47.5	D	500
4	RT		147	147	0.17	24.4	C	160
TOTAL		1740	147	1887				
Scenario 2								
1	CTL	705	0	705	1.73	376.5	F	2300
2	CTL	705	0	705	1.73	376.5	F	2300
3	ATL	330	0	330	0.77	47.5	D	500
4	RT		147	147	0.17	24.4	C	160
TOTAL		1740	147	1887				

IV. APPROACH RESULTS

	Avg. Delay (sec/veh)	LOS	ATL Utilization (ATL TH/Total TH)	Estimated Min. ATL Length	
				Upstream ATL (ft)	Downstream ATL (ft)
Scenario 1	291.53	F	0.189655172	NA	1080
Scenario 2	291.53	F	19%	2300	1080

Notes:

CTL = Continuous Through Lane

ATL = Auxiliary Through Lane

RTL = Right-turn Lane

Shared = Right-turn movements allowed with through movements

Minimum ATL Length estimates do not include taper lengths

Utilization Factor
0.82

RELEASE DATE SEPTEMBER 2011

VERSION 2.2



Appendix G

Year 2027 Background Operations Worksheets

HCM Signalized Intersection Capacity Analysis

3: State St & Pierce Park Ln

2027 Bkgrd AM Peak Hour

12/05/2022

						
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (vph)	194	211	167	1484	705	78
Future Volume (vph)	194	211	167	1484	705	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0	7.0	6.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1710	1530	1693	3386	3335	
Flt Permitted	0.95	1.00	0.27	1.00	1.00	
Satd. Flow (perm)	1710	1530	477	3386	3335	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	216	234	186	1649	783	87
RTOR Reduction (vph)	0	196	0	0	4	0
Lane Group Flow (vph)	216	38	186	1649	866	0
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Turn Type	Prot	Prot	pm+pt	NA	NA	
Protected Phases	4	4	1	6	2	
Permitted Phases			6			
Actuated Green, G (s)	24.2	24.2	113.8	113.8	95.5	
Effective Green, g (s)	24.2	24.2	113.8	113.8	95.5	
Actuated g/C Ratio	0.16	0.16	0.76	0.76	0.64	
Clearance Time (s)	6.0	6.0	7.0	6.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	275	246	445	2568	2123	
v/s Ratio Prot	c0.13	0.02	0.03	c0.49	0.26	
v/s Ratio Perm			0.29			
v/c Ratio	0.79	0.15	0.42	0.64	0.41	
Uniform Delay, d1	60.4	54.1	6.6	8.5	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.7	0.3	0.6	1.2	0.6	
Delay (s)	74.1	54.4	7.2	9.8	14.0	
Level of Service	E	D	A	A	B	
Approach Delay (s)	63.8			9.5	14.0	
Approach LOS	E			A	B	
Intersection Summary						
HCM 2000 Control Delay			18.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			150.0		Sum of lost time (s)	20.0
Intersection Capacity Utilization			64.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

3: State St & Pierce Park Ln

2027 Bkgrd AM Peak Hour

12/05/2022

						
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	194	211	167	1484	705	78
Future Volume (veh/h)	194	211	167	1484	705	78
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1800	1786	1786	1786	1786
Adj Flow Rate, veh/h	216	234	186	1649	783	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	1	1	1	1
Cap, veh/h	292	260	471	2520	1987	221
Arrive On Green	0.17	0.17	0.05	0.74	0.65	0.65
Sat Flow, veh/h	1714	1525	1701	3483	3168	342
Grp Volume(v), veh/h	216	234	186	1649	431	439
Grp Sat Flow(s),veh/h/ln	1714	1525	1701	1697	1697	1724
Q Serve(g_s), s	17.9	22.5	5.4	36.5	18.1	18.1
Cycle Q Clear(g_c), s	17.9	22.5	5.4	36.5	18.1	18.1
Prop In Lane	1.00	1.00	1.00			0.20
Lane Grp Cap(c), veh/h	292	260	471	2520	1095	1113
V/C Ratio(X)	0.74	0.90	0.40	0.65	0.39	0.39
Avail Cap(c_a), veh/h	389	346	543	2520	1095	1113
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.0	60.9	9.0	9.7	12.6	12.7
Incr Delay (d2), s/veh	5.1	20.8	0.5	1.3	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.9	15.4	3.4	18.1	11.3	11.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	64.1	81.8	9.6	11.0	13.7	13.7
LnGrp LOS	E	F	A	B	B	B
Approach Vol, veh/h	450			1835	870	
Approach Delay, s/veh	73.3			10.9	13.7	
Approach LOS	E			B	B	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.6	103.8		31.6		118.4
Change Period (Y+Rc), s	7.0	7.0		6.0		* 7
Max Green Setting (Gmax), s	14.0	82.0		34.0		* 1E2
Max Q Clear Time (g_c+I1), s	7.4	20.1		24.5		38.5
Green Ext Time (p_c), s	0.3	6.1		1.1		20.7
Intersection Summary						
HCM 6th Ctrl Delay			20.5			
HCM 6th LOS			C			
Notes						

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis 2027 Bkgrd AM Peak Hour - ACHD Ult Lane Config

3: State St & Pierce Park Ln

12/05/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations								  			  	
Traffic Volume (vph)	0	0	0	194	0	211	172	1484	0	0	705	78
Future Volume (vph)	0	0	0	194	0	211	172	1484	0	0	705	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				6.0		6.0	7.0	6.0			7.0	7.0
Lane Util. Factor				1.00		1.00	1.00	*0.82			*0.82	1.00
Frt				1.00		0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1710		1530	1693	4384			4384	1515
Flt Permitted				0.95		1.00	0.28	1.00			1.00	1.00
Satd. Flow (perm)				1710		1530	496	4384			4384	1515
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	216	0	234	191	1649	0	0	783	87
RTOR Reduction (vph)	0	0	0	0	0	196	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	216	0	38	191	1649	0	0	783	60
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	1%	1%	2%	2%	1%	1%
Parking (#/hr)		0										
Turn Type				Prot		Prot	pm+pt	NA			NA	Perm
Protected Phases				4		4	1	6			2	
Permitted Phases							6					2
Actuated Green, G (s)				24.2		24.2	113.8	113.8			95.3	95.3
Effective Green, g (s)				24.2		24.2	113.8	113.8			95.3	95.3
Actuated g/C Ratio				0.16		0.16	0.76	0.76			0.64	0.64
Clearance Time (s)				6.0		6.0	7.0	6.0			7.0	7.0
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				275		246	460	3325			2785	962
v/s Ratio Prot				c0.13		0.02	0.03	c0.38			0.18	
v/s Ratio Perm							0.29					0.04
v/c Ratio				0.79		0.15	0.42	0.50			0.28	0.06
Uniform Delay, d1				60.4		54.1	5.6	7.0			12.1	10.4
Progression Factor				1.00		1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				13.7		0.3	0.6	0.5			0.3	0.1
Delay (s)				74.1		54.4	6.2	7.5			12.4	10.5
Level of Service				E		D	A	A			B	B
Approach Delay (s)		0.0			63.8			7.4			12.2	
Approach LOS		A			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			16.8									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			150.0								20.0	
Intersection Capacity Utilization			50.8%									ICU Level of Service A
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary 2027 Bkgrd AM Peak Hour - ACHD Ult Lane Config

3: State St & Pierce Park Ln

12/05/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	194	0	211	172	1484	0	0	705	78
Future Volume (veh/h)	0	0	0	194	0	211	172	1484	0	0	705	78
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No			No				No	
Adj Sat Flow, veh/h/ln				1800	0	1800	1786	1786	0	0	1786	1786
Adj Flow Rate, veh/h				216	0	234	191	1649	0	0	783	87
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	0	0	1	1	0	0	1	1
Cap, veh/h				292	0	260	500	3263	0	0	2830	975
Arrive On Green				0.17	0.00	0.17	0.05	0.74	0.00	0.00	0.64	0.64
Sat Flow, veh/h				1714	0	1525	1701	4715	0	0	4715	1514
Grp Volume(v), veh/h				216	0	234	191	1649	0	0	783	87
Grp Sat Flow(s),veh/h/ln				1714	0	1525	1701	1464	0	0	1464	1514
Q Serve(g_s), s				17.9	0.0	22.5	5.5	23.2	0.0	0.0	11.6	3.3
Cycle Q Clear(g_c), s				17.9	0.0	22.5	5.5	23.2	0.0	0.0	11.6	3.3
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				292	0	260	500	3263	0	0	2830	975
V/C Ratio(X)				0.74	0.00	0.90	0.38	0.51	0.00	0.00	0.28	0.09
Avail Cap(c_a), veh/h				389	0	346	571	3263	0	0	2830	975
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				59.0	0.0	60.9	8.0	7.9	0.0	0.0	11.6	10.1
Incr Delay (d2), s/veh				5.1	0.0	20.8	0.5	0.6	0.0	0.0	0.2	0.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				12.9	0.0	15.4	3.5	10.9	0.0	0.0	6.7	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				64.1	0.0	81.8	8.5	8.5	0.0	0.0	11.8	10.3
LnGrp LOS				E	A	F	A	A	A	A	B	B
Approach Vol, veh/h					450			1840			870	
Approach Delay, s/veh					73.3			8.5			11.6	
Approach LOS					E			A			B	
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	14.8	103.6		31.6		118.4						
Change Period (Y+Rc), s	7.0	7.0		6.0		* 7						
Max Green Setting (Gmax), s	14.0	82.0		34.0		* 1E2						
Max Q Clear Time (g_c+I1), s	7.5	13.6		24.5		25.2						
Green Ext Time (p_c), s	0.3	6.4		1.1		19.4						
Intersection Summary												
HCM 6th Ctrl Delay				18.6								
HCM 6th LOS				B								
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	0.2					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↱		↱	↑↑	↱	
Traffic Vol, veh/h	1656	12	16	911	5	7
Future Vol, veh/h	1656	12	16	911	5	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1800	13	17	990	5	8
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1813	0	2336	907
Stage 1	-	-	-	-	1807	-
Stage 2	-	-	-	-	529	-
Critical Hdwy	-	-	4.12	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.21	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	339	-	32	282
Stage 1	-	-	-	-	119	-
Stage 2	-	-	-	-	561	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	339	-	30	282
Mov Cap-2 Maneuver	-	-	-	-	96	-
Stage 1	-	-	-	-	119	-
Stage 2	-	-	-	-	533	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0.3		30.2	
HCM LOS	D					
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER	
Capacity (veh/h)	156	339	-	-	-	
HCM Lane V/C Ratio	0.084	0.051	-	-	-	
HCM Control Delay (s)	30.2	16.2	-	-	-	
HCM Lane LOS	D	C	-	-	-	
HCM 95th %tile Q(veh)	0.3	0.2	-	-	-	

Intersection						
Int Delay, s/veh	0.1					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑			↑↑↑		↗
Traffic Vol, veh/h	1656	28	0	932	0	12
Future Vol, veh/h	1656	28	0	932	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1800	30	0	1013	0	13
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	915
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.9
Pot Cap-1 Maneuver	-	-	0	-	0	239
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	239
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	SE	NW	NE			
HCM Control Delay, s	0	0	20.9			
HCM LOS	C					
Minor Lane/Major Mvmt	NELn1	NWT	SET	SER		
Capacity (veh/h)	239	-	-	-		
HCM Lane V/C Ratio	0.055	-	-	-		
HCM Control Delay (s)	20.9	-	-	-		
HCM Lane LOS	C	-	-	-		
HCM 95th %tile Q(veh)	0.2	-	-	-		

Intersection						
Int Delay, s/veh	0					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	3	1723	791	2	0	1
Future Vol, veh/h	3	1723	791	2	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	3	1853	851	2	0	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	853	0	-	0	1784	426
Stage 1	-	-	-	-	851	-
Stage 2	-	-	-	-	933	-
Critical Hdwy	4.12	-	-	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	2.21	-	-	-	3.51	3.31
Pot Cap-1 Maneuver	788	-	-	-	74	580
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	346	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	788	-	-	-	74	580
Mov Cap-2 Maneuver	-	-	-	-	199	-
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	346	-
Approach	SE	NW		SW		
HCM Control Delay, s	0	0		11.2		
HCM LOS	B					
Minor Lane/Major Mvmt		NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)		-	-	788	-	580
HCM Lane V/C Ratio		-	-	0.004	-	0.002
HCM Control Delay (s)		-	-	9.6	-	11.2
HCM Lane LOS		-	-	A	-	B
HCM 95th %tile Q(veh)		-	-	0	-	0

Intersection						
Int Delay, s/veh	0					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations	↘	↑↑↑↑	↑↑↑↑	↗		↗
Traffic Vol, veh/h	3	1723	791	2	0	1
Future Vol, veh/h	3	1723	791	2	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	3	1853	851	2	0	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	853	0	-	0	-	426
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	5.32	-	-	-	-	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	3.11	-	-	-	-	3.91
Pot Cap-1 Maneuver	464	-	-	-	0	495
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	464	-	-	-	-	495
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	SE	NW		SW		
HCM Control Delay, s	0	0		12.3		
HCM LOS	B					
Minor Lane/Major Mvmt		NWT	NWR	SEL	SETSWLn1	
Capacity (veh/h)		-	-	464	-	495
HCM Lane V/C Ratio		-	-	0.007	-	0.002
HCM Control Delay (s)		-	-	12.8	-	12.3
HCM Lane LOS		-	-	B	-	B
HCM 95th %tile Q(veh)		-	-	0	-	0

HCM Signalized Intersection Capacity Analysis

3: State St & Pierce Park Ln

2027 BKgrd PM Peak Hour

01/16/2023

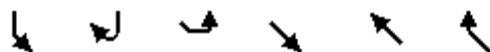
						
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (vph)	119	208	219	1198	1738	143
Future Volume (vph)	119	208	219	1198	1738	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0	7.0	6.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1710	1530	1693	3386	3347	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1710	1530	1693	3386	3347	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	121	212	223	1222	1773	146
RTOR Reduction (vph)	0	190	0	0	4	0
Lane Group Flow (vph)	121	22	223	1222	1915	0
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Turn Type	Prot	Prot	Prot	NA	NA	
Protected Phases	4	4	1	6	2	
Permitted Phases						
Actuated Green, G (s)	16.6	16.6	27.0	131.4	96.4	
Effective Green, g (s)	16.6	16.6	27.0	131.4	96.4	
Actuated g/C Ratio	0.10	0.10	0.17	0.82	0.60	
Clearance Time (s)	6.0	6.0	7.0	6.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	177	158	285	2780	2016	
v/s Ratio Prot	c0.07	0.01	c0.13	0.36	c0.57	
v/s Ratio Perm						
v/c Ratio	0.68	0.14	0.78	0.44	0.95	
Uniform Delay, d1	69.2	65.2	63.7	4.0	29.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.4	0.4	13.1	0.5	11.3	
Delay (s)	79.6	65.6	76.8	4.5	40.9	
Level of Service	E	E	E	A	D	
Approach Delay (s)	70.7			15.7	40.9	
Approach LOS	E			B	D	
Intersection Summary						
HCM 2000 Control Delay			33.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.89			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	20.0
Intersection Capacity Utilization			92.0%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

3: State St & Pierce Park Ln

2027 BKgrd PM Peak Hour

01/16/2023



Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	119	208	219	1198	1738	143
Future Volume (veh/h)	119	208	219	1198	1738	143
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1800	1786	1786	1786	1786
Adj Flow Rate, veh/h	121	181	223	1222	1773	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	1	1	1	1
Cap, veh/h	228	203	242	2667	1907	155
Arrive On Green	0.13	0.13	0.14	0.79	0.60	0.60
Sat Flow, veh/h	1714	1525	1701	3483	3267	258
Grp Volume(v), veh/h	121	181	223	1222	936	983
Grp Sat Flow(s),veh/h/ln	1714	1525	1701	1697	1697	1739
Q Serve(g_s), s	10.5	18.7	20.7	19.3	78.6	83.2
Cycle Q Clear(g_c), s	10.5	18.7	20.7	19.3	78.6	83.2
Prop In Lane	1.00	1.00	1.00			0.15
Lane Grp Cap(c), veh/h	228	203	242	2667	1018	1044
V/C Ratio(X)	0.53	0.89	0.92	0.46	0.92	0.94
Avail Cap(c_a), veh/h	300	267	245	2667	1018	1044
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.7	68.3	67.8	5.7	28.5	29.4
Incr Delay (d2), s/veh	1.9	24.5	37.1	0.6	14.4	17.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.3	13.5	17.0	10.2	43.8	47.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	66.7	92.8	104.9	6.3	42.9	46.4
LnGrp LOS	E	F	F	A	D	D
Approach Vol, veh/h	302			1445	1919	
Approach Delay, s/veh	82.3			21.5	44.7	
Approach LOS	F			C	D	
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	29.7	103.0		27.2		132.8
Change Period (Y+Rc), s	7.0	7.0		6.0		* 7
Max Green Setting (Gmax), s	23.0	89.0		28.0		* 1.2E2
Max Q Clear Time (g_c+I1), s	22.7	85.2		20.7		21.3
Green Ext Time (p_c), s	0.0	3.3		0.6		12.0

Intersection Summary

HCM 6th Ctrl Delay	38.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis 2027 BKgrd PM Peak Hour - ACHD Ult Lane Config 3: State St & Pierce Park Ln 01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	119	0	208	226	1198	0	0	1738	143
Future Volume (vph)	0	0	0	119	0	208	226	1198	0	0	1738	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				6.0		6.0	7.0	6.0			7.0	7.0
Lane Util. Factor				1.00		1.00	1.00	*0.82			*0.82	1.00
Frt				1.00		0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1710		1530	1693	4384			4384	1515
Flt Permitted				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1710		1530	1693	4384			4384	1515
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	121	0	212	231	1222	0	0	1773	146
RTOR Reduction (vph)	0	0	0	0	0	190	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	121	0	22	231	1222	0	0	1773	119
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	1%	1%	2%	2%	1%	1%
Turn Type				Prot		Prot	Prot	NA			NA	Perm
Protected Phases				4		4	1	6			2	
Permitted Phases												2
Actuated Green, G (s)				16.6		16.6	28.1	131.4			95.3	95.3
Effective Green, g (s)				16.6		16.6	28.1	131.4			95.3	95.3
Actuated g/C Ratio				0.10		0.10	0.18	0.82			0.60	0.60
Clearance Time (s)				6.0		6.0	7.0	6.0			7.0	7.0
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				177		158	297	3600			2611	902
v/s Ratio Prot				c0.07		0.01	c0.14	0.28			c0.40	
v/s Ratio Perm												0.08
v/c Ratio				0.68		0.14	0.78	0.34			0.68	0.13
Uniform Delay, d1				69.2		65.2	63.0	3.5			22.0	14.2
Progression Factor				1.00		1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				10.4		0.4	12.1	0.3			1.4	0.3
Delay (s)				79.6		65.6	75.0	3.8			23.4	14.5
Level of Service				E		E	E	A			C	B
Approach Delay (s)		0.0			70.7			15.1			22.7	
Approach LOS		A			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			24.1									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			160.0								20.0	
Intersection Capacity Utilization			70.6%									ICU Level of Service C
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 BKgrd PM Peak Hour - ACHD Ult Lane Config

3: State St & Pierce Park Ln

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	119	0	208	226	1198	0	0	1738	143
Future Volume (veh/h)	0	0	0	119	0	208	226	1198	0	0	1738	143
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No			No				No	
Adj Sat Flow, veh/h/ln				1800	0	1800	1786	1786	0	0	1786	1786
Adj Flow Rate, veh/h				121	0	181	231	1222	0	0	1773	146
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	0	0	1	1	0	0	1	1
Cap, veh/h				228	0	203	245	3453	0	0	2629	906
Arrive On Green				0.13	0.00	0.13	0.14	0.79	0.00	0.00	0.60	0.60
Sat Flow, veh/h				1714	0	1525	1701	4715	0	0	4715	1514
Grp Volume(v), veh/h				121	0	181	231	1222	0	0	1773	146
Grp Sat Flow(s),veh/h/ln				1714	0	1525	1701	1464	0	0	1464	1514
Q Serve(g_s), s				10.5	0.0	18.7	21.5	13.2	0.0	0.0	43.5	6.9
Cycle Q Clear(g_c), s				10.5	0.0	18.7	21.5	13.2	0.0	0.0	43.5	6.9
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				228	0	203	245	3453	0	0	2629	906
V/C Ratio(X)				0.53	0.00	0.89	0.94	0.35	0.00	0.00	0.67	0.16
Avail Cap(c_a), veh/h				300	0	267	245	3453	0	0	2629	906
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				64.7	0.0	68.3	67.9	5.1	0.0	0.0	21.6	14.3
Incr Delay (d2), s/veh				1.9	0.0	24.5	42.5	0.3	0.0	0.0	1.4	0.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln				8.3	0.0	13.5	17.9	6.4	0.0	0.0	21.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				66.7	0.0	92.8	110.3	5.4	0.0	0.0	23.0	14.7
LnGrp LOS				E	A	F	F	A	A	A	C	B
Approach Vol, veh/h					302			1453			1919	
Approach Delay, s/veh					82.3			22.0			22.4	
Approach LOS					F			C			C	
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	30.0	102.8		27.2		132.8						
Change Period (Y+Rc), s	7.0	7.0		6.0		* 7						
Max Green Setting (Gmax), s	23.0	89.0		28.0		* 1.2E2						
Max Q Clear Time (g_c+I1), s	23.5	45.5		20.7		15.2						
Green Ext Time (p_c), s	0.0	20.2		0.6		11.4						
Intersection Summary												
HCM 6th Ctrl Delay				27.2								
HCM 6th LOS				C								
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	0.3					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↱		↱	↑↑	↱	
Traffic Vol, veh/h	1403	26	31	1932	7	18
Future Vol, veh/h	1403	26	31	1932	7	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1432	27	32	1971	7	18
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1459	0	2496	730
Stage 1	-	-	-	-	1446	-
Stage 2	-	-	-	-	1050	-
Critical Hdwy	-	-	4.12	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.21	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	464	-	25	369
Stage 1	-	-	-	-	186	-
Stage 2	-	-	-	-	302	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	464	-	23	369
Mov Cap-2 Maneuver	-	-	-	-	112	-
Stage 1	-	-	-	-	186	-
Stage 2	-	-	-	-	281	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0.2		23	
HCM LOS					C	
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER	
Capacity (veh/h)	225	464	-	-	-	
HCM Lane V/C Ratio	0.113	0.068	-	-	-	
HCM Control Delay (s)	23	13.3	-	-	-	
HCM Lane LOS	C	B	-	-	-	
HCM 95th %tile Q(veh)	0.4	0.2	-	-	-	

Intersection						
Int Delay, s/veh	0.1					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑			↑↑↑		↗
Traffic Vol, veh/h	1403	57	0	1970	0	25
Future Vol, veh/h	1403	57	0	1970	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1432	58	0	2010	0	26
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	-	-	-	745
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.9
Pot Cap-1 Maneuver	-	-	0	-	0	309
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	309
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	SE	NW		NE		
HCM Control Delay, s	0	0		17.7		
HCM LOS	C					
Minor Lane/Major Mvmt	NELn1	NWT	SET	SER		
Capacity (veh/h)	309	-	-	-		
HCM Lane V/C Ratio	0.083	-	-	-		
HCM Control Delay (s)	17.7	-	-	-		
HCM Lane LOS	C	-	-	-		
HCM 95th %tile Q(veh)	0.3	-	-	-		

Intersection						
Int Delay, s/veh	0.5					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	20	1290	1826	21	14	20
Future Vol, veh/h	20	1290	1826	21	14	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	20	1316	1863	21	14	20
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1884	0	-	0	2561	932
Stage 1	-	-	-	-	1863	-
Stage 2	-	-	-	-	698	-
Critical Hdwy	4.12	-	-	-	6.82	6.92
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	2.21	-	-	-	3.51	3.31
Pot Cap-1 Maneuver	318	-	-	-	22	270
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	457	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	318	-	-	-	21	270
Mov Cap-2 Maneuver	-	-	-	-	82	-
Stage 1	-	-	-	-	102	-
Stage 2	-	-	-	-	457	-
Approach	SE	NW		SW		
HCM Control Delay, s	0.3	0		39.3		
HCM LOS	E					
Minor Lane/Major Mvmt		NWT	NWR	SEL	SETSWLn1	
Capacity (veh/h)		-	-	318	-	139
HCM Lane V/C Ratio		-	-	0.064	-	0.25
HCM Control Delay (s)		-	-	17.1	-	39.3
HCM Lane LOS		-	-	C	-	E
HCM 95th %tile Q(veh)		-	-	0.2	-	0.9

Intersection						
Int Delay, s/veh	0.4					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	20	1290	1826	21	0	21
Future Vol, veh/h	20	1290	1826	21	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	-	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	20	1316	1863	21	0	21
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1884	0	-	0	-	932
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	5.32	-	-	-	-	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	3.11	-	-	-	-	3.91
Pot Cap-1 Maneuver	145	-	-	-	0	232
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	145	-	-	-	-	232
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	SE	NW		SW		
HCM Control Delay, s	0.5	0		22.1		
HCM LOS	C					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1		
Capacity (veh/h)	-	-	145	-	232	
HCM Lane V/C Ratio	-	-	0.141	-	0.092	
HCM Control Delay (s)	-	-	33.9	-	22.1	
HCM Lane LOS	-	-	D	-	C	
HCM 95th %tile O(veh)	-	-	0.5	-	0.3	



Appendix H
Year 2027 Total Traffic Operations
Worksheets – Access Scenario 1

HCM Signalized Intersection Capacity Analysis 2027 Total AM Access Scen 1 - EX Lane Config

3: N-S Street & State St

12/05/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	192	194	9	211	167	1436	144	116	670	78
Future Volume (vph)	183	16	192	194	9	211	167	1436	144	116	670	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1536		1710	1540		1693	3340		1693	3333	
Flt Permitted	0.30	1.00		0.37	1.00		0.24	1.00		0.06	1.00	
Satd. Flow (perm)	530	1536		657	1540		427	3340		98	3333	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	213	216	10	234	186	1596	160	129	744	87
RTOR Reduction (vph)	0	105	0	0	189	0	0	5	0	0	6	0
Lane Group Flow (vph)	203	126	0	216	55	0	186	1751	0	129	825	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	40.0	28.0		38.0	27.0		89.6	77.0		80.4	72.4	
Effective Green, g (s)	40.0	28.0		38.0	27.0		89.6	77.0		80.4	72.4	
Actuated g/C Ratio	0.27	0.19		0.25	0.18		0.60	0.51		0.54	0.48	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	234	286		243	277		361	1714		137	1608	
v/s Ratio Prot	c0.07	0.08		0.07	0.04		0.04	c0.52		c0.05	0.25	
v/s Ratio Perm	c0.16			0.16			0.26			0.45		
v/c Ratio	0.87	0.44		0.89	0.20		0.52	1.02		0.94	0.51	
Uniform Delay, d1	49.4	54.1		52.0	52.3		16.1	36.5		42.4	26.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.9	4.9		29.9	1.6		1.2	27.4		59.0	1.2	
Delay (s)	76.3	58.9		82.0	53.9		17.3	63.9		101.4	27.9	
Level of Service	E	E		F	D		B	E		F	C	
Approach Delay (s)		67.1			67.1			59.4			37.7	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			55.7			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			100.2%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 3: N-S Street & State St

2027 Total AM Access Scen 1 - EX Lane Config

12/05/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	192	194	9	211	167	1436	144	116	670	78
Future Volume (veh/h)	183	16	192	194	9	211	167	1436	144	116	670	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	185	216	10	234	186	1596	160	129	744	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	211	25	261	249	11	263	388	1600	159	139	1526	178
Arrive On Green	0.08	0.19	0.19	0.07	0.18	0.18	0.07	0.51	0.51	0.05	0.50	0.50
Sat Flow, veh/h	1701	136	1398	1714	62	1461	1701	3118	309	1701	3061	358
Grp Volume(v), veh/h	203	0	203	216	0	244	186	860	896	129	412	419
Grp Sat Flow(s),veh/h/ln	1701	0	1534	1714	0	1523	1701	1697	1730	1701	1697	1722
Q Serve(g_s), s	12.0	0.0	18.6	11.0	0.0	23.5	8.0	75.1	77.0	7.1	24.1	24.2
Cycle Q Clear(g_c), s	12.0	0.0	18.6	11.0	0.0	23.5	8.0	75.1	77.0	7.1	24.1	24.2
Prop In Lane	1.00		0.91	1.00		0.96	1.00		0.18	1.00		0.21
Lane Grp Cap(c), veh/h	211	0	286	249	0	274	388	871	888	139	846	858
V/C Ratio(X)	0.96	0.00	0.71	0.87	0.00	0.89	0.48	0.99	1.01	0.93	0.49	0.49
Avail Cap(c_a), veh/h	211	0	286	249	0	274	454	871	888	139	846	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	0.0	57.2	54.5	0.0	60.1	18.5	36.0	36.5	44.2	24.9	24.9
Incr Delay (d2), s/veh	50.9	0.0	13.8	26.2	0.0	32.2	0.9	27.7	32.2	55.5	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.9	0.0	13.1	8.6	0.0	17.1	5.7	46.1	49.4	11.4	15.2	15.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	103.6	0.0	71.0	80.7	0.0	92.2	19.4	63.8	68.7	99.8	26.9	26.9
LnGrp LOS	F	A	E	F	A	F	B	E	F	F	C	C
Approach Vol, veh/h	406				460		1942				960	
Approach Delay, s/veh	87.3				86.8		61.8				36.7	
Approach LOS	F				F		E				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.2	81.8	18.0	33.0	15.0	84.0	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	69.0	12.0	27.0	8.0	77.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	10.0	26.2	14.0	25.5	9.1	79.0	13.0	20.6				
Green Ext Time (p_c), s	0.2	5.7	0.0	0.2	0.0	0.0	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay			61.2									
HCM 6th LOS			E									

HCM Signalized Intersection Capacity Analysis - Total AM Access Scen 1 - EX Ln Conf - Shoulder 3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	192	126	9	137	130	1121	144	116	525	61
Future Volume (vph)	183	16	192	126	9	137	130	1121	144	116	525	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1536		1710	1546		1693	3328		1693	3333	
Flt Permitted	0.48	1.00		0.37	1.00		0.33	1.00		0.09	1.00	
Satd. Flow (perm)	859	1536		671	1546		592	3328		152	3333	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	213	140	10	152	144	1246	160	129	583	68
RTOR Reduction (vph)	0	137	0	0	125	0	0	7	0	0	6	0
Lane Group Flow (vph)	203	94	0	140	37	0	144	1399	0	129	645	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	40.3	28.3		37.7	27.0		87.9	77.0		82.1	74.1	
Effective Green, g (s)	40.3	28.3		37.7	27.0		87.9	77.0		82.1	74.1	
Actuated g/C Ratio	0.27	0.19		0.25	0.18		0.59	0.51		0.55	0.49	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	289		242	278		426	1708		165	1646	
v/s Ratio Prot	c0.05	0.06		0.04	0.02		0.02	c0.42		c0.04	0.19	
v/s Ratio Perm	c0.13			0.10			0.17			0.39		
v/c Ratio	0.68	0.32		0.58	0.13		0.34	0.82		0.78	0.39	
Uniform Delay, d1	47.2	52.6		46.2	51.7		14.8	30.7		25.7	23.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.4	3.0		3.3	1.0		0.5	4.5		21.0	0.7	
Delay (s)	53.6	55.6		49.5	52.7		15.3	35.2		46.7	24.5	
Level of Service	D	E		D	D		B	D		D	C	
Approach Delay (s)		54.6			51.2			33.3			28.2	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			36.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			86.8%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total AM Access Scen 1 - EX Ln Conf - Shoulder
3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	192	126	9	137	130	1121	144	116	525	61
Future Volume (veh/h)	183	16	192	126	9	137	130	1121	144	116	525	61
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	185	140	10	152	144	1246	160	129	583	68
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	286	25	261	249	17	258	453	1566	200	200	1568	182
Arrive On Green	0.08	0.19	0.19	0.07	0.18	0.18	0.05	0.52	0.52	0.05	0.51	0.51
Sat Flow, veh/h	1701	136	1398	1714	94	1434	1701	3026	387	1701	3062	356
Grp Volume(v), veh/h	203	0	203	140	0	162	144	696	710	129	322	329
Grp Sat Flow(s),veh/h/ln	1701	0	1534	1714	0	1528	1701	1697	1716	1701	1697	1722
Q Serve(g_s), s	12.0	0.0	18.6	10.0	0.0	14.6	6.0	50.4	51.0	5.4	17.2	17.3
Cycle Q Clear(g_c), s	12.0	0.0	18.6	10.0	0.0	14.6	6.0	50.4	51.0	5.4	17.2	17.3
Prop In Lane	1.00		0.91	1.00		0.94	1.00		0.23	1.00		0.21
Lane Grp Cap(c), veh/h	286	0	286	249	0	275	453	878	888	200	869	882
V/C Ratio(X)	0.71	0.00	0.71	0.56	0.00	0.59	0.32	0.79	0.80	0.64	0.37	0.37
Avail Cap(c_a), veh/h	286	0	286	249	0	275	542	878	888	207	869	882
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	0.0	57.2	46.7	0.0	56.4	16.6	29.6	29.8	28.3	22.0	22.1
Incr Delay (d2), s/veh	7.9	0.0	13.8	2.9	0.0	8.9	0.4	7.3	7.5	6.4	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.4	0.0	13.1	8.0	0.0	10.5	4.2	29.2	29.8	4.4	11.4	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	71.0	49.6	0.0	65.4	17.0	36.9	37.2	34.7	23.3	23.3
LnGrp LOS	E	A	E	D	A	E	B	D	D	C	C	C
Approach Vol, veh/h	406		302				1550				780	
Approach Delay, s/veh	64.6		58.0				35.2				25.2	
Approach LOS	E		E				D				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.2	83.8	18.0	33.0	14.4	84.6	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	69.0	12.0	27.0	8.0	77.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	8.0	19.3	14.0	16.6	7.4	53.0	12.0	20.6				
Green Ext Time (p_c), s	0.2	4.2	0.0	0.6	0.0	10.4	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay	38.8											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis 2027 Total AM Acc Scen 1 - EX Config-Mitigated 3: State St & Pierce Park Ln

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	192	194	9	211	167	1436	144	116	670	78
Future Volume (vph)	183	16	192	194	9	211	167	1436	144	116	670	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.86		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3285	1536		3317	1540		1693	3386	1515	1693	3386	1515
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	3285	1536		3317	1540		1693	3386	1515	106	3386	1515
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	213	216	10	234	186	1596	160	129	744	87
RTOR Reduction (vph)	0	92	0	0	188	0	0	0	56	0	0	48
Lane Group Flow (vph)	203	139	0	216	56	0	186	1596	104	129	744	39
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases									6	2		2
Actuated Green, G (s)	11.8	28.0		11.0	27.2		17.8	77.0	77.0	75.2	67.2	67.2
Effective Green, g (s)	11.8	28.0		11.0	27.2		17.8	77.0	77.0	75.2	67.2	67.2
Actuated g/C Ratio	0.08	0.19		0.07	0.18		0.12	0.51	0.51	0.50	0.45	0.45
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	258	286		243	279		200	1738	777	137	1516	678
v/s Ratio Prot	0.06	c0.09		c0.07	0.04		c0.11	c0.47		0.05	0.22	
v/s Ratio Perm									0.07	0.42		0.03
v/c Ratio	0.79	0.49		0.89	0.20		0.93	0.92	0.13	0.94	0.49	0.06
Uniform Delay, d1	67.9	54.6		68.9	52.2		65.5	33.6	19.1	38.0	29.3	23.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.6	5.8		29.9	1.6		44.2	9.3	0.4	59.0	1.1	0.2
Delay (s)	82.4	60.4		98.8	53.8		109.7	42.9	19.4	97.0	30.4	23.6
Level of Service	F	E		F	D		F	D	B	F	C	C
Approach Delay (s)		70.7			74.9			47.4			38.8	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			51.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			90.1%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 3: State St & Pierce Park Ln

2027 Total AM Acc Scen 1 - EX Config-Mitigated

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	192	194	9	211	167	1436	144	116	670	78
Future Volume (veh/h)	183	16	192	194	9	211	167	1436	144	116	670	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	185	216	10	234	186	1596	160	129	744	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	245	25	261	244	12	271	204	1742	777	161	1516	676
Arrive On Green	0.07	0.19	0.19	0.07	0.19	0.19	0.12	0.51	0.51	0.05	0.45	0.45
Sat Flow, veh/h	3300	136	1398	3326	62	1461	1701	3393	1514	1701	3393	1514
Grp Volume(v), veh/h	203	0	203	216	0	244	186	1596	160	129	744	87
Grp Sat Flow(s),veh/h/ln	1650	0	1534	1663	0	1523	1701	1697	1514	1701	1697	1514
Q Serve(g_s), s	9.1	0.0	18.6	9.7	0.0	23.3	16.2	64.8	8.6	6.2	23.3	5.1
Cycle Q Clear(g_c), s	9.1	0.0	18.6	9.7	0.0	23.3	16.2	64.8	8.6	6.2	23.3	5.1
Prop In Lane	1.00		0.91	1.00		0.96	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	245	0	286	244	0	283	204	1742	777	161	1516	676
V/C Ratio(X)	0.83	0.00	0.71	0.89	0.00	0.86	0.91	0.92	0.21	0.80	0.49	0.13
Avail Cap(c_a), veh/h	264	0	286	244	0	283	204	1742	777	161	1516	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.5	0.0	57.2	68.9	0.0	59.2	65.2	33.5	19.9	34.2	29.4	24.4
Incr Delay (d2), s/veh	18.1	0.0	13.8	29.7	0.0	27.7	39.3	9.1	0.6	24.3	1.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.9	0.0	13.1	8.8	0.0	16.6	14.2	36.4	5.8	6.3	14.7	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	86.6	0.0	71.0	98.6	0.0	86.9	104.5	42.6	20.5	58.5	30.6	24.8
LnGrp LOS	F	A	E	F	A	F	F	D	C	E	C	C
Approach Vol, veh/h	406				460		1942				960	
Approach Delay, s/veh	78.8				92.4		46.7				33.8	
Approach LOS	E				F		D				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	74.0	17.2	33.8	15.0	84.0	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	18.0	67.0	12.0	27.0	8.0	77.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	18.2	25.3	11.1	25.3	8.2	66.8	11.7	20.6				
Green Ext Time (p_c), s	0.0	5.9	0.1	0.2	0.0	7.4	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay			52.5									
HCM 6th LOS			D									

HCM Signalized Intersection Capacity Analysis 2027 Total ALT 1 AM Access - Ult State St 3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	192	194	9	211	167	1436	144	116	670	78
Future Volume (vph)	183	16	192	194	9	211	167	1436	144	116	670	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.82		1.00	*0.82	1.00
Frt	1.00	0.86		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1693	1536		1710	1782	1530	1693	4324		1693	4384	1515
Flt Permitted	0.75	1.00		0.34	1.00	1.00	0.27	1.00		0.06	1.00	1.00
Satd. Flow (perm)	1339	1536		616	1782	1530	472	4324		110	4384	1515
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	213	216	10	234	186	1596	160	129	744	87
RTOR Reduction (vph)	0	147	0	0	0	185	0	7	0	0	0	49
Lane Group Flow (vph)	203	84	0	216	10	49	186	1749	0	129	744	38
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6			2		2
Actuated Green, G (s)	43.8	29.3		48.2	31.5	31.5	80.9	67.7		75.1	64.8	64.8
Effective Green, g (s)	43.8	29.3		48.2	31.5	31.5	80.9	67.7		75.1	64.8	64.8
Actuated g/C Ratio	0.29	0.20		0.32	0.21	0.21	0.54	0.45		0.50	0.43	0.43
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	425	300		319	374	321	362	1951		163	1893	654
v/s Ratio Prot	0.05	0.05		c0.08	0.01		0.05	c0.40		c0.05	0.17	
v/s Ratio Perm	0.09			c0.14		0.03	0.23			0.34		0.02
v/c Ratio	0.48	0.28		0.68	0.03	0.15	0.51	0.90		0.79	0.39	0.06
Uniform Delay, d1	42.7	51.4		40.3	47.1	48.4	18.7	37.9		35.6	29.1	24.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	2.3		5.6	0.0	0.2	1.2	6.9		22.5	0.6	0.2
Delay (s)	43.6	53.7		46.0	47.1	48.6	20.0	44.9		58.1	29.8	25.0
Level of Service	D	D		D	D	D	B	D		E	C	C
Approach Delay (s)		48.9			47.3			42.5			33.1	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			41.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			85.9%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

2027 Total ALT 1 AM Access - Ult State St

3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	192	194	9	211	167	1436	144	116	670	78
Future Volume (veh/h)	183	16	192	194	9	211	167	1436	144	116	670	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	213	216	10	234	186	1596	160	129	744	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	439	23	273	301	369	315	395	1963	197	179	1961	676
Arrive On Green	0.10	0.19	0.19	0.11	0.21	0.21	0.07	0.47	0.47	0.05	0.45	0.45
Sat Flow, veh/h	1701	119	1412	1714	1786	1525	1701	4217	422	1701	4393	1514
Grp Volume(v), veh/h	203	0	231	216	10	234	186	1108	648	129	744	87
Grp Sat Flow(s),veh/h/ln	1701	0	1532	1714	1786	1525	1701	1464	1710	1701	1464	1514
Q Serve(g_s), s	14.4	0.0	21.5	15.0	0.7	21.6	8.8	48.8	48.9	6.1	16.9	5.1
Cycle Q Clear(g_c), s	14.4	0.0	21.5	15.0	0.7	21.6	8.8	48.8	48.9	6.1	16.9	5.1
Prop In Lane	1.00		0.92	1.00		1.00	1.00		0.25	1.00		1.00
Lane Grp Cap(c), veh/h	439	0	296	301	369	315	395	1363	796	179	1961	676
V/C Ratio(X)	0.46	0.00	0.78	0.72	0.03	0.74	0.47	0.81	0.81	0.72	0.38	0.13
Avail Cap(c_a), veh/h	439	0	296	301	369	315	451	1363	796	211	1961	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	0.0	57.5	43.1	47.5	55.8	20.7	34.5	34.5	32.0	27.7	24.4
Incr Delay (d2), s/veh	0.8	0.0	18.2	8.0	0.0	9.1	0.9	5.4	8.9	9.4	0.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.3	0.0	15.0	11.4	0.5	14.1	6.4	24.8	29.4	5.2	10.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.3	0.0	75.7	51.2	47.5	64.9	21.6	39.8	43.4	41.4	28.2	24.8
LnGrp LOS	D	A	E	D	D	E	C	D	D	D	C	C
Approach Vol, veh/h	434				460		1942				960	
Approach Delay, s/veh	60.5				58.1		39.3				29.7	
Approach LOS	E				E		D				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	74.0	21.0	37.0	15.2	76.8	23.0	35.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	62.0	15.0	31.0	11.0	67.0	17.0	29.0				
Max Q Clear Time (g_c+I1), s	10.8	18.9	16.4	23.6	8.1	50.9	17.0	23.5				
Green Ext Time (p_c), s	0.2	5.9	0.0	0.5	0.1	10.3	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			41.6									
HCM 6th LOS			D									

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	222	37	50	8	2	341
Future Vol, veh/h	222	37	50	8	2	341
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	247	41	56	9	2	379
Number of Lanes	1	1	0	1	1	0

Approach	SB	SE	NW
Opposing Approach		NW	SE
Opposing Lanes	0	1	1
Conflicting Approach Left	NW	SB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	SE		SB
Conflicting Lanes Right	1	0	2
HCM Control Delay	12.2	9	10.7
HCM LOS	B	A	B

Lane	NWLn1	SELn1	SBLn1	SBLn2
Vol Left, %	0%	86%	100%	0%
Vol Thru, %	1%	14%	0%	0%
Vol Right, %	99%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	343	58	222	37
LT Vol	0	50	222	0
Through Vol	2	8	0	0
RT Vol	341	0	0	37
Lane Flow Rate	381	64	247	41
Geometry Grp	2	2	7	7
Degree of Util (X)	0.449	0.096	0.409	0.054
Departure Headway (Hd)	4.239	5.343	5.97	4.761
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	850	666	597	743
Service Time	2.274	3.414	3.762	2.551
HCM Lane V/C Ratio	0.448	0.096	0.414	0.055
HCM Control Delay	10.7	9	12.9	7.8
HCM Lane LOS	B	A	B	A
HCM 95th-tile Q	2.3	0.3	2	0.2

HCM Signalized Intersection Capacity Analysis 2027 Total PM Access Scen 1 - EX Lane Config

3: N-S Street & State St

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	106	119	13	208	219	1161	172	171	1681	143
Future Volume (vph)	110	8	106	119	13	208	219	1161	172	171	1681	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	6.0		5.0	5.0		7.0	6.0		6.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1533		1710	1546		1693	3317		1693	3346	
Flt Permitted	0.57	1.00		0.53	1.00		0.95	1.00		0.06	1.00	
Satd. Flow (perm)	1024	1533		947	1546		1693	3317		109	3346	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Adj. Flow (vph)	112	8	108	121	13	212	223	1185	187	174	1715	146
RTOR Reduction (vph)	0	88	0	0	155	0	0	8	0	0	4	0
Lane Group Flow (vph)	112	28	0	121	70	0	223	1364	0	174	1857	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4						2		
Actuated Green, G (s)	37.9	29.0		54.0	40.1		14.0	74.8		87.2	73.0	
Effective Green, g (s)	37.9	29.0		54.0	40.1		14.0	74.8		87.2	73.0	
Actuated g/C Ratio	0.24	0.18		0.34	0.25		0.09	0.47		0.55	0.46	
Clearance Time (s)	5.0	6.0		5.0	5.0		7.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	279	277		410	387		148	1550		199	1526	
v/s Ratio Prot	c0.02	0.02		c0.04	0.05		c0.13	0.41		0.08	c0.56	
v/s Ratio Perm	c0.07			0.06						0.40		
v/c Ratio	0.40	0.10		0.30	0.18		1.51	0.88		0.87	1.22	
Uniform Delay, d1	49.9	54.6		38.0	47.1		73.0	38.5		45.8	43.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7		1.8	1.0		259.8	7.5		31.9	103.9	
Delay (s)	50.9	55.3		39.8	48.1		332.8	46.0		77.7	147.4	
Level of Service	D	E		D	D		F	D		E	F	
Approach Delay (s)		53.1			45.2			86.1			141.4	
Approach LOS		D			D			F			F	
Intersection Summary												
HCM 2000 Control Delay		107.7				HCM 2000 Level of Service		F				
HCM 2000 Volume to Capacity ratio		0.95										
Actuated Cycle Length (s)		160.0				Sum of lost time (s)		25.0				
Intersection Capacity Utilization		107.4%				ICU Level of Service		G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 3: N-S Street & State St

2027 Total PM Access Scen 1 - EX Lane Config

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	106	119	13	208	219	1161	172	171	1681	143
Future Volume (veh/h)	110	8	106	119	13	208	219	1161	172	171	1681	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	108	121	13	181	223	1185	187	174	1715	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	311	20	267	405	26	359	149	2080	327	324	2099	177
Arrive On Green	0.06	0.19	0.19	0.12	0.25	0.25	0.09	0.71	0.71	0.05	0.66	0.66
Sat Flow, veh/h	1701	105	1424	1714	103	1438	1701	2938	462	1701	3168	266
Grp Volume(v), veh/h	112	0	116	121	0	194	223	682	690	174	909	952
Grp Sat Flow(s),veh/h/ln	1701	0	1530	1714	0	1541	1701	1697	1703	1701	1697	1738
Q Serve(g_s), s	8.5	0.0	10.7	8.3	0.0	17.3	14.0	31.4	31.8	5.3	62.3	65.4
Cycle Q Clear(g_c), s	8.5	0.0	10.7	8.3	0.0	17.3	14.0	31.4	31.8	5.3	62.3	65.4
Prop In Lane	1.00		0.93	1.00		0.93	1.00		0.27	1.00		0.15
Lane Grp Cap(c), veh/h	311	0	287	405	0	385	149	1201	1206	324	1124	1151
V/C Ratio(X)	0.36	0.00	0.40	0.30	0.00	0.50	1.50	0.57	0.57	0.54	0.81	0.83
Avail Cap(c_a), veh/h	311	0	287	405	0	385	149	1201	1206	401	1124	1151
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	0.0	57.1	40.5	0.0	51.5	73.0	11.4	11.5	11.5	19.6	20.2
Incr Delay (d2), s/veh	0.7	0.0	4.2	1.9	0.0	4.6	256.1	1.9	2.0	1.4	6.3	6.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	8.0	6.7	0.0	11.6	26.5	17.2	17.5	3.5	33.0	35.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.9	0.0	61.3	42.4	0.0	56.1	329.1	13.4	13.4	12.9	25.9	27.0
LnGrp LOS	D	A	E	D	A	E	F	B	B	B	C	C
Approach Vol, veh/h	228		315				1595				2035	
Approach Delay, s/veh	55.7		50.8				57.5				25.3	
Approach LOS	E		D				E				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.0	114.0	14.0	46.0	13.6	121.4	24.0	36.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	* 6	6.0	* 7	5.0	6.0				
Max Green Setting (Gmax), s	14.0	73.0	9.0	* 40	15.0	* 74	19.0	29.0				
Max Q Clear Time (g_c+I1), s	16.0	67.4	10.5	19.3	7.3	33.8	10.3	12.7				
Green Ext Time (p_c), s	0.0	4.7	0.0	1.1	0.3	12.1	0.2	0.5				
Intersection Summary												
HCM 6th Ctrl Delay			41.2									
HCM 6th LOS			D									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis - Total PM Access Scen 1 - EX Ln Conf - Shoulder 3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	106	110	13	192	206	1093	172	171	1398	119
Future Volume (vph)	110	8	106	110	13	192	206	1093	172	171	1398	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		7.0	6.0		6.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1533		1710	1547		1693	3313		1693	3346	
Flt Permitted	0.32	1.00		0.57	1.00		0.95	1.00		0.16	1.00	
Satd. Flow (perm)	569	1533		1020	1547		1693	3313		279	3346	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Adj. Flow (vph)	112	8	108	112	13	196	210	1115	187	174	1427	121
RTOR Reduction (vph)	0	90	0	0	153	0	0	8	0	0	4	0
Lane Group Flow (vph)	112	26	0	112	56	0	210	1294	0	174	1544	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4						2		
Actuated Green, G (s)	32.0	27.0		32.0	27.0		21.0	100.8		100.2	89.0	
Effective Green, g (s)	32.0	27.0		32.0	27.0		21.0	100.8		100.2	89.0	
Actuated g/C Ratio	0.19	0.16		0.19	0.16		0.13	0.61		0.60	0.54	
Clearance Time (s)	5.0	5.0		5.0	5.0		7.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	143	249		217	251		214	2011		263	1793	
v/s Ratio Prot	c0.02	0.02		0.02	0.04		c0.12	0.39		0.04	c0.46	
v/s Ratio Perm	c0.13			0.08						0.35		
v/c Ratio	0.78	0.10		0.52	0.22		0.98	0.64		0.66	0.86	
Uniform Delay, d1	64.6	59.2		60.2	60.4		72.3	21.0		17.6	33.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	23.8	0.8		8.5	2.0		55.9	1.6		6.1	5.7	
Delay (s)	88.5	60.0		68.7	62.4		128.2	22.6		23.7	38.9	
Level of Service	F	E		E	E		F	C		C	D	
Approach Delay (s)		74.0			64.6			37.3			37.4	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			41.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			166.0			Sum of lost time (s)				24.0		
Intersection Capacity Utilization			96.5%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total PM Access Scen 1 - EX Ln Conf - Shoulder 3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	106	110	13	192	206	1093	172	171	1398	119
Future Volume (veh/h)	110	8	106	110	13	192	206	1093	172	171	1398	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	108	112	13	165	210	1115	187	174	1427	121
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	160	17	232	217	18	233	215	1773	296	300	1698	143
Arrive On Green	0.03	0.16	0.16	0.03	0.16	0.16	0.13	0.61	0.61	0.06	0.54	0.54
Sat Flow, veh/h	1701	105	1424	1714	113	1430	1701	2909	486	1701	3167	267
Grp Volume(v), veh/h	112	0	116	112	0	178	210	649	653	174	761	787
Grp Sat Flow(s),veh/h/ln	1701	0	1530	1714	0	1543	1701	1697	1698	1701	1697	1738
Q Serve(g_s), s	5.0	0.0	11.4	5.0	0.0	18.1	20.4	40.2	40.5	7.7	62.6	63.7
Cycle Q Clear(g_c), s	5.0	0.0	11.4	5.0	0.0	18.1	20.4	40.2	40.5	7.7	62.6	63.7
Prop In Lane	1.00		0.93	1.00		0.93	1.00		0.29	1.00		0.15
Lane Grp Cap(c), veh/h	160	0	249	217	0	251	215	1034	1035	300	910	932
V/C Ratio(X)	0.70	0.00	0.47	0.52	0.00	0.71	0.98	0.63	0.63	0.58	0.84	0.84
Avail Cap(c_a), veh/h	160	0	249	217	0	251	215	1034	1035	353	910	932
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.9	0.0	63.0	63.3	0.0	65.8	72.2	20.5	20.6	19.2	32.4	32.6
Incr Delay (d2), s/veh	12.9	0.0	6.2	8.5	0.0	15.6	54.3	2.9	2.9	1.8	9.0	9.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.4	0.0	8.5	4.8	0.0	12.9	17.8	22.8	23.1	5.6	35.7	37.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.9	0.0	69.1	71.8	0.0	81.4	126.5	23.4	23.5	21.0	41.4	41.9
LnGrp LOS	E	A	E	E	A	F	F	C	C	C	D	D
Approach Vol, veh/h	228		290				1512				1722	
Approach Delay, s/veh	74.4		77.7				37.8				39.6	
Approach LOS	E		E				D				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.0	96.0	10.0	32.0	15.8	108.2	10.0	32.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	6.0	* 7	5.0	5.0				
Max Green Setting (Gmax), s	21.0	89.0	5.0	27.0	15.0	* 97	5.0	27.0				
Max Q Clear Time (g_c+I1), s	22.4	65.7	7.0	20.1	9.7	42.5	7.0	13.4				
Green Ext Time (p_c), s	0.0	11.7	0.0	0.5	0.2	11.7	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay	43.9											
HCM 6th LOS	D											
Notes												

HCM Signalized Intersection Capacity Analysis - 2027 Total PM Acc Scen 1 - EX Config Mitigated -Split Adj

3: State St & Pierce Park Ln

01/22/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	106	119	13	208	219	1161	172	171	1681	143
Future Volume (vph)	110	8	106	119	13	208	219	1161	172	171	1681	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	6.0		5.0	6.0		7.0	6.0	6.0	6.0	7.0	7.0
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.86		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3285	1533		3317	1546		1693	3386	1515	1693	3386	1515
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	3285	1533		3317	1546		1693	3386	1515	338	3386	1515
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	8	108	121	13	212	223	1185	176	174	1715	146
RTOR Reduction (vph)	0	89	0	0	149	0	0	0	70	0	0	72
Lane Group Flow (vph)	112	27	0	121	76	0	223	1185	106	174	1715	74
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases									6	2		2
Actuated Green, G (s)	6.0	28.0		6.0	28.0		22.0	93.3	93.3	88.7	79.0	79.0
Effective Green, g (s)	6.0	28.0		6.0	28.0		22.0	93.3	93.3	88.7	79.0	79.0
Actuated g/C Ratio	0.04	0.18		0.04	0.18		0.14	0.58	0.58	0.55	0.49	0.49
Clearance Time (s)	5.0	6.0		5.0	6.0		7.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	123	268		124	270		232	1974	883	269	1671	748
v/s Ratio Prot	0.03	0.02		c0.04	c0.05		c0.13	0.35		0.04	c0.51	
v/s Ratio Perm									0.07	0.32		0.05
v/c Ratio	0.91	0.10		0.98	0.28		0.96	0.60	0.12	0.65	1.03	0.10
Uniform Delay, d1	76.7	55.4		76.9	57.3		68.6	21.4	15.0	19.1	40.5	21.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	54.3	0.7		74.6	2.6		48.0	1.4	0.3	5.3	29.0	0.3
Delay (s)	131.0	56.2		151.5	59.8		116.6	22.7	15.2	24.3	69.5	21.8
Level of Service	F	E		F	E		F	C	B	C	E	C
Approach Delay (s)		92.9			91.9			35.1			62.2	
Approach LOS		F			F			D			E	
Intersection Summary												
HCM 2000 Control Delay			56.1			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			25.0			
Intersection Capacity Utilization			101.2%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total PM Acc Scen 1 - EX Config Mitigated -Split Adj
3: State St & Pierce Park Ln 01/22/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	106	119	13	208	219	1161	172	171	1681	143
Future Volume (veh/h)	110	8	106	119	13	208	219	1161	172	171	1681	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	108	121	13	181	223	1185	176	174	1715	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	124	18	249	125	18	252	234	2196	980	359	1900	847
Arrive On Green	0.04	0.17	0.17	0.04	0.17	0.17	0.14	0.65	0.65	0.06	0.56	0.56
Sat Flow, veh/h	3300	105	1424	3326	103	1438	1701	3393	1514	1701	3393	1514
Grp Volume(v), veh/h	112	0	116	121	0	194	223	1185	176	174	1715	146
Grp Sat Flow(s),veh/h/ln	1650	0	1530	1663	0	1541	1701	1697	1514	1701	1697	1514
Q Serve(g_s), s	5.4	0.0	10.8	5.8	0.0	19.0	20.8	30.3	7.4	7.0	71.9	7.5
Cycle Q Clear(g_c), s	5.4	0.0	10.8	5.8	0.0	19.0	20.8	30.3	7.4	7.0	71.9	7.5
Prop In Lane	1.00		0.93	1.00		0.93	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	124	0	268	125	0	270	234	2196	980	359	1900	847
V/C Ratio(X)	0.91	0.00	0.43	0.97	0.00	0.72	0.95	0.54	0.18	0.48	0.90	0.17
Avail Cap(c_a), veh/h	124	0	268	125	0	270	234	2196	980	369	1900	847
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	76.7	0.0	58.9	76.9	0.0	62.3	68.5	15.3	11.3	14.4	31.3	17.1
Incr Delay (d2), s/veh	52.8	0.0	5.0	73.0	0.0	15.3	45.8	1.0	0.4	1.0	7.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.8	0.0	8.1	6.8	0.0	13.4	17.6	17.1	4.8	5.0	39.1	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	129.5	0.0	64.0	149.9	0.0	77.6	114.3	16.3	11.7	15.5	38.8	17.6
LnGrp LOS	F	A	E	F	A	E	F	B	B	B	D	B
Approach Vol, veh/h	228				315		1584				2035	
Approach Delay, s/veh	96.2				105.3		29.6				35.3	
Approach LOS	F				F		C				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.0	96.6	11.0	34.0	15.0	110.6	11.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	6.0	6.0	* 7	5.0	6.0				
Max Green Setting (Gmax), s	22.0	79.0	6.0	28.0	10.0	* 93	6.0	28.0				
Max Q Clear Time (g_c+I1), s	22.8	73.9	7.4	21.0	9.0	32.3	7.8	12.8				
Green Ext Time (p_c), s	0.0	4.2	0.0	0.6	0.0	12.2	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay	41.7											
HCM 6th LOS	D											
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis 2027 Total ALT 1 PM Access - Ult State St 3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	106	119	13	208	219	1161	172	171	1681	143
Future Volume (vph)	110	8	106	119	13	208	219	1161	172	171	1681	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.82		1.00	*0.82	1.00
Frt	1.00	0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1693	1533		1710	1782	1530	1693	4299		1693	4384	1515
Flt Permitted	0.75	1.00		0.59	1.00	1.00	0.95	1.00		0.13	1.00	1.00
Satd. Flow (perm)	1335	1533		1064	1782	1530	1693	4299		238	4384	1515
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	8	108	121	13	212	223	1185	176	174	1715	146
RTOR Reduction (vph)	0	88	0	0	0	172	0	11	0	0	0	79
Lane Group Flow (vph)	112	28	0	121	13	40	223	1350	0	174	1715	67
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4				2		2
Actuated Green, G (s)	35.0	29.0		37.0	30.0	30.0	24.5	86.8		84.7	73.5	73.5
Effective Green, g (s)	35.0	29.0		37.0	30.0	30.0	24.5	86.8		84.7	73.5	73.5
Actuated g/C Ratio	0.22	0.18		0.23	0.19	0.19	0.15	0.54		0.53	0.46	0.46
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	305	277		274	334	286	259	2332		227	2013	695
v/s Ratio Prot	0.01	0.02		c0.02	0.01		c0.13	0.31		0.05	c0.39	
v/s Ratio Perm	0.07			c0.08		0.03				0.35		0.04
v/c Ratio	0.37	0.10		0.44	0.04	0.14	0.86	0.58		0.77	0.85	0.10
Uniform Delay, d1	52.4	54.6		51.9	53.2	54.2	66.1	24.4		20.9	38.4	24.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.7		1.1	0.0	0.2	24.1	1.1		14.3	4.8	0.3
Delay (s)	53.1	55.3		53.0	53.2	54.4	90.2	25.5		35.2	43.2	24.7
Level of Service	D	E		D	D	D	F	C		D	D	C
Approach Delay (s)		54.3			53.9			34.6			41.2	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			40.5				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			26.0		
Intersection Capacity Utilization			77.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

2027 Total ALT 1 PM Access - Ult State St

3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	106	119	13	208	219	1161	172	171	1681	143
Future Volume (veh/h)	110	8	106	119	13	208	219	1161	172	171	1681	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	108	121	13	212	223	1185	176	174	1715	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	320	19	258	268	335	286	244	2193	326	301	2062	710
Arrive On Green	0.04	0.18	0.18	0.04	0.19	0.19	0.14	0.55	0.55	0.07	0.47	0.47
Sat Flow, veh/h	1701	105	1424	1714	1786	1525	1701	4012	596	1701	4393	1514
Grp Volume(v), veh/h	112	0	116	121	13	212	223	865	496	174	1715	146
Grp Sat Flow(s),veh/h/ln	1701	0	1530	1714	1786	1525	1701	1464	1679	1701	1464	1514
Q Serve(g_s), s	6.0	0.0	10.7	7.0	1.0	21.0	20.7	30.4	30.4	8.5	54.4	9.1
Cycle Q Clear(g_c), s	6.0	0.0	10.7	7.0	1.0	21.0	20.7	30.4	30.4	8.5	54.4	9.1
Prop In Lane	1.00		0.93	1.00		1.00	1.00		0.35	1.00		1.00
Lane Grp Cap(c), veh/h	320	0	277	268	335	286	244	1601	918	301	2062	710
V/C Ratio(X)	0.35	0.00	0.42	0.45	0.04	0.74	0.92	0.54	0.54	0.58	0.83	0.21
Avail Cap(c_a), veh/h	320	0	277	268	335	286	287	1601	918	316	2062	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	0.0	58.0	54.5	53.2	61.3	67.6	23.3	23.3	21.0	37.0	24.9
Incr Delay (d2), s/veh	0.7	0.0	4.6	1.2	0.0	9.9	29.3	1.3	2.3	2.4	4.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.0	0.0	8.1	2.3	0.8	13.9	16.3	15.9	18.2	6.4	27.1	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.1	0.0	62.6	55.7	53.2	71.2	96.9	24.6	25.6	23.4	41.1	25.6
LnGrp LOS	D	A	E	E	D	E	F	C	C	C	D	C
Approach Vol, veh/h	228				346				1584		2035	
Approach Delay, s/veh	57.9				65.1				35.1		38.4	
Approach LOS	E				E				D		D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.9	82.1	12.0	36.0	17.5	94.5	13.0	35.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	27.0	71.0	6.0	30.0	12.0	86.0	7.0	29.0				
Max Q Clear Time (g_c+I1), s	22.7	56.4	8.0	23.0	10.5	32.4	9.0	12.7				
Green Ext Time (p_c), s	0.2	10.1	0.0	0.4	0.1	12.3	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay	40.5											
HCM 6th LOS	D											

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	270	62	43	2	7	181
Future Vol, veh/h	270	62	43	2	7	181
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	300	69	48	2	8	201
Number of Lanes	1	1	0	1	1	0

Approach	SB	SE	NW
Opposing Approach		NW	SE
Opposing Lanes	0	1	1
Conflicting Approach Left	NW	SB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	SE		SB
Conflicting Lanes Right	1	0	2
HCM Control Delay	12.2	8.8	8.9
HCM LOS	B	A	A

Lane	NWLn1	SELn1	SBLn1	SBLn2
Vol Left, %	0%	96%	100%	0%
Vol Thru, %	4%	4%	0%	0%
Vol Right, %	96%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	188	45	270	62
LT Vol	0	43	270	0
Through Vol	7	2	0	0
RT Vol	181	0	0	62
Lane Flow Rate	209	50	300	69
Geometry Grp	2	2	7	7
Degree of Util (X)	0.254	0.074	0.466	0.084
Departure Headway (Hd)	4.38	5.328	5.595	4.39
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	819	671	642	811
Service Time	2.408	3.376	3.351	2.144
HCM Lane V/C Ratio	0.255	0.075	0.467	0.085
HCM Control Delay	8.9	8.8	13.2	7.6
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	1	0.2	2.5	0.3



Appendix I
Year 2027 Total Traffic
Operations Worksheets – Access Scenario 2

HCM Signalized Intersection Capacity Analysis 2027 Total AM Access Scen 2 - EX Lane Config

3: N-S Street & State St

12/05/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	138	194	9	211	167	1462	118	83	670	78
Future Volume (vph)	183	16	138	194	9	211	167	1462	118	83	670	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.86		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1543		1710	1540		1693	3348		1693	3333	
Flt Permitted	0.30	1.00		0.51	1.00		0.24	1.00		0.06	1.00	
Satd. Flow (perm)	530	1543		917	1540		426	3348		98	3333	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	153	216	10	234	186	1624	131	92	744	87
RTOR Reduction (vph)	0	110	0	0	189	0	0	4	0	0	6	0
Lane Group Flow (vph)	203	61	0	216	55	0	186	1751	0	92	825	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	40.0	28.0		38.0	27.0		89.8	77.2		80.2	72.4	
Effective Green, g (s)	40.0	28.0		38.0	27.0		89.8	77.2		80.2	72.4	
Actuated g/C Ratio	0.27	0.19		0.25	0.18		0.60	0.51		0.53	0.48	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	234	288		290	277		361	1723		135	1608	
v/s Ratio Prot	c0.07	0.04		0.05	0.04		c0.04	c0.52		0.04	0.25	
v/s Ratio Perm	c0.16			0.13			0.26			0.33		
v/c Ratio	0.87	0.21		0.74	0.20		0.52	1.02		0.68	0.51	
Uniform Delay, d1	49.4	51.7		50.1	52.3		16.1	36.4		32.7	26.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.9	1.7		9.9	1.6		1.2	25.8		13.3	1.2	
Delay (s)	76.3	53.3		60.0	53.9		17.3	62.2		46.0	27.9	
Level of Service	E	D		E	D		B	E		D	C	
Approach Delay (s)		65.8			56.8			57.9			29.7	
Approach LOS		E			E			E			C	
Intersection Summary												
HCM 2000 Control Delay			51.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			98.1%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 3: N-S Street & State St

2027 Total AM Access Scen 2 - EX Lane Config

12/05/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	138	194	9	211	167	1462	118	83	670	78
Future Volume (veh/h)	183	16	138	194	9	211	167	1462	118	83	670	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	125	216	10	234	186	1624	131	92	744	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	211	36	252	305	11	263	388	1679	134	122	1526	178
Arrive On Green	0.08	0.19	0.19	0.07	0.18	0.18	0.07	0.53	0.53	0.04	0.50	0.50
Sat Flow, veh/h	1701	194	1349	1714	62	1461	1701	3182	254	1701	3061	358
Grp Volume(v), veh/h	203	0	143	216	0	244	186	859	896	92	412	419
Grp Sat Flow(s),veh/h/ln	1701	0	1543	1714	0	1523	1701	1697	1740	1701	1697	1722
Q Serve(g_s), s	12.0	0.0	12.5	11.0	0.0	23.5	8.0	72.7	75.2	4.0	24.1	24.2
Cycle Q Clear(g_c), s	12.0	0.0	12.5	11.0	0.0	23.5	8.0	72.7	75.2	4.0	24.1	24.2
Prop In Lane	1.00		0.87	1.00		0.96	1.00		0.15	1.00		0.21
Lane Grp Cap(c), veh/h	211	0	288	305	0	274	388	895	918	122	846	858
V/C Ratio(X)	0.96	0.00	0.50	0.71	0.00	0.89	0.48	0.96	0.98	0.76	0.49	0.49
Avail Cap(c_a), veh/h	211	0	288	305	0	274	454	895	918	146	846	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	0.0	54.7	51.9	0.0	60.1	18.5	33.9	34.5	35.4	24.9	24.9
Incr Delay (d2), s/veh	50.9	0.0	6.0	7.4	0.0	32.2	0.9	21.8	24.4	16.7	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.9	0.0	9.2	5.9	0.0	17.1	5.7	43.4	46.3	3.9	15.2	15.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	103.6	0.0	60.7	59.3	0.0	92.2	19.4	55.7	58.9	52.1	26.9	26.9
LnGrp LOS	F	A	E	E	A	F	B	E	E	D	C	C
Approach Vol, veh/h	346				460		1941				923	
Approach Delay, s/veh	85.9				76.8		53.7				29.4	
Approach LOS	F				E		D				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.2	81.8	18.0	33.0	12.9	86.1	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	69.0	12.0	27.0	8.0	77.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	10.0	26.2	14.0	25.5	6.0	77.2	13.0	14.5				
Green Ext Time (p_c), s	0.2	5.7	0.0	0.2	0.0	0.0	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			53.5									
HCM 6th LOS			D									

HCM Signalized Intersection Capacity Analysis - Total AM Access Scen 2 - EX Ln Conf - Shoulder 3: N-S Street & State St

01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	138	126	9	137	130	1141	118	83	525	61
Future Volume (vph)	183	16	138	126	9	137	130	1141	118	83	525	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.86		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1543		1710	1546		1693	3339		1693	3333	
Flt Permitted	0.48	1.00		0.52	1.00		0.33	1.00		0.09	1.00	
Satd. Flow (perm)	859	1543		931	1546		590	3339		157	3333	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	153	140	10	152	144	1268	131	92	583	68
RTOR Reduction (vph)	0	124	0	0	125	0	0	5	0	0	6	0
Lane Group Flow (vph)	203	47	0	140	37	0	144	1394	0	92	645	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	40.3	28.3		37.7	27.0		88.2	77.3		81.8	74.1	
Effective Green, g (s)	40.3	28.3		37.7	27.0		88.2	77.3		81.8	74.1	
Actuated g/C Ratio	0.27	0.19		0.25	0.18		0.59	0.52		0.55	0.49	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	291		289	278		427	1720		164	1646	
v/s Ratio Prot	c0.05	0.03		0.03	0.02		0.02	c0.42		c0.03	0.19	
v/s Ratio Perm	c0.13			0.09			0.17			0.28		
v/c Ratio	0.68	0.16		0.48	0.13		0.34	0.81		0.56	0.39	
Uniform Delay, d1	47.2	50.9		45.9	51.7		14.7	30.2		23.7	23.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.4	1.2		1.3	1.0		0.5	4.3		4.3	0.7	
Delay (s)	53.6	52.1		47.2	52.7		15.2	34.5		28.1	24.5	
Level of Service	D	D		D	D		B	C		C	C	
Approach Delay (s)		52.9			50.1			32.7			25.0	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			35.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			83.9%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total AM Access Scen 2 - EX Ln Conf - Shoulder
3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	138	126	9	137	130	1141	118	83	525	61
Future Volume (veh/h)	183	16	138	126	9	137	130	1141	118	83	525	61
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	125	140	10	152	144	1268	131	92	583	68
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	286	36	252	305	17	258	453	1640	169	191	1568	182
Arrive On Green	0.08	0.19	0.19	0.07	0.18	0.18	0.05	0.53	0.53	0.04	0.51	0.51
Sat Flow, veh/h	1701	194	1349	1714	94	1434	1701	3105	320	1701	3062	356
Grp Volume(v), veh/h	203	0	143	140	0	162	144	691	708	92	322	329
Grp Sat Flow(s),veh/h/ln	1701	0	1543	1714	0	1528	1701	1697	1728	1701	1697	1722
Q Serve(g_s), s	12.0	0.0	12.5	10.0	0.0	14.6	6.0	48.6	49.1	3.9	17.2	17.3
Cycle Q Clear(g_c), s	12.0	0.0	12.5	10.0	0.0	14.6	6.0	48.6	49.1	3.9	17.2	17.3
Prop In Lane	1.00		0.87	1.00		0.94	1.00		0.18	1.00		0.21
Lane Grp Cap(c), veh/h	286	0	288	305	0	275	453	896	913	191	869	882
V/C Ratio(X)	0.71	0.00	0.50	0.46	0.00	0.59	0.32	0.77	0.78	0.48	0.37	0.37
Avail Cap(c_a), veh/h	286	0	288	305	0	275	542	896	913	217	869	882
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	0.0	54.7	46.0	0.0	56.4	16.6	28.2	28.3	25.5	22.0	22.1
Incr Delay (d2), s/veh	7.9	0.0	6.0	1.1	0.0	8.9	0.4	6.4	6.4	1.9	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.4	0.0	9.2	7.8	0.0	10.5	4.2	28.0	28.7	2.9	11.4	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	60.7	47.1	0.0	65.4	17.0	34.5	34.7	27.4	23.3	23.3
LnGrp LOS	E	A	E	D	A	E	B	C	C	C	C	C
Approach Vol, veh/h	346		302				1543		743			
Approach Delay, s/veh	59.2		56.9				33.0		23.8			
Approach LOS	E		E				C		C			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.2	83.8	18.0	33.0	12.8	86.2	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	69.0	12.0	27.0	8.0	77.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	8.0	19.3	14.0	16.6	5.9	51.1	12.0	14.5				
Green Ext Time (p_c), s	0.2	4.2	0.0	0.6	0.0	10.7	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay	36.2											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis 2027 Total AM Acc Scen 2 - EX Config-Mitigated

3: State St & Pierce Park Ln

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	138	194	9	211	167	1462	118	83	670	78
Future Volume (vph)	183	16	138	194	9	211	167	1462	118	83	670	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3285	1543		3317	1540		1693	3386	1515	1693	3386	1515
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	3285	1543		3317	1540		1693	3386	1515	106	3386	1515
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	153	216	10	234	186	1624	131	92	744	87
RTOR Reduction (vph)	0	81	0	0	188	0	0	0	56	0	0	48
Lane Group Flow (vph)	203	90	0	216	56	0	186	1624	75	92	744	39
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases									6	2		2
Actuated Green, G (s)	11.8	28.0		11.0	27.2		17.8	78.0	78.0	74.2	67.2	67.2
Effective Green, g (s)	11.8	28.0		11.0	27.2		17.8	78.0	78.0	74.2	67.2	67.2
Actuated g/C Ratio	0.08	0.19		0.07	0.18		0.12	0.52	0.52	0.49	0.45	0.45
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	258	288		243	279		200	1760	787	126	1516	678
v/s Ratio Prot	0.06	c0.06		c0.07	0.04		c0.11	c0.48		0.03	0.22	
v/s Ratio Perm									0.05	0.33		0.03
v/c Ratio	0.79	0.31		0.89	0.20		0.93	0.92	0.10	0.73	0.49	0.06
Uniform Delay, d1	67.9	52.7		68.9	52.2		65.5	33.2	18.2	30.3	29.3	23.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.6	2.8		29.9	1.6		44.2	9.6	0.2	19.4	1.1	0.2
Delay (s)	82.4	55.5		98.8	53.8		109.7	42.8	18.4	49.7	30.4	23.6
Level of Service	F	E		F	D		F	D	B	D	C	C
Approach Delay (s)		70.1			74.9			47.6			31.7	
Approach LOS		E			E			D			C	
Intersection Summary												
HCM 2000 Control Delay			49.3			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			26.0			
Intersection Capacity Utilization			89.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 3: State St & Pierce Park Ln

2027 Total AM Acc Scen 2 - EX Config-Mitigated

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	138	194	9	211	167	1462	118	83	670	78
Future Volume (veh/h)	183	16	138	194	9	211	167	1462	118	83	670	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	125	216	10	234	186	1624	131	92	744	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	245	36	252	244	12	271	204	1781	795	143	1516	676
Arrive On Green	0.07	0.19	0.19	0.07	0.19	0.19	0.12	0.52	0.52	0.04	0.45	0.45
Sat Flow, veh/h	3300	194	1349	3326	62	1461	1701	3393	1514	1701	3393	1514
Grp Volume(v), veh/h	203	0	143	216	0	244	186	1624	131	92	744	87
Grp Sat Flow(s),veh/h/ln	1650	0	1543	1663	0	1523	1701	1697	1514	1701	1697	1514
Q Serve(g_s), s	9.1	0.0	12.5	9.7	0.0	23.3	16.2	65.4	6.8	4.4	23.3	5.1
Cycle Q Clear(g_c), s	9.1	0.0	12.5	9.7	0.0	23.3	16.2	65.4	6.8	4.4	23.3	5.1
Prop In Lane	1.00		0.87	1.00		0.96	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	245	0	288	244	0	283	204	1781	795	143	1516	676
V/C Ratio(X)	0.83	0.00	0.50	0.89	0.00	0.86	0.91	0.91	0.16	0.64	0.49	0.13
Avail Cap(c_a), veh/h	264	0	288	244	0	283	204	1781	795	152	1516	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.5	0.0	54.7	68.9	0.0	59.2	65.2	32.5	18.5	33.9	29.4	24.4
Incr Delay (d2), s/veh	18.1	0.0	6.0	29.7	0.0	27.7	39.3	8.6	0.4	8.1	1.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.9	0.0	9.2	8.8	0.0	16.6	14.2	36.4	4.5	3.7	14.7	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	86.6	0.0	60.7	98.6	0.0	86.9	104.5	41.0	19.0	42.1	30.6	24.8
LnGrp LOS	F	A	E	F	A	F	F	D	B	D	C	C
Approach Vol, veh/h	346				460		1941				923	
Approach Delay, s/veh	75.9				92.4		45.6				31.2	
Approach LOS	E				F		D				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	74.0	17.2	33.8	13.3	85.7	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	18.0	67.0	12.0	27.0	7.0	78.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	18.2	25.3	11.1	25.3	6.4	67.4	11.7	14.5				
Green Ext Time (p_c), s	0.0	5.9	0.1	0.2	0.0	7.7	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			50.7									
HCM 6th LOS			D									

HCM Signalized Intersection Capacity Analysis 2027 Total ALT 2 AM Access - Ult State St 3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	138	194	9	211	167	1462	118	83	670	78
Future Volume (vph)	183	16	138	194	9	211	167	1462	118	83	670	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.82		1.00	*0.82	1.00
Frt	1.00	0.87		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1693	1543		1710	1800	1530	1693	4335		1693	4238	1515
Flt Permitted	0.75	1.00		0.47	1.00	1.00	0.26	1.00		0.06	1.00	1.00
Satd. Flow (perm)	1339	1543		839	1800	1530	465	4335		110	4238	1515
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	153	216	10	234	186	1624	131	92	744	87
RTOR Reduction (vph)	0	123	0	0	0	185	0	5	0	0	0	49
Lane Group Flow (vph)	203	48	0	216	10	49	186	1750	0	92	744	38
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Parking (#/hr)												0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6			2		2
Actuated Green, G (s)	43.8	29.3		48.2	31.5	31.5	82.0	68.8		74.0	64.8	64.8
Effective Green, g (s)	43.8	29.3		48.2	31.5	31.5	82.0	68.8		74.0	64.8	64.8
Actuated g/C Ratio	0.29	0.20		0.32	0.21	0.21	0.55	0.46		0.49	0.43	0.43
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	425	301		366	378	321	362	1988		151	1830	654
v/s Ratio Prot	0.05	0.03		c0.07	0.01		c0.05	c0.40		0.04	0.18	
v/s Ratio Perm	0.09			c0.12		0.03	0.24			0.26		0.02
v/c Ratio	0.48	0.16		0.59	0.03	0.15	0.51	0.88		0.61	0.41	0.06
Uniform Delay, d1	42.7	50.1		39.9	47.1	48.4	18.3	36.9		28.8	29.4	24.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	1.1		2.5	0.0	0.2	1.2	6.0		6.8	0.7	0.2
Delay (s)	43.6	51.2		42.4	47.1	48.6	19.5	42.8		35.6	30.0	25.0
Level of Service	D	D		D	D	D	B	D		D	C	C
Approach Delay (s)		47.1			45.6			40.6			30.1	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay		39.3				HCM 2000 Level of Service		D				
HCM 2000 Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		150.0				Sum of lost time (s)		26.0				
Intersection Capacity Utilization		80.3%				ICU Level of Service		D				
Analysis Period (min)		15										

c Critical Lane Group

HCM 6th Signalized Intersection Summary

2027 Total ALT 2 AM Access - Ult State St

3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	138	194	9	211	167	1462	118	83	670	78
Future Volume (veh/h)	183	16	138	194	9	211	167	1462	118	83	670	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	153	216	10	234	186	1624	131	92	744	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	439	31	266	356	372	315	395	2058	166	164	1961	676
Arrive On Green	0.10	0.19	0.19	0.11	0.21	0.21	0.07	0.48	0.48	0.04	0.45	0.45
Sat Flow, veh/h	1701	162	1376	1714	1800	1525	1701	4306	347	1701	4393	1514
Grp Volume(v), veh/h	203	0	171	216	10	234	186	1104	651	92	744	87
Grp Sat Flow(s),veh/h/ln	1701	0	1538	1714	1800	1525	1701	1464	1724	1701	1464	1514
Q Serve(g_s), s	14.4	0.0	15.1	15.0	0.7	21.6	8.8	47.4	47.5	4.4	16.9	5.1
Cycle Q Clear(g_c), s	14.4	0.0	15.1	15.0	0.7	21.6	8.8	47.4	47.5	4.4	16.9	5.1
Prop In Lane	1.00		0.89	1.00		1.00	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	439	0	297	356	372	315	395	1400	824	164	1961	676
V/C Ratio(X)	0.46	0.00	0.58	0.61	0.03	0.74	0.47	0.79	0.79	0.56	0.38	0.13
Avail Cap(c_a), veh/h	439	0	297	356	372	315	451	1400	824	217	1961	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	0.0	54.9	42.2	47.5	55.8	20.7	32.8	32.8	29.9	27.7	24.4
Incr Delay (d2), s/veh	0.8	0.0	7.9	2.9	0.0	9.1	0.9	4.6	7.6	3.0	0.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.3	0.0	10.8	10.9	0.5	14.1	6.4	24.0	28.5	3.4	10.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.3	0.0	62.8	45.1	47.5	64.9	21.6	37.4	40.4	32.9	28.2	24.8
LnGrp LOS	D	A	E	D	D	E	C	D	D	C	C	C
Approach Vol, veh/h	374				460		1941				923	
Approach Delay, s/veh	52.2				55.2		36.9				28.4	
Approach LOS	D				E		D				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	74.0	21.0	37.0	13.3	78.7	23.0	35.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	62.0	15.0	31.0	11.0	67.0	17.0	29.0				
Max Q Clear Time (g_c+I1), s	10.8	18.9	16.4	23.6	6.4	49.5	17.0	17.1				
Green Ext Time (p_c), s	0.2	5.9	0.0	0.5	0.1	10.9	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay			38.6									
HCM 6th LOS			D									

Intersection												
Int Delay, s/veh	0.7											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	3	1813	26	33	839	2	0	0	54	0	0	1
Future Vol, veh/h	3	1813	26	33	839	2	0	0	54	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	3	1949	28	35	902	2	0	0	58	0	0	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	904	0	0	1977	0	0	-	-	989	1953	2955	451
Stage 1	-	-	-	-	-	-	-	-	-	972	972	-
Stage 2	-	-	-	-	-	-	-	-	-	981	1983	-
Critical Hdwy	4.12	-	-	4.12	-	-	-	-	6.92	7.52	6.52	6.92
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.52	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.52	5.52	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	-	-	3.31	3.51	4.01	3.31
Pot Cap-1 Maneuver	754	-	-	293	-	-	0	0	247	39	15	558
Stage 1	-	-	-	-	-	-	0	0	-	273	331	-
Stage 2	-	-	-	-	-	-	0	0	-	270	106	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	754	-	-	293	-	-	-	-	247	27	13	558
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	107	56	-
Stage 1	-	-	-	-	-	-	-	-	-	272	292	-
Stage 2	-	-	-	-	-	-	-	-	-	206	106	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0			0.7			24			11.5		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	247	293	-	-	754	-	-	558				
HCM Lane V/C Ratio	0.235	0.121	-	-	0.004	-	-	0.002				
HCM Control Delay (s)	24	19	-	-	9.8	-	-	11.5				
HCM Lane LOS	C	C	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.9	0.4	-	-	0	-	-	0				

HCM 6th TWSC
7: State St & Zamzows Drwy/Site Acc A

2027 Total ALT 2 AM Access - Ult State St

Intersection												
Int Delay, s/veh	1.1											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↱ ↻ ↻ ↻			↱ ↻ ↻ ↻		↱			↱			↱
Traffic Vol, veh/h	3	1813	26	33	839	2	0	0	54	0	0	1
Future Vol, veh/h	3	1813	26	33	839	2	0	0	54	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	150	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	2	2	2
Mvmt Flow	3	1949	28	35	902	2	0	0	58	0	0	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	904	0	0	1977	0	0	-	-	989	-	-	451
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.32	-	-	5.32	-	-	-	-	7.12	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.11	-	-	3.11	-	-	-	-	3.91	-	-	3.92
Pot Cap-1 Maneuver	438	-	-	130	-	-	0	0	212	0	0	475
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	438	-	-	130	-	-	-	-	212	-	-	475
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0			1.6			28.3			12.6		
HCM LOS							D			B		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	212	130	-	-	438	-	-	475				
HCM Lane V/C Ratio	0.274	0.273	-	-	0.007	-	-	0.002				
HCM Control Delay (s)	28.3	42.8	-	-	13.3	-	-	12.6				
HCM Lane LOS	D	E	-	-	B	-	-	B				
HCM 95th %tile O(veh)	1.1	1	-	-	0	-	-	0				

Intersection

Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	169	35	45	8	2	292
Future Vol, veh/h	169	35	45	8	2	292
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	188	39	50	9	2	324
Number of Lanes	1	1	0	1	1	0

Approach	SB	SE	NW
Opposing Approach		NW	SE
Opposing Lanes	0	1	1
Conflicting Approach Left	NW	SB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	SE		SB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.5	8.6	9.4
HCM LOS	B	A	A

Lane	NWLn1	SELn1	SBLn1	SBLn2
Vol Left, %	0%	85%	100%	0%
Vol Thru, %	1%	15%	0%	0%
Vol Right, %	99%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	294	53	169	35
LT Vol	0	45	169	0
Through Vol	2	8	0	0
RT Vol	292	0	0	35
Lane Flow Rate	327	59	188	39
Geometry Grp	2	2	7	7
Degree of Util (X)	0.366	0.083	0.304	0.05
Departure Headway (Hd)	4.036	5.065	5.821	4.613
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	892	705	614	771
Service Time	2.059	3.109	3.581	2.373
HCM Lane V/C Ratio	0.367	0.084	0.306	0.051
HCM Control Delay	9.4	8.6	11.1	7.6
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	1.7	0.3	1.3	0.2

HCM Signalized Intersection Capacity Analysis 2027 Total PM Access Scen 2 - EX Lane Config

3: N-S Street & State St

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	81	119	13	208	219	1197	136	124	1681	143
Future Volume (vph)	110	8	81	119	13	208	219	1197	136	124	1681	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	6.0		5.0	5.0		7.0	6.0		6.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1538		1710	1546		1693	3334		1693	3346	
Flt Permitted	0.57	1.00		0.58	1.00		0.95	1.00		0.07	1.00	
Satd. Flow (perm)	1024	1538		1042	1546		1693	3334		133	3346	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	8	83	121	13	212	223	1221	139	127	1715	146
RTOR Reduction (vph)	0	68	0	0	155	0	0	5	0	0	4	0
Lane Group Flow (vph)	112	23	0	121	70	0	223	1355	0	127	1857	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4						2		
Actuated Green, G (s)	37.9	29.0		54.0	40.1		14.0	77.0		85.0	73.0	
Effective Green, g (s)	37.9	29.0		54.0	40.1		14.0	77.0		85.0	73.0	
Actuated g/C Ratio	0.24	0.18		0.34	0.25		0.09	0.48		0.53	0.46	
Clearance Time (s)	5.0	6.0		5.0	5.0		7.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	279	278		431	387		148	1604		187	1526	
v/s Ratio Prot	c0.02	0.01		c0.03	0.05		c0.13	c0.41		0.05	c0.56	
v/s Ratio Perm	c0.07			0.06						0.31		
v/c Ratio	0.40	0.08		0.28	0.18		1.51	0.84		0.68	1.22	
Uniform Delay, d1	49.9	54.4		37.9	47.1		73.0	36.3		29.2	43.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.6		1.6	1.0		259.8	5.6		9.4	103.9	
Delay (s)	50.9	55.0		39.5	48.1		332.8	41.9		38.6	147.4	
Level of Service	D	E		D	D		F	D		D	F	
Approach Delay (s)		52.7			45.1			82.9			140.4	
Approach LOS		D			D			F			F	
Intersection Summary												
HCM 2000 Control Delay		106.0			HCM 2000 Level of Service			F				
HCM 2000 Volume to Capacity ratio		0.95										
Actuated Cycle Length (s)		160.0			Sum of lost time (s)			25.0				
Intersection Capacity Utilization		107.4%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 3: N-S Street & State St

2027 Total PM Access Scen 2 - EX Lane Config

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	81	119	13	208	219	1197	136	124	1681	143
Future Volume (veh/h)	110	8	81	119	13	208	219	1197	136	124	1681	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	83	121	13	181	223	1221	139	127	1715	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	311	25	262	429	26	359	149	2204	250	318	2099	177
Arrive On Green	0.06	0.19	0.19	0.12	0.25	0.25	0.09	0.72	0.72	0.04	0.66	0.66
Sat Flow, veh/h	1701	135	1399	1714	103	1438	1701	3071	349	1701	3168	266
Grp Volume(v), veh/h	112	0	91	121	0	194	223	673	687	127	909	952
Grp Sat Flow(s),veh/h/ln	1701	0	1534	1714	0	1541	1701	1697	1723	1701	1697	1738
Q Serve(g_s), s	8.5	0.0	8.2	8.3	0.0	17.3	14.0	29.7	30.0	3.9	62.3	65.4
Cycle Q Clear(g_c), s	8.5	0.0	8.2	8.3	0.0	17.3	14.0	29.7	30.0	3.9	62.3	65.4
Prop In Lane	1.00		0.91	1.00		0.93	1.00		0.20	1.00		0.15
Lane Grp Cap(c), veh/h	311	0	288	429	0	385	149	1218	1237	318	1124	1151
V/C Ratio(X)	0.36	0.00	0.32	0.28	0.00	0.50	1.50	0.55	0.56	0.40	0.81	0.83
Avail Cap(c_a), veh/h	311	0	288	429	0	385	149	1218	1237	412	1124	1151
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	0.0	56.1	40.3	0.0	51.5	73.0	10.6	10.6	10.3	19.6	20.2
Incr Delay (d2), s/veh	0.7	0.0	2.9	1.6	0.0	4.6	256.1	1.8	1.8	0.8	6.3	6.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	6.2	6.7	0.0	11.6	26.5	16.3	16.6	2.6	33.0	35.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.9	0.0	59.0	41.9	0.0	56.1	329.1	12.4	12.4	11.1	25.9	27.0
LnGrp LOS	D	A	E	D	A	E	F	B	B	B	C	C
Approach Vol, veh/h	203		315				1583				1988	
Approach Delay, s/veh	54.0		50.7				57.0				25.5	
Approach LOS	D		D				E				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.0	114.0	14.0	46.0	12.1	122.9	24.0	36.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	* 6	6.0	* 7	5.0	6.0				
Max Green Setting (Gmax), s	14.0	73.0	9.0	* 40	15.0	* 74	19.0	29.0				
Max Q Clear Time (g_c+I1), s	16.0	67.4	10.5	19.3	5.9	32.0	10.3	10.2				
Green Ext Time (p_c), s	0.0	4.7	0.0	1.1	0.2	12.0	0.2	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			41.1									
HCM 6th LOS			D									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis - Total PM Access Scen 2 - EX Ln Conf - Shoulder 3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	81	110	13	192	206	1127	136	124	1398	119
Future Volume (vph)	110	8	81	110	13	192	206	1127	136	124	1398	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		7.0	6.0		6.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1538		1710	1547		1693	3331		1693	3346	
Flt Permitted	0.35	1.00		0.65	1.00		0.95	1.00		0.16	1.00	
Satd. Flow (perm)	625	1538		1165	1547		1693	3331		283	3346	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	8	83	112	13	196	210	1150	139	127	1427	121
RTOR Reduction (vph)	0	68	0	0	158	0	0	5	0	0	4	0
Lane Group Flow (vph)	112	23	0	112	51	0	210	1284	0	127	1544	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4						2		
Actuated Green, G (s)	33.0	28.0		33.0	28.0		20.0	95.5		92.5	83.0	
Effective Green, g (s)	33.0	28.0		33.0	28.0		20.0	95.5		92.5	83.0	
Actuated g/C Ratio	0.21	0.18		0.21	0.18		0.12	0.60		0.58	0.52	
Clearance Time (s)	5.0	5.0		5.0	5.0		7.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	162	269		257	270		211	1988		247	1735	
v/s Ratio Prot	c0.02	0.01		0.01	0.03		c0.12	0.39		0.03	c0.46	
v/s Ratio Perm	c0.12			0.08						0.27		
v/c Ratio	0.69	0.08		0.44	0.19		1.00	0.65		0.51	0.89	
Uniform Delay, d1	59.7	55.3		55.0	56.3		70.0	21.2		17.6	34.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.0	0.6		5.3	1.6		60.3	1.6		1.8	7.3	
Delay (s)	71.7	55.9		60.3	57.9		130.2	22.8		19.4	41.7	
Level of Service	E	E		E	E		F	C		B	D	
Approach Delay (s)		64.6			58.7			37.8			40.0	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay		42.1			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		160.0			Sum of lost time (s)			24.0				
Intersection Capacity Utilization		96.5%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total PM Access Scen 2 - EX Ln Conf - Shoulder
3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	81	110	13	192	206	1127	136	124	1398	119
Future Volume (veh/h)	110	8	81	110	13	192	206	1127	136	124	1398	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	83	112	13	165	210	1150	139	127	1427	121
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	180	24	245	262	20	250	213	1835	221	282	1643	139
Arrive On Green	0.03	0.17	0.17	0.03	0.17	0.17	0.13	0.60	0.60	0.05	0.52	0.52
Sat Flow, veh/h	1701	135	1399	1714	113	1430	1701	3049	368	1701	3167	267
Grp Volume(v), veh/h	112	0	91	112	0	178	210	639	650	127	761	787
Grp Sat Flow(s),veh/h/ln	1701	0	1534	1714	0	1543	1701	1697	1720	1701	1697	1738
Q Serve(g_s), s	5.0	0.0	8.3	5.0	0.0	17.2	19.7	38.5	38.7	5.6	62.6	63.7
Cycle Q Clear(g_c), s	5.0	0.0	8.3	5.0	0.0	17.2	19.7	38.5	38.7	5.6	62.6	63.7
Prop In Lane	1.00		0.91	1.00		0.93	1.00		0.21	1.00		0.15
Lane Grp Cap(c), veh/h	180	0	268	262	0	270	213	1021	1035	282	880	902
V/C Ratio(X)	0.62	0.00	0.34	0.43	0.00	0.66	0.99	0.63	0.63	0.45	0.86	0.87
Avail Cap(c_a), veh/h	180	0	268	262	0	270	213	1021	1035	360	880	902
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.9	0.0	57.9	57.5	0.0	61.6	69.9	20.4	20.4	19.1	33.6	33.9
Incr Delay (d2), s/veh	6.5	0.0	3.4	5.0	0.0	12.0	58.0	2.9	2.9	1.1	11.1	11.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.5	0.0	6.3	3.9	0.0	12.2	17.6	22.0	22.4	4.1	36.2	37.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.4	0.0	61.3	62.6	0.0	73.5	127.9	23.3	23.3	20.2	44.7	45.3
LnGrp LOS	E	A	E	E	A	E	F	C	C	C	D	D
Approach Vol, veh/h	203		290				1499				1675	
Approach Delay, s/veh	65.2		69.3				37.9				43.1	
Approach LOS	E		E				D				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	27.0	90.0	10.0	33.0	13.7	103.3	10.0	33.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	6.0	* 7	5.0	5.0				
Max Green Setting (Gmax), s	20.0	83.0	5.0	28.0	15.0	* 90	5.0	28.0				
Max Q Clear Time (g_c+I1), s	21.7	65.7	7.0	19.2	7.6	40.7	7.0	10.3				
Green Ext Time (p_c), s	0.0	9.8	0.0	0.6	0.2	11.2	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay	44.3											
HCM 6th LOS	D											
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis 2027 Total PM Acc Scen 2 - EX Config Mitigated-Split Adj2
3: State St & Pierce Park Ln 01/22/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	 			 				 			 	
Traffic Volume (vph)	110	8	81	119	13	208	219	1197	136	124	1681	143
Future Volume (vph)	110	8	81	119	13	208	219	1197	136	124	1681	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	6.0		5.0	6.0		7.0	6.0	6.0	6.0	7.0	7.0
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.86		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3285	1538		3317	1545		1693	3386	1515	1693	3386	1515
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	3285	1538		3317	1545		1693	3386	1515	332	3386	1515
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	8	83	121	13	212	223	1221	139	127	1715	146
RTOR Reduction (vph)	0	68	0	0	149	0	0	0	54	0	0	72
Lane Group Flow (vph)	112	23	0	121	76	0	223	1221	85	127	1715	74
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases									6	2		2
Actuated Green, G (s)	6.0	28.0		6.0	28.0		22.0	95.1	95.1	86.9	79.0	79.0
Effective Green, g (s)	6.0	28.0		6.0	28.0		22.0	95.1	95.1	86.9	79.0	79.0
Actuated g/C Ratio	0.04	0.18		0.04	0.18		0.14	0.59	0.59	0.54	0.49	0.49
Clearance Time (s)	5.0	6.0		5.0	6.0		7.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	123	269		124	270		232	2012	900	247	1671	748
v/s Ratio Prot	0.03	0.01		c0.04	c0.05		c0.13	0.36		0.03	c0.51	
v/s Ratio Perm									0.06	0.25		0.05
v/c Ratio	0.91	0.08		0.98	0.28		0.96	0.61	0.09	0.51	1.03	0.10
Uniform Delay, d1	76.7	55.3		76.9	57.3		68.6	20.6	13.9	19.1	40.5	21.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	54.3	0.6		74.6	2.6		48.0	1.4	0.2	1.8	29.0	0.3
Delay (s)	131.0	55.9		151.5	59.8		116.6	22.0	14.2	20.9	69.5	21.8
Level of Service	F	E		F	E		F	C	B	C	E	C
Approach Delay (s)		97.3			91.9			34.6			62.9	
Approach LOS		F			F			C			E	
Intersection Summary												
HCM 2000 Control Delay			56.2			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			25.0			
Intersection Capacity Utilization			101.2%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total PM Acc Scen 2 - EX Config Mitigated-Split Adj2
 3: State St & Pierce Park Ln 01/22/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	81	119	13	208	219	1197	136	124	1681	143
Future Volume (veh/h)	110	8	81	119	13	208	219	1197	136	124	1681	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	83	121	13	181	223	1221	139	127	1715	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	124	24	245	125	18	250	234	2249	1003	338	1911	852
Arrive On Green	0.04	0.17	0.17	0.04	0.17	0.17	0.14	0.66	0.66	0.04	0.56	0.56
Sat Flow, veh/h	3300	135	1399	3326	102	1427	1701	3393	1514	1701	3393	1514
Grp Volume(v), veh/h	112	0	91	121	0	194	223	1221	139	127	1715	146
Grp Sat Flow(s),veh/h/ln	1650	0	1534	1663	0	1529	1701	1697	1514	1701	1697	1514
Q Serve(g_s), s	5.4	0.0	8.3	5.8	0.0	19.2	20.8	30.3	5.5	5.1	71.4	7.5
Cycle Q Clear(g_c), s	5.4	0.0	8.3	5.8	0.0	19.2	20.8	30.3	5.5	5.1	71.4	7.5
Prop In Lane	1.00		0.91	1.00		0.93	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	124	0	268	125	0	268	234	2249	1003	338	1911	852
V/C Ratio(X)	0.91	0.00	0.34	0.97	0.00	0.72	0.95	0.54	0.14	0.38	0.90	0.17
Avail Cap(c_a), veh/h	124	0	268	125	0	268	234	2249	1003	347	1911	852
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	76.7	0.0	57.9	76.9	0.0	62.4	68.5	14.2	10.0	14.2	30.9	16.9
Incr Delay (d2), s/veh	52.8	0.0	3.4	73.0	0.0	15.7	45.8	0.9	0.3	0.7	7.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.8	0.0	6.3	6.8	0.0	13.4	17.6	16.9	3.5	3.6	38.7	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	129.5	0.0	61.3	149.9	0.0	78.1	114.3	15.2	10.3	14.9	38.0	17.3
LnGrp LOS	F	A	E	F	A	E	F	B	B	B	D	B
Approach Vol, veh/h	203		315				1583				1988	
Approach Delay, s/veh	98.9		105.7				28.7				35.0	
Approach LOS	F		F				C				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.0	97.2	11.0	34.0	13.1	113.1	11.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	6.0	6.0	* 7	5.0	6.0				
Max Green Setting (Gmax), s	22.0	79.0	6.0	28.0	8.0	* 95	6.0	28.0				
Max Q Clear Time (g_c+I1), s	22.8	73.4	7.4	21.2	7.1	32.3	7.8	10.3				
Green Ext Time (p_c), s	0.0	4.6	0.0	0.6	0.0	12.6	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay	41.2											
HCM 6th LOS	D											
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis 2027 Total ALT 2 PM Access - Ult State St 3: Driveway - Single NBLT/Pierce Park Ln & State St

													
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR	
Lane Configurations													
Traffic Volume (vph)	110	8	81	119	13	208	219	1197	136	124	1681	143	
Future Volume (vph)	110	8	81	119	13	208	219	1197	136	124	1681	143	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.82		1.00	*0.82	1.00	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1693	1538		1710	1800	1530	1693	4317		1693	4384	1515	
Flt Permitted	0.75	1.00		0.65	1.00	1.00	0.95	1.00		0.14	1.00	1.00	
Satd. Flow (perm)	1335	1538		1174	1800	1530	1693	4317		247	4384	1515	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	112	8	83	121	13	212	223	1221	139	127	1715	146	
RTOR Reduction (vph)	0	68	0	0	0	172	0	7	0	0	0	79	
Lane Group Flow (vph)	112	23	0	121	13	40	223	1353	0	127	1715	67	
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm	
Protected Phases	3	8		7	4		1	6		5	2		
Permitted Phases	8			4		4				2		2	
Actuated Green, G (s)	35.0	29.0		37.0	30.0	30.0	24.5	88.2		83.3	73.5	73.5	
Effective Green, g (s)	35.0	29.0		37.0	30.0	30.0	24.5	88.2		83.3	73.5	73.5	
Actuated g/C Ratio	0.22	0.18		0.23	0.19	0.19	0.15	0.55		0.52	0.46	0.46	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	305	278		294	337	286	259	2379		217	2013	695	
v/s Ratio Prot	0.01	0.01		c0.02	0.01		c0.13	0.31		0.04	c0.39		
v/s Ratio Perm	0.07			c0.08		0.03				0.27		0.04	
v/c Ratio	0.37	0.08		0.41	0.04	0.14	0.86	0.57		0.59	0.85	0.10	
Uniform Delay, d1	52.4	54.4		51.4	53.2	54.2	66.1	23.5		20.5	38.4	24.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.6		0.9	0.0	0.2	24.1	1.0		4.0	4.8	0.3	
Delay (s)	53.1	55.0		52.3	53.2	54.4	90.2	24.5		24.4	43.2	24.7	
Level of Service	D	E		D	D	D	F	C		C	D	C	
Approach Delay (s)		54.0			53.7			33.7			40.7		
Approach LOS		D			D			C			D		
Intersection Summary													
HCM 2000 Control Delay			39.7									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.74										
Actuated Cycle Length (s)			160.0									Sum of lost time (s)	26.0
Intersection Capacity Utilization			77.4%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary

2027 Total ALT 2 PM Access - Ult State St

3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	81	119	13	208	219	1197	136	124	1681	143
Future Volume (veh/h)	110	8	81	119	13	208	219	1197	136	124	1681	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1800	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	83	121	13	212	223	1221	139	127	1715	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	320	24	254	292	338	286	244	2332	265	285	2062	710
Arrive On Green	0.04	0.18	0.18	0.04	0.19	0.19	0.14	0.56	0.56	0.05	0.47	0.47
Sat Flow, veh/h	1701	135	1399	1714	1800	1525	1701	4157	473	1701	4393	1514
Grp Volume(v), veh/h	112	0	91	121	13	212	223	860	500	127	1715	146
Grp Sat Flow(s),veh/h/ln	1701	0	1534	1714	1800	1525	1701	1464	1701	1701	1464	1514
Q Serve(g_s), s	6.0	0.0	8.3	7.0	0.9	21.0	20.7	29.2	29.2	6.2	54.4	9.1
Cycle Q Clear(g_c), s	6.0	0.0	8.3	7.0	0.9	21.0	20.7	29.2	29.2	6.2	54.4	9.1
Prop In Lane	1.00		0.91	1.00		1.00	1.00		0.28	1.00		1.00
Lane Grp Cap(c), veh/h	320	0	278	292	338	286	244	1643	954	285	2062	710
V/C Ratio(X)	0.35	0.00	0.33	0.41	0.04	0.74	0.92	0.52	0.52	0.45	0.83	0.21
Avail Cap(c_a), veh/h	320	0	278	292	338	286	287	1643	954	325	2062	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	0.0	57.0	53.8	53.2	61.3	67.6	21.8	21.8	20.8	37.0	24.9
Incr Delay (d2), s/veh	0.7	0.0	3.1	0.9	0.0	9.9	29.3	1.2	2.1	1.1	4.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.0	0.0	6.3	2.1	0.8	13.9	16.3	15.4	17.7	4.6	27.1	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.1	0.0	60.1	54.8	53.2	71.2	96.9	23.0	23.9	21.9	41.1	25.6
LnGrp LOS	D	A	E	D	D	E	F	C	C	C	D	C
Approach Vol, veh/h	203		346				1583				1988	
Approach Delay, s/veh	56.3		64.8				33.7				38.7	
Approach LOS	E		E				C				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.9	82.1	12.0	36.0	15.3	96.7	13.0	35.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	27.0	71.0	6.0	30.0	12.0	86.0	7.0	29.0				
Max Q Clear Time (g_c+I1), s	22.7	56.4	8.0	23.0	8.2	31.2	9.0	10.3				
Green Ext Time (p_c), s	0.2	10.1	0.0	0.4	0.1	12.2	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay	39.8											
HCM 6th LOS	D											

Intersection												
Int Delay, s/veh	1.1											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	20	1334	36	47	1893	21	0	0	25	13	0	20
Future Vol, veh/h	20	1334	36	47	1893	21	0	0	25	13	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	20	1361	37	48	1932	21	0	0	26	13	0	20
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1953	0	0	1398	0	0	-	-	699	2749	3466	966
Stage 1	-	-	-	-	-	-	-	-	-	2028	2028	-
Stage 2	-	-	-	-	-	-	-	-	-	721	1438	-
Critical Hdwy	4.12	-	-	4.12	-	-	-	-	6.92	7.52	6.52	6.92
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.52	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.52	5.52	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	-	-	3.31	3.51	4.01	3.31
Pot Cap-1 Maneuver	299	-	-	490	-	-	0	0	385	~ 9	7	256
Stage 1	-	-	-	-	-	-	0	0	-	60	101	-
Stage 2	-	-	-	-	-	-	0	0	-	387	199	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	299	-	-	490	-	-	-	-	385	~ 7	6	256
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	44	53	-
Stage 1	-	-	-	-	-	-	-	-	-	56	91	-
Stage 2	-	-	-	-	-	-	-	-	-	337	186	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.3			0.3			15			69.3		
HCM LOS							C			F		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	385	490	-	-	299	-	-	88				
HCM Lane V/C Ratio	0.066	0.098	-	-	0.068	-	-	0.383				
HCM Control Delay (s)	15	13.1	-	-	17.9	-	-	69.3				
HCM Lane LOS	C	B	-	-	C	-	-	F				
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0.2	-	-	1.5				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

HCM 6th TWSC
7: State St & Zamzows Drwy/Site Acc A

2027 Total ALT 2 PM Access - Ult State St

Intersection												
Int Delay, s/veh	0.8											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↵ ↵ ↵ ↵			↵ ↵ ↵ ↵		↵			↵			↵
Traffic Vol, veh/h	20	1334	36	47	1893	21	0	0	25	0	0	20
Future Vol, veh/h	20	1334	36	47	1893	21	0	0	25	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	150	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	2	2	2
Mvmt Flow	20	1361	37	48	1932	21	0	0	26	0	0	20
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1953	0	0	1398	0	0	-	-	699	-	-	966
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.32	-	-	5.32	-	-	-	-	7.12	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.11	-	-	3.11	-	-	-	-	3.91	-	-	3.92
Pot Cap-1 Maneuver	134	-	-	253	-	-	0	0	330	0	0	219
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	134	-	-	253	-	-	-	-	330	-	-	219
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.5			0.5			16.8			23.1		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	330	253	-	-	134	-	- 219					
HCM Lane V/C Ratio	0.077	0.19	-	-	0.152	-	- 0.093					
HCM Control Delay (s)	16.8	22.5	-	-	36.6	-	- 23.1					
HCM Lane LOS	C	C	-	-	E	-	- C					
HCM 95th %tile O(veh)	0.2	0.7	-	-	0.5	-	- 0.3					

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	195	66	41	2	7	158
Future Vol, veh/h	195	66	41	2	7	158
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	217	73	46	2	8	176
Number of Lanes	1	1	0	1	1	0

Approach	SB	SE	NW
Opposing Approach		NW	SE
Opposing Lanes	0	1	1
Conflicting Approach Left	NW	SB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	SE		SB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.1	8.4	8.3
HCM LOS	B	A	A

Lane	NWLn1	SELn1	SBLn1	SBLn2
Vol Left, %	0%	95%	100%	0%
Vol Thru, %	4%	5%	0%	0%
Vol Right, %	96%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	165	43	195	66
LT Vol	0	41	195	0
Through Vol	7	2	0	0
RT Vol	158	0	0	66
Lane Flow Rate	183	48	217	73
Geometry Grp	2	2	7	7
Degree of Util (X)	0.211	0.067	0.332	0.088
Departure Headway (Hd)	4.15	5.054	5.519	4.314
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	867	709	652	829
Service Time	2.167	3.084	3.255	2.05
HCM Lane V/C Ratio	0.211	0.068	0.333	0.088
HCM Control Delay	8.3	8.4	11	7.5
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0.8	0.2	1.5	0.3



Appendix J
Year 2027 Total Traffic
Operations Worksheets – Access Scenario 3

HCM Signalized Intersection Capacity Analysis 2027 Total AM Access Scen 3 - EX Lane Config 3: N-S Street & State St

12/06/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	124	194	9	211	167	1477	110	83	670	78
Future Volume (vph)	183	16	124	194	9	211	167	1477	110	83	670	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.86		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1546		1710	1540		1693	3351		1693	3333	
Flt Permitted	0.30	1.00		0.55	1.00		0.24	1.00		0.06	1.00	
Satd. Flow (perm)	530	1546		984	1540		426	3351		98	3333	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	138	216	10	234	186	1641	122	92	744	87
RTOR Reduction (vph)	0	111	0	0	189	0	0	3	0	0	6	0
Lane Group Flow (vph)	203	45	0	216	55	0	186	1760	0	92	825	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	40.0	28.0		38.0	27.0		89.8	77.2		80.2	72.4	
Effective Green, g (s)	40.0	28.0		38.0	27.0		89.8	77.2		80.2	72.4	
Actuated g/C Ratio	0.27	0.19		0.25	0.18		0.60	0.51		0.53	0.48	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	234	288		302	277		361	1724		135	1608	
v/s Ratio Prot	c0.07	0.03		0.05	0.04		c0.04	c0.53		0.04	0.25	
v/s Ratio Perm	c0.16			0.13			0.26			0.33		
v/c Ratio	0.87	0.16		0.72	0.20		0.52	1.02		0.68	0.51	
Uniform Delay, d1	49.4	51.1		49.6	52.3		16.1	36.4		32.9	26.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.9	1.2		7.8	1.6		1.2	27.0		13.3	1.2	
Delay (s)	76.3	52.3		57.4	53.9		17.3	63.4		46.2	27.9	
Level of Service	E	D		E	D		B	E		D	C	
Approach Delay (s)		65.9			55.6			59.0			29.7	
Approach LOS		E			E			E			C	
Intersection Summary												
HCM 2000 Control Delay			51.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			98.3%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 3: N-S Street & State St

2027 Total AM Access Scen 3 - EX Lane Config

12/06/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	124	194	9	211	167	1477	110	83	670	78
Future Volume (veh/h)	183	16	124	194	9	211	167	1477	110	83	670	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	110	216	10	234	186	1641	122	92	744	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	211	41	248	319	11	263	388	1690	125	121	1526	178
Arrive On Green	0.08	0.19	0.19	0.07	0.18	0.18	0.07	0.53	0.53	0.04	0.50	0.50
Sat Flow, veh/h	1701	218	1329	1714	62	1461	1701	3204	236	1701	3061	358
Grp Volume(v), veh/h	203	0	128	216	0	244	186	863	900	92	412	419
Grp Sat Flow(s),veh/h/ln	1701	0	1547	1714	0	1523	1701	1697	1743	1701	1697	1722
Q Serve(g_s), s	12.0	0.0	11.0	11.0	0.0	23.5	8.0	73.3	75.7	4.0	24.1	24.2
Cycle Q Clear(g_c), s	12.0	0.0	11.0	11.0	0.0	23.5	8.0	73.3	75.7	4.0	24.1	24.2
Prop In Lane	1.00		0.86	1.00		0.96	1.00		0.14	1.00		0.21
Lane Grp Cap(c), veh/h	211	0	289	319	0	274	388	895	920	121	846	858
V/C Ratio(X)	0.96	0.00	0.44	0.68	0.00	0.89	0.48	0.96	0.98	0.76	0.49	0.49
Avail Cap(c_a), veh/h	211	0	289	319	0	274	454	895	920	145	846	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	0.0	54.1	51.4	0.0	60.1	18.5	34.1	34.6	35.5	24.9	24.9
Incr Delay (d2), s/veh	50.9	0.0	4.9	5.6	0.0	32.2	0.9	22.5	25.0	17.5	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.9	0.0	8.3	5.5	0.0	17.1	5.7	43.9	46.8	3.9	15.2	15.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	103.6	0.0	59.0	57.0	0.0	92.2	19.4	56.5	59.6	53.0	26.9	26.9
LnGrp LOS	F	A	E	E	A	F	B	E	E	D	C	C
Approach Vol, veh/h	331				460		1949				923	
Approach Delay, s/veh	86.3				75.7		54.4				29.5	
Approach LOS	F				E		D				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.2	81.8	18.0	33.0	12.9	86.1	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	69.0	12.0	27.0	8.0	77.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	10.0	26.2	14.0	25.5	6.0	77.7	13.0	13.0				
Green Ext Time (p_c), s	0.2	5.7	0.0	0.2	0.0	0.0	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			53.7									
HCM 6th LOS			D									

HCM Signalized Intersection Capacity Analysis - 2027 Total AM Access Scen 3 - EX Ln Conf - Shoulder 3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	124	126	9	137	130	1153	110	83	525	61
Future Volume (vph)	183	16	124	126	9	137	130	1153	110	83	525	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.86		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1546		1710	1546		1693	3342		1693	3333	
Flt Permitted	0.48	1.00		0.55	1.00		0.33	1.00		0.09	1.00	
Satd. Flow (perm)	859	1546		998	1546		590	3342		155	3333	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	138	140	10	152	144	1281	122	92	583	68
RTOR Reduction (vph)	0	112	0	0	125	0	0	5	0	0	6	0
Lane Group Flow (vph)	203	44	0	140	37	0	144	1398	0	92	645	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	40.3	28.3		37.7	27.0		88.2	77.3		81.8	74.1	
Effective Green, g (s)	40.3	28.3		37.7	27.0		88.2	77.3		81.8	74.1	
Actuated g/C Ratio	0.27	0.19		0.25	0.18		0.59	0.52		0.55	0.49	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	291		301	278		427	1722		163	1646	
v/s Ratio Prot	c0.05	0.03		0.03	0.02		0.02	c0.42		c0.03	0.19	
v/s Ratio Perm	c0.13			0.08			0.17			0.28		
v/c Ratio	0.68	0.15		0.47	0.13		0.34	0.81		0.56	0.39	
Uniform Delay, d1	47.2	50.8		45.9	51.7		14.7	30.3		23.8	23.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.4	1.1		1.1	1.0		0.5	4.3		4.4	0.7	
Delay (s)	53.6	51.9		47.0	52.7		15.2	34.6		28.3	24.5	
Level of Service	D	D		D	D		B	C		C	C	
Approach Delay (s)		52.9			50.0			32.8			25.0	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			35.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			84.0%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total AM Access Scen 3 - EX Ln Conf - Shoulder
3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	124	126	9	137	130	1153	110	83	525	61
Future Volume (veh/h)	183	16	124	126	9	137	130	1153	110	83	525	61
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	110	140	10	152	144	1281	122	92	583	68
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	286	41	248	319	17	258	453	1654	157	191	1568	182
Arrive On Green	0.08	0.19	0.19	0.07	0.18	0.18	0.05	0.53	0.53	0.04	0.51	0.51
Sat Flow, veh/h	1701	218	1329	1714	94	1434	1701	3132	297	1701	3062	356
Grp Volume(v), veh/h	203	0	128	140	0	162	144	692	711	92	322	329
Grp Sat Flow(s),veh/h/ln	1701	0	1547	1714	0	1528	1701	1697	1732	1701	1697	1722
Q Serve(g_s), s	12.0	0.0	11.0	10.0	0.0	14.6	6.0	48.8	49.2	3.9	17.2	17.3
Cycle Q Clear(g_c), s	12.0	0.0	11.0	10.0	0.0	14.6	6.0	48.8	49.2	3.9	17.2	17.3
Prop In Lane	1.00		0.86	1.00		0.94	1.00		0.17	1.00		0.21
Lane Grp Cap(c), veh/h	286	0	289	319	0	275	453	896	915	191	869	882
V/C Ratio(X)	0.71	0.00	0.44	0.44	0.00	0.59	0.32	0.77	0.78	0.48	0.37	0.37
Avail Cap(c_a), veh/h	286	0	289	319	0	275	542	896	915	216	869	882
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	0.0	54.1	45.9	0.0	56.4	16.6	28.2	28.3	25.6	22.0	22.1
Incr Delay (d2), s/veh	7.9	0.0	4.9	0.9	0.0	8.9	0.4	6.4	6.4	1.9	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.4	0.0	8.3	7.8	0.0	10.5	4.2	28.1	28.9	2.9	11.4	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	59.0	46.9	0.0	65.4	17.0	34.6	34.7	27.5	23.3	23.3
LnGrp LOS	E	A	E	D	A	E	B	C	C	C	C	C
Approach Vol, veh/h	331		302				1547				743	
Approach Delay, s/veh	58.4		56.8				33.0				23.8	
Approach LOS	E		E				C				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.2	83.8	18.0	33.0	12.8	86.2	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	69.0	12.0	27.0	8.0	77.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	8.0	19.3	14.0	16.6	5.9	51.2	12.0	13.0				
Green Ext Time (p_c), s	0.2	4.2	0.0	0.6	0.0	10.7	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay	36.0											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis 2027 Total AM Acc Scen 3 - EX Config-Mitigated

3: State St & Pierce Park Ln

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	124	194	9	211	167	1477	110	83	670	78
Future Volume (vph)	183	16	124	194	9	211	167	1477	110	83	670	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3285	1546		3317	1540		1693	3386	1515	1693	3386	1515
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	3285	1546		3317	1540		1693	3386	1515	105	3386	1515
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	138	216	10	234	186	1641	122	92	744	87
RTOR Reduction (vph)	0	81	0	0	182	0	0	0	56	0	0	48
Lane Group Flow (vph)	203	75	0	216	62	0	186	1641	66	92	744	39
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases									6	2		2
Actuated Green, G (s)	11.8	28.0		11.0	27.2		17.0	78.0	78.0	75.0	68.0	68.0
Effective Green, g (s)	11.8	28.0		11.0	27.2		17.0	78.0	78.0	75.0	68.0	68.0
Actuated g/C Ratio	0.08	0.19		0.07	0.18		0.11	0.52	0.52	0.50	0.45	0.45
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	258	288		243	279		191	1760	787	126	1534	686
v/s Ratio Prot	0.06	c0.05		c0.07	0.04		c0.11	c0.48		0.03	0.22	
v/s Ratio Perm									0.04	0.33		0.03
v/c Ratio	0.79	0.26		0.89	0.22		0.97	0.93	0.08	0.73	0.49	0.06
Uniform Delay, d1	67.9	52.1		68.9	52.4		66.3	33.5	18.1	30.5	28.7	23.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.6	2.2		29.9	1.8		57.1	10.5	0.2	19.4	1.1	0.2
Delay (s)	82.4	54.3		98.8	54.2		123.4	44.0	18.3	49.9	29.8	23.2
Level of Service	F	D		F	D		F	D	B	D	C	C
Approach Delay (s)		70.2			75.2			50.0			31.2	
Approach LOS		E			E			D			C	
Intersection Summary												
HCM 2000 Control Delay			50.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			26.0			
Intersection Capacity Utilization			89.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 3: State St & Pierce Park Ln

2027 Total AM Acc Scen 3 - EX Config-Mitigated

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	124	194	9	211	167	1477	110	83	670	78
Future Volume (veh/h)	183	16	124	194	9	211	167	1477	110	83	670	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	110	216	10	234	186	1641	122	92	744	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	245	41	248	244	12	271	193	1782	795	140	1538	686
Arrive On Green	0.07	0.19	0.19	0.07	0.19	0.19	0.11	0.53	0.53	0.04	0.45	0.45
Sat Flow, veh/h	3300	218	1329	3326	62	1461	1701	3393	1514	1701	3393	1514
Grp Volume(v), veh/h	203	0	128	216	0	244	186	1641	122	92	744	87
Grp Sat Flow(s),veh/h/ln	1650	0	1547	1663	0	1523	1701	1697	1514	1701	1697	1514
Q Serve(g_s), s	9.1	0.0	11.0	9.7	0.0	23.3	16.3	66.7	6.2	4.3	23.0	5.0
Cycle Q Clear(g_c), s	9.1	0.0	11.0	9.7	0.0	23.3	16.3	66.7	6.2	4.3	23.0	5.0
Prop In Lane	1.00		0.86	1.00		0.96	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	245	0	289	244	0	283	193	1782	795	140	1538	686
V/C Ratio(X)	0.83	0.00	0.44	0.89	0.00	0.86	0.96	0.92	0.15	0.65	0.48	0.13
Avail Cap(c_a), veh/h	264	0	289	244	0	283	193	1782	795	149	1538	686
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.5	0.0	54.1	68.9	0.0	59.2	66.2	32.7	18.4	34.2	28.7	23.8
Incr Delay (d2), s/veh	18.1	0.0	4.9	29.7	0.0	27.7	54.5	9.3	0.4	9.1	1.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.9	0.0	8.3	8.8	0.0	16.6	15.1	37.2	4.2	3.7	14.5	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	86.6	0.0	59.0	98.6	0.0	86.9	120.7	42.0	18.8	43.3	29.8	24.2
LnGrp LOS	F	A	E	F	A	F	F	D	B	D	C	C
Approach Vol, veh/h	331				460		1949				923	
Approach Delay, s/veh	75.9				92.4		48.1				30.6	
Approach LOS	E				F		D				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.0	75.0	17.2	33.8	13.2	85.8	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	17.0	68.0	12.0	27.0	7.0	78.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	18.3	25.0	11.1	25.3	6.3	68.7	11.7	13.0				
Green Ext Time (p_c), s	0.0	5.9	0.1	0.2	0.0	7.0	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay	51.8											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis 2027 Total ALT 3 AM Access - Ult State St 3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	183	16	124	194	9	211	167	1477	110	83	670	78
Future Volume (vph)	183	16	124	194	9	211	167	1477	110	83	670	78
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.82		1.00	*0.82	1.00
Frt	1.00	0.87		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1693	1546		1710	1782	1530	1693	4339		1693	4384	1515
Flt Permitted	0.75	1.00		0.50	1.00	1.00	0.26	1.00		0.06	1.00	1.00
Satd. Flow (perm)	1339	1546		897	1782	1530	465	4339		110	4384	1515
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	18	138	216	10	234	186	1641	122	92	744	87
RTOR Reduction (vph)	0	111	0	0	0	185	0	5	0	0	0	49
Lane Group Flow (vph)	203	45	0	216	10	49	186	1758	0	92	744	38
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6			2		2
Actuated Green, G (s)	43.8	29.3		48.2	31.5	31.5	82.0	68.8		74.0	64.8	64.8
Effective Green, g (s)	43.8	29.3		48.2	31.5	31.5	82.0	68.8		74.0	64.8	64.8
Actuated g/C Ratio	0.29	0.20		0.32	0.21	0.21	0.55	0.46		0.49	0.43	0.43
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	425	301		378	374	321	362	1990		151	1893	654
v/s Ratio Prot	0.05	0.03		c0.06	0.01		c0.05	c0.41		0.04	0.17	
v/s Ratio Perm	0.09			c0.12		0.03	0.24			0.26		0.02
v/c Ratio	0.48	0.15		0.57	0.03	0.15	0.51	0.88		0.61	0.39	0.06
Uniform Delay, d1	42.7	50.0		39.8	47.1	48.4	18.3	37.0		28.9	29.1	24.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	1.0		2.1	0.0	0.2	1.2	6.1		6.8	0.6	0.2
Delay (s)	43.6	51.1		41.9	47.1	48.6	19.5	43.1		35.7	29.8	25.0
Level of Service	D	D		D	D	D	B	D		D	C	C
Approach Delay (s)		46.8			45.4			40.8			29.9	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			39.3	HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			150.0	Sum of lost time (s)					26.0			
Intersection Capacity Utilization			79.5%	ICU Level of Service					D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

2027 Total ALT 3 AM Access - Ult State St

3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	183	16	124	194	9	211	167	1477	110	83	670	78
Future Volume (veh/h)	183	16	124	194	9	211	167	1477	110	83	670	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	203	18	138	216	10	234	186	1641	122	92	744	87
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	439	34	263	370	369	315	395	2072	154	163	1961	676
Arrive On Green	0.10	0.19	0.19	0.11	0.21	0.21	0.07	0.48	0.48	0.04	0.45	0.45
Sat Flow, veh/h	1701	178	1363	1714	1786	1525	1701	4335	322	1701	4393	1514
Grp Volume(v), veh/h	203	0	156	216	10	234	186	1108	655	92	744	87
Grp Sat Flow(s),veh/h/ln	1701	0	1541	1714	1786	1525	1701	1464	1728	1701	1464	1514
Q Serve(g_s), s	14.4	0.0	13.6	15.0	0.7	21.6	8.8	47.7	47.8	4.4	16.9	5.1
Cycle Q Clear(g_c), s	14.4	0.0	13.6	15.0	0.7	21.6	8.8	47.7	47.8	4.4	16.9	5.1
Prop In Lane	1.00		0.88	1.00		1.00	1.00		0.19	1.00		1.00
Lane Grp Cap(c), veh/h	439	0	298	370	369	315	395	1400	826	163	1961	676
V/C Ratio(X)	0.46	0.00	0.52	0.58	0.03	0.74	0.47	0.79	0.79	0.56	0.38	0.13
Avail Cap(c_a), veh/h	439	0	298	370	369	315	451	1400	826	216	1961	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	0.0	54.3	42.0	47.5	55.8	20.7	32.9	32.9	30.0	27.7	24.4
Incr Delay (d2), s/veh	0.8	0.0	6.5	2.3	0.0	9.1	0.9	4.7	7.7	3.0	0.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.3	0.0	9.8	10.8	0.5	14.1	6.4	24.2	28.7	3.4	10.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.3	0.0	60.8	44.3	47.5	64.9	21.6	37.5	40.6	33.1	28.2	24.8
LnGrp LOS	D	A	E	D	D	E	C	D	D	C	C	C
Approach Vol, veh/h	359				460		1949				923	
Approach Delay, s/veh	50.9				54.8		37.0				28.4	
Approach LOS	D				D		D				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	74.0	21.0	37.0	13.3	78.7	23.0	35.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	62.0	15.0	31.0	11.0	67.0	17.0	29.0				
Max Q Clear Time (g_c+I1), s	10.8	18.9	16.4	23.6	6.4	49.8	17.0	15.6				
Green Ext Time (p_c), s	0.2	5.9	0.0	0.5	0.1	10.9	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay	38.4											
HCM 6th LOS	D											

Intersection						
Int Delay, s/veh	0.1					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	1751	8	0	1075	0	15
Future Vol, veh/h	1751	8	0	1075	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1903	9	0	1168	0	16
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	956
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	0	262
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	262
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0		19.7	
HCM LOS					C	
Minor Lane/Major Mvmt	NELn1	NWT	SET	SER		
Capacity (veh/h)	262	-	-	-		
HCM Lane V/C Ratio	0.062	-	-	-		
HCM Control Delay (s)	19.7	-	-	-		
HCM Lane LOS	C	-	-	-		
HCM 95th %tile Q(veh)	0.2	-	-	-		

HCM 6th TWSC
6: Plantation Dr (Site Acc) & State St

2027 Total ALT 3 AM Access - Ult State St

Intersection						
Int Delay, s/veh	0.1					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑↱			↑↑↑↑		↱
Traffic Vol, veh/h	1751	8	0	1075	0	15
Future Vol, veh/h	1751	8	0	1075	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1903	9	0	1168	0	16
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	956
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.9
Pot Cap-1 Maneuver	-	-	0	-	0	225
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	225
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0		22.2	
HCM LOS					C	
Minor Lane/Major Mvmt	NELn1	NWT	SET	SER		
Capacity (veh/h)	225	-	-	-		
HCM Lane V/C Ratio	0.072	-	-	-		
HCM Control Delay (s)	22.2	-	-	-		
HCM Lane LOS	C	-	-	-		
HCM 95th %tile O(veh)	0.2	-	-	-		

Intersection												
Int Delay, s/veh	0.7											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	3	1814	26	33	839	2	0	0	53	0	0	1
Future Vol, veh/h	3	1814	26	33	839	2	0	0	53	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	3	1951	28	35	902	2	0	0	57	0	0	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	904	0	0	1979	0	0	-	-	990	1954	2957	451
Stage 1	-	-	-	-	-	-	-	-	-	972	972	-
Stage 2	-	-	-	-	-	-	-	-	-	982	1985	-
Critical Hdwy	4.12	-	-	4.12	-	-	-	-	6.92	7.52	6.52	6.92
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.52	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.52	5.52	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	-	-	3.31	3.51	4.01	3.31
Pot Cap-1 Maneuver	754	-	-	292	-	-	0	0	247	39	15	558
Stage 1	-	-	-	-	-	-	0	0	-	273	331	-
Stage 2	-	-	-	-	-	-	0	0	-	269	106	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	754	-	-	292	-	-	-	-	247	27	13	558
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	107	56	-
Stage 1	-	-	-	-	-	-	-	-	-	272	291	-
Stage 2	-	-	-	-	-	-	-	-	-	206	106	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0			0.7			23.9			11.5		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	247	292	-	-	754	-	-	558				
HCM Lane V/C Ratio	0.231	0.122	-	-	0.004	-	-	0.002				
HCM Control Delay (s)	23.9	19	-	-	9.8	-	-	11.5				
HCM Lane LOS	C	C	-	-	A	-	-	B				
HCM 95th %tile O(veh)	0.9	0.4	-	-	0	-	-	0				

HCM 6th TWSC
7: State St & Zamzows Drwy/Site Acc A

2027 Total ALT 3 AM Access - Ult State St

Intersection													
Int Delay, s/veh	1												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations	↱ ↻ ↻ ↻			↱ ↻ ↻ ↻		↱			↱			↱	
Traffic Vol, veh/h	3	1814	26	33	839	2	0	0	53	0	0	1	
Future Vol, veh/h	3	1814	26	33	839	2	0	0	53	0	0	1	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	100	-	-	100	-	150	-	-	0	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93	
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	2	2	2	
Mvmt Flow	3	1951	28	35	902	2	0	0	57	0	0	1	
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	904	0	0	1979	0	0	-	-	990	-	-	451	
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	
Critical Hdwy	5.32	-	-	5.32	-	-	-	-	7.12	-	-	7.14	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-	
Follow-up Hdwy	3.11	-	-	3.11	-	-	-	-	3.91	-	-	3.92	
Pot Cap-1 Maneuver	438	-	-	130	-	-	0	0	212	0	0	475	
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-	
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	438	-	-	130	-	-	-	-	212	-	-	475	
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-	
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-	
Approach	SE			NW			NE			SW			
HCM Control Delay, s	0			1.6			28.1			12.6			
HCM LOS							D			B			
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1						
Capacity (veh/h)	212	130	-	-	438	-	-	475					
HCM Lane V/C Ratio	0.269	0.273	-	-	0.007	-	-	0.002					
HCM Control Delay (s)	28.1	42.8	-	-	13.3	-	-	12.6					
HCM Lane LOS	D	E	-	-	B	-	-	B					
HCM 95th %tile O(veh)	1	1	-	-	0	-	-	0					

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	163	33	35	8	2	288
Future Vol, veh/h	163	33	35	8	2	288
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	181	37	39	9	2	320
Number of Lanes	1	1	0	1	1	0

Approach	SB	SE	NW
Opposing Approach		NW	SE
Opposing Lanes	0	1	1
Conflicting Approach Left	NW	SB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	SE		SB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.3	8.4	9.2
HCM LOS	B	A	A

Lane	NWLn1	SELn1	SBLn1	SBLn2
Vol Left, %	0%	81%	100%	0%
Vol Thru, %	1%	19%	0%	0%
Vol Right, %	99%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	290	43	163	33
LT Vol	0	35	163	0
Through Vol	2	8	0	0
RT Vol	288	0	0	33
Lane Flow Rate	322	48	181	37
Geometry Grp	2	2	7	7
Degree of Util (X)	0.358	0.067	0.291	0.047
Departure Headway (Hd)	3.995	5.022	5.783	4.576
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	902	711	619	778
Service Time	2.015	3.064	3.538	2.33
HCM Lane V/C Ratio	0.357	0.068	0.292	0.048
HCM Control Delay	9.2	8.4	10.9	7.6
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	1.6	0.2	1.2	0.1

HCM Signalized Intersection Capacity Analysis 2027 Total PM Access Scen 3 - EX Lane Config

3: N-S Street & State St

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	74	119	13	208	219	1204	125	124	1681	143
Future Volume (vph)	110	8	74	119	13	208	219	1204	125	124	1681	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	6.0		5.0	5.0		7.0	6.0		6.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1540		1710	1545		1693	3336		1693	3346	
Flt Permitted	0.57	1.00		0.59	1.00		0.95	1.00		0.07	1.00	
Satd. Flow (perm)	1024	1540		1069	1545		1693	3336		130	3346	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Adj. Flow (vph)	112	8	76	121	13	212	223	1229	136	127	1715	146
RTOR Reduction (vph)	0	62	0	0	155	0	0	5	0	0	4	0
Lane Group Flow (vph)	112	22	0	121	70	0	223	1360	0	127	1857	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4						2		
Actuated Green, G (s)	37.9	29.0		54.0	40.1		14.0	76.9		85.1	73.0	
Effective Green, g (s)	37.9	29.0		54.0	40.1		14.0	76.9		85.1	73.0	
Actuated g/C Ratio	0.24	0.18		0.34	0.25		0.09	0.48		0.53	0.46	
Clearance Time (s)	5.0	6.0		5.0	5.0		7.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	279	279		436	387		148	1603		187	1526	
v/s Ratio Prot	c0.02	0.01		c0.03	0.05		c0.13	c0.41		0.05	c0.56	
v/s Ratio Perm	c0.07			0.06						0.31		
v/c Ratio	0.40	0.08		0.28	0.18		1.51	0.85		0.68	1.22	
Uniform Delay, d1	49.9	54.4		37.9	47.1		73.0	36.4		29.4	43.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.5		1.6	1.0		259.8	5.8		9.4	103.9	
Delay (s)	50.9	54.9		39.5	48.1		332.8	42.2		38.8	147.4	
Level of Service	D	D		D	D		F	D		D	F	
Approach Delay (s)		52.6			45.1			83.0			140.4	
Approach LOS		D			D			F			F	
Intersection Summary												
HCM 2000 Control Delay		106.1			HCM 2000 Level of Service			F				
HCM 2000 Volume to Capacity ratio		0.95										
Actuated Cycle Length (s)		160.0			Sum of lost time (s)			25.0				
Intersection Capacity Utilization		107.4%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 3: N-S Street & State St

2027 Total PM Access Scen 3 - EX Lane Config

01/16/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	74	119	13	208	219	1204	125	124	1681	143
Future Volume (veh/h)	110	8	74	119	13	208	219	1204	125	124	1681	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	76	121	13	181	223	1229	136	127	1715	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	310	27	261	436	26	357	149	2212	244	317	2099	177
Arrive On Green	0.06	0.19	0.19	0.12	0.25	0.25	0.09	0.72	0.72	0.04	0.66	0.66
Sat Flow, veh/h	1701	146	1390	1714	102	1427	1701	3081	340	1701	3168	266
Grp Volume(v), veh/h	112	0	84	121	0	194	223	675	690	127	909	952
Grp Sat Flow(s),veh/h/ln	1701	0	1536	1714	0	1529	1701	1697	1725	1701	1697	1738
Q Serve(g_s), s	8.5	0.0	7.5	8.3	0.0	17.4	14.0	29.8	30.1	3.9	62.3	65.4
Cycle Q Clear(g_c), s	8.5	0.0	7.5	8.3	0.0	17.4	14.0	29.8	30.1	3.9	62.3	65.4
Prop In Lane	1.00		0.90	1.00		0.93	1.00		0.20	1.00		0.15
Lane Grp Cap(c), veh/h	310	0	288	436	0	382	149	1218	1238	317	1124	1151
V/C Ratio(X)	0.36	0.00	0.29	0.28	0.00	0.51	1.50	0.55	0.56	0.40	0.81	0.83
Avail Cap(c_a), veh/h	310	0	288	436	0	382	149	1218	1238	411	1124	1151
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	0.0	55.9	40.3	0.0	51.5	73.0	10.6	10.6	10.3	19.6	20.2
Incr Delay (d2), s/veh	0.7	0.0	2.6	1.6	0.0	4.7	256.1	1.8	1.8	0.8	6.3	6.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	5.7	6.7	0.0	11.6	26.5	16.4	16.7	2.6	33.0	35.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.9	0.0	58.4	41.8	0.0	56.3	329.1	12.4	12.4	11.1	25.9	27.0
LnGrp LOS	D	A	E	D	A	E	F	B	B	B	C	C
Approach Vol, veh/h	196		315				1588				1988	
Approach Delay, s/veh	53.5		50.7				56.9				25.5	
Approach LOS	D		D				E				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.0	114.0	14.0	46.0	12.1	122.9	24.0	36.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	* 6	6.0	* 7	5.0	6.0				
Max Green Setting (Gmax), s	14.0	73.0	9.0	* 40	15.0	* 74	19.0	29.0				
Max Q Clear Time (g_c+I1), s	16.0	67.4	10.5	19.4	5.9	32.1	10.3	9.5				
Green Ext Time (p_c), s	0.0	4.7	0.0	1.1	0.2	12.1	0.2	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			41.0									
HCM 6th LOS			D									
Notes												

HCM Signalized Intersection Capacity Analysis - 2027 Total PM Access Scen 3 - Ex Ln Conf - Shoulder 3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	74	110	13	192	206	1133	125	124	1398	119
Future Volume (vph)	110	8	74	110	13	192	206	1133	125	124	1398	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		7.0	6.0		6.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.86		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1540		1710	1546		1693	3333		1693	3346	
Flt Permitted	0.34	1.00		0.66	1.00		0.95	1.00		0.16	1.00	
Satd. Flow (perm)	601	1540		1194	1546		1693	3333		286	3346	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Adj. Flow (vph)	112	8	76	112	13	196	210	1156	136	127	1427	121
RTOR Reduction (vph)	0	63	0	0	158	0	0	5	0	0	4	0
Lane Group Flow (vph)	112	21	0	112	51	0	210	1287	0	127	1544	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4						2		
Actuated Green, G (s)	32.0	27.0		32.0	27.0		20.0	96.6		93.4	84.0	
Effective Green, g (s)	32.0	27.0		32.0	27.0		20.0	96.6		93.4	84.0	
Actuated g/C Ratio	0.20	0.17		0.20	0.17		0.12	0.60		0.58	0.52	
Clearance Time (s)	5.0	5.0		5.0	5.0		7.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	154	259		254	260		211	2012		249	1756	
v/s Ratio Prot	c0.02	0.01		0.01	0.03		c0.12	0.39		0.03	c0.46	
v/s Ratio Perm	c0.12			0.07						0.27		
v/c Ratio	0.73	0.08		0.44	0.20		1.00	0.64		0.51	0.88	
Uniform Delay, d1	60.8	56.0		55.7	57.2		70.0	20.5		17.0	33.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.7	0.6		5.5	1.7		60.3	1.6		1.8	6.7	
Delay (s)	76.5	56.6		61.1	58.9		130.2	22.0		18.8	40.2	
Level of Service	E	E		E	E		F	C		B	D	
Approach Delay (s)		68.0			59.6			37.2			38.6	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			41.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				24.0		
Intersection Capacity Utilization			96.5%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total PM Access Scen 3 - Ex Ln Conf - Shoulder
3: N-S Street & State St 01/18/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	74	110	13	192	206	1133	125	124	1398	119
Future Volume (veh/h)	110	8	74	110	13	192	206	1133	125	124	1398	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	76	112	13	165	210	1156	136	127	1427	121
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	170	25	234	260	19	239	213	1861	218	285	1663	140
Arrive On Green	0.03	0.17	0.17	0.03	0.17	0.17	0.13	0.61	0.61	0.05	0.52	0.52
Sat Flow, veh/h	1701	146	1390	1714	112	1419	1701	3059	359	1701	3167	267
Grp Volume(v), veh/h	112	0	84	112	0	178	210	640	652	127	761	787
Grp Sat Flow(s),veh/h/ln	1701	0	1536	1714	0	1531	1701	1697	1721	1701	1697	1738
Q Serve(g_s), s	5.0	0.0	7.7	5.0	0.0	17.5	19.7	38.0	38.2	5.5	61.8	62.9
Cycle Q Clear(g_c), s	5.0	0.0	7.7	5.0	0.0	17.5	19.7	38.0	38.2	5.5	61.8	62.9
Prop In Lane	1.00		0.90	1.00		0.93	1.00		0.21	1.00		0.15
Lane Grp Cap(c), veh/h	170	0	259	260	0	258	213	1032	1047	285	891	912
V/C Ratio(X)	0.66	0.00	0.32	0.43	0.00	0.69	0.99	0.62	0.62	0.44	0.85	0.86
Avail Cap(c_a), veh/h	170	0	259	260	0	258	213	1032	1047	364	891	912
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.1	0.0	58.5	58.2	0.0	62.6	69.9	19.7	19.7	18.5	32.7	33.0
Incr Delay (d2), s/veh	8.9	0.0	3.3	5.2	0.0	14.0	58.0	2.8	2.8	1.1	10.3	10.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	0.0	5.9	3.9	0.0	12.4	17.6	21.7	22.0	4.0	35.6	36.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.9	0.0	61.8	63.3	0.0	76.6	127.9	22.5	22.5	19.6	43.0	43.6
LnGrp LOS	E	A	E	E	A	E	F	C	C	B	D	D
Approach Vol, veh/h	196		290				1502				1675	
Approach Delay, s/veh	67.6		71.5				37.3				41.5	
Approach LOS	E		E				D				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	27.0	91.0	10.0	32.0	13.6	104.4	10.0	32.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	6.0	* 7	5.0	5.0				
Max Green Setting (Gmax), s	20.0	84.0	5.0	27.0	15.0	* 91	5.0	27.0				
Max Q Clear Time (g_c+I1), s	21.7	64.9	7.0	19.5	7.5	40.2	7.0	9.7				
Green Ext Time (p_c), s	0.0	10.5	0.0	0.5	0.2	11.3	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay			43.5									
HCM 6th LOS			D									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis 2027 Total PM Acc Scen 3 - EX Config Mitigated-Split Adj
3: State St & Pierce Park Ln 01/22/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	74	119	13	208	219	1204	125	124	1681	143
Future Volume (vph)	110	8	74	119	13	208	219	1204	125	124	1681	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	6.0		5.0	6.0		7.0	6.0	6.0	6.0	7.0	7.0
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.86		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3285	1540		3317	1545		1693	3386	1515	1693	3386	1515
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	3285	1540		3317	1545		1693	3386	1515	328	3386	1515
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	8	76	121	13	212	223	1229	128	127	1715	146
RTOR Reduction (vph)	0	63	0	0	149	0	0	0	49	0	0	72
Lane Group Flow (vph)	112	21	0	121	76	0	223	1229	79	127	1715	74
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases									6	2		2
Actuated Green, G (s)	6.0	28.0		6.0	28.0		22.0	95.1	95.1	86.9	79.0	79.0
Effective Green, g (s)	6.0	28.0		6.0	28.0		22.0	95.1	95.1	86.9	79.0	79.0
Actuated g/C Ratio	0.04	0.18		0.04	0.18		0.14	0.59	0.59	0.54	0.49	0.49
Clearance Time (s)	5.0	6.0		5.0	6.0		7.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	123	269		124	270		232	2012	900	245	1671	748
v/s Ratio Prot	0.03	0.01		c0.04	c0.05		c0.13	0.36		0.03	c0.51	
v/s Ratio Perm									0.05	0.26		0.05
v/c Ratio	0.91	0.08		0.98	0.28		0.96	0.61	0.09	0.52	1.03	0.10
Uniform Delay, d1	76.7	55.2		76.9	57.3		68.6	20.7	13.9	19.1	40.5	21.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	54.3	0.6		74.6	2.6		48.0	1.4	0.2	1.9	29.0	0.3
Delay (s)	131.0	55.8		151.5	59.8		116.6	22.1	14.1	21.0	69.5	21.8
Level of Service	F	E		F	E		F	C	B	C	E	C
Approach Delay (s)		98.8			91.9			34.8			62.9	
Approach LOS		F			F			C			E	
Intersection Summary												
HCM 2000 Control Delay			56.2			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			25.0			
Intersection Capacity Utilization			101.2%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total PM Acc Scen 3 - EX Config Mitigated-Split Adj
3: State St & Pierce Park Ln 01/22/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	 			 				 			 	
Traffic Volume (veh/h)	110	8	74	119	13	208	219	1204	125	124	1681	143
Future Volume (veh/h)	110	8	74	119	13	208	219	1204	125	124	1681	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	76	121	13	181	223	1229	128	127	1715	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	124	26	243	125	18	250	234	2249	1003	335	1911	852
Arrive On Green	0.04	0.17	0.17	0.04	0.17	0.17	0.14	0.66	0.66	0.04	0.56	0.56
Sat Flow, veh/h	3300	146	1390	3326	102	1427	1701	3393	1514	1701	3393	1514
Grp Volume(v), veh/h	112	0	84	121	0	194	223	1229	128	127	1715	146
Grp Sat Flow(s),veh/h/ln	1650	0	1536	1663	0	1529	1701	1697	1514	1701	1697	1514
Q Serve(g_s), s	5.4	0.0	7.6	5.8	0.0	19.2	20.8	30.6	5.0	5.1	71.4	7.5
Cycle Q Clear(g_c), s	5.4	0.0	7.6	5.8	0.0	19.2	20.8	30.6	5.0	5.1	71.4	7.5
Prop In Lane	1.00		0.90	1.00		0.93	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	124	0	269	125	0	268	234	2249	1003	335	1911	852
V/C Ratio(X)	0.91	0.00	0.31	0.97	0.00	0.72	0.95	0.55	0.13	0.38	0.90	0.17
Avail Cap(c_a), veh/h	124	0	269	125	0	268	234	2249	1003	345	1911	852
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	76.7	0.0	57.6	76.9	0.0	62.4	68.5	14.3	9.9	14.3	30.9	16.9
Incr Delay (d2), s/veh	52.8	0.0	3.0	73.0	0.0	15.7	45.8	1.0	0.3	0.7	7.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.8	0.0	5.8	6.8	0.0	13.4	17.6	17.1	3.2	3.6	38.7	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	129.5	0.0	60.6	149.9	0.0	78.1	114.3	15.2	10.2	15.0	38.0	17.3
LnGrp LOS	F	A	E	F	A	E	F	B	B	B	D	B
Approach Vol, veh/h	196		315				1580				1988	
Approach Delay, s/veh	100.0		105.7				28.8				35.0	
Approach LOS	F		F				C				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.0	97.2	11.0	34.0	13.1	113.1	11.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	6.0	6.0	* 7	5.0	6.0				
Max Green Setting (Gmax), s	22.0	79.0	6.0	28.0	8.0	* 95	6.0	28.0				
Max Q Clear Time (g_c+I1), s	22.8	73.4	7.4	21.2	7.1	32.6	7.8	9.6				
Green Ext Time (p_c), s	0.0	4.6	0.0	0.6	0.0	12.7	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay			41.2									
HCM 6th LOS			D									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis 2027 Total ALT 3 PM Access - Ult State St 3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	110	8	74	119	13	208	219	1204	125	124	1681	143
Future Volume (vph)	110	8	74	119	13	208	219	1204	125	124	1681	143
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*0.82		1.00	*0.82	1.00
Frt	1.00	0.86		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1693	1540		1710	1782	1530	1693	4322		1693	4384	1515
Flt Permitted	0.75	1.00		0.67	1.00	1.00	0.95	1.00		0.14	1.00	1.00
Satd. Flow (perm)	1335	1540		1205	1782	1530	1693	4322		248	4384	1515
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	8	76	121	13	212	223	1229	128	127	1715	146
RTOR Reduction (vph)	0	62	0	0	0	172	0	7	0	0	0	79
Lane Group Flow (vph)	112	22	0	121	13	40	223	1350	0	127	1715	67
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4				2		2
Actuated Green, G (s)	35.0	29.0		37.0	30.0	30.0	24.5	88.2		83.3	73.5	73.5
Effective Green, g (s)	35.0	29.0		37.0	30.0	30.0	24.5	88.2		83.3	73.5	73.5
Actuated g/C Ratio	0.22	0.18		0.23	0.19	0.19	0.15	0.55		0.52	0.46	0.46
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	305	279		300	334	286	259	2382		217	2013	695
v/s Ratio Prot	0.01	0.01		c0.02	0.01		c0.13	0.31		0.04	c0.39	
v/s Ratio Perm	0.07			c0.08		0.03				0.27		0.04
v/c Ratio	0.37	0.08		0.40	0.04	0.14	0.86	0.57		0.59	0.85	0.10
Uniform Delay, d1	52.4	54.4		51.3	53.2	54.2	66.1	23.4		20.4	38.4	24.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.5		0.9	0.0	0.2	24.1	1.0		4.0	4.8	0.3
Delay (s)	53.1	54.9		52.2	53.2	54.4	90.2	24.4		24.4	43.2	24.7
Level of Service	D	D		D	D	D	F	C		C	D	C
Approach Delay (s)		53.9			53.6			33.7			40.7	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			39.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			26.0		
Intersection Capacity Utilization			77.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

2027 Total ALT 3 PM Access - Ult State St

3: Driveway - Single NBLT/Pierce Park Ln & State St

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	110	8	74	119	13	208	219	1204	125	124	1681	143
Future Volume (veh/h)	110	8	74	119	13	208	219	1204	125	124	1681	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	112	8	76	121	13	212	223	1229	128	127	1715	146
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	320	27	252	299	335	286	244	2355	245	286	2062	710
Arrive On Green	0.04	0.18	0.18	0.04	0.19	0.19	0.14	0.56	0.56	0.05	0.47	0.47
Sat Flow, veh/h	1701	146	1390	1714	1786	1525	1701	4199	437	1701	4393	1514
Grp Volume(v), veh/h	112	0	84	121	13	212	223	857	500	127	1715	146
Grp Sat Flow(s),veh/h/ln	1701	0	1536	1714	1786	1525	1701	1464	1707	1701	1464	1514
Q Serve(g_s), s	6.0	0.0	7.6	7.0	1.0	21.0	20.7	29.1	29.1	6.2	54.4	9.1
Cycle Q Clear(g_c), s	6.0	0.0	7.6	7.0	1.0	21.0	20.7	29.1	29.1	6.2	54.4	9.1
Prop In Lane	1.00		0.90	1.00		1.00	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	320	0	278	299	335	286	244	1643	958	286	2062	710
V/C Ratio(X)	0.35	0.00	0.30	0.41	0.04	0.74	0.92	0.52	0.52	0.44	0.83	0.21
Avail Cap(c_a), veh/h	320	0	278	299	335	286	287	1643	958	326	2062	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	0.0	56.7	53.6	53.2	61.3	67.6	21.8	21.8	20.8	37.0	24.9
Incr Delay (d2), s/veh	0.7	0.0	2.8	0.9	0.0	9.9	29.3	1.2	2.0	1.1	4.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.0	0.0	5.7	2.0	0.8	13.9	16.3	15.3	17.6	4.6	27.1	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.1	0.0	59.5	54.5	53.2	71.2	96.9	23.0	23.8	21.9	41.1	25.6
LnGrp LOS	D	A	E	D	D	E	F	C	C	C	D	C
Approach Vol, veh/h	196				346		1580				1988	
Approach Delay, s/veh	55.8				64.7		33.7				38.7	
Approach LOS	E				E		C				D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	29.9	82.1	12.0	36.0	15.3	96.7	13.0	35.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	27.0	71.0	6.0	30.0	12.0	86.0	7.0	29.0				
Max Q Clear Time (g_c+l1), s	22.7	56.4	8.0	23.0	8.2	31.1	9.0	9.6				
Green Ext Time (p_c), s	0.2	10.1	0.0	0.4	0.1	12.2	0.0	0.4				
Intersection Summary												
HCM 6th Ctrl Delay	39.8											
HCM 6th LOS	D											

Intersection						
Int Delay, s/veh	0					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	1545	11	0	2016	0	7
Future Vol, veh/h	1545	11	0	2016	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1577	11	0	2057	0	7
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	794
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	0	335
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	335
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0		16	
HCM LOS					C	
Minor Lane/Major Mvmt	NELn1	NWT	SET	SER		
Capacity (veh/h)	335	-	-	-		
HCM Lane V/C Ratio	0.021	-	-	-		
HCM Control Delay (s)	16	-	-	-		
HCM Lane LOS	C	-	-	-		
HCM 95th %tile Q(veh)	0.1	-	-	-		

HCM 6th TWSC
6: Plantation Dr (Site Acc) & State St

2027 Total ALT 3 PM Access - Ult State St

Intersection						
Int Delay, s/veh	0					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑↱			↑↑↑↑		↱
Traffic Vol, veh/h	1545	11	0	2016	0	7
Future Vol, veh/h	1545	11	0	2016	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1577	11	0	2057	0	7
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	794
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.9
Pot Cap-1 Maneuver	-	-	0	-	0	287
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	287
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0		17.9	
HCM LOS					C	
Minor Lane/Major Mvmt	NELn1	NWT	SET	SER		
Capacity (veh/h)	287	-	-	-		
HCM Lane V/C Ratio	0.025	-	-	-		
HCM Control Delay (s)	17.9	-	-	-		
HCM Lane LOS	C	-	-	-		
HCM 95th %tile O(veh)	0.1	-	-	-		

Intersection												
Int Delay, s/veh	1.1											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	20	1334	36	47	1893	21	0	0	25	13	0	20
Future Vol, veh/h	20	1334	36	47	1893	21	0	0	25	13	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	100	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	20	1361	37	48	1932	21	0	0	26	13	0	20
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1953	0	0	1398	0	0	-	-	699	2749	3466	966
Stage 1	-	-	-	-	-	-	-	-	-	2028	2028	-
Stage 2	-	-	-	-	-	-	-	-	-	721	1438	-
Critical Hdwy	4.12	-	-	4.12	-	-	-	-	6.92	7.52	6.52	6.92
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.52	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.52	5.52	-
Follow-up Hdwy	2.21	-	-	2.21	-	-	-	-	3.31	3.51	4.01	3.31
Pot Cap-1 Maneuver	299	-	-	490	-	-	0	0	385	~ 9	7	256
Stage 1	-	-	-	-	-	-	0	0	-	60	101	-
Stage 2	-	-	-	-	-	-	0	0	-	387	199	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	299	-	-	490	-	-	-	-	385	~ 7	6	256
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	44	53	-
Stage 1	-	-	-	-	-	-	-	-	-	56	91	-
Stage 2	-	-	-	-	-	-	-	-	-	337	186	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.3			0.3			15			69.3		
HCM LOS							C			F		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	385	490	-	-	299	-	-	88				
HCM Lane V/C Ratio	0.066	0.098	-	-	0.068	-	-	0.383				
HCM Control Delay (s)	15	13.1	-	-	17.9	-	-	69.3				
HCM Lane LOS	C	B	-	-	C	-	-	F				
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0.2	-	-	1.5				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			

Intersection												
Int Delay, s/veh	0.8											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↰ ↱ ↱ ↱ ↱			↰ ↱ ↱ ↱ ↱		↰			↰			↰
Traffic Vol, veh/h	20	1334	36	47	1893	21	0	0	25	0	0	20
Future Vol, veh/h	20	1334	36	47	1893	21	0	0	25	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	150	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	2	2	2
Mvmt Flow	20	1361	37	48	1932	21	0	0	26	0	0	20
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1953	0	0	1398	0	0	-	-	699	-	-	966
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	5.32	-	-	5.32	-	-	-	-	7.12	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.11	-	-	3.11	-	-	-	-	3.91	-	-	3.92
Pot Cap-1 Maneuver	134	-	-	253	-	-	0	0	330	0	0	219
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	134	-	-	253	-	-	-	-	330	-	-	219
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.5			0.5			16.8			23.1		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	330	253	-	-	134	-	- 219					
HCM Lane V/C Ratio	0.077	0.19	-	-	0.152	-	- 0.093					
HCM Control Delay (s)	16.8	22.5	-	-	36.6	-	- 23.1					
HCM Lane LOS	C	C	-	-	E	-	- C					
HCM 95th %tile O(veh)	0.2	0.7	-	-	0.5	-	- 0.3					

Intersection

Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	187	64	36	2	7	156
Future Vol, veh/h	187	64	36	2	7	156
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	208	71	40	2	8	173
Number of Lanes	1	1	0	1	1	0

Approach	SB	SE	NW
Opposing Approach		NW	SE
Opposing Lanes	0	1	1
Conflicting Approach Left	NW	SB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	SE		SB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9.9	8.4	8.2
HCM LOS	A	A	A

Lane	NWLn1	SELn1	SBLn1	SBLn2
Vol Left, %	0%	95%	100%	0%
Vol Thru, %	4%	5%	0%	0%
Vol Right, %	96%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	163	38	187	64
LT Vol	0	36	187	0
Through Vol	7	2	0	0
RT Vol	156	0	0	64
Lane Flow Rate	181	42	208	71
Geometry Grp	2	2	7	7
Degree of Util (X)	0.207	0.059	0.319	0.085
Departure Headway (Hd)	4.113	5.02	5.533	4.328
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	875	714	655	833
Service Time	2.132	3.05	3.233	2.028
HCM Lane V/C Ratio	0.207	0.059	0.318	0.085
HCM Control Delay	8.2	8.4	10.8	7.4
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0.8	0.2	1.4	0.3



Appendix K

Year 2027 Mitigation Threshold Analysis

Worksheets

2027 Volume Trip Thresholds

Total Units = 750

The 15% is lower than the 37% estimate because of the addition of the south leg that also takes some phase time.

HCM Signalized Intersection Capacity Analysis 2027 Total AM - EX Config Thres Anal-2024 15% 3: N-S Street & State St 01/21/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	32	2	25	185	1	201	139	1408	26	25	654	74
Future Volume (vph)	32	2	25	185	1	201	139	1408	26	25	654	74
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.85		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1533		1710	1531		1693	3377		1693	3335	
Flt Permitted	0.49	1.00		0.64	1.00		0.24	1.00		0.06	1.00	
Satd. Flow (perm)	866	1533		1157	1531		430	3377		98	3335	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	36	2	28	206	1	223	154	1564	29	28	727	82
RTOR Reduction (vph)	0	23	0	0	173	0	0	1	0	0	6	0
Lane Group Flow (vph)	36	7	0	206	51	0	154	1592	0	28	803	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)	35.9	29.2		44.5	33.5		90.8	79.6		76.6	72.4	
Effective Green, g (s)	35.9	29.2		44.5	33.5		90.8	79.6		76.6	72.4	
Actuated g/C Ratio	0.24	0.19		0.30	0.22		0.61	0.53		0.51	0.48	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	244	298		383	341		356	1792		94	1609	
v/s Ratio Prot	0.01	0.00		c0.04	0.03		c0.03	c0.47		0.01	0.24	
v/s Ratio Perm	0.03			c0.12			0.23			0.14		
v/c Ratio	0.15	0.03		0.54	0.15		0.43	0.89		0.30	0.50	
Uniform Delay, d1	44.5	48.9		43.2	46.8		15.4	31.3		26.5	26.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		1.5	0.9		0.8	7.0		1.8	1.1	
Delay (s)	44.8	49.0		44.7	47.7		16.3	38.3		28.3	27.6	
Level of Service	D	D		D	D		B	D		C	C	
Approach Delay (s)		46.7			46.3			36.3			27.6	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			35.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				26.0		
Intersection Capacity Utilization			84.3%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total AM - EX Config Thres Anal-2024 15%
3: N-S Street & State St 01/21/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	32	2	25	185	1	201	139	1408	26	25	654	74
Future Volume (veh/h)	32	2	25	185	1	201	139	1408	26	25	654	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	36	2	0	206	1	223	154	1564	29	28	727	82
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	209	333	0	441	2	356	388	1853	34	137	1565	176
Arrive On Green	0.02	0.19	0.00	0.07	0.24	0.24	0.06	0.54	0.54	0.02	0.51	0.51
Sat Flow, veh/h	1701	1786	0	1714	7	1508	1701	3408	63	1701	3074	347
Grp Volume(v), veh/h	36	2	0	206	0	224	154	778	815	28	401	408
Grp Sat Flow(s),veh/h/ln	1701	1786	0	1714	0	1515	1701	1697	1775	1701	1697	1724
Q Serve(g_s), s	2.6	0.1	0.0	11.0	0.0	19.9	6.5	57.9	58.2	1.2	22.8	22.8
Cycle Q Clear(g_c), s	2.6	0.1	0.0	11.0	0.0	19.9	6.5	57.9	58.2	1.2	22.8	22.8
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.04	1.00		0.20
Lane Grp Cap(c), veh/h	209	333	0	441	0	358	388	922	965	137	864	877
V/C Ratio(X)	0.17	0.01	0.00	0.47	0.00	0.63	0.40	0.84	0.85	0.20	0.46	0.46
Avail Cap(c_a), veh/h	305	333	0	441	0	358	472	922	965	189	864	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	49.7	0.0	45.6	0.0	51.3	17.7	28.8	28.9	26.9	23.7	23.7
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.8	0.0	8.0	0.7	9.3	9.0	0.7	1.8	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.0	0.1	0.0	2.6	0.0	13.2	4.6	33.1	34.4	0.9	14.5	14.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.7	49.7	0.0	46.4	0.0	59.4	18.3	38.1	37.9	27.7	25.5	25.5
LnGrp LOS	D	D	A	D	A	E	B	D	D	C	C	C
Approach Vol, veh/h	38			430			1747			837		
Approach Delay, s/veh	48.7			53.1			36.3			25.5		
Approach LOS	D			D			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.6	83.4	9.6	41.4	10.4	88.6	17.0	34.0				
Change Period (Y+Rc), s	7.0	7.0	6.0	6.0	7.0	7.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	69.0	12.0	27.0	8.0	77.0	11.0	28.0				
Max Q Clear Time (g_c+I1), s	8.5	24.8	4.6	21.9	3.2	60.2	13.0	2.1				
Green Ext Time (p_c), s	0.2	5.5	0.0	0.6	0.0	9.9	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			35.9									
HCM 6th LOS			D									

HCM Signalized Intersection Capacity Analysis 2027 Total PM - EX Config SC3 Thres Test 2024-15% Dev 3: N-S Street & State St 01/21/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	23	1	26	113	2	198	209	1129	39	44	1623	137
Future Volume (vph)	23	1	26	113	2	198	209	1129	39	44	1623	137
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0	5.0		5.0	5.0		7.0	6.0		6.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.85		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1693	1524		1710	1532		1693	3369		1693	3347	
Flt Permitted	0.42	1.00		0.69	1.00		0.95	1.00		0.14	1.00	
Satd. Flow (perm)	755	1524		1244	1532		1693	3369		257	3347	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	23	1	27	115	2	202	213	1152	40	45	1656	140
RTOR Reduction (vph)	0	22	0	0	163	0	0	1	0	0	4	0
Lane Group Flow (vph)	23	6	0	115	41	0	213	1191	0	45	1792	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4						2		
Actuated Green, G (s)	32.0	29.0		36.0	31.0		22.2	90.4		93.4	79.8	
Effective Green, g (s)	32.0	29.0		36.0	31.0		22.2	90.4		93.4	79.8	
Actuated g/C Ratio	0.20	0.18		0.22	0.19		0.14	0.57		0.58	0.50	
Clearance Time (s)	5.0	5.0		5.0	5.0		7.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	168	276		294	296		234	1903		272	1669	
v/s Ratio Prot	0.00	0.00		c0.01	0.03		c0.13	0.35		0.01	c0.54	
v/s Ratio Perm	0.02			c0.08						0.08		
v/c Ratio	0.14	0.02		0.39	0.14		0.91	0.63		0.17	1.07	
Uniform Delay, d1	52.2	53.8		52.5	53.4		67.9	23.4		33.5	40.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		3.9	1.0		35.5	1.6		0.3	44.8	
Delay (s)	52.6	54.0		56.4	54.4		103.4	25.0		33.8	84.9	
Level of Service	D	D		E	D		F	C		C	F	
Approach Delay (s)		53.3			55.1			36.9			83.6	
Approach LOS		D			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			62.5			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			24.0			
Intersection Capacity Utilization			100.2%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 2027 Total PM - EX Config SC3 Thres Test 2024-15% Dev
3: N-S Street & State St 01/21/2023

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	23	1	26	113	2	198	209	1129	39	44	1623	137
Future Volume (veh/h)	23	1	26	113	2	198	209	1129	39	44	1623	137
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			Yes		
Adj Sat Flow, veh/h/ln	1786	1786	1786	1800	1786	1800	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	23	1	22	115	2	161	213	1152	35	45	1656	120
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	0	1	0	1	1	1	1	1	1
Cap, veh/h	179	11	246	319	3	270	223	1870	57	352	1665	120
Arrive On Green	0.02	0.17	0.17	0.03	0.18	0.18	0.13	0.56	0.56	0.10	0.52	0.52
Sat Flow, veh/h	1701	66	1457	1714	19	1498	1701	3362	102	1701	3210	231
Grp Volume(v), veh/h	23	0	23	115	0	163	213	581	606	45	869	907
Grp Sat Flow(s),veh/h/ln	1701	0	1524	1714	0	1516	1701	1697	1768	1701	1697	1744
Q Serve(g_s), s	1.8	0.0	2.0	5.0	0.0	15.8	19.9	37.0	37.0	0.0	80.8	83.0
Cycle Q Clear(g_c), s	1.8	0.0	2.0	5.0	0.0	15.8	19.9	37.0	37.0	0.0	80.8	83.0
Prop In Lane	1.00		0.96	1.00		0.99	1.00		0.06	1.00		0.13
Lane Grp Cap(c), veh/h	179	0	257	319	0	273	223	944	983	352	880	905
V/C Ratio(X)	0.13	0.00	0.09	0.36	0.00	0.60	0.95	0.62	0.62	0.13	0.99	1.00
Avail Cap(c_a), veh/h	198	0	257	319	0	273	223	944	983	362	880	905
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.0	0.0	56.1	55.9	0.0	60.3	69.0	24.0	24.0	33.2	38.0	38.5
Incr Delay (d2), s/veh	0.3	0.0	0.7	3.2	0.0	9.3	47.3	3.0	2.9	0.2	27.3	30.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.4	0.0	1.5	3.6	0.0	11.1	17.1	21.7	22.4	2.2	49.0	52.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.3	0.0	56.8	59.0	0.0	69.6	116.3	27.0	26.9	33.3	65.3	69.1
LnGrp LOS	D	A	E	E	A	E	F	C	C	C	E	F
Approach Vol, veh/h	46		278				1400				1821	
Approach Delay, s/veh	55.6		65.2				40.5				66.4	
Approach LOS	E		E				D				E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	28.0	90.0	8.2	33.8	23.0	95.0	10.0	32.0				
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	7.0	* 6	5.0	5.0				
Max Green Setting (Gmax), s	21.0	83.0	5.0	27.0	17.0	* 89	5.0	27.0				
Max Q Clear Time (g_c+I1), s	21.9	85.0	3.8	17.8	2.0	39.0	7.0	4.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.5	0.1	9.6	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			55.9									
HCM 6th LOS			E									
Notes												



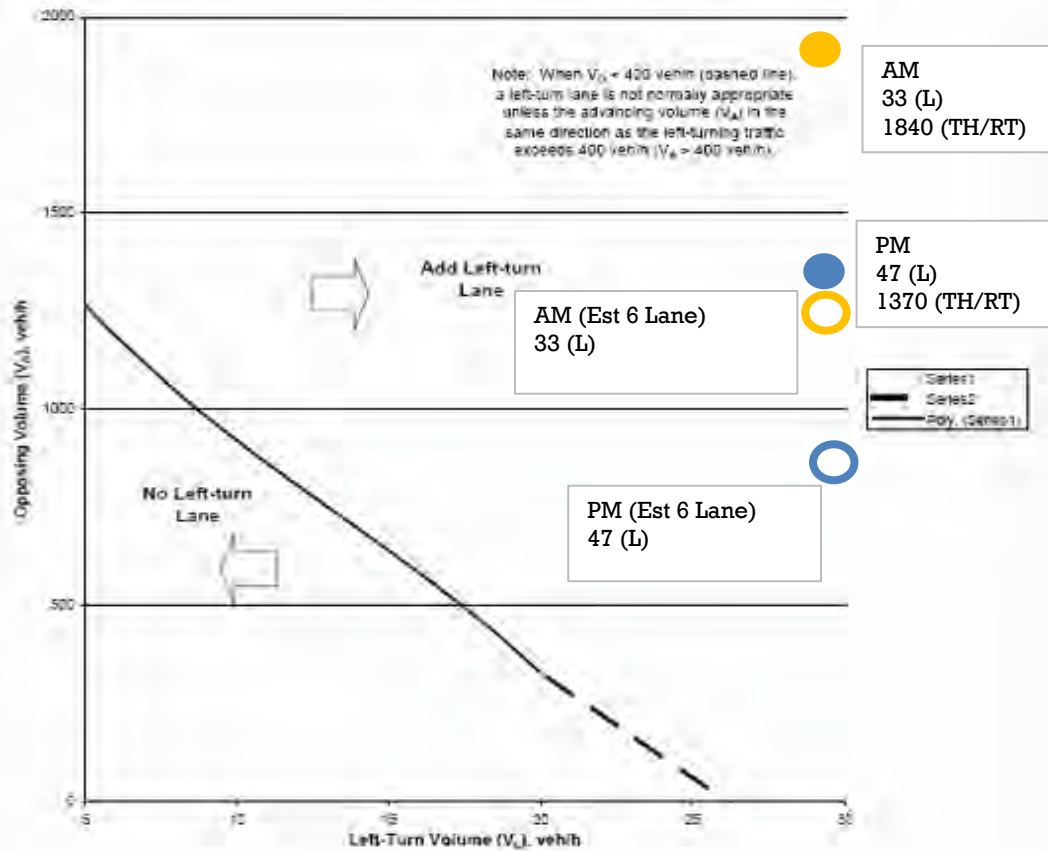
Appendix L

Year 2027 Turn Lane Warrant Evaluation

Turn Lane Warrants

Site Access A/State Street (Right-in/Right-out/Left-In WB LT Lane Warrant Analysis

Figure 4 – Left-Turn Lane Guidelines for Four-Lane Undivided Roadways



The following data are required:

1. Opposing Volume (veh/hr) - V_O - The opposing volume is to include only the right-turn through movements in the opposite direction of the left-turning vehicle.
2. Left-Turn Volume - V_L

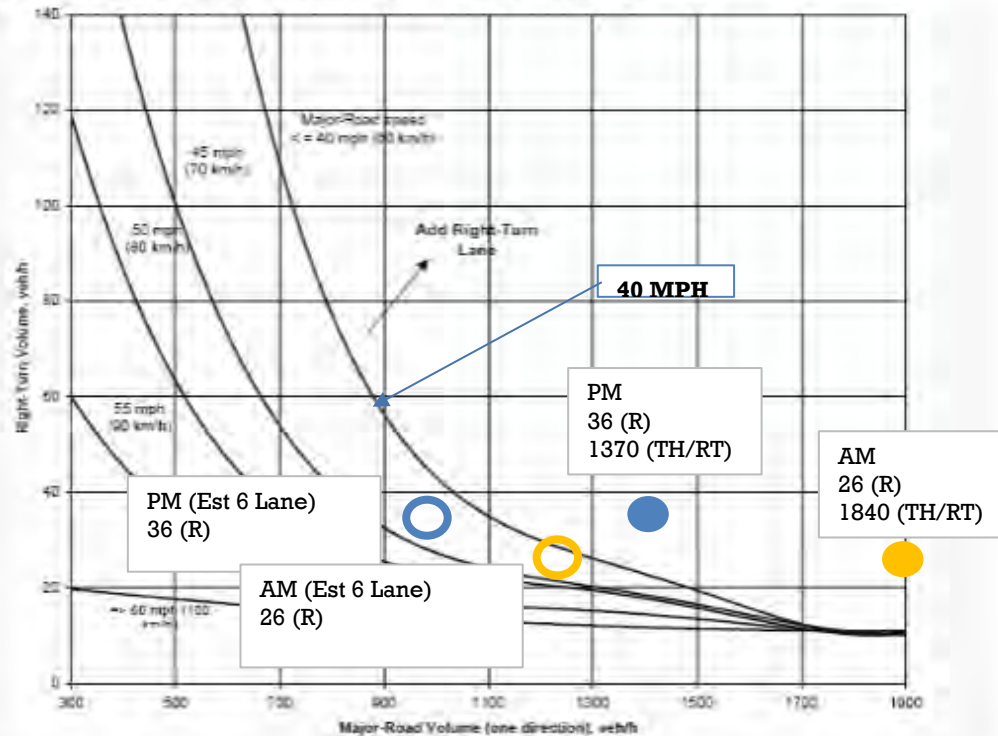
If the opposing and left-turn volume combination intersects above or to the right of the trer line, a left- turn lane is appropriate.

Source: NCHRP Report 279 and 457

Turn Lane Warrants

EB RT Lane Warrant Analysis - Warranted as 4 Lane/Not as Estimate 6-Lane

Figure 7 – Right-Turn Lane Guidelines for Four-Lane Roadways



The following data are required:

1. Advancing Volume (veh/hr) - The advancing volume is to include the right-turn, left-turn and through movements in the same direction as the right-turning vehicle.
2. Right-Turning Volume (veh/hr) - The right-turning volume is the number of advancing vehicles turning right.
3. Operating Speed (mph) - The greatest of anticipated operating speed, measured 85th percentile speed or posted speed.

Note: Right-turn lane not warranted for right-turn volume less than 10 vph. However, criteria other than volume, e.g., crash experience, may be used to justify a right-turn lane.

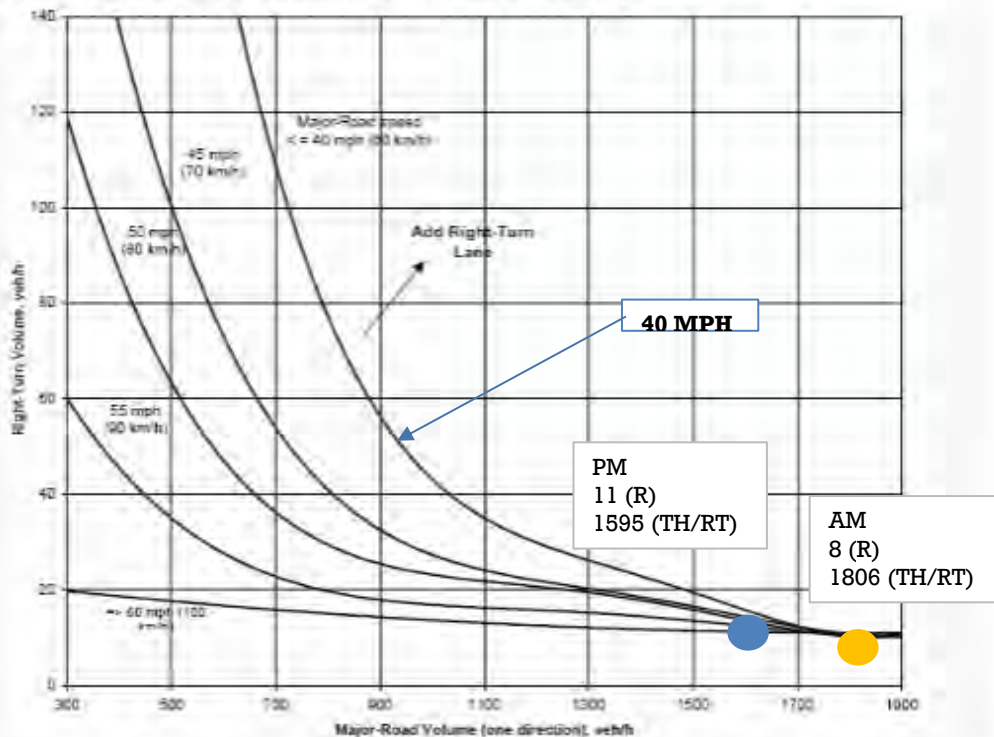
If the combination of major road approach volume and right-turn volume intersects above or to the right of the speed trend line corresponding to the major road operating speed, then a right-turn lane is appropriate.

Source: MCHDD Docket 270 and 457

Turn Lane Warrants

Plantation Drive Rin/Rout - Not Warranted

Figure 7 – Right-Turn Lane Guidelines for Four-Lane Roadways



The following data are required:

1. Advancing Volume (veh/hr) - The advancing volume is to include the right-turn, left-turn and through movements in the same direction as the right-turning vehicle.
2. Right-Turning Volume (veh/hr) - The right-turning volume is the number of advancing vehicles turning right.
3. Operating Speed (mph) - The greatest of anticipated operating speed, measured 85th percentile speed or posted speed.

Note: Right-turn lane not warranted for right-turn volume less than 10 vph. However, criteria other than volume, e.g., crash experience, may be used to justify a right-turn lane.

If the combination of major road approach volume and right-turn volume intersects above or to the right of the speed trend line corresponding to the major road operating speed, then a right-turn lane is appropriate.

Source: MCHDD Docket 270 and 457