Town of Hilton Head Island

William Hilton Parkway Gateway Corridor Independent Review Advisory Committee Meeting

Wednesday, August 14, 2024, 1:00 PM
1 Town Center Court, Hilton Head Island, SC
Benjamin M. Racusin Council Chambers

The meeting can be viewed on the Town's YouTube Channel, the Beaufort County Channel, and Spectrum Channel 1304.

1. **Call to Order**
2. **Approval of the Minutes**
   - **a.** Regular Meeting Minutes of June 12, 2024
3. **Unfinished Business**
   - **a.** Update on Project Progress
   - **b.** Review of Downstream Impacts to William Hilton Parkway, Cross Island Parkway, Palmetto Bay Road and Sea Pines Circle
   - **c.** Recommended Improvements to Consider for Intersections Downstream of Gum Tree Road and Cross Island Parkway
   - **d.** Presentation and Acceptance of Final Report
4. **New Business**
5. **Public Comment - Non Agenda Items**
6. **Adjournment**

FOIA Compliance: Public notification of this meeting has been published, posted, and distributed in compliance with the South Carolina Freedom of Information Act and the requirements of the Town of Hilton Head Island.

In accordance with the requirements of Title II of the Americans with Disabilities Act of 1990 ("ADA"), the Town of Hilton Head Island will not discriminate against qualified

individuals with disabilities on the basis of disability in its services, programs, or activities. Auditory accommodations are available. Any person requiring further accommodation should contact the Town of Hilton Head Island ADA Coordinator as soon as possible but no later than 48 hours before the scheduled event.

Municipal Association of South Carolina (MASC) Civility Pledge:
“I pledge to build a stronger and more prosperous community by advocating for civil engagement, respecting others and their viewpoints, and finding solutions for the betterment of my city or town.”

Town of Hilton Head Island
WILLIAM HILTON PARKWAY GATEWAY CORRIDOR INDEPENDENT REVIEW ADVISORY COMMITTEE MEETING
Wednesday, June 12, 2024, 1:00 PM
Minutes

1. Call to Order

Mayor Perry called the meeting to order at 1:00 PM.

2. Approval of the Minutes

a. Regular Meeting Minutes of April 22, 2024.

Mr. Advocaat raised questions pertaining to the April 22, 2024, Special Meeting Minutes regarding the Town's venture to Columbia to discuss Lochmueller findings with SCDOT. After some discussion and clarification, a motion was made by Mr. Advocaat to approve the minutes of April 22, 2024, with a second by Mr. Warner. The motion passed unanimously.

b. Regular Meeting Minutes of May 8, 2024.

Mr. Advocaat made a motion to approve the Regular Meeting Minutes of May 8, 2024. Mr. Warner seconded. The motion passed unanimously.

3. Unfinished Business

a. Update on Project Progress

Prior to the beginning of the update, Mr. Advocaat proposed that the Committee move 'Appearance by Citizens' from item five to item three on the agenda as he felt it necessary to hear public comment prior to presentations. Mayor Perry called for a vote in which Mr. Advocaat made the motion to move the item, with a second by Mr. Walczak. The motion tied with a 2-0-2 vote, and the motion did not carry. Shawn Colin, Assistant Town Manager - Engineering and Capital Projects, opened up the floor to Nathan Nohren, Senior Traffic Engineer for the Lochmueller consultant group, to give updates on the project progress. Mr. Nohren also introduced Kate Swinford, Michelle Romine, and Chad Costa who virtually attended the meeting to assist in presenting and addressing any questions from the committee.

The project progress, along with the agenda items that follow, consider the selection of Alternative #1 as previously presented by Lochmueller with the modification of having a

single eastbound left turn and a single southbound right turn onto Squire Pope Road, developing a Visum Model optimizing the timing considering the adaptive system from Bluffton all the way through the Gum Tree Road, as well as incorporating the intersections remaining within the study areas from Indigo Run down to the Sea Pines Circle which Mr. Nohren noted are merely impacts and no mitigation strategies have been evaluated pertaining to these intersections. Mr. Nohren stated that Lochmueller is currently 75% completed with the entirety of the project, Task 1 is pending a meeting with Town Staff and is near 100% complete, Task 3 is considered 90% complete with the anticipation of presenting the findings to Town Council, Task 4 is considered 50% complete with the understanding of what the impacts will be, and Task 5 is a comprehensive document which will memorialize Lochmueller's work which will be executed after completion of Task 4.

Mr. Advocaat expressed concern that the projects are moving at a rapid pace, and questioned whether Lochmueller's work would be completed ahead of the June 17th Town Council meeting. Mr. Nohren addressed this question and explained that Lochmueller would be engaging council for the first time beginning June 17th, and the meaning of the future Town Council meetings is to update Council with progress being made from Task 1 through Task 3 explaning that all subject deliverables have been completed and will be provided.

Kate Swinford addressed the committee by going over review items reiterating Lochmueller's method of progress as well as answering questions received regarding levels of service criteria and generation of base traffic data. Ms. Swinford reminded the committee that Lochmueller's analysis was completed independently of outside input and stated there was no significant variation between prior study efforts and their study efforts with respect to previously considered alternatives. According to Ms. Swinford, Lochmueller has not been involved in any meetings with SCDOT nor have they ever coordinated with SCDOT in regards to the respective project. Not only did Lochmueller evaluate previous ideas, but also brought new ideas to the table to provide for consideration regarding Alternatives 2, 3 and 4. Ms. Swinford went on to explain that levels-of-service is one method used among a three-pronged approach analyzing the effectiveness of a certain approach with the remaining two prongs being queue and volume-to-capacity ratio. Queue length speaks to the resulting number of cars waiting to make their turn to enter the corridor based upon the configuration, while volume-to-capacity ratio speaks to the lane capacity.

Ms. Swinford stated that all hourly volumes used as a basis for this independent analysis and provided scenarios were collected in March of 2023, and both hourly volumes and daily volumes are taken into consideration with the main bulk of analysis being based upon hourly volumes. The 30th highest traffic volume day recorded was specifically utilized to ensure the research conducted by Lochmueller responsibly reflected peak conditions without overestimating or underestimating traffic volumes. Using a singular growth rate, Lochmueller developed a model depicting the future scenario at the year 2045 which they explain would be the "worst case scenario" compared to years prior.

4. New Business

a. Presentation of Findings for Downstream Intersection Impacts

Michelle Romine presented the Downstream Impacts by first building upon Kate Swinford's statements stating that Lochmueller has provided some excerpts of traffic volumes to show the hourly volumes used in the analysis. All traffic volumes were provided as part of the William Hilton Parkway Gateway Corridor Independent Review Advisory Committee meeting on March 27th, 2024 as well as within the corridor, an Alternatives Analysis Memorandum which was submitted on May 3rd, 2024.

Ms. Romine explains that her focus for the presentation will be west of Section 9, which is known as the Squire Pope area. The morning peak hour consists of approximately 2,800 vehicles traveling in the eastbound direction which includes 159 left turns, 2,620 through vehicles, and two right turning vehicles. In the evening, just west of Section 9 at Squire Pope, there are approximately 3,000 vehicles traveling in the westbound direction which includes 2,687 through vehicles, 2 northbound left turns, and 341 southbound right turns. Ms. Romine reiterated that these are the 2023 traffic volumes used in the analysis. Lochmueller took these volumes and raised them by their determined growth rate of 0.56% which brings morning peak hour volume to approximately 3,150 vehicles traveling eastbound and evening peak hour volume to 3,400 vehicles traveling westbound, these volumes were then used for the 2045 scenarios with Squire Pope being an excerpt of one intersection out of the many provided by Lochmueller.

Ms. Romine went on to present their Task 4 Scope of Findings. There were previously 4 alternatives considered between Moss Creek Drive and Gum Tree Road, and after review of the findings and discussion with SCDOT, Lochmueller was directed by the Town of Hilton Head Island to pursue Alternative 1 SCDOT Modified Recommended Preferred with additional modifications to provide a single eastbound left turn lane, and a single southbound right turn lane at U.S. 278 and Squire Pope. Lochmueller is in the process of determining what impacts this alternative might have, as well as evaluating what, if any, improvements need to be made. The analysis presented now includes the entire study area including intersections near Indigo Run, traveling all the way down to the Sea Pines Circle. The Visum Model, which is a simulation tool used to accurately replicate vehicles and their interactions within complex traffic streams, travel time runs for the Modified Alternative 1, as well as the SCDOT Alternative, match the numbers of the "No-Build" scenario previously presented by Lochmueller. Ms. Romine presented the Synchro results for the first time for the Modified Alternative 1 to serve as a comparison which Lochmueller expected to be less pronounced than the original Visum Model, as it is noted that Visum provides a more accurate representation. The values from these models presented in the table included the use of an Adaptive Traffic Signal System along U.S. 278 along the Modified 1 Alternative Traffic System.

Under the 2045 "No-Build" scenario, it is expected that it would take approximately 26.3 minutes to travel eastbound along Hilton Parkway between Moss Creek and Indigo Run

during the AM peak hour. Using the Visum Model, it is expected that this travel time would be reduced to 10.5 minutes under the Modified Alternative 1. Under the same 2045 "No-Build" scenario, it is expected that is would take 25.7 minutes in the evening peak hour to travel westbound along Hilton Parkway between Moss Creek and Indigo Run. It is now expected that the travel time would be reduced to 10.3 minutes under the Modified Alternative 1 Scenario, and these are expected to be the final travel times, assuming no changes along U.S. 278 east of Gum Tree or along the Cross Island Parkway. However, as Lochmueller proceeds through mitigation strategies, the values are subject to changes that may reflect potential improvements. Ms. Romine displayed and narrated a simulated video presentation to help visualize the 2045 Modified Alternative 1 Scenario displaying both AM and PM peak hours as well as specific locations where queuing issues are being addressed.

Ms. Romine elaborated further by displaying results based upon the operating conditions expected from this scenario provided by Visum, with the operating conditions for each intersection being included in the Appedix of the presentation for reference. The results presented for key intersections of note were provided as follows: The intersections between Squire Pope and Gum Tree are expected to operate acceptably overall during the AM and PM peak hours. Each signalized intersection is expected to have an LOS-D or better, which is the target LOS for an intersection overall, and the inidivual approaches are expected to operate with an LOS-E or better, which Ms. Romine notes is typically considered acceptable during peak hours concerning some of the side street approaches. Ms. Romine states that Lochmueller is considering any additional improvements that can be made, including reconfiguring intersections and turn lanes to improve efficiency, addition of lanes to improve capacity, and most certainly looking to improve the Sea Pines roundabout, which is performing the least efficiently out of all the performance studies conducted. Mr. Advocaat had questions regarding traffic volumes and breakdown lanes which Ms. Romine addressed. Mr. Walczak had additional questions regarding emergency lanes, which were also addressed by Lochmueller as well as Shawn Colin, Assistant Town Manager. There was a lengthy discussion by the Committee regarding the option of a Southern Bypass which Lochmueller, Shawn Colin and Mayor Perry addressed in detail.

b. Consideration of a Resolution to Accept the Findings of the William Hilton Parkway Gateway Corridor Independent End to End Analysis

On February 21st, 2023 Town Council authorized the creation and appointment of the William Hilton Parkway Gateway Corridor Independent Review Advisory Committee. Shawn Colin, Assistant Town Manager, went over the resolution which created the Committee stating the resolution required the Committee to secure a consultant to adopt a scope of work to recommend to Town Council. On May 12th, 2023 the Committee recommended an agreed upon scope of work, and on June 6th, 2023 Town Council unanimously adopted a resolution approving the scope of work and request for qualifications. On August 28th the Committee unanimously recommended the Town negotiate a contract with Lochmueller group, and on October 12th, 2023 the Town

executed the contract with Lochmueller tp preform the independent analysis. Since then, the Town has held ten public meetings spanning from November 3rd, 2023 to June 12th, 2024 to review the consultants findings and recommendations for the William Hilton Parkway Gateway Corridor Independent End-to-End Analysis as well as to receive public input. As of today, the consultant has presented technical reports and deliverables as outlined in the contract.

Shawn Colin requested consideration from the Committee to accept the findings and recommendations of the William Hilton Parkway Gateway Corridor Independent End-to-End Analysis delivered by the consultant. Secondarily, Mr. Colin asks that the Committee authorize the Town Manager to use the findings and recommendations for future planning purposes. Mayor Perry called for a motion, Mr. Warner made the motion to approve. Mayor Perry passed the gavel to Mr. Warner and seconded the motion. The motion failed with a vote of 2-2. Mr. Advocaat asked that the record reflect that he is not in favor of this motion.

5. Appearance by Citizens:

Mayor Perry opened up the floor for public comment.

Christopher Cliff made comments regarding the letter from SCDOT as well as completion percentages.
Jack Alderman, Chairman of the Housing Action Committee, stated that the development of the roadways is a key component to the island's growth and economic vitality, and he was disappointed to hear some of the same issues being discussed that were resolved early on in the process.
Kris Ruffner commented that she is from Chicago and has experienced some of the worst traffic delays. Further, Ms. Ruffner explained that further development will increase induced demand and will not solve the issue, "if you build it, they will come."
Frank Babel, former member of the original Gateway Corridor Committee, made comments regarding the need for development of the roadways and mentioned the frequency of accidents. Mr. Babel stated the roadway does not work as it stands now, and that the traffic has affected the businesses on the island.
Gerald Devito commented stating he believes Alternative #1 is the only viable option and mentioned that the cross-sections would address various issues.
Tammy Becker, Member of Council, thanked Lochmueller for their review of the Southern Bypass option. Ms. Becker then clarified that she does not remember Council ever being further consulted regarding the Bypass which Lochmueller addressed.
Greg Whitaker stated that the simulation displayed at this afternoon's meeting was very beneficial and requested that Lochmueller display it at the next Town Council meeting where these alternatives will be discussed. Mr. Whitaker also suggested that Lochmueller discuss why reversible lanes were considered but dismissed, and that they shed some light on the Southern Bypass option.
Gray Smith noted that the amount of lanes are not the issue in his opinion, but how free flowing the traffic is through the corridor. Mr. Smith also stated that he believes voting on the findings is premature at this point.

Richard Busy explained that he believes the Southern Bypass should have received the same evaluation efforts as the other alternatives presented by Lochmueller.
Kathleen Redman stated she believes two lanes in each direction would suffice and she does not think we need six lanes.
Carol Vuxxer made comment stating she agrees with Ms. Redman regarding the two lane bridge as opposed to six. Ms. Vuxxer also noted that she is against taking any Stoney property to complete this project.

6. Adjournment

The meeting was declared adjourned at 4:00 PM.

Approved:

The recording of this Meeting can be found on the Town's website at www.hiltonheadislandsc.gov

TOWN OF HILTON HEAD ISLAND

Willliam Hilton Parkway
Gateway Corridor Advisory Committee

TO: Advisory Committee
FROM: Shawn Colin, Assistant Town Manager
DATE: August 14, 2024
SUBJECT: Recommendation for the William Hilton Parkway Gateway Corridor Independent Review Advisory Committee to accept the Final Report for the William Hilton Parkway Independent Study

RECOMMENDATION:

Recommendation for the William Hilton Parkway Gateway Corridor Independent Review Advisory Committee to accept the Final Report for the William Hilton Parkway Independent Study.

BACKGROUND:

February 2023 – Town Council created the William Hilton Parkway Gateway Corridor Independent Review Advisory Committee (Committee)

March 2023 - Appointments made on March 21, 2023.

May 2023 – Committee approved draft Request for Proposals and Scope of Work for Independent Study and forwarded to Town Council for consideration

June 2023 - Town Council approved Request for Proposals and Scope of Work for Independent Study

August to October 2023 – Consultant, The Lochmueller Group, Inc. procured to conduct Independent Study

Oct 2023 to August 2024 – Hilton Head Island Procured Independent Study consultant conducted 11 public meetings with the Committee between November 3, 2023, and August 14, 2024 to present findings and recommendation to the Committee in accordance with the Town Council approved Scope of Work. Presentation of the Final Report completes the Scope of Work deliverables for this project.

ATTACHMENTS:

1. The Lochmueller Group Document Transmittal Memo – dated August 9, 2024
2. Presentation by the Lochmueller Group – dated August 14, 2024
3. Independent Study of the William Hilton Parkway Gateway Corridor Traffic Operations and Safety Report – dated August 9, 2024

TRANSMITTAL

LOCHMUELLER GROUP

To: Shawn Colin, AICP – Town of Hilton Head Island

From: Nate Nohren, PE, PTOE

Date: August 9, 2024

Subject: Copies of Presentation Materials for 8/14/2024 Advisory Committee Meeting

RE: William Hilton Parkway Gateway Corridor Independent Review

Hi Shawn,

Attached please find a PDF copy of the power point slides we will be presenting at the June 12, 2024, Advisory Committee meeting. The content provided within our presentation can be summarized as follows:

- **Update on Project Progress** – we will provide the Committee an update on what our team has been working on and/or completed since the June 10 Committee meeting. We also provide current status of percent-of-work completed to date for the entire project, in relation to the Town approved Scope of Services Addendum (9/29/2023).
- **Review of Downstream Impacts to Task 4 Intersections (Assuming Implementation of Modified Alternative 1 from Task 3)** – we will provide a summary review of our findings that we presented during the 6/12 Committee meeting, related to the anticipated impacts to intersections downstream of Gum Tree Road and Cross Island Parkway, assuming the implementation of the "modified" Alternative #1, which includes the implementation of a single eastbound left-turn and a single southbound right-turn lane at Squire Pope Road.
- **Additional Mitigation Solutions for Local Intersections** – we will present slides that summarize our key findings related to the potential mitigation solutions for select intersections downstream of Gum Tree Road and Cross Island Parkway; at locations where it was determined that the suggested mitigation solutions would provide noticeable operational benefits at the respective intersections, as compared to 2045 No-Build conditions.
- **Presentation of Final Results for Entire Study Area** – we will present two slides that provide a concise overview of key findings related comparisons of aforementioned mitigations strategies for select intersections downstream of Gum Tree Road and Cross Island Parkway; as compared to (1) the 2045 No-Build scenario results for Entire Study Area, and (2) a scenario that considers the 2045 Modified Alternative 1 results for intersections upstream of Gum Tree Road and Cross Island Parkway, but no improvements being implemented downstream of Gum Tree Road and Cross Island Parkway.

We have also attached a PDF copy of the draft Traffic Operations and Safety Report (deliverable for Task 5.1), which comprehensively details all work completed to date by Lochmueller, as a part of this project. We will have a copy of this report available during the meeting, should any questions arise pertaining to our final study related findings that are not specifically mentioned within the Power Point presentation. For the sake of brevity, we do not intend to cover topics that have already been discussed in detail during previous Committee meetings.

Please let me know if you have any questions regarding the information shared above. Otherwise, we look forward to speaking with you all on August 14.

Sincerely,

Nate Nohren, PE, PTOE

William Hilton Parkway Gateway Corridor Independent Review Advisory Committee Meeting

August 14th, 2024

LOCHMUELLER GROUP

Lochmueller Team Members Participating Today

- ❑ Nate Nohren – Project Manager
- ❑ Kate Swinford – Deputy Project Manager/Traffic Analysis Lead
- ❑ Michelle Romine – Traffic Analysis Staff Engineer
- ❑ Lorne Jackson – Roadway/ROW Impacts Lead

Agenda

- Update on Project Progress
- Review of Downstream Impacts to Task 4 Intersections (Assuming Implementation of Modified Alternative 1 from Task 3)
- Additional Mitigation Solutions for Local Intersections
- Presentation of Final Results for Entire Study Area
- Questions

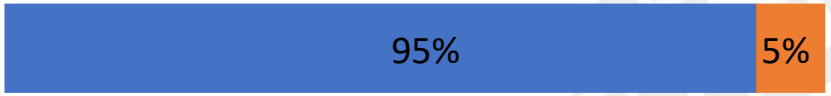
Update on Project Progress

(*Key Tasks Completed & Continuing to Work on Since Last Meeting*)

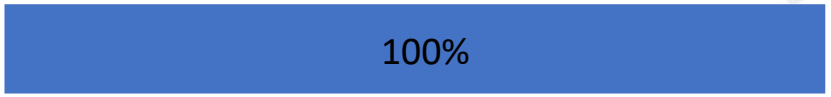
- ✓ Participated in 6/17 Town Council Workshop
- ✓ Attended 6/20 Special Town Council Meeting
- ✓ Completed traffic analyses, modeling (Synchro/VISSIM), and related findings to determine proposed mitigation strategies for 2045 Build Year conditions at intersections downstream of CIP
- ✓ Prepared preliminary Traffic Operations & Safety Report (deliverable for Task 5.1), which comprehensively details all work completed by Lochmueller as a part of this project
  - ➢ Submitted draft report to Town staff on 8/9

Update on Overall Project Progress (as of 8/9/24)

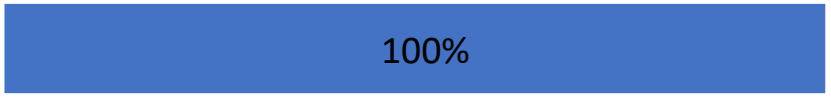
Overall ~95% Complete



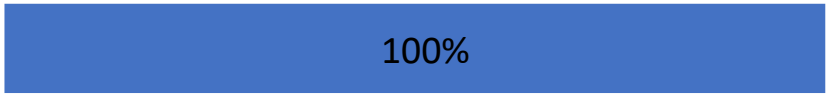
- **Task #1: Project Initiation and Coordination**
  - ~100% Complete



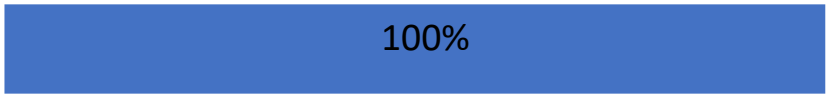
- **Task #2: Review of Travel Demand Model & Evaluation of 2023 Existing Operating Conditions (Entire Study Area)**
  - 100% Complete



- **Task #3: Traffic Model and Operational Update – Modified Original Project Study Area**
  - 100% Complete

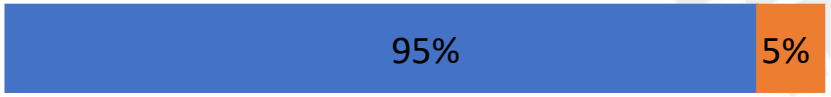


- **Task #4: Traffic Model and Operational Update – Entire Project Study Area**
  - 100% Complete



Update on Overall Project Progress (as of 8/9/24)

- **<u>Task #5: Final Report</u>**
  - **~95% Complete**



  - Key Subtasks Remaining:
    - Finalize Traffic Operations & Safety Report, after receiving feedback from Town staff
    - Presentation of final report findings to Town Council

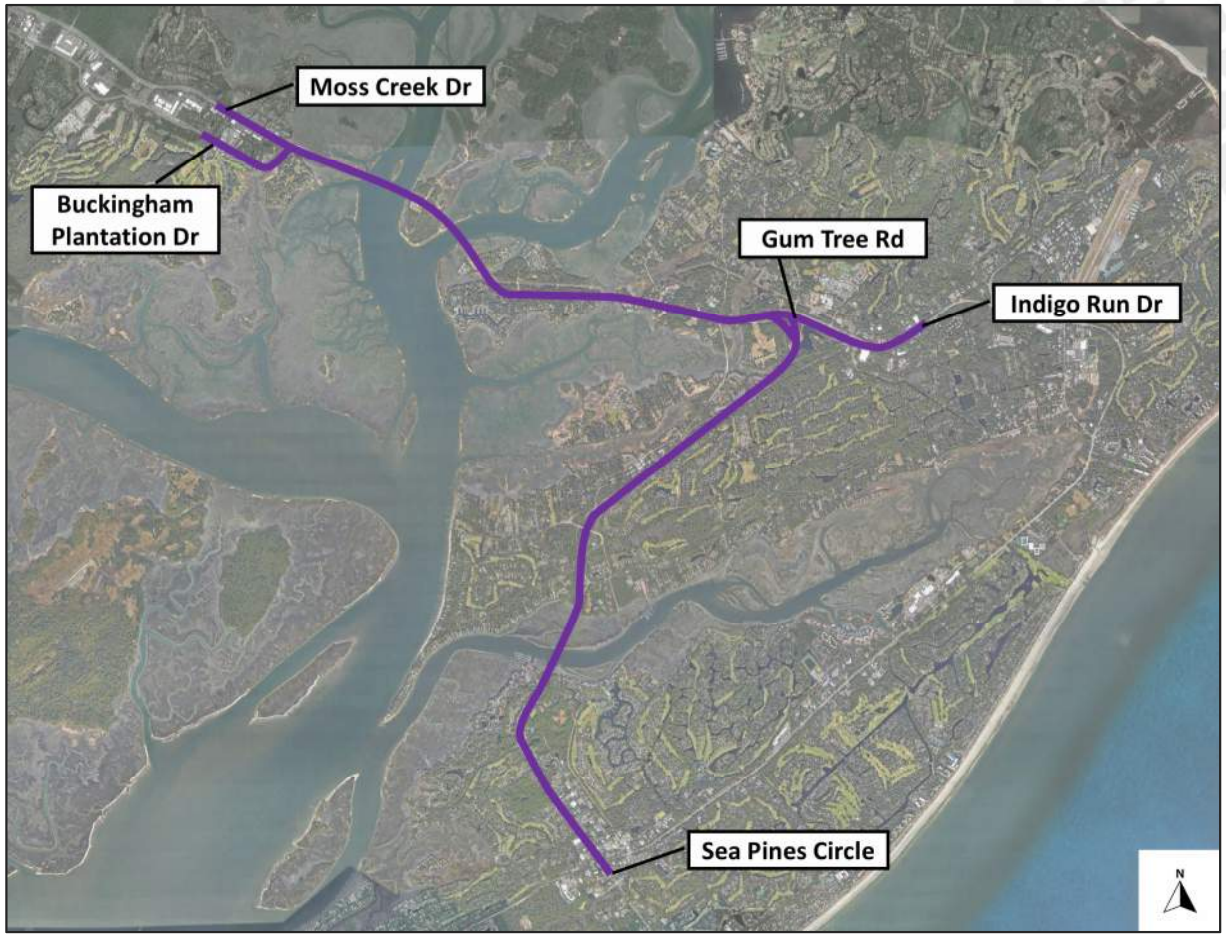
Review of Downstream Impacts to Task 4 Intersections (Assuming only the Implementation of Modified Alternative 1)

- Lochmueller previously analyzed four alternatives intended to improve the operating conditions along US 278 between Moss Creek Dr and Gum Tree Rd.

- After review of the findings and discussion with SCDOT, Lochmueller was directed by the Town of Hilton Head Island to pursue Alternative 1: SCDOT Modified Recommended Preferred with modifications to provide a single eastbound left-turn lane and a single southbound right-turn lane at US 278 at Squire Pope Rd.

- Lochmueller then evaluated the impacts the modified Alternative 1 would have on the entire project study area and determined what, if any, improvements should be made to accommodate the 2045 forecasted traffic.

Review of Downstream Impacts to Task 4 Intersections (Assuming only the Implementation of Modified Alternative 1)



Review of Downstream Impacts to Task 4 Intersections (Assuming only the Implementation of Modified Alternative 1)

- VISSIM Travel Time Results:

Corridor		2045 No Build Simulated travel time (secs)		2045 Modified Alternative 1 Simulated Travel Time (secs)		% Difference	
		AM	PM	AM	PM	AM	PM
Hilton Parkway between Moss Creek and Indigo Run	EB	1579 [26.3]	642 [10.7]	628 [10.5]	631 [10.5]	**-60.23%**	**-1.71%**
	WB	584 [9.7]	1544 [25.7]	597 [10]	616 [10.3]	**2.23%**	**-60.10%**
Hilton Parkway @Moss Creek to **Cross Island Parkway** @Sea Pine	SB	1984 [33.1]	873 [14.6]	1387 [23.1]	874 [14.6]	**-30.09%**	**0.11%**
	NB	823 [13.7]	2465 [41.1]	848 [14.1]	904 [15.1]	**3.04%**	**-63.33%**

Review of Downstream Impacts to Task 4 Intersections (Assuming only the Implementation of Modified Alternative 1)

- Overall, even with no improvements in place east of Gumtree Road or along Cross Island Parkway, it was found that the travel times would significantly improve when compared to the 2045 no build scenario.

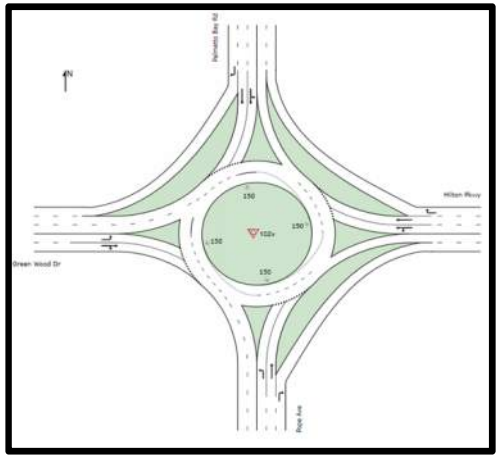
- The intersections would be expected to operate acceptably overall. However, the eastbound and westbound approaches between Wilborn Road and Pembroke Drive are expected to experience long queues and be over capacity in the year 2045.

- Additionally, the existing roundabout at Palmetto Bay Road and Sea Pines Circle is expected to fail during both the AM and PM peak hours. As a result of the failing roundabout, the queue lengths are expected to extend beyond nearby intersections.

- Therefore, Lochmueller evaluated two options with potential solutions to the local intersections downstream of Gum Tree Road and Cross Island Parkway to help mitigate the expected long queues and delays.

Additional Mitigation Solutions for Local Intersections – Option A

- **Option A**:
  - William Hilton Parkway & Pembroke Drive:
    - Reconfigure the northbound approach to provide dual northbound left-turn lanes, one through lane, and one right-turn lane
    - In addition to the roadway widening, this will require relocation of the shared use path on the east side, adjustments to signal equipment and additional ROW on the south leg
    - Estimated preliminary probable opinion of cost (including ROW) = $750,000
    - Estimated construction duration = 4 months
  - Palmetto Bay Road & William Hilton Parkway (Sea Pines Circle):
    - Provide a two-lane roundabout
    - Each approach should have a right-turn bypass, with the exception of the west leg
    - This will require pavement widening to the inside of the traffic circle and on each of the four legs of the intersection to accommodate the additional lane
    - Estimated preliminary probable opinion of cost = $2,000,000
    - Estimated construction duration = 8 months



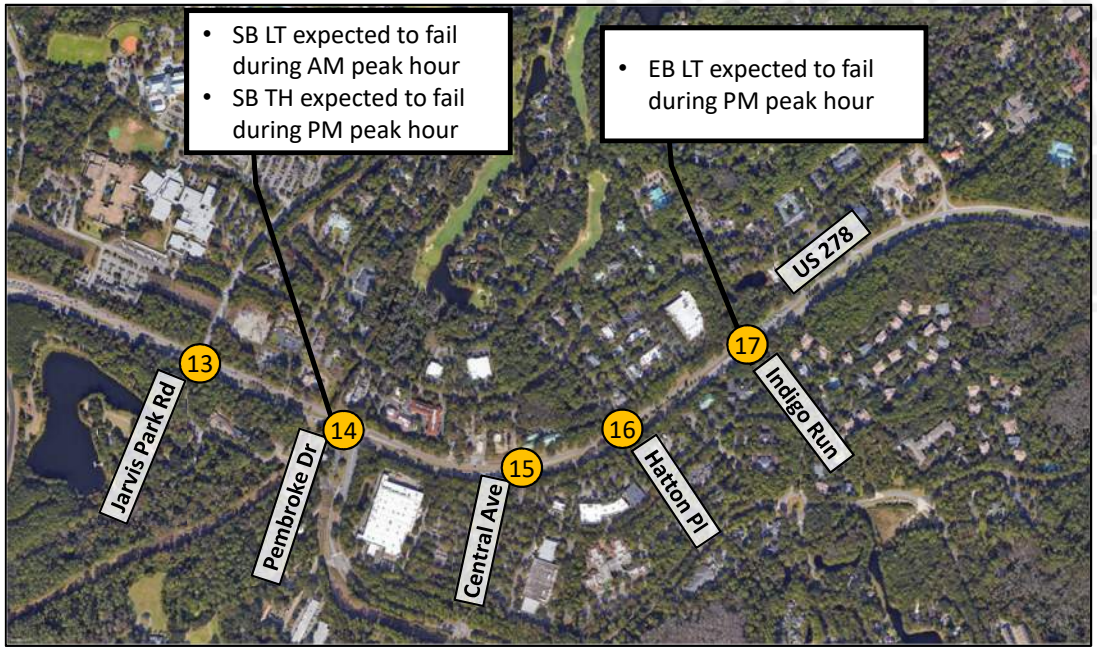
Option A Operating Conditions (VISSIM)

- VISSIM Travel Time Results:
  - Travel times along William Hilton Parkway between Moss Creek Drive and Indigo Run Drive are expected to improve by approximately:
    - 17.2 minutes during the AM peak hour in the eastbound direction
    - 15.7 minutes during the PM peak hour in the westbound direction
  - The travel times along William Hilton Parkway at Moss Creek to the Cross Island Parkway at Sea Pines Circle are expected to improve by approximately:
    - 19.2 minutes during the AM peak hour in the southbound direction
    - 27 minutes during the PM peak hour in the northbound direction

Corridor		2045 No Build Simulated travel time (secs) [min]		2045 Modified Alternative 1 Option A Simulated Travel Time (secs) [min]		% Difference	
		AM	PM	AM	PM	AM	PM
Hilton Parkway between Moss Creek and Indigo Run	EB	1579 [26.3]	642 [10.7]	548 [9.1]	589 [9.8]	**-65.31%**	**-8.21%**
	WB	584 [9.7]	1544 [25.7]	556 [9.3]	600 [10]	**-4.85%**	**-61.12%**
Hilton Parkway @Moss Creek to **Cross Island Parkway** @Sea Pine	SB	1984 [33.1]	873 [14.6]	833 [13.9]	856 [14.3]	**-58.01%**	**-1.93%**
	NB	823 [13.7]	2465 [41.1]	814 [13.6]	845 [14.1]	**-1.04%**	**-65.72%**

Option A Operating Conditions (VISSIM)

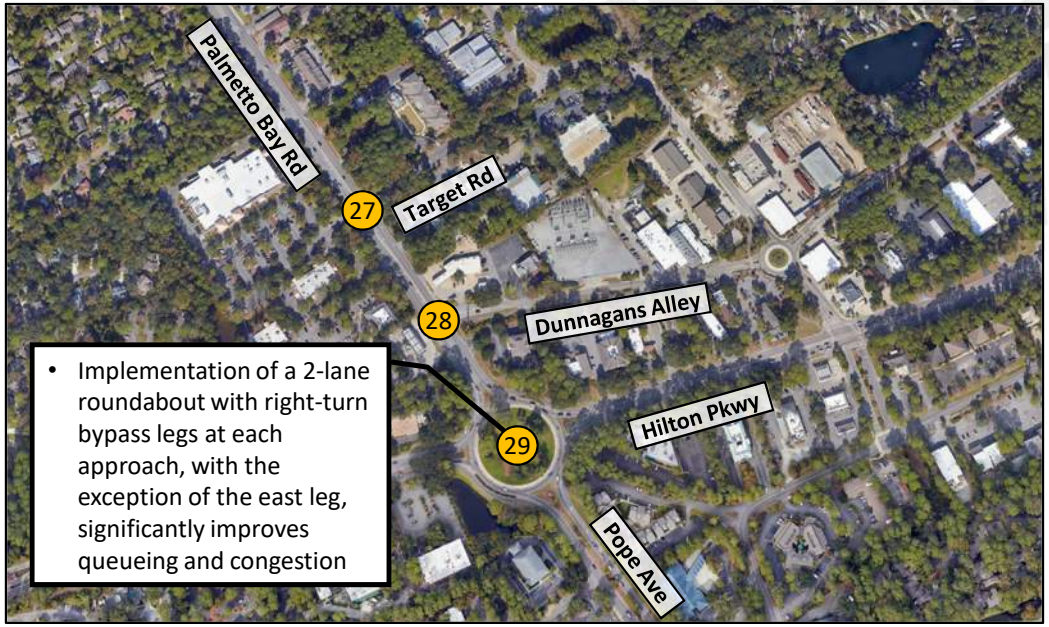
Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
13: Jarvis Park Rd/Wilborn Rd & Hilton Pkwy (signal)		
Overall Intersection	**B (15.5)**	**B (15.4)**
Eastbound Approach	A (9.0) [48] {424}	A (9.8) [51] {410}
Westbound Approach	B (13.8) [62] {635}	B (16.8) [156] {1076}
Northbound Approach	E (74.8) [46] {179}	F (81.9) [53] {189}
Southbound Approach	D (40.7) [72] {233}	B (20.0) [31] {115}
14: Pembroke Dr/Museum St & Hilton Pkwy (signal)		
Overall Intersection	**B (19.2)**	**C (20.8)**
Eastbound Approach	A (7.8) [80] {962}	A (7.9) [36] {439}
Westbound Approach	C (24.4) [115] {629}	C (21.8) [286] {937}
Northbound Approach	E (68.3) [84] {267}	E (60.7) [85] {301}
Southbound Approach	D (39.1) [27] {119}	D (48.3) [37] {137}
15: Central Ave & Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (9.9) [<25] {<25}	B (15.7) [<25] {<25}
Westbound Left Turn	C (21.8) [<25] {<25}	B (16.9) [<25] {<25}
Northbound Right Turn	C (17.9) [<25] {27}	B (13.4) [<25] {32}
Southbound Right Turn	B (12.5) [<25] {44}	B (19.3) [<25] {41}
16: Hatton Pl/Merchant St & Hilton Pkwy (un-signalized)		
Northbound Right Turn	A (7.7) [<25] {<25}	A (7.0) [<25] {64}
Southbound Right Turn	B (11.4) [<25] {37}	B (15.8) [<25] {35}
17: Indigo Run Dr/Whooping Crane Way & Hilton Pkwy (signal)		
Overall Intersection	**B (17.8)**	**C (30.5)**
Eastbound Approach	A (6.8) [<25] {324}	C (20.9) [133] {467}
Westbound Approach	B (14.7) [43] {349}	C (26.5) [192] {872}
Northbound Approach	E (58.4) [34] {122}	E (58.3) [53] {208}



Even with the adaptive signals and reconfiguration of the northbound approach at Pembroke Dr to allow more of the cycle length to go to the mainline, long queues would still be expected between Gumtree Rd and Pembroke Ave. However, it is not expected that the maximum queue would extend into nearby intersections.

Option A Operating Conditions (VISSIM)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**B (17.8)**	**C (30.5)**
Eastbound Approach	A (6.8) [<25] {324}	C (20.9) [133] {467}
Westbound Approach	B (14.7) [43] {349}	C (26.5) [192] {872}
Northbound Approach	E (58.4) [34] {122}	E (58.3) [53] {208}
Southbound Approach	D (53.3) [64] {223}	E (58.5) [79] {274}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	E (40.2) [<25] {34}	E (56.1) [<25] {79}
Westbound Right Turn	A (8.0) [<25] {69}	B (14.6) [<25] {113}
Southbound Left Turn	A (7.0) [<25] {153}	B (15.4) [<25] {37}
29: Palmetto Bay Rd & Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**A (8.9)**	**B (10.8)**
Eastbound Approach	D (29.0) [75] {342}	C (29.8) [122] {514}
Westbound Approach	A (5.0) [<25] {123}	B (10.2) [29] {191}
Northbound Approach	A (2.8) [<25] {78}	A (4.4) [<25] {158}
Southbound Approach	A (6.6) [28] {296}	A (5.5) [<25] {231}



Additional Mitigation Solutions for Local Intersections – Option B

- **Option B**:
  - Extend the 6-lane section from Gumtree Road past Pembroke Drive. The 6-lane section can taper back to a 4-lane section at Central Avenue.
  - In addition to the roadway widening, this will require adjustments to the shared use path on the north side of the road, new traffic signals at Wilborn and Pembroke, temporary construction easements and possibly new ROW.
    - Estimated preliminary probable opinion of cost = $3,000,000
    - Estimated construction duration = 6 months
  - William Hilton Parkway & Wilborn Road:
    - Provide dual southbound right-turn lanes
    - In addition to the roadway widening, this will require adjustments to the shared use path on the east side of the road, temporary construction easements and possibly new ROW
    - Estimated preliminary probable opinion of cost = $1,000,000
    - Estimated construction duration = 4 months

Additional Mitigation Solutions for Local Intersections – Option B (cont.)

- **Option B**:
  - Palmetto Bay Road & William Hilton Parkway (Sea Pines Circle):
    - Signalize the intersection rather than the existing roundabout
    - Provide a left-turn lane, two thru lanes, and a right-turn lane for every approach except the EB approach, which will have dual left-turn lanes
    - In addition to the roadway widening on each leg of the intersection to accommodate the addition of turn lane, this will require adjustments to the shared use path on the east side of the south leg, new traffic signals, temporary construction easements, and new ROW on the north and west legs
    - Estimated preliminary probable opinion of cost = $6,000,000
    - Estimated construction duration = 12 months

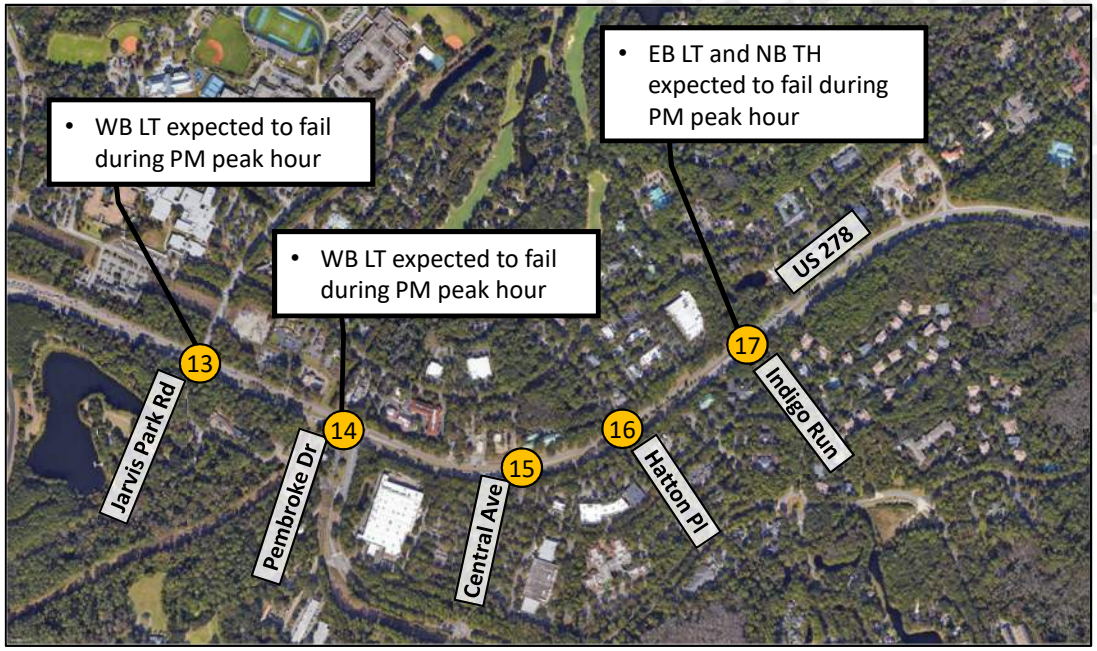
Option B Operating Conditions (VISSIM)

- VISSIM Travel Time Results:
  - Travel times along William Hilton Parkway between Moss Creek Drive and Indigo Run Drive are expected to improve by approximately:
    - 17.4 minutes during the AM peak hour in the eastbound direction
    - 16.5 minutes during the PM peak hour in the westbound direction
  - The travel times along William Hilton Parkway at Moss Creek to the Cross Island Parkway at Sea Pines Circle are expected to improve by approximately:
    - 19.4 minutes during the AM peak hour in the southbound direction
    - 27 minutes during the PM peak hour in the northbound direction

Corridor		2045 No Build Simulated travel time (secs) [min]		2045 Modified Alternative 1 Option B Simulated Travel Time (secs) [min]		% Difference	
		AM	PM	AM	PM	AM	PM
Hilton Parkway between Moss Creek and Indigo Run	EB	1579 [26.3]	642 [10.7]	534 [8.9]	571 [9.5]	**-66.18%**	**-11.06%**
	WB	584 [9.7]	1544 [25.7]	547 [9.1]	552 [9.2]	**-6.34%**	**-64.25%**
Hilton Parkway @Moss Creek to **Cross Island Parkway** @Sea Pine	SB	1984 [33.1]	873 [14.6]	820 [13.7]	840 [14]	**-58.67%**	**-3.78%**
	NB	823 [13.7]	2465 [41.1]	816 [13.6]	848 [14.1]	**-0.86%**	**-65.60%**

Option B Operating Conditions (VISSIM)

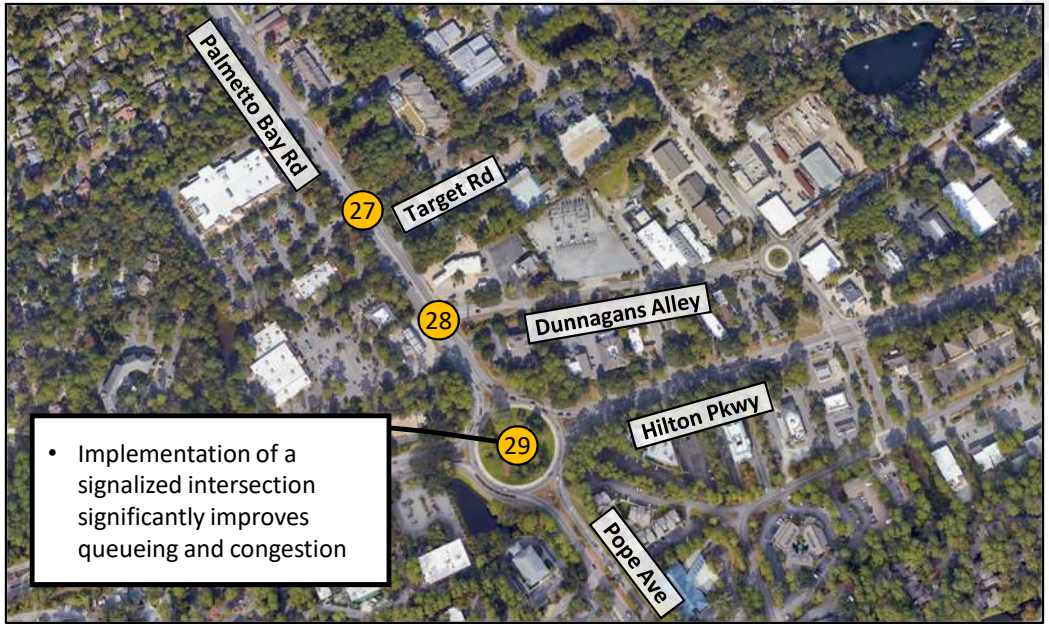
Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
13: Jarvis Park Rd/Wilborn Rd & Hilton Pkwy (signal)		
Overall Intersection	**B (17.3)**	**B (12.3)**
Eastbound Approach	B (12.8) [139] {463}	A (9.1) [53] {239}
Westbound Approach	A (9.8) [30] {434}	A (6.7) [30] {407}
Northbound Approach	E (73.3) [30] {175}	E (67.9) [30] {168}
Southbound Approach	D (49.7) [72] {248}	D (44.6) [40] {172}
14: Pembroke Dr/Museum St & Hilton Pkwy (signal)		
Overall Intersection	**C (20.5)**	**B (16.3)**
Eastbound Approach	A (9.3) [38] {307}	B (12.7) [44] {306}
Westbound Approach	C (29.2) [87] {440}	A (7.7) [31] {214}
Northbound Approach	E (58.3) [79] {284}	E (59.5) [93] {320}
Southbound Approach	C (34.4) [<25] {105}	D (36.6) [<25] {127}
15: Central Ave & Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (12.6) [<25] {27}	B (10.5) [<25] {<25}
Westbound Left Turn	C (23.8) [<25] {27}	B (12.7) [<25] {<25}
Northbound Right Turn	C (18.5) [<25] {30}	B (13.7) [<25] {32}
Southbound Right Turn	A (3.6) [<25] {<25}	A (5.6) [<25] {<25}
16: Hatton Pl/Merchant St & Hilton Pkwy (un-signalized)		
Northbound Right Turn	A (9.5) [<25] {28}	A (8.2) [<25] {66}
Southbound Right Turn	B (10.6) [<25] {38}	B (15.2) [<25] {35}
17: Indigo Run Dr/Whooping Crane Way & Hilton Pkwy (signal)		
Overall Intersection	**B (16.9)**	**D (35.7)**
Eastbound Approach	A (5.2) [<25] {278}	C (34.5) [154] {810}
Westbound Approach	B (15.7) [47] {355}	C (26.8) [195] {845}
Northbound Approach	E (57.1) [32] {106}	E (67.3) [64] {267}



By extending the 6-lane section east towards Central Avenue, the long queue lengths between Gumtree Rd and Pembroke Dr would be mitigated.

Option B Operating Conditions (VISSIM)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**A (8.5)**	**B (16.6)**
Eastbound Approach	D (35.6) [<25] {125}	D (41.5) [67] {250}
Westbound Approach	D (39.1) [44] {154}	C (29.2) [42] {148}
Northbound Approach	A (5.0) [<25] {236}	B (13.2) [82] {490}
Southbound Approach	A (4.4) [28] {488}	B (11.9) [68] {432}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	D (30.3) [<25] {34}	C (34.3) [<25] {64}
Westbound Right Turn	A (8.3) [<25] {68}	B (12.8) [<25] {98}
Southbound Left Turn	A (6.2) [<25] {109}	B (10.6) [<25] {46}
29: Palmetto Bay Rd & Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**C (24.2)**	**C (25.0)**
Eastbound Approach	D (45.3) [93] {237}	D (36.7) [90] {283}
Westbound Approach	D (37.7) [104] {265}	C (30.2) [107] {295}
Northbound Approach	B (15.8) [31] {204}	C (24.7) [88] {382}
Southbound Approach	B (14.7) [62] {293}	B (15.0) [55] {361}



Final Travel Time Comparison

Corridor		Hilton Parkway between Moss Creek and Indigo Run		% Difference to 2045 No Build		Hilton Parkway @Moss Creek to Cross Island Parkway @Sea Pine		% Difference to 2045 No Build	
		EB	WB	EB	WB	SB	NB	SB	NB
2045 No Build Simulated travel time (secs) [min]	**AM**	*1579 [26.3]*	*584 [9.7]*	-	-	*1984 [33.1]*	*823 [13.7]*	-	-
	PM	*642 [10.7]*	*1544 [25.7]*	-	-	*873 [14.6]*	*2465 [41.1]*	-	-
2045 Modified Alternative 1 Simulated Travel Time (secs) [min]	**AM**	628 [10.5]	597 [10]	**-60.23%**	**2.23%**	*1387 [23.1]*	*848 [14.1]*	**-30.09%**	**3.04%**
	PM	631 [10.5]	616 [10.3]	**-1.71%**	**-60.10%**	*874 [14.6]*	*904 [15.1]*	**0.11%**	**-63.33%**
2045 Modified Alternative 1 Option A Simulated Travel Time (secs) [min]	**AM**	548 [9.1]	556 [9.3]	**-65.31%**	**-4.85%**	*833 [13.9]*	*814 [13.6]*	**-58.01%**	**-1.04%**
	PM	589 [9.8]	600 [10]	**-8.21%**	**-61.12%**	*856 [14.3]*	*845 [14.1]*	**-1.93%**	**-65.72%**
2045 Modified Alternative 1 Option B Simulated Travel Time (secs) [min]	**AM**	534 [8.9]	547 [9.1]	**-66.18%**	**-6.34%**	*820 [13.7]*	*816 [13.6]*	**-58.67%**	**-0.86%**
	PM	571 [9.5]	552 [9.2]	**-11.06%**	**-64.25%**	*840 [14]*	*848 [14.1]*	**-3.78%**	**-65.60%**

Neither Option A nor Option B is expected to have a meaningful impact on travel times between Moss Creek and Indigo run. But they are expected to have a meaningful impact from Moss Creek to Cross Island @ Sea Pines

Conclusions

- Lochmueller Group was directed to pursue Alternative 1: SCDOT Modified Recommended Preferred with modifications to provide a single eastbound left-turn lane and a single southbound right-turn lane at William Hilton Parkway at Squire Pope Road
- With the recommended improvements under Alternative 1: SCDOT Modified Recommended Preferred in place, the rest of the downstream intersections would be expected to operate acceptably overall. However, the eastbound and westbound approaches between Wilborn Road and Pembroke Drive are expected to experience long queues in the year 2045 and the existing roundabout at Palmetto Bay Road and Sea Pines Circle is expected to fail during both the AM and PM peak hours
- Two additional options for mitigation are provided for The Town of Hilton Head Island's consideration in the final report to help ease congestion between Gumtree Road and Indigo Run Drive as well as along the Cross Island Parkway towards Sea Pines Circle.
- **Physical improvements east of Gum Tree Road have a marginal impact on the travel times along the William Hilton Parkway corridor between Moss Creek and Indigo Run but can improve key intersection performance and help reduce queueing.**
- **Improvements such as expanding the existing roundabout at Sea Pines Circle or signalizing the intersection would significantly improve the travel times along Cross Island Parkway.**

QUESTIONS?

https://www.islandpacket.com/news/local/traffic/article235209867.html

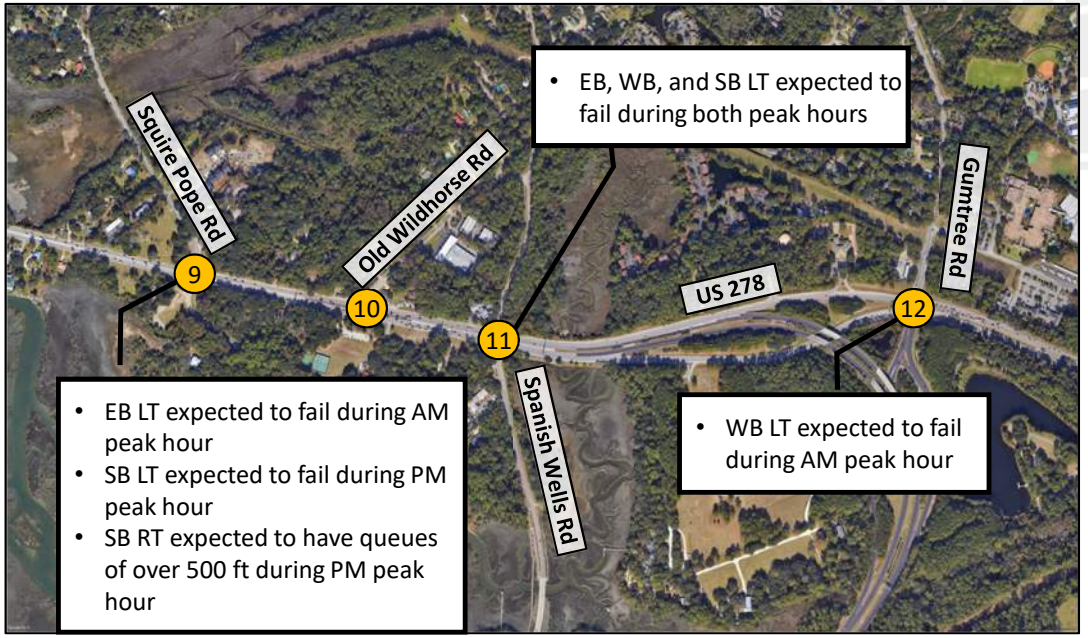
LOCHMUELLER GROUP

APPENDIX

https://www.islandpacket.com/news/local/traffic/article235209867.html

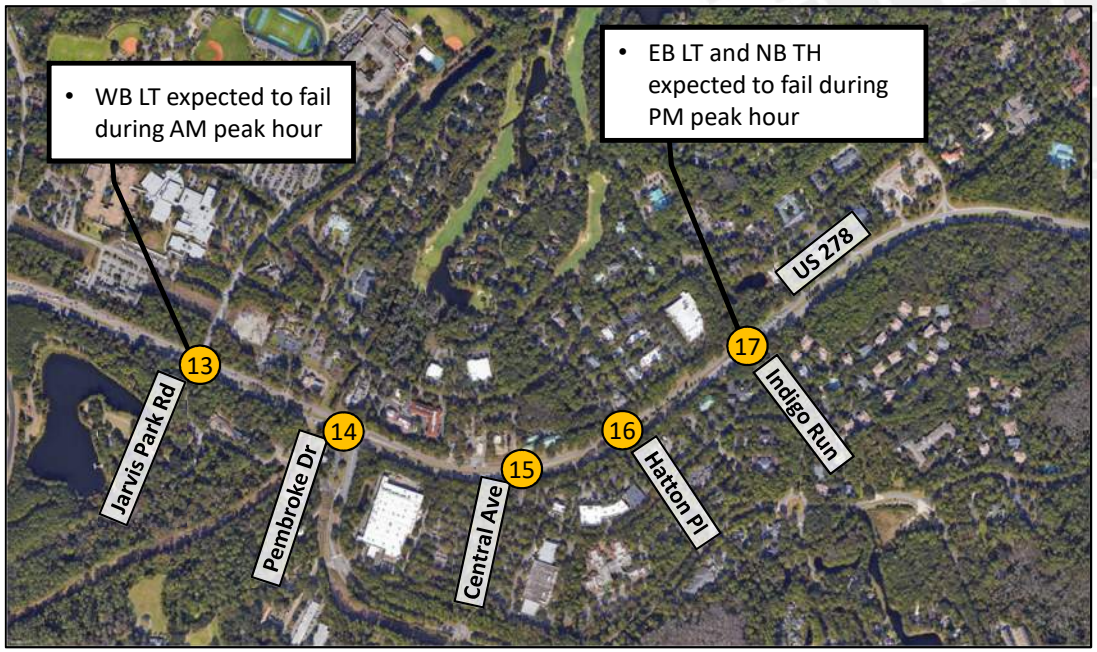
Downstream Impacts to Task 4 Intersections (Assuming only the Implementation of Modified Alternative 1)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & Hilton Pkwy (signal)		
Overall Intersection	**A (8.4)**	**B (11.8)**
Eastbound Approach	A (7.0) [102] {697}	B (11.3) [124] {484}
Westbound Approach	A (8.2) [28] {237}	A (5.8) [36] {524}
Northbound Approach	C (30.4) [<25] {56}	E (67.0) [<25] {109}
Southbound Approach	C (22.6) [<25] {170}	D (51.1) [128] {521}
10: Old Wild Horse Rd & Hilton Pkwy (un-signalized)		
Southbound Approach	A (4.7) [<25] {56}	B (12.5) [<25] {32}
11: Spanish Wells Rd/Wild Horse Rd & Hilton Pkwy (signal)		
Overall Intersection	**B (16.6)**	**C (23.8)**
Eastbound Approach	B (11.0) [106] {998}	C (27.9) [198] {861}
Westbound Approach	B (11.2) [56] {248}	B (11.9) [84] {779}
Northbound Approach	D (48.6) [45] {135}	E (65.2) [77] {196}
Southbound Approach	E (75.9) [74] {292}	E (60.6) [49] {197}
12: Gumtree Rd & Hilton Pkwy (signal)		
Overall Intersection	**D (37.1)**	**D (43.8)**
Eastbound Approach	C (33.4) [164] {682}	E (57.1) [184] {562}
Westbound Approach	D (40.8) [130] {369}	D (35.4) [236] {786}
Northbound Approach	C (26.6) [61] {264}	D (37.3) [98] {327}
Southbound Approach	D (50.2) [93] {302}	D (52.7) [119] {453}



Downstream Impacts to Task 4 Intersections (Assuming only the Implementation of Modified Alternative 1)

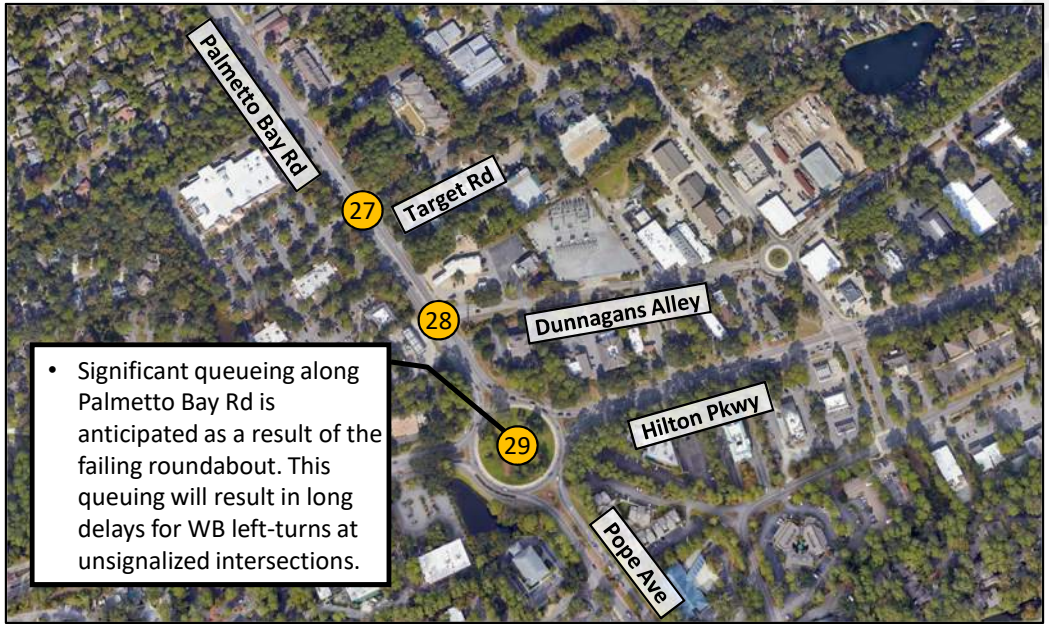
Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
13: Jarvis Park Rd/Wilborn Rd & Hilton Pkwy (signal)		
Overall Intersection	**C (26.7)**	**B (18.8)**
Eastbound Approach	C (25.4) [439] {1480}	B (16.3) [103] {735}
Westbound Approach	C (21.6) [101] {686}	B (18.2) [295] {1202}
Northbound Approach	E (68.6) [43] {170}	F (87.6) [56] {191}
Southbound Approach	D (39.1) [66] {228}	B (19.2) [29] {112}
14: Pembroke Dr/Museum St & Hilton Pkwy (signal)		
Overall Intersection	**C (23.1)**	**C (24.5)**
Eastbound Approach	B (18.9) [403] {1224}	B (17.2) [128] {910}
Westbound Approach	C (20.9) [75] {532}	C (21.6) [171] {903}
Northbound Approach	D (53.1) [71] {257}	E (60.1) [92] {299}
Southbound Approach	C (30.4) [<25] {89}	D (40.3) [<25] {111}
15: Central Ave & Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (7.1) [<25] {<25}	C (19.3) [<25] {25}
Westbound Left Turn	C (24.1) [<25] {26}	A (9.5) [<25] {<25}
Northbound Right Turn	C (16.5) [<25] {27}	B (13.9) [<25] {32}
Southbound Right Turn	B (12.5) [<25] {45}	C (18.3) [<25] {38}
16: Hatton Pl/Merchant St & Hilton Pkwy (un-signalized)		
Northbound Right Turn	A (9.5) [<25] {28}	A (7.8) [<25] {63}
Southbound Right Turn	B (11.3) [<25] {36}	C (22.9) [<25] {41}
17: Indigo Run Dr/Whooping Crane Way & Hilton Pkwy (signal)		
Overall Intersection	**C (25.1)**	**D (36.1)**
Eastbound Approach	C (21.1) [134] {846}	C (33.6) [128] {751}
Westbound Approach	B (17.3) [53] {359}	C (28.0) [207] {887}
Northbound Approach	E (56.6) [33] {114}	E (66.9) [65] {268}
Southbound Approach	D (47.7) [56] {192}	E (57.6) [77] {264}



*Highlighted cells indicate that the maximum queues are expected to extend into the next intersection

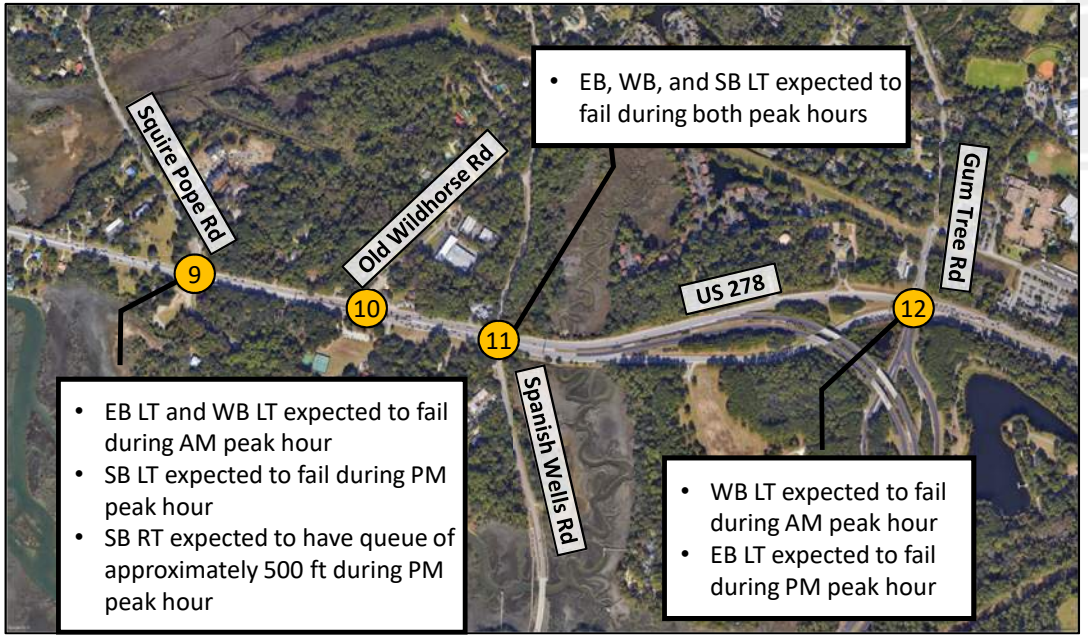
Downstream Impacts to Task 4 Intersections (Assuming only the Implementation of Modified Alternative 1)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**C (29.0)**	**B (19.0)**
Eastbound Approach	D (36.9) [1380] {1512}	B (15.9) [142] {823}
Westbound Approach	B (12.9) [39] {249}	B (15.8) [85] {539}
Northbound Approach	C (26.6) [<25] {105}	D (39.5) [65] {263}
Southbound Approach	D (35.7) [34] {151}	C (25.5) [37] {140}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	F (1,033.8) [80] {183}	F (101.3) [<25] {99}
Westbound Right Turn	F (91.9) [109] {217}	B (13.3) [35] {134}
Southbound Left Turn	C (22.0) [278] {513}	B (13.7) [29] {465}
29: Palmetto Bay Rd & Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**F (53.4)**	**F (79.2)**
Eastbound Approach	F (314.9) [809] {838}	F (179.8) [805] {838}
Westbound Approach	B (14.0) [56] {420}	F (189.7) [1644] {1658}
Northbound Approach	A (4.1) [<25] {209}	F (52.9) [463] {788}
Southbound Approach	C (18.5) [307] {461}	A (9.1) [111] {460}



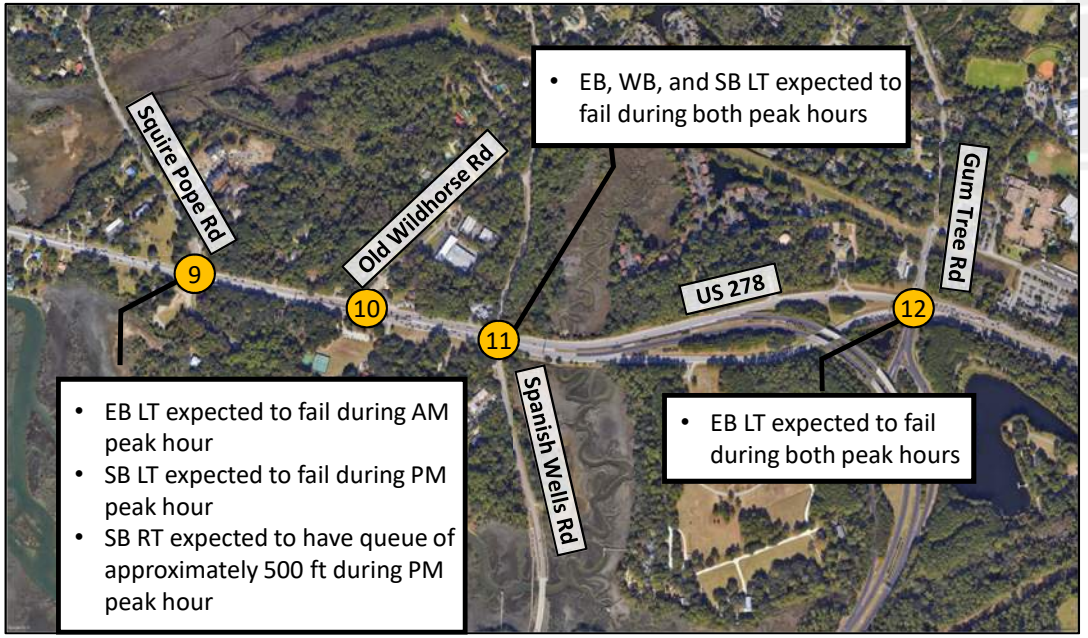
Option A Operating Conditions (VISSIM)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & Hilton Pkwy (signal)		
Overall Intersection	**A (9.4)**	**B (11.8)**
Eastbound Approach	A (6.9) [100] {676}	B (11.0) [117] {489}
Westbound Approach	B (11.7) [41] {263}	A (6.2) [40] {552}
Northbound Approach	C (30.8) [<25] {56}	E (67.0) [<25] {109}
Southbound Approach	C (22.3) [<25] {171}	D (52.3) [132] {518}
10: Old Wild Horse Rd & Hilton Pkwy (un-signalized)		
Southbound Approach	A (4.6) [<25] {50}	B (11.2) [<25] {32}
11: Spanish Wells Rd/Wild Horse Rd & Hilton Pkwy (signal)		
Overall Intersection	**B (16.6)**	**C (26.4)**
Eastbound Approach	B (11.2) [109] {990}	C (28.2) [206] {845}
Westbound Approach	B (11.2) [56] {207}	B (17.1) [113] {525}
Northbound Approach	D (48.4) [45] {140}	E (65.2) [77] {196}
Southbound Approach	E (76.0) [74] {292}	E (60.6) [49] {197}
12: Gumtree Rd & Hilton Pkwy (signal)		
Overall Intersection	**C (31.5)**	**D (37.2)**
Eastbound Approach	C (31.3) [168] {705}	E (58.2) [187] {559}
Westbound Approach	C (24.2) [90] {261}	B (19.9) [126] {651}
Northbound Approach	C (32.4) [89] {305}	D (41.2) [143] {359}
Southbound Approach	D (48.6) [91] {306}	D (51.9) [117] {428}



Option B Operating Conditions (VISSIM)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & Hilton Pkwy (signal)		
Overall Intersection	**A (7.1)**	**B (12.5)**
Eastbound Approach	A (6.9) [101] {590}	B (11.3) [119] {513}
Westbound Approach	A (4.5) [<25] {158}	A (7.5) [58] {670}
Northbound Approach	C (33.2) [<25] {57}	E (67.0) [<25] {109}
Southbound Approach	C (23.2) [<25] {174}	D (50.9) [127] {508}
10: Old Wild Horse Rd & Hilton Pkwy (un-signalized)		
Southbound Approach	A (5.5) [<25] {74}	B (12.6) [<25] {26}
11: Spanish Wells Rd/Wild Horse Rd & Hilton Pkwy (signal)		
Overall Intersection	**C (20.6)**	**C (21.8)**
Eastbound Approach	B (11.5) [112] {1032}	C (24.6) [158] {771}
Westbound Approach	C (23.7) [113] {536}	B (10.9) [162] {951}
Northbound Approach	D (48.6) [45] {135}	E (65.2) [77] {186}
Southbound Approach	E (75.9) [74] {292}	E (59.8) [49] {193}
12: Gumtree Rd & Hilton Pkwy (signal)		
Overall Intersection	**C (30.9)**	**C (29.7)**
Eastbound Approach	D (37.4) [160] {658}	C (33.0) [103] {485}
Westbound Approach	B (13.2) [53] {195}	B (18.8) [111] {575}
Northbound Approach	C (30.6) [90] {316}	D (40.5) [139] {359}
Southbound Approach	D (51.5) [99] {366}	D (51.4) [118] {443}



AUGUST 9, 2024

Independent Study of William Hilton Parkway Gateway Corridor Traffic Operations and Safety Report

Town of Hilton Head Island, South Carolina

Prepared for:

Town of Hilton Head Island

1 Town Center Court

Hilton Head Island, South Carolina

843.341.4600

Prepared by:

Lochmueller Group

Huntington Tower, 201 W Springfield Avenue

Suite 1012

Champaign, Illinois 61820

217.673.7633

CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The Town of Hilton Head Island, South Carolina commissioned an independent study of the William Hilton Parkway Gateway Corridor to assess the need for improvements along US 278 (William Hilton Parkway) from Moss Creek Drive to Indigo Run Drive, as well as along US 278 (Palmetto Bay Road) from Cross Island Parkway to Sea Pines Circle. This report summarizes Existing and future year No-Build traffic operations along the corridor to quantify mobility issues that exist today and that would be expected in the future, absent any upgrades to the roadway network.

Additionally, this report details the numerous corridor alternatives considered for implementation along William Hilton Parkway between Moss Creek Drive and Gum Tree Road. Proposed alternatives consisting of two at-grade solutions and two grade separated solutions were analyzed in further detail. The goal of the corridor alternatives analysis was to provide an objective, data-driven evaluation of the four alternatives. This evaluation was then used to assist with the selection of a single recommended alternative for the corridor between Moss Creek and Gum Tree Road.

EXISTING AND NO-BUILD CONDITIONS

CONGESTION AND CORRIDOR MOBILITY

- In 2045, out of a total of 105 **intersection approaches**, 19 and 24 intersection approaches experienced levels of service between E/F throughout the study corridor during the AM and PM peak hours, respectively.
- The existing vehicle speeds along William Hilton Parkway between Moss Creek Drive and Indigo Run Drive average at approximately 19 miles per hour (mph) in the eastbound direction during the AM peak hour and approximately 17 mph in the westbound direction during the PM peak hour. This is well below the posted speed limits, indicating significant congestion along the corridor today.
- It was found that an over-saturation of the study area under the 2045 No-Build scenario resulted in vehicles not being able to enter the VISSIM simulation network. Therefore, some of the vehicles in the model were not processed through each intersection.
- The 2045 No-Build travel times along the William Hilton Parkway corridor between Moss Creek Drive and Indigo Run are higher than existing conditions. It is expected that the travel time in the eastbound direction during the AM peak hour will increase from approximately 19.3 minutes to 26.3 minutes, an increase of 7 minutes (36%) when compared to existing conditions. During the PM peak hour, it is expected that the travel time in the westbound direction will increase from 20.9 minutes to 25.7 minutes, an increase of approximately 5 minutes (23%) when compared to existing conditions.

CORRIDOR STUDY GOALS

The following goals for improving the William Hilton Parkway Gateway Corridor were established by Town of Hilton Head representatives to guide the development of alternatives and form the basis for the alternatives analysis:

- Fix the transportation issues in the corridor in a way that improves the safety and quality of life for all residents, workers, and visitors to Hilton Head Island
  a) Address transportation needs for natural disasters and resiliency of island access
  b) Consider future transportation alternatives
- Improve the safety and quality of life for the residents of the neighborhoods and businesses directly impacted by the US 278 corridor
  a) Stoney Community
  b) Neighborhoods on Jenkins and Hog Islands (including but not limited to Windmill Harbor)
- Have a gateway to and from Hilton Head Island that the region will be proud of:
  a) Aesthetically pleasing and reflecting the Hilton Head Island/Low Country values
  b) Safe and functional pathways for pedestrians and cyclists
  c) Minimizes environmental impacts and enhances the national asset of Pinckney Island

PROPOSED ALTERNATIVES SELECTED FOR ANALYSIS

Four proposed corridor alternatives were developed to help mitigate congestion along William Hilton Parkway between Moss Creek Drive and Gum Tree Road.

ALTERNATIVE 1: SCDOT MODIFIED RECOMMENDED PREFERRED

- Alternative 1 considers the SCDOT Modified Recommended Preferred alternative with adaptive signals in place and improvements at Gum Tree Road.
- The improvements at Gum Tree Road include keeping the intersection at-grade, completely reconfiguring the intersection to improve its efficiency, and providing dual left-turn lanes for the westbound, northbound, and southbound approaches.

ALTERNATIVE 2: BOWTIES

- Alternative 2 considers bowties at Squire Pope Road and Spanish Wells Road with adaptive signals in place and aforementioned improvements at Gum Tree Rd.
- A bowtie intersection removes left-turns from the intersection and requires vehicles to navigate through roundabouts along the side-street to return to the signal and continue in their intended direction of travel.

ALTERNATIVE 3: ECHELON / CENTER TURN OVERPASS

- Alternative 3 considers either an echelon or a center turn overpass at either Squire Pope Road or Spanish Wells Rd. Echelons or Center Turn Overpasses at both Squire Pope Road and Spanish Wells Road were not considered because there is not enough distance between intersections for both to be independently grade-separated.
- Alternative 3 also considers the aforementioned improvements at Gum Tree Road.

- An echelon is a grade-separate intersection where one approach on both roadways is elevated. For example, the northbound and eastbound approaches would be elevated and the southbound and westbound approaches would remain at-grade to create two intersections. Both intersections would be signalized and all pedestrian and bicycle movements would remain at-grade.
- A center turn overpass is also a grade-separated intersection which raises only the left-turn movements from the main intersection using ramps to create two intersections. Both intersections would be signalized and all pedestrian and bicycle movements would remain at-grade.

ALTERNATIVE 4: ELEVATED BYPASS

- Alternative 4 considers an elevated bypass which would begin west of Squire Pope Road and end east of Gum Tree Road. The elevated bypass takes the four internal lanes, two in each direction, and elevates them over the study intersections. This would allow free-flow movement for the eastbound and westbound thru traffic from just east of the Jenkins Island causeway to just west of Wilborn Road. One lane in each direction along William Hilton Parkway would remain at grade along with a separate eastbound right-turn lane at Squire Pope Road and left-turn lanes at Squire Pope Road and Spanish Wells Road. This allows for full access to be maintained at Squire Pope Road and Spanish Wells Road. Full access could also be provided at Old Wild Horse Rd, which is currently a right-in/right-out intersection, in this scenario.
- The elevated bypass would directly connect to the Cross Island Parkway and allow thru vehicles to bypass Gum Tree Road. In the eastbound direction, the two eastbound lanes would expand to provide one lane to the Cross Island Pkwy, one lane to William Hilton Parkway at-grade for access to Gum Tree Road, and two lanes will continue along the elevated bypass and connect to the at-grade section just east of Gum Tree Road, allowing thru vehicles to also bypass Gum Tree Road.

The goal of the alternatives analysis was to provide an objective, data-driven evaluation of the four corridor alternatives. Therefore, various matrices were compiled with respect to traffic operations, bicycle and pedestrian accommodations, right-of-way (ROW) requirements, and environmental factors to inform an overall scoring matrix. Each of the matrices includes scores for various categories. A score of 1 is the highest ranking, whereas a score of 4 is the lowest ranking. The ranking for each category were tallied to reach a total aggregate score per alternative.

Alternative 1 ranked first with a total score of 20. Alternative 4 ranked second with a total score of 21. Alternative 2 ranked third with a total score of 24, and Alternative 3 ranked last with a total score of 28.

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Traffic Operations (Throughput and Traffic Simulations)	4	3	3	1
ROW Impact	2	4	4	1
Environmental Impact	1	3	4	2
Safety	4	3	3	1
Bike/Pedestrian Impact	4	3	1	2
Community and Social Impact	1	3	4	2
Aesthetic	2	1	3	4
Preliminary Probable Opinion of Cost	1	2	3	4
Construction Duration	1	2	3	4
TOTAL	**20**	**24**	**28**	**21**
RANK	**1**	**3**	**4**	**2**

Per the direction of the Town of Hilton Head Island, Lochmueller Group was directed to pursue corridor Alternative 1: South Carolina Department of Transportation (SCDOT) Modified Recommended Preferred with modifications to provide a single eastbound left-turn lane and a single southbound right-turn lane at the intersection of William Hilton Parkway at Squire Pope Road.

With the recommended improvements under Alternative 1: SCDOT Modified Recommended Preferred in place, this report further provides an evaluation on the impacts to the intersections downstream (i.e., east of Gum Tree Road to Indigo Run, and south of Cross Island Parkway to Sea Pines Circle). Two additional options for mitigation are provided herein for the Town of Hilton Head Island's consideration to help ease congestion along the local intersections between Gum Tree Road and Indigo Run Drive, as well as along the Cross Island Parkway towards Sea Pines Circle.

INTRODUCTION

The Town of Hilton Head Island, South Carolina commissioned an independent review of the William Hilton Parkway Gateway Corridor to assess congestion related issues along US 278 (William Hilton Parkway) from Moss Creek Drive to Indigo Run Drive, as well as along US 278 (Palmetto Bay Road) from Cross Island Parkway to Sea Pines Circle. This report summarizes Existing and future year No-Build traffic operations along the William Hilton Parkway corridor to quantify mobility issues that exist today and that would be expected in the future, absent any upgrades to the corridor.

Additionally, this report details the numerous alternatives considered for implementation along William Hilton Parkway between Moss Creek Drive and Gum Tree Road. Proposed alternatives consisting of two at-grade solutions and two grade separated solutions were then analyzed to help alleviate congestion along the corridor. The goal of the corridor alternatives analysis was to provide an objective, data-driven evaluation of the four alternatives.

After review of the four corridor alternatives, the Town of Hilton Head Island directed Lochmueller Group to pursue further evaluation of Alternative 1: SCDOT Modified Recommended Preferred with modifications to provide a single eastbound left-turn lane and a single southbound right-turn lane at William Hilton Parkway at Squire Pope Rd. This report details the final projected operating conditions for the selected alternative and addresses the potential downstream impacts to the intersections along William Hilton Parkway between Gum Tree Road and Indigo Run Drive, as well as along Cross Island Parkway to Sea Pines Circle assuming no additional improvements are in place. Lastly, two additional mitigation solutions were developed to address congestion issues at the local intersections between Gum Tree Road and Indigo Run Drive, as well as along Cross Island Parkway to Sea Pines Circle.

STUDY OBJECTIVE

The objective of this study was to provide an independent review and end-to-end analysis of the William Hilton Parkway Gateway Corridor. This study assessed congestion related issues along the corridor between Moss Creek Drive and Indigo Run Drive, as well as along the Cross Island Parkway to Sea Pines Circle. The intention of this study was to evaluate several corridor alternatives to help address the existing and future projected congestion in order to provide the Town of Hilton Head Island with a data driven analysis.

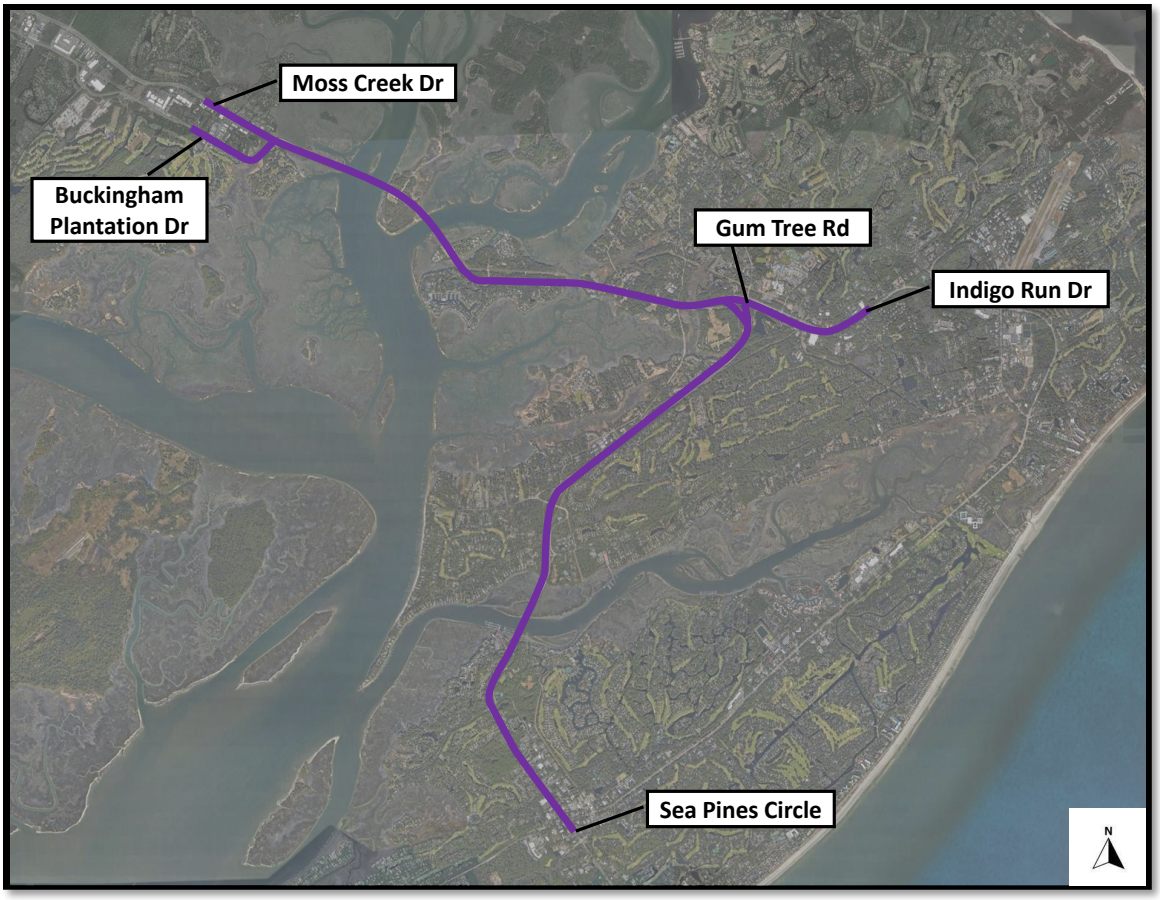


Figure 1. Entire Project Study Area

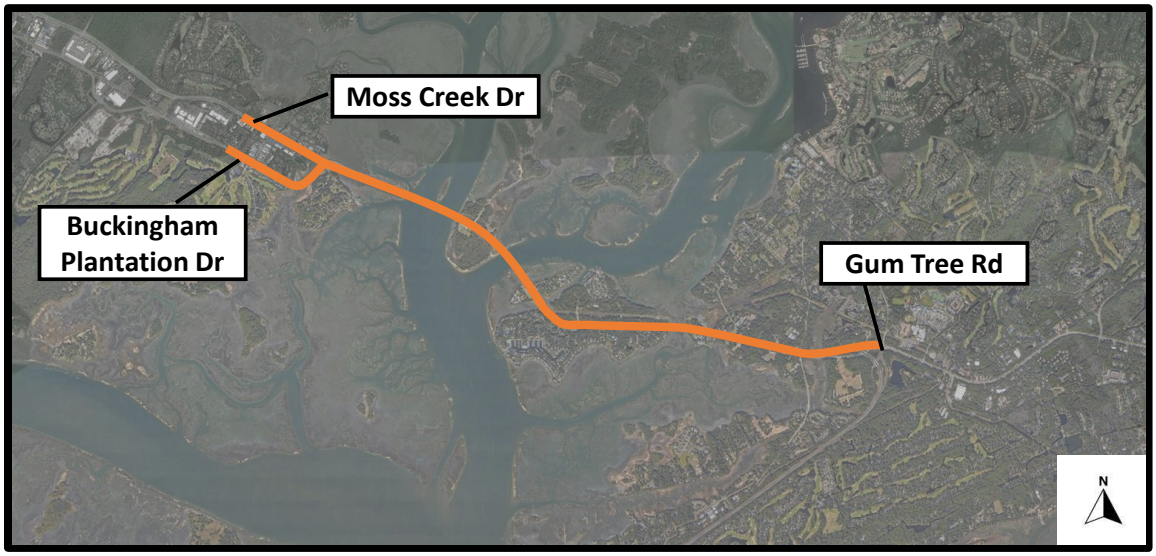


Figure 2. Modified Original Project Study Area

STUDY OVERVIEW

William Hilton Parkway (US 278) is currently classified as a principal arterial oriented in the east-west direction within the study area, providing connectivity to Hilton Head Island. This study was completed in several phases. The first phase evaluated the 2023 Existing conditions and 2045 No-Build conditions for the entire project area, which includes William Hilton Parkway from Moss Creek Drive to Indigo Run Drive, as well as Palmetto Bay Road from Cross Island Parkway to Sea Pines Circle, as shown in **Figure 1.**

The second phase evaluated four alternatives to help reduce congestion along the William Hilton Parkway corridor between Moss Creek Drive and Gum Tree Road. This is referred to as the Modified Original Project Study Area and is shown in **Figure 2.** Of those four corridor alternatives, one was selected for further evaluation to assess the impacts throughout the Entire Project Study Area.

The third and final phase evaluated the impacts of the selected corridor alternative from the second phase of analysis, and further recommendations were made to help improve the overall operations of the Entire Project Study Area (**Figure 1**).

BACKGROUND

DATA COLLECTION AND FIELD INVENTORY

TRAFFIC DATA

Traffic volumes were collected by others at the following intersections on March 22, 2023, and provided to Lochmueller Group for use in this analysis:

- Buckingham Plantation Dr and Bluffton Pkwy
- Buckingham Plantation Dr and US 278
- Moss Creek Dr and US 278
- WB Bluffton Pkwy Ramp and WB US 278
- EB Bluffton Pkwy Ramp and EB US 278
- Fording Island Rd Extension and US 278
- Pinckney Wildlife Refuge and US 278
- Blue Heron Point Rd and US 278
- Crosstree Dr and US 278
- Jenkins Rd and US 278
- Squire Pope Rd and US 278
- Spanish Wells Rd and US 278
- Cross Island Pkwy Diverge and EB US 278
- Cross Island Pkwy Merge and WB US 278
- Gum Tree Rd and Cross Island Pkwy Off and On Ramps
- Gum Tree Rd and Business US 278
- Jarvis Park Rd and Business US 278
- Pembroke Dr and Business US 278
- Indigo Run Dr and Business US 278
- Marshland Rd and Spanish Wells Rd
- Marshland Rd and SB Cross Island Pkwy Ramps
- Marshland Rd and NB Cross Island Pkwy Ramps
- Arrow Rd and US 278
- Target Rd and US 278
- Sea Pines Circle and US 278

This study evaluated conditions during the morning and evening peak periods of a typical weekday, as these periods represent the most critical times of day for traffic operations within the study area for commuter peaks. If traffic can be accommodated during these peak periods, it stands to reason that adequate capacity would be available throughout the remainder of the day.

Traffic data utilized for this study is based on a combination of historical traffic counts obtained from SCDOT supplemented with new counts performed in March 2023. From the data, the weekday peak hours of traffic for the entire project study area were determined to occur between 7:00 AM and 8:00 AM in the morning and from 4:30 PM to 5:30 PM during the afternoon.

Corridor studies often reference the 30th highest day for traffic volumes to ensure that the volumes used in the analysis reflect peak conditions, while not over- or under-estimating the traffic volumes. Therefore, it was necessary to ensure that the counts collected accurately reflect the 30th highest day. Historical traffic data was obtained from SCDOT from the most recent 365 days. Given that the study focuses on commuter peak hours, the hourly data from 6:00 AM – 6:00 PM was referenced. After reviewing the traffic volumes throughout the year, it was determined that March 30, 2023 was the 30th highest day out of the year for traffic volumes. The counts collected on March 22, 2023 were grown by the percent difference between the two dates to bring them up to the estimated traffic volumes on March 30, 2023 (30^{th} highest day). The resulting 2023 traffic volumes used in this study are provided in **Appendix A.**

FIELD INVENTORY

A detailed inventory of field conditions was performed to capture both physical and operational characteristics of the study area network. The physical inventory emphasized static features of the roadway and included items such as posted speed limits, number of travel lanes, lane designations at intersections, adaptive signal operations, and traffic signal phasing (e.g., protected turn arrows versus permissive turning movements).

This detailed inventory of field conditions, as well as traffic observations focused on traffic flows during the peak periods, was performed over the course of two weekdays in December 2023. Locations of congestion and traffic backups were identified and monitored to determine sources of constrained flows. Prevailing queue lengths at intersections were inventoried. Traffic signal operations were monitored to determine the quality of traffic progression along the William Hilton Parkway corridor and to identify the operations of the recently installed (late Fall 2023) adaptive signal system. Travel time runs and average speeds were conducted during the AM and PM peak periods along William Hilton Parkway between Moss Creek Drive and Indigo Run Drive, as well as from William Hilton Parkway at Moss Creek Drive to Cross Island Parkway at Sea Pines Circle, as detailed in the model calibration section of this document.

ANALYSIS METHODOLOGY

TRAFFIC

A preliminary analysis was completed using Synchro 11 traffic modeling software, which is based upon the methodologies outlined in the “Highway Capacity Manual” (HCM) published by the Transportation Research Board. Intersection performance or traffic operations are quantified by six Levels of Service (LOS), which range from LOS A ("Free Flow”) to LOS F ("Fully Saturated"). LOS D is considered acceptable for peak period conditions in urban and suburban areas. However, at side-street stop-controlled intersections, LOS E or even F is common occurrence for peak period conditions as it is typical for delays to be longer for vehicles along the side-street as they wait to find acceptable gaps in the traffic to turn into the traffic stream. **Table 1** shows the LOS criteria for signalized and unsignalized intersections.

Levels of service for intersections are determined based on the average delay experienced by motorists. Signalized intersections reflect higher delay tolerances as compared to unsignalized and roundabout locations because motorists are accustomed to and accepting of longer delays at signals. For signalized and all-way stop intersections, the average control delay per vehicle is estimated for each movement and then aggregated for each approach and the intersection as a whole. For intersections with partial (side-street) stop control, the delay is calculated for the minor movements only (side-street approaches and major road left-turns) since thru traffic on the major road is not required to stop.

Table 1. Intersection Level of Service Criteria

Level of Service	Control Delay per Vehicle (sec/veh)	
	Signalized	Unsignalized
A	≤ 10	0 - 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 -35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

Source: HCM 6th Edition

In addition to Synchro, VISSIM software was also used, which is a microsimulation tool that accurately replicates individual vehicles and their interactions within complex traffic streams, such as interchanges, freeways, and expressway corridors with signalized intersections. A robust amount of data and field observations were conducted, as previously described, to calibrate the VISSIM models to closely replicate field conditions.

MODEL CALIBRATION

The VISSIM traffic simulation model calibration process began with the development of a base model, which aims to replicate Existing conditions. As previously noted, a robust data collection effort was required to support this effort, including roadway geometry, turning speeds, traffic signal timings, etc. The first step in base model development involved coding the roadway geometry (number of lanes, lane configurations, link lengths, etc.) with links and connectors using a recent aerial as a template.

Once the network backbone was established, free-flow speed distributions were created. Reduced speed zones were also established for turning movements and locations in the network where the roadway geometry physically limits speeds below the free-flow speed or posted speed limits. The next steps addressed traffic control. The adaptive traffic signal timings obtained from Q-Free were input into the simulation, with detectors coded where applicable. Stop-controlled movements received stop signs coded into the network. Locations where yielding or traffic control priority needed to be established (such as a right-turn-on-red) were coded with conflict areas or priority rules. Conflict areas are most commonly used unless further refinement of the gap times or yielding characteristics was necessary, in which case priority rules were deployed.

Traffic volumes were then represented in the VISSIM model as an origin-destination matrix estimated from turning movement counts. The matrix specifies the model's traffic patterns and the routes vehicles take to traverse the model network. Traffic entering the model network was coded using vehicle inputs. Vehicle inputs specify volumes and vehicle type compositions, which were grouped into passenger vehicles, trucks, light-goods, and buses. The origin-destination matrix was routed statically with routes traversing the entire network for optimum accuracy rather than simply intersection by intersection.

Since VISSIM starts with zero vehicles in the network, a warm-up period is needed to initiate the model with traffic prior to capturing data. The warm-up period is known as the seeding period and its length and volume characteristics were adjusted as part of the calibration process. Given the scale of the network, a 60-minute seeding period was used to establish background traffic before recording results.

Given the inherent stochastic nature of simulation (imposed by random seeds), multiple simulation runs using different seed numbers were required for each scenario and the reported model results were averaged across runs. Ten simulation runs were completed, which is typically sufficient to obtain an appropriate level of confidence in the results.

The model calibration process finished with a detailed review of model parameters and thorough consideration of adjustments to improve the model's ability to replicate field conditions. The final calibration process compared data output from the model, such as travel times and flow rates, to field measurements of the same attributes.

As part of the calibration criteria, it was determined that the travel times reported in the VISSIM model should be within 10% of the travel times recorded in the field. The travel times calculated in the VISSIM model were inflated by 15% to account for higher volumes in March (when traffic counts were collected) versus in December (when the travel times were collected). The travel time results are provided in **Table 2.** As shown, all the travel times reported by the Existing conditions VISSIM model were within 10% of the observed travel times recorded during field observations. Therefore, all travel time targets were satisfied.

Table 2. 2023 Existing VISSIM Calibration Travel Time Results

Corridor		Observed Travel Time (secs) [min]		Simulated Travel Time (secs) [min]		% Difference	
		AM	PM	AM	PM	AM	PM
William Hilton Pkwy between Moss Creek and Indigo Run	EB	1108 [18.5 min]	672]11.2 min]	1157 [19.3 min]	619 [10.3 min]	4.42%	-7.91%
	WB	605 [10.1 min]	1202 [20 min]	572 [9.5 min]	1252 [20.9 min]	-5.50%	4.17%
William Hilton Pkwy from Moss Creek to Sea Pine Circle via **Cross Island Pkwy**	SB	1378 [23 min]	821 [13.7 min]	1356 [22.6 min]	857 [14.3 min]	-1.58%	4.37%
	NB	800 [13.3 min]	1516 [25.3 min]	826 [13.8 min]	1520 [25.3 min]	3.20%	0.25%

In addition to travel time calculations, traffic volumes were also used to help calibrate the VISSIM model. Similar to the travel times, it was determined that the traffic volumes reported in the VISSIM model should be within 10% of the 2023 existing traffic volumes provided in **Appendix A**. The traffic volume results are provided in **Table 3.** As shown, all the traffic volumes reported by the existing conditions VISSIM model were within 10% of the calculated 2023 existing corridor traffic volumes. Therefore, all traffic volume targets were satisfied.

Table 3. 2023 Existing VISSIM Calibration Traffic Volumes Results

Location	Observed Traffic Volumes (vehicles)		Simulated Traffic Volumes (vehicles)		% Difference	
	AM	PM	AM	PM	AM	PM
William Hilton Pkwy west of Squire Pope EB	2774	2237	2970	2240	7.07%	0.13%
William Hilton Pkwy west of Squire Pope WB	1639	3030	1650	2898	0.67%	-4.36%
William Hilton Pkwy east of Spanish Wells EB	2729	1991	2929	1955	7.33%	-1.81%
William Hilton Pkwy east of Spanish Wells WB	1408	2623	1423	2614	1.07%	-0.34%
Cross Island Pkwy north of Marshland Rd NB	975	1422	964	1371	-1.13%	-3.59%
Cross Island Pkwy north of Marshland Rd SB	1416	1190	1486	1167	4.94%	-1.93%

EXISTING CONDITIONS

EXISTING SYNCHRO TRAFFIC OPERATIONAL ANALYSIS

A preliminary analysis was completed using Synchro 11 traffic modeling software, which is based upon the methodologies outlined in the "Highway Capacity Manual" (HCM) published by the Transportation Research Board.

Operating conditions at the study intersections were evaluated using Synchro 11 and are summarized in **Appendix B.** The measures of effectiveness reported include LOS, delay, queue, and volume-to-capacity ratio (v/c). The delay is reported in seconds per vehicle. The queue is reported in feet as the 95th percentile queue, which represents a value that is only expected to be exceeded once or twice during a peak hour. The v/c ratio compares vehicle demand to the capacity of an associated lane group. A v/c ratio of 1.0 represents a road segment that is at full capacity. A v/c ratio that exceeds 1.0 represents a road segment that is oversaturated or has more vehicular demand than the provided roadway geometry can theoretically support.

It was found that the eastbound traffic experiences significant congestion during the AM peak period, whereas westbound traffic experiences significant congestion during the PM peak period. This is consistent with the commuter traffic patterns in the Town of Hilton Head.

While several intersections experience long delays and queue lengths during the AM peak hour, the PM peak hour appears to have overall worse operating conditions. Long delays occur along side-streets at unsignalized intersections throughout the entire study area. Additionally, a rolling queue begins at Wilborn Road and continues in the westbound lanes of William Hilton Parkway over the bridge during the PM peak hour. The westbound queue length reaches up to approximately 2,500 ft (101 cars) at Squire Pope during the PM peak hour. It is evident that the study area currently experiences congestion during both the AM and PM peak periods.

EXISTING VISSIM TRAFFIC OPERATIONAL ANALYSIS

A VISSIM traffic model was also completed to further evaluate conditions during the morning and afternoon peak hours, and provides performance measures as outputs. The LOS criteria for signalized and unsignalized intersections are the same as **Table 1**. The measures of effectiveness (MOE) reported include levels of service, delay, average queue length, and maximum observed queue length. The delay is reported in seconds per vehicle and the queue is reported in feet.

The 2023 Existing operating conditions based on the VISSIM model are summarized in **Appendix C.** The traffic operations largely agree with those shown in **Appendix B** from the Synchro analysis. The PM peak hour appears to have overall worse operating conditions than the AM peak period. The long delays presented in the Synchro analysis along side-streets at unsignalized intersections throughout the entire study area were confirmed in the VISSIM analysis. The study area experiences significant congestion during both the existing AM and PM peak periods.

EXISTING VISSIM NETWORK PERFORMANCE

The existing average recorded speeds along William Hilton Parkway between Moss Creek Drive and Indigo Run range from approximately 19 miles per hour (mph) in the AM peak hour to 35 mph during the PM peak hour for the eastbound direction, as shown in **Table 4.** The posted speed limit along the corridor ranges between 45-55 mph. Therefore, it is evident that the existing average recoded speeds are well below the posted speed limit, which is an indication that there is significant congestion along the corridor. The westbound direction experiences average speeds of approximately 38 mph during the AM peak hour and 17 mph during the PM peak hour. This indicates significant congestion in the westbound direction during the PM peak hour, as is evidenced by the commuter peaks.

Between Moss Creek Drive and Sea Pines Circle via the Cross Island Parkway in the southbound direction, the average recorded speed is approximately 27 mph during the AM peak hour and the average recorded speed is 42 mph during the PM peak hour. In the opposite direction, the average recorded speed is approximately 44 mph during the AM peak hour and 24 mph in the PM peak hour. Similar to the William Hilton Parkway corridor between Moss Creek Drive and Indigo Run, this corridor also experiences congestion in relation to the commuter peaks.

Table 5 further breaks down overall network performance for the existing peak period conditions. As shown, throughout the entire project area, vehicles are required to stop on average between 6 to 10 times when traveling along the corridor.

Table 4. Existing Corridor Speeds (VISSIM)

Routes	Average Speed (mph)	
	AM Peak Hour	PM Peak Hour
Moss Creek Drive to Indigo Run Drive – Eastbound	18.9	35.2
Indigo Run Drive to **Moss Creek Drive** – Westbound	38.0	17.4
Moss Creek Drive to Sea Pines Circle – Southbound	26.6	42.1
Sea Pines Circle to Moss Creek Drive – Northbound	43.9	23.8

Table 5. Network Performance – Existing Conditions

Peak Hour	Average Number of Stops per Vehicle	Average Speed (mph)	Total Vehicles (vph)
Existing AM	6.5	25	10,497
Existing PM	9.9	22	12,393

2045 NO-BUILD CONDITIONS

2045 was selected as the project's design year for purposes of evaluating traffic operations conditions into the future. The 2045 No-Build conditions analysis is intended to reflect future conditions within the study area while accounting for an increase in "background" traffic. No modifications were made to the lane configurations. The 2045 No-Build scenario does include the effects of the adaptive signal system implemented in the Fall of 2023, as well as the inclusion of Windmill Harbour into the adaptive signal system.

In order to evaluate traffic conditions through the year 2045, it was necessary to forecast the anticipated growth within the study area based on an increase in "background" traffic resulting from increasing population and commercial and employment growth in The Town of Hilton Head.

An annual background growth rate of 0.56% was determined after careful consideration of the Lowcountry Area Transportation Study (LATS) Travel Demand Model (TDM), census data, Beaufort County historic growth trends, historic traffic growth on the US 278 bridge, sale and restaurant tax revenue, public parking revenue, and short term rental data. A memorandum detailing the methodology behind the 0.56% growth rate is provided in **Appendix D.** The 2023 Existing traffic volumes were grown annually by 0.56% to 2045 in order to produce the 2045 No-Build traffic volumes which are provided in **Appendix E.**

2045 NO-BUILD SYNCHRO TRAFFIC OPERATIONAL ANALYSIS

The 2045 No-Build operating conditions at the study intersections were preliminarily evaluated using Synchro 11 and are summarized in **Appendix F.** The previously failing conditions and congestion experienced in the 2023 Existing conditions are expected to be exacerbated by 2045 with the forecasted background traffic growth. Significant congestion is expected throughout the study area. Therefore, it can be concluded that the study intersections cannot accommodate the forecasted traffic growth in their existing state.

2045 NO-BUILD VISSIM TRAFFIC OPERATIONAL ANALYSIS

The 2045 No-Build operating conditions at the study intersections were further evaluated using VISSIM and are summarized in **Appendix G.** The operating conditions largely agree with those shown in the 2045 No-Build Synchro operating conditions (**Appendix F**) and validate the travel time and volume conclusions above. Significant congestion is expected throughout the study area through the year 2045. The congestion that currently exists throughout the study area is expected to be exacerbated by 2045 with the forecasted growth.

2045 NO-BUILD VISSIM NETWORK PERFORMANCE

The VISSIM differences in reported travel time calculations and traffic volumes between the 2023 Existing conditions and 2045 No-Build conditions were evaluated and shown in **Table 6** and **Table 7**, respectively.

It is expected that the travel time in the eastbound direction along Hilton Parkway between Moss Creek Drive and Indigo Run Drive during the AM peak hour will increase from approximately 19.3 minutes to 26.3 minutes, an increase of 7 minutes (36%) when compared to existing conditions. During the PM peak hour along Hilton Parkway between Moss Creek Drive and Indigo Run Drive, it is expected that the travel time in the westbound direction will increase from 20.9 minutes to 25.7 minutes, an increase of approximately 5 minutes (23%) when compared to existing conditions

It is expected that the travel time in the southbound direction along Hilton Parkway at Moss Creek to Cross Island Parkway at Sea Pines Circle during the AM peak hour will increase from approximately 22.6 minutes to 30.1 minutes, an increase of 7.5 minutes (46%) when compared to existing conditions. During the PM peak hour along Hilton Parkway at Moss Creek to Cross Island Parkway at Sea Pines Circle, it is expected that the travel time in the northbound direction will increase from 25.3 minutes to 41.1 minutes, an increase of approximately 16 minutes (62%) when compared to existing conditions

Multiple locations have negative percent differences for traffic volume results where the 2045 No-Build simulated volumes are less than the 2023 Existing simulated volumes. This is due to over-saturation of the study area in the model, and results in vehicles not being able to enter the simulation network to process through each intersection. Therefore, it is evident that the study area is expected to experience significant congestion through the year 2045.

Table 6. 2045 No-Build VISSIM Calibration Travel Time Results

Corridor		Existing Simulated Travel Time (secs) [min]		2045 No-Build Simulated Travel Time (secs) [min]		% Difference	
		AM	PM	AM	PM	AM	PM
William Hilton Pkwy between Moss Creek and Indigo Run	EB	1157 [19.3 min]	619 [10.3 min]	1579 [26.3 min]	642 [10.7 min]	**36.47%**	**3.72%**
	WB	572 [9.5 min]	1252 [20.9 min]	584 [9.7 min]	1544 [25.7 min]	**2.10%**	**23.32%**
William Hilton Pkwy from Moss Creek to Sea Pine Circle via Cross Island Pkwy	SB	1356 [22.6 min]	857 [14.3 min]	1984 [30.1 min]	873 [14.6 min]	**46.31%**	**1.87%**
	NB	826 [13.8 min]	1520 [25.3 min]	823 [13.7 min]	2465 [41.1 min]	**-0.36%**	**62.17%**

Table 7. 2045 No-Build VISSIM Calibration Traffic Volumes Results

Location	Existing Simulated Volume Results (vehicles)		2045 No-Build Simulated Volume Results (vehicles)		% Difference	
	AM	PM	AM	PM	AM	PM
William Hilton Pkwy west of Squire Pope EB	2970	2240	2783	2524	**-6.30%**	**12.68%**
William Hilton Pkwy west of Squire Pope WB	1650	2898	1843	2754	**11.70%**	**-4.97%**
William Hilton Pkwy east of Spanish Wells EB	2929	1955	2748	2198	**-6.18%**	**12.43%**
William Hilton Pkwy east of Spanish Wells WB	1423	2614	1570	2413	**10.33%**	**-7.69%**
Cross Island Pkwy north of Marshland Rd NB	964	1371	1065	919	**10.48%**	**-32.97%**
Cross Island Pkwy north of Marshland Rd SB	1486	1167	1440	1299	**-3.10%**	**11.31%**

Table 8 summarizes overall network performance for the 2045 No-Build scenario as compared to the Existing conditions through the entire study area. During the PM peak hour, vehicles stops will increase throughout the study area. Vehicles will be required to stop on average 10 to 15 times. Additionally, the average vehicle speeds during the PM peak hour will degrade to an average of 16 mph. These metrics are indicative of stop and go conditions and peak hour congestion. This is below the already congested existing average off-peak speed for the corridor which is 25 mph and 22 mph for AM and PM peak hours, respectively.

Due to congestion during the 2045 No-Build condition, approximately 10% of total network vehicles were unable to enter the model network, and therefore are not captured in the network performance results shown in Table 8.

Table 8. Network Performance – 2045 No-Build Conditions

Scenario	Average Number of Stops per Vehicle	Average Speed (mph)	Total Vehicles (vph)
Existing AM	6.5	25	10,497
Existing PM	9.9	22	12,393
2045 No-Build AM	9.9	21	11,143
2045 No-Build PM	15.4	16	12,393

2045 ALTERNATIVES ANALYSIS

In addition to the simulation modeling of the study area, Lochmueller evaluated several strategies in order to determine the viability of maintaining four lanes along William Hilton Parkway between Windmill Harbour and Squire Pope Road. The strategies included:

- Implementation of a second bridge
- Modifications to the existing mass transit system
- Implementation of a new ferry system
- Implementation of a facility usage fee

Ultimately, it was determined that it would be highly unlikely that modifications to the existing transit system, the implementation of a new ferry system, or the implementation of a facility usage fee would reduce traffic volumes enough to maintain the existing four-lane section. Furthermore, it was determined that a six-lane section of William Hilton Parkway onto Hilton Head Island would be needed independently of a second bridge. Additional preliminary evaluations pertaining to the financial feasibility of structurally rehabilitating and/or seismically retrofitting the existing Mackay Creek and Skull Creek bridges in lieu of building a new six-lane structure were completed. A cursory, high-level evaluation of a potential southern bypass was also completed. Additional information regarding the above stated topics are provided in **Appendix H.**

As evidenced by the Existing and No-Build conditions, some of the existing traditional signalized intersections will no longer be able to process the volume of vehicles within the William Hilton Parkway corridor study area by the year 2045. Therefore, innovative concepts to improve the capacity of the corridor were considered. Both at-grade and grade separated innovative intersections were evaluated to improve safety, reduce delay, and increase efficiency.

CORRIDOR STUDY GOALS

The following goals for improving the William Hilton Parkway corridor were established by The Town of Hilton Head Island to guide the development of alternatives and form the basis of the alternatives analysis:

- Fix the transportation issues in the corridor in a way that improves the safety and quality of life for all residents, workers, and visitors to Hilton Head Island
  a) Address transportation needs for natural disasters and resiliency of island access
  b) Consider future transportation alternatives
- Improve the safety and quality of life for the residents of the neighborhoods and businesses directly impacted by the US 278 corridor
  a) Stoney Community
  b) Neighborhoods on Jenkins and Hog Islands (including but not limited to Windmill Harbor)
- Have a gateway to and from Hilton Head Island that the region will be proud of:
  a) Aesthetically pleasing and reflecting the Hilton Head Island/Low County values
  b) Safe and functional pathways for pedestrians and cyclists
  c) Minimizes environmental impacts and enhances the national asset of Pinckney Island

ALTERNATIVES CONSIDERED

With the guiding principles in mind, the following four corridor alternatives were recommended for further study:

- Alternative 1: SCDOT Modified Recommended Preferred
- Alternative 2: Bowties at Squire Pope and Spanish Wells
- Alternative 3: Echelon / Center Turn Overpass
  - Grade-Separated Intersection at either Squire Pope or Spanish Wells, but not both
- Alternative 4: Elevated Bypass

As agreed upon with the Town of Hilton Head, the alternative analysis was completed for the Modified Original Project Study Area shown in **Figure 2**.

ALTERNATIVE 1: SCDOT MODIFIED RECOMMENDED PREFERRED

Alternative 1 considers the SCDOT Modified Recommended Preferred alternative with adaptive signals in place and improvements at Gum Tree Road. The improvements at Gum Tree Road include keeping the intersection at-grade, completely reconfiguring the intersection to improve its efficiency, and providing dual left-turn lanes for the westbound, northbound, and southbound approaches. **Figure 3** shows the improvements recommended as part of Alternative 1, as provided by SCDOT. It should be noted that the improvements at Gum Tree Road are not reflected in **Figure 3**, which was provided by SCDOT.

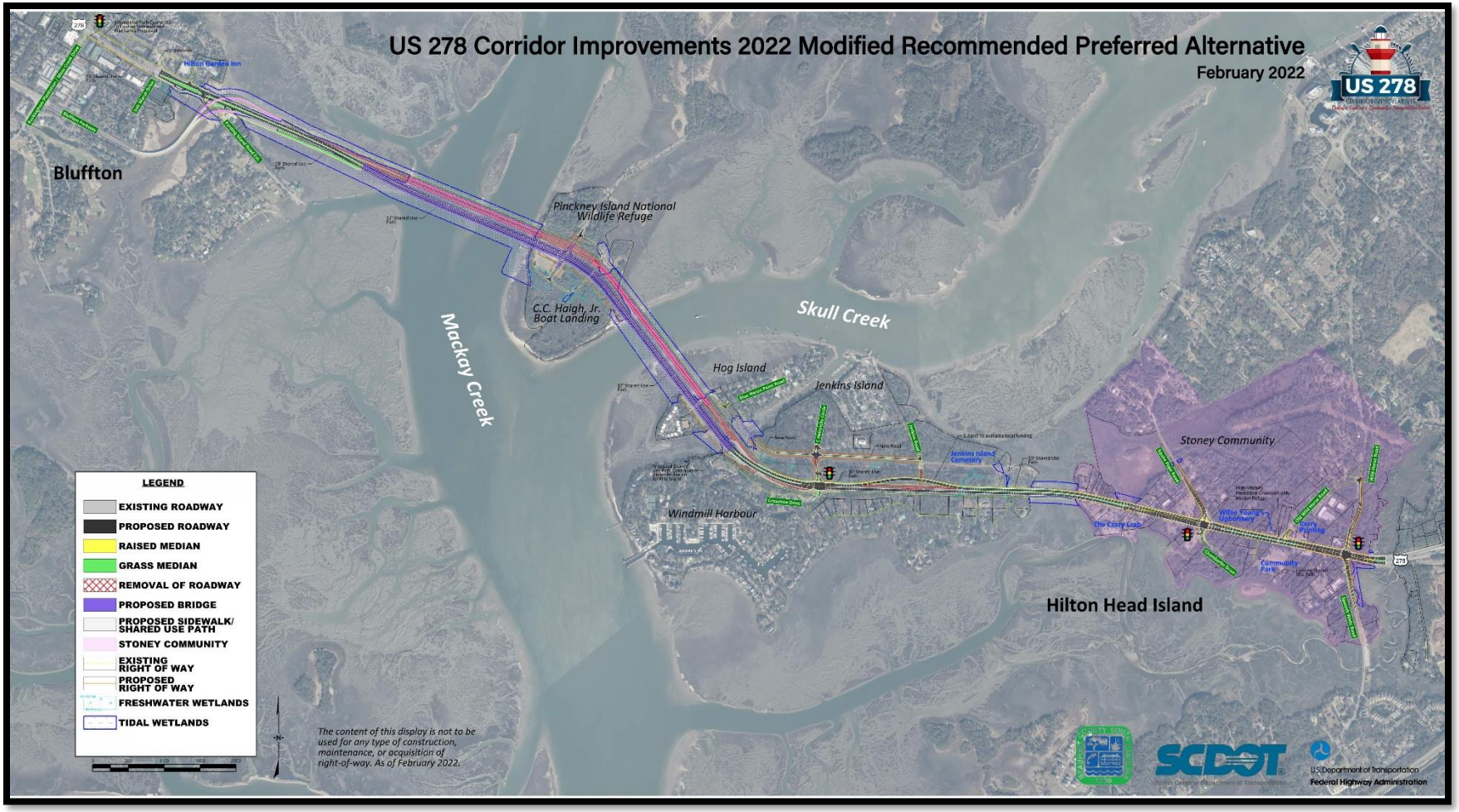


Figure 3. Alternative 1: SCDOT Modified Recommended Preferred

ALTERNATIVE 2: BOWTIES AT SQUIRE POPE AND SPANISH WELLS

Alternative 2 considers bowties at Squire Pope Road and Spanish Wells Road with adaptive signals in place and improvements at Gum Tree Road. The improvements at Gum Tree Road are the same as what was included in Alternative 1, which keeps the intersections at-grade, reconfigures the intersection to improve its efficiency, and provides dual left-turn lanes for the westbound, northbound, and southbound approaches.

A bowtie intersection removes left-turns from the intersection and requires vehicles to navigate through roundabouts along the side-street to return to the signal and continue in the intended direction of travel. **Figure 4** shows an example of a bowtie intersection. Note that this is only an example and not a schematic drawing of William Hilton Parkway.

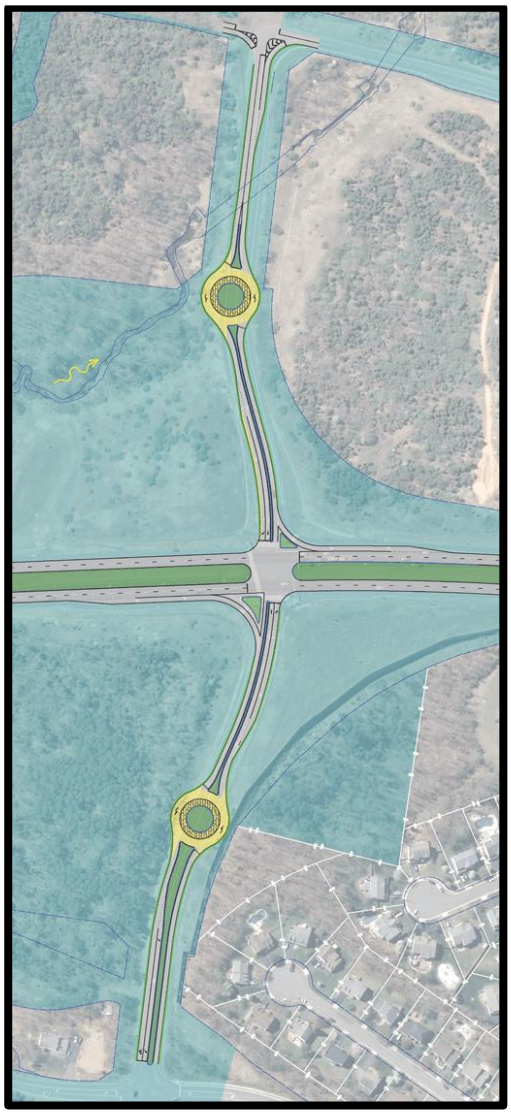


Figure 4. Example Bowtie Intersection (Provided by Virginia DOT)

Bowtie intersections provide several benefits. They improve safety as fewer conflicting vehicle and pedestrian movements are allowed. Bowtie intersections have 12 fewer conflict points when compared to traditional intersections, which have 32 conflict points. Bowtie intersections also encourage lower vehicle speeds through the roundabouts. The size of main intersections can be reduced as left-turn lanes are removed. Lastly, bowtie intersections increase the efficiency of the signalized intersections as more of the signal time can go to the main thru movements, improving traffic operations.

However, bowtie intersections require a change in decision making for drivers as all left-turn movements would be required to navigate the adjacent roundabouts along Squire Pope Road and Spanish Wells Road. Bowtie intersections also may increase the amount of travel time for left-turning vehicles and may require additional ROW for the roundabouts.

ALTERNATIVE 3: ECHELON / CENTER TURN OVERPASS

Alternative 3 considers either an echelon or a center turn overpass at either Squire Pope Road or Spanish Wells Road. Echelons or center turn overpasses at both Squire Pope Road and Spanish Wells Road were not considered because there is not enough distance between the two intersections for both to be independently grade-separated.

Alternative 3 includes the adaptive signals in place as well as the previously detailed improvements at Gum Tree Road. The improvements at Gum Tree Road are the same as what was included in Alternative 1, which keeps the intersections at-grade, reconfigures the intersection to improve its efficiency, and provides dual left-turn lanes for the westbound, northbound, and southbound approaches.

An echelon is a grade-separated intersection where one approach on both roadways is elevated. For example, the northbound and eastbound approaches would be elevated and the southbound and westbound approaches would remain at-grade to create two intersections. Both intersections would be signalized and all pedestrian and bicycle movements would remain at-grade. **Figure 5** shows an example of an echelon. Note that this is only an example and not a schematic drawing of William Hilton Parkway.

An echelon improves safety as fewer conflicting vehicle and pedestrian movements are allowed. Echelon intersections have 10 fewer conflict points when compared to traditional intersections (32 conflict points). They do not require a change in decision making for drivers as all movements would remain at Squire Pope Road and Spanish Wells Road. Echelons increase the efficiency of the signalized intersections as more of the signal time can go to the main thru movements, improving traffic operations. While each approach would likely need the same lane configurations as shown in Alternative 1, only two approaches would conflict.

However, echelons do require grade separation of intersections and large intersections would likely remain as all movements (left-turn, thru, and right-turn) are still allowed.

A center turn overpass is also a grade-separated intersection which raises only the left-turn movements from the main intersection using ramps to create two intersections. Both intersections would be signalized and all pedestrian and bicycle movements would remain at-grade. **Figure 6** shows an example of a center turn overpass. Note that this is only an example and not a schematic drawing of William Hilton Parkway.

A center turn overpass improves safety as fewer conflicting vehicle and pedestrian movements are allowed. Center turn overpass intersections have 8 fewer conflict points when compared to traditional intersections (32 conflict points). They increase the efficiency of the signalized intersections as more of the signal time can go to the main thru movements, improving traffic operations.

However, similar to echelons, center turn overpasses require grade separation and large intersections would likely remain as all movements (left-turn, thru, and right-turn) are still allowed.

Figure 5. Example Echelon (Provided by Virginia DOT)

Figure 6. Example Center Turn Overpass (Provided by Virginia DOT)

ALTERNATIVE 4: ELEVATED BYPASS

Alternative 4 considers an elevated bypass which would begin west of Squire Pope Road and end east of Gum Tree Road. The elevated bypass would take the four internal lanes, two in each direction, and elevate them over the study intersections. This would allow free-flow movement for the eastbound and westbound thru traffic from just east of the Jenkins Island causeway to just west of Wilborn Road. One lane in each direction along William Hilton Parkway would remain at grade along with a separate eastbound right-turn lane at Squire Pope Road and left-turn lanes at Squire Pope Road and Spanish Wells Road. This allows for full access to be maintained at Squire Pope Road and Spanish Wells Rd. Full access could also be provided at Old Wild Horse Road, which is currently a right-in/right-out intersection today.

The elevated bypass would directly connect to the Cross Island Parkway. In the eastbound direction, the two eastbound lanes would expand to provide one lane to the Cross Island Pkwy, one lane to William Hilton Parkway at-grade for access to Gum Tree Road, and two lanes will continue along the elevated bypass and connect to the at-grade section just east of Gum Tree Road, allowing thru vehicles to also bypass Gum Tree Road. In the westbound direction, two lanes would be provided along William Hilton Parkway just east of Gum Tree Road. These lanes would be reduced to one lane prior to the merge with the westbound Cross Island Parkway ramp. The westbound Cross Island Parkway ramp and the single elevated westbound bypass ramp would then merge into a two-lane elevated section.

Alternative 4 also assumes the adaptive signal system would remain in operation. However, the improvements needed at Gum Tree Road in Alternatives 1, 2, and 3 would no longer be needed. In fact, the Gum Tree Road intersection would be able to be reduced in size, as most of the eastbound and westbound thru traffic would remain on the bypass rather than navigating thru the at-grade intersection. Similarly, the at-grade intersections at Squire Pope Road and Spanish Wells Road would also be able to be reduced in size. An elevated bypass would improve safety, as fewer thru vehicles would remain at grade, thereby reducing the conflicts between vehicles and pedestrians. In addition, the efficiency of the at-grade signalized intersections would be increased despite the reduction in the size of the intersection. Lastly, Alternative 4 provides the most capacity for traffic growth along the corridor.

However, this alternative would be the most expensive and would result in the largest construction impact. Alternative 4 also requires grade separation and a change in decision making, as drivers looking to continue traveling eastbound or westbound would need to enter the bypass, rather than go thru the local intersections of Squire Pope Road, Old Wildhorse Road, and Spanish Wells Road as they do today. Full access would still be provided at-grade. **Figure 7** through **Figure 10** provide an example schematic of the elevated bypass.

Figure 7. Example of Elevated Bypass - 01

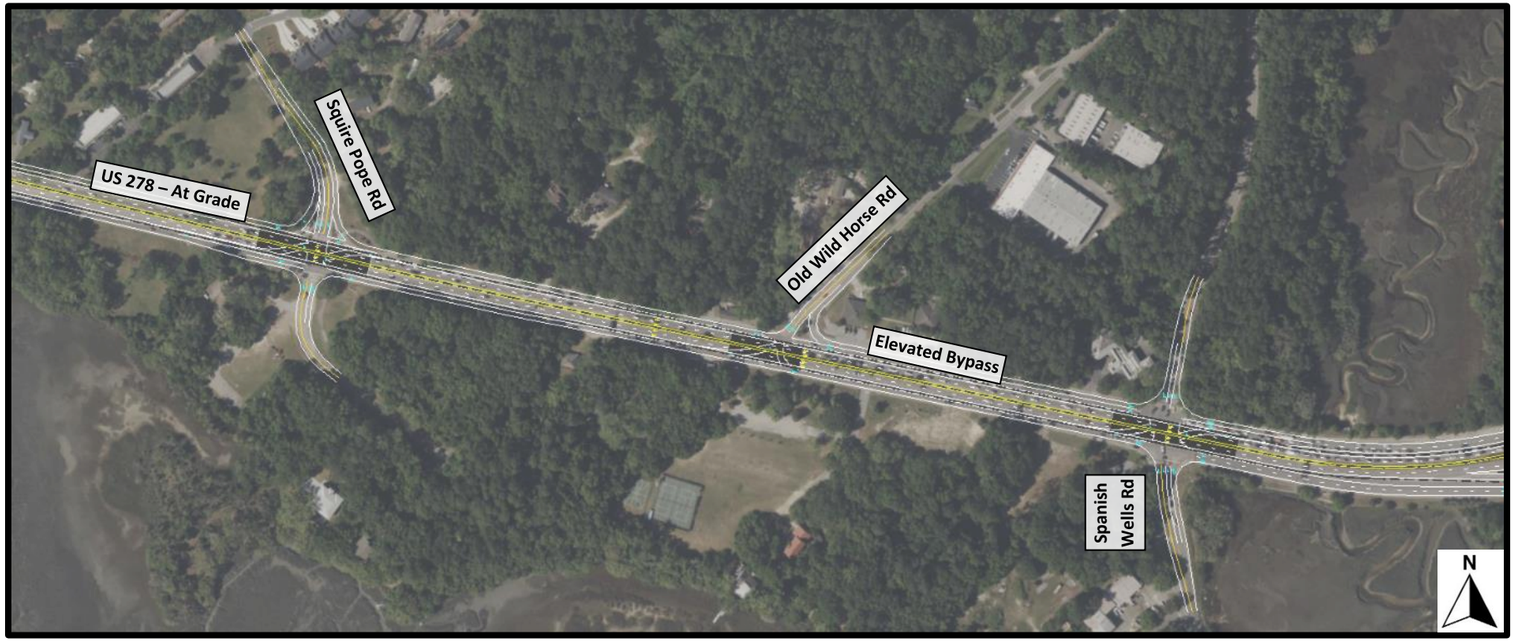


Figure 8. Example of Elevated Bypass - 02

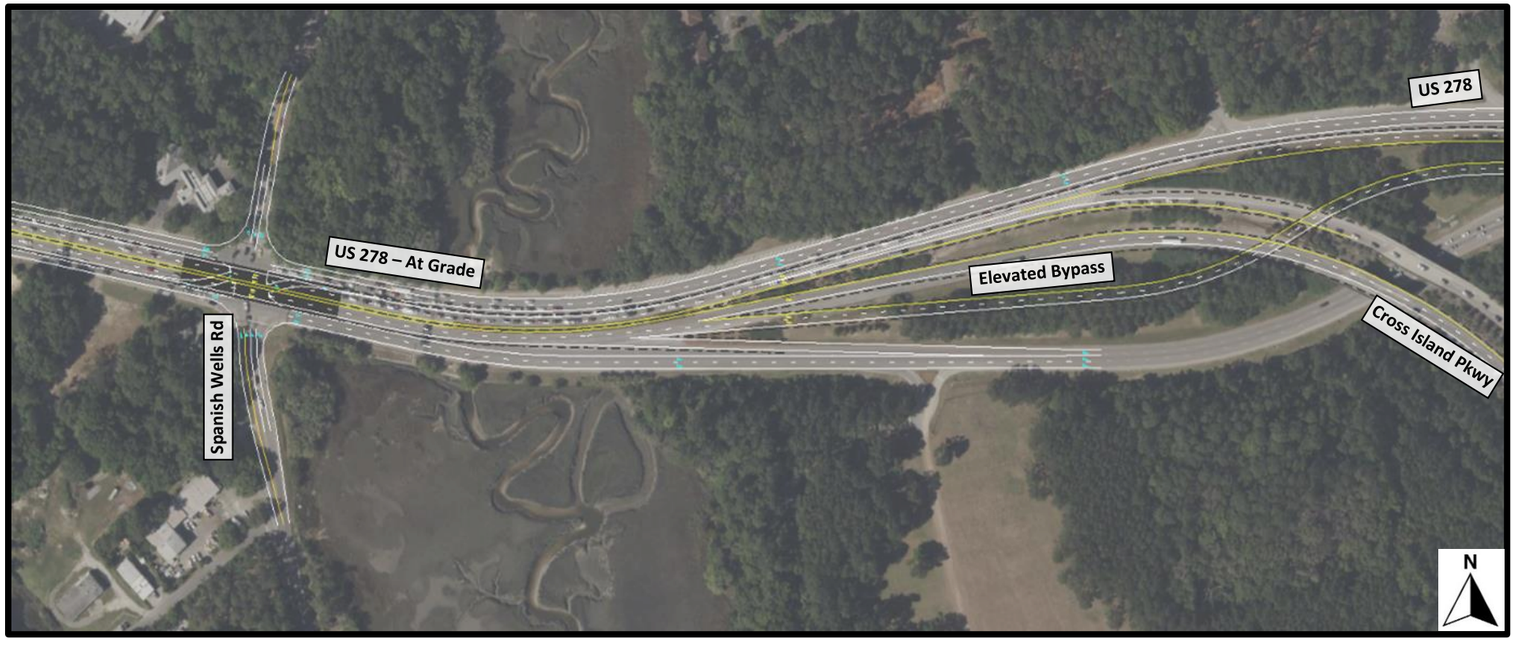


Figure 9. Example of Elevated Bypass - 03

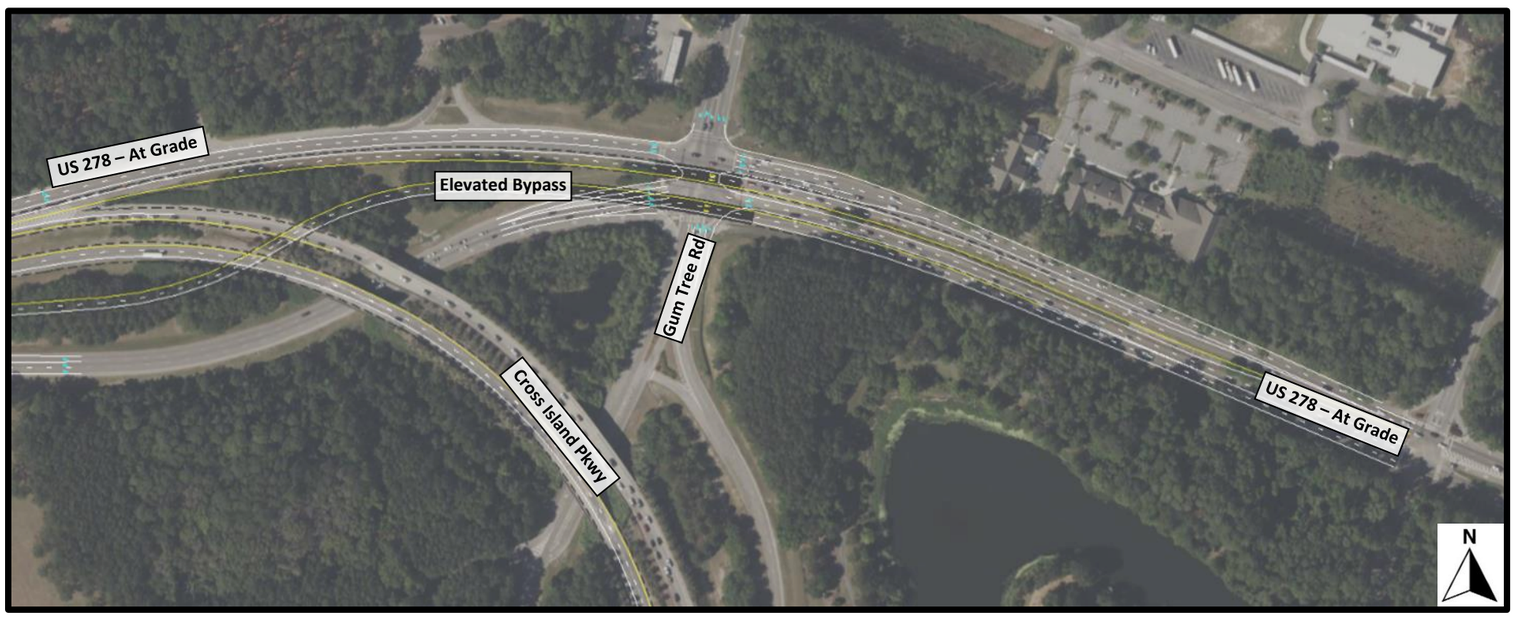


Figure 10. Example of Elevated Bypass - 04

2045 ALTERNATIVE 1: SCDOT MODIFIED RECOMMENDED PREFERRED

2045 ALTERNATIVE 1 TRAFFIC VOLUMES

The traffic volumes used for the 2045 Alternative 1 analysis were largely similar to the 2045 No-Build traffic volumes. However, some intersections were combined in this alternative, requiring traffic diversions. The 2045 Alternative 1 traffic volumes are provided in **Appendix I.**

2045 ALTERNATIVE 1 TRAFFIC OPERATIONAL ANALYSIS

As agreed upon with the Town of Hilton Head, a preliminary traffic analysis was completed using Synchro 11. The 2045 Alternative 1 operating conditions were evaluated using the same methodology applied to the 2023 Existing and 2045 No-Build conditions. The operating conditions for the 2045 Alternative 1 scenario are shown in **Appendix I.**

Overall the study intersections are expected to operate acceptably under Alternative 1. Each signalized intersection is expected to operate with a LOS D or better overall. However, side-street and unsignalized approaches may still experience long delays. This is to be expected given the heavy volumes experienced along the mainline of William Hilton Parkway and the inability of side-street traffic to find gaps in the mainline traffic to complete their movement.

In addition to the Synchro operating conditions, preliminary travel time calculations were performed in Synchro along the William Hilton Parkway corridor between Moss Creek Drive and Indigo Run Drive. Synchro was used for the purposes of evaluating alternatives at a high level, as its results provide a reasonable comparison useful for preferred alternative selection. Final travel time results for the chosen preferred alternative were conducted in VISSIM.

Table 9 shows the changes in travel time for the 2045 Alternative 1 scenario when compared to the 2045 No-Build scenario travel time results gathered from Synchro. As shown, Alternative 1 is expected to improve the travel time along eastbound William Hilton Parkway by approximately 16% during the AM peak period and westbound William Hilton Parkway by approximately 34% during the PM peak period.

It should be noted that westbound William Hilton Parkway during the AM peak period and eastbound William Hilton Parkway during the PM peak period are not expected to experience significant congestion in the 2045 No-Build scenario, as traffic patterns in the study area largely follow commuter travel patterns. Therefore, the increase in travel time shown is not expected to significantly impact the operating conditions of the study area.

Table 9. Travel Time Comparison for Alternative 1

Scenario		Difference in Travel Time (seconds) when Compared to 2045 No-Build		% Difference	
		AM	PM	AM	PM
2045 Alternative 1: SCDOT Modified Recommended Preferred	EB	-109 [-1.8 min]	+18 [<1 min]	**-16.1%**	**2.7%**
	WB	+43 [<1 min]	-276 [-4.6 min]	**6.3%**	**-34.2%**

2045 ALTERNATIVE 1 RIGHT-OF-WAY IMPACTS

The proposed modifications to the SCDOT Preferred Alternative in this alternative involve reconfiguring the Gum Tree Road intersection to provide dual left-turn lanes for the westbound, northbound, and southbound approaches. These improvements will require a strip of additional ROW of approximately 0.2 acre on Town owned land, in the northeast quadrant to accommodate the additional southbound left turn lane. The lane additions on the westbound and northbound approaches can be accommodated within existing ROW. It should be noted that the ROW estimates refer to permanent ROW needed for the completed improvements only, and do not consider temporary ROW needed for construction or staging.

2045 ALTERNATIVE 1 ENVIRONMENTAL ANALYSIS

As noted above, Alternative 1 would require 0.2 acre of additional ROW. The additional ROW impacts are located within the Squire Pope neighborhood. The additional ROW to be acquired is owned by the Town of Hilton Head. The SCDOT Environmental Assessment (EA) determined that this area is an environmental justice community. One hazardous material site, Shell Food Mart Station 101 (165 William Hilton Pkwy), is located near the corridor. No impacts to the site are anticipated as a result of Alternative 1. The SCDOT recommended preferred alternative was determined to have a “may affect-not likely to adversely affect” finding for threatened and endangered species. Alternative 1 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA National Marine Fisheries Service (NMFS) will need to occur to affirm this finding. Alternative 1 would not result in additional impacts to National Wetland Inventory (NWI) wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 1. No additional impacts to cultural resources or Section 4(f) properties would occur as a result of Alternative 1.

Please refer to the Technical Environmental Overview in **Appendix J** for additional details.

2045 ALTERNATIVE 2: BOWTIES AT SQUIRE POPE AND SPANISH WELLS

2045 ALTERNATIVE 2 TRAFFIC VOLUMES

The traffic volumes used for the 2045 Alternative 2 analysis were largely similar to the 2045 No-Build traffic volumes. However, given that the left-turns along William Hilton Parkway were removed at Squire Pope Road and Spanish Wells Road, some traffic diversions were necessary. The 2045 Alternative 2 traffic volumes are provided in **Appendix K.**

It should be noted that Lochmueller agrees with the improvements proposed along William Hilton Parkway between Moss Creek Drive and Crosstree Drive in Alternative 1. These improvements include the following:

- Widen William Hilton Parkway from four lanes to six lanes from Salt Marsh Drive through Spanish Wells Drive
- Reconfigure the intersection of William Hilton Parkway and Wildlife Refuge Driveway to eliminate left-turns and provide right-in/right-out access only
- Consolidate Jenkins Island access to one signalized location at Crosstree Drive

Therefore, those improvements were included in Alternative 2. As such, the traffic volumes at those intersections would be the same between Alternative 2 and Alternative 1.

2045 ALTERNATIVE 2 TRAFFIC OPERATIONAL ANALYSIS

As agreed upon with the Town of Hilton Head, the preliminary traffic analysis was completed using Synchro 11. The 2045 Alternative 2 operating conditions were evaluated using the same methodology applied to the 2023 Existing and 2045 No-Build conditions. The operating conditions for the 2045 Alternative 2 scenario are shown in **Appendix K.**

The bowties at Squire Pope and Spanish Wells are expected to improve operations throughout the study area. Overall, the study intersections are expected to operate acceptably under Alternative 2. Each signalized intersection is expected to operate with a LOS D or better overall. However, side-street and unsignalized approaches may still experience long delays. Similar to Alternative 1, this is to be expected given the heavy volumes experienced along the mainline of William Hilton Parkway and the inability of side-street traffic to find gaps in the mainline traffic to complete their movement.

In addition to the Synchro operating conditions, preliminary travel time calculations were performed in Synchro along the William Hilton Parkway corridor between Moss Creek Drive and Indigo Run Drive. Synchro was used for the purposes of evaluating alternatives at a high level, as its results provide a reasonable comparison useful for preferred alternative selection. Final travel time results for the chosen preferred alternative were conducted in VISSIM.

Table 10 shows the changes in travel time for the 2045 Alternative 2 scenario when compared to the 2045 No-Build scenario travel time results gathered from Synchro. As shown, Alternative 2 is expected to improve the travel time along eastbound William Hilton Parkway by approximately 15% during the AM peak period and westbound William Hilton Parkway by approximately 36% during the PM peak period.

Table 10. Travel Time Comparison for Alternative 2

Scenario		Difference in Travel Time (seconds) when Compared to 2045 No-Build		% Difference	
		AM	PM	AM	PM
2045 Alternative 2: Bowties at Squire Pope and Spanish Wells	EB	-104 [-1.7 min]	-39 [<1 min]	**-15.3%**	**-6.6%**
	WB	+9 [<1 min]	-290 [-4.8 min]	**1.4%**	**-36.4%**

As previously noted, bowtie intersections may increase the total travel time for left-turning vehicles as they must alter their course to navigate through a roundabout and return to the main intersection to complete their movement. Therefore, the expected change in travel time was calculated in Synchro to better determine the additional time for the re-routed left-turn movements. The changes in travel time are shown in **Table 11**. As shown, it could take an additional two minutes for a vehicle making a northbound left-turn at Squire Pope Road to navigate through the bowtie intersection. However, several left-turning movements, such as the eastbound left-turn at Spanish Wells Rd, are expected to experience a decrease in travel time as compared to the 2045 No-Build scenario, due to the long delay those movements are expected to face absent any changes to the intersection.

Table 11. Expected Change in Travel Time for Left-Turning Vehicles at Bowtie Intersections

Intersection		Difference in Travel Time (seconds) for Left-Turning Vehicles	
		AM	PM
Squire Pope Road	EB Left-Turn	+63 [1.1 min]	+42 [<1 min]
	WB Left-turn	+82 [1.4 min]	+81 [1.4 min]
	NB Left-Turn	+101 [1.7 min]	+120 [2 min]
	SB Left-Turn	+44 [<1 min]	+4 [<1 min]
Spanish Wells Road	EB Left-Turn	-10 [<1 min]	-26 [<1 min]
	WB Left-turn	-13 [<1 min]	-7 [<1 min]
	NB Left-Turn	+89 [1.5 min]	-42 [<1 min]
	SB Left-Turn	+43 [<1 min]	+61 [1 min]

2045 ALTERNATIVE 2 RIGHT-OF-WAY IMPACTS

The proposed Bowtie configurations of Alternative 2 will require the 0.2 acre of additional ROW at Gum Tree Road, as well as additional ROW along the crossroads to accommodate the construction of the roundabouts. It should be noted that the ROW estimates refer to permanent ROW needed for the completed improvements only, and do not consider temporary ROW needed for construction or staging.

At the Squire Pope Road intersection, the north roundabout would be located along Squire Pope Road at Old Stony Lane, requiring approximately 0.2 acres of additional ROW from privately owned land. The

south roundabout would be located at the end of Chamberlin Road and would require approximately 0.4 acre of additional ROW from Town owned land.

At the Spanish Wells Road intersection, the north roundabout would be located along Wild Horse Road at Old Wild Horse Road, requiring approximately 0.2 acre of additional ROW from Town owned land. The south roundabout would be located south of Humane Way and would require approximately 0.1 acre of additional ROW from Town owned land.

This alternative could potentially reduce the ROW required for the widening of William Hilton Parkway by 0.5 acre or more due to the elimination of the left turn lanes at the intersections.

2045 ALTERNATIVE 2 ENVIRONMENTAL ANALYSIS

As noted above, Alternative 2 would require 1.10 acres of additional ROW. The Town of Hilton Head owns 0.9 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood was outside of the SCDOT EA investigation area, but is also a Gullah Geechee community. The Gullah Geechee people are the only African-American population in the United States that have maintained a separate language and a distinct culture. Therefore, the Squire Pope neighborhood is likely an environmental justice community. The SCDOT recommended alternative was determined to have a "may affect- not likely to adversely affect" finding for threatened and endangered species. Alternative 2 is not anticipated to alter this finding. Coordination with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA-NMFS) would need to occur to affirm this finding. Alternative 2 would require additional impacts to the Stoney Traditional Cultural Property (TCP). The SCDOT identified the Stoney community as a TCP and as a resource eligible for inclusion in the National Register of Historic Places (NRHP). As a NRHP-eligible resource, it is also considered a Section 4(f) property. Alternative 2 would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 2.

Please refer to the Technical Environmental Overview in **Appendix J** for additional details.

2045 ALTERNATIVE 3: ECHELON / CENTER TURN OVERPASS

2045 ALTERNATIVE 3 TRAFFIC VOLUMES

The traffic volumes used for the 2045 Alternative 3 analysis were largely similar to the 2045 No-Build traffic volumes. The traffic volumes for the intersections impacted by Alternative 3 are provided in **Appendix L.**

It should be noted that Lochmueller agrees with the improvements proposed along William Hilton Parkway between Moss Creek Drive and Crosstree Drive in Alternative 1, as detailed below:

- Widen William Hilton Parkway from four lanes to six lanes from Salt Marsh Drive through Spanish Wells Drive
- Reconfigure the intersection of William Hilton Parkway and Wildlife Refuge Driveway to eliminate left-turns and provide right-in/right-out access only
- Consolidate Jenkins Island access to one signalized location at Crosstree Drive

Therefore, those improvements were included in Alternative 3. As such, the traffic volumes at those intersections would be the same between Alternative 3 and Alternative 1.

2045 ALTERNATIVE 3 TRAFFIC OPERATIONAL ANALYSIS

As agreed upon with the Town of Hilton Head, the preliminary traffic analysis was completed using Synchro 11. The 2045 Alternative 3 operating conditions were evaluated using the same methodology applied to the 2023 Existing and 2045 No-Build conditions. The operating conditions for the 2045 Alternative 3 scenario are shown in **Appendix L.**

Overall the study intersections are expected to operate acceptably under Alternative 3. Each signalized intersection is expected to operate with a LOS D or better overall for either configuration. Similar to the previous scenarios, side-street and unsignalized approaches may still experience long delays. The long queues and delays that are expected under the 2045 No-Build Scenario would be expected to be improved overall.

It should be noted that while operating conditions overall would be expected to improve when compared to the 2045 No-Build conditions, some movements would be expected to experience failing levels of service. When considering an echelon at Squire Pope Road, the southbound approach at Squire Pope Road is expected to fail. This is caused by a reduction in green time for the heavy southbound right-turns. Additionally, when considering a center turn overpass at Squire Pope Road, the northbound approach at Spanish Wells Road is expected to experience failing operating conditions. This is due to the limited amount of green time allowed for this movement under this scenario. However, overall each option in Alternative 3 is an improvement when compared to the 2045 No-Build scenario.

In addition to the Synchro operating conditions, preliminary travel time calculations were performed in Synchro along the William Hilton Parkway corridor between Moss Creek Drive and Indigo Run Drive. Synchro was used for the purposes of evaluating alternatives at a high level, as its results provide a reasonable comparison useful for preferred alternative selection. Final travel time results for the chosen preferred alternative were conducted in VISSIM.

Table 12 shows the changes in travel time for the 2045 Alternative 3 scenario when compared to the 2045 No-Build scenario travel time results gathered from Synchro. As shown, between the four options provided in Alternative 3, the travel time calculations indicate that the travel time along eastbound William Hilton Parkway would improve between approximately 18-32% during the AM peak period and westbound William Hilton Parkway would improve between approximately 41-60% during the PM peak period.

Table 12. Travel Time Comparison for Alternative 3

Scenario		Difference in Travel Time (seconds) when Compared to 2045 No-Build		% Difference	
		AM	PM	AM	PM
2045 Alternative 3: Echelon at Squire Pope	**EB**	-191 [-3.2 min]	-68 [-1.1 min]	**-32.1%**	**-12.1%**
	WB	-79 -[1.3 min]	-407 [-6.8 min]	**-13.9%**	**-60.0%**
2045 Alternative 3: Echelon at Spanish Wells	EB	-140 [-2.3 min]	-11 [<1 min]	**-21.6%**	**-1.8%**
	WB	-15 [<1 min]	-331 [-5.5 min]	**-2.3%**	**-44.0%**
2045 Alternative 3: Center Turn Overpass at Squire Pope	EB	-122 [-2 min]	+23 [<1 min]	**-18.4%**	**3.5%**
	WB	-21 [<1 min]	-319 [-5.3 min]	**-3.3%**	**-41.6%**
2045 Alternative 3: Center Turn Overpass at Spanish Wells	EB	-134 [-2.2 min]	-17 [<1 min]	**-20.6%**	**-2.9%**
	WB	-16 [<1 min]	-339 [-5.7 min]	**-2.5%**	**-45.4%**

2045 ALTERNATIVE 3 RIGHT-OF-WAY IMPACTS

The proposed Echelon or Center Turn Overpass configurations of Alternative 3 would still require the 0.2 acres of additional ROW at Gum Tree Road, as well as additional ROW along William Hilton Parkway for turn lanes and additional ROW along the crossroads to accommodate the construction of the turn arounds and/or roundabouts to maintain full access to parcels near the intersections. It should be noted that the ROW estimates refer to permanent ROW needed for the completed improvements only, and do not consider temporary ROW needed for construction or staging.

At the Squire Pope Road intersection, the north roundabout would be located along Squire Pope Road at Old Stony Lane, requiring approximately 0.2 acres of additional ROW from privately owned land. The south roundabout would be located at the end of Chamberlin Road and would require approximately 0.4 acres of additional ROW from Town owned land. Widening of Chamberlin Road would require approximately 0.05 acres of additional ROW from private land and 0.05 acres of ROW from Town owned land. Widening along the north side of William Hilton Parkway will require approximately 0.1 acres of additional ROW from Town owned land.

At the Spanish Wells Road intersection, the north roundabout would be located along Wild Horse Road at Old Wild Horse Road, requiring approximately 0.2 acres of additional ROW from Town owned land. The south turn around would require approximately 0.35 acres of additional ROW from private land. Widening along the south side of William Hilton Parkway would require approximately 0.3 acres of additional ROW from Town owned land and approximately 0.05 acres of additional ROW from private land.

2045 ALTERNATIVE 3 ENVIRONMENTAL ANALYSIS

The environmental impacts for Alternative 3 were evaluated for an echelon at the Squire Pope Road intersection and an echelon at the Spanish Wells Road/Wild Horse Road intersection. A center turn overpass would result in more impacts than an echelon at either intersection. Therefore, a center turn overpass was dismissed from further consideration.

An echelon at the Squire Pope intersection would require the 1.0 acre of additional ROW. The Town of Hilton Head owns 0.75 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood is a Gullah Geechee community and is likely an environmental justice community. The SCDOT recommended preferred alternative was determined to have a "may affect- not likely to adversely affect" finding for threatened and endangered species. An echelon at the Squire Pope intersection is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. An echelon at Squire Pope Road would result in additional impacts to the Stoney TCP, a cultural resource and Section 4(f) property. The addition of a grade separated intersection at Squire Pope Road also has the potential to create visual barriers within the Stoney TCP. It would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 3.

An echelon at the Spanish Wells Road/ Wild Horse Road intersection would require 1.1 acres of additional ROW. The Town of Hilton Head owns 0.7 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood is a Gullah Geechee neighborhood and likely an environmental justice community. The SCDOT recommended preferred alternative was determined to have a "may affect- not likely to adversely affect" finding for threatened and endangered species. An echelon at the Spanish Wells Road intersection is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. An echelon at Spanish Wells Road would result in 0.29 acre of additional impacts to floodplains. It would result in additional impacts to the Stoney TCP, a cultural resource and Section 4(f) property. It would also result in 0.03 acre of additional impacts to the public park at 152 William Hilton Pkwy, a Section 4(f) property. The addition of a grade separated intersection at Spanish Wells Road / Wild Horse Road also has the potential to create visual barriers within the Stoney TCP. An echelon at Spanish Wells Road would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, or essential fish habitat types. No relocations would occur as a result of Alternative 3.

Please refer to the Technical Environmental Overview in **Appendix J** for additional details.

2045 ALTERNATIVE 4: ELEVATED BYPASS

2045 ALTERNATIVE 4 TRAFFIC VOLUMES

The traffic volumes used for the 2045 Alternative 4 analysis were largely similar to the 2045 No-Build traffic volumes. The traffic volumes for the intersections impacted by Alternative 4 are provided in **Appendix M.**

It should be noted that Lochmueller agrees with the improvements proposed along William Hilton Parkway between Moss Creek Drive and Crosstree Drive in Alternative 1, as detailed below:

- Widen William Hilton Parkway from four lanes to six lanes from Salt Marsh Drive through Spanish Wells Drive
- Reconfigure the intersection of William Hilton Parkway and Wildlife Refuge Driveway to eliminate left-turns and provide right-in/right-out access only
- Consolidate Jenkins Island access to one signalized location at Crosstree Drive

Therefore, those improvements were included in Alternative 4. As such, the traffic volumes at those intersections would be the same between Alternative 4 and Alternative 1.

2045 ALTERNATIVE 4 TRAFFIC OPERATIONAL ANALYSIS

As agreed upon with the Town of Hilton Head, the preliminary traffic analysis was completed using Synchro 11. The 2045 Alternative 4 operating conditions were evaluated using the same methodology applied to the 2023 Existing and 2045 No-Build conditions. The operating conditions for the 2045 Alternative 4 scenario are shown in **Appendix M.**

As shown, the intersections at Squire Pope Road, Spanish Wells Road, and Gum Tree Road would be expected to operate at an overall LOS C or better. Overall, the study intersections are expected to operate acceptably under Alternative 4. The signalized intersections throughout the corridor are expected to operate with a LOS C or better overall. Similar to the previous scenarios, side-street and unsignalized approaches throughout the corridor may still experience long delays. It should be noted that the results provided are for the at-grade intersections only, and the operating conditions for the elevated bypass traffic are not provided in Synchro.

In addition to the Synchro operating conditions, preliminary travel time calculations were performed in Synchro along the William Hilton Parkway corridor between Moss Creek Drive and Indigo Run Drive. Synchro was used for the purposes of evaluating alternatives at a high level, as its results provide a reasonable comparison useful for preferred alternative selection. Final travel time results for the chosen preferred alternative were conducted in VISSIM.

Table 13 shows the changes in travel time for the 2045 Alternative 4 scenario when compared to the 2045 No-Build scenario travel time results gathered from Synchro. As shown, Alternative 4 is expected to improve the travel time along the remaining at grade eastbound William Hilton Parkway by approximately 19% during the AM peak period and at grade westbound William Hilton Parkway by approximately 44% during the PM peak period. It should be noted that the travel times reflect

operations of at-grade intersections only. VISSIM software will allow for modeling of the bypass itself and will therefore yield greater reductions in travel times than those shown in the table.

Table 13. Travel Time Comparison for Alternative 4

Scenario		Difference in Travel Time (seconds) when Compared to 2045 No-Build		% Difference	
		AM	PM	AM	PM
2045 Alternative 4: Elevated Bypass	**EB**	-126 [-2.1 min]	27 [<1 min]	**-19.1%**	**4.1%**
	WB	+4 [<1 min]	-330 [-5.5 min]	**0.5%**	**-43.7%**

2045 ALTERNATIVE 4 RIGHT-OF-WAY IMPACTS

Based upon available GIS and parcel map data made available to Lochmueller during the completion of the corridor alternatives analysis process, it appears the proposed Elevated Bypass Alternative could be contained within the proposed ROW footprint of the SCDOT Preferred alternative and, unlike the other alternatives, would not require adding turn lanes to the Gum Tree Road intersection and the additional strip of ROW required by those improvements, resulting in no additional ROW being required for this alternative. It should be noted that the ROW estimates refer to permanent ROW needed for the completed improvements only, and do not consider temporary ROW needed for construction or staging.

2045 ALTERNATIVE 4 ENVIRONMENTAL ANALYSIS

Alternative 4 would impact an additional 0.03 acre of National Wetland Inventory (NWI) wetlands and an additional 0.03 acre of essential fish habitats. Approximately 65 linear feet of Jarvis Creek would be impacted. Alternative 4 would require no additional ROW. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. Alternative 4 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding.

The Honey Horn Plantation is a collection of historic farm buildings and landscape and would be considered a Section 4(f) resource. It is also home to the Coastal Discovery Museum, which educates the public on the region’s cultural and natural history. Alternative 4 intersects the current boundary of Honey Horn plantation according to the South Carolina Department of Archives and History website. This is unlikely to be considered a Section 4(f) use as the proposed improvements associated with this alternative would occur entirely within existing transportation ROW. Therefore, there is likely no conversion of the resource from a non-transportation use to a transportation one. The current boundary of the site extends into the existing footprint of U.S. 278. However, this part of the site has likely been disturbed by previous construction. Further investigation and coordination with the applicable agencies would be needed to determine the exact cultural and Section 4(f) impacts to this site. No additional relocations would be required. The addition of an elevated bypass lane on a combination of fill or structure also has the potential to create visual barriers within the Stoney TCP. However, this alternative would not result in additional encroachment on the Stoney TCP and, as such, is not quantified as a direct

impact. No additional impacts to hazardous materials sites, neighborhoods, or environmental justice communities are anticipated. No impacts to floodplains are anticipated. Please refer to the Technical Environmental Overview in **Appendix J** for additional details.

ALTERNATIVES COMPARISON AND CONCLUSIONS

The goal of the alternatives analysis is to provide an objective, data-driven evaluation of the four corridor alternatives, with respect to US 278/William Hilton Parkway between Moss Creek Drive and Gum Tree Road. Therefore, various matrices were compiled with respect to traffic operations, bicycle and pedestrian accommodations, ROW requirements, and environmental factors to inform an overall scoring matrix. Each of the matrices includes scores for various categories. A score of 1 is the highest ranking, whereas a score of 4 is the lowest ranking. The ranking for each category were tallied to reach a total aggregate score per alternative.

As shown in **Table 18,** Alternative 1 ranked first with a total score of 20. Alternative 4 ranked second with a total score of 21. Alternative 2 ranked third with a total score of 24, and Alternative 3 ranked last with a total score of 28.

The matrix for traffic operations is presented in **Table 14.**

Table 14. Traffic Operations Overview Matrix

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Travel Time along US 278	4	4	2	1
Overall Intersection Operations	4	3	3	1
Side-Street Operations	4 Movements with a LOS F at a signalized intersection: Squire Pope: Northbound approach (PM)	2 No movements have a LOS F at a signalized intersection. However, some movements are expected to have a LOS E at signalized intersections between Squire Pope and Gum Tree.	4 Movements with a LOS F at a signalized intersection: Echelon at Squire Pope: Squire Pope: Southbound approach (PM) Center Turn Overpass at Squire Pope: Spanish Wells: Northbound Approach (PM)	1 All movements are expected to have a LOS D or better at signalized intersections between Squire Pope and Gum Tree.
TOTAL	**12**	**9**	**9**	**3**
RANK	**4**	**3**	**3**	**1**

The matrix for bicycle and pedestrian impact is presented in **Table 15.**

Table 15. Bicycle and Pedestrian Overview Matrix

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Pedestrian Crossing Distance	Longest pedestrian crossing distances.	Reduced pedestrian crossing distances and exposure to motor vehicle traffic.	Reduced pedestrian crossing distances and exposure to motor vehicle traffic.	Reduced pedestrian crossing distances and exposure to motor vehicle traffic.
Potential for Refuge Islands	No refuge islands on north-south crossings.	Potential for median refuge island on east and west crosswalk legs at Squire Pope	Refuge islands between directional traffic allow pedestrians to more comfortably navigate the complex intersection.	Refuge islands between directional traffic allow pedestrians to more comfortably navigate the complex intersection; HOWEVER, multiple refuge islands per leg and long end-to-end crossing distances increase intersection complexity and the likelihood of pedestrians needing two or more stages to complete a north-south crossing.
Conflict Points	Multiple turning movements and potential conflict points along each leg.	Fewer ped/vehicle conflict points and vehicle turning movements.	Fewer ped/vehicle conflict points and vehicle turning movements.	Fewer ped/vehicle conflict points and vehicle turning movements.

The matrix for ROW impact is presented in **Table 16.**

Table 16. Right-of-Way Overview Matrix

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Estimated Additional Right-of-Way Acres – Public Estimated Additional Right-of-Way Acres – Private **Approx. TOTAL Additional Right-of-Way Acres**	0.2 ac 0.0 ac **0.2 ac**	0.9 ac 0.2 ac **1.1 ac**	0.7 ac 0.4 ac **1.1 ac**	0 ac
Right-of-Way Score	2	4	4	1
Estimated Preliminary Probable Opinion of Cost	$426	$430M	$440M to $450M	$545M to $575M
Cost Score	1	2	3	4
Estimated Construction Duration	36 months	38 months	42 months	48 months
Construction Duration Score	1	2	3	4
TOTAL	**4**	**8**	**10**	**9**
RANK	**1**	**2**	**4**	**3**

The matrix for environmental impacts is presented in **Table 17.**

Table 17. Environmental Overview Matrix

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
NWI Wetlands	1	1	1	4
Streams	1	1	1	4
Floodplains	1	1	4	1
Essential Fish Habitat	1	1	1	4
Threatened & Endangered Species	1	1	1	1
Hazardous Material Sites	1	1	1	1
Relocations	1	1	1	1
Right-of-Way	2	4	4	1
Neighborhoods	2	4	4	1
Environmental Justice	2	4	4	1
Cultural Resources	1	4	4	4
Section 4(f) Resources	1	3	4	1
Total	**15**	**26**	**30**	**24**
Rank	**1**	**3**	**4**	**2**

Table 18. Overall Scoring Matrix

Resource/Category	Alternative 1 (Mod. SCDOT Recommended Preferred)	Alternative 2 (Bowties at Squire Pope and Spanish Wells)	Alternative 3 (Echelon / Center Turn Overpass)	Alternative 4 (Elevated Bypass)
Traffic Operations (Throughput and Traffic Simulations)	4	3	3	1
ROW Impact	2	4	4	1
Environmental Impact	1	3	4	2
Safety	4	3	3	1
Bike/Pedestrian Impact	4	3	1	2
Community and Social Impact	1	3	4	2
Aesthetic	2	1	3	4
Preliminary Probable Opinion of Cost	1	2	3	4
Construction Duration	1	2	3	4
TOTAL	**20**	**24**	**28**	**21**
RANK	**1**	**3**	**4**	**2**

TOWN SELECTED ALTERNATIVE

Based upon the preceding alternatives analysis, Lochmueller was directed by the Town of Hilton Head Island to pursue Alternative 1: SCDOT Modified Recommended Preferred with modifications to provide a single eastbound left-turn lane and a single southbound right-turn lane at the intersection of William Hilton Parkway at Squire Pope Road through to the final phase of this analysis.

TOWN SELECTED ALTERNATIVE MULTIMODAL RECOMMENDATIONS

The roadway improvements recommended under Modified Alternative 1 were further evaluated with respect to improving the multimodal experience and safety within the study area. As previously stated, Alternative 1 considers the SCDOT Modified Recommended Preferred alternative with adaptive signals in place and improvements at Gum Tree Road. However, unlike the original SCDOT Modified Recommended Preferred Alternative, a single eastbound left-turn lane and a single southbound right-turn lane at the intersection of William Hilton Parkway at Squire Pope Road will be provided. The SCDOT Modified Recommended Preferred Alternative will also provide a separated shared use path (SUP) for bicycles. Due to the heavy traffic volumes, on street facilities are not being considered. Therefore, the multimodal recommendations mainly focus on how to accommodate pedestrians. The following improvements along William Hilton Parkway between Moss Creek Drive and Gum Tree Road are recommended as part of the Modified Alternative 1:

- William Hilton Parkway & Pinckney Island Refuge
    - If pedestrians are going to be encouraged to cross the south leg of the intersection immediately adjacent to William Hilton Parkway, a high visibility marked crosswalk should be incorporated, and if possible, the proposed channelized island should be expanded/extended to provide a refuge area. Alternatively, the pedestrians could be directed to cross the south leg at a location further away from William Hilton Parkway, with appropriate signage and pavement markings to accommodate.
- William Hilton Parkway & Crosstree Drive (Windmill Harbour)
    - This signalized intersection should be incorporated into the adaptive signal system as soon possible to ensure optimal traffic signal progression along William Hilton Parkway.
- William Hilton Parkway & Squire Pope Road
    - Provide high visibility crosswalks.
    - If continuous sidewalk facilities are not planned to be installed along the south side of William Hilton Parkway west of Squire Pope Road, consider eliminating the William Hilton Parkway pedestrian crossing on the west leg to instead encourage pedestrians to cross William Hilton Parkway at the east leg only.
    - Consider moving the north crosswalk slightly northward, so as to provide greater distance between pedestrians within the crosswalk and the adjacent westbound travel lanes along William Hilton Parkway.
    - During final design efforts, seek to increase extents of raised center medians along William Hilton Parkway to provide pedestrian refuge, if possible, given ROW and other geometric factors that must be considered.

    - During final design efforts, seek to tighten curb radii to shorten pedestrian crossing distances on all approaches.
- William Hilton Parkway & Spanish Wells Road
    - Provide high visibility crosswalks.
    - Consider moving the north crosswalk slightly northward, so as to provide greater distance between pedestrians within the crosswalk and the adjacent westbound travel lanes along William Hilton Parkway.
    - During final design efforts, seek to increase extents of western raised center median along William Hilton Parkway to provide pedestrian refuge for west leg crossing, if possible, given ROW and other geometric factors that must be considered.
    - During final design efforts, seek to tighten curb radii to shorten pedestrian crossing distances across north and west leg of the intersection.

DOWNSTREAM IMPACTS OF TOWN SELECTED MODIFIED ALTERNATIVE 1

As a next step, Lochmueller evaluated the impacts Modified Alternative 1 would have on the entire project study area (**Figure 1**) and determined what, if any, improvements should be made to accommodate the 2045 forecasted traffic at the intersections downstream (i.e., east of Gum Tree Road to Indigo Run Drive, and south of Cross Island Parkway to Sea Pines Circle).

MODIFIED ALTERNATIVE 1 TRAFFIC ANALYSIS

The travel time calculations and traffic volumes between the 2045 No-Build conditions and the 2045 Modified Alternative 1 conditions were evaluated using VISSIM. It should be noted that this analysis was conducted assuming only the improvements under the Modified Alternative 1 were in place to better understand how the entire study area would operate if no geometric roadway improvements were implemented east of Gum Tree Road to Indigo Run Drive, or along Cross Island Parkway to Sea Pines Circle.

As shown in **Table 19**, under the 2045 No-Build scenario, it is expected that it would take approximately 26.3 minutes to travel eastbound along Hilton Parkway between Moss Creek Drive and Indigo Run Drive during the AM peak hour. It is expected that the travel time will be reduced to approximately 10.5 minutes (60%) under the Modified Alternative 1. Under the 2045 No-Build scenario, it is expected that it would take approximately 25.7 minutes to travel westbound along Hilton Parkway between Moss Creek Drive and Indigo Run Drive during the PM peak hour. It is expected that the travel time will be reduced to approximately 10.3 minutes (60%) under the Modified Alternative 1.

Table 19. 2045 Modified Alternative 1 VISSIM Travel Time Results

Corridor		2045 No-Build Simulated Travel Time (secs) [min]		2045 Modified Alternative 1 Without Improvements to Downstream Intersections Simulated Travel Time (secs) [min]		% Difference	
		AM	PM	AM	PM	AM	PM
William Hilton Pkwy between Moss Creek and Indigo Run	EB	1579 [26.3 min]	642 [10.7 min]	628 [10.5 min]	631 [10.5 min]	**-60.23%**	**-1.71%**
	WB	584 [9.7 min]	1544 [25.7 min]	597 [10 min]	616 [10.3 min]	**2.23%**	**-60.10%**
William Hilton Pkwy from Moss Creek to Sea Pine Circle via Cross Island Pkwy	SB	1984 [30.1 min]	873 [14.6 min]	1387 [23.1 min]	874 [14.6 min]	**-30.09%**	**0.11%**
	NB	823 [13.7 min]	2465 [41.1 min]	848 [14.1 min]	904 [15.1 min]	**3.04%**	**-63.33%**

In addition, with the improvements in place, the approximately 10% of total network vehicles that were unable to enter the model network during the 2045 No-Build scenario are able to be accommodated under this scenario.

Table 20 summarizes overall network performance for the 2045 Modified Alternative scenario assuming no improvements to intersections east of Gum Tree Road or along Cross Island Parkway as compared to the 2045 No-Build scenario. During the PM peak hour, vehicles stops will decrease when compared to the 2045 No-Build scenario throughout the study area. Vehicles will be required to stop on average 6 times during both peak periods. Additionally, the average vehicle speeds during the PM peak hour will improve to an average of 28 and 30 mph, during the AM and PM peak hours, respectively.

In addition, with the improvements in place, the approximately 10% of total network vehicles that were unable to enter the model network during the 2045 No-Build scenario are able to be accommodated under this scenario.

Table 20. Network Performance – 2045 Modified Alternative 1 Without Improvements to Downstream Intersections

Peak Hour	Average Number of Stops per Vehicle	Average Speed (mph)	Total Vehicles (vph)
2045 No-Build AM	9.9	21	11,143
2045 No-Build PM	15.4	16	12,393
2045 Modified Alternative 1: AM Peak Hour	6.3	28	11,355
2045 Modified Alternative 1: PM Peak hour	6.7	29.8	13,531

The 2045 Modified Alternative 1 operating conditions at the study intersections were evaluated using VISSIM and are provided in **Appendix N.** As shown, with the improvements proposed under the Modified Alternative 1, the study intersections are largely expected to operate acceptably in the year 2045, with some exceptions. The eastbound and westbound thru movements along William Hilton Parkway are expected to operate with an overall LOS D or better between Moss Creek Drive and Gum Tree Road. While some of the side-street approaches at unsignalized intersections are still expected to experience failing conditions, the operations overall are significantly improved from the 2045 No-Build scenario as vehicles can better complete their turning movement due to the reduction in congestion along the eastbound and westbound mainline.

The intersections east of Gum Tree Road are largely expected to operate favorably in 2045 with no improvements in place. However, long eastbound queues extending from Pembroke Drive through Gum Tree Road are expected during the AM peak hour. Similarly, the westbound queue at Jarvis Park Road/Wilborn Road is expected to extend back to Pembroke Drive during the PM peak hour. Furthermore, the mainline is expected to be over capacity in the year 2045. However, overall, the intersections are expected to operate acceptably with an overall LOS D or better during both peak periods. Even though the mainline functions over capacity in 2045 (which is evidenced by the resulting queue lengths), the adaptive signal system is expected to perform well enough to still provide overall LOS D or better during both peak periods.

As shown, the northbound approach at Jarvis Park Road/Wilborn Road is expected to have a failing LOS during the PM peak hour. It should be noted that this approach has minimal traffic volumes and the maximum queue expected is only approximately 200 ft. The eastbound left-turn movement at Indigo Run Drive is also expected to fail during the PM peak hour. The maximum queue length is expected to be approximately 335 ft, which would be contained within the existing turn lane.

Along Palmetto Bay Rd, the roundabout at Sea Pines is expected to fail during both AM and PM peak hours. The failing conditions result in long queue lengths. The southbound queue is expected to extend past the study intersection at Target Road and towards Point Comfort Road during the AM peak hour. This results in failing movements for the westbound left-turns out of the unsignalized intersections along Palmetto Bay Road as vehicles are unable to find a gap in the traffic to complete their turning movement. During the PM peak hour, nearly every approach of Sea Pines Circle is expected to fail in

2045 with no improvements in place as the roundabout is unable to accommodate the expected traffic volumes.

Overall, with the improvements proposed under the Modified Alternative 1, the downstream study intersections are largely expected to operate acceptably in the year 2045. However, the eastbound and westbound approaches between Wilborn Road and Pembroke Drive are expected to experience long queues and be over capacity in the year 2045, and the existing roundabout at Palmetto Bay Road and Sea Pines Circle is expected to fail during both the AM and PM peak hours. As a result of the failing roundabout, the southbound queue lengths are expected to extend beyond nearby intersections.

Therefore, it was necessary to evaluate potential improvements to the local intersections downstream of Gum Tree Road and Cross Island Parkway to help mitigate the expected long queues and delays.

ADDITIONAL MITIGATION SOLUTIONS FOR LOCAL INTERSECTIONS

As previously stated, some of the local downstream intersections would be expected to experience long queues and delays. As such, two options were developed to help mitigate the local intersections east of Gum Tree Road to Indigo Run Drive, and south of Cross Island Parkway to Sea Pines Circle.

Option A minimizes the physical impacts along the corridor, with suggested improvements for only one intersection along William Hilton Parkway. Physical improvements are also recommended at Sea Pines Circle in order to accommodate the expected increase in traffic over time. Option A considers keeping Sea Pines Circle as a roundabout intersection, but expanding the lanes to increase capacity.

Option B considers a more significant approach to help mitigate the expected queue lengths along William Hilton Parkway between Gum Tree Road and Pembroke Drive. Option B also provides a separate solution for Sea Pines Circle via signalizing the intersection.

The improvements recommended under the two options to help mitigate the local intersections east of Gum Tree Road and along Cross Island Parkway are detailed below:

- Local Intersection Option A:
    - William Hilton Parkway & Pembroke Drive
        - Reconfigure the northbound approach to provide dual northbound left-turn lanes, one thru lane, and one right-turn lane.
            - In addition to the roadway widening, this will require relocation of the shared use path on the east side, adjustments to signal equipment and additional ROW on the south leg.
            - Estimated preliminary probable opinion of cost, including ROW of $750,000 and a construction duration estimated at 4 months.
    - Palmetto Bay Road & William Hilton Parkway (Sea Pines Circle)
        - Provide a two-lane roundabout.
        - Each approach should have a right-turn bypass, with the exception of the west leg, as shown in **Figure 11.**
        - This will require pavement widening to the inside of the traffic circle and on each of the four legs of the intersection to accommodate the additional lane.

- Estimated preliminary probable opinion of cost of $2,000,000 and a construction duration estimated at 8 months.

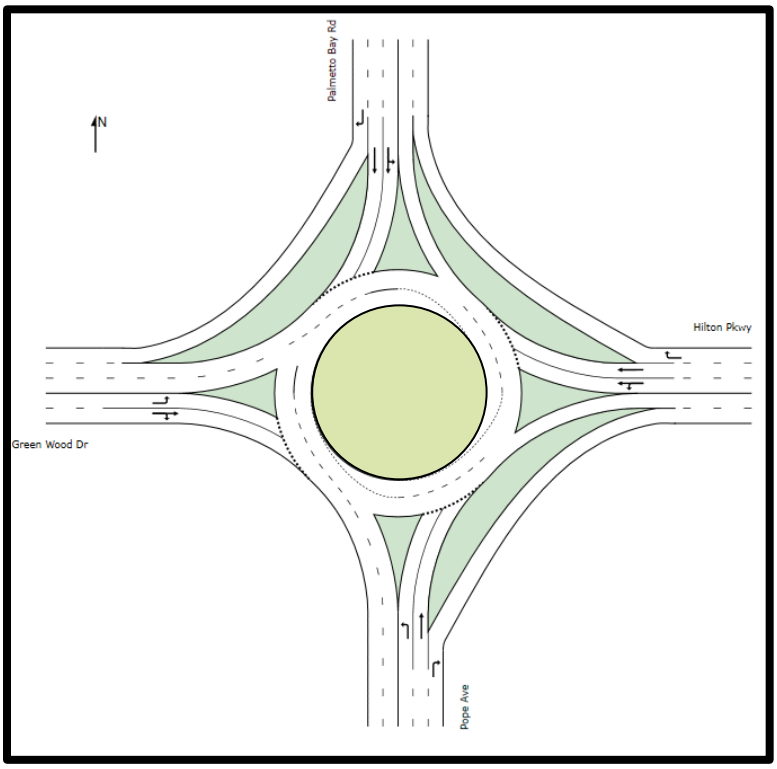


Figure 11. Proposed Roundabout Configuration at Sea Pines Circle Under Option A

- Local Intersection Option B:
  - Extend the 6-lane section from Gum Tree Road past Pembroke Drive. The 6-lane section can taper back to a 4-lane section at Central Avenue.
    - In addition to the roadway widening, this will require adjustments to the shared use path on the north side of the road, new traffic signals at Wilborn and Pembroke, temporary construction easements and possibly new ROW.
    - Estimated preliminary probable opinion of cost of $3,000,000 and a construction duration estimated at 6 months.
  - William Hilton Parkway & Wilborn Road
    - Provide dual southbound right-turn lanes.
    - In addition to the roadway widening, this will require adjustments to the shared use path on the east side of the road, temporary construction easements and possibly new ROW.
    - Estimated preliminary probable opinion of cost of $1,000,000 and a construction duration estimated at 4 months.
  - Palmetto Bay Road & William Hilton Parkway (Sea Pines Circle)
    - Signalize the intersection rather than the existing roundabout.
    - Provide a left-turn lane, two thru lanes, and a right-turn lane for every approach except the EB approach, which will have dual LT lanes.

- In addition to the roadway widening on each leg of the intersection to accommodate the addition of turn lane, this will require adjustments to the shared use path on the east side of the south leg, new traffic signals, temporary construction easements and new ROW on the north and west legs.
- Estimated preliminary probable opinion of cost of $6,000,000 and a construction duration estimated at 12 months.

It should be noted that the improvements recommended at Sea Pines Circle could be implemented independently of the improvements along William Hilton Parkway.

OPTIONS A AND B VISSSIM TRAFFIC OPERATIONAL ANALYSIS

The operating conditions for all of the study intersections under Options A and B are provided in **Appendix O**. Overall, the study intersections are largely expected to operate acceptably in the year 2045 under both Options.

Under Option A, the previous operating conditions along William Hilton Parkway west of Gum Tree Road would be maintained. The intersections downstream of Gum Tree Road are largely expected to operate acceptably in 2045 with the improvements under Option A in place. The reconfiguration of the northbound approach at the intersection of William Hilton Parkway and Pembroke Drive is expected to help reduce the eastbound and westbound queue lengths as more of the cycle length can go towards the mainline. However, even with adaptive signals and the reconfiguration of the northbound approach, long eastbound and westbound queues would still be expected under this scenario. That being said, the queue lengths are not expected to impact the nearby intersections with the improvements in place and are well served, as evidenced by the expected overall LOS D's at each signalized intersection.

Along Palmetto Bay Road, the two-lane roundabout with bypass lanes for all legs except for the east leg at Sea Pines is expected to operate favorably during both AM and PM peak hours. The roundabout is expected to operate with an overall LOS B or better during both peak periods. The previously failing approaches would be mitigated and the queue lengths would be minimized.

Under Option B, the intersections downstream of Gum Tree Road are expected to operate favorably in 2045. The long eastbound and westbound queues between Pembroke Drive and Gum Tree Road would be minimized. The roadways would have adequate capacity to accommodate traffic through 2045.

Option B removes the roundabout at Sea Pines Circle and replaces it with a signalized intersection. It was found that a signalized intersection would also operate acceptably through the year 2045 at Sea Pines. The overall LOS would be a C during both the AM and PM peak hours and the queue lengths would not be expected to impact nearby intersections.

OPTIONS A AND B VISSIM TRAVEL TIME COMPARISON

A comparison of the calculated travel times between the 2045 No-Build conditions and the 2045 Modified Alternative 1 without any improvements to the downstream intersections as well as with the recommended improvements under both Option A and Option B were evaluated using VISSIM. These travel times represent the final travel time calculations for the study area and are presented in **Table 21.**

Under Option A, the travel times are expected to improve along William Hilton Parkway between Moss Creek Drive and Indigo Run Drive by approximately 17.2 minutes (65%) during the AM peak hour in the eastbound direction and by approximately 15.7 minutes (61%) during the PM peak hour in the westbound direction. The travel times along William Hilton Parkway at Moss Creek to the Cross Island Parkway at Sea Pines Circle are expected to improve by approximately 19.2 minutes (58%) during the AM peak hour in the southbound direction and by approximately 27 minutes (66%) during the PM peak hour in the northbound direction.

Under Option B, the travel times are expected to improve along William Hilton Parkway between Moss Creek Drive and Indigo Run Drive by approximately 17.4 minutes (65%) during the AM peak hour in the eastbound direction and by approximately 16.5 minutes (64%) during the PM peak hour in the westbound direction. The travel times along William Hilton Parkway at Moss Creek to the Cross Island Parkway at Sea Pines Circle are expected to improve by approximately 19.4 minutes (59%) during the AM peak hour in the southbound direction and by approximately 27 minutes (66%) during the PM peak hour in the northbound direction.

As shown in **Table 21**, the travel times along William Hilton Parkway between Moss Creek Drive and Indigo Run Drive are relatively comparable between the three scenarios. The 2045 Modified Alternative 1 without improvements to downstream intersections is already expected to operate under largely free-flowing conditions. While the recommended improvements under Options A and B help to reduce long queues, they do not largely impact the travel times.

However, the travel times along William Hilton Parkway between Moss Creek Drive to the Cross Island Parkway at Sea Pines Circle are expected to vastly improve under Options A and B.

Table 21. Comparison of Final Travel Times for Entire Study Area

Corridor		William Hilton Pkwy Between Moss Creek and Indigo Run		% Difference to 2045 No-Build		William Hilton Pkwy from Moss Creek to Sea Pine Circle via Cross Island Pkwy		% Difference to 2045 No-Build	
		EB	WB	EB	WB	SB	NB	SB	NB
2045 No-Build Simulated Travel Time (secs) [min]	**AM**	*1579* [26.3]	*584 [9.7]*	-	-	*1984 [33.1]*	*823 [13.7]*	-	-
	PM	*642 [10.7]*	*1544 [25.7]*	-	-	*873* [14.6]	*2465 [41.1]*	-	-
2045 Modified Alternative 1 Without Improvements to Downstream Intersections Simulated Travel Time (secs) [min]	**AM**	628 [10.5]	597 [10]	**60.23%**	**2.23%**	1387 [23.1]	848 [14.1]	**30.09%**	**3.04%**
	PM	631 [10.5]	616 [10.3]	**-1.71%**	**60.10%**	874 [14.6]	904 [15.1]	**0.11%**	**63.33%**
2045 Modified Alternative 1 Option A Simulated Travel Time (secs) [min]	**AM**	548 [9.1]	556 [9.3]	**65.31%**	**-4.85%**	833 [13.9]	814 [13.6]	**58.01%**	**-1.04%**
	PM	589 [9.8]	600 [10]	**-8.21%**	**61.12%**	856 [14.3]	845 [14.1]	**-1.93%**	**65.72%**
2045 Modified Alternative 1 Option B Simulated Travel Time (secs) [min]	**AM**	534 [8.9]	547 [9.1]	**66.18%**	**-6.34%**	820 [13.7]	816 [13.6]	**58.67%**	**-0.86%**
	PM	571 [9.5]	552 [9.2]	**11.06%**	**64.25%**	840 [14]	848 [14.1]	**-3.78%**	**65.60%**

OPTIONS A AND B NETWORK PERFORMANCE

Table 22 summarizes overall network performance for the 2045 Modified Alternative 1 with the improvements to the local intersections under Option A and Option B as compared to the 2045 No-Build conditions. As shown, the network performance is expected to drastically improve under both options.

During the AM peak hour, vehicles stops will decrease throughout the study area. Vehicles will be required to stop on average 1.6 times under both Options A and B. Additionally, the average vehicle speeds during the AM peak hour will increase to an average of 38 to 37 mph for Option A and B, respectively.

During the PM peak hour, vehicles will be required to stop on average 2.1 to 1.9 times under Options A and B, respectively, both of which are significantly lower than the 2045 No-Build scenario. Additionally, the average vehicle speeds during the PM peak hour will increase to an average of 36 mph.

Table 22. Network Performance for Entire Study Area

Scenario	Average Number of Stops per Vehicle	Average Speed (mph)	Total Vehicles (vph)
2045 No-Build AM	9.9	21	11,143
2045 No-Build PM	15.4	16	12,393
2045 Modified Alternative 1: No Improvements to Local Intersections AM	6.3	28	11,355
2045 Modified Alternative 1: No Improvements to Local Intersections PM	6.7	29.8	13,531
2045 Modified Alternative 1: Option A AM	1.6	38	11,697
2045 Modified Alternative 1: Option A PM	2.1	36	14,060
2045 Modified Alternative 1: Option B AM	1.6	37	11,693
2045 Modified Alternative 1: Option B PM	1.9	36	14,064

MULTIMODAL AND SAFETY RECOMMENDATIONS FOR LOCAL INTERSECTIONS

In order to help improve the multimodal experience and improve safety along the local intersections east of Gum Tree Road and along Cross Island Parkway, the following additional improvements for the local intersections are recommended:

- William Hilton Parkway & Wilborn Road
  - Realign north crosswalk to ensure pedestrian path is routed through the existing raised channelized islands to provide pedestrian refuge areas within the northwest and northeast quadrants of the intersection. Remove existing crosswalk related pavement markings and wooden stop signs associated with the north crosswalk. Ensure pedestrian signal actuation is provided across southbound left-turn and thru lanes; however, pedestrian signal actuation across the southbound and westbound right-turn lanes would not be necessary.
  - Realign east crosswalk further to the east toward the existing raised channelized island to provide pedestrian refuge area. Remove portions of the existing channelized pavement marking between the westbound thru and left-turn lanes, and implement a raised median to provide pedestrian refuge, similar to what is currently in place for the westbound approach at Pembroke Drive.
  - Ensure Accessible Pedestrian Signal (APS) infrastructure is installed for all signalized pedestrian crossings, and located in compliance with current Public ROW Accessibility Guidelines (PROWAG) requirements. This may require modifications to existing curb

ramps and/or sidewalk segments at the intersection, if the existing pedestrian path surfaces that are not PROWAG compliant.
    - Ensure pedestrian clearance interval signal timing data complies with MUTCD requirements.
    - Ensure vegetation is maintained within each quadrant to ensure optimal intersection sight distance for side-street motorists entering William Hilton Parkway, as well as that the presence of pedestrians are clearly visible to northbound/southbound/westbound right-turning vehicles.
- William Hilton Parkway & Pembroke Drive
    - Improve pedestrian path crossing landing area on the north side of the intersection to provide more refuge for waiting pedestrians
    - Ensure APS infrastructure is installed for all signalized pedestrian crossings, and located in compliance with current PROWAG requirements. This may require modifications to existing curb ramps and/or sidewalk segments at the intersection, if the existing pedestrian path surfaces that are not PROWAG compliant.
    - Ensure pedestrian clearance interval signal timing data complies with MUTCD requirements.
- William Hilton Parkway & Central Avenue
    - Currently, pedestrians must cross in front of the uncontrolled eastbound left-turn. Therefore, it is recommended that the west leg pedestrian crossing be improved to provide for shorter crossing distances/fewer lane crossings at once.
- Palmetto Bay Road & Arrow Road
    - Ensure an ADA compliant detectable warning is installed in the northwest quadrant's curb ramp.
    - Ensure APS infrastructure is installed for all signalized pedestrian crossings, and located in compliance with current PROWAG requirements. This may require modifications to existing curb ramps and/or sidewalk segments at the intersection, if the existing pedestrian path surfaces that are not PROWAG compliant.
    - Ensure pedestrian clearance interval signal timing data complies with MUTCD requirements.
- Palmetto Bay Road & Target Road
    - Ensure APS infrastructure is installed for all signalized pedestrian crossings, and located in compliance with current PROWAG requirements. This may require modifications to existing curb ramps and/or sidewalk segments at the intersection, if the existing pedestrian path surfaces that are not PROWAG compliant.
    - Ensure pedestrian clearance interval signal timing data complies with MUTCD requirements.

- Palmetto Bay Road & William Hilton Parkway (Sea Pines Circle)
    - Incorporate pedestrian facilities and crossings for each approach where feasible.

Additionally, from a safety perspective, congested corridors often lead to an increase in crashes because of stop-and-go conditions. By alleviating the congestion along William Hilton Parkway, it is expected that the total number of crashes along the corridor would decrease. It should also be noted that access points throughout the study area were not restricted to a point where emergency vehicles would be significantly impacted or be required to alter their response routes.

CONCLUSIONS

The Town of Hilton Head Island, South Carolina commissioned an independent study of the William Hilton Parkway Gateway Corridor to assess the need for improvements along US 278 (William Hilton Parkway) from Moss Creek Drive to Indigo Run Drive, as well as along US 278 (Palmetto Bay Road) from Cross Island Parkway to Sea Pines Circle. This report summarized Existing and future year No-Build traffic operations and safety along the corridor to quantify mobility issues that exist today and that would be expected in the future, absent any upgrades to the roadway network.

This report also detailed the numerous corridor alternatives considered for implementation along William Hilton Parkway between Moss Creek Drive and Gum Tree Road. Four proposed corridor alternatives consisting of two at-grade solution and two grade separated solutions were analyzed. The goal of the alternatives analysis was to provide an objective, data-driven evaluation of the four alternatives. This evaluation was then used to assist with the selection of a single recommended alternative for the corridor.

Per the direction of the Town of Hilton Head Island, Lochmueller Group was directed to pursue corridor Alternative 1: SCDOT Modified Recommended Preferred with modifications to provide a single eastbound left-turn lane and a single southbound right-turn lane at the intersection of William Hilton Parkway at Squire Pope Road.

With the recommended improvements under Alternative 1: SCDOT Modified Recommended Preferred in place, this report further evaluated the impacts to the intersections downstream (i.e., east of Gum Tree Road to Indigo Run, and south of Cross Island Parkway to Sea Pines Circle). Two additional options for mitigation were then provided for The Town of Hilton Head Island's consideration to help ease congestion at the local intersections between Gum Tree Road and Indigo Run Drive, as well as along the Cross Island Parkway towards Sea Pines Circle.

The following conclusions were reached:

2045 ALTNERATIVES ANALYSIS

CONGESTION AND CORRIDOR MOBILITY

- Under Alternative 1, the northbound approach of Squire Pope Road during the PM peak hour is expected to operate with a LOS F. All other approaches at signalized intersections between Squire Pope Road and Gum Tree Road are expected to operate with a LOS E or better.
- Under Alternative 2, there are no movements between Squire Pope Road and Gum Tree Road that are expected to operate with a LOS F at a signalized intersection; however, some movements between Squire Pope Road and Gum Tree Road are expected to have a LOS E.
- Under Alternative 3, if an echelon at Squire Pope is pursued, then the southbound approach at Squire Pope Road during the PM peak hour would be expected to have a LOS F. If a center turn overpass at Squire Pope is pursued, then the northbound approach at Spanish Wells would be expected to operate with a LOS F. All other approaches at

signalized intersections between Squire Pope Road and Gum Tree Road are expected to operate with a LOS E or better.

- Under Alternative 4, all movements at signalized intersections are expected to operate at a LOS D or better between Squire Pope Road and Gum Tree Road.
- All four proposed alternatives show significant improvements to corridor-wide metrics as compared to the 2045 No-Build condition.
- While all four proposed alternatives are expected to result in improved travel times along William Hilton Parkway between Moss Creek Drive and Gum Tree Road when compared to the 2045 No-Build, Alternative 4 is expected to have the lowest, and therefore best, travel times. Alternative 3 is expected to have the second best travel times, and the travel times between Alternative 1 and 2 are expected to be comparable.

SAFETY AND MULTIMODAL CONSIDERATIONS

- Alternative 1 results in the longest pedestrian crossing distances at the study intersections. The amount of ROW needed in Alternative 1 may limit the ability to add median refuge islands. In addition, each intersection would have multiple turning movements and potential conflict points along each leg.
- Alternative 2 results in a reduced pedestrian crossing distance at the study intersections which reduces pedestrians' exposure to vehicular traffic. Alternative 2 also allows the potential for median refuge islands. Bowtie intersections have fewer pedestrian and vehicle conflict points than a traditional intersection.
- Alternative 3 results in a reduced pedestrian crossing distance at the study intersections which reduces pedestrians' exposure to vehicular traffic. Alternative 3 also allows the potential for median refuge islands to help pedestrians navigate the more complex intersections. Both echelons and center turn overpass intersections have fewer pedestrian and vehicle conflict points than a traditional intersection.
- Alternative 4 also results in a reduced pedestrian crossing distance at the study intersections which reduces pedestrians' exposure to vehicular traffic. With an elevated bypass, refuge islands can be provided between directional traffic flow. However, it should be noted that multiple refuge islands per leg may result in a more complex intersection. The elevated bypass would be expected to have fewer pedestrian and vehicle conflict points when compared to Alternative 1 given the smaller intersections. Alternative 4 would also divert a majority of thru traffic onto the elevated by-pass, thereby greatly reducing the number of vehicles that pedestrians and bicyclists must contend with while crossing/navigating William Hilton Parkway.

RIGHT-OF-WAY (ROW)/PRELIMINARY PROBABLE OPINION OF COST

- From a ROW perspective, each of the four proposed alternatives were compared to Alternative 1 (SCDOT Modified Recommended Preferred). The proposed alternatives were not compared to existing conditions for ROW purposes. ROW estimates refer to permanent

ROW needed for the completed improvements only, and do not consider temporary ROW needed for construction or staging.

- Alternative 1:
  - When compared to the original SCDOT Modified Recommended Preferred, Alternative 1 is expected to require an additional 0.2 acres of ROW to allow for the improvements at Gum Tree Road.
  - Alternative 1 has an estimated preliminary probable opinion of cost of $426 million dollars and a construction duration estimated at 36 months.
- Alternative 2:
  - When compared to the original SCDOT Modified Recommended Preferred, Alternative 2 is expected to require an additional 1.1 acres of ROW to allow for the improvements at Gum Tree Road as well as for the bowtie intersections.
  - Alternative 2 has an estimated preliminary probable opinion of cost of $430 million dollars and a construction duration estimated at 38 months.
- Alternative 3:
  - When compared to the original SCDOT Modified Recommended Preferred, Alternative 3 is expected to require an additional 1.1 acres of ROW to allow for the improvements at Gum Tree Road as well as for the echelon / center turn overpass intersections.
  - Alternative 3 has an estimated preliminary probable opinion of cost between $440-$450 million dollars and a construction duration estimated at 42 months.
- Alternative 4:
  - When compared to the original SCDOT Modified Recommended Preferred, Alternative 4 is not expected to require any additional ROW.
  - Alternative 4 has an estimated preliminary probable opinion of cost between $545-$575 million dollars and a construction duration estimated at 48 months.

ENVIRONMENTAL

- Similar to the ROW, each of the four proposed corridor alternatives were compared to Alternative 1 (SCDOT Modified Recommended Preferred) for the environmental assessment.
- Several categories were evaluated with respect to the environmental impact such as streams, floodplains, relocations, neighborhoods, environmental justice, cultural resources, and Section 4(f) resources.
- Alternative 1 is expected to have the least environmental impact when compared to the original SCDOT Modified Recommended Preferred alternative, followed by Alternative 4, Alternative 2, then Alternative 3, respectively.

TOWN SELECTED ALTERNATIVE

After evaluating the four proposed corridor alternatives, Lochmueller was directed by the Town of Hilton Head Island to pursue corridor Alternative 1: SCDOT Modified Recommended Preferred with modifications to provide a single eastbound left-turn lane and a single southbound right-turn lane at the intersection of William Hilton Parkway at Squire Pope Road through to the final phase of analysis.

DOWNSTREAM IMPACTS OF TOWN SELECTED ALTERNATIVE 1

An analysis was conducted assuming only the improvements under the Modified Alternative 1 were in place, to better understand how the entire study area would operate if no geometric roadway improvements were implemented east of Gum Tree Road or along Cross Island Parkway.

Even with no improvements in place east of Gum Tree Road or along Cross Island Parkway, travel times would significantly improve as compared to the 2045 No-Build scenario. The intersections would be expected to operate acceptably overall. However, long queues were noted between Wilborn Road and Pembroke Drive. Additionally, the existing roundabout at Palmetto Bay Road and Sea Pines Circle is expected to fail during both the AM and PM peak hours. As a result of the failing roundabout, the southbound queue lengths are expected to extend beyond nearby intersections.

ADDITIONAL MITIGATION SOLUTIONS FOR LOCAL INTERSECTIONS

To help mitigate the long queue lengths and operational failures at Sea Pines Circle, two options with potential improvements to the local intersections downstream of Gum Tree Road and Cross Island Parkway were developed for the Town of Hilton Head Island's consideration:

- Option A was developed to help address congestion between Wilborn Road and Pembroke Drive while minimizing the physical impacts along the corridor by reconfiguring the northbound approach at the intersection of William Hilton Parkway and Pembroke Drive. Under Option A, the existing roundabout at Sea Pines Circle was expanded to a two-lane roundabout with right-turn bypass lanes for each approach except for the east leg.
- Option B considered a more significant approach to help mitigate the expected queue lengths between Wilborn Road and Pembroke Drive by extending the six-lane section through Central Avenue. Under Option B, the existing roundabout at Sea Pines Circle was reconfigured into a signalized intersection.
- The 2045 Modified Alternative 1 without improvements to downstream intersections is already expected to operate under largely free-flowing conditions. While the recommended improvements under Options A and B help to reduce long queues, they do not largely improve the travel times. However, the travel times along William Hilton Parkway between Moss Creek Drive to the Cross Island Parkway at Sea Pines Circle are expected to vastly improve under Options A and B.

SAFETY AND MULTIMODAL CONSIDERATIONS

- The SCDOT Modified Recommended Preferred Alternative will provide a separated SUP for bicycles. Due to the heavy traffic volumes, on street facilities are not being considered. Therefore, the recommendations made mainly focus on how to best accommodate pedestrians. In order to help improve safety as well as the multimodal experience, it is recommended that pedestrian refuge islands be provided wherever possible. Some specific locations include the east and west legs of William Hilton Parkway at Squire Pope Road; the west leg of William Hilton Parkway at Spanish Wells Road; and the east leg of William Hilton Parkway at Wilborn Road.
- If continuous sidewalk facilities are not planned to be installed along the south side of William Hilton Parkway west of Squire Pope Road, consider eliminating the William Hilton Parkway pedestrian crossing on the west leg at Squire Pope Road to instead encourage pedestrians to cross William Hilton Parkway at the east leg only.
- During final design efforts for the intersections of William Hilton Parkway at Squire Pope Road and Spanish Wells Road, provide high visibility crosswalks, and also seek to tighten curb radii to shorten pedestrian crossing distances across applicable legs of the intersections.
- It is recommended that the north crosswalk at William Hilton Parkway and Wilborn Road be relocated further north away from traffic, and that the right-turn channelized islands be reconfigured to provide a pedestrian refuge. It is also recommended that the east crosswalk be relocated further east toward the existing raised channelized island in the northeast quadrant to provide a pedestrian refuge.
- Ensure Accessible Pedestrian Signal (APS) infrastructure is installed for all signalized pedestrian crossings, and located in compliance with current Public ROW Accessibility Guidelines (PROWAG) requirements. This may require modifications to existing curb ramps and/or sidewalk segments at the intersection, if the existing pedestrian path surfaces that are not PROWAG compliant.
- Ensure pedestrian clearance interval signal timing data complies with MUTCD requirements for all signalized pedestrian crossings.
- Congested corridors often lead to an increase in crashes because of stop-and-go conditions. By alleviating the congestion along William Hilton Parkway, it is expected that the total number of crashes along the corridor would decrease.
- It should also be noted that access points throughout the study area were not restricted to a point where emergency vehicles would be significantly impacted or required to alter their response routes.

APPENDIX

Appendix A. 2023 Existing Traffic Volumes

Appendix B. 2023 Existing Operating Conditions (Synchro)

Appendix C. 2023 Existing Operating Conditions (VISSIM)

Appendix D. Traffic Forecasting Memorandum

Appendix E. 2045 No-Build Traffic Volumes

Appendix F. 2045 No-Build Traffic Operating Conditions (Synchro)

Appendix G. 2045 No-Build Traffic Operating Conditions (VISSIM)

Appendix H. Four Lane Viability Review Technical Memorandum; Seismic Study Review; Cursory Review of Southern Bypass

Appendix I. 2045 Alternative 1 Traffic Volumes and Operating Conditions (Synchro)

Appendix J. Technical Environmental Overview

Appendix K. 2045 Alternative 2 Traffic Volumes and Operating Conditions (Synchro)

Appendix L. 2045 Alternative 3 Traffic Volumes and Operating Conditions (Synchro)

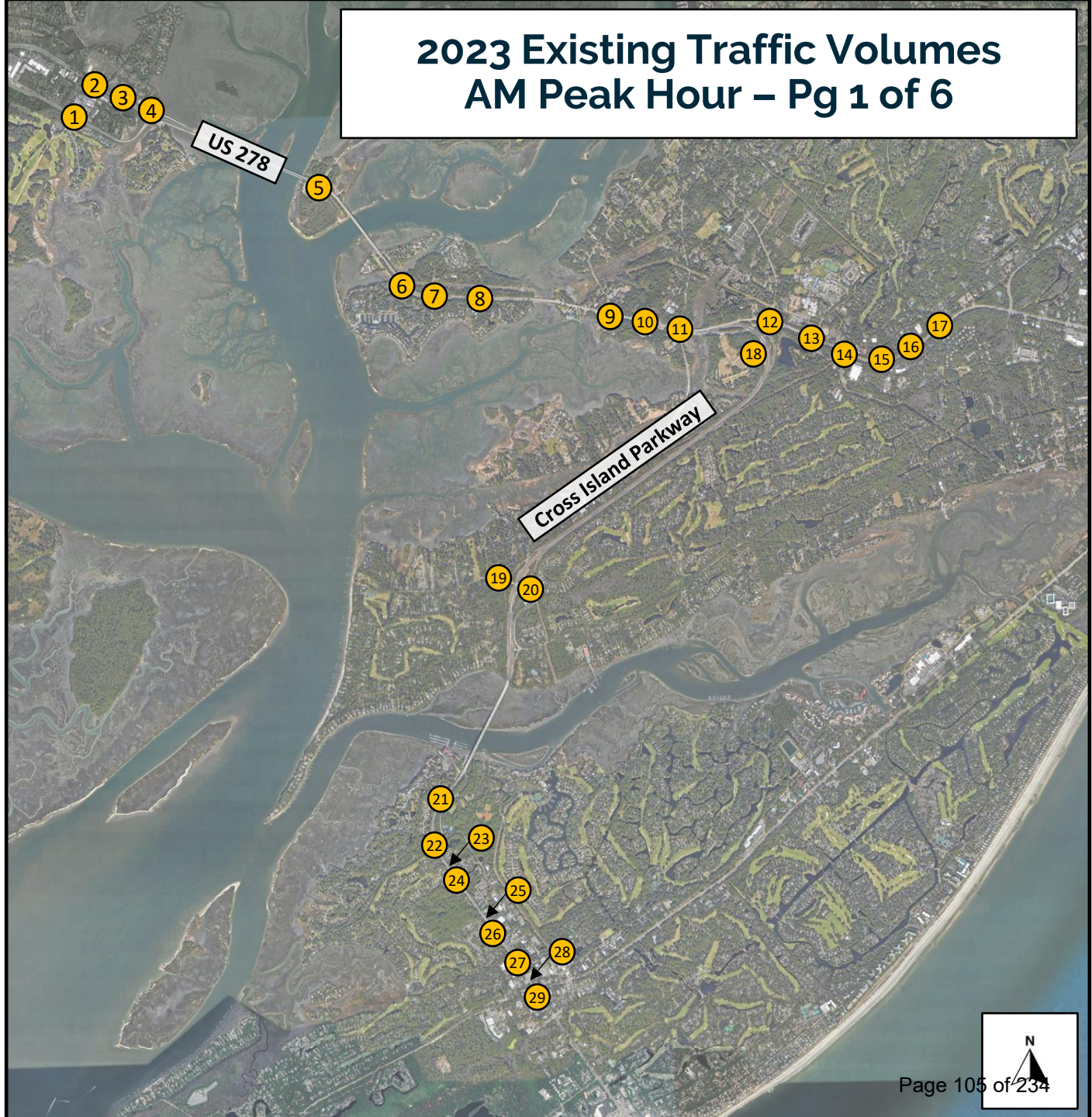
Appendix M. 2045 Alternative 4 Traffic Volumes and Operating Conditions (Synchro)

Appendix N. 2045 Modified Alternative 1 Operating Conditions (VISSIM)

Appendix O. 2045 Local Intersections Operating Conditions (VISSIM)

APPENDIX A: 2023 EXISTING TRAFFIC VOLUMES

2023 Existing Traffic Volumes
AM Peak Hour – Pg 1 of 6



1 — Bluffton Pkwy & Buckingham Plantation Dr
- Bluffton Pkwy: 74 ↙, 2 ↓, 4 ↘
- Buckingham Plantation Dr: 16 ←, 436 ←, 6 ↖
- Bluffton Pkwy: 232 ↗, 879 →, 25 ↘
- Buckingham Plantation Dr: 27 ↖, 11 ↑, 28 ↗

2 — US 278 & Buckingham Plantation Dr
- US 278: 68 ↙, 25 ↓, 42 ↘
- Buckingham Plantation Dr: 23 ←, 1119 ←, 20 ↖
- US 278: 62 ↗, 1590 →, 35 ↘
- Buckingham Plantation Dr: 29 ↖, 60 ↑, 170 ↗

3 — US 278 & Salt Marsh Dr
- US 278: 78 ↙, 0 ↓, 8 ↘
- Salt Marsh Dr: 86 ←, 1084 ←, 6 ↖
- US 278: 8 ↗, 1792 →, 2 ↘
- Salt Marsh Dr: 0 ↖, 0 ↑, 45 ↗

4 — US 278 & Fording Island Rd Ext
- US 278: 1162 ←, 4 ↖
- US 278: 1843 →, 2 ↘
- Fording Island Rd Ext: 14 ↖, 15 ↗

5 — US 278 & Wildlife Refuge
- US 278: 0 ↙, 0 ↓, 0 ↘
- Wildlife Refuge: 0 ←, 1624 ←, 0 ↖
- US 278: 2 ↗, 2763 →, 4 ↘
- Wildlife Refuge: 0 ↖, 0 ↑, 2 ↗

6 — US 278 & Blue Heron Point Rd
- US 278: 1622 ←, 0 ↖
- US 278: 2762 →, 3 ↘
- Blue Heron Point Rd: 2 ↖, 10 ↗

7 — US 278 & Crosstree Dr
- US 278: 1 ↙
- Crosstree Dr: 3 ←, 1607 ←, 30 ↖
- US 278: 2740 →, 32 ↘
- Crosstree Dr: 14 ↖, 0 ↑, 40 ↗

8 — US 278 & Jenkins Rd
- US 278: 6 ↙, 4 ↘
- Jenkins Rd: 5 ←, 1634 ←
- US 278: 6 →, 2774 →

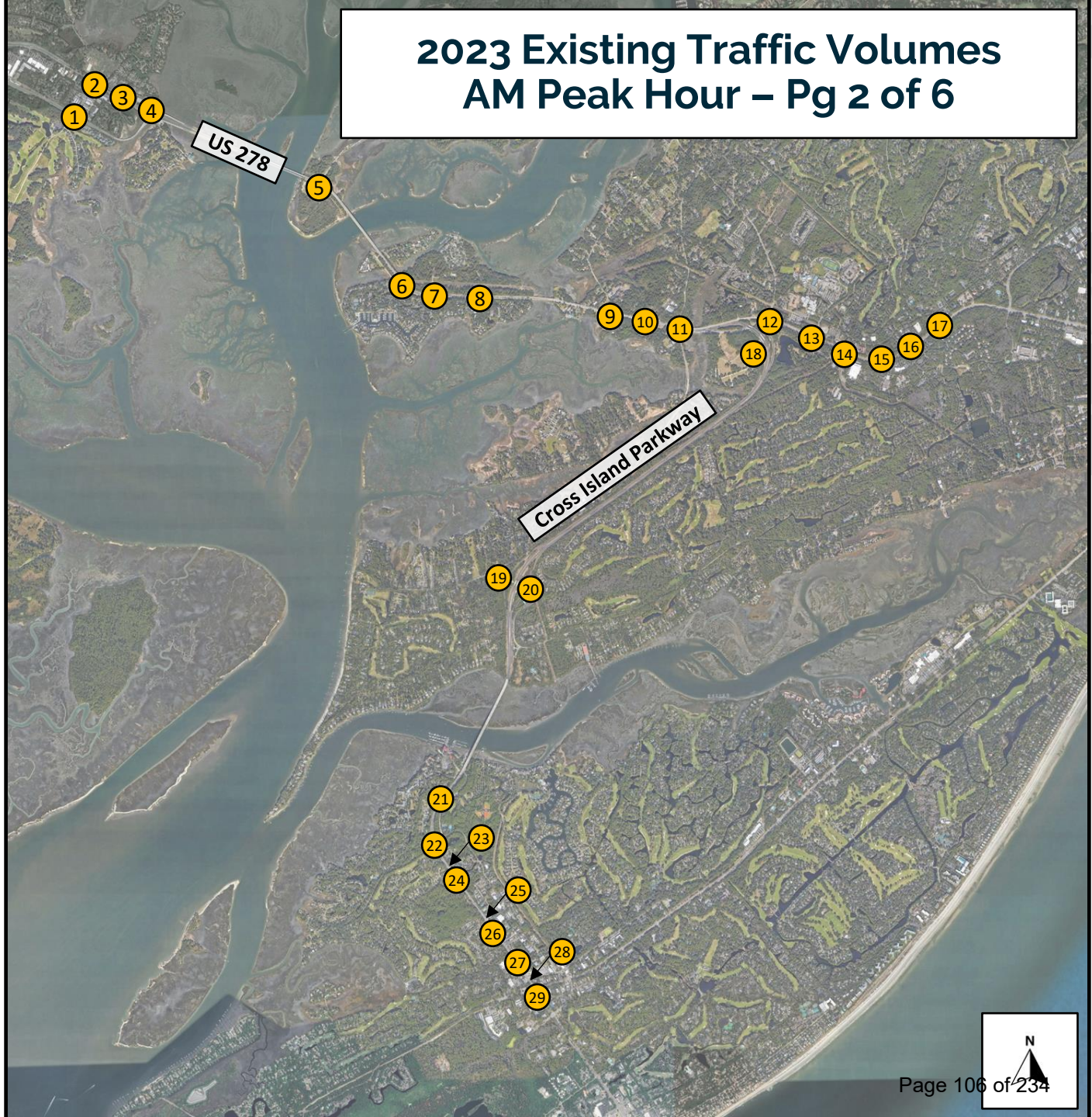
9 — US 278 & Squire Pope Rd
- US 278: 212 ↙, 0 ↓, 45 ↘
- Squire Pope Rd: 43 ←, 1425 ←, 2 ↖
- US 278: 156 ↗, 2620 →, 2 ↘
- Squire Pope Rd: 2 ↖, 0 ↑, 5 ↗

10 — US 278 & Old Wild Horse Rd
- US 278: 76 ↙
- Old Wild Horse Rd: 20 ←, 1394 ←
- US 278: 2670 →

11 — US 278 & Spanish Wells Rd
- US 278: 12 ↙, 70 ↓, 127 ↘
- Spanish Wells Rd: 56 ←, 1281 ←, 71 ↖
- US 278: 43 ↗, 2481 →, 146 ↘
- Spanish Wells Rd: 121 ↖, 43 ↑, 121 ↗

12 — US 278 & Gum Tree Rd
- US 278: 92 ↙, 179 ↓, 212 ↘
- Gum Tree Rd: 189 ←, 775 ←, 193 ↖
- US 278: 154 ↗, 1527 →, 6 ↘
- Gum Tree Rd: 8 ↖, 144 ↑, 290 ↗

2023 Existing Traffic Volumes
AM Peak Hour – Pg 2 of 6



13
181 ↓ 27 ↓ 244
US 278: 253 ←, 1708 →, 68 ↓
Jarvis Park Rd: 23 ←, 45 ↑, 0 →
302 ←, 953 ↑, 2 →

14
45 ↓ 12 ↓ 18
US 278: 80 ←, 1631 →, 241 ↓
Pembroke Dr: 259 ←, 21 ↑, 37 →
31 ←, 953 ↑, 33 →

15
20 ↓
US 278: 5 ←, 1676 →, 5 ↓
Central Ave: 5 →
20 ←, 997 ↑, 5 →

16
10 ↓ Hatton Pl
US 278: 1589 →, 92 ↓
41 ←, 1012 ↑
10 →

17
111 ↓ 68 ↓ 214
US 278: 129 ←, 1415 →, 55 ↓
Indigo Run Dr: 80 ←, 51 ↑, 33 →
166 ←, 862 ↑, 33 →

18
6 ↓ 374
Honey Horn Rd: 2 ←, 0 ↓
Cross Island Pkwy SB

19
36 ↓ 0 ↓ 23 ↓ Cross Island Pkwy SB
Marshland Rd: 225 →, 242 →
140 ←, 115 ←

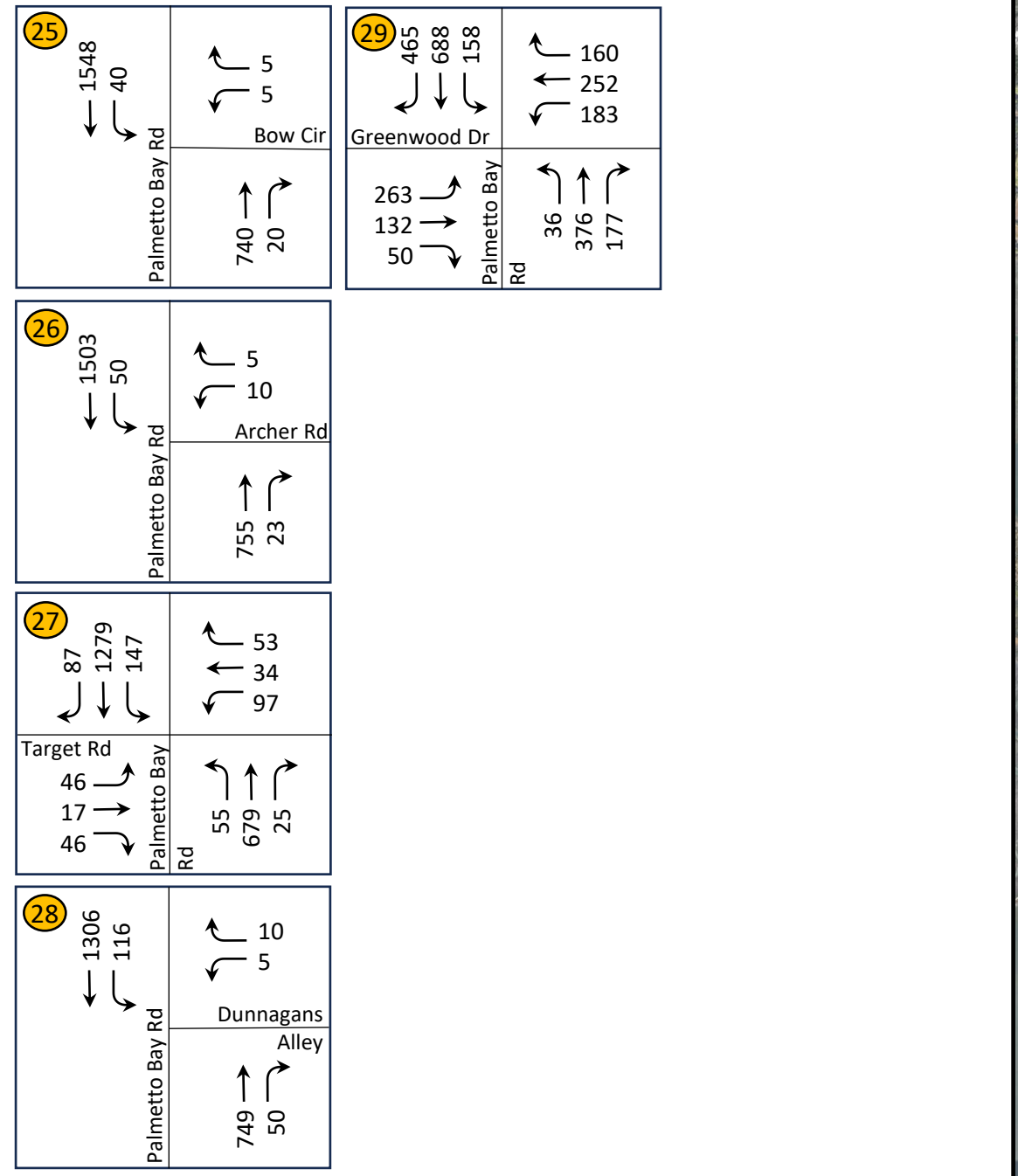
20
Marshland Rd: 126 →, 122 →
Cross Island Pkwy NB: 71 ←, 58 ←
79 ←, 184 ←

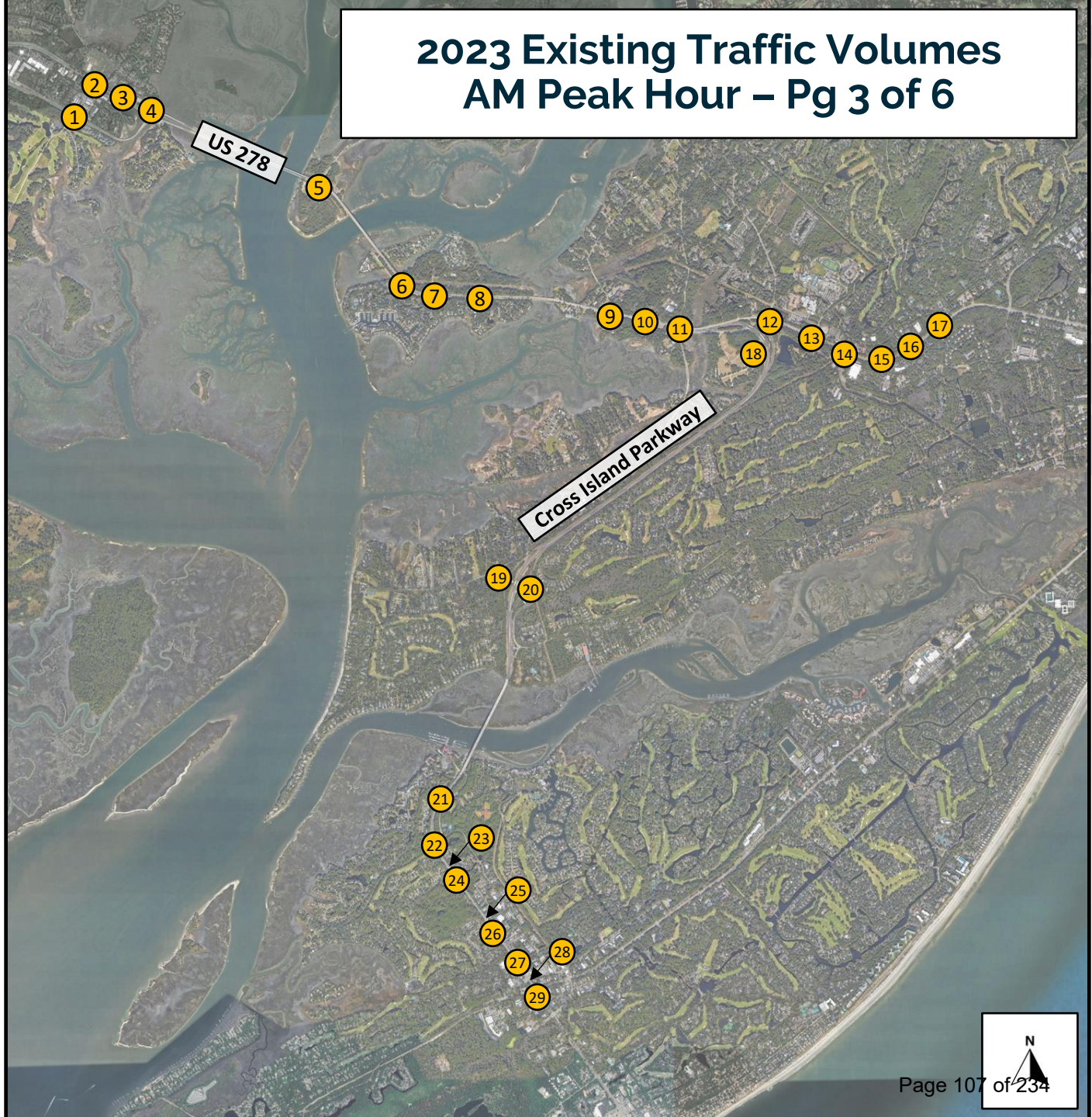
21
0 ↓ 1714 ↓
Bay Pines Rd: 0 ←, 5 ↓
Palmetto Bay Rd: 5 ←, 899 →

22
53 ↓ 1443 ↓ 223 ↓
Arrow Rd: 114 ←, 15 →, 138 ↓
Palmetto Bay Rd: 44 ←, 672 →, 34 →
118 ←, 11 ↑, 38 →

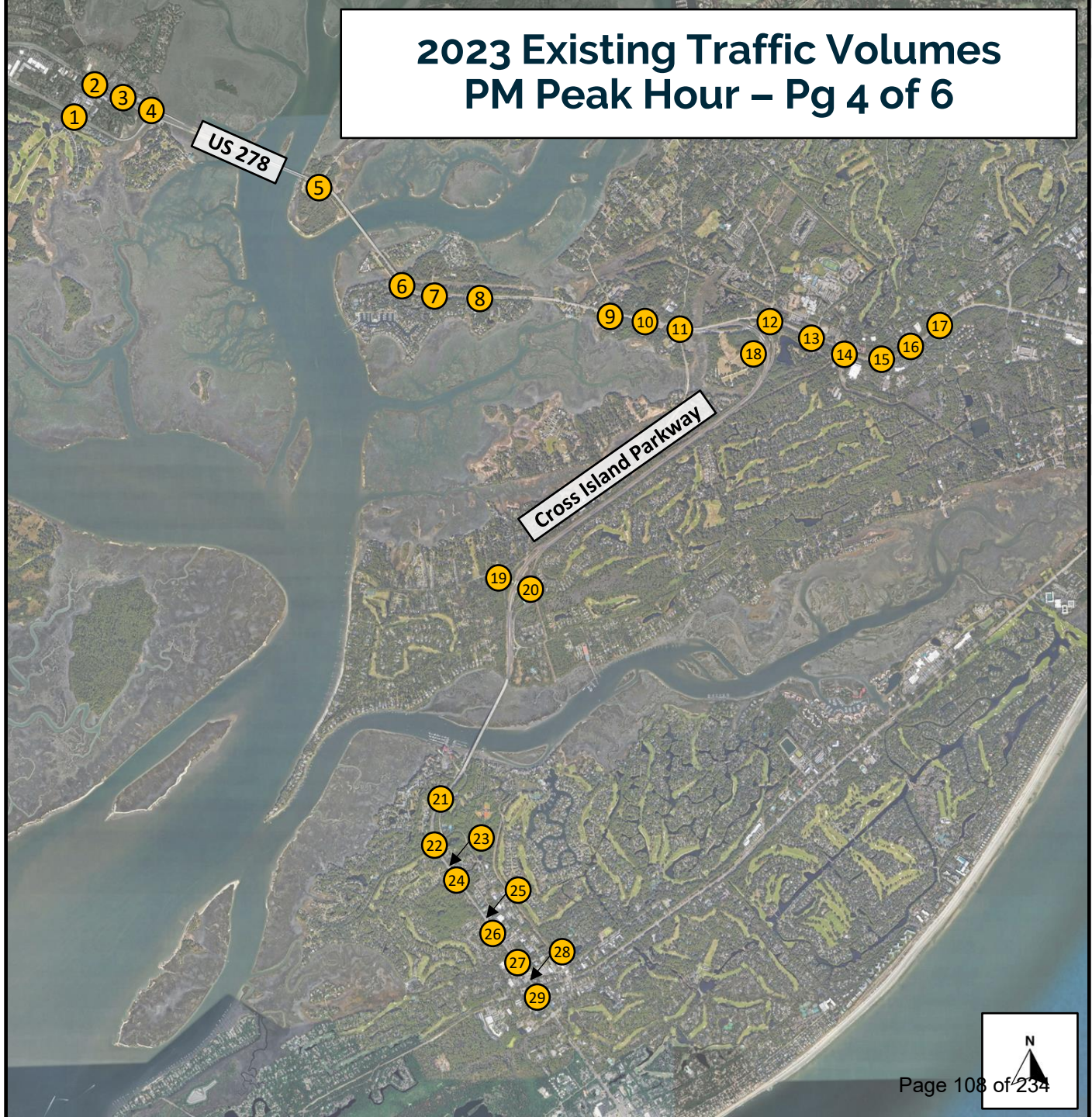
23
1603 ↓ 16 ↓
Genesta St
Palmetto Bay Rd: 745 →, 5 →
5 ←, 5 →

24
1583 ↓ 25 ↓
Palmetto Bay Rd
Palmetto Business Park Rd: 745 →, 0 →
5 ←, 5 →


25
1548
40
5
5
Bow Cir
Palmetto Bay Rd
740
20
29
465
688
158
160
252
183
Greenwood Dr
263
132
50
Palmetto Bay Rd
36
376
177
26
1503
50
5
10
Archer Rd
Palmetto Bay Rd
755
23
27
87
1279
147
53
34
97
Target Rd
46
17
46
Palmetto Bay Rd
55
679
25
28
1306
116
10
5
Dunnagans Alley
Palmetto Bay Rd
749
50


2023 Existing Traffic Volumes
AM Peak Hour – Pg 3 of 6
US 278
Cross Island Parkway
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
N

2023 Existing Traffic Volumes
PM Peak Hour – Pg 4 of 6



1
99 ↓ 12 ↓ 2
10 ← 923 ← 20
Bluffton Pkwy
88 → 654 → 22
Buckingham Plantation Dr
24 ↑ 12 ↑ 26

2
122 ↓ 36 ↓ 67
45 ← 1992 ← 21
US 278
94 → 1441 → 56
Buckingham Plantation Dr
50 ↑ 40 ↑ 20

3
78 ↓ 0 ↓ 5
56 ← 1980 ← 28
US 278
24 → 1496 → 8
Salt Marsh Dr
0 ↑ 0 ↑ 40

4
2044 ← 16
US 278
1517 → 24
Fording Island Rd Ext
20 ↑ 20

5
10 ↓ 0 ↓ 4
6 ← 3001 ← 2
US 278
4 → 2211 → 4
Wildlife Refuge
2 ↑ 0 ↑ 6

6
3005 ← 2
US 278
2213 → 8
Blue Heron Point Rd
4 ↑ 12

7
0 ↓
5 ← 2975 ← 50
US 278
2195 → 30
Crosstree Dr
32 ↑ 0 ↑ 52

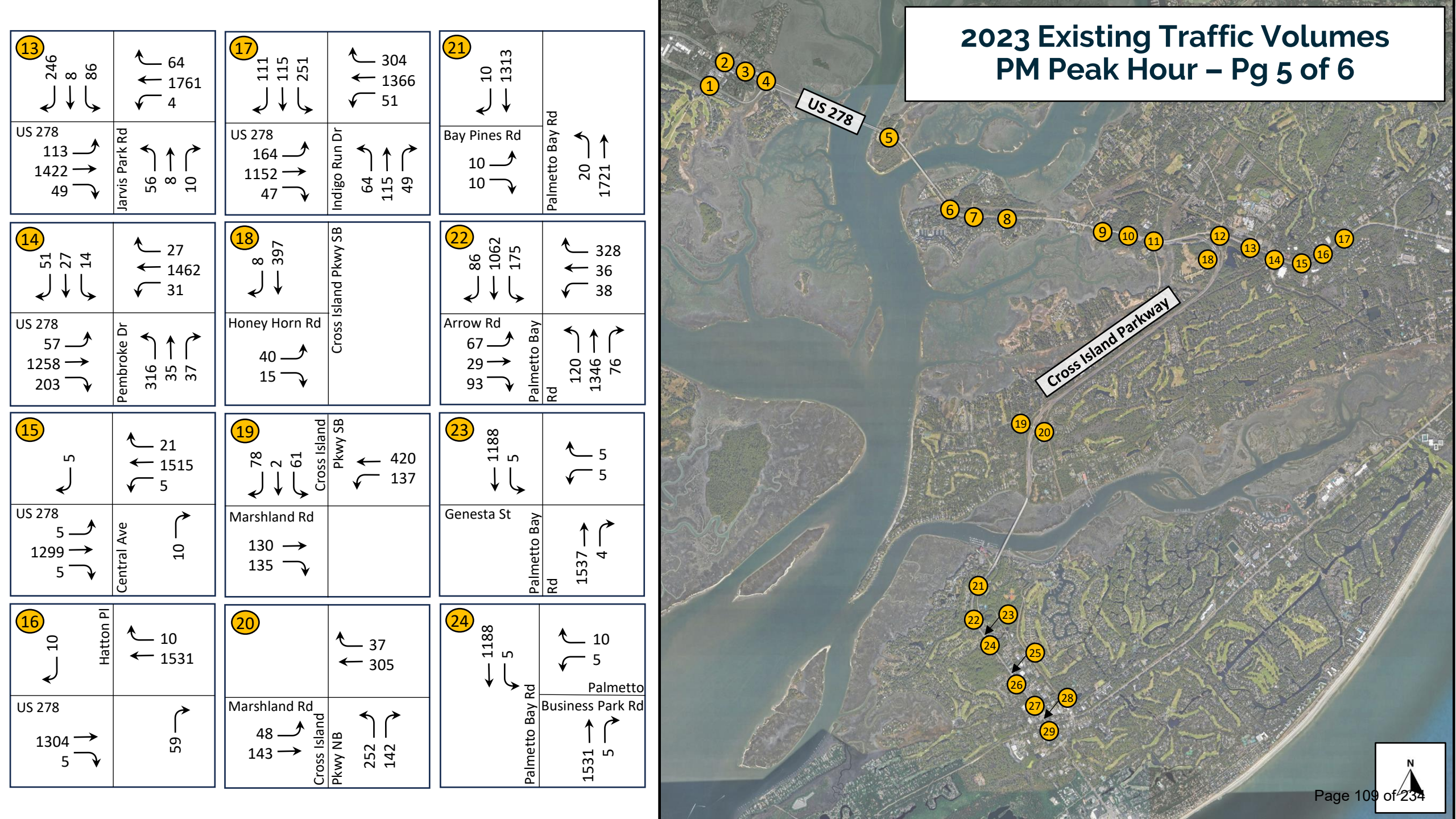
8
10 ↓ 6 Jenkins Rd
10 ← 3020
US 278
10 → 2237 →

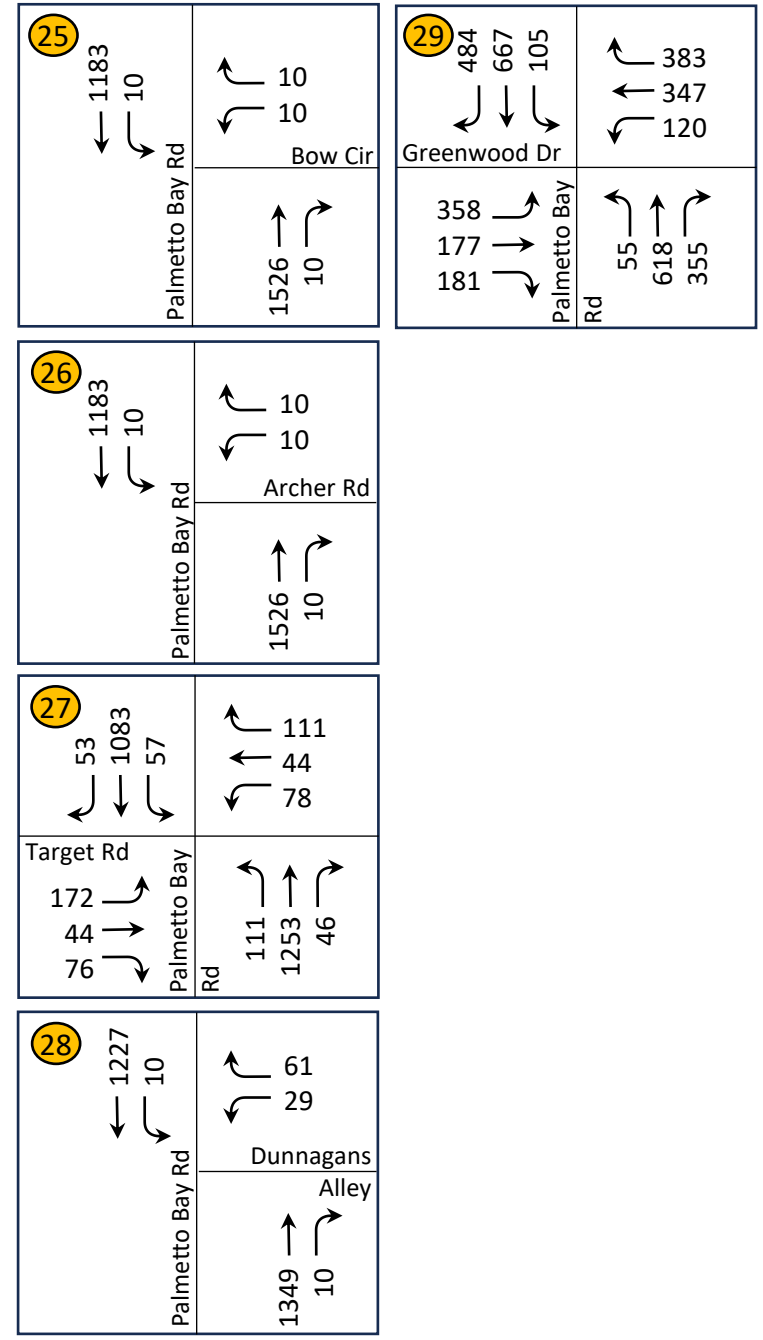
9
341 ↓ 2 ↓ 41 Squire Pope Rd
57 ← 2687 ← 2
US 278
222 → 1992 → 29
2 ↑ 25 ↑ 2

10
10 ↓ Old Wild Horse Rd
64 ← 2736
US 278
2035 →

11
33 ↓ 78 ↓ 62
84 ← 2508 ← 31
US 278
51 → 1869 → 115
Spanish Wells Rd
259 ↑ 47 ↑ 60

12
107 ↓ 183 ↓ 242
326 ← 1542 ← 195
US 278
125 → 1065 → 23
Gum Tree Rd
224 ↑ 207 ↑ 277


2023 Existing Traffic Volumes
PM Peak Hour – Pg 5 of 6
US 278
Cross Island Parkway
13
246
8
86
64
1761
4
US 278
113
1422
49
Jarvis Park Rd
56
8
10
17
111
115
251
304
1366
51
US 278
164
1152
47
Indigo Run Dr
64
115
49
21
10
1313
Bay Pines Rd
10
10
Palmetto Bay Rd
20
1721
14
51
27
14
27
1462
31
US 278
57
1258
203
Pembroke Dr
316
35
37
18
8
397
Honey Horn Rd
40
15
Cross Island Pkwy SB
22
86
1062
175
328
36
38
Arrow Rd
67
29
93
Palmetto Bay Rd
120
1346
76
15
5
21
1515
5
US 278
5
1299
5
Central Ave
10
19
78
2
61
Cross Island Pkwy SB
420
137
Marshland Rd
130
135
23
1188
5
5
5
Genesta St
Palmetto Bay Rd
1537
4
16
10
Hatton Pl
10
1531
US 278
1304
5
59
20
37
305
Marshland Rd
48
143
Cross Island Pkwy NB
252
142
24
1188
5
10
5
Palmetto Business Park Rd
Palmetto Bay Rd
1531
5
N



2023 Existing Traffic Volumes
PM Peak Hour – Pg 6 of 6

APPENDIX B: 2023 EXISTING OPERATING CONDITIONS (SYNCHRO)

Table B-1. 2023 Existing Operating Conditions (Synchro)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (10.4)**	**B (15.2)**
Eastbound Approach	A (7.1) [196] <0.37>	A (9.1) [166] <0.29>
Westbound Approach	B (12.4) [146] <0.21>	B (17.5) [346] <0.46>
Northbound Approach	D (41.9) [63] <0.14>	C (34.2) [48] <0.15>
Southbound Approach	B (18.4) [55] <0.25>	C (23.4) [m89] <0.30>
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**B (19.2)**	**C (29.6)**
Eastbound Approach	B (15.0) [413] <0.56>	B (19.5) [391] <0.64>
Westbound Approach	B (14.6) [291] <0.36>	C (26.8) [710] <0.71>
Northbound Approach	D (45.5) [126] <0.67>	E (75.9) [103] <0.56>
Southbound Approach	E (59.4) [107] <0.57>	F (81.3) [174] <0.91>
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (16.5) [<25] <0.03>	E (43.4) [<25] <0.22>
Westbound Left Turn	D (33.5) [<25] <0.05>	D (26.6) [<25] <0.15>
Northbound Approach	D (26.5) [<25] <0.23>	C (21.7) [<25] <0.23>
Southbound Approach	D (30.8) [45] <0.41>	F (165.4) [150] <0.99>
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	C (18.0) [<25] <0.02>	B (14.8) [<25] <0.04>
Northbound Approach	F (242.4) [75] <0.81>	F ($744.7) [168] <1.97>
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (15.4) [<25] <0.01>	E (45.1) [<25] <0.05>
Westbound Left Turn	No volumes observed	C (22.7) [<25] <0.01>
Northbound Approach	E (38.1) [<25] <0.02>	F ($2538.4) [68] <2.99>
Southbound Approach	No volumes observed	F (50.4) [<25] <0.17>
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	No volumes observed	C (23.8) [<25] <0.01>
Northbound Approach	F ($794.0) [58] <1.19>	F ($2033.9) [118] <3.51>

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**B (15.5)**	**E (59.1)**
Eastbound Approach	C (21.2) [#1701] <0.97>	B (10.3) [697] <0.82>
Westbound Approach	A (5.2) [291] <0.62>	F (93.2) [#2084] <1.16>
Northbound Approach	D (38.0) [65] <0.42>	E (68.0) [105] <0.72>
Southbound Approach	0 (0.0) [<25] <0.01>	0 (0.0) [<25] <0.00>
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (15.6) [<25] <0.02>	F (56.9) [<25] <0.13>
Southbound Approach	F ($469.6) [45] <0.73>	F ($7285.9) [158] <12.12>
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (12.5)**	**F (101.4)**
Eastbound Approach	A (6.3) [530] <0.66>	B (14.4) [#387] <0.93>
Westbound Approach	A (9.4) [264] <0.55>	F (140.5) [m#2353] <1.26>
Northbound Approach	C (24.0) [<25] <0.03>	E (79.9) [70] <0.22>
Southbound Approach	F (97.3) [#319] <1.01>	F (296.1) [#709] <1.61>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (21.5) [28] <0.28>	F (53.5) [<25] <0.13>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (30.1)**	**D (36.0)**
Eastbound Approach	C (26.2) [1224] <0.85>	B (16.7) [383] <0.62>
Westbound Approach	B (18.2) [274] <0.66>	C (25.2) [631] <0.80>
Northbound Approach	E (61.8) [223] <0.62>	F (214.3) [#667] <1.46>
Southbound Approach	F (117.7) [#284] <1.00>	E (65.7) [187] <0.36>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**E (59.1)**	**E (66.1)**
Eastbound Approach	E (64.3) [#1177] <0.98>	E (65.7) [763] <0.90>
Westbound Approach	C (33.6) [#411] <0.93>	D (54.5) [602] <1.00>
Northbound Approach	E (72.0) [#312] <0.89>	E (61.5) [351] <0.86>
Southbound Approach	F (90.7) [#418] <0.90>	F (115.5) [#517] <1.07>

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (21.5)**	**B (16.5)**
Eastbound Approach	B (16.6) [m516] <0.71>	B (15.8) [m405] <0.76>
Westbound Approach	B (11.3) [316] <0.49>	A (9.7) [#1297] <0.87>
Northbound Approach	F (99.7) [143] <0.61>	F (108.7) [146] <0.76>
Southbound Approach	E (60.7) [262] <0.77>	C (26.9) [102] <0.60>
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**B (19.7)**	**C (31.2)**
Eastbound Approach	B (11.2) [560] <0.73>	C (21.9) [704] <0.60>
Westbound Approach	A (9.0) [155] <0.44>	C (22.9) [508] <0.82>
Northbound Approach	F (101.1) [#317] <0.86>	F (89.3) [324] <0.84>
Southbound Approach	D (39.8) [78] <0.39>	D (49.2) [95] <0.60>
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (10.7) [<25] <0.01>	B (14.9) [<25] <0.01>
Westbound Left Turn	C (16.0) [<25] <0.02>	B (12.3) [<25] <0.01>
Northbound Right Turn	C (18.3) [<25] <0.02>	B (14.5) [<25] <0.03>
Southbound Right Turn	B (12.8) [<25] <0.05>	C (17.1) [<25] <0.02>
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	C (17.6) [<25] <0.04>	C (16.1) [<25] <0.17>
Southbound Right Turn	B (12.7) [<25] <0.02>	C (17.5) [<25] <0.04>
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**C (31.1)**	**D (42.1)**
Eastbound Approach	C (27.3) [693] <0.65>	C (30.9) [634] <0.71>
Westbound Approach	B (16.2) [343] <0.41>	C (31.3) [891] <0.75>
Northbound Approach	E (70.1) [112] <0.48>	E (68.9) [205] <0.68>
Southbound Approach	E (70.3) [#188] <0.78>	F (96.0) [#247] <0.98>
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	B (11.0) [<25] <0.00>	B (12.8) [<25] <0.16>
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (8.9) [<25] <0.12>	A (8.4) [<25] <0.14>
Southbound Left Turn	C (17.2) [<25] <0.08>	D (33.6) [35] <0.35>
Southbound Right Turn	A (9.2) [<25] <0.04>	B (12.9) [<25] <0.16>

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (8.2) [<25] <0.11>	A (8.4) [<25] <0.05>
Northbound Left Turn	B (14.5) [<25] <0.17>	C (23.0) [100] <0.61>
Northbound Right Turn	A (9.2) [<25] <0.07>	B (10.2) [<25] <0.20>
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	F (209.4) [30] <0.40>
Eastbound Right Turn	C (18.7) [<25] <0.02>	B (14.9) [<25] <0.03>
Northbound Left Turn	C (16.4) [<25] <0.02>	B (13.0) [<25] <0.05>
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (13.8)**	**C (21.1)**
Eastbound Approach	D (43.3) [175] <0.70>	C (30.2) [101] <0.38>
Westbound Approach	C (28.0) [74] <0.44>	D (46.9) [249] <0.88>
Northbound Approach	A (5.4) [75] <0.30>	B (17.8) [756] <0.66>
Southbound Approach	B (11.5) [535] <0.61>	B (15.4) [432] <0.65>
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	D (32.5) [<25] <0.08>	F (80.7) [<25] <0.19>
Southbound Left Turn	A (9.6) [<25] <0.02>	B (14.6) [<25] <0.01>
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	D (33.8) [<25] <0.08>	F (61.2) [<25] <0.20>
Southbound Left Turn	A (9.6) [<25] <0.03>	B (14.6) [<25] <0.01>
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	C (23.7) [<25] <0.03>	E (41.3) [<25] <0.10>
Westbound Right Turn	B (11.1) [<25] <0.01>	C (16.7) [<25] <0.03>
Southbound Left Turn	A (9.8) [<25] <0.05>	B (14.6) [<25] <0.03>
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	C (24.7) [<25] <0.06>	E (41.3) [<25] <0.10>
Westbound Right Turn	B (11.2) [<25] <0.01>	C (16.7) [<25] <0.03>
Southbound Left Turn	A (9.9) [<25] <0.07>	B (14.6) [<25] <0.03>
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**B (10.6)**	**B (18.6)**
Eastbound Approach	D (39.4) [82] <0.32>	E (59.5) [247] <0.80>
Westbound Approach	E (56.6) [154] <0.68>	C (33.7) [119] <0.49>
Northbound Approach	A (8.7) [199] <0.31>	B (15.3) [530] <0.59>
Southbound Approach	A (3.9) [102] <0.58>	A (8.7) [155] <0.53>

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
28: Palmetto Bay Rd & Dunnagans Aly (un-signalized)		
Westbound Left Turn	D (26.5) [<25] <0.03>	E (40.3) [<25] <0.24>
Westbound Right Turn	B (11.4) [<25] <0.02>	C (17.1) [<25] <0.18>
Southbound Left Turn	B (10.6) [<25] <0.16>	B (13.0) [<25] <0.02>
29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**D (25.8)**	**C (24.4)**
Eastbound Approach	D (34.2) [200] <0.81>	E (45.6) [300] <0.92>
Westbound Approach	C (16.4) [125] <0.64>	E (36.6) [225] <0.85>
Northbound Approach	B (12.1) [75] <0.54>	D (32.4) [275] <0.88>
Southbound Approach	F (59.4) [500] <1.03>	E (39.2) [375] <0.94>

– 95th Percentile volume exceeds capacity
$ – Delay more than 300 seconds
m – Upstream metering is in effect

APPENDIX C: 2023 EXISTING OPERATING CONDITIONS (VISSIM)

Table C-1. 2023 Existing Traffic Operations (VISSIM)

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (12.2)**	**B (11.4)**
Eastbound Approach	B (12.5) [43] {324}	B (11.7) [<25] {178}
Westbound Approach	A (8.3) [<25] {171}	A (9.3) [<25] {234}
Northbound Approach	D (38.1) [<25] {73}	C (32.2) [<25] {65}
Southbound Approach	A (9.0) [<25] {68}	B (12.6) [<25] {84}
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**D (47.2)**	**B (19.5)**
Eastbound Approach	E (70.7) [807] {1620}	B (15.6) [65] {522}
Westbound Approach	B (14.4) [35] {353}	B (19.1) [100] {633}
Northbound Approach	D (35.9) [37] {263}	D (53.6) [<25] {104}
Southbound Approach	D (42.4) [<25] {92}	C (33.6) [29] {161}
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	E (35.3) [720] {1302}	C (19.7) [<25] {47}
Westbound Left Turn	F (414.9) [37] {107}	B (11.2) [<25] {41}
Northbound Approach	B (10.1) [<25] {61}	A (7.3) [<25] {55}
Southbound Approach	C (19.7) [<25] {76}	A (8.0) [<25] {73}
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	E (40.7) [46] {102}	C (16.8) [<25] {28}
Northbound Approach	F (591.0) [120] {186}	C (17.5) [<25] {41}
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (21.4) [691] {1658}	D (33.1) [<25] {<25}
Westbound Left Turn	No volumes observed	C (20.9) [<25] {<25}
Northbound Approach	F (270.5) [<25] {38}	C (20.8) [<25] {46}
Southbound Approach	No volumes observed	C (18.2) [<25] {39}
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	No volumes observed	D (27.7) [<25] {<25}
Northbound Approach	F (1,270.4) [123] {228}	C (23.8) [<25] {60}
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**B (10.4)**	**A (8.2)**
Eastbound Approach	A (8.4) [335] {1093}	A (5.4) [62] {890}
Westbound Approach	B (10.7) [53] {655}	A (7.5) [292] {1626}
Northbound Approach	E (67.8) [30] {164}	E (79.0) [52] {214}
Southbound Approach	B (17.3) [<25] {<25}	A (0.0) [<25] {<25}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (8.2) [<25] {<25}	F (98.0) [<25] {54}
Southbound Approach	F (51.8) [<25] {44}	F (109.4) [<25] {92}
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (39.2)**	**E (67.3)**
Eastbound Approach	E (56.8) [451] {1334}	B (19.3) [283] {1132}
Westbound Approach	A (7.0) [39] {618}	F (104.8) [874] {1383}
Northbound Approach	C (31.9) [<25] {38}	E (78.6) [<25] {76}
Southbound Approach	C (21.7) [<25] {147}	F (91.6) [220] {638}
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (1.3) [<25] {<25}	A (6.4) [<25] {25}
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (29.8)**	**F (240.4)**
Eastbound Approach	C (26.6) [270] {1027}	B (17.1) [103] {622}
Westbound Approach	C (21.9) [87] {471}	F (415.7) [892] {989}
Northbound Approach	E (57.1) [85] {321}	F (395.1) [1241] {1288}
Southbound Approach	F (89.0) [103] {319}	E (63.9) [58] {242}
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (40.7)**	**E (66.4)**
Eastbound Approach	D (40.6) [765] {1592}	D (49.9) [203] {779}
Westbound Approach	C (30.3) [136] {357}	E (75.2) [961] {1610}
Northbound Approach	C (29.0) [75] {291}	D (45.2) [175] {338}
Southbound Approach	E (77.2) [182] {579}	F (93.4) [234] {779}
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (39.2)**	**E (67.3)**
Eastbound Approach	E (56.8) [451] {1334}	B (19.3) [283] {1132}
Westbound Approach	A (7.0) [39] {618}	F (104.8) [874] {1383}
Northbound Approach	C (31.9) [<25] {38}	E (78.6) [<25] {76}
Southbound Approach	C (21.7) [<25] {147}	F (91.6) [220] {638}
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (1.3) [<25] {<25}	A (6.4) [<25] {25}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (29.8)**	**F (240.4)**
Eastbound Approach	C (26.6) [270] {1027}	B (17.1) [103] {622}
Westbound Approach	C (21.9) [87] {471}	F (415.7) [892] {989}
Northbound Approach	E (57.1) [85] {321}	F (395.1) [1241] {1288}
Southbound Approach	F (89.0) [103] {319}	E (63.9) [58] {242}
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (40.7)**	**E (66.4)**
Eastbound Approach	D (40.6) [765] {1592}	D (49.9) [203] {779}
Westbound Approach	C (30.3) [136] {357}	E (75.2) [961] {1610}
Northbound Approach	C (29.0) [75] {291}	D (45.2) [175] {338}
Southbound Approach	E (77.2) [182] {579}	F (93.4) [234] {779}
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (21.8)**	**C (25.8)**
Eastbound Approach	B (17.1) [178] {929}	B (13.8) [67] {754}
Westbound Approach	B (17.9) [73] {543}	C (34.2) [668] {1285}
Northbound Approach	F (81.1) [45] {168}	E (77.4) [43] {186}
Southbound Approach	D (45.4) [72] {233}	C (21.7) [28] {120}
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**B (18.7)**	**C (33.7)**
Eastbound Approach	B (12.6) [134] {991}	B (14.3) [76] {754}
Westbound Approach	B (12.7) [39] {443}	D (42.4) [645] {1261}
Northbound Approach	E (72.0) [84] {274}	E (69.4) [93] {310}
Southbound Approach	D (37.3) [<25] {91}	D (42.2) [<25] {115}
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (8.5) [<25] {<25}	F (55.9) [<25] {50}
Westbound Left Turn	C (16.5) [<25] {<25}	A (9.7) [<25] {<25}
Northbound Right Turn	C (21.6) [<25] {27}	B (12.4) [<25] {32}
Southbound Right Turn	B (11.3) [<25] {41}	F (165.1) [<25] {65}
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	B (11.5) [<25] {25}	A (7.7) [<25] {61}
Southbound Right Turn	B (10.6) [<25] {46}	F (93.1) [<25] {72}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**C (23.3)**	**D (44.1)**
Eastbound Approach	B (18.9) [115] {848}	C (30.6) [116] {772}
Westbound Approach	B (15.3) [40] {333}	D (44.8) [592] {1536}
Northbound Approach	D (54.0) [29] {103}	E (58.6) [46] {190}
Southbound Approach	D (49.7) [52] {187}	E (73.4) [83] {324}
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	A (9.1) [<25] {45}	B (10.9) [<25] {61}
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (3.7) [<25] {63}	A (2.1) [<25] {60}
Southbound Left Turn	A (8.8) [<25] {47}	B (10.6) [<25] {77}
Southbound Right Turn	A (6.1) [<25] {80}	A (7.9) [<25] {110}
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (1.3) [<25] {36}	A (1.4) [<25] {<25}
Northbound Left Turn	B (10.8) [<25] {69}	C (21.3) [31] {193}
Northbound Right Turn	A (6.0) [<25] {94}	A (7.0) [46] {218}
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	E (40.7) [<25] {33}
Eastbound Right Turn	B (14.3) [<25] {25}	B (12.5) [<25] {31}
Northbound Left Turn	A (9.0) [<25] {<25}	A (7.1) [<25] {34}
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (13.2)**	**B (16.9)**
Eastbound Approach	C (33.3) [52] {191}	C (32.0) [37] {175}
Westbound Approach	B (18.8) [<25] {106}	C (23.2) [56] {261}
Northbound Approach	B (10.5) [29] {261}	B (15.7) [92] {612}
Southbound Approach	B (10.9) [94] {873}	B (14.2) [67] {606}
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	C (17.1) [<25] {50}	C (18.1) [<25] {52}
Southbound Left Turn	A (3.2) [<25] {<25}	B (13.2) [<25] {<25}
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	C (18.0) [<25] {53}	C (17.4) [<25] {53}
Southbound Left Turn	A (4.0) [<25] {37}	A (7.5) [<25] {<25}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	D (27.5) [<25] {<25}	D (30.0) [<25] {35}
Westbound Right Turn	A (8.4) [<25] {58}	B (13.1) [<25] {68}
Southbound Left Turn	A (3.6) [<25] {40}	B (11.0) [<25] {26}
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	D (30.6) [<25] {27}	D (32.8) [<25] {39}
Westbound Right Turn	A (8.8) [<25] {63}	B (11.4) [<25] {75}
Southbound Left Turn	A (4.3) [<25] {98}	B (11.9) [<25] {<25}
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**B (16.0)**	**B (17.6)**
Eastbound Approach	C (33.3) [<25] {110}	D (41.8) [62] {248}
Westbound Approach	D (37.1) [35] {151}	C (29.4) [38] {149}
Northbound Approach	A (9.7) [28] {214}	B (13.3) [71] {508}
Southbound Approach	B (15.4) [287] {1309}	B (13.9) [99] {742}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	F (184.7) [<25] {50}	F (65.5) [<25] {75}
Westbound Right Turn	A (9.1) [<25] {84}	B (13.1) [<25] {110}
Southbound Left Turn	B (10.4) [112] {512}	B (12.5) [<25] {383}
29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**E (37.0)**	**F (51.8)**
Eastbound Approach	F (208.4) [615] {814}	F (51.0) [285] {770}
Westbound Approach	A (7.5) [<25] {263}	F (168.3) [1635] {1658}
Northbound Approach	A (4.2) [<25] {223}	D (30.8) [228] {738}
Southbound Approach	B (12.9) [194] {461}	A (8.4) [85] {460}

APPENDIX D: TRAFFIC FORECASTING MEMORANDUM

MEMORANDUM

LOCHMUELLER GROUP
411 North 10th Street, Suite 200
St. Louis, Missouri 63101
PHONE: 314.621.3395

To:	Shawn Colin, AICP (Town of Hilton Head)
Cc:	Bryan McIlwee, PE (Town of Hilton Head) Jim Iwanicki, PE (Town of Hilton Head)
From:	Nate Nohren, PE, PTOE Sharif Ullah, PE, PTP
Date:	February 12, 2024
Subject:	Independent Study of WHP Gateway Corridor Traffic Forecasting Memorandum

Lochmueller Group (Lochmueller) was retained by the Town of Hilton Head Island to conduct an independent study of the William Hilton Parkway (WHP) Gateway Corridor. This memorandum summarizes the review of the existing Lowcountry Area Transportation Study (LATS) Travel Demand Model (TDM) and recommends future traffic growth at the William Hilton Parkway Bridge connecting Hilton Head Island with the mainland. The future traffic growth estimation was based on a thorough review of historic traffic volumes, socio-economic trends for Jasper and Beaufort Counties, and accommodation and restaurant tax revenues collected per year by the Town of Hilton Head.

LATS TDM Evaluation

The Lowcountry TDM was updated in December 2021 with a new base year, 2019, and a new horizon year, 2045. Lochmueller completed a thorough review of the TDM to determine its ability to forecast traffic growth along WHP.

The detailed review of the LATS TDM revealed the following:

- The latest update was limited/minor in nature and did not include any major model changes.
- 2045 Horizon year roadway network did not include all future planned projects.
- Socio-economic (e.g., population, household, employment) growth for the horizon year 2045 was forecasted by simply extrapolating 2040 attributes of the previous version of the TDM.
- Socio-economic projections did not consider recent land-use plan updates from municipalities within the TDM boundaries.
- The TDM update did not include a complete model re-estimation and re-calibration.
- The LATS Long-Range 2045 Transportation Plan forecasts 48,500 more future population in Jasper and Beaufort Counties than incorporated into the TDM.

Based on these findings, Lochmueller staff determined the LATS TDM may not provide accurate traffic forecasts for WHP. To that end, alternative methods of traffic forecasting were investigated. First, key data indicators of traffic growth were researched.

Socio-Economic Trends for Hilton Head Island, Jasper County, and Beaufort County

Hilton Head Island is located in Beaufort County. Beaufort and neighboring Jasper County experienced significant growth over the last 20 years. **Table 1** shows population growth trends for Beaufort and Jasper Counties and Hilton Head Island based on the US Census. This data reflects permanent residents.

Table 1: Population Trends[1]

Geographic Unit	Year			Annual Growth (%) (2000 -2010)	Annual Growth (%) (2010 -2020)
	2000	2010	2020		
Beaufort County	120,937	162,233	187,117	3.0	1.4
Jasper County	20,678	24,777	28,791	1.8	1.5
Hilton Head Island	33,862	37,099	37,661	0.9	0.2

As shown in **Table 1**, both Beaufort and Jasper Counties experienced significant population growth since 2000. However, population growth was much slower between 2010 and 2020 compared to 2000 to 2010. Hilton Head Island experienced a modest growth rate of 0.2% from 2010 and 2020.

Table 2 shows the total employment for Beaufort and Jasper Counties and Hilton Head Island for 2010 and 2020.

Table 2: Total Employment Trend[1]

Geographic Unit	Year		Annual Growth (%) (2010 -2020)
	2010	2020	
Beaufort County	51,761	62,001	1.8
Jasper County	6,522	9,819	4.2
Hilton Head Island	21,346	21,854	0.2

As can be seen in **Table 2**, both Jasper and Beaufort Counties experienced significant growth in jobs between 2010 and 2020. Overall job growth in Hilton Head Island was small and similar to the island's population growth rate.

Population Growth Projections for Beaufort and Jasper Counties

Population growth estimates are a key element in forecasting traffic growth for a region. For this study, Lochmueller staff researched reliable population growth estimates for Beaufort and Jasper counties. The State of South Carolina's Revenue and Fiscal Affairs Office provides population growth estimates for all counties within the state through 2035. **Table 3** shows the population projections for Beaufort and Jasper Counties for 2035 and the corresponding growth rates.

Table 3: Population Growth Projections[2]

County	Year		Annual Growth Rate (%)
	2020	2035	
Beaufort	187,691	204,374	**0.56**
Jasper	29,073	34,046	**1**
Total	216,764	238,420	**0.6**

Historic Annual Average Daily Traffic Volume Trends at the WHP Bridge

Lochmueller staff obtained Annual Average Daily Traffic (AADT) volumes on WHP near the WHP Bridge (Site ID #0035) from the South Carolina Department of Transportation's Traffic Data Site[3]. **Table 4** shows the AADT volumes by year. These volumes effectively represent the volume of traffic entering and exiting Hilton Head Island via US 278.

As shown in **Table 4**, there was a significant reduction in growth between 2019 and 2020 and a significant increase in growth between 2020 and 2021. Such sudden changes were attributed to COVID-19 pandemic-related restrictions. Overall traffic growth on WHP from 2010 to 2023 was approximately 16.5%.

Table 4: AADT Volumes on WHP near the WHP Bridge[3]

Year	AADT	Annual Growth (%)
2010	49,600	
2011	49,900	0.60%
2012	50,700	1.60%
2013	52,200	2.96%
2014	53,200	1.92%
2015	54,700	2.82%
2016	54,700	0.00%
2017	56,300	2.93%
2018	56,100	-0.36%
2019	57,100	1.78%
2020	51,400	-9.98%
2021	57,400	11.67%
2022	57,400	0.00%
2023	57,800	0.70%

Short-Term Rental Permit and Tax Revenue Data

Lochmueller staff received information on the short-term rental units per year and the accommodation (hotel) and restaurant tax revenues collected by the Town of Hilton Head. The short-term rental unit information was available only for 2023. Thus, this information was not used in statistical analysis. The accommodation and restaurant tax revenue information was available from 2018 to 2023. Lochmueller staff evaluated the revenue data to test any relation between revenues and the volume of traffic entering and exiting Hilton Head Island. These measures are intended to represent the visitor population as compared to permanent residents reflected in the Census data. **Table 5** shows the annual accommodation and restaurant tax revenue information for the Town of Hilton Head Island.

Table 5: Annual Accommodation and Hospitality Tax (Source: Town of Hilton Head Island)

Year	Tax Revenue (2021 USD)	
	Accommodation Tax	Hospitality Tax
2018	$3,827,423	$7,419,881
2019	$3,964,475	$6,807,961
2020	$3,624,196	$6,598,684
2021	$5,561,900	$8,051,256
2022	$6,534,674	$9,213,533
2023	$6,260,297	$8,905,425

As shown in **Table 5**, the tax revenues have increased significantly since 2020 after a reduction due to Covid-19 Pandemic-related impacts. These increases have outpaced traffic growth on WHP entering/exiting the island and can be at least partially attributed to factors beyond the number of visitors to the island, such as high rates of inflation in recent years.

Traffic Growth Estimation Using Available Data

Lochmueller staff performed regression analyses utilizing the preceding available socio-economic and revenue information data as indicators of traffic on WHP at the WHP bridge. The regression analyses considered AADT volumes as the dependent variable and evaluated whether different independent variables (e.g., population, employment, tax revenue) had a statistically significant influence on the AADT volumes.

In regression analysis, the coefficient of determination (R^2) and the P-values were used to identify independent variables with significant impact on the dependent variable. R^2 values explain to what degree an independent variable (e.g., population) explains the variation of the dependent variable (AADT). R^2 values range from 0 to 1. An R^2 value of 0.7 indicates that 70% of the variation in the output variable can be explained by the independent variable(s).

The P-value is the probability that the observed difference between the dependent and independent variables is due to chance. Its value ranges from 0 to 1. A P-value close to 0 means that any observed difference in the dependent variable is more likely due to the independent variable (not by chance). For regression analysis with a 95% confidence interval, a P-value less than 0.05 would represent a strong correlation between the dependent and independent variables.

Table 6 shows the simple regression analysis (95% Confidence Interval) results in terms of R^2 and P-values for various independent variables relative to the dependent variable (AADT).

Table 6: Simple Regression Analysis Results with Different Independent Variables

Independent Variable	Co-efficient of Determination (R^2)	P-Value
Total Population of Beaufort and Jasper Counties	**0.95**	**1.5E-08**
Total Employment in Beaufort and Jasper Counties	**0.9**	**8.1E-07**
Accommodation Tax	0.64	0.1
Hospitality Tax	0.37	0.28

As shown in **Table 6,** the total population and total employment in Beaufort and Jasper Counties clearly influence the AADT volumes. P-values in both of these cases are very close to zero, which confirms the differences in AADT are influenced by changes in population and employment numbers in the two counties. On the other hand, there is no clear correlation between hospitality tax and AADT and between accommodation tax and AADT.

Lochmueller staff also completed a more complex multiple regression analysis combining both independent variables (population and employment). With the multiple regression analysis, the adjusted R^2 value showed almost no improvement. Therefore, the simple regression analysis using the total population of Beaufort and Jasper Counties was utilized to formulate an equation for estimating AADT on WHP as a function of population in the counties. **Equation 1** shows the regression equation for the AADT estimate.

Equation 1: Regression Equation for AADT Estimate

AADT = 0.262684*(Total Population of Beaufort and Jasper Counties) + 830

Equation 1 was then used to forecast future traffic on WHP based on anticipated population growth. Lochmueller estimated the 2045 population of Beaufort and Jasper Counties utilizing the following assumptions:

- Annual population growth in Hilton Head Island from 2020 to 2045 will be very small (0.1%). As the population within Hilton Head Island is stable and available land for development is very limited. Moreover, population growth in Hilton Head Island from 2010 to 2020 was only 0.2% per year.
- Annual population growth from 2020 and 2045 for the rest of Beaufort County and Jasper County will be 0.6%, as suggested by the State of South Carolina's Revenue and Fiscal Affairs Office, referenced in **Table 3**.

Based on the above-mentioned population growth assumptions, **Table 7** shows the projected 2045 population for the Beaufort and Jasper Counties.

Table 7: Projected Population

Geographic Unit	Projected Annual Growth Rate	Population	
		2020	2045
Hilton Head Island	0.10%	37,661	38,614
Jasper County and Beaufort County (Excluding Hilton Head Island)	0.60%	178,247	207,000
Total		**215,908**	**245,614**

As shown in **Table 7**, the total population in 2045 for Beaufort and Jasper Counties was estimated at 245,614. Applying **Equation 1**, that population number would translate to 65,349 AADT on WHP at the WHP Bridge.

Table 8 shows the estimated annual traffic growth rate from 2023 to 2045 based on the 2045 forecast of 65,425 compared to the 2023 traffic count.

Table 8: Projected Traffic Growth Rate at the WHP Bridge

Year	AADT	Annual Growth Rate (%)
2023	57,800	0.56
2045	65,349	

Conclusion

Lochmueller determined that the LATS TDM may not be a reliable source of future traffic on WHP. Through careful application of statistical analysis, an alternative method for forecasting traffic on WHP was developed using the population of Beaufort and Jasper Counties as the key indicator. Based on this method, traffic on WHP at the WHP Bridge is expected to increase by 0.56 percent annually, resulting in an AADT forecast of 65,349 daily vehicles in 2045.

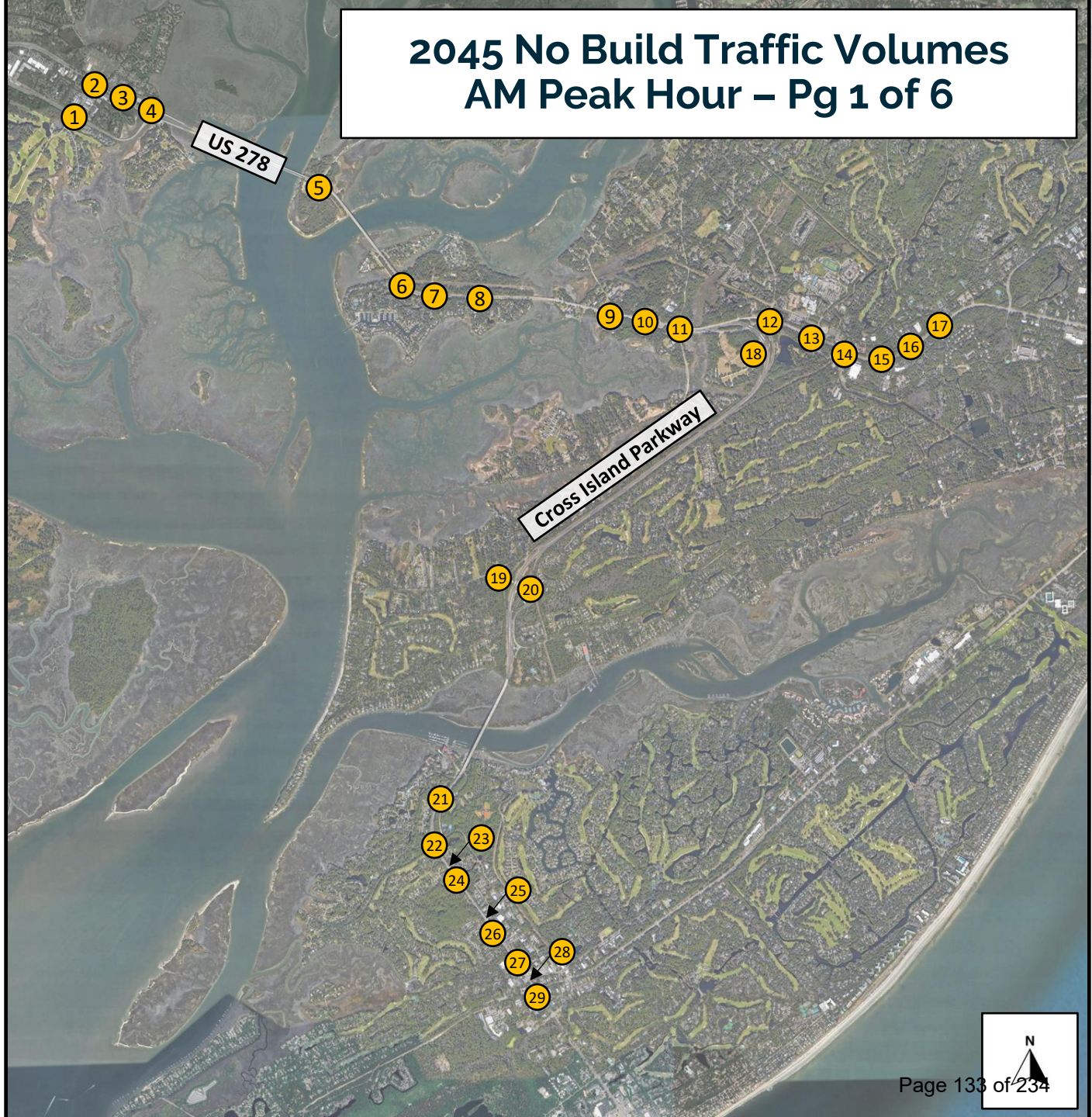
Lochmueller Group appreciates the opportunity to serve the Town of Hilton Head by performing this independent analysis to determine the appropriate annual background growth rate that should be utilized for the overall corridor study. Should you have any questions regarding the information shared within this technical memorandum, please do not hesitate to contact us at nnohren@lochgroup.com or 217-821-8435.

Reference

1. U.S. Census Bureau (www.census.gov)
2. South Carolina Revenue and Fiscal Affairs Office. (www.rfa.sc.gov).
3. South Carolina Department of Transportation Traffic Counts Website. (www.scdot.org/travel/travel-trafficdata.aspx)

APPENDIX E: 2045 NO-BUILD TRAFFIC VOLUMES

2045 No Build Traffic Volumes
AM Peak Hour – Pg 1 of 6



1
84 2 5
18 493 7
Bluffton Pkwy
263 994 28
Buckingham Plantation Dr
31 12 32

2
77 28 47
26 1265 23
US 278
70 1798 40
Buckingham Plantation Dr
33 68 192

3
88 0 9
97 1226 7
US 278
9 2026 2
Salt Marsh Dr
0 0 51

4
1314 5
US 278
2083 3
Fording Island Rd Ext
16 17

5
0 0 0
0 1837 0
US 278
2 3124 5
Wildlife Refuge
0 0 2

6
1835 0
US 278
3123 3
Blue Heron Point Rd
2 11

7
1
3 1818 34
US 278
3098 36
Crosstree Dr
16 0 45

8
7 5
Jenkins Rd
6 1848
US 278
7 3136

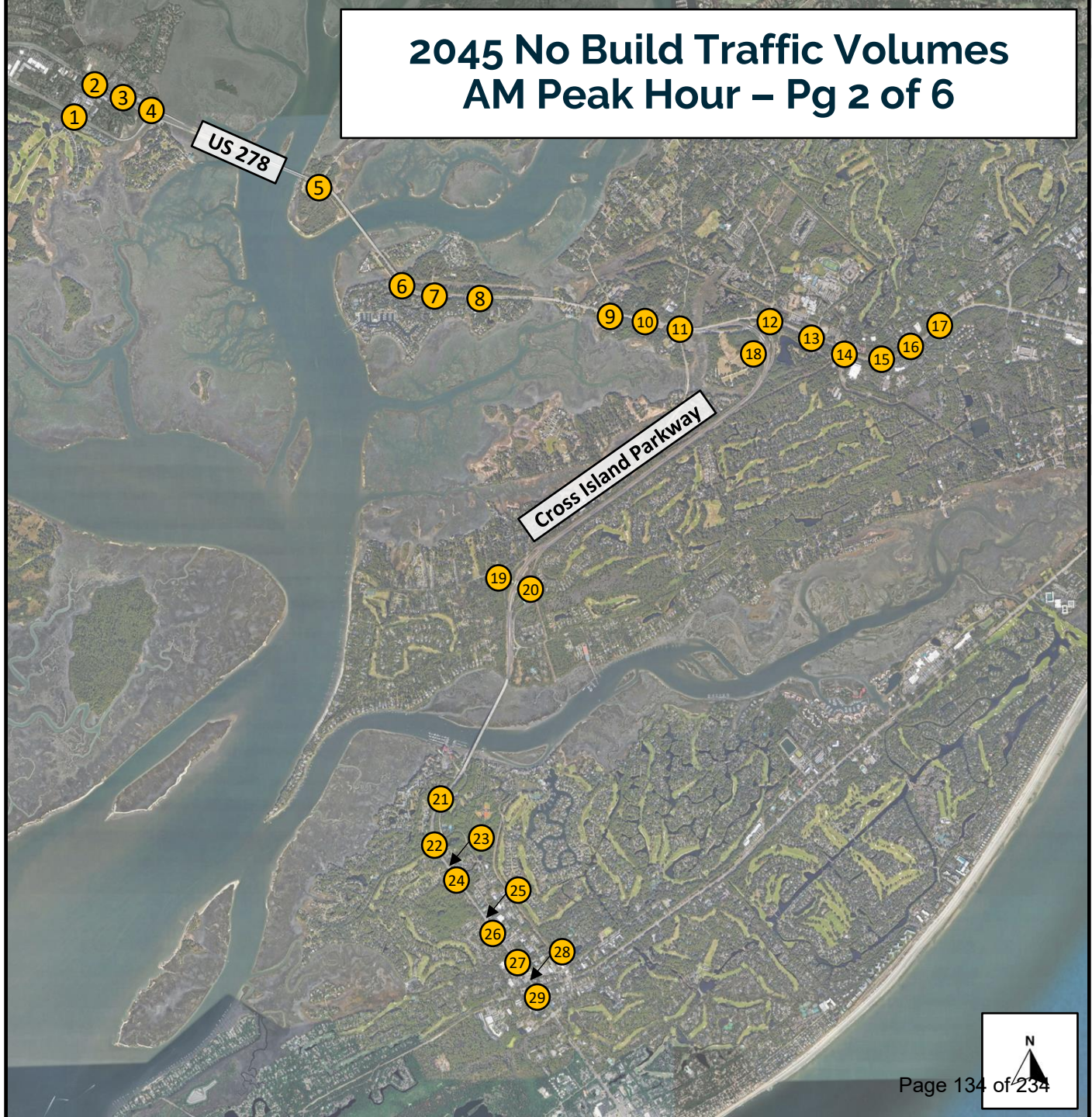
9
240 0 51
Squire Pope Rd
49 1612 2
US 278
176 2963 2
2 0 6

10
86
Old Wild Horse Rd
23 1577
US 278
3020

11
14 79 144
63 1449 80
US 278
49 2806 165
Spanish Wells Rd
137 49 137

12
104 202 240
214 876 218
US 278
174 1727 7
Gum Tree Rd
9 163 328

2045 No Build Traffic Volumes
AM Peak Hour – Pg 2 of 6



13
US 278: 286 → 1932 → 77 ↓
Jarvis Park Rd: 26 ↑ 51 0 ↱
205 ↓ 31 ↓ 276 ↓
341 ← 1077 ← 2 ↰

14
US 278: 90 → 1845 → 273 ↓
Pembroke Dr: 293 ↰ 24 ↑ 42 ↱
51 ↓ 14 ↓ 20 ↓
35 ← 1076 ← 37 ↰

15
US 278: 6 → 1895 → 6 ↓
Central Ave: 6 ↱
23 ↓
23 ← 1125 ← 6 ↰

16
US 278: 1797 → 104 ↓
12 ↱
11 ↓ Hatton Pl
46 ← 1143 ↰

17
US 278: 146 → 1601 → 62 ↓
Indigo Run Dr: 90 ↰ 58 ↑ 37 ↱
126 ↓ 77 ↓ 242 ↓
188 ← 973 ← 37 ↰

18
Honey Horn Rd: 2 ↱ 0 ↓
Cross Island Pkwy SB
7 ↓ 422 ↓

19
Marshland Rd: 254 → 274 ↓
41 ↓ 0 ↓ 26 ↓ Cross Island Pkwy SB
158 ← 130 ↰

20
Marshland Rd: 142 → 138 → Cross Island Pkwy NB: 80 ↰ 66 ↑
89 ← 208 ↰

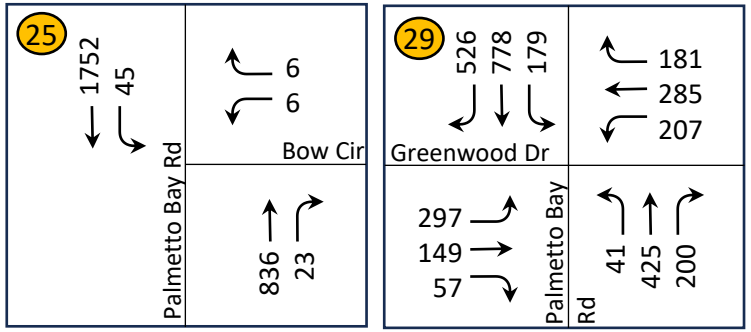
21
Bay Pines Rd: 0 ↱ 6 ↓
Palmetto Bay Rd: 7 ↰ 1018 ↑
0 ↓ 1938 ↓

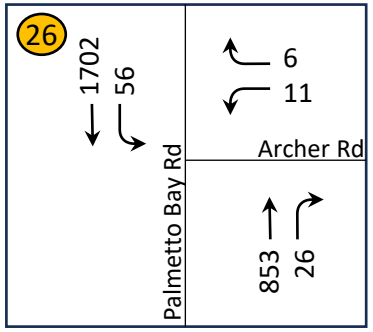
22
Arrow Rd: 130 ↑ 17 → 156 ↓
Palmetto Bay Rd: 50 ↰ 760 ↑ 38 ↱
60 ↓ 1632 ↓ 252 ↓
135 ← 12 ← 43 ↰

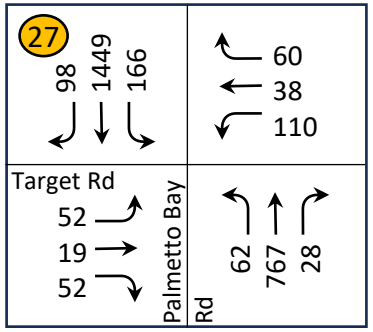
23
Genesta St
Palmetto Bay Rd: 842 ↑ 6 ↱
1813 ↓ 18 ↓
6 ↰ 6

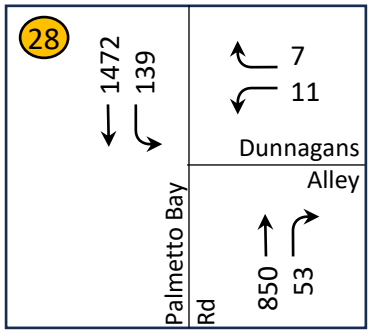
24
Palmetto Bay Rd: 842 ↑ 0
Palmetto Business Park Dr
1791 ↓ 28 ↓
6 ↰ 6

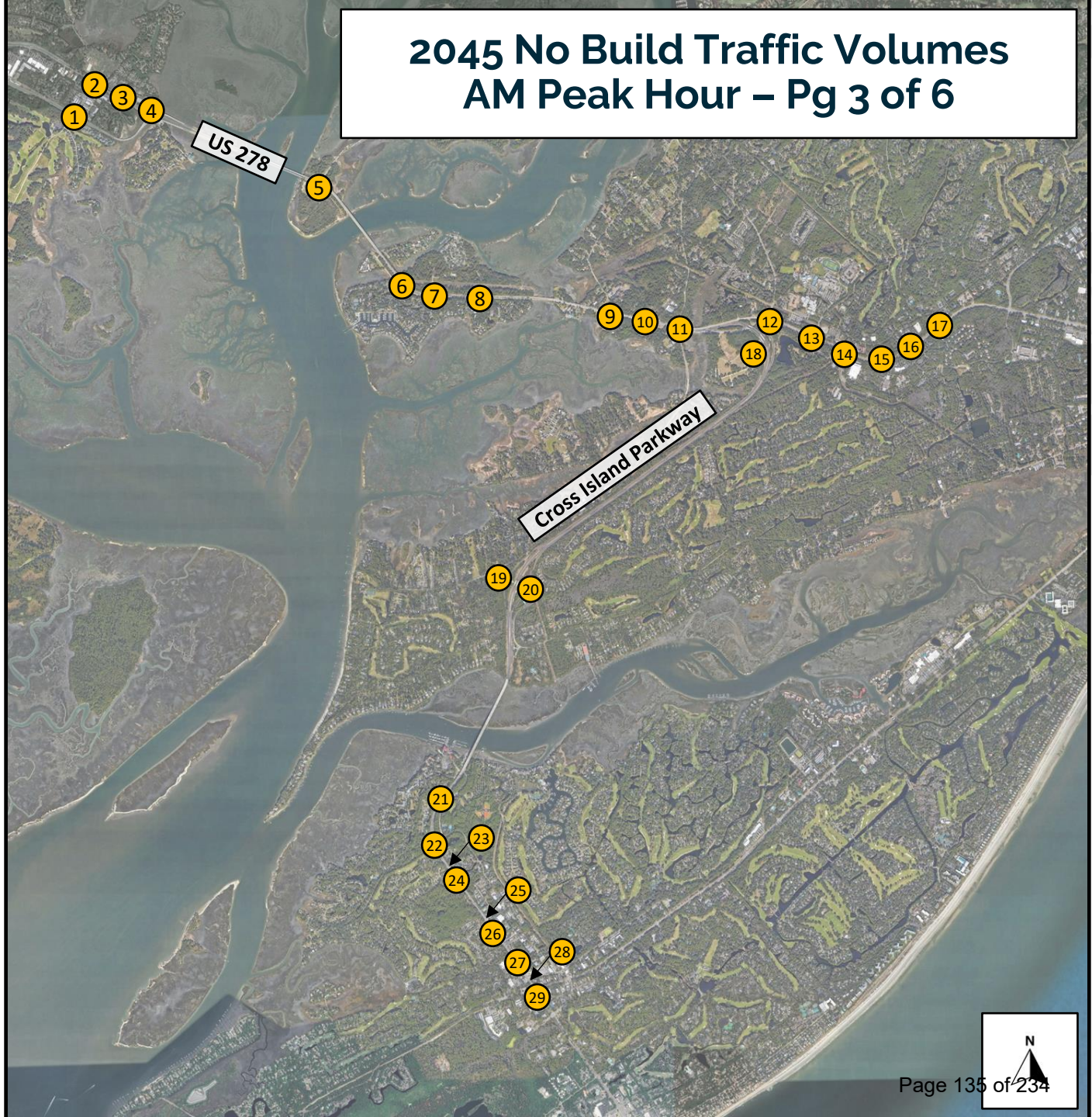
2045 No Build Traffic Volumes
AM Peak Hour – Pg 3 of 6



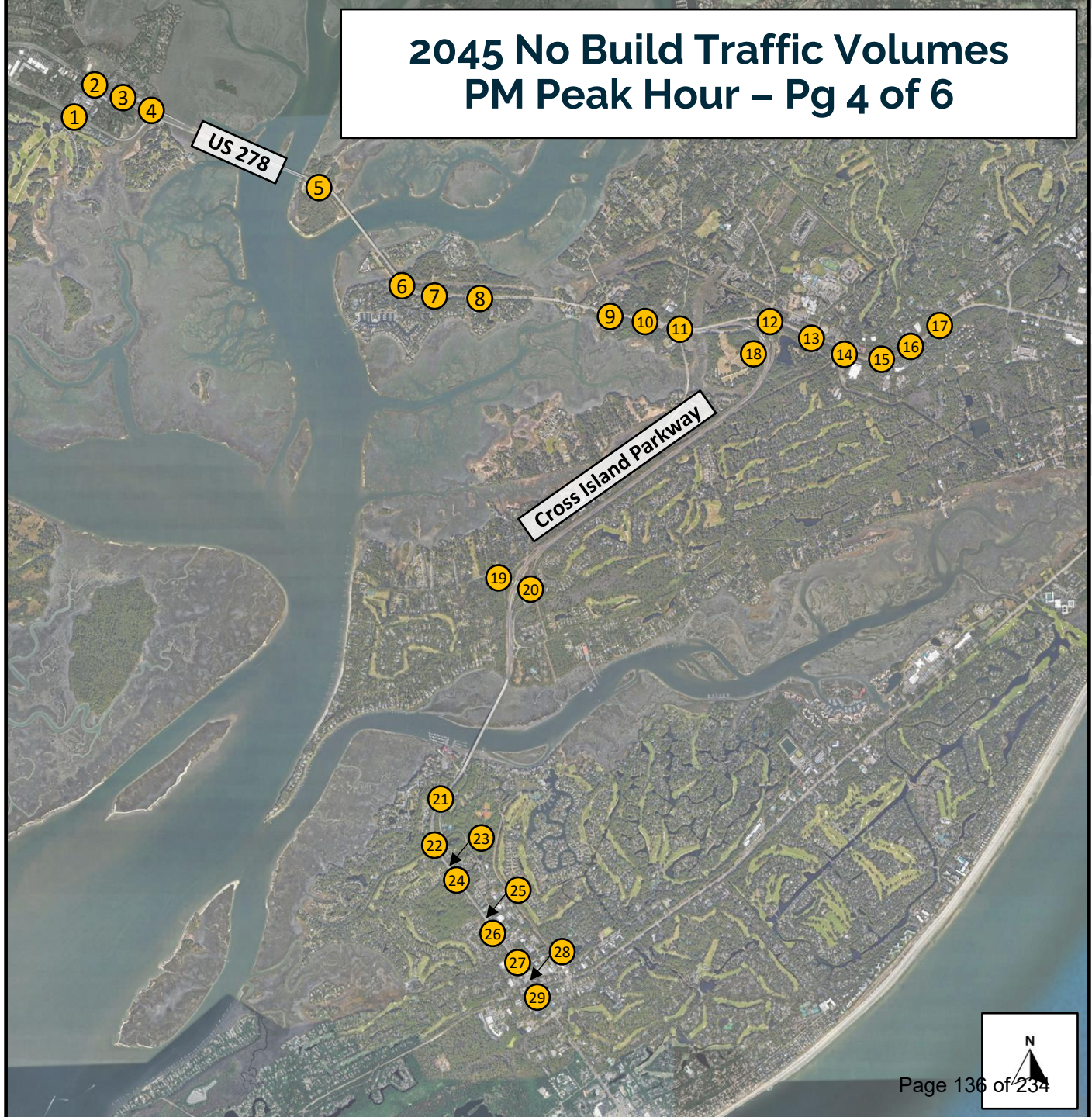








2045 No Build Traffic Volumes
PM Peak Hour – Pg 4 of 6



1

	112 → 14 ↓ 2 ←	11 ← 1044 ← 23
Bluffton Pkwy 100 → 739 → 25 ↓	Buckingham Plantation Dr	27 → 14 ← 29 ↑

2

	138 → 41 ↓ 76 ←	51 ← 2252 ← 24
US 278 106 → 1629 → 63 ↓	Buckingham Plantation Dr	57 → 45 ← 23 ↑

3

	88 → 0 ↓ 6 ←	63 ← 2239 ← 32
US 278 27 → 1692 → 9 ↓	Salt Marsh Dr	0 → 0 ← 45 ↑

4

		2311 ← 18 ←
US 278 1716 → 27 ↓	Fording Island Rd Ext	23 → 23 ↑

5

	11 → 0 ↓ 5 ←	7 ← 3394 ← 2 ←
US 278 5 → 2499 → 5 ↓	Wildlife Refuge	2 → 0 ← 7 ↑

6

		3398 ← 2 ←
US 278 2502 → 9 ↓	Blue Heron Point Rd	5 → 14 ↑

7

	0 ↓	6 ← 3364 ← 57 ←
US 278 2482 → 34 ↓	Crosstree Dr	36 → 0 ← 59 ↑

8

	11 → 7 ↓	Jenkins Rd 11 ← 3416 ←
US 278 11 → 2530 →		

9

	386 → 2 ↓ 46 ←	Squire Pope Rd 64 ← 3039 ← 2 ←
US 278 251 → 2253 → 33 ↓		2 → 28 ← 2 ↑

10

	11 ↓	Old Wild Horse Rd 73 ← 3094 ←
US 278 2301 →		

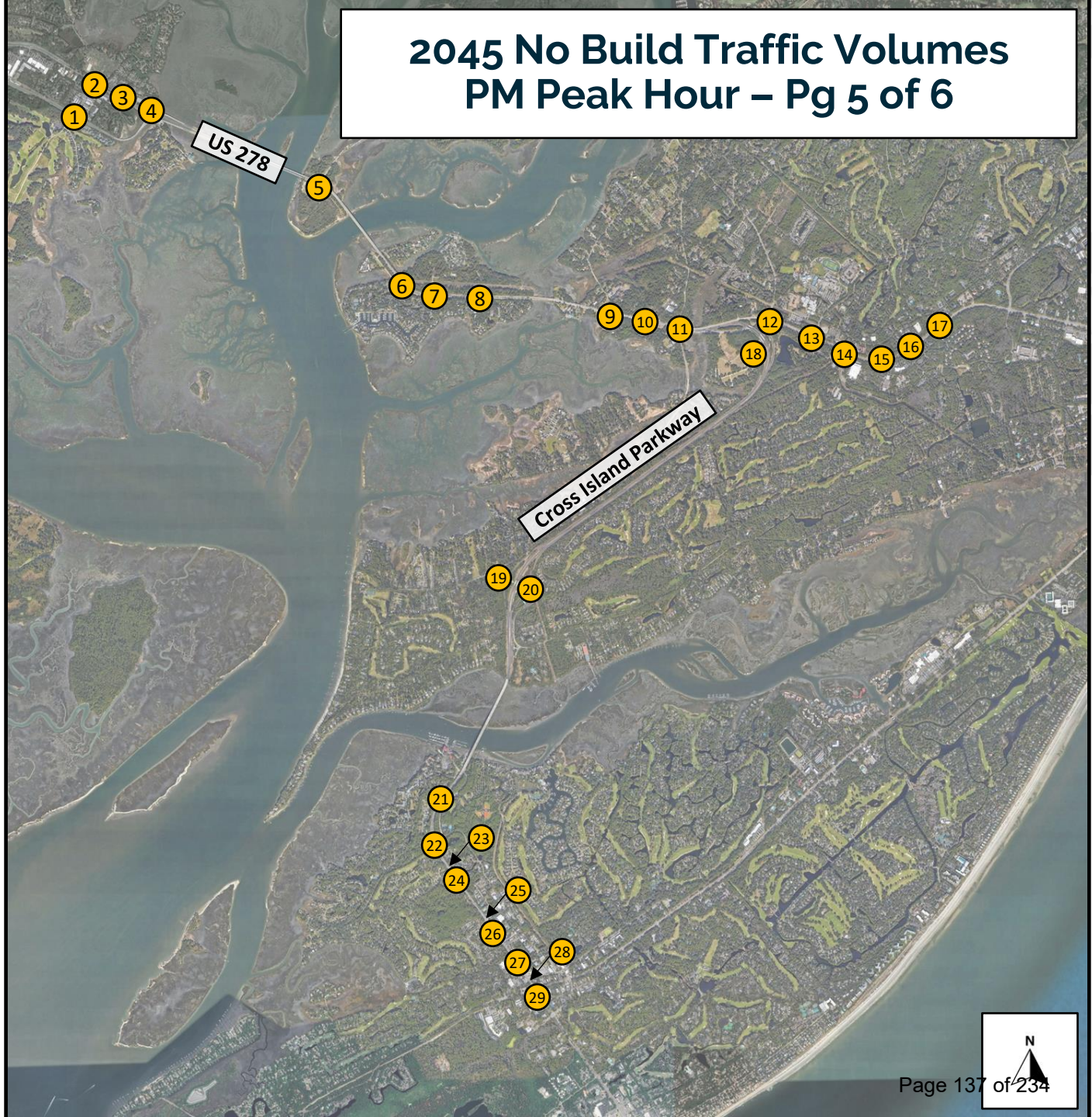
11

	37 → 88 ↓ 70 ←	95 ← 2837 ← 35 ←
US 278 58 → 2113 → 130 ↓	Spanish Wells Rd	293 → 53 ← 68 ↑

12

	121 → 207 ↓ 274 ←	369 ← 1745 ← 220 ←
US 278 141 → 1204 → 26 ↓	Gum Tree Rd	253 → 234 ← 313 ↑

2045 No Build Traffic Volumes
PM Peak Hour – Pg 5 of 6



13
278 → 9 → 97
72 ← 1993 ← 5
US 278: 128 → 1608 → 55
Jarvis Park Rd: 63 ← 9 ← 11

14
58 → 30 → 16
31 ← 1655 ← 35
US 278: 64 → 1422 → 230
Pembroke Dr: 357 ← 39 ← 42

15
6 →
24 ← 1715 ← 6
US 278: 6 → 1468 → 6
Central Ave: 11 →

16
11 →
Hatton Pl: 11 ← 1734
US 278: 1473 → 6
66 →

17
126 → 130 → 284
344 ← 1547 ← 58
US 278: 185 → 1301 → 53
Indigo Run Dr: 72 → 130 → 55

18
9 → 449
Honey Horn Rd: 45 → 17
Cross Island Pkwy SB

19
88 → 2 → 69
Cross Island Pkwy SB: 475 ← 155
Marshland Rd: 147 → 153

20
42 ← 345
Marshland Rd: 54 → 162
Cross Island Pkwy NB: 285 → 161

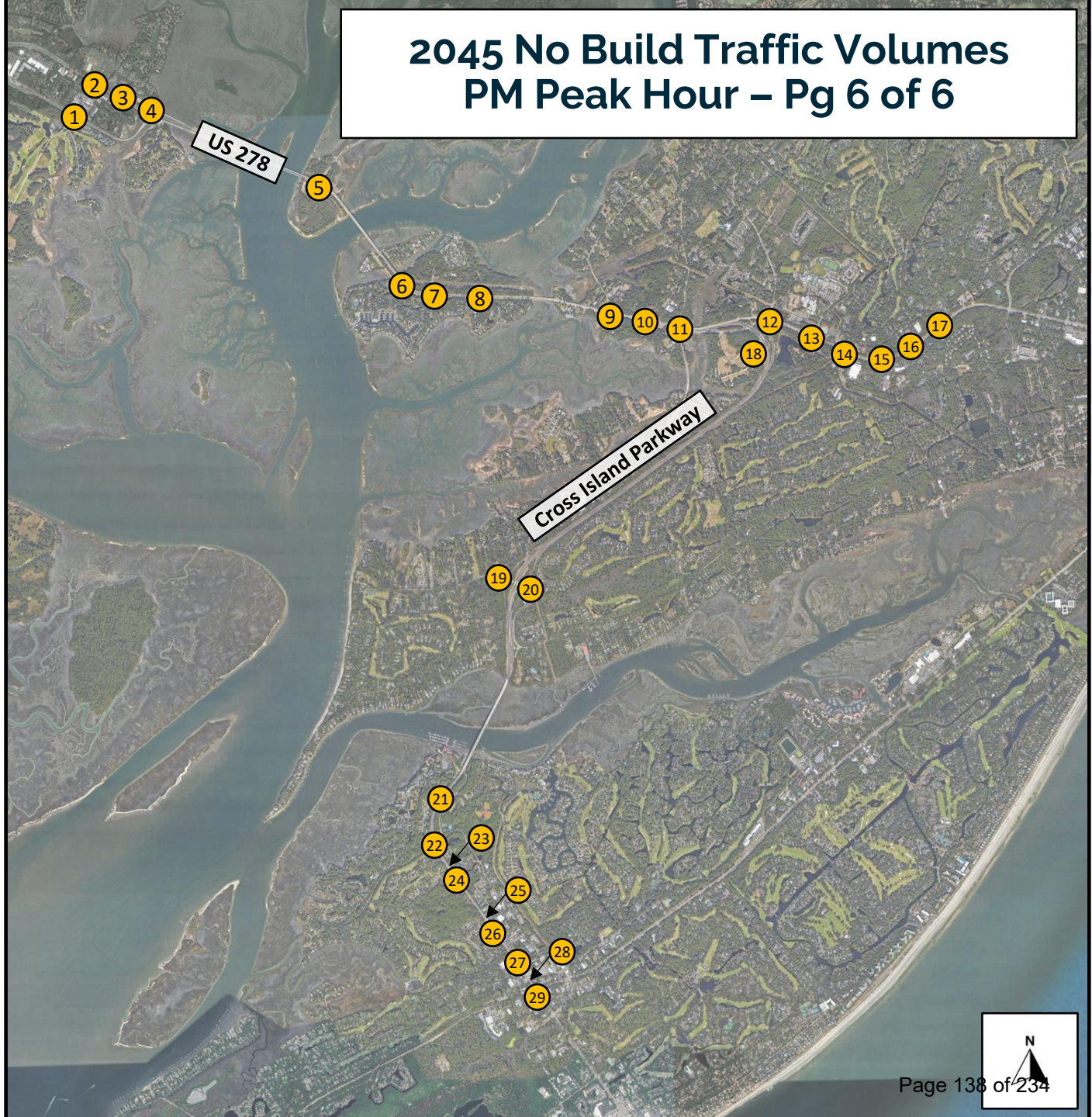
21
11 → 1486
Bay Pines Rd: 11 → 11
Palmetto Bay Rd: 21 → 1947

22
98 → 1201 → 198
371 ← 41 ← 43
Arrow Rd: 76 → 33 → 105
Palmetto Bay Rd: 136 → 1521 → 86

23
1343 → 6 →
6 ← 6
Genesta St
Palmetto Bay Rd: 1737 → 5

24
1343 → 6 →
11 ← 6
Palmetto Business Park Rd
Palmetto Bay Rd: 1731 → 6

2045 No Build Traffic Volumes
PM Peak Hour – Pg 6 of 6



25
- Palmetto Bay Rd: 1338, 11
- Bow Cir: 11, 11
- Palmetto Bay Rd: 1726, 11

29
- Greenwood Dr: 547, 754, 119
- Palmetto Bay Rd: 433, 392, 136
- Palmetto Bay Rd: 405, 200, 205
- Palmetto Bay Rd: 62, 699, 401

26
- Palmetto Bay Rd: 1338, 11
- Archer Rd: 11, 11
- Palmetto Bay Rd: 1726, 11

27
- Target Rd: 60, 1225, 64
- Palmetto Bay Rd: 126, 50, 88
- Target Rd: 194, 50, 86
- Palmetto Bay Rd: 126, 1417, 52

28
- Palmetto Bay Rd: 1388, 11
- Dunnagans Alley: 69, 32
- Palmetto Bay Rd: 1526, 11

APPENDIX F: 2045 NO-BUILD TRAFFIC OPERATING CONDITIONS (SYNCHRO)

Table F-1. 2045 No Build Operating Conditions (Synchro)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (17.6)**	**C (25.5)**
Eastbound Approach	B (15.1) [298] <0.54>	B (16.0) [207] <0.50>
Westbound Approach	C (25.4) [202] <0.38>	D (36.7) [#496] <0.86>
Northbound Approach	B (15.9) [37] <0.08>	B (15.7) [30] <0.11>
Southbound Approach	A (9.9) [m23] <0.18>	A (6.1) [m21] <0.23>
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**B (18.2)**	**C (26.9)**
Eastbound Approach	B (16.9) [443] <0.64>	B (17.1) [345] <0.75>
Westbound Approach	B (17.9) [290] <0.51>	C (28.1) [#644] <0.89>
Northbound Approach	C (21.2) [98] <0.56>	D (49.7) [m#76] <0.74>
Southbound Approach	C (31.2) [70] <0.45>	E (60.9) [#123] <0.88>
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (18.9) [<25] <0.04>	F (65.8) [33] <0.33>
Westbound Left Turn	E (44.8) [<25] <0.08>	D (34.9) [<25] <0.22>
Northbound Approach	D (34.4) [33] <0.31>	D (26.7) [30] <0.30>
Southbound Approach	F (57.0) [88] <0.63>	F ($649.6) [273] <2.05>
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	C (21.6) [<25] <0.02>	C (17.0) [<25] <0.06>
Northbound Approach	F ($684.9) [115] <1.63>	F ($1880.2) [225] <4.10>
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (17.8) [<25] <0.01>	F (67.3) [<25] <0.08>
Westbound Left Turn	No volumes observed	D (28.7) [<25] <0.01>
Northbound Approach	F (50.7) [<25] <0.03>	D (32.3) [<25] <0.09>
Southbound Approach	No volumes observed	F (74.9) [<25] <0.26>
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	No volumes observed	D (30.2) [<25] <0.01>
Northbound Approach	F ($1763.6) [73] <2.35>	F ($5024.3) [145] <8.33>

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**E (67.8)**	**F (92.1)**
Eastbound Approach	F (105.5) [#2262] <1.19>	C (33.3) [#1547] <1.00>
Westbound Approach	A (5.9) [320] <0.64>	F (133.8) [#2434] <1.26>
Northbound Approach	B (14.6) [34] <0.39>	E (77.5) [#106] <0.86>
Southbound Approach	0 (0.0) [<25] <0.01>	0 (0.0) [<25] <0.00>
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (18.3) [<25] <0.03>	F (91.5) [<25] <0.22>
Southbound Approach	F ($1398.4) [65] <1.86>	F (151.3) [73] <.69>
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (23.4)**	**F (144.6)**
Eastbound Approach	B (15.2) [918] <0.81>	B (12.6) [370] <0.91>
Westbound Approach	C (31.1) [625] <0.74>	F (233.2) [m#2394] <1.49>
Northbound Approach	B (13.0) [<25] <0.02>	E (70.6) [67] <0.29>
Southbound Approach	E (69.0) [#286] <0.92>	F (231.6) [#577] <1.46>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	D (26.7) [40] <0.36>	F (77.9) [<25] <0.20>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (37.5)**	**D (45.1)**
Eastbound Approach	D (38.7) [#1280] <1.02>	C (20.5) [381] <0.89>
Westbound Approach	C (24.0) [344] <0.91>	D (45.2) [m909] <0.99>
Northbound Approach	D (51.5) [214] <0.60>	F (171.7) [#606] <1.35>
Southbound Approach	F (94.1) [#306] <0.97>	D (49.3) [168] <0.34>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**F (84.2)**	**F (82.7)**
Eastbound Approach	F (94.6) [~1146] <1.16>	D (54.0) [#842] <0.99>
Westbound Approach	D (43.1) [#390] <0.90>	D (50.3) [m594] <0.99>
Northbound Approach	F (113.6) [#372] <1.13>	F (137.9) [#466] <1.29>
Southbound Approach	F (119.0) [#473] <1.09>	F (178.8) [#506] <1.33>

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (19.7)**	**C (27.2)**
Eastbound Approach	B (15.9) [m199] <0.89>	A (7.2) [m262] <0.77>
Westbound Approach	B (11.8) [306] <0.68>	C (33.4) [#1335] <0.99>
Northbound Approach	F (82.7) [136] <0.58>	F (259.8) [#208] <1.33>
Southbound Approach	D (49.4) [249] <0.75>	C (24.8) [100] <0.65>
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**C (27.9)**	**D (38.3)**
Eastbound Approach	B (15.8) [#1252] <0.91>	B (14.1) [351] <0.71>
Westbound Approach	D (36.7) [681] <0.55>	D (47.7) [1072] <0.89>
Northbound Approach	E (73.6) [254] <0.76>	F (86.1) [#355] <0.89>
Southbound Approach	C (32.7) [74] <0.36>	D (49.5) [93] <0.68>
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (11.4) [<25] <0.01>	C (17.2) [<25] <0.02>
Westbound Left Turn	C (18.7) [<25] <0.02>	B (13.6) [<25] <0.01>
Northbound Right Turn	C (21.0) [<25] <0.03>	C (15.9) [<25] <0.04>
Southbound Right Turn	B (13.8) [<25] <0.06>	C (19.5) [<25] <0.03>
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	C (20.2) [<25] <0.05>	C (18.4) [<25] <0.21>
Southbound Right Turn	B (13.6) [<25] <0.03>	C (20.1) [<25] <0.05>
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**B (18.0)**	**D (36.4)**
Eastbound Approach	A (3.5) [<25] <0.79>	B (16.9) [#297] <0.93>
Westbound Approach	B (19.2) [407] <0.51>	D (38.4) [#951] <0.92>
Northbound Approach	E (62.2) [112] <0.52>	E (70.5) [#245] <0.82>
Southbound Approach	D (54.9) [178] <0.71>	E (67.7) [212] <0.86>
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	B (13.8) [<25] <0.19>	B (13.8) [<25] <0.19>
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (9.2) [<25] <0.14>	A (8.6) [<25] <0.17>
Southbound Left Turn	C (19.7) [<25] <0.1>	E (49.9) [58] <0.49>
Southbound Right Turn	A (9.4) [<25] <0.05>	B (14.1) [<25] <0.19>

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (8.3) [<25] <0.13>	A (8.6) [<25] <0.06>
Northbound Left Turn	C (16.2) [<25] <0.21>	D (34.1) [160] <0.76>
Northbound Right Turn	A (9.4) [<25] <0.08>	B (10.6) [<25] <0.23>
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	F ($454) [48] <0.75>
Eastbound Right Turn	C (21.7) [<25] <0.03>	C (16.5) [<25] <0.04>
Northbound Left Turn	C (19.4) [<25] <0.03>	B (14.5) [<25] <0.06>
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (17.1)**	**C (26.9)**
Eastbound Approach	D (46.0) [171] <0.71>	C (24.5) [102] <0.35>
Westbound Approach	C (23.8) [73] <0.44>	E (55.3) [#376] <0.94>
Northbound Approach	A (9.7) [136] <0.37>	C (21.7) [443] <0.86>
Southbound Approach	B (15.2) [670] <0.73>	C (24.3) [434] <0.88>
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	E (45.4) [<25] <0.13>	F (146[28] <0.37>
Southbound Left Turn	B (10.0) [<25] <0.03>	C (16.8) [<25] <0.02>
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	E (47.3) [<25] <0.13>	F (114.3) [33] <0.37>
Southbound Left Turn	B (10.1) [<25] <0.04>	C (16.7) [<25] <0.02>
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	D (27.7) [<25] <0.04>	F (54.8) [<25] <0.14>
Westbound Right Turn	B (11.6) [<25] <0.01>	C (19.0) [<25] <0.04>
Southbound Left Turn	B (10.3) [<25] <0.07>	C (16.7) [<25] <0.04>
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	D (29.0) [<25] <0.07>	F (54.8) [<25] <0.14>
Westbound Right Turn	B (11.7) [<25] <0.01>	C (19.0) [<25] <0.04>
Southbound Left Turn	B (10.5) [<25] <0.09>	C (16.7) [<25] <0.04>
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**B (10.8)**	**B (18.7)**
Eastbound Approach	C (33.2) [81] <0.31>	D (51.4) [241] <0.82>
Westbound Approach	D (48.8) [152] <0.69>	C (30.4) [115] <0.50>
Northbound Approach	B (10.9) [240] <0.37>	B (19.0) [585] <0.72>
Southbound Approach	A (4.6) [149] <0.69>	A (7.3) [233] <0.66>

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	D (33.5) [<25] <0.09>	F (55.4) [<25] <0.33>
Westbound Right Turn	B (12.0) [<25] <0.02>	C (20.0) [<25] <0.24>
Southbound Left Turn	B (11.5) [<25] <0.22>	B (14.6) [<25] <0.03>
29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**F (56.0)**	**F (60.3)**
Eastbound Approach	F (83.3) [375] <1.04>	F (117.9) [550] <1.16>
Westbound Approach	D (26.1) [200] <0.79>	F (92.4) [425] <1.08>
Northbound Approach	C (16.4) [125] <0.66>	F (78.2) [525] <1.07>
Southbound Approach	F (134.4) [650] <1.24>	F (94.3) [675] <1.13>

– 95th Percentile volume exceeds capacity
$ – Delay more than 300 seconds
m – Upstream metering is in effect

APPENDIX G: 2045 NO-BUILD TRAFFIC OPERATING CONDITIONS (VISSIM)

Table G-1. 2045 No-Build Operating Conditions (VISSIM)

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**C (22.3)**	**B (15.9)**
Eastbound Approach	C (26.6) [123] {700}	B (18.5) [43] {241}
Westbound Approach	B (14.0) [<25] {168}	B (14.4) [32] {218}
Northbound Approach	B (14.1) [<25] {68}	B (14.5) [<25] {53}
Southbound Approach	A (6.6) [<25] {56}	A (8.5) [<25] {83}
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**E (74.1)**	**B (18.6)**
Eastbound Approach	F (146.0) [1628] {1658}	B (16.6) [86] {567}
Westbound Approach	B (14.1) [37] {302}	B (18.4) [86] {474}
Northbound Approach	C (26.4) [25] {186}	D (39.3) [<25] {91}
Southbound Approach	D (35.8) [<25] {88}	C (24.4) [<25] {119}
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	F (54.8) [1075] {1304}	C (18.8) [<25] {55}
Westbound Left Turn	F (4,646.8) [142] {214}	B (12.4) [<25] {45}
Northbound Approach	B (12.3) [<25] {63}	A (7.4) [<25] {62}
Southbound Approach	D (29.4) [49] {107}	A (8.1) [<25] {77}
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	F (3,675.2) [85] {146}	C (19.0) [<25] {34}
Northbound Approach	F (3,448.2) [171] {189}	C (18.4) [<25] {43}
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (20.9) [902] {1658}	D (26.6) [<25] {<25}
Westbound Left Turn	No volumes observed	C (21.4) [<25] {<25}
Northbound Approach	F (426.9) [<25] {38}	C (20.6) [<25] {47}
Southbound Approach	No volumes observed	C (17.5) [<25] {42}
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	No volumes observed	F (131.6) [<25] {<25}
Northbound Approach	F (2,505.2) [214] {351}	E (49.9) [<25] {74}
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**A (9.5)**	**B (13.4)**
Eastbound Approach	B (11.3) [433] {1093}	B (10.6) [216] {1092}
Westbound Approach	A (5.3) [26] {601}	A (6.0) [86] {913}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
Northbound Approach	D (41.6) [<25] {138}	F (237.4) [193] {326}
Southbound Approach	A (9.8) [<25] {<25}	A (0.0) [<25] {<25}
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (14.4) [<25] {<25}	D (32.0) [<25] {33}
Southbound Approach	D (29.2) [<25] {47}	E (43.5) [<25] {62}
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (26.8)**	**E (70.7)**
Eastbound Approach	D (38.4) [361] {1332}	B (13.9) [235] {1106}
Westbound Approach	A (8.4) [55] {700}	F (128.0) [1018] {1383}
Northbound Approach	C (21.2) [<25] {42}	E (67.4) [<25] {73}
Southbound Approach	B (19.2) [<25] {189}	F (80.3) [228] {693}
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (1.4) [<25] {26}	A (8.0) [<25] {29}
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (30.3)**	**F (328.8)**
Eastbound Approach	C (25.2) [169] {787}	B (15.1) [98] {668}
Westbound Approach	B (15.5) [80] {365}	F (637.7) [896] {989}
Northbound Approach	E (63.1) [122] {407}	F (510.5) [1241] {1288}
Southbound Approach	F (147.4) [192] {319}	D (49.1) [51] {243}
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (51.9)**	**E (76.0)**
Eastbound Approach	D (43.1) [838] {1562}	D (50.4) [254] {711}
Westbound Approach	C (31.2) [128] {375}	E (76.3) [1203] {1623}
Northbound Approach	D (38.8) [166] {334}	F (92.7) [280] {356}
Southbound Approach	F (143.1) [1039] {1452}	F (121.3) [657] {1380}
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (22.3)**	**C (33.4)**
Eastbound Approach	B (17.7) [169] {962}	B (12.6) [51] {552}
Westbound Approach	C (21.5) [106] {673}	D (42.5) [907] {1289}
Northbound Approach	E (67.4) [42] {178}	F (281.4) [153] {297}
Southbound Approach	D (36.9) [65] {225}	C (25.8) [32] {153}
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**C (22.1)**	**E (55.1)**
Eastbound Approach	B (17.8) [227] {1081}	B (18.9) [99] {679}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
Westbound Approach	B (19.5) [72] {553}	D (54.5) [998] {1279}
Northbound Approach	D (52.8) [71] {260}	F (260.2) [397] {719}
Southbound Approach	C (31.1) [<25] {87}	D (43.2) [<25] {114}
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (13.4) [<25] {<25}	C (21.6) [87] {146}
Westbound Left Turn	C (22.4) [<25] {25}	C (21.8) [<25] {<25}
Northbound Right Turn	C (16.2) [<25] {29}	B (12.6) [<25] {31}
Southbound Right Turn	B (12.3) [<25] {44}	F (2,448.4) [87] {171}
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	A (8.1) [<25] {<25}	A (6.9) [<25] {64}
Southbound Right Turn	B (11.0) [<25] {36}	F (1,211.0) [123] {244}
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**C (24.5)**	**E (66.7)**
Eastbound Approach	B (19.7) [107] {764}	C (34.5) [115] {636}
Westbound Approach	B (17.3) [53] {371}	E (75.8) [1341] {1658}
Northbound Approach	E (55.2) [32] {110}	E (76.4) [65] {265}
Southbound Approach	D (47.7) [57] {203}	F (126.4) [327] {1023}
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	A (9.7) [<25] {45}	B (12.1) [<25] {72}
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (4.5) [<25] {62}	A (2.4) [<25] {67}
Southbound Left Turn	A (9.8) [<25] {53}	B (11.1) [<25] {79}
Southbound Right Turn	A (6.1) [<25] {86}	A (7.9) [<25] {112}
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (1.6) [<25] {49}	A (1.5) [<25] {<25}
Northbound Left Turn	B (11.9) [<25] {77}	D (27.8) [46] {252}
Northbound Right Turn	A (6.0) [<25] {102}	A (8.0) [62] {277}
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	E (48.5) [<25] {35}
Eastbound Right Turn	C (15.6) [<25] {<25}	B (13.9) [<25] {32}
Northbound Left Turn	B (12.8) [<25] {<25}	A (7.8) [<25] {31}
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (14.0)**	**B (18.2)**
Eastbound Approach	C (30.2) [51] {187}	C (29.0) [38] {164}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
Westbound Approach	B (17.3) [<25] {108}	C (28.2) [79] {337}
Northbound Approach	B (12.4) [38] {311}	B (15.5) [94] {596}
Southbound Approach	B (11.6) [91] {737}	B (16.3) [90] {601}
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	E (41.7) [<25] {57}	D (25.4) [<25] {53}
Southbound Left Turn	A (5.5) [37] {255}	A (8.8) [<25] {<25}
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	F (65.1) [<25] {75}	C (21.0) [<25] {59}
Southbound Left Turn	A (5.7) [35] {176}	B (12.8) [<25] {<25}
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	F (69.4) [46] {98}	E (40.7) [<25] {48}
Westbound Right Turn	A (9.1) [59] {131}	B (13.1) [<25] {81}
Southbound Left Turn	C (16.2) [551] {1040}	B (14.1) [<25] {67}
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	F (1,234.0) [40] {69}	D (31.8) [<25] {34}
Westbound Right Turn	B (11.6) [62] {105}	B (11.5) [<25] {70}
Southbound Left Turn	C (16.2) [228] {469}	B (12.0) [<25] {28}
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**C (26.9)**	**B (18.6)**
Eastbound Approach	C (26.5) [<25] {105}	D (37.6) [62] {250}
Westbound Approach	C (34.2) [32] {157}	C (26.1) [38] {144}
Northbound Approach	B (12.5) [39] {235}	B (15.4) [83] {522}
Southbound Approach	C (33.5) [1209] {1511}	B (15.6) [129] {820}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	F (872.0) [62] {148}	F (87.7) [<25] {97}
Westbound Right Turn	E (36.3) [88] {182}	B (13.0) [30] {132}
Southbound Left Turn	C (20.8) [258] {513}	B (13.1) [<25] {416}
29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, RAB)		
Overall Intersection	**F (60.5)**	**F (81.8)**
Eastbound Approach	F (314.7) [808] {838}	F (168.2) [805] {838}
Westbound Approach	B (14.3) [56] {434}	F (200.4) [1645] {1658}
Northbound Approach	A (4.2) [<25] {207}	F (61.1) [534] {794}
Southbound Approach	C (34.4) [297] {461}	A (8.2) [88] {460}

APPENDIX H: FOUR LANE VIABILITY REVIEW TECHNICAL MEMORANDUM; SEISMIC STUDY REVIEW; CURSORY REVIEW OF SOUTHERN BYPASS

MEMO

To: Town of Hilton Head, South Carolina

From: Lochmueller Group

Date: May 3, 2024

Subject: Independent Study of the William Hilton Parkway Gateway Corridor
Four Lane Viability Review Technical Memorandum – Task 1.3.3

Lochmueller Group (Lochmueller) is preparing an independent study that evaluates congestion and mobility challenges along the William Hilton Parkway Gateway Corridor. As part of this independent study, Lochmueller evaluated the viability of several strategies in order to determine if they should be included or excluded from further consideration as part of this project. These items include the viability of maintaining four lanes along William Hilton Parkway (US 278) between Windmill Harbour and Squire Pope Road; the implementation of a second bridge; modifications to the existing mass transit system; implementation of a new ferry system; and the implementation of a facility usage fee. It should be noted that an in-depth detailed analysis of any of these items was excluded from the scope of work.

The intention of this memorandum is to provide the Town of Hilton Head with Lochmueller's professional opinion regarding the feasibility of William Hilton Parkway being able to remain a four lane facility within areas between Moss Creek Drive and Squire Pope Road, if one or more of these strategies were implemented.

Viability of Maintaining Four Lanes Between Windmill Harbour and Squire Pope Road

Lochmueller evaluated the viability of maintaining four lanes between Windmill Harbour and Squire Pope Road. Currently, the intersection of Squire Pope Road and US 278 experiences significant congestion, specifically during the PM peak hour. The westbound approach has failing conditions and queues which extend 2,500 feet from Squire Pope past Spanish Wells. This congestion is expected to be exacerbated by 2045 with the forecasted growth.

Travel times were calculated using VISSIM, which is a microsimulation tool that accurately replicates individual vehicles and their interactions within complex traffic streams, such as interchanges, freeways, and expressway corridors with signalized intersections. A robust amount of data and field observations were conducted to calibrate VISSIM to reproduce field conditions.

The travel time results are provided in **Table 1.** As shown, it currently takes approximately 19 minutes to travel along US 278 between Moss Creek Drive and Indigo Run Drive during the AM peak hour, and it takes approximately 21 minutes to travel along US 278 between Indigo Run Drive and Moss Creek Drive during the PM peak hour today.

US 278 between Moss Creek Drive and Indigo Run Drive is approximately 8.2 miles. Based on the travel times, the existing average speed along this corridor is 26 miles per hour (mph) during the AM peak hour and 23 mph during the PM peak hour. This is well below the posted speed limits of 45 mph and 55 mph along the corridor.

Huntington Tower, 201 W Springfield Avenue, Suite 1012
Champaign, Illinois 61820
PHONE: 217.673.7633

These travel times are expected to increase by approximately 36% during the AM peak hour and by approximately 23% during the PM peak hour in the year 2045 with the anticipated background growth. It is evident based on the travel times that the existing four-lane section already struggles to accommodate the 2023 traffic volumes, and the 2045 forecasted traffic volumes would be expected to significantly deteriorate operating conditions along the corridor.

TABLE 1. VISSIM 2023 EXISTING AND 2045 NO BUILD TRAVEL TIME RESULTS

Corridor		2023 Existing Simulated travel time (secs)		2045 No Build Simulated travel time (secs)		% Difference	
		AM	PM	AM	PM	AM	PM
William Hilton Parkway between Moss Creek and Indigo Run	EB	1157	619	1579	642	**36.47%**	**3.72%**
	WB	572	1252	584	1544	**2.10%**	**23.32%**

A preliminary analysis was completed in an effort to determine how much the 2023 existing and 2045 no build traffic volumes would need to be reduced in order for the existing four-lane section to operate acceptably. It was determined that the 2023 existing traffic volumes would need to be reduced by approximately 30% for the current four-lane configuration to operate acceptably. Furthermore, based on an annual growth rate of 0.56%, the 2045 traffic volumes would need to be reduced by approximately 40% for the current four-lane configuration to operate acceptably.

Implementation of a Second Bridge

Lochmueller was asked to evaluate the implementation of a second bridge and/or point of access onto Hilton Head Island from the mainland. It is Lochmueller's understanding that a second bridge or point of access has been discussed locally to address congestion along US 278. A new bridge could take up to twenty years to come to fruition once all studies, planning, environmental, design, and construction is complete.

While there are clear benefits to providing a second bridge, such as redundancy, the operating conditions along US 278 are already congested today. As previously stated, the 2023 existing traffic volumes would need to be reduced by approximately 30% and the 2045 traffic volumes would need to be reduced by approximately 40% for the current four-lane configuration to operate acceptably. Given the congestion already experienced along this corridor today and the time it would take to construct a second bridge, it is our opinion that a six-lane section of US 278 onto Hilton Head Island is needed independently of a second bridge.

Modifications to Existing Transit System

Lochmueller evaluated whether modifications to the existing mass transit system and its services, or the implementation of a new mass transit system, could provide enough benefit to maintain the needed levels of efficiency and operations of a four-lane section between Windmill Harbour and Squire Pope Road.

Based on data provided by the Lowcountry Regional Transportation Authority (LRTA), transit service in the region has been on the decline. It should be noted that the transit service does show signs of rebounding; however, it remains to be seen what the new normal or equilibrium state may mean and if this is sustainable and long lasting for passenger volumes as transit agencies struggle with driver shortages, funding gaps and other operational challenges.

The following ridership data was provided from the LRTA:

- The Palmetto Breeze commuter bus's yearly unlinked trips peaked in 2019 at 196,978
- Trips declined to 129,160 in 2021 (post pandemic)
- Trips increased by 4.45% to 134,916 in 2022 according to the Federal Transit Administration (FTA) National Transit Database (NTD) data

The transit service in the region is fragmented by service area and type (commuter/worker, worker/tourist) and serves different markets with limited coordination. According to the LRTA, they currently have 72,963 yearly unlinked trips or 201 unlinked trips daily across all the routes that serve Hilton Head, with 363 service days and one AM and PM trip respectively. The Breeze Trolley, a seasonal service had 34,600 unlinked trips (2023) across 143 service days or 242 trips per day with 18 daily runs Sunday to Thursday and 20 runs on Friday and Saturday. The trolley runs April through Labor Day from 1 PM to 10 PM daily, with extended service to 11 PM Friday and Saturday.

There is an on-demand van service countywide with trips to Hilton Head. However, the ridership is unknown, and a 24 hour prior reservation is needed to make a trip. The is also a Beach Parking shuttle which operates 47 days per year from 10 AM to 4:30 PM on Friday, Saturday, Sunday and holidays from Memorial Day to Labor Day, with 3,980 riders (2023).

The fixed route Breeze transit option, as currently structured, only largely addresses the employment side to/from the island, and the trolley partially addresses trips of visitors, residents and likely some workers once they are on the island. The Breeze service does provide long distance routes. The on-island trolley is seasonal and has limited service hours. Overall, there is little coordination between the transit service types (commuter bus and trolley/shuttle), and there is service gap from Labor Day to April when the trolley does not currently run.

Based upon Lochmueller's evaluations, it appears transit across all services currently only provides a fraction of the total regional trip making to and from, and on, the island. In the future, transit would need to be more robust in terms of service span (number of trips daily and days per year of service) and coordinated to be most effective, with some sort of travel time advantage and way to address the last mile distribution once passengers are on the island.

As described in the preceding sections of this memorandum, the 2023 existing traffic volumes would need to be reduced by approximately 30% and the 2045 traffic volumes would need to be reduced by approximately 40% for the current 4-lane configuration to operate acceptably. By comparison, in 2021, the transit mode share was less than 1% in the region[1] , and would therefore have to grow exponentially to be effective enough to reduce the need for six lanes along US 278 in the area under study.

[1] https://datausa.io/profile/geo/hilton-head-island-bluffton-towns-beaufort-city-puma-sc#housing

Therefore, it is Lochmueller's opinion that even if significant modifications were made to the existing Palmetto Breeze transit system, it would be highly unlikely these modifications alone could account for enough trips and the mode share percentage needed to sufficiently reduce the number of trips across the US 278 bridges, such that a four-lane facility could be maintained.

Ferry System/Facility Usage Fee

In addition to expanding the existing mass transit system, Lochmueller evaluated whether the implementation of a new ferry system or the implementation of a facility usage fee, also commonly known as congestion pricing, would provide enough benefit to maintain the existing four-lane section across the US 278 bridges and/or between Windmill Harbour and Squire Pope Road.

In regard to the implementation of a new ferry system, it is our understanding that during the development of the 2045 Lowcountry Area Transportation Study (LATS) Long Range Transportation Plan (LRTP), long-term transit considerations were discussed with the public and stakeholders. One of these considerations included implementing high-speed ferry services between Hilton Head Island and Beaufort or Port Royal to the north, and Savannah or Tybee Island to the south.

It should be noted, however, that no formal studies have been initiated by the LATS Policy Committee or other governing bodies to determine the feasibility of implementing and/or maintaining a high-speed ferry system to/from Hilton Head Island. Therefore, it is reasonable to assume that a high speed ferry system to/from Hilton Head Island would not be fully operational within the next ten to fifteen years. If/when a new ferry system is implemented, it is highly unlikely the resulting reduction in traffic would allow for a four-lane section to be maintained along US 278 across the bridges and/or between Windmill Harbour and Squire Pope Road (e.g., 30% reduction in 2023 traffic or 40% reduction in traffic by 2045), given that the existing Palmetto Breeze transit system accounts for less than 1% of the region's transit mode share today.

In regard to the implementation of a facility usage fee, it is our understanding that laws within the State of South Carolina only allow tolls/fees to be implemented on new roads within the State system. As such, implementing facility usage fees on any of the existing roadways that are within the William Hilton Parkway Gateway Corridor Study area would be prohibited. It should be noted that, even if a facility usage fee could be implemented, the fee would largely impact commuters, not tourists, who enter and exit the island for work, as the majority of traffic during the AM and PM peak hours is a result of commuter traffic. Therefore, even if a facility usage fee could be implemented, it is highly unlikely the resulting reduction in traffic would allow for a four-lane section to be maintained along US 278 across the bridges and/or between Windmill Harbour and Squire Pope Road (e.g., e.g., 30% reduction in 2023 traffic or 40% reduction in traffic by 2045).

Conclusions

Lochmueller evaluated the viability of maintaining four lanes along William Hilton Parkway (US 278) between Windmill Harbour and Squire Pope Road; the implementation of a second bridge; modifications to the existing mass transit system; implementation of a new ferry system; and the implementation of a facility usage fee. These evaluations were completed by Lochmueller to determine feasibility of maintaining a four lane section along William Hilton Parkway between Moss Creek Drive and Squire Pope Road, if one or more of these strategies were implemented.

As noted in this technical memorandum, the existing traffic volumes already create significant congestion along US 278, and the congestion is expected to be exacerbated by 2045 with the forecasted background growth. Based on a preliminary analysis, the existing traffic volumes would need to be reduced by approximately 30%, and the 2045 traffic volumes would need to be reduced by approximately 40%, in order for a four-lane section to operate acceptably.

Based on Lochmueller's evaluations, it was concluded that it would be highly unlikely that modifications to the existing transit system alone could account for enough trips and the mode share percentage needed to sufficiently reduce the number of trips across the US 278 bridges, such that a four-lane facility could be maintained, given that the current transit mode share within the region is less than 1%, and would therefore have to increase exponentially to reach the target goal. In addition, neither the implementation of a new ferry system, nor the implementation of a facility usage fee (if there were a legal way to implement said fee), would be able to significantly reduce the number of vehicles along US 278 within the study area to allow for a four-lane section to be maintained.

In order for the existing four-lane section to operate acceptably, the total reduction in vehicles from mass transit, a new ferry system, and the implementation of a facility usage fee would need to be between 30-40%. While implementing the aforementioned types of transportation strategies would help slow future traffic growth on US 278, it is Lochmueller's opinion that even if all of these strategies are implemented, the reduction in vehicles would not reach 30%. Furthermore, these strategies would not address the structural issues associated with the existing bridges over Mackay Creek and Skull Creek. Consequently, it is Lochmueller's opinion that these strategies should not be considered as viable alternatives to be used individually and/or collectively to solely address traffic congestion and mobility related concerns along US 278 within the project study area, that could allow a four-lane section to be maintained along US 278 within the study area.

In regard to implementing a second bridge and/or point of access onto Hilton Head Island from the mainland, while it is acknowledged there are clear benefits to providing a second bridge (e.g., redundancy during natural disasters), Lochmueller's evaluations show that operating conditions along US 278 are already congested today. Given the congestion that is already experienced along this corridor today, the amount of traffic that would need to be removed from the existing traffic stream to be able to maintain four lanes across the bridge (i.e., 30% reduction in 2023 traffic or 40% reduction in traffic by 2045), and the time it would take to construct a second bridge, it is our opinion that a six-lane section of US 278 onto Hilton Head Island is needed independently of a second bridge.

MEMO

To: Town of Hilton Head Island, South Carolina

From: Lochmueller Group

Date: May 31, 2024

Subject: Independent Study of the William Hilton Parkway Gateway Corridor
SCDOT Seismic Study Review Findings – Task 1.8

During the May 8, 2024, William Hilton Parkway Gateway Corridor Independent Review Advisory Committee meeting, Lochmueller provided findings related Lochmueller's cursory, high-level review the US 278 Bridge Seismic Study prepared by the South Carolina Department of Transportation (SCDOT) in April of 2020. Lochmueller was asked to perform this cursory, high-level review of SCDOT's Seismic Study to offer a professional opinion regarding the feasibility of seismically retrofitting and structurally rehabilitating the existing US 278 bridges to allow for six travel lanes (three eastbound lanes and three westbound lanes), rather than constructing the new six-lane bridge proposed by SCDOT. A copy of the Seismic Study Review related slides that were presented during the 5/8 Committee meeting are attached to this memorandum as **Appendix A**.

The SCDOT Seismic Study included an evaluation of options to retrofit, widen, or replace the existing US 278 bridges onto Hilton Head Island, and provided information to SCDOT to implement best replacement strategies, as well as detailed Life Cycle Cost Analysis (LCCA) results, considering three Options:

- **Option #1** – Construct a new eastbound bridge over Mackay Creek & Skull Creek; widen the existing westbound bridge over Mackay Creek; and modify the existing Skull Creek bridges for westbound movements.
- **Option #2** – Construct a new eastbound bridge over Mackay Creek & Skull Creek; replace the existing westbound bridge over Mackay Creek; and modify the existing Skull Creek bridges for westbound movements.
- **Option #3** – Construct a new six-lane bridge between Bluffton and Hilton Head Island, and then remove all existing bridges across Mackay Creek and Skull Creek.

A copy of the LLCA prepared by SCDOT's Design team is shown below:

	Option 1	Option 2	Option 3
Initial Construction Cost	$ 129,560,000.00	$ 137,837,000.00	$ 171,108,500.00
Future Construction Cost	$ 85,233,000.00	$ 53,151,000.00	$ -
User Cost	$ 10,920,000.00	$ 10,920,000.00	$ -
Maintenance Cost	$ 22,900,000.00	$ 20,850,000.00	$ 11,350,000.00
Total LCCA Cost	$ 248,613,000.00	$ 222,758,000.00	$ 182,458,500.00
Construction Schedule	60 Months	60 Months	36 Months

Huntington Tower, 201 W Springfield Avenue, Suite 1012
Champaign, Illinois 61820
PHONE: 217.673.7633

It should be noted that Lochmueller's efforts in reviewing the Seismic Study prepared by SCDOT were limited to a cursory review of the SCDOT Design Team's structural analysis related assumptions and findings; LLCA results; their noted benefits/risks with Options 1/2/3; and if these efforts by SCDOT's Design Team appeared to following standard engineering practices. Lochmueller's efforts did not include any detailed evaluations of the SCDOT Design Team's design calculations or software modeling inputs/results; any considerations for alternative Options to consider for inclusion in the Seismic Study; any roadway, bridge, or environmental design/review services; or coordination with SCDOT, their Design Team, Beaufort County, Town of Hilton Head, and/or any other governing Agency or design consultant associated with the US 278 project.

Key observations from Lochmueller's review of the SCDOT Seismic Study are summarized below. Please refer to **Appendix A** for additional information:

- The SCDOT Design Team's structural analysis findings; LCCA results; and noted benefits/risks with Options 1/2/3 appear valid and appear to follow standard engineering practices.
- The LCCA results do not account for costs that would be required to improve seismic conditions for Options 1 & 2. Therefore, true costs associated with Options 1 & 2 would be significantly higher to implement, than what is shown in the LCCA table above.
- Options 1 & 2 would take approximately 2 years longer to construct vs Option 3. The rehabilitated structures would still need to be replaced at some point, and time required to do so is not accounted for in this table.
- Existing bridge structures would be approximately 50 years old after improvements made by Options 1 or 2, with rehab efforts likely to extend life of existing structures by approximately 25 to 35 years. By comparison, typical design life for Option 3 newly constructed bridges approximately 75 to 100 years.
- Options 1 & 2 being pursued for use solely as temporary condition would require more than $130M to construct initially (using 2020 costs), and these costs do not account for needed Functional Evaluation Earthquake (FEE) seismic design improvements. Depending upon when remaining structures were replaced, the future/user/maintenance costs req'd over that time would assuredly lead to higher overall cost than building new at outset.
- Options 1 & 2 would put maintenance/replacement schedules of the structures on varying timeframes, which would cause additional user disruptions in the future.
- Existing structures under Options 1 & 2 would never meet Safety Evaluation Earthquake (SEE) seismic design requirements. New structures can be built to meet SEE seismic design requirements.
- In summary, Lochmueller does not recommend rehabilitation and/or retrofit options being pursued for this project, in lieu of constructing a new six-lane bridge connecting Bluffton and Hilton Head Island.

SCDOT Seismic Study Review Findings (Task 1.8)

- **Objective: Perform cursory, high-level review of seismic study and offer professional opinion regarding feasibility of seismic retrofit & structural rehab existing bridges vs. constructing new bridge**
  - PDF copy of SCDOT approved US 278 Bridge Seismic Study (dated April 2020) provided to Lochmueller on 4/15/24.
  - Study included evaluation of options to retrofit, widen, or replace the existing US 278 bridges onto HHI, and provided information to SCDOT to implement best replacement strategy, as well as detailed Life Cycle Costs Analysis (LCCA) results, considering following three Options:
    - **Option #1** – Construct new EB bridge over Mackay Creek & Skull Creek; widen existing WB bridge over Mackay Creek; modify existing Skull Creek bridges for WB movements.
    - **Option #2** – Construct new EB bridge over Mackay Creek & Skull Creek; replace existing WB bridge over Mackay; modify existing Skull Creek bridges for WB movements.
    - **Option #3** – Construct new 6-lane bridge; remove all existing bridges

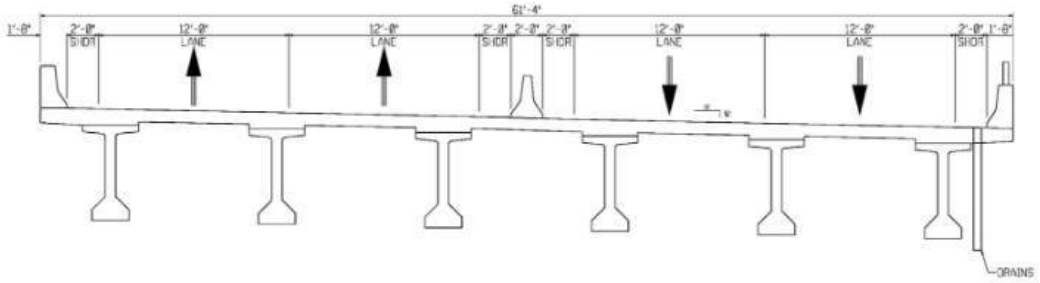
SCDOT Seismic Study Review Findings (Task 1.8)

- With each Option, a new EB bridge will be constructed
  - Designed to SCDOT standards to withstand seismic events
  - Serve as a "lifeline" bridge in case of significant seismic event for Options 1 or 2

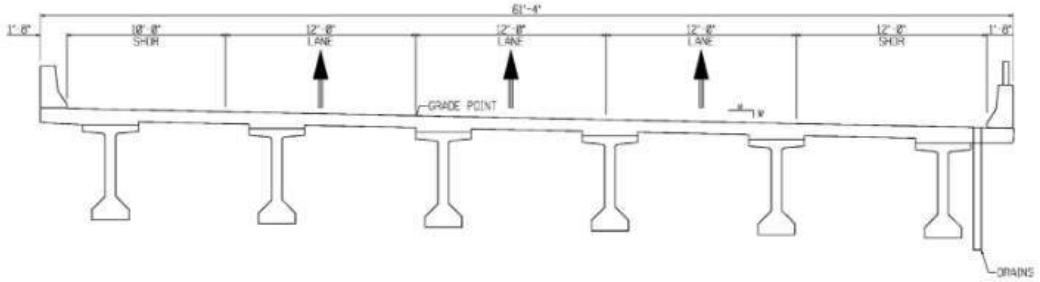
- Assumed Construction Sequence
  - **Options #1 or #2**:
    - New EB structure constructed wide enough to accommodate 4-Lanes, 2-Way traffic in temporary condition & 6-Lanes in permanent condition.
    - All traffic moved to new EB structure, while demolition / seismic retrofits / structural repairs & replacements take place on existing structures.
    - Traffic then moved in to final positions
    - If necessary, traffic can be returned to the 4-Lanes, 2-Way traffic pattern on EB structure
  - **Option #3**:
    - Entire new 6-Lane structure can constructed with traffic retained in existing patterns

SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-1: Option 1 & 2 – New EBL over Skull Creek & Mackay Creek



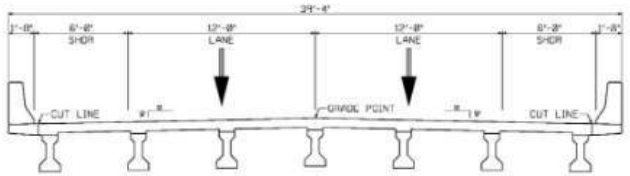
PROPOSED SECTION
US 278 OVER SKULL CREEK & MACKAY CREEK
(TEMPORARY PATTERN)



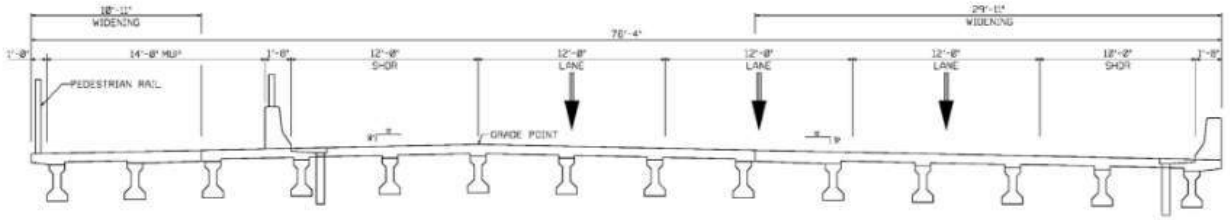
PROPOSED EBL SECTION
US 278 OVER SKULL CREEK & MACKAY CREEK

SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-2: Option 1 – Widen WBL Mackay Creek



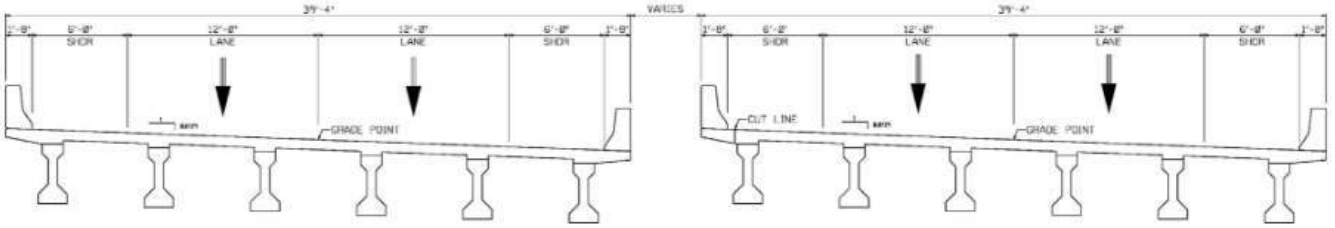
EXISTING WBL SECTION
US 278 OVER MACKAY CREEK



PROPOSED WBL SECTION
US 278 OVER MACKAY CREEK

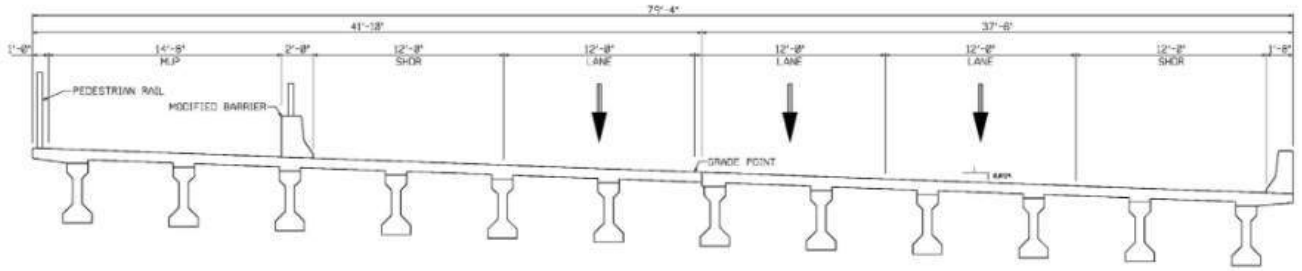
SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-3: Option 1 & 2 - Combine Skull Creek Bridges
(Information for Spans 1-6)



EXISTING WBL SECTION
US 278 OVER SKULL CREEK
(Remove Spans 1 to 6)

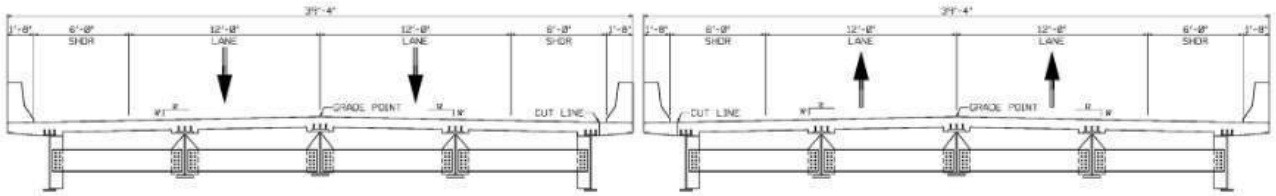
EXISTING EBL SECTION
US 278 OVER SKULL CREEK
(Retain)



PROPOSED WBL SECTION
US 278 OVER SKULL CREEK
(Spans 1 to 6)

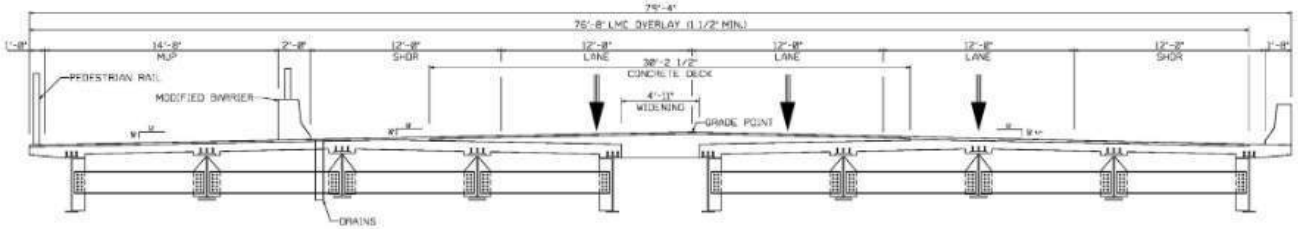
SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-4: Option 1 & 2 - Combine Skull Creek Bridges
(Information for Spans 7-26)



EXISTING WBL SECTION
US 278 OVER SKULL CREEK

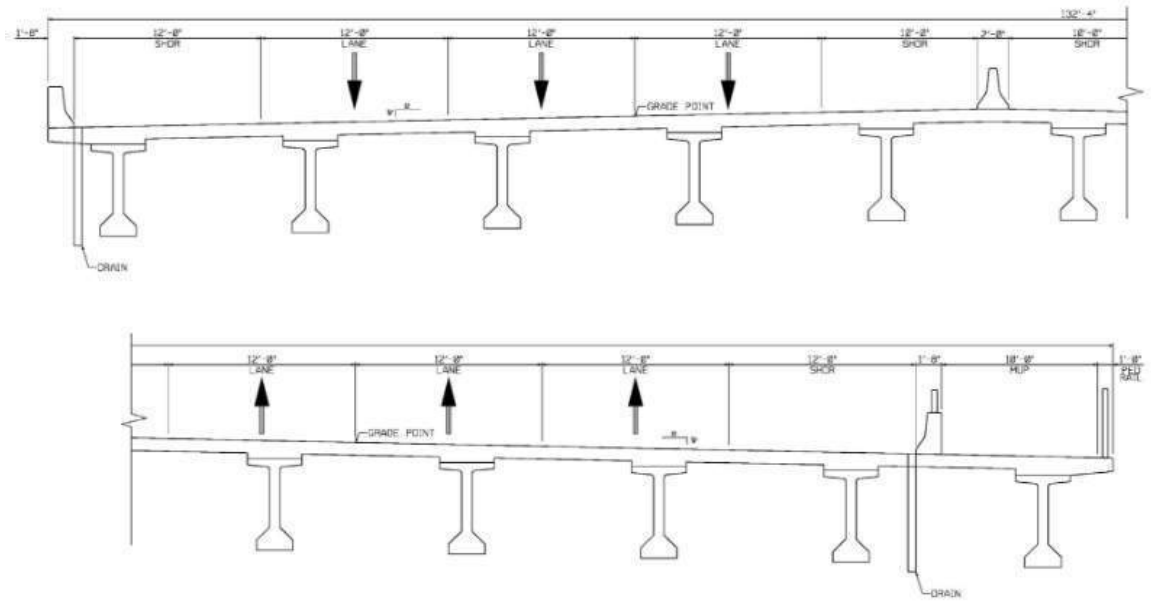
EXISTING EBL SECTION
US 278 OVER SKULL CREEK



PROPOSED WBL SECTION
US 278 OVER SKULL CREEK
(Spans 7 to 26)

SCDOT Seismic Study Review Findings (Task 1.8)

Figure 3.2-5: Option 3 - New 6-Lane Structure over Mackay Creek & Skull Creek



PROPOSED SECTION
US278 OVER SKULL CREEK & MACKAY CREEK

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Assumptions/Findings Noted by SCDOT Design Team:**
  - All existing bridges designed and constructed prior to SCDOT's implementation of seismic analysis and detailing. Therefore, **all existing bridges are considered inadequate when compared to today's seismic design standards**.
  - In order to model existing structures, SCDOT design team assumed minimum level of seismic retrofits would be performed. Design team did not determine if existing structures could withstand any seismic event without minimum retrofits being performed.
  - SCDOT design team intended to evaluate the bridges for two seismic events as required by SCDOT Seismic Design Specifications (SDS):
    - **Functional Evaluation Earthquake (FEE)** = lower magnitude earthquake event that has higher chance of occurrence during life of the bridge.
    - **Safety Evaluation Earthquake (SEE)** = higher magnitude earthquake event that has lower chance of occurrence during life of the bridge.
    - NOTE: US 278 Bridges assigned highest SCDOT SDS classification rating OC 1; therefore, must meet FEE design thresholds at a minimum

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Assumptions/Findings Noted by SCDOT Design Team (cont.):**
  - It was determined that soils around and below the existing bridge foundations and roadway approaches can liquefy at ground accelerations just above the FEE event:
    - This liquefaction could cause bridges/roadways to settle, slide or collapse during and/or after seismic event.
    - Design team recognized that mitigation for liquefaction (i.e., add'l foundations, deep soil mixing, etc.) would likely exceed costs for new construction, and would greatly increase environmental disturbance.
    - Design team therefore elected to limit structural improvements through seismic retrofits to FEE level, w/ SCDOT concurrence.
    - New bridges can be constructed to meet SEE requirements; existing bridges only will be able to attain FEE requirements at best.

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Assumptions/Findings Noted by SCDOT Design Team (cont.):**
  - SCDOT Design team prepared LCCA, for Options 1/2/3, as shown below.
    - Costs are in 2020 dollars, assume annual inflation of 2% for future costs.
    - Construction costs developed from historical data, as well as correspondence w/ local Contractors. **Widening existing structures over water ~1.5 to 2 times more expensive than new construction.**
    - User Costs developed from SCDOT provided data, based on cost/lane/day.
    - Maintenance costs based on existing bridge details and assumed new bridges.
    - NOTE: LCCA costs only reflect rehabilitation related costs (e.g., widening, maintenance, cosmetic improvements), and do **not** include retrofit related costs (e.g., seismic related improvements). Therefore, **true costs to attain FEE standards for Options 1 & 2 would be significantly higher than those shown in the table below**.

	Option 1	Option 2	Option 3
Initial Construction Cost	$ 129,560,000.00	$ 137,837,000.00	$ 171,108,500.00
Future Construction Cost	$ 85,233,000.00	$ 53,151,000.00	$ -
User Cost	$ 10,920,000.00	$ 10,920,000.00	$ -
Maintenance Cost	$ 22,900,000.00	$ 20,850,000.00	$ 11,350,000.00
Total LCCA Cost	$ 248,613,000.00	$ 222,758,000.00	$ 182,458,500.00
Construction Schedule	60 Months	60 Months	36 Months

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Assumptions/Findings Noted by SCDOT Design Team (cont.):**
  - SCDOT Design team evaluated benefits & risks of Options 1/2/3

Benefits / Risks of Options 1, 2 and 3

Option 1	Initial Construction Cost	Least (assumed)	Initial cost of retrofits and widening may be less than the cost of a new structure and demolition.
	Utility Relocation	Least	Every option will require the relocation of the 24" diameter waterline as well as the fiber optic line. May require the relocation of the power line on poles. Avoids the power lines on towers.
	Constructability	Hardest	New EBL built off alignment from ground, barge and temporary work trestle. Skull Creek will be challenging to retrofit, especially in curved sections. Mackay Creek widening will follow demolition of existing EBL bridge.
	Future Maintenance	Greatest	WBL Mackay and Skull Creek bridges will be 50 year old bridges at completion of project and require more substantial maintenance. Steel bridges also require additional maintenance versus concrete bridges.
	Pickney Island Access	Worst	Island access still tied to existing (improved) interchange along US 278. New bridge could include ramps to access island.
	Environmental Impact	Least	The new EBL bridge and widening of WBL over Mackay Creek will increase impacts. The removal of existing EBL will reduce impacts.
	Seismic Response	FEE / SEE	The new EBL bridge will be designed for the SEE event. WBL Skull Creek may only withstand the FEE event. Mackay Creek may not be able to withstand the FEE event within acceptable performance limits.

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Assumptions/Findings Noted by SCDOT Design Team (cont.):**
  - SCDOT Design team evaluated benefits & risks of Options 1/2/3 (cont.)

Option 2	Initial Construction Cost	Middle	Replacing WBL Mackay Creek bridge may cost more than widening and retrofit. All other costs are similar.
	Utility Relocation	Least	Same as Option 1.
	Constructability	Middle	WBL Mackay Creek will be constructed after demolition is performed, increasing construction schedule. Existing EBL Mackay Creek bridge may be used for construction access.
	Future Maintenance	Middle	Skull Creek bridges will be 50 year old bridges at completion of project and require more substantial maintenance. Steel bridges also require additional maintenance versus concrete bridges. New Mackay Creek WBL will reduce maintenance versus Option 1.
	Pickney Island Access	Worst	Same as Option 1.
	Environmental Impact	Middle	There will be a slight increase in environmental impact due to new construction versus widening for Option 1.
	Seismic Response	FEE / SEE	The new WBL Mackay Creek bridge and new EBL bridge will be designed for the SEE event. WBL Skull Creek bridges may only withstand the FEE event within acceptable performance limits.
Option 3	Initial Construction Cost	Most	Replacing all bridges will be most expensive initial construction cost.
	Utility Relocation	Most	Power lines south of the Skull Creek bridges will need to be relocated in addition to the waterline and fiber optic line. This may be the same for all 3 options.
	Constructability	Easiest	Bridge will be constructed off alignment. Provides the shortest construction schedule.
	Future Maintenance	Least	All bridges will be new.
	Pickney Island Access	Best	A new interchange can be constructed with right-in, right-out only access. Existing Skull Creek bridges could be modified to maintain Pinckney Island access while US 278 bypasses the island.
	Environmental Impact	Most	A new 6 lane alignment will have highest impacts. Removal of existing bridges and causeway will reduce impacts.
	Seismic Response	SEE	All bridges will be designed for SEE event.

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Observations by Lochmueller Group:**
  - SCDOT Design Team's structural analysis findings; LCCA results; and noted benefits/risks associated with Options 1/2/3 appear valid and appear to follow standard engineering practices.

	Option 1	Option 2	Option 3
Initial Construction Cost	$ 129,560,000.00	$ 137,837,000.00	$ 171,108,500.00
Future Construction Cost	$ 85,233,000.00	$ 53,151,000.00	$ -
User Cost	$ 10,920,000.00	$ 10,920,000.00	$ -
Maintenance Cost	$ 22,900,000.00	$ 20,850,000.00	$ 11,350,000.00
Total LCCA Cost	$ 248,613,000.00	$ 222,758,000.00	$ 182,458,500.00
Construction Schedule	60 Months	60 Months	36 Months

  - LCCA results do not account for costs that would be required to improve seismic conditions for Options 1 & 2. Therefore, **true costs associated with Options 1 & 2 would be significantly higher to implement, than what is shown in the LCCA table above**.

  - Options 1 & 2 would take ~ 2 years longer to construct vs Option 3. **The rehabilitated structures would still need to be replaced at some point, and time required to do so is not accounted for in this table.**

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Observations by Lochmueller Group (cont.):**

	Option 1	Option 2	Option 3
Initial Construction Cost	$ 129,560,000.00	$ 137,837,000.00	$ 171,108,500.00
Future Construction Cost	$ 85,233,000.00	$ 53,151,000.00	$ -
User Cost	$ 10,920,000.00	$ 10,920,000.00	$ -
Maintenance Cost	$ 22,900,000.00	$ 20,850,000.00	$ 11,350,000.00
Total LCCA Cost	$ 248,613,000.00	$ 222,758,000.00	$ 182,458,500.00
Construction Schedule	60 Months	60 Months	36 Months

  - Existing bridge structures would be ~50 years old after improvements made by Options 1 or 2, with rehab efforts likely to extend life of existing structures by ~25 to 35 years. By comparison, **typical design life for Option 3 newly constructed bridges ~ 75 to 100 years**.

  - Options 1 & 2 being pursued for use solely as temporary condition would require >$130M to construct initially (using 2020 costs), and **these costs do not account for needed FEE improvements**. Depending upon when remaining structures were replaced, the future/user/maintenance costs req'd over that time would assuredly lead to higher overall cost than building new at outset.

SCDOT Seismic Study Review Findings (Task 1.8)

- **Key Observations by Lochmueller Group (cont.):**

	Option 1	Option 2	Option 3
Initial Construction Cost	$ 129,560,000.00	$ 137,837,000.00	$ 171,108,500.00
Future Construction Cost	$ 85,233,000.00	$ 53,151,000.00	$ -
User Cost	$ 10,920,000.00	$ 10,920,000.00	$ -
Maintenance Cost	$ 22,900,000.00	$ 20,850,000.00	$ 11,350,000.00
Total LCCA Cost	$ 248,613,000.00	$ 222,758,000.00	$ 182,458,500.00
Construction Schedule	60 Months	60 Months	36 Months

  - **Options 1 & 2** would put maintenance/replacement schedules of the structures on varying timeframes, which **would cause additional user disruptions in the future**.

  - **Existing structures under Options 1 & 2 would never meet SEE seismic design requirements**. New structures can be built to meet SEE seismic design requirements.

  - In summary, Lochmueller does not recommend rehabilitation and/or retrofit options be pursued.

MEMO

To: Town of Hilton Head Island, South Carolina

From: Lochmueller Group

Date: May 13, 2024

Subject: Independent Study of the William Hilton Parkway Gateway Corridor
Response to Advisory Committee Desire to Fully Evaluate Southern Bypass Alternative

During the May 8, 2024, William Hilton Parkway Gateway Corridor Independent Review Advisory Committee meeting, Lochmueller provided cursory, high-level observations related to traffic, geometric, ROW, and environmental challenges associated with the "Southern Bypass" alternative that has been brought up by citizens and/or Committee members. The primary purpose for sharing this information with the Committee and others in attendance was to provide reasoning as to why Lochmueller did not include this Southern Bypass alternative as one of the four alternatives that were thoroughly evaluated as a part of our independent study. A copy of the Southern Bypass related slides that were presented during the 5/8 Committee meeting are attached to this memorandum as **Appendix A**.

As specified during the May 8 Committee meeting, Lochmueller has been clear that our professional opinion is that any iteration of a new terrain route along the south side of US 278 is not feasible due to the many sensitive resources that would be impacted. However, the May 8 Committee meeting included a passing voice vote that seemingly puts Lochmueller in the position of having to evaluate an alternate concept that still has considerable identified flaws and only perpetuates a fallacious motive by some members of the Committee. We contend that further exploration and detailed evaluation of such a concept only serves as an exercise in futility and would not expend the Town's money prudently, as the results will remain unchanged. Additionally, we can predict with certainty that South Carolina Department of Transportation (SCDOT) and the Federal Highway Administration (FHWA) will outright reject such a concept, regardless of its location south of US 278, because such a premise fails to regard the basic NEPA principles applied to projects of avoid, minimize, and mitigate. If the Town expands our scope to provide an in-depth analysis regarding the viability of a southern bypass alternative, we want to be certain the following is clear:

1) The FHWA and SCDOT will not accept any version of a route that extends on new terrain creating more direct impacts to the Stoney TCP and other Section 4(f) resources.

2) Recommending the inclusion of the southern bypass as part of SCDOTs recommended preferred alternative has grave implications associated with the trajectory of the level of NEPA document being prepared, if adopted by SCDOT. Currently, SCDOT is preparing an Environmental Assessment (EA) for the project. An EA is prepared for projects where it is unknown whether there are clear significant impacts to the natural or human environment, and typically culminates with FHWA issuing a Finding of No Significant Impact (FONSI). The FONSI is FHWA's decision document for the project that acknowledges the absence of any significant impacts to the natural or human environment. However, at any point during the development of an EA, FHWA can elevate the level of environmental documentation to an Environmental Impact Statement

Huntington Tower, 201 W Springfield Avenue, Suite 1012
Champaign, Illinois 61820
PHONE: 217.673.7633

(EIS) if they foresee the potential for significant impacts. EIS-level projects conclude with FHWA issuing a Record of Decision (ROD), which is their acceptance of the preferred alternative and identification of all mitigation measures to offset the significant impacts. If FHWA elevates this project to an EIS, it is likely to require at least an additional two years to reach a ROD. Some of this time is attributed to necessary backsteps in the process to make the transition to the higher level of document, but a majority of it resides with time needed to update / complete the essential technical analyses that would be prompted by such an action in this case. A summary of some major actions associated with the elevation to an EIS for this project is listed below.

- Publication of a Notice of Intent (NOI) in the Federal Register
- Scoping meeting with resource agencies
- Update alternatives analysis
- Update noise analysis
- Update environmental justice analysis / additional outreach
- Update ecological surveys and supplemental coordination with agencies
- Updating Section 106 process to reflect adverse effects to previously reviewed resources (Stoney TCP) and new cultural resources (Honey Horn Plantation)
- Amend the Section 106 Memorandum of Agreement (MOA) to account for mitigation measures for new adverse effects
- Completion of an Individual Section 4(f) Evaluation for Stoney TCP, Park at 152 William Hilton Parkway, and Honey Horn Plantation)
- Prepare a Draft EIS
- Prepare for and conduct another public hearing
- Prepare Final EIS / ROD

This is not intended to be an exclusive list of tasks needed for the transition to an EIS but provides some insight on the breadth in task detail that will be required for such an endeavor. Elevation to an EIS would also likely make the project subject to the July 2020 regulations promulgated by the Council on Environmental Quality (CEQ) regarding Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act. Specifically, Section 1501.10(b)(2) of 40 CFR which mandates the completion of EISs within two years measured from NOI to ROD.

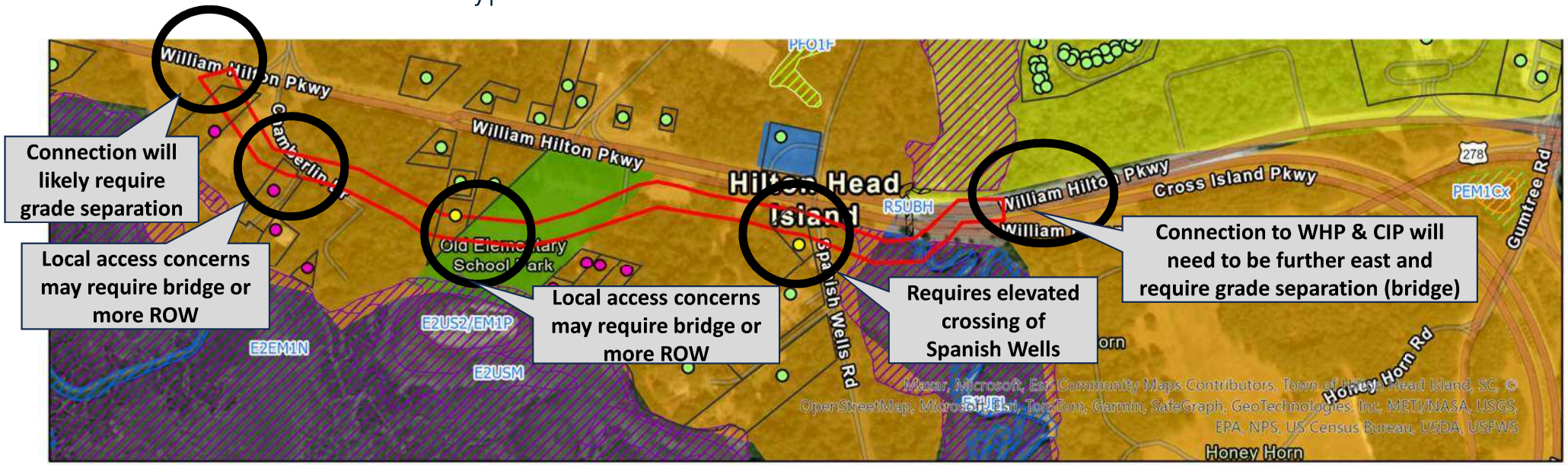
3) The requested analysis, if authorized by Town Council, is a deviation from our agreed upon scope of work and will require additional funds. We have taken the liberty of outlining some cost estimates to complete a full evaluation of the southern bypass to the same level as the other four alternatives approved by the Committee. Please note that what is provided below are ballpark estimates, intended to provide the Town with context regarding the scale of a supplemental request, and are not definitive costs.

Discipline	*Scope Modifications*	*Est. Cost*
Traffic Engineering Services	Evaluate concept to the level of detail identified in Task 3.3.3.	$9,000
Environmental Services	Evaluate concept to match level of effort identified in Task 3.4.	$8,000
Roadway/ROW/Costing Services	Define most realistic concept alignment, tie-in points to CIP, and general ROW footprint. Prepare cost estimate for concept.	$9,000
Cursory Observation Services of TWG's Version 3.1	Initial observations already completed by Lochmueller to assess the TWG's Version 3.1 of the southern bypass, and presentation of findings at 5/8 Committee meeting.	$5,725
	TOTAL COST	**$31,725**
	TIME REQUIRED FOR COMPLETION (*UPON RECEIVING FORMAL NTP)	**3 WEEKS**

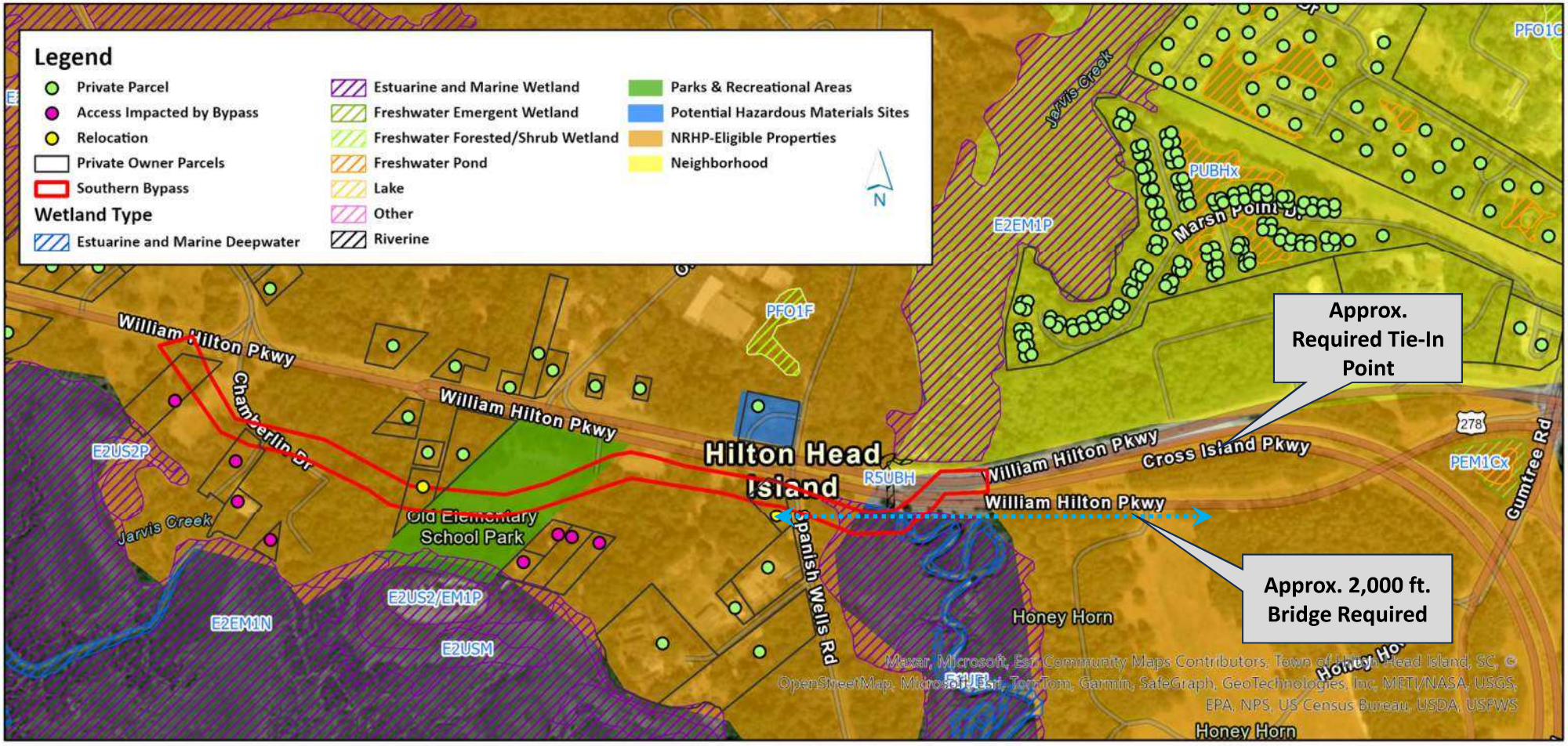
Pending a decision regarding the Southern Bypass, as per your direction, we will proceed with our Task 4 related modeling efforts for Alternative 1 (with minor modifications noted on 5/1). Any further evaluation of the Southern Bypass will be placed on hold until a definitive direction is received from you.

"Southern Bypass" | Cursory Traffic Overview

- At 12/12/23 Committee meeting, Committee members prioritized limiting impacts to ROW (any public and/or private parcels) as guidance to Lochmueller when selecting potential Alternatives. Topic re-emphasized at 3/27/24 Committee meeting.
- The "Southern Bypass" is not anticipated to improve the operating conditions of Gumtree Road, as there is no way to effectively bypass Gumtree at-grade.
- While the bypass has the opportunity to remove most of the through traffic from US 278, if the bypass is at grade, then it will still need to cross several streets as shown below, reducing the effectiveness of the bypass.



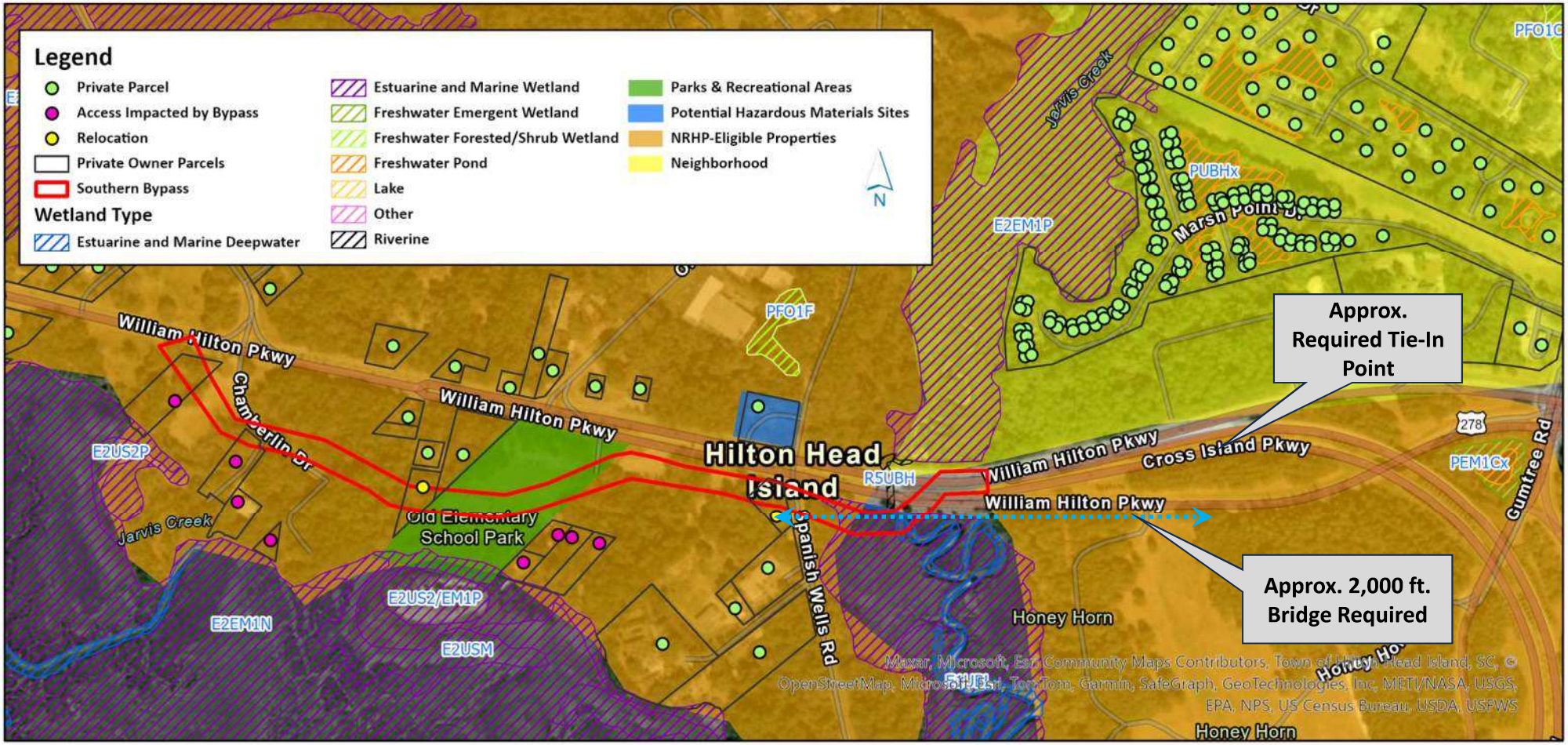
"Southern Bypass" | Cursory Overview Map



"Southern Bypass" | Cursory Engineering Overview

Categories	Prior SCDOT Findings / Considerations	Southern Bypass Constraints / Issues	Southern Bypass Overall Risks
Engineering Feasibility	• Concept not considered	• The horizontal alignment to the east tying back into US 278, as presented, is not feasible • Current at-grade alignment creates access issues at Chamberlin Drive that requires consideration (i.e., bridge) • Tie-in point requires moving east to the Cross Island Parkway ramp (US 278 East)	• Challenges in addressing the horizontal and vertical alignments need to be addressed – affects time and cost • New bridge, approximately 2,000 ft. in length required between Spanish Wells Road and Cross Island Parkway ramp
Right-of-Way	• Total of 34 acres of right-of-way required for the recommended preferred alternative	• Estimated 6 additional acres required • Eliminates approximately 1.2 acres from SCDOTs proposed right-of-way needed for recommended preferred alternative 4(a) • 23 total parcels impacted (18 publicly owned 5 privately owned) • Creates 8 private parcels with access concerns (2 of which are partially impacted)	• Additional right-of-way increases impacts to sensitive environmental resources • Additional time necessary to address access issues with the 8 parcels (total purchase or additional access road to Spanish Wells Road)
Relocations	• Two commercial relocations	• Results in at least 2 additional relocations	• Additional impacts to Stoney TCP

"Southern Bypass" | Cursory Overview Map



"Southern Bypass" | Cursory Environmental Overview

Categories	Prior SCDOT Findings / Considerations	Southern Bypass Constraints / Issues	Southern Bypass Overall Risks
Section 106 (Cultural)	• "Adverse Effect" finding for the project due to impacts to Archaeological Site 38BU66; "No Adverse Effect" for Stoney TCP	• Greater impacts to Stoney TCP • New impacts to Honey Horn Plantation if tie-in corrected	• Change in effect finding for Stoney TCP to "Adverse Effect" • New "Adverse Effect" likely for Honey Horn Plantation • Amendment to the Memorandum of Agreement likely
Section 4(f)	• De *minimis* impact finding for both Stoney TCP and the Old Elementary School Park • Honey Horn Plantation was not impacted	• Additional "use" of Stoney TCP & Old Elementary School Park • New "use" of Honey Horn Plantation	• Additional use of non-transportation land from Stoney TCP & the Old Elementary School Park likely to elevate to an Individual 4(f) evaluation • Time and cost expended to complete the Individual evaluation ≠ a feasible & prudent option
Environmental Justice / Community Impacts	• 1 EJ community identified – Stoney • Determined project effects are not disproportionately high & adverse compared to non-EJ areas	• New impacts to the EJ Stoney community requires: ✓ Outreach & engagement ✓ Benefits & burdens analysis ✓ Noise considerations	• New terrain route introduces potential added benefits & burdens to evaluate • Potential unacceptance by the EJ community • Added mitigation costs
Ecological Impacts	• Impacts 22.9 acres of wetlands / streams • Impacts 145 acres of floodplain • "May Affect – Not Likely to Adversely Affect" finding for threatened & endangered from U.S. Fish & Wildlife Service	• Creation of segmented forest block (Approx. 4 acres of tree clearing) • Approx. 0.7 acre of NWI wetland impact; 140 linear ft. of stream impact • Approx. 1 acre of floodplain impact	• Agency concerns with added forest, wetland, stream, & floodplain impacts • Potential elevation in Threatened & Endangered Species finding • Added mitigation costs

APPENDIX I: 2045 ALTERNATIVE 1 TRAFFIC VOLUMES AND OPERATING CONDITIONS (SYNCHRO)

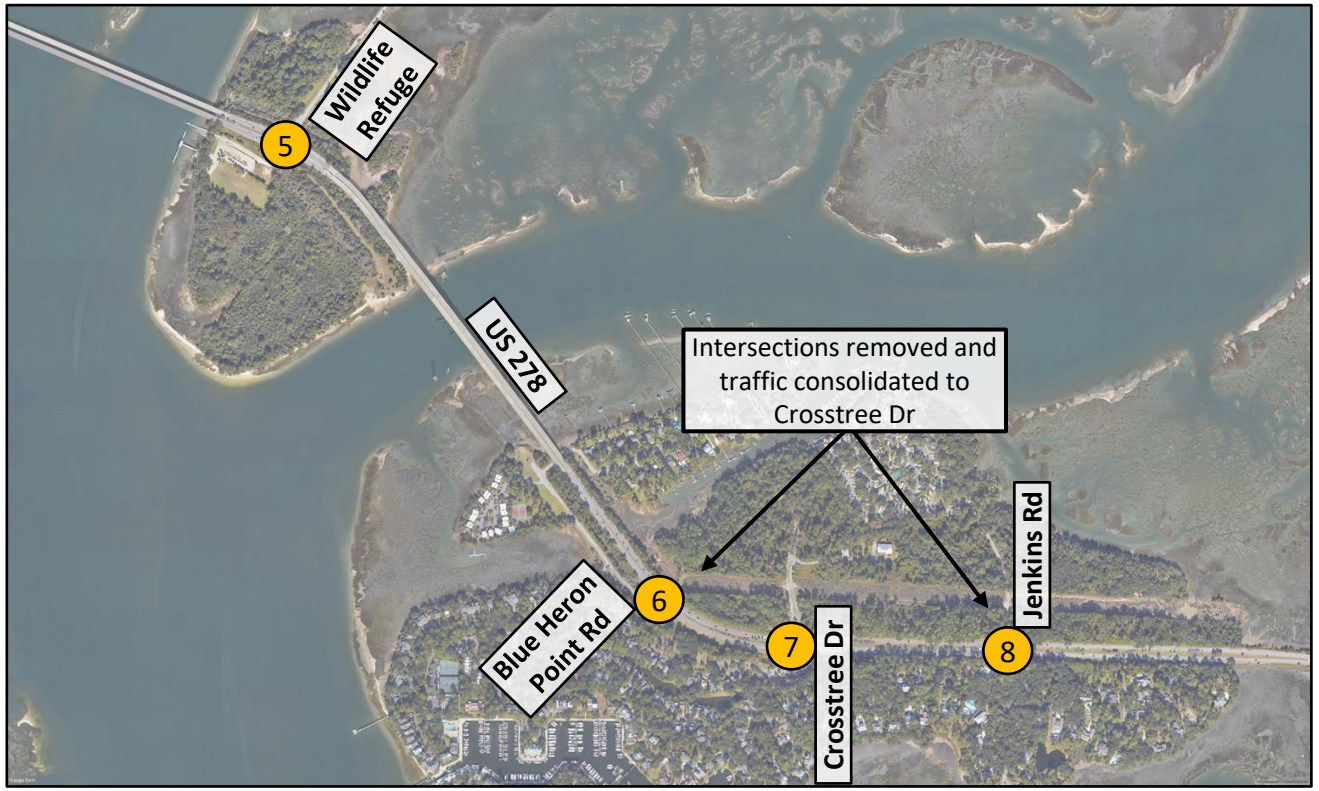
Table I-1. 2045 Alternative 1 Traffic Operating Conditions (Synchro)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (16.9)**	**B (12.9)**
Eastbound Approach	B (16.2) [361] <0.54>	A (8.7) [254] <0.50>
Westbound Approach	C (20.4) [180] <0.38>	B (12.1) [291] <0.86>
Northbound Approach	B (17.1) [49] <0.08>	D (47.7) [77] <0.11>
Southbound Approach	A (7.2) [55] <0.18>	C (27.1) [137] <0.23>
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**B (14.8)**	**C (19.1)**
Eastbound Approach	B (13.1) [283] <0.64>	B (14.0) [274] <0.75>
Westbound Approach	B (13.9) [223] <0.51>	C (21.1) [348] <0.89>
Northbound Approach	C (24.5) [120] <0.56>	D (38.2) [97] <0.74>
Southbound Approach	C (24.4) [80] <0.45>	D (27.4) [169] <0.88>
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	C (18.9) [27] <0.04>	F (65.8) [33] <0.33>
Westbound Left Turn	E (44.8) [<25] <0.08>	D (34.9) [<25] <0.22>
Northbound Approach	B (14.2) [59] <0.31>	C (11.4) [59] <0.30>
Southbound Approach	B (17.0) [91] <0.63>	F (173.4) [305] <2.05>
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	D (27.4) [<25] <0.06>	B (17.7) [34] <0.13>
Northbound Approach	E (37.7) [53] <0.58>	F (99.8) [127] <1.26>
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Northbound Right-Turn	A (3.0) [<25] <0.00>	A (1.3) [<25] <0.00>
Southbound Right-Turn	No volumes observed	A (2.9) [<25] <0.00>
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**B (15.4)**	**B (14.6)**
Eastbound Approach	B (18.6) [338] <0.82>	B (11.6) [283] <0.70>
Westbound Approach	A (8.4) [166] <0.45>	B (19.6) [280] <0.92>
Northbound Approach	D (52.9) [93] <0.35>	E (60.4) [108] <0.72>
Southbound Approach	C (31.0) [<25] <0.06>	D (48.9) [30] <0.14>
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	

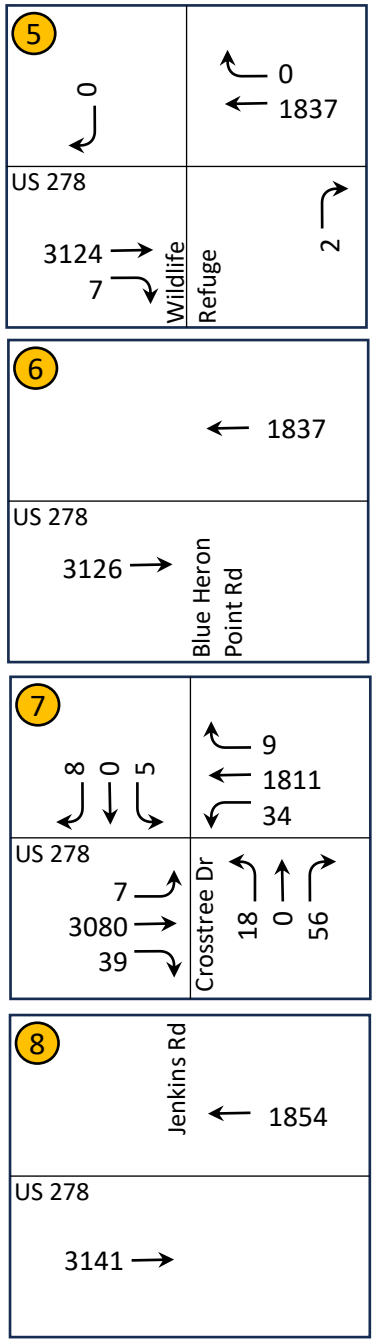
Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
A: The Crazy Crab & William Hilton Pkwy (un-signalized)		
Westbound Left-Turn	F (169.2) [<25] <0.05>	F (77.1) [<25] <0.02>
Northbound Right-Turn	F (95.8) [<25] <0.02>	E (39.3) [<25] <0.01>
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (18.1)**	**C (23.3)**
Eastbound Approach	B (13.3) [852] <0.75>	B (11.1) [467] <0.71>
Westbound Approach	A (3.2) [91] <0.48>	B (18.0) [522] <0.97>
Northbound Approach	E (70.6) [263] <0.07>	F (84.1) [#464] <0.29>
Southbound Approach	D (52.9) [151] <0.58>	E (65.6) [281] <0.70>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (17.0) [74] <0.36>	E (43.2) [32] <0.20>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (26.0)**	**C (20.9)**
Eastbound Approach	B (11.7) [354] <0.99>	B (10.1) [216] <0.85>
Westbound Approach	A (8.7) [350] <0.91>	C (28.3) [1107] <0.99>
Northbound Approach	E (73.5) [459] <0.66>	E (70.9) [#609] <0.95>
Southbound Approach	E (58.6) [411] <0.76>	E (57.7) [430] <0.77>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (38.8)**	**D (38.4)**
Eastbound Approach	C (32.3) [655] <0.77>	C (31.3) [489] <0.93>
Westbound Approach	D (40.4) [310] <0.75>	D (43.6) [554] <0.97>
Northbound Approach	E (57.4) [375] <0.41>	D (54.5) [319] <0.93>
Southbound Approach	E (60.8) [293] <0.87>	E (74.3) [298] <0.90>

– 95th Percentile volume exceeds capacity

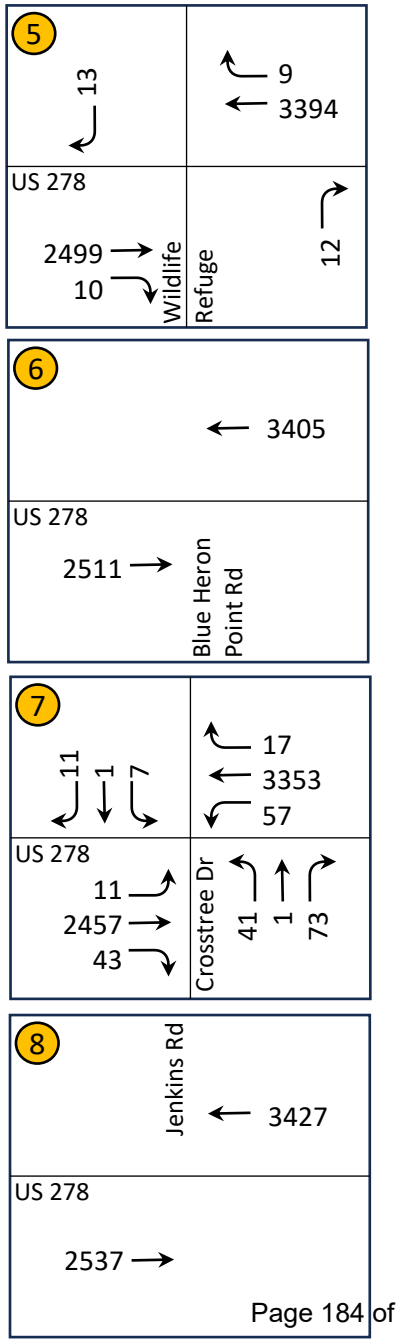
2045 Alternative 1. Modified Recommended Traffic Volumes



AM Peak Hour Volumes



PM Peak Hour Volumes



APPENDIX J: TECHNICAL ENVIRONMENTAL OVERVIEW

MEMO

To: Nathan Nohren, PE, PTOE, Senior Traffic Engineer

From: Chad Costa, Environmental Department Manager, Ashley Taylor, Environmental Specialist, and Samantha Beaupre, Environmental Specialist

Date: May 3, 2024

Subject: William Hilton Parkway Gateway Corridor – Technical Environmental Overview

1.0 Regulation Overview

This section encompasses a brief description of the applicable laws and regulations pertaining to the human and natural environment, which help shape the decision-making process for projects with Federal funding.

1.1 National Environmental Policy Act

The Federal Highway Administration (FHWA) is required by the National Environmental Policy Act (NEPA) to evaluate potential impacts to the social, economic, and natural environments for the proposed reasonable alternatives. According to the NEPA federal government website (www.nepa.gov), Section 101 (42 U.S.C. §4331(a)) of NEPA sets forth a national policy "to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." Section 102 (42 U.S.C. §4332(2)(C)) of NEPA "establishes procedural requirements, applying that national policy to proposals for major Federal actions significantly affecting the quality of the human environment by requiring Federal agencies to prepare a detailed statement on: (1) the environmental impact of the proposed action; (2) any adverse effects that cannot be avoided; (3) alternatives to the proposed action; (4) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and (5) any irreversible and irretrievable commitments of resources that would be involved in the proposed action."

1.2 Clean Water Act

The Clean Water Act (CWA) (33 U.S.C. §1251) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.

1.3 Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973 (16 U.S.C. §1531) is the federal regulation whose goal is "to protect and recover imperiled species and the ecosystems upon which they depend." The U.S. Fish and Wildlife Service (USFWS) manages terrestrial and freshwater organisms while the National Oceanic and Atmospheric Administration (NOAA) Fisheries manages marine and anadromous species. Both administer the ESA and establish a list of protected species.

1.4 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1361) prohibits, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. Jurisdiction for MMPA is shared by USFWS and NOAA Fisheries.

1.5 Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. §470) requires Federal agencies to take into account the effect of federal undertakings on historic properties and provide the Advisory Council of Historic Preservation (ACHP) an opportunity to comment on the undertaking. The NHPA established the National Register of Historic Places (NRHP). Items considered for the NRHP include districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, which possess national, state, or local significance. The NHPA also provides funding for the State Historic Preservation Officer (SHPO) and staff to conduct surveys and develop comprehensive preservation planning standards for state programs.

1.6 Section 4(f) of the U.S. Department of Transportation Act

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 states that USDOT-funded projects are prohibited from using land from certain properties unless there is no feasible and prudent alternative to the use of the Section 4(f) resource. The proposed action must also include planning to minimize harm to the property that would result from such use. The purpose of Section 4(f) is to protect historic sites and publicly owned park and recreation lands and wildlife and waterfowl refuges. Section 4(f) properties are defined by 23 U.S.C. §138 and the Section 4(f) Policy Paper as "any publicly owned land from a public park, recreation area, of wildlife and waterfowl refuge of national, state, or local significance as determined by the federal, state, or local officials having jurisdiction thereof, or any land from an historic site of national, state, or local significance as so determined by such officials." The law prevents agencies within the USDOT from approving a project that "uses" land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites providing, 1) there is no feasible and prudent alternative to the use of the resource, 2) the project includes measures to minimize harm to the resource, or 3) the agency determines the use of the resource is considered to be a *de minimis* impact. A "use" is considered to be the conversion of a Section 4(f) property from a non-transportation use to a transportation use.

1.7 Environmental Justice

Executive Order (EO) 12898 was signed in 1994 and requires Federal actions to identify and address potentially disproportionately high and adverse human health or environmental impacts among minority and low-income populations which may occur as part of the proposed project. EO 13985 was signed in 2021 and expanded in EO 12898 to consider not only minority and low-income populations, but assess "equity with respect to race, ethnicity, religion, income, geography, gender identity, sexual orientation, and disability." The order also expanded to evaluate whether "underserved communities and their members face systemic barriers in accessing benefits and opportunities available."

2.0 Methodology

2.1 Limitations and Exceptions

There were several limitations and exceptions considered as part of this independent environmental overview, which are described in more detail below. Lochmueller Group has applied generally accepted professional practices and standards and exercised its professional judgment, skill, and care in a manner consistent with that of other professionals performing similar work under similar conditions.

2.1.1 Independent Study

As part of the overall independent study, this document represents an overview that evaluates reasonably foreseeable environmental implications associated with conceptual alternatives for possible incorporation by the South Carolina Department of Transportation (SCDOT) into a larger recommended preferred alternative for the William Hilton Parkway Gateway Corridor project along United States (U.S.) Highway 278 within the town of Hilton Head Island, Beaufort County, South Carolina. This document discusses conceptual layouts of alternatives, which would require further agency coordination, field investigation, public involvement, and evaluation if advanced for adoption into the SCDOTs recommended preferred alternative. This document does not replicate or replace the Environmental Assessment (EA) prepared by the SCDOT. Additionally, this overview is not intended to serve as a NEPA document or even comply with NEPA requirements either independently or in conjunction with SCDOTs project.

2.1.2 Desktop Review of Environmental Resources and Constraints

The environmental impacts are based on a preliminary desktop review of potential resources located within the project area. Environmental resources were not field verified as part of this study. The environmental resources identified during the desktop review were assumed to be present, and each alternative evaluated potential impacts to those resources. These resources would need to be field delineated and evaluated under the existing EA before an alternative could be pursued.

2.1.3 Coordination Efforts

This independent overview of potential environmental implications did not complete any agency, stakeholder, or public involvement and outreach, which is a necessary component to the NEPA process. It is expected that the necessary coordination with applicable agencies, stakeholders, and the public would be undertaken by the SCDOT and their consultant as part of the NEPA evaluation for the William Hilton Parkway Gateway Corridor project.

2.1.4 Noise Analysis

A noise analysis was not conducted for this independent overview of potential environmental implications. Before an alternative could be pursued, a noise analysis would be required to determine the impacts of each alternative to the surrounding communities and whether any noise mitigation measures would be deemed necessary.

2.1.5 Reasonably Ascertainable, Publicly Available, and Practically Reviewable Information

This independent overview of potential environmental implications associated with the William Hilton Parkway Gateway Corridor Project was solely based on information that was publicly available, practically reviewable, and reasonably ascertainable. That is, the content of this overview is based on records that are feasibly retrieved for review, information that is readily available to the public upon request, and obtainable from a source within a reasonable time and cost constraint. As of the date of this independent overview, information sought from the SCDOT regarding access to specific data relating to their recommended preferred alternative (i.e., proposed right-of-way limits) and the resources identified through technical environmental studies (i.e., delineated wetlands) was not furnished to Lochmueller Group. While the absence of this information is unlikely to have affected the overall results of this overview, it does present a limiting factor in the data provided herein.

2.2 Sources Reviewed

In association with the Federal Highway Administration (FHWA) and Beaufort County, the SCDOT developed an Environmental Assessment (EA) to document the proposed U.S. Route 278 Corridor Improvements (https://www.scdot278corridor.com/environmental-assessment). The EA was released in June 2021 for public review and was reviewed as a part of this investigation. Information regarding hazardous material sites was retrieved from the EPA Envirofacts website (https://enviro.epa.gov/) and the South Carolina Department of Health and Environmental Control website (https://scdhec.gov/, https://apps.dhec.sc.gov/Environment/USTRegistry). Information about the Honey Horn Plantation site was found on the Hilton Head Island website (https://hiltonheadislandsc.gov/parks/HoneyHorn/).

In addition, several publicly available geographic information systems (GIS) were reviewed. The GIS resources reviewed are summarized in the table below.

Table 1. GIS Resources Reviewed

Database	Map Service	Data Retrieved	Link
Hilton Head Island Open Data	Town-Owned Property Dashboard & Property Viewer	Property data	https://opendata.hiltonheadislandsc.gov/
South Carolina Department of Natural Resources (SDNR)'s Geospatial Data	SCDNR Public Lands Map, South Carolina Public Water Access, SC Public Boat Ramps, Recreational Shellfish Map Application, & Shellfish Management Layers Public View	Public Lands, public water access, and state shellfish grounds	https://data-scdnr.opendata.arcgis.com/
National Oceanic and Atmospheric Administration (NOAA)'s GeoPlatform	Essential Fish Habitat	Essential fish habitat	https://noaa.maps.arcgis.com/home/gallery.html?sortField=relevance&sortOrder=desc
U.S. Geological Survey (USGS) National Hydrography Dataset (NHD)	The National Map Downloader	NHD lines	https://www.usgs.gov/national-hydrography/access-national-hydrography-products
Federal Emergency Management Agency (FEMA)'s Flood Map Service Center	NFHL_45013C	floodways	https://msc.fema.gov/portal/home
SC Arch Site	Subscriber View Map	Cultural resources	http://www.scarchsite.org/default.aspx
U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI)	Wetlands Data Layer	NWI wetlands	https://www.fws.gov/program/national-wetlands-inventory/wetlands-data

3.0 Alternatives Analysis on Potentially Affected Resources

Four conceptual alternatives were evaluated as part of this overview. Publicly available GIS data was used to evaluate potentially affected resources for each of the conceptual alternatives in an effort to identify potential implications associated with each. These resources were separated into two categories: 1) ecological and 2) community and social impacts (i.e., the human environment). Ecological resources included NWI wetlands, streams, floodplains, essential fish habitat types, and threatened and endangered species. Community and social impacts included relocations, right-of-way (ROW) acquisition, hazardous materials sites, neighborhood impacts, environmental justice impacts, impacts to cultural resources, and impacts to Section 4(f) resources. All alternatives identified result in some level of impact to identified resources. However, some conceptual alternatives may result in a reduction of impacts to some resources compared to the approved EA. The impacts discussed below are additional impacts anticipated as a result of each conceptual alternative and are independent of quantities identified in SCDOTs Environmental Assessment (EA). In order to be considered cumulative impacts, the quantities presented here must be added to those of the recommended preferred alternative advanced by SCDOT in the EA for the project. However, there are some extenuating issues associated with this in that resources identified in the EA have been verified through field surveys, coordination with agencies, and/or through the results of public engagement. Quantities presented in this overview are largely based on unverified resources unless reasonably obtainable from the EA in combination with available GIS resources.

3.1 Alternative 1

Alternative 1 is the SCDOT Modified Recommended Preferred Alternative. Alternative 1 would require 0.2 acre of additional ROW. The additional ROW impacts are located within the Squire Pope neighborhood. The additional ROW to be acquired is owned by the Town of Hilton Head. The SCDOT EA determined that this area is an environmental justice community. One hazardous material site, Shell Food Mart Station 101 (165 William Hilton Parkway), is located near the alternatives. No impacts to the site are anticipated as a result of Alternative 1. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. Alternative 1 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA National Marine Fisheries Service (NMFS) would need to occur to affirm this finding. Alternative 1 would not result in additional impacts to NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 1. No additional impacts to cultural resources or Section 4(f) properties would occur as a result of Alternative 1.

Table 2. Alternative 1 Additional Impact Summary			
Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0
	Streams	Linear Feet	0
	Floodplains	Acres	0
	Essential Fish Habitat Types	Acres	0
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
Community & Social	Hazardous Material Sites	No.	0
	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	0.2 1
	Right-of-Way Owned by Town	Acres No. of Tracts	0.2 1
	Neighborhoods	No.	1 (Squire Pope)
	Environmental Justice	No.	1 (Squire Pope)
	Cultural Resources	No.	0
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	0

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

3.2 Alternative 2

Alternative 2 would involve the construction of bowties along both Squire Pope Road and Spanish Wells Road/Wild Horse Road. Alternative 2 would require 1.10 acres of additional ROW. The Town of Hilton Head owns 0.9 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood was outside of the SCDOT EA investigation area but is also a Gullah community. The Gullah people are the only African American population in the US that have maintained a separate language and a distinct culture. Therefore, Squire Pope is likely an environmental justice community. The SCDOT recommended alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. Alternative 2 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. Alternative 2 would require additional impacts to the Stoney Traditional Cultural Property (TCP). The SCDOT identified the Stoney community as a TCP and as a resource eligible for inclusion in the National Register of Historic Places (NRHP). As a NRHP-eligible resource, it is also considered a Section 4(f) property. Alternative 2 would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 2.

Table 3. Alternative 2 Additional Impact Summary			
Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0
	Streams	Linear Feet	0
	Floodplains	Acres	0
	Essential Fish Habitat Types	Acres	0
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
Community & Social	Hazardous Material Sites	No.	0
	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	1.1 11
	Right-of-Way Owned by Town	Acres No. of Tracts	0.9 8
	Neighborhoods	No.	2 (Stoney & Squire Pope)
	Environmental Justice	No.	2 (Stoney & Squire Pope)
	Cultural Resources	No.	1 (Stoney TCP)
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	1 (Stoney TCP)

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

3.3 Alternative 3

Alternative 3 would involve an echelon or center turn overpass at either Squire Pope Road or Spanish Wells Road/Wild Horse Road intersection with William Hilton Parkway (US 278). The environmental impacts for Alternative 3 were evaluated for an echelon at the Squire Pope Road intersection and an echelon at the Spanish Wells Road/Wild Horse Road intersection. A center turn overpass would result in more impacts than an echelon at either intersection. Therefore, a center turn overpass was dismissed from further consideration.

An echelon at the Squire Pope intersection would require 1.0 acre of additional ROW. The Town of Hilton Head owns 0.75 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood is a Gullah community and is likely an environmental justice community. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. An echelon at the Squire Pope intersection is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. An echelon at Squire Pope Road would result in additional impacts to the Stoney TCP, a cultural resource and Section 4(f) property. The addition of a grade separated intersection at Squire Pope Road also has the potential to create visual barriers within the Stoney TCP. It would not result in additional impacts to hazardous

materials sites, NWI wetlands, streams, floodplains, or essential fish habitat types. No additional relocations would occur as a result of Alternative 3.

Table 4. Alternative 3 (Echelon at Squire Pope Road) Additional Impact Summary			
Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0
	Streams	Linear Feet	0
	Floodplains	Acres	0
	Essential Fish Habitat Types	Acres	0
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
Community & Social	Hazardous Material Sites	No.	0
	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	1.0 12
	Right-of-Way Owned by Town	Acres No. of Tracts	0.75 7
	Neighborhoods	No.	2 (Stoney & Squire Pope)
	Environmental Justice	No.	2 (Stoney & Squire Pope)
	Cultural Resources	No.	1 (Stoney TCP)
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	1 (Stoney TCP)

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

An echelon at the Spanish Wells Road/ Wild Horse Road intersection would require 1.1 acres of additional ROW. The Town of Hilton Head owns 0.7 acre of the ROW that would need to be acquired. The additional ROW impacts are located within the Stoney and Squire Pope neighborhoods. The SCDOT EA determined that the Stoney neighborhood is an environmental justice community. The Squire Pope neighborhood is a Gullah neighborhood and likely an environmental justice community. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. An echelon at the Spanish Wells Road intersection is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding. An echelon at Spanish Wells Road would result in 0.29 acre of additional impacts to floodplains. It would result in additional impacts to the Stoney TCP, a cultural resource and Section 4(f) property. It would also result in 0.03 acre of additional impacts to the public park at 152 William Hilton Parkway, a Section 4(f) property. The addition of a grade separated intersection at Spanish Wells Road / Wild Horse Road also has the potential to create visual barriers within the Stoney TCP. An echelon at Spanish Wells Road would not result in additional impacts to hazardous materials sites, NWI wetlands, streams, or essential fish habitat types. No relocations would occur as a result of Alternative 3.

Table 5. Alternative 3 (Echelon at Spanish Wells Road/Wild Horse Road) Additional Impact Summary			
Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0
	Streams	Linear Feet	0
	Floodplains	Acres	0.3
	Essential Fish Habitat Types	Acres	0
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
Community & Social	Hazardous Material Sites	No.	0
	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	1.1 9
	Right-of-Way Owned by Town	Acres No. of Tracts	0.7 5
	Neighborhoods	No.	2 (Stoney & Squire Pope)
	Environmental Justice	No.	2 (Stoney & Squire Pope)
	Cultural Resources	No.	1 (Stoney TCP)
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	2 (Stoney TCP & Park at 152 William Hilton Parkway)

*Anticipated finding, pending coordination with USFWS and NOAA-NMF

3.4 Alternative 4

Alternative 4 would involve the construction of an elevated bypass lane generally within the center of the existing William Hilton Parkway (US 278) roadway section (i.e., no additional widening of the mainline). Alternative 4 would impact an additional 0.03 acre of National Wetland Inventory (NWI) wetlands and an additional 0.03 acre of essential fish habitats. Approximately 65 linear feet of Jarvis Creek would be impacted. Alternative 4 would require no additional ROW. The SCDOT recommended preferred alternative was determined to have a “may affect- not likely to adversely affect” finding for threatened and endangered species. Alternative 4 is not anticipated to alter this finding. Coordination with the USFWS and the NOAA-NMFS would need to occur to affirm this finding.

The Honey Horn Plantation is a collection of historic farm buildings and landscape and would be considered a Section 4(f) resource. It is also home to the Coastal Discovery Museum, which educates the public on the region’s cultural and natural history. Alternative 4 intersects the current boundary of Honey Horn plantation according to the South Carolina Department of Archives and History website. This is unlikely to be considered a Section 4(f) use as the proposed improvements associated with this alternative would occur entirely within existing transportation ROW. Therefore, there is likely no conversion of the resource from a non-transportation use to a transportation one. The current boundary of the site extends into the existing footprint of U.S. 278. However, this part of the site has likely been disturbed by previous construction. Further investigation and coordination with the applicable agencies would be needed to determine the exact cultural and Section 4(f) impacts to this site. No additional relocations would be required. The addition of an elevated bypass lane on a combination of fill or structure also has the

potential to create visual barriers within the Stoney TCP. However, this alternative would not result in additional encroachment on the Stoney TCP and, as such, is not quantified as a direct impact in the table below. No additional impacts to hazardous materials sites, neighborhoods, or environmental justice communities are anticipated. No impacts to floodplains are anticipated.

Table 6. Alternative 4 Additional Impact Summary

Resource/Category		Units	Impacts
Ecological	NWI Wetlands	Acres	0.03
	Streams	Linear Feet	65
	Floodplains	Acres	0
	Essential Fish Habitat	Acres	0.03
	Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*
	Hazardous Material Sites	No.	0
Community & Social	Relocations	No.	0
	Right-of-Way	Acres No. of Tracts	0 0
	Neighborhoods	No.	0
	Environmental Justice	No.	0
	Cultural Resources	No.	1 (Honey Horn Plantation)
	Section 4(f) Resources (Hist. Properties/Public Recreational Areas/Wildlife Refuges)	No.	0

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

3.5 Summary

An overall summary of the environmental impacts for each of the alternatives can be seen in Table 7:

Table 7. Additional Environmental Impacts Summary

Resource/Category	Units	Alternative 1	Alternative 2	Alternative 3 (Echelon at Squire Pope)	Alternative 3 (Echelon at Spanish Wells)	Alternative 4
NWI Wetlands	Acres	0	0	0	0	0.03
Streams	Linear Feet	0	0	0	0	65
Floodplains	Acres	0	0	0	0.29	0
Essential Fish Habitat	Acres	0	0	0	0	0.03
Threatened & Endangered Species	Finding	May Affect, Not Likely to Adversely Affect*	May Affect, Not Likely to Adversely Affect*	May Affect, Not Likely to Adversely Affect*	May Affect, Not Likely to Adversely Affect*	May Affect, Not Likely to Adversely Affect*
Hazardous Material Sites	No.	0	0	0	0	0
Relocations	No.	0	0	0	0	0
Right-of Way	Acres No. of Tracts	0.2 1	1.1 11	1.0 12	1.1 9	0 0
Right-of-Way Owned by Town	Acres No. of Tracts	0.2 1	0.9 8	0.75 7	0.7 5	0 0
Neighborhoods	No.	1 (Squire Pope)	2 (Stoney & Squire Pope)	2 (Stoney & Squire Pope)	2 (Stoney & Squire Pope)	0
Environmental Justice	No.	1 (Squire Pope)	2 (Stoney & Squire Pope)	2 (Stoney & Squire Pope)	2 (Stoney & Squire Pope)	0
Cultural Resources	No.	0	1 (Stoney TCP)	1 (Stoney TCP)	1 (Stoney TCP)	1 (Honey Horn Plantation)
Section 4(f) Resources	No.	0	1 (Stoney TCP)	1 (Stoney TCP)	2 (Stoney TCP & Park at 152 William Hilton Parkway)	0

*Anticipated finding, pending coordination with USFWS and NOAA-NMFS

Each environmental impact was ranked in order from least impactful (1) to most impactful (4) across the four different alternatives. The total of these rankings was calculated for each alternative and this was used to rank the alternatives from least impactful (1) to most impactful (4).

Table 8. Additional Environmental Impacts- Alternatives Ranking				
Resource/Category	Alternative 1	Alternative 2	Alternative 3	Alternative 4
NWI Wetlands	1	1	1	4
Streams	1	1	1	4
Floodplains	1	1	4	1
Essential Fish Habitat	1	1	1	4
Threatened & Endangered Species	1	1	1	1
Hazardous Material Sites	1	1	1	1
Relocations	1	1	1	1
Right-of-Way	2	4	4	1
Neighborhoods	2	4	4	1
Environmental Justice	2	4	4	1
Cultural Resources	1	4	4	4
Section 4(f) Resources	1	3	4	1
Total	**15**	**26**	**30**	**24**
Rank	**1**	**3**	**4**	**2**

4.0 Risk Assessment

The largest risk for implementing any alternative beyond those identified within the existing NEPA document is the additional time required to complete field investigations of new areas added, coordinate with appropriate regulatory agencies, and complete additional community outreach and engagement opportunities. Therefore, the project schedule would be delayed in order to complete these activities. In addition to time, there will be an added cost to complete these activities and update the existing NEPA document.

Alternatives 1 and 2 are not anticipated to change the cultural resources or Section 4(f) findings compared to the existing EA. However, additional outreach may be necessary within the Stoney and Squire Pope communities. Alternatives 3 and 4 may elevate the cultural resources finding from a No Adverse Effect (NAE) to Adverse Effect (AE) finding due to additional impacts to the Stoney Traditional Cultural Property (TCP). Additional Section 106 investigations and documentation would be required to determine if this

finding would be elevated or not. Alternatives 3 and 4 have additional involvement with Section 4(f) resources, which is not anticipated to be a “use.” However, additional evaluation and concurrence with appropriate agencies would be required for any changes to impacts to Section 4(f) resources. The specific risks associated with each alternative are summarized in Table 9.

Table 9: Summary of Risk Considerations for Each Alternative

Resource/Category Type		Alt. 1: Risk Considerations	Alt. 2: Risk Considerations	Alt. 3: Risk Considerations	Alt. 4: Risk Considerations
Ecological	Wetlands, Streams, Floodplains, Threatened & Endangered Species	Additional time will be necessary for field investigations of new areas added and coordination with the appropriate regulatory agencies.			
	Permits	Since no impacts to wetlands, streams, or floodplains are anticipated, no water resource permits are anticipated.		Water resource permits are anticipated due to impacts to the floodplain.	Water resource permits are anticipated due to impacts to wetlands, streams, and essential fish habitat.
Community & Social	Relocations	None			
	Right-of-Way	Risks same as noted in ecological.			None
	Neighborhoods	New impacts to Squire Pope community	Additional impacts within Stoney and new impacts to Squire Pope community. Turning limitations will bring additional traffic into neighborhood at bowtie locations.	Additional impacts within Stoney and new impacts to Squire Pope community. Echelons within Stoney creates potential barriers.	While no additional ROW acquired, the elevated bypass lane within Stoney creates a potential barrier dividing community.
		All impacts to neighborhoods require additional outreach and engagement opportunities to inform the public of project updates.			
	Environmental Justice	Risks are the same as noted in the neighborhoods section.			
	Cultural Resources	Current Section 106 finding is "Adverse Effect" for impacts to archaeological site 38BU66; no change in finding is expected. Additional project elements at Gum Tree may require consideration of Squire Pope as a TCP.	Current Section 106 finding is "Adverse Effect" for impacts to archaeological site 38BU66; additional ROW from Stoney; no change in finding is expected. Additional project elements at Gum Tree may require consideration of Squire Pope as a TCP.	Additional ROW from Stoney and elevated project elements creates visual effects, which may elevate Stoney TCP from NAE to AE finding and require a MOA amendment. Additional project elements at Gum Tree may require consideration of Squire Pope as a TCP.	Elevated project elements within Stoney TCP create visual effects, which may elevate Stoney TCP from NAE to AE finding and require a MOA amendment. New impacts to Honey Horn Plantation require consideration.
	Section 4(f) Resources	No change expected to current 4(f) findings in EA. Potential for Squire Pope to be considered a TCP. ROW required unlikely to be considered a conversion ("use").	No change expected to current 4(f) findings in EA. Potential for Squire Pope to be considered a TCP. ROW required unlikely to be considered a conversion ("use").	Additional "use" at Stoney & park at 152 WHP; likely AE at Stoney TCP may require additional 4(f) evaluations. Potential for Squire Pope to be considered a TCP. ROW required unlikely to be considered a conversion ("use").	Likely AE at Stoney TCP, when added to impacts identified in EA, may require additional 4(f) evaluations. Project elements within Honey Horn Plantation unlikely to be considered a conversion ("use").

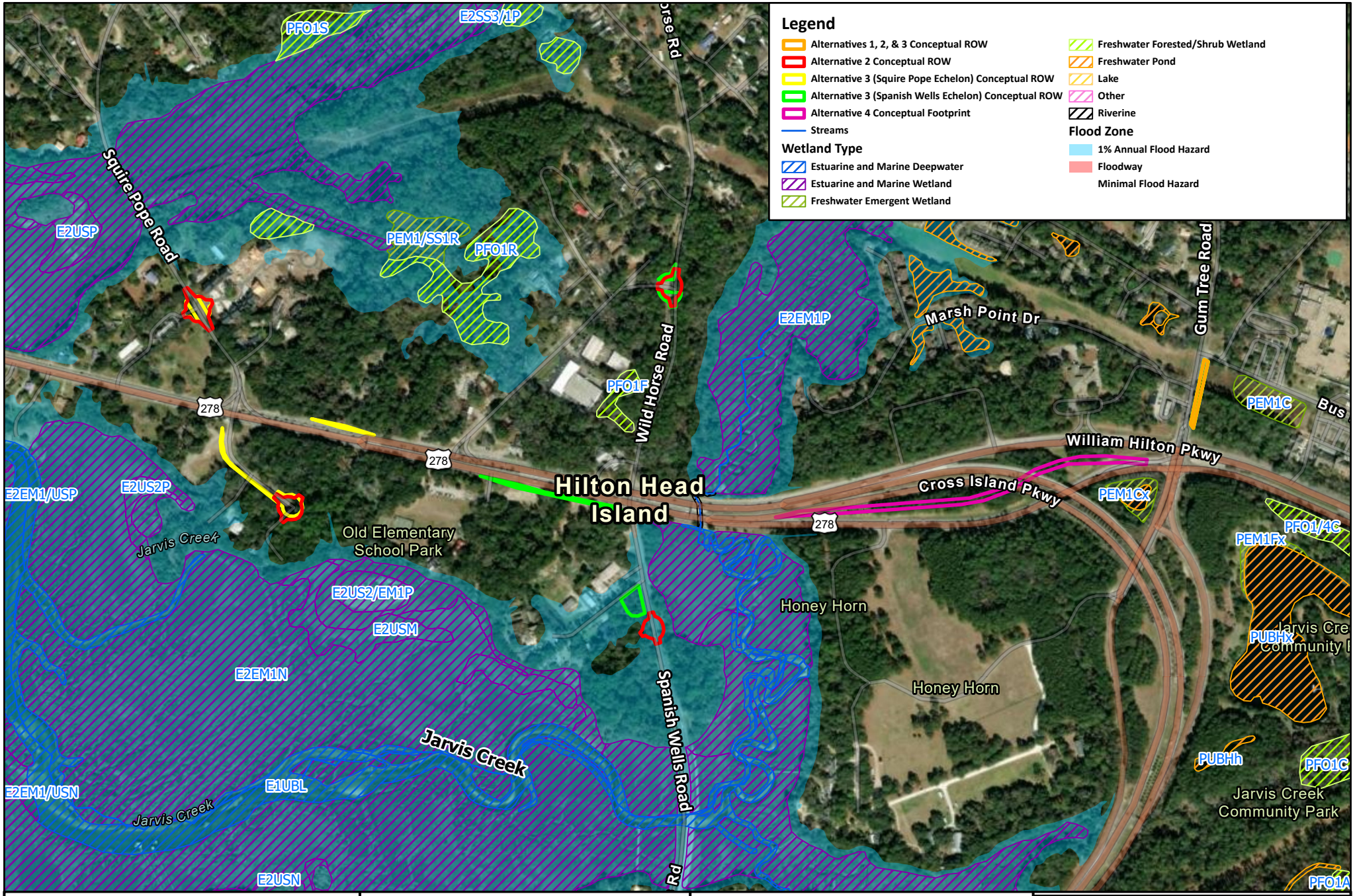
5.0 Conceptual Mitigation Strategies

For alternatives where impacts to ecological resources such as wetlands, streams, and floodplains are unavoidable, mitigation would be determined during the permitting phase of the project and in context with the overall project impacts. For alternatives where impacts to Section 106, Section 4(f), and the local communities are unavoidable, mitigation may become necessary.

Based on the risks associated with Alternative 1, additional mitigation considerations are unlikely to be required. Alternative 2 is unlikely to require mitigation for Section 106 and Section 4(f) impacts. However, mitigation measures such as traffic calming measures, inclusion of Gullah art in bowties, or the creation of a unique gateway may be necessary to address any community impacts. Alternatives 3 and 4 have higher associated risk and impacts to the surrounding communities. Mitigation strategies could include a variety of different approaches focusing on the Gullah community. This may include interpretive signage, incorporation of community art, a walking tour pamphlet, or a video documentary about the Gullah. Additionally, elements would focus on encouraging connectivity of the community on either side of U.S. 278. The specific risk level and mitigation strategies associated with each alternative are summarized in Table 10.

Table 10: Summary of Environmental Risk Levels and Potential Mitigation Strategies

Alternative		Risk Categories (related to cost and schedule implications to the NEPA process)		
		Section 106 (Cultural Resources)	Section 4(f)	Community & Social Impacts
Alt. 1 – Mod. SCDOT Rec. Preferred Alt.	Risk Considerations	Moderate	Low	Low
	Mitigation	Unlikely additional mitigation considerations would be required for this alternative.		
Alt. 2 – Bowties at Squire Pope and Spanish Wells	Risk Considerations	Moderate	Moderate	Moderate
	Mitigation	Mitigation for Section 106 and Section 4(f) unlikely. Community impacts may require mitigation. Concepts could include traffic calming measures, inclusion of Gullah art in bowties, or creation of unique gateway.		
Alt. 3 – Echelon/Center Turn Overpass	Risk Considerations	High	High	Moderate
	Mitigation	Interpretive signage about Gullah community along trails. Incorporation of Gullah art into the transportation infrastructure (crosswalks, wall murals, lighting, asphalt painting, sculptures). Walking tour pamphlet or video documentary about the Gullah. Include design elements that encourage connectivity of community on either side of U.S. 278 and traffic calming on intersecting roadways. Evaluate context sensitive design opportunities.		
Alt. 4 – Elevated Bypass	Risk Considerations	High	High	High
	Mitigation	Same as Alternative 3.		



LOCHMUELLER GROUP
3502 Woodview Trace, Suite 150
Indianapolis, IN 46268
Phone: (317) 222-3880
Fax: (317) 222-3881

Ecological Resources Map

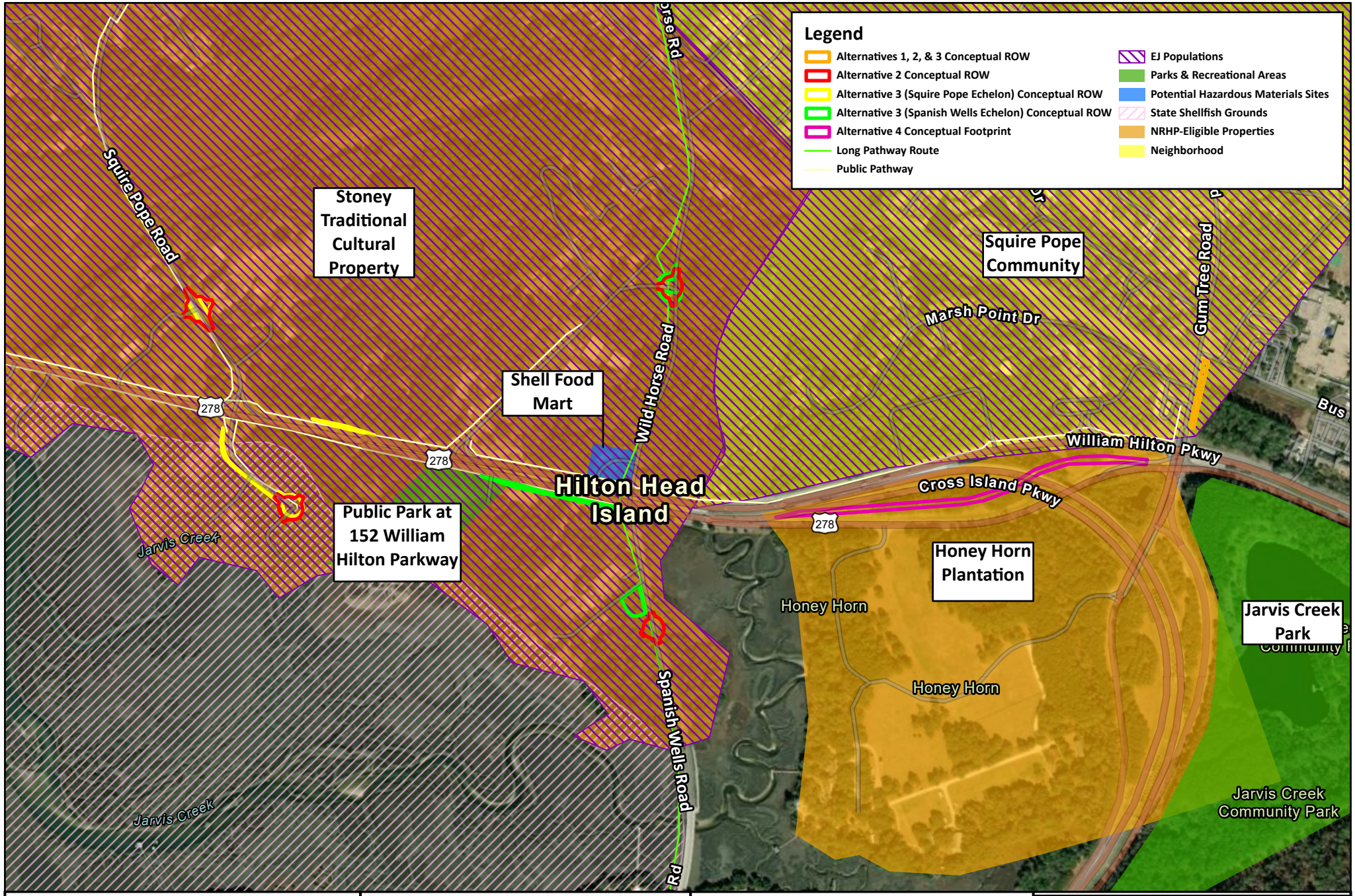
0 500 1,000 Feet

N

County: Beaufort
City: Hilton Head Island
State: South Carolina

Created: 5/3/2024, SBeaupre

Source(s): Maxar, Esri Community Maps Contributors, Town of Hilton Head Island, SC, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS



LOCHMUELLER GROUP
3502 Woodview Trace, Suite 150
Indianapolis, IN 46268
Phone: (317) 222-3880
Fax: (317) 222-3881

Community Resources Map

0 500 1,000 Feet

N

County: Beaufort
City: Hilton Head Island
State: South Carolina

Created: 4/24/2024, SBeaupre

Source(s): Maxar, Esri Community Maps Contributors, Town of Hilton Head Island, SC, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

APPENDIX K: 2045 ALTERNATIVE 2 TRAFFIC VOLUMES AND OPERATING CONDITIONS (SYNCHRO)

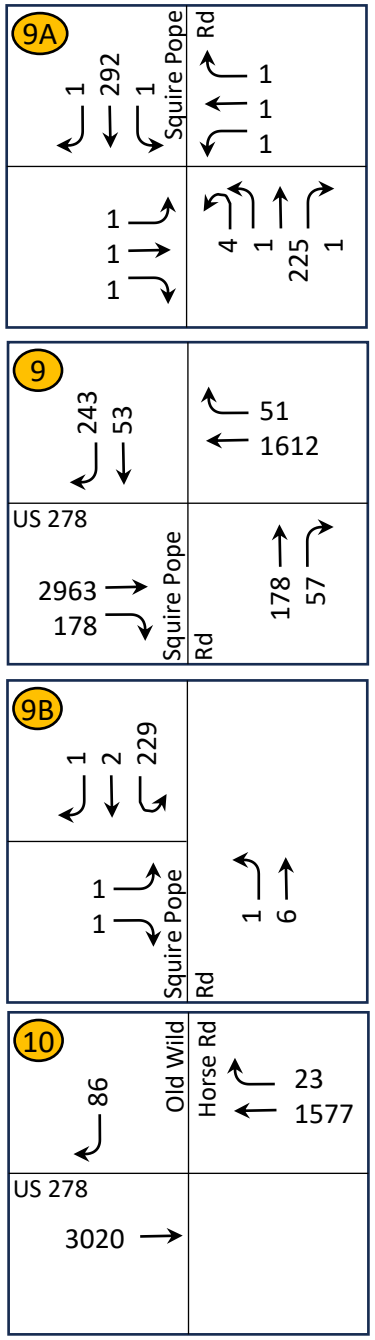
Table K-1. 2045 Alternative 2 Traffic Operating Conditions (Synchro)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (16.3)**	**B (13.6)**
Eastbound Approach	B (15.8) [394] <0.82>	B (14.7) [301] <0.65>
Westbound Approach	B (11.5) [253] <0.45>	B (11.3) [507] <0.95>
Northbound Approach	E (60.4) [277] <0.78>	D (44.0) [535] <0.94>
Southbound Approach	B (12.2) [87] <0.62>	D (51.8) [369] <0.82>
9A: Squire Pope North Bowtie (Roundabout)		
Overall Intersection	**A (4.5)**	**A (5.5)**
Eastbound Approach	A (3.7) [<25]	A (4.4) [<25]
Westbound Approach	A (3.4) [<25]	A (3.9) [<25]
Northbound Approach	A (4.2) [25]	A (5.1) [25]
Southbound Approach	A (4.7) [25]	A (5.9) [50]
9B: Chamberlin Dr South Bowtie (Roundabout)		
Overall Intersection	**A (4.2)**	**A (4.9)**
Eastbound Approach	A (3.4) [<25]	A (3.8) [<25]
Northbound Approach	A (3.5) [<25]	A (4.0) [<25]
Southbound Approach	A (4.2) [25]	A (5.0) [25]
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (17.0) [80] <0.36>	F (51.5) [33] <0.20>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (23.7)**	**C (21.2)**
Eastbound Approach	C (23.8) [519] <0.87>	B (15.5) [348] <0.69>
Westbound Approach	A (5.7) [118] <0.39>	B (16.9) [357] <0.94>
Northbound Approach	D (54.4) [486] <0.88>	E (58.9) [560] <0.94>
Southbound Approach	D (42.8) [369] <0.79>	C (29.4) [245] <0.81>
11A: Wild Horse Rd North Bowtie (Roundabout)		
Overall Intersection	**A (6.1)**	**A (6.6)**
Eastbound Approach	A (4.4) [<25]	A (4.7) [<25]
Northbound Approach	A (6.3) [50]	A (6.8) [50]
Southbound Approach	A (5.7) [25]	A (6.1) [25]

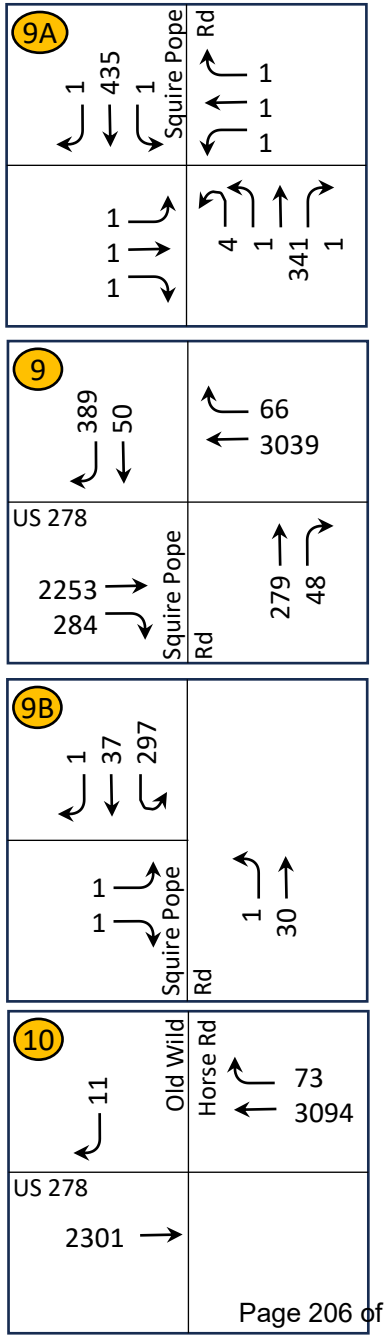
Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
11B: Spanish Wells Rd South Bowtie (Roundabout)		
Overall Intersection	**A (7.2)**	**A (6.2)**
Eastbound Approach	A (4.7) [<25]	A (4.0) [<25]
Northbound Approach	A (7.9) [50]	A (6.9) [50]
Southbound Approach	A (6.6) [50]	A (5.4) [25]
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (35.1)**	**D (36.5)**
Eastbound Approach	D (40.2) [465] <0.88>	C (29.7) [360] <0.93>
Westbound Approach	B (19.4) [314] <0.41>	D (32.9) [455] <0.97>
Northbound Approach	C (32.2) [208] <0.75>	D (44.2) [341] <0.93>
Southbound Approach	E (57.8) [244] <0.86>	E (57.9) [275] <0.90>

2045 Alternative 2. Bowties at Spanish Wells and Squire Pope Traffic Volumes

AM Peak Hour Volumes

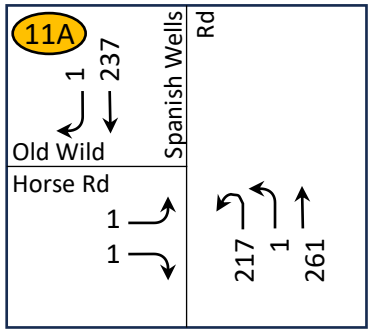


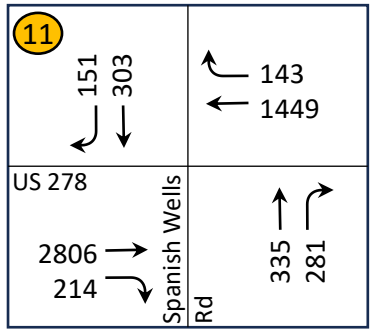
PM Peak Hour Volumes

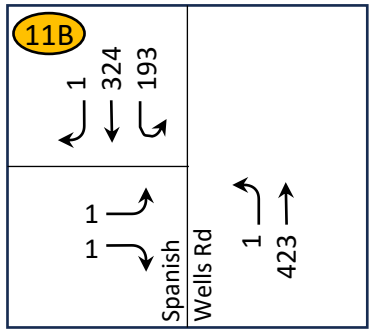


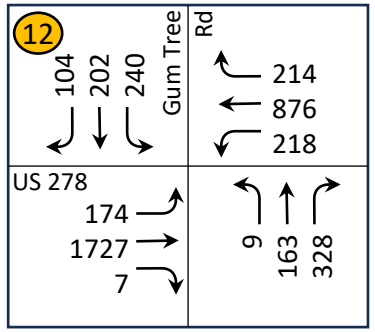
2045 Alternative 2. Bowties at Spanish Wells and Squire Pope Traffic Volumes

AM Peak Hour Volumes

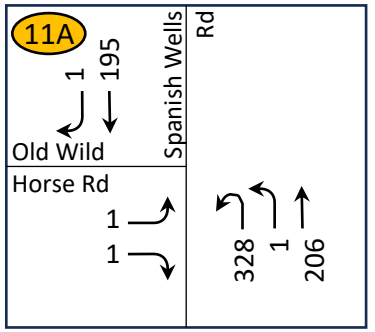


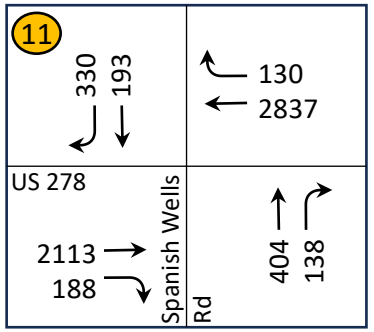


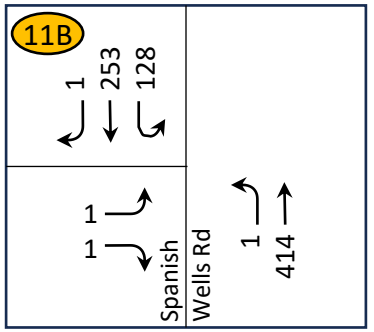


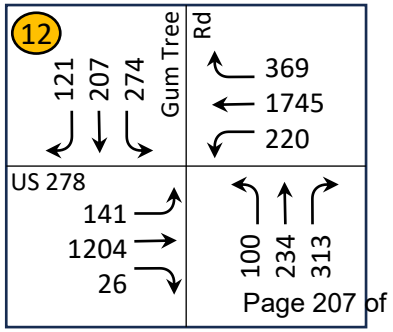


PM Peak Hour Volumes









APPENDIX L: 2045 ALTERNATIVE 3 TRAFFIC VOLUMES AND OPERATING CONDITIONS (SYNCHRO)

Table L-1. 2045 Alternative 3 Traffic Operating Conditions – Echelon at Spanish Wells (Synchro)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (11.2)**	**C (20.4)**
Eastbound Approach	B (12.4) [236] <0.75>	C (24.4) [478] <0.89>
Westbound Approach	A (7.7) [159] <0.48>	B (15.5) [332] <0.94>
Northbound Approach	D (41.3) [29] <0.03>	E (62.3) [77] <0.28>
Southbound Approach	B (16.7) [102] <0.57>	C (26.9) [274] <0.83>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (4.2) [37] <0.36>	A (4.8) [<25] <0.17>
11A: Wild Horse Rd & William Hilton Pkwy (signal) - Echelon		
Overall Intersection	**B (10.8)**	**B (12.8)**
Westbound Approach	A (7.2) [134] <0.38>	B (11.5) [249] <0.82>
Southbound Approach	C (34.5) [138] <0.58>	C (32.8) [131] <0.53>
11B: Spanish Wells Rd & William Hilton Pkwy (signal) - Echelon		
Overall Intersection	**B (18.3)**	**B (12.4)**
Eastbound Approach	B (17.3) [474] <0.95>	A (9.4) [288] <0.75>
Northbound Approach	C (28.1) [147] <0.72>	C (29.1) [233] <0.77>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (44.6)**	**D (44.2)**
Eastbound Approach	D (53.1) [449] <0.88>	D (42.5) [406] <0.93>
Westbound Approach	C (30.0) [479] <0.38>	D (42.1) [824] <0.97>
Northbound Approach	C (33.3) [213] <0.75>	D (46.0) [356] <0.93>
Southbound Approach	E (59.5) [239] <0.86>	D (54.4) [274] <0.90>

Table L-2. 2045 Alternative 3 Traffic Operating Conditions - Echelon at Squire Pope (Synchro)

Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9A: Squire Pope Rd & William Hilton Pkwy (signal) - Echelon		
Overall Intersection	**A (3.6)**	**C (35.0)**
Westbound Approach	A (2.2) [57] <0.51>	A (8.4) [258] <0.95>
Southbound Approach	B (6.6) [156] <0.62>	F (250.5) [858] <1.02>
9B: Chamberlin Dr & William Hilton Pkwy (signal) - Echelon		
Overall Intersection	**C (25.9)**	**A (4.6)**
Eastbound Approach	C (25.9) [263] <0.66>	A (4.1) [167] <0.54>
Northbound Approach	C (26.9) [151] <0.05>	D (37.9) [66] <0.19>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (17.6) [85] <0.36>	B (12.7) [<25] <0.17>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (35.5)**	**D (39.6)**
Eastbound Approach	D (45.0) [906] <0.99>	B (17.4) [369] <0.67>
Westbound Approach	B (11.8) [168] <0.69>	D (52.5) [984] <0.93>
Northbound Approach	D (43.2) [167] <0.51>	E (67.8) [239] <0.90>
Southbound Approach	E (61.3) [214] <0.98>	D (47.1) [166] <0.37>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (35.5)**	**D (42.4)**
Eastbound Approach	D (44.9) [464] <0.87>	D (35.6) [399] <0.87>
Westbound Approach	B (17.1) [204] <0.41>	D (42.8) [801] <0.83>
Northbound Approach	C (28.7) [202] <0.75>	D (43.3) [364] <0.89>
Southbound Approach	D (52.7) [230] <0.77>	E (55.1) [260] <0.77>

Table L-3. 2045 Alternative 3 Traffic Operating Conditions - Center Turn Overpass at Spanish Wells

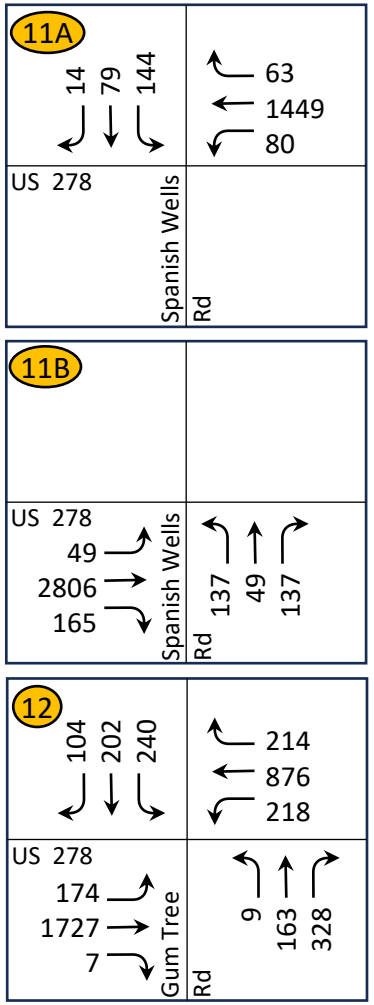
Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (12.6)**	**C (26.8)**
Eastbound Approach	B (11.4) [210] <0.75>	D (39.0) [620] <0.81>
Westbound Approach	B (14.5) [306] <0.48>	B (16.3) [456] <0.96>
Northbound Approach	D (49.0) [<25] <0.07>	E (63.9) [64] <0.26>
Southbound Approach	B (14.7) [99] <0.58>	C (24.5) [292] <0.77>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	B (13.6) [78] <0.36>	E (46.6) [36] <0.20>
11A: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (12.9)**	**A (8.8)**
Eastbound Approach	B (13.8) [346] <0.87>	A (8.6) [271] <0.62>
Westbound Approach	A (5.9) [139] <0.64>	A (5.7) [135] <0.75>
Northbound Approach	C (32.4) [209] <0.81>	C (34.6) [146] <0.62>
Southbound Approach	E (59.8) [146] <0.51>	E (56.6) [186] <0.69>
11B: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal) – Center Turn Overpass		
Overall Intersection	**B (19.1)**	**B (17.9)**
Eastbound Approach	B (16.3) [58] <0.07>	B (12.2) [55] <0.08>
Northbound Approach	C (20.1) [102] <0.22>	B (19.2) [176] <0.46>
Southbound Approach	B (18.8) [32] <0.02>	B (16.9) [68] <0.11>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (36.7)**	**D (35.4)**
Eastbound Approach	D (48.2) [465] <0.87>	C (31.9) [347] <0.93>
Westbound Approach	B (17.1) [337] <0.41>	C (30.9) [571] <0.97>
Northbound Approach	C (28.6) [203] <0.75>	D (37.4) [286] <0.93>
Southbound Approach	D (51.2) [234] <0.77>	E (58.8) [249] <0.90>

Table L-4. 2045 Alternative 3 Traffic Operating Conditions - Center Turn Overpass at Squire Pope (Synchro)

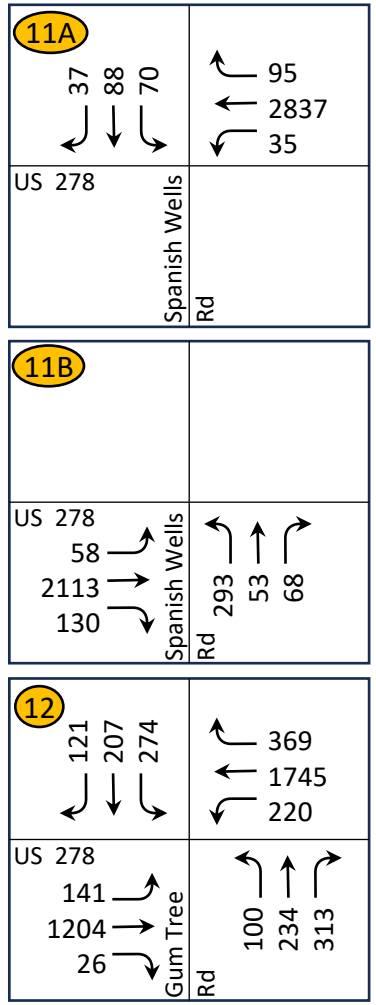
Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9A: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**A (3.2)**	**A (9.3)**
Eastbound Approach	A (3.5) [40] <0.78>	A (4.8) [139] <0.64>
Westbound Approach	A (2.0) [42] <0.43>	A (7.4) [234] <0.93>
Northbound Approach	D (37.3) [21] <0.05>	E (68.1) [67] <0.11>
Southbound Approach	A (6.1) [149] <0.77>	D (48.3) [387] <0.89>
9B: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal) – Center Turn Overpass		
Overall Intersection	**B (17.2)**	**B (10.0)**
Eastbound Approach	B (15.9) [108] <0.21>	A (3.9) [70] <0.65>
Westbound Approach	B (10.6) [<25] <0.00>	A (4.1) [<25] <0.95>
Northbound Approach	B (18.8) [<25] <0.00>	E (56.2) [<25] <0.94>
Southbound Approach	C (21.8) [64] <0.10>	D (40.9) [77] <0.82>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	C (17.4) [77] <0.36>	E (42.4) [29] <0.20>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (32.4)**	**C (31.3)**
Eastbound Approach	D (39.0) [771] <0.98>	B (17.6) [369] <0.68>
Westbound Approach	B (12.6) [149] <0.91>	C (22.1) [446] <0.99>
Northbound Approach	D (44.0) [162] <0.64>	F (157.4) [766] <1.28>
Southbound Approach	E (62.8) [220] <0.82>	E (57.9) [152] <0.85>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (35.8)**	**D (36.4)**
Eastbound Approach	D (45.7) [473] <0.87>	C (32.5) [387] <0.93>
Westbound Approach	B (17.4) [263] <0.41>	C (33.5) [651] <0.97>
Northbound Approach	C (28.3) [199] <0.75>	D (36.4) [277] <0.93>
Southbound Approach	D (52.7) [228] <0.77>	E (56.5) [262] <0.90>

2045 Alternative 3. Echelon at Spanish Wells Traffic Volumes

AM Peak Hour Volumes

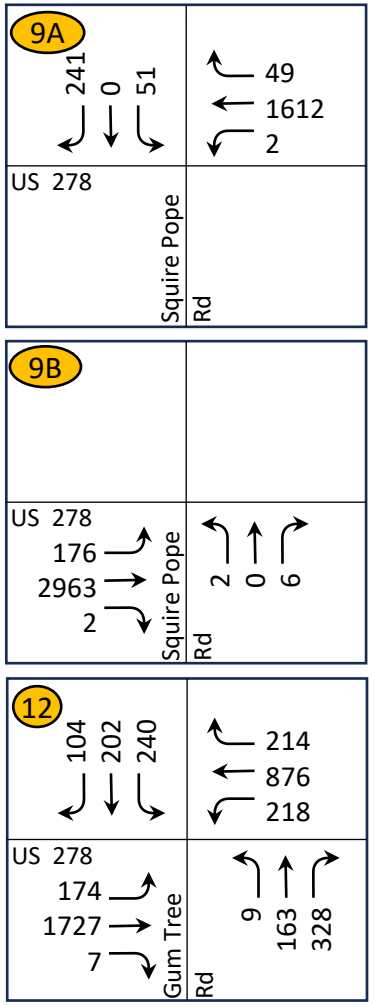


PM Peak Hour Volumes

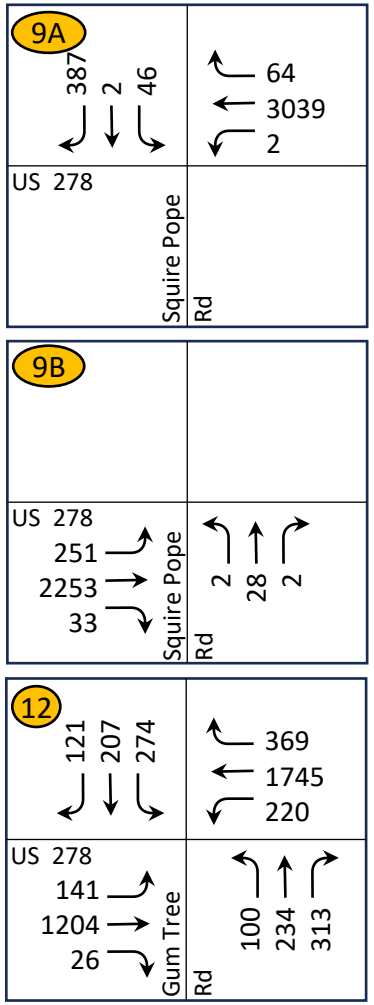


2045 Alternative 3. Echelon at Squire Pope Traffic Volumes

AM Peak Hour Volumes

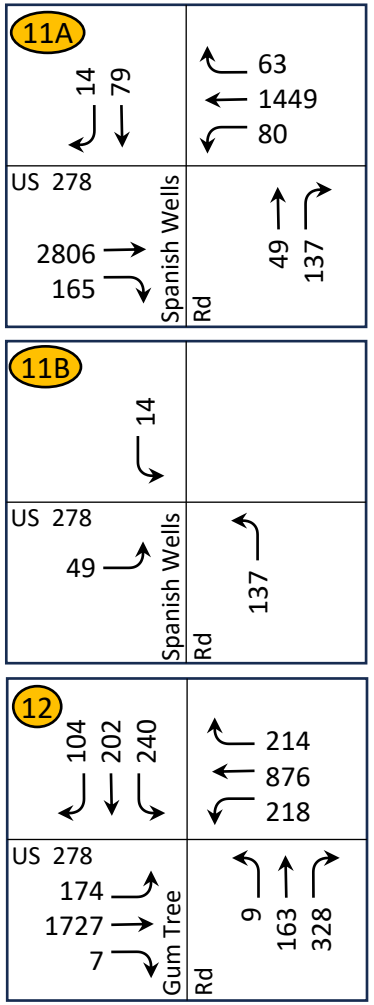


PM Peak Hour Volumes

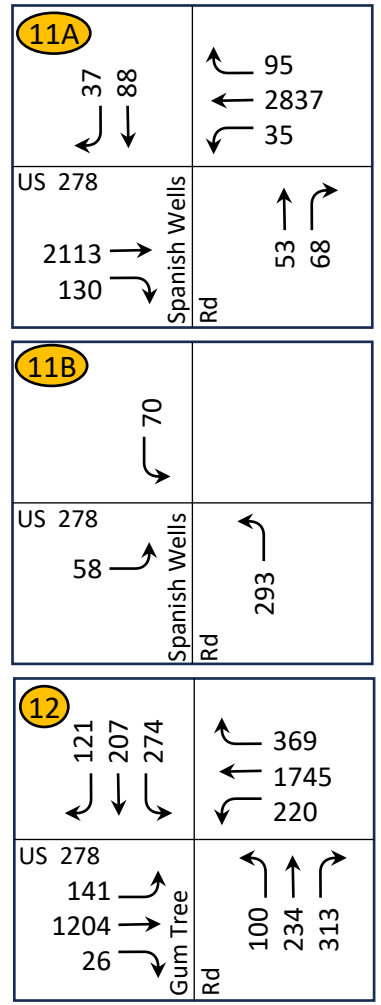


2045 Alternative 3. Center Turn Overpass at Spanish Wells Traffic Volumes

AM Peak Hour Volumes

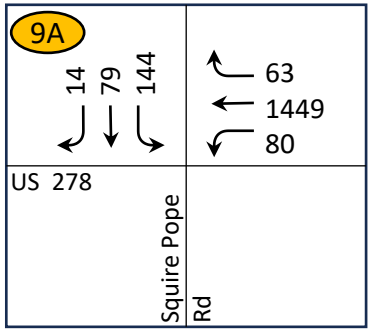


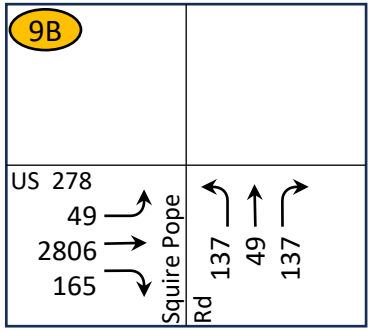
PM Peak Hour Volumes

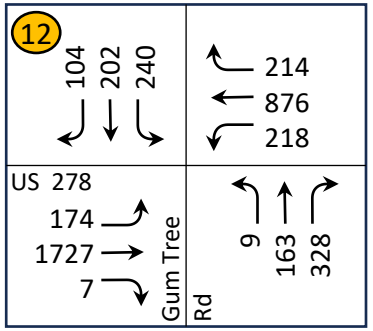


2045 Alternative 3. Center Turn Overpass at Squire Pope Traffic Volumes

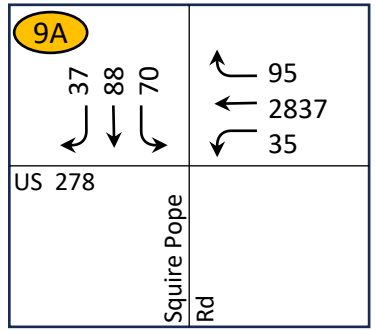
AM Peak Hour Volumes

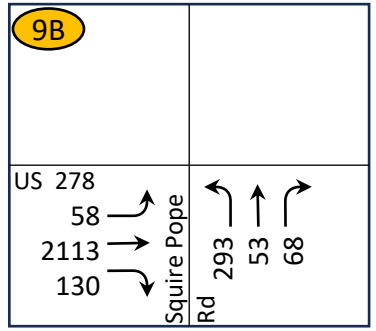


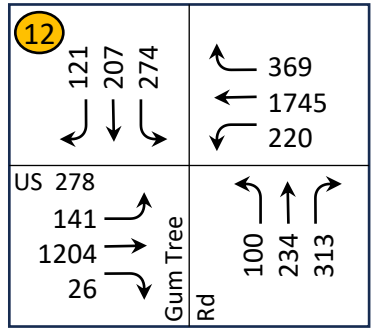




PM Peak Hour Volumes







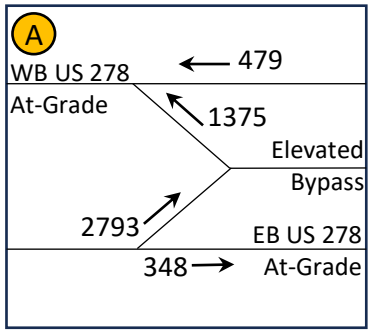
APPENDIX M: 2045 ALTERNATIVE 4 TRAFFIC VOLUMES AND OPERATING CONDITIONS (SYNCHRO)

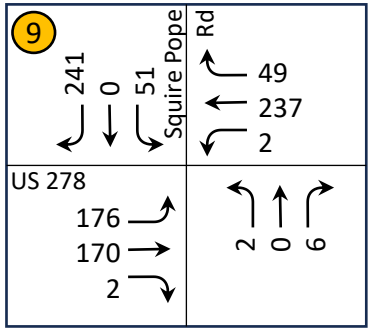
Table M-1. 2045 Alternative 4 Traffic Operating Conditions (Synchro)

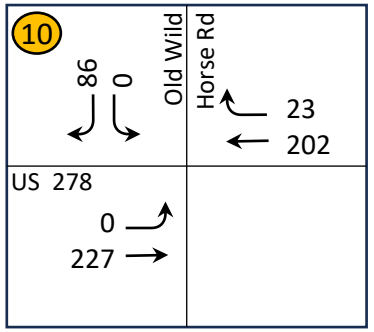
Intersection & Movements	LOS (Delay, sec) [95th Queue Length, ft] <v/c ratio>	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**A (7.5)**	**A (9.6)**
Eastbound Approach	A (4.1) [71] <0.23>	A (4.7) [75] <0.42>
Westbound Approach	A (6.5) [75] <0.27>	A (6.5) [120] <0.46>
Northbound Approach	A (6.7) [<25] <0.01>	C (31.8) [38] <0.19>
Southbound Approach	B (12.6) [58] <0.52>	B (16.1) [103] <0.74>
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	B (3.3) [<25] <0.11>	B (11.9) [<25] <0.02>
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (28.1)**	**C (27.9)**
Eastbound Approach	B (13.2) [63] <0.43>	B (15.0) [71] <0.44>
Westbound Approach	C (24.6) [100] <0.60>	B (13.2) [55] <0.32>
Northbound Approach	C (27.0) [102] <0.65>	D (39.6) [132] <0.78>
Southbound Approach	D (47.1) [161] <0.75>	D (46.5) [136] <0.73>
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (26.0)**	**C (28.5)**
Eastbound Approach	B (17.1) [115] <0.25>	C (29.9) [142] <0.28>
Westbound Approach	B (10.9) [142] <0.33>	B (17.3) [205] <0.54>
Northbound Approach	C (30.4) [212] <0.70>	C (33.6) [266] <0.81>
Southbound Approach	D (42.9) [250] <0.80>	C (34.1) [211] <0.83>

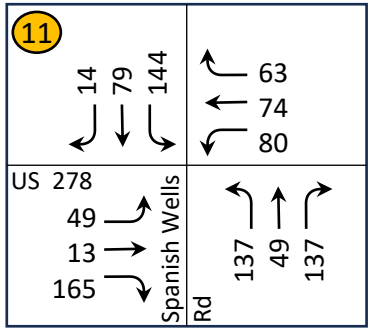
2045 Alternative 4. Elevated Bypass

AM Peak Hour Volumes

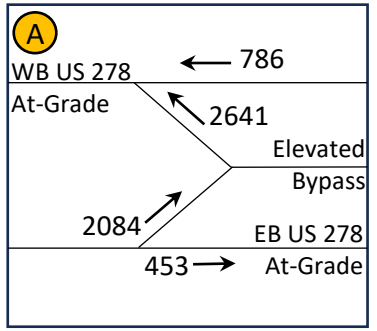


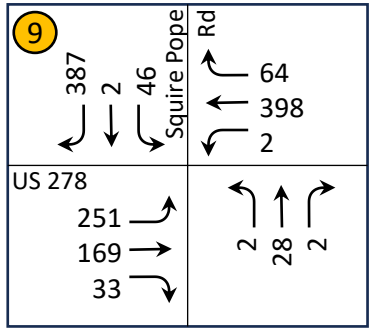


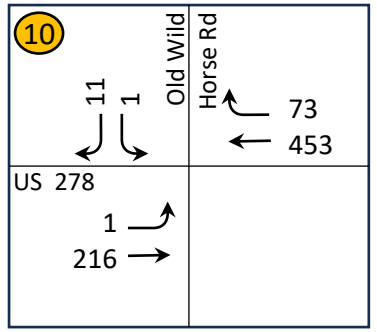


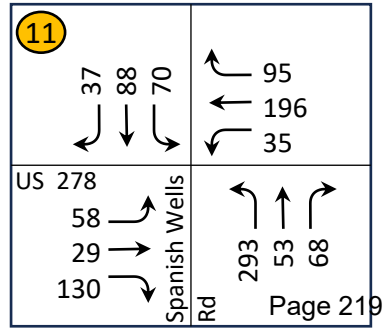


PM Peak Hour Volumes



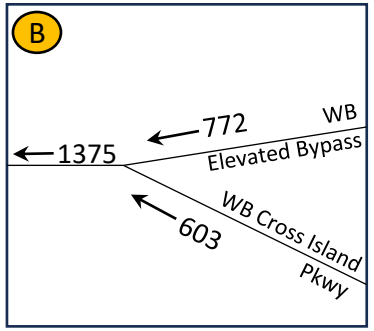


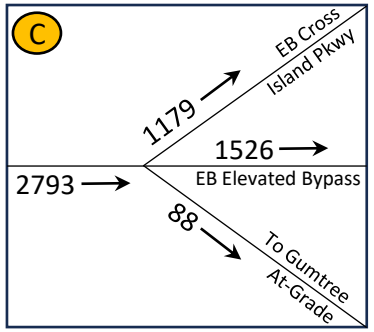


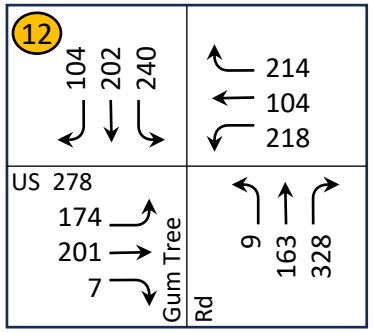


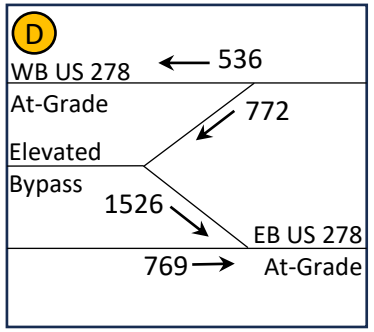
2045 Alternative 4. Elevated Bypass

AM Peak Hour Volumes

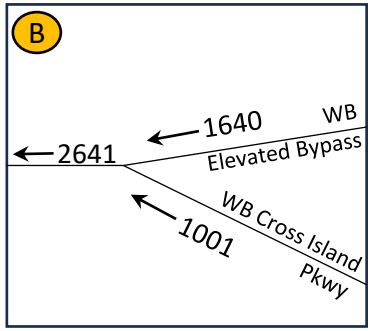


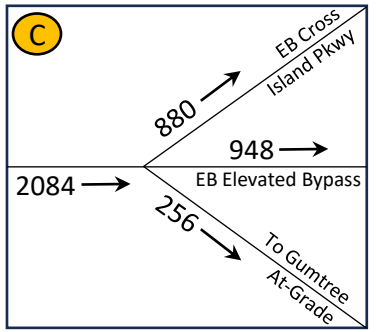


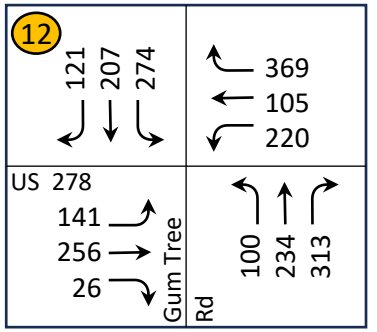


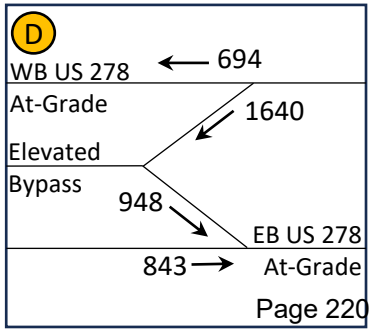


PM Peak Hour Volumes









APPENDIX N: 2045 MODIFIED ALTERNATIVE 1 OPERATING CONDITIONS (VISSIM)

Table N-1. 2045 Modified Alternative 1 Operating Conditions (VISSIM)

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (17.0)**	**B (17.3)**
Eastbound Approach	B (19.6) [63] {351}	C (20.4) [50] {242}
Westbound Approach	B (12.9) [<25] {188}	B (16.0) [51] {406}
Northbound Approach	B (14.3) [<25] {74}	B (14.2) [<25] {52}
Southbound Approach	A (6.6) [<25] {57}	A (9.6) [<25] {91}
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**B (15.8)**	**B (19.7)**
Eastbound Approach	B (14.6) [59] {389}	B (15.2) [51] {313}
Westbound Approach	B (15.7) [41] {286}	C (21.5) [127] {700}
Northbound Approach	B (20.0) [<25] {159}	D (37.5) [<25] {104}
Southbound Approach	C (22.8) [<25] {84}	C (26.3) [<25] {116}
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (8.0) [<25] {<25}	C (17.1) [<25] {50}
Westbound Left Turn	A (8.7) [<25] {<25}	A (8.3) [<25] {46}
Northbound Approach	B (11.3) [<25] {65}	B (10.7) [<25] {66}
Southbound Approach	A (8.6) [<25] {79}	B (10.5) [<25] {80}
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	C (16.7) [<25] {<25}	C (15.6) [<25] {32}
Northbound Approach	B (13.3) [<25] {37}	B (12.1) [<25] {43}
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Northbound Right-Turn	A (7.7) [<25] {<25}	A (6.4) [<25] {<25}
Southbound Right-Turn	No volumes observed	C (16.2) [<25] {25}
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**A (9.5)**	**A (7.3)**
Eastbound Approach	A (8.9) [80] {818}	A (9.2) [58] {581}
Westbound Approach	A (8.6) [36] {330}	A (3.3) [31] {188}
Northbound Approach	D (42.5) [<25] {124}	E (58.1) [61] {244}
Southbound Approach	D (50.9) [<25] {92}	D (44.9) [<25] {101}
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
Overall Intersection	**A (8.4)**	**B (11.8)**
Eastbound Approach	A (7.0) [102] {697}	B (11.3) [124] {484}
Westbound Approach	A (8.2) [28] {237}	A (5.8) [36] {524}
Northbound Approach	C (30.4) [<25] {56}	E (67.0) [<25] {109}
Southbound Approach	C (22.6) [<25] {170}	D (51.1) [128] {521}
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (4.7) [<25] {56}	B (12.5) [<25] {32}
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (16.6)**	**C (23.8)**
Eastbound Approach	B (11.0) [106] {998}	C (27.9) [198] {861}
Westbound Approach	B (11.2) [56] {248}	B (11.9) [84] {779}
Northbound Approach	D (48.6) [45] {135}	E (65.2) [77] {196}
Southbound Approach	E (75.9) [74] {292}	E (60.6) [49] {197}
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**D (37.1)**	**D (43.8)**
Eastbound Approach	C (33.4) [164] {682}	E (57.1) [184] {562}
Westbound Approach	D (40.8) [130] {369}	D (35.4) [236] {786}
Northbound Approach	C (26.6) [61] {264}	D (37.3) [98] {327}
Southbound Approach	D (50.2) [93] {302}	D (52.7) [119] {453}
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (26.7)**	**B (18.8)**
Eastbound Approach	C (25.4) [439] {1480}	B (16.3) [103] {735}
Westbound Approach	C (21.6) [101] {686}	B (18.2) [295] {1202}
Northbound Approach	E (68.6) [43] {170}	F (87.6) [56] {191}
Southbound Approach	D (39.1) [66] {228}	B (19.2) [29] {112}
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**C (23.1)**	**C (24.5)**
Eastbound Approach	B (18.9) [403] {1224}	B (17.2) [128] {910}
Westbound Approach	C (20.9) [75] {532}	C (21.6) [171] {903}
Northbound Approach	D (53.1) [71] {257}	E (60.1) [92] {299}
Southbound Approach	C (30.4) [<25] {89}	D (40.3) [<25] {111}
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (7.1) [<25] {<25}	C (19.3) [<25] {25}
Westbound Left Turn	C (24.1) [<25] {26}	A (9.5) [<25] {<25}
Northbound Right Turn	C (16.5) [<25] {27}	B (13.9) [<25] {32}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
Southbound Right Turn	B (12.5) [<25] {45}	C (18.3) [<25] {38}
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	A (9.5) [<25] {28}	A (7.8) [<25] {63}
Southbound Right Turn	B (11.3) [<25] {36}	C (22.9) [<25] {41}
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**C (25.1)**	**D (36.1)**
Eastbound Approach	C (21.1) [134] {846}	C (33.6) [128] {751}
Westbound Approach	B (17.3) [53] {359}	C (28.0) [207] {887}
Northbound Approach	E (56.6) [33] {114}	E (66.9) [65] {268}
Southbound Approach	D (47.7) [56] {192}	E (57.6) [77] {264}
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	B (11.4) [<25] {45}	B (10.9) [<25] {69}
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (4.5) [<25] {63}	A (2.4) [<25] {70}
Southbound Left Turn	A (6.1) [<25] {85}	A (8.7) [<25] {127}
Southbound Right Turn	A (9.0) [<25] {51}	B (12.2) [<25] {94}
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (1.6) [<25] {49}	A (1.5) [<25] {<25}
Northbound Left Turn	B (12.1) [<25] {76}	D (27.7) [44] {227}
Northbound Right Turn	A (6.1) [<25] {101}	A (7.5) [61] {252}
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	E (47.6) [<25] {40}
Eastbound Right Turn	D (29.7) [<25] {41}	C (17.8) [<25] {38}
Northbound Left Turn	F (91.9) [<25] {60}	A (8.1) [<25] {26}
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**C (33.0)**	**B (19.9)**
Eastbound Approach	E (63.8) [98] {338}	C (30.6) [40] {184}
Westbound Approach	C (21.9) [26] {112}	C (28.0) [79] {328}
Northbound Approach	B (16.9) [50] {314}	B (16.6) [99] {607}
Southbound Approach	D (36.4) [840] {1658}	B (19.2) [120] {745}
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	F (303.0) [78] {175}	D (25.2) [<25] {54}
Southbound Left Turn	C (19.7) [494] {946}	B (13.6) [<25] {26}
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	F (163.9) [109] {214}	C (17.9) [<25] {59}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
Southbound Left Turn	B (10.5) [233] {419}	A (9.9) [<25] {<25}
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	F (207.8) [89] {174}	E (45.5) [<25] {40}
Westbound Right Turn	F (70.2) [118] {207}	B (13.0) [<25] {74}
Southbound Left Turn	D (30.8) [1399] {1658}	B (14.3) [<25] {28}
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	F (2,462.0) [73] {88}	E (35.5) [<25] {39}
Westbound Right Turn	B (13.2) [109] {125}	B (12.9) [<25] {76}
Southbound Left Turn	C (22.2) [380] {493}	B (11.6) [<25] {28}
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**C (29.0)**	**B (19.0)**
Eastbound Approach	D (36.9) [1380] {1512}	B (15.9) [142] {823}
Westbound Approach	B (12.9) [39] {249}	B (15.8) [85] {539}
Northbound Approach	C (26.6) [<25] {105}	D (39.5) [65] {263}
Southbound Approach	D (35.7) [34] {151}	C (25.5) [37] {140}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	F (1,033.8) [80] {183}	F (101.3) [<25] {99}
Westbound Right Turn	F (91.9) [109] {217}	B (13.3) [35] {134}
Southbound Left Turn	C (22.0) [278] {513}	B (13.7) [29] {465}
29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, Roundabout)		
Overall Intersection	**F (53.4)**	**F (79.2)**
Eastbound Approach	F (314.9) [809] {838}	F (179.8) [805] {838}
Westbound Approach	B (14.0) [56] {420}	F (189.7) [1644] {1658}
Northbound Approach	A (4.1) [<25] {209}	F (52.9) [463] {788}
Southbound Approach	C (18.5) [307] {461}	A (9.1) [111] {460}

APPENDIX O: 2045 LOCAL INTERSECTIONS OPERATING CONDITIONS (VISSIM)

Table O-1. 2045 Operating Conditions - Option A (VISSIM)

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (17.7)**	**B (18.3)**
Eastbound Approach	C (20.5) [68] {351}	C (22.5) [56] {252}
Westbound Approach	B (13.5) [<25] {175}	B (16.2) [53] {398}
Northbound Approach	B (14.4) [<25] {66}	B (14.2) [<25] {52}
Southbound Approach	A (6.7) [<25] {59}	B (11.1) [<25] {118}
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**B (16.1)**	**C (20.7)**
Eastbound Approach	B (14.8) [60] {402}	B (15.0) [50] {322}
Westbound Approach	B (16.1) [42] {311}	C (23.2) [148] {752}
Northbound Approach	C (20.5) [<25] {154}	D (37.9) [<25] {103}
Southbound Approach	C (24.6) [<25] {99}	C (28.9) [25] {179}
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (7.9) [<25] {<25}	C (22.7) [<25] {58}
Westbound Left Turn	B (11.4) [<25] {<25}	A (8.3) [<25] {41}
Northbound Approach	B (11.2) [<25] {67}	B (10.1) [<25] {64}
Southbound Approach	A (8.6) [<25] {79}	A (9.7) [<25] {81}
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	C (18.2) [<25] {<25}	B (15.6) [<25] {38}
Northbound Approach	B (12.6) [<25] {39}	B (13.4) [<25] {43}
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Northbound Right-Turn	B (11.8) [<25] {<25}	A (6.6) [<25] {<25}
Southbound Right-Turn	No volumes observed	C (22.4) [<25] {37}
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**A (8.8)**	**A (7.3)**
Eastbound Approach	A (8.8) [79] {777}	A (9.2) [59] {558}
Westbound Approach	A (7.1) [28] {282}	A (3.3) [35] {400}
Northbound Approach	D (42.2) [<25] {124}	E (57.9) [61] {244}
Southbound Approach	D (51.0) [<25] {92}	D (43.7) [<25] {101}
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**A (9.4)**	**B (11.8)**
Eastbound Approach	A (6.9) [100] {676}	B (11.0) [117] {489}
Westbound Approach	B (11.7) [41] {263}	A (6.2) [40] {552}
Northbound Approach	C (30.8) [<25] {56}	E (67.0) [<25] {109}
Southbound Approach	C (22.3) [<25] {171}	D (52.3) [132] {518}
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (4.6) [<25] {50}	B (11.2) [<25] {32}
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (16.6)**	**C (26.4)**
Eastbound Approach	B (11.2) [109] {990}	C (28.2) [206] {845}
Westbound Approach	B (11.2) [56] {207}	B (17.1) [113] {525}
Northbound Approach	D (48.4) [45] {140}	E (65.2) [77] {196}
Southbound Approach	E (76.0) [74] {292}	E (60.6) [49] {197}
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (31.5)**	**D (37.2)**
Eastbound Approach	C (31.3) [168] {705}	E (58.2) [187] {559}
Westbound Approach	C (24.2) [90] {261}	B (19.9) [126] {651}
Northbound Approach	C (32.4) [89] {305}	D (41.2) [143] {359}
Southbound Approach	D (48.6) [91] {306}	D (51.9) [117] {428}
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (15.5)**	**B (15.4)**
Eastbound Approach	A (9.0) [48] {424}	A (9.8) [51] {410}
Westbound Approach	B (13.8) [62] {635}	B (16.8) [156] {1076}
Northbound Approach	E (74.8) [46] {179}	F (81.9) [53] {189}
Southbound Approach	D (40.7) [72] {233}	B (20.0) [31] {115}
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**B (19.2)**	**C (20.8)**
Eastbound Approach	A (7.8) [80] {962}	A (7.9) [36] {439}
Westbound Approach	C (24.4) [115] {629}	C (21.8) [286] {937}
Northbound Approach	E (68.3) [84] {267}	E (60.7) [85] {301}
Southbound Approach	D (39.1) [27] {119}	D (48.3) [37] {137}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (9.9) [<25] {<25}	B (15.7) [<25] {<25}
Westbound Left Turn	C (21.8) [<25] {<25}	B (16.9) [<25] {<25}
Northbound Right Turn	C (17.9) [<25] {27}	B (13.4) [<25] {32}
Southbound Right Turn	B (12.5) [<25] {44}	B (19.3) [<25] {41}
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	A (7.7) [<25] {<25}	A (7.0) [<25] {64}
Southbound Right Turn	B (11.4) [<25] {37}	B (15.8) [<25] {35}
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**B (17.8)**	**C (30.5)**
Eastbound Approach	A (6.8) [<25] {324}	C (20.9) [133] {467}
Westbound Approach	B (14.7) [43] {349}	C (26.5) [192] {872}
Northbound Approach	E (58.4) [34] {122}	E (58.3) [53] {208}
Southbound Approach	D (53.3) [64] {223}	E (58.5) [79] {274}
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	B (11.9) [<25] {45}	B (10.8) [<25] {71}
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (4.5) [<25] {62}	A (2.4) [<25] {66}
Southbound Left Turn	A (6.1) [<25] {89}	A (8.6) [<25] {136}
Southbound Right Turn	A (9.8) [<25] {55}	B (12.3) [<25] {103}
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (1.6) [<25] {51}	A (1.7) [<25] {<25}
Northbound Left Turn	B (12.0) [<25] {70}	D (36.9) [74] {316}
Northbound Right Turn	A (6.1) [<25] {95}	A (8.9) [93] {340}
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	D (52.2) [<25] {40}
Eastbound Right Turn	C (20.7) [<25] {26}	B (15.5) [<25] {37}
Northbound Left Turn	B (10.5) [<25] {<25}	A (9.7) [<25] {43}
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (14.2)**	**B (17.9)**
Eastbound Approach	D (36.7) [60] {211}	C (33.7) [43] {179}
Westbound Approach	B (19.7) [27] {104}	C (27.6) [71] {335}
Northbound Approach	A (10.0) [33] {213}	B (12.1) [91] {658}
Southbound Approach	B (12.1) [128] {940}	B (19.5) [110] {696}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	C (17.5) [<25] {53}	C (23.5) [<25] {53}
Southbound Left Turn	A (4.3) [<25] {28}	B (19.4) [<25] {<25}
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	C (17.3) [<25] {53}	C (22.2) [<25] {61}
Southbound Left Turn	A (4.5) [<25] {55}	B (15.1) [<25] {<25}
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	E (37.4) [<25] {33}	D (54.7) [<25] {44}
Westbound Right Turn	A (9.4) [<25] {66}	B (14.1) [<25] {78}
Southbound Left Turn	A (4.3) [<25] {45}	B (17.3) [<25] {26}
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	E (37.2) [<25] {35}	D (44.7) [<25] {42}
Westbound Right Turn	A (8.5) [<25] {72}	B (14.9) [<25] {78}
Southbound Left Turn	A (4.4) [<25] {71}	B (13.9) [<25] {36}
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**B (10.5)**	**B (18.6)**
Eastbound Approach	C (34.6) [<25] {125}	D (40.6) [67] {251}
Westbound Approach	D (39.2) [44] {154}	C (29.6) [42] {148}
Northbound Approach	A (9.2) [30] {250}	B (16.8) [112] {553}
Southbound Approach	A (5.9) [74] {1011}	B (13.1) [88] {695}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	E (40.2) [<25] {34}	E (56.1) [<25] {79}
Westbound Right Turn	A (8.0) [<25] {69}	B (14.6) [<25] {113}
Southbound Left Turn	A (7.0) [<25] {153}	B (15.4) [<25] {37}
29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, Roundabout)		
Overall Intersection	**A (8.9)**	**B (10.8)**
Eastbound Approach	D (29.0) [75] {342}	C (29.8) [122] {514}
Westbound Approach	A (5.0) [<25] {123}	B (10.2) [29] {191}
Northbound Approach	A (2.8) [<25] {78}	A (4.4) [<25] {158}
Southbound Approach	A (6.6) [28] {296}	A (5.5) [<25] {231}

Table O-2. 2045 Operating Conditions - Option B (VISSIM)

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
1: Buckingham Plantation Dr & Bluffton Pkwy (signal)		
Overall Intersection	**B (17.3)**	**B (18.0)**
Eastbound Approach	B (19.8) [65] {335}	C (21.8) [54] {241}
Westbound Approach	B (13.6) [<25] {178}	B (16.1) [54] {419}
Northbound Approach	B (14.5) [<25] {66}	B (14.0) [<25] {51}
Southbound Approach	A (6.7) [<25] {61}	B (10.9) [<25] {103}
2: Buckingham Plantation Dr/Moss Creek Dr & William Hilton Pkwy (signal)		
Overall Intersection	**B (15.9)**	**C (21.1)**
Eastbound Approach	B (14.5) [58] {383}	B (14.8) [49] {328}
Westbound Approach	B (15.9) [42] {321}	C (24.1) [158] {798}
Northbound Approach	C (20.7) [<25] {166}	D (41.0) [<25] {109}
Southbound Approach	C (23.7) [<25] {101}	C (28.2) [25] {170}
3: Salt Marsh Dr/Moss Creek Village & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	A (7.9) [<25] {<25}	C (23.1) [<25] {55}
Westbound Left Turn	B (12.4) [<25] {<25}	A (9.5) [<25] {39}
Northbound Approach	B (12.0) [<25] {66}	B (10.2) [<25] {64}
Southbound Approach	A (8.5) [<25] {78}	A (9.8) [<25] {86}
4: Fording Island Rd Ext & William Hilton Pkwy (un-signalized)		
Westbound Left Turn	C (20.6) [<25] {<25}	B (17.5) [<25] {37}
Northbound Approach	B (12.5) [<25] {37}	B (12.6) [<25] {43}
5: Boat Landing Driveway/Wildlife Refuge Driveway & William Hilton Pkwy (un-signalized)		
Northbound Right-Turn	B (11.9) [<25] {<25}	A (5.9) [<25] {<25}
Southbound Right-Turn	No volumes observed	C (22.3) [<25] {33}
6: Blue Heron Point Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	
7: Crosstree Dr (Windmill Harbour) & William Hilton Pkwy (signal)		
Overall Intersection	**A (8.4)**	**A (7.3)**
Eastbound Approach	A (8.9) [80] {784}	A (9.3) [59] {605}
Westbound Approach	A (5.6) [<25] {257}	A (3.3) [35] {278}
Northbound Approach	D (42.2) [<25] {124}	E (57.9) [61] {244}
Southbound Approach	D (51.0) [<25] {92}	D (44.7) [<25] {101}
8: Jenkins Rd & William Hilton Pkwy (un-signalized)		
	Intersection combined with Crosstree Dr	

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
9: Chamberlin Dr/Squire Pope Rd & William Hilton Pkwy (signal)		
Overall Intersection	**A (7.1)**	**B (12.5)**
Eastbound Approach	A (6.9) [101] {590}	B (11.3) [119] {513}
Westbound Approach	A (4.5) [<25] {158}	A (7.5) [58] {670}
Northbound Approach	C (33.2) [<25] {57}	E (67.0) [<25] {109}
Southbound Approach	C (23.2) [<25] {174}	D (50.9) [127] {508}
10: Old Wild Horse Rd & William Hilton Pkwy (un-signalized)		
Southbound Approach	A (5.5) [<25] {74}	B (12.6) [<25] {26}
11: Spanish Wells Rd/Wild Horse Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (20.6)**	**C (21.8)**
Eastbound Approach	B (11.5) [112] {1032}	C (24.6) [158] {771}
Westbound Approach	C (23.7) [113] {536}	B (10.9) [162] {951}
Northbound Approach	D (48.6) [45] {135}	E (65.2) [77] {186}
Southbound Approach	E (75.9) [74] {292}	E (59.8) [49] {193}
12: Gumtree Rd & William Hilton Pkwy (signal)		
Overall Intersection	**C (30.9)**	**C (29.7)**
Eastbound Approach	D (37.4) [160] {658}	C (33.0) [103] {485}
Westbound Approach	B (13.2) [53] {195}	B (18.8) [111] {575}
Northbound Approach	C (30.6) [90] {316}	D (40.5) [139] {359}
Southbound Approach	D (51.5) [99] {366}	D (51.4) [118] {443}
13: Jarvis Park Rd/Wilborn Rd & William Hilton Pkwy (signal)		
Overall Intersection	**B (17.3)**	**B (12.3)**
Eastbound Approach	B (12.8) [139] {463}	A (9.1) [53] {239}
Westbound Approach	A (9.8) [30] {434}	A (6.7) [30] {407}
Northbound Approach	E (73.3) [30] {175}	E (67.9) [30] {168}
Southbound Approach	D (49.7) [72] {248}	D (44.6) [40] {172}
14: Pembroke Dr/Museum St & William Hilton Pkwy (signal)		
Overall Intersection	**C (20.5)**	**B (16.3)**
Eastbound Approach	A (9.3) [38] {307}	B (12.7) [44] {306}
Westbound Approach	C (29.2) [87] {440}	A (7.7) [31] {214}
Northbound Approach	E (58.3) [79] {284}	E (59.5) [93] {320}
Southbound Approach	C (34.4) [<25] {105}	D (36.6) [<25] {127}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
15: Central Ave & William Hilton Pkwy (un-signalized)		
Eastbound Left Turn	B (12.6) [<25] {27}	B (10.5) [<25] {<25}
Westbound Left Turn	C (23.8) [<25] {27}	B (12.7) [<25] {<25}
Northbound Right Turn	C (18.5) [<25] {30}	B (13.7) [<25] {32}
Southbound Right Turn	A (3.6) [<25] {<25}	A (5.6) [<25] {<25}
16: Hatton Pl/Merchant St & William Hilton Pkwy (un-signalized)		
Northbound Right Turn	A (9.5) [<25] {28}	A (8.2) [<25] {66}
Southbound Right Turn	B (10.6) [<25] {38}	B (15.2) [<25] {35}
17: Indigo Run Dr/Whooping Crane Way & William Hilton Pkwy (signal)		
Overall Intersection	**B (16.9)**	**D (35.7)**
Eastbound Approach	A (5.2) [<25] {278}	C (34.5) [154] {810}
Westbound Approach	B (15.7) [47] {355}	C (26.8) [195] {845}
Northbound Approach	E (57.1) [32] {106}	E (67.3) [64] {267}
Southbound Approach	D (50.7) [59] {211}	E (56.5) [75] {278}
18: Cross Island Pkwy SB Ramp/Gumtree Rd & Honey Horn Rd (un-signalized)		
Eastbound Approach	A (8.1) [<25] {45}	B (11.1) [<25] {72}
19: Cross Island Pkwy SB Ramp & Marshland Rd (un-signalized)		
Westbound Left Turn	A (4.5) [<25] {64}	A (2.4) [<25] {68}
Southbound Left Turn	A (6.0) [<25] {83}	A (8.0) [<25] {111}
Southbound Right Turn	A (9.9) [<25] {49}	B (12.0) [<25] {78}
20: Cross Island Pkwy NB Ramp & Marshland Rd (un-signalized)		
Eastbound Left Turn	A (1.6) [<25] {51}	A (1.6) [<25] {<25}
Northbound Left Turn	B (11.6) [<25] {69}	D (38.8) [79] {326}
Northbound Right Turn	A (5.9) [<25] {94}	A (9.3) [98] {351}
21: Palmetto Bay Rd & Bay Pines Rd (un-signalized)		
Eastbound Left Turn	No volumes observed	E (55.7) [<25] {41}
Eastbound Right Turn	C (19.7) [<25] {<25}	B (14.2) [<25] {38}
Northbound Left Turn	A (9.2) [<25] {<25}	A (6.8) [<25] {32}
22: Palmetto Bay Rd & Point Comfort Rd/Arrow Rd (signal)		
Overall Intersection	**B (12.7)**	**B (16.9)**
Eastbound Approach	D (35.8) [59] {213}	C (33.9) [43] {177}
Westbound Approach	B (19.7) [26] {103}	C (26.3) [68] {337}
Northbound Approach	A (6.4) [<25] {162}	B (12.2) [85] {608}
Southbound Approach	B (11.3) [93] {770}	B (17.1) [90] {644}

Intersection & Movements	LOS (Delay, sec) [Average Queue Length, ft] {Max Queue, ft}	
	AM Peak Hour	PM Peak Hour
23: Palmetto Bay Rd & Genesta St (un-signalized)		
Westbound Approach	C (20.0) [<25] {55}	C (23.8) [<25] {51}
Southbound Left Turn	A (5.1) [<25] {26}	B (14.4) [<25] {<25}
24: Palmetto Bay Rd & Palmetto Business Park Rd (un-signalized)		
Westbound Approach	C (19.8) [<25] {53}	C (21.8) [<25] {57}
Southbound Left Turn	A (4.7) [<25] {30}	B (14.3) [<25] {<25}
25: Palmetto Bay Rd & Bow Cir (un-signalized)		
Westbound Left Turn	D (30.9) [<25] {32}	D (51.8) [<25] {41}
Westbound Right Turn	B (11.1) [<25] {65}	B (14.1) [<25] {75}
Southbound Left Turn	A (5.4) [<25] {39}	B (11.5) [<25] {26}
26: Palmetto Bay Rd & Archer Rd (un-signalized)		
Westbound Left Turn	E (36.6) [<25] {37}	D (36.4) [<25] {38}
Westbound Right Turn	A (9.9) [<25] {73}	B (13.9) [<25] {75}
Southbound Left Turn	A (5.6) [<25] {85}	A (8.8) [<25] {25}
27: Palmetto Bay Rd & Target Rd (signal)		
Overall Intersection	**A (8.5)**	**B (16.6)**
Eastbound Approach	D (35.6) [<25] {125}	D (41.5) [67] {250}
Westbound Approach	D (39.1) [44] {154}	C (29.2) [42] {148}
Northbound Approach	A (5.0) [<25] {236}	B (13.2) [82] {490}
Southbound Approach	A (4.4) [28] {488}	B (11.9) [68] {432}
28: Palmetto Bay Rd & Dunnagans Alley (un-signalized)		
Westbound Left Turn	D (30.3) [<25] {34}	C (34.3) [<25] {64}
Westbound Right Turn	A (8.3) [<25] {68}	B (12.8) [<25] {98}
Southbound Left Turn	A (6.2) [<25] {109}	B (10.6) [<25] {46}
29: Palmetto Bay Rd & William Hilton Pkwy (Sea Pines Circle, Roundabout)		
Overall Intersection	**C (24.2)**	**C (25.0)**
Eastbound Approach	D (45.3) [93] {237}	D (36.7) [90] {283}
Westbound Approach	D (37.7) [104] {265}	C (30.2) [107] {295}
Northbound Approach	B (15.8) [31] {204}	C (24.7) [88] {382}
Southbound Approach	B (14.7) [62] {293}	B (15.0) [55] {361}