Terminal Island

MIAMI BEACH

traffic study

dpa

Since 1978

Prepared By:
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Prepared For:
Related Group

Prepared In:
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DPA Job #:
20129

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EXECUTIVE SUMMARY

The project is located at 120 MacArthur Causeway (on Terminal Island) in Miami Beach, Florida. The project proposes a new 171,305 SF office complex (with two buildings, A and B) with an on-site parking garage, located on the northwest side of Building B. The offices will accommodate approximately 932 employees and a 100-seat restaurant (located within Building A). The existing six boat berth marina will remain. Access to the site will be provided via Terminal Isle (the internal roadway on Terminal Island) which provides access to MacArthur Causeway. For the purpose of this traffic study, project build-out is anticipated by 2023.

An assessment of the weekday and weekend AM and PM peak hour traffic associated with the proposed Terminal Island project was performed in accordance with the approved methodology submitted to the City of Miami Beach and the requirements of the *City of Miami Beach Comprehensive Plan*. Intersection capacity analysis was performed for the following intersections:

- MacArthur Causeway / Bridge Road (Star Island)
- MacArthur Causeway / Terminal Isle
- Alton Road / 5th Street
- MacArthur Causeway / Terminal Isle Exclusive Right-turn (east of the MacArthur Causeway / Terminal Isle signalized intersection)

At the request of the City the analysis of the project's traffic impact was performed under two conditions. The first condition was a typical office analysis, where the trips generated for the project were based on the size (square footage) of the office use and the restaurant seats. The second analysis was performed to determine the maximum traffic impacts that the development may have on the surrounding roadway network; the trips generated in this analysis were based on the maximum occupancy of office employees and the number of restaurant seats.

Results based on the Office Square footage

The results of the intersection analysis during the AM and PM peak hours of a typical weekday show that all of the analyzed intersections currently operate and are projected to operate within the overall LOS standards established in the *City of Miami Beach Comprehensive Plan* for existing,

future without project, and future with project conditions. The analysis also shows adequate operations at the unsignalized project driveway.

For existing, future without project, and future with project conditions, the northbound and southbound approaches of the MacArthur Causeway / Bridge Road intersection experience delays during the AM and PM peak hours. This is an existing condition; the project adds no delay to the northbound approach and only 3.6 seconds of delay to the southbound approach during the AM peak hour and adds no delay to these approaches during the PM peak hour. The northbound approach of the Alton Road / 5th Street intersection experiences delays during the AM and PM peak hours for existing, future without project, and future with project conditions. This is an existing condition; the project adds less than one second of delay to the northbound approach during the AM and PM peak hours. The westbound left approach and the northwest bound approach (Terminal Isle approach) of the Terminal Isle / MacArthur Causeway intersection experience delays during the AM and PM peak hours. It should be noted that the project adds no delay to these approaches during the AM peak hour and only 4.3 seconds of delay to the northwest bound approach (Terminal Isle approach) during the PM peak hour. It should also be noted that the project represents only 3% of the total projected intersection volume during the morning and afternoon peak hours. The delays at these intersections may be due to the fact that the County gives priority to vehicles travelling east / west along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets. Signal timing improvements are recommended at the Alton Road / 5th Street and Terminal Isle / MacArthur Causeway intersections to improve approach delays and mitigate the effects of the project.

The results of the intersection analysis for the AM and PM peak hours of a typical weekend show that all of the analyzed intersections currently operate and are projected to operate within the overall LOS standards established in the *City of Miami Beach Comprehensive Pla*n for existing, future without project, and future with project conditions.

For existing, future without project, and future with project conditions, the southbound approach of the MacArthur Causeway / Bridge Road intersection experiences delays during the morning and afternoon peak hours. The northbound approach of the Alton Road / 5th Street intersection also

experiences delays during both the morning and afternoon hours. These are existing delays; the project adds no delay or less than one second of delay to these approaches during the AM and PM peak hours of a typical weekend. This may be due to the fact that the County gives priority to vehicles travelling along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets. During the existing, future without project, and future with project conditions, the westbound left approach and the northwest bound approach (Terminal Isle approach) of the Terminal Isle / MacArthur Causeway intersection experience delays during the AM and PM peak hours. These delays are an existing condition; the project adds no delays to the northwest bound approach during the AM and PM peak hours. The project adds only 6.7 seconds and 3.6 seconds of delay to the AM and PM peak hours, respectively. The project driveway was analyzed and the results show adequate operations. Signal timing improvements are recommended at the Alton Road / 5th Street and Terminal Isle / MacArthur Causeway intersections to improve approach delays and mitigate the effects of the project.

Results based on the Maximum number of Office Employees

The results of the intersection analysis during the AM and PM peak hours of a typical weekday show that all of the analyzed intersections currently operate and are projected to operate within the overall LOS standards established in the *City of Miami Beach Comprehensive Plan* for existing, future without project, and future with project conditions. The analysis also shows adequate operations at the unsignalized project driveway.

For existing, future without project, and future with project conditions, the northbound and southbound approaches of the MacArthur Causeway / Bridge Road intersection experience delays during the AM and PM peak hours. This is an existing condition; the project adds no delays to the northbound approach, and only 3.6 and 0.6 seconds of delay to the southbound approach during the respective AM and PM peak hours. The northbound approach of the Alton Road / 5th Street intersection experiences delays during the AM and PM peak hours for existing, future without project, and future with project conditions. This is an existing condition; the project adds less than one second of delay to the northbound approach during the AM and PM peak hours. These delays may be due to the fact that the County gives priority to vehicles travelling along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets.

The westbound left approach of the Terminal Isle / MacArthur Causeway intersection experiences delays during the AM and PM peak hours. It should be noted, that the project adds no delay to this approach during the AM and PM peak hours. The northwest bound approach (Terminal Isle approach) of the Terminal Isle / MacArthur Causeway intersection also experiences delays during the AM and PM peak hours. The project adds no delay to this approach during the AM peak hour. It should be noted that the project represents only about 5% of the total projected intersection volume during the morning and afternoon peak hours. Signal timing improvements are recommended at the Alton Road / 5th Street and Terminal Isle / MacArthur Causeway intersections to improve approach delays and mitigate the effects of the project.

The results of the intersection analysis during the AM and PM peak hours of a typical weekend show that all of the analyzed intersections currently operate and are projected to operate within the overall LOS standards established in the *City of Miami Beach Comprehensive Pla*n for existing, future without project, and future with project conditions.

For existing, future without project, and future with project conditions, the southbound approach of the MacArthur Causeway / Bridge Road intersection experiences delays during the morning and afternoon peak hours. The northbound approach of the Alton Road / 5th Street intersection also experiences delays during both the morning and afternoon hours. These are existing delays; the project adds no delay or less than one second of delay to these approaches during the AM and PM peak hours of a typical weekend. This may be due to the fact that the County gives priority to vehicles travelling along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets.

During the existing, future without project, and future with project conditions, the westbound left approach and the northwest bound approach (Terminal Isle approach) of the Terminal Isle / MacArthur Causeway intersection experience delays during the AM and PM peak hours. These delays are an existing condition; the project adds no delays to the northwest bound approach during the AM and PM peak hours. The project adds only 6.7 seconds and 3.9 seconds of delay to the AM and PM peak hours, respectively. The project driveway was analyzed and the results show adequate operations. Signal timing improvements are recommended at the Alton Road / 5th Street

and Terminal Isle / MacArthur Causeway intersections to improve approach delays and mitigate the effects of the project.

A valet queuing analysis was performed to ensure that the drop-off / pick-up demand at the proposed valet station would not extend past the provided storage space at the valet station during the AM and PM peak hours. The analysis was performed based on the employee occupancy to ensure that the valet can accommodate the maximum trips generated by the project. The results of the queuing analysis show that with two valet attendants during the AM peak hour and three valet attendants during the PM peak hour the queue will not extend past the valet station storage area.

As part of the study, field observations were performed at the Fisher Island Ferry terminals located on the east and west ends of Terminal Island. The observations showed that the operations at the ferry terminals did not interfere with the operations along MacArthur Causeway.

A mobility and circulation plan was completed as part of the study. The plan shows that the project area is currently served by four Miami-Dade Transit bus routes and a Miami Beach Trolley route. The project is located in an area that provides sidewalk connectivity, clearly marked crosswalks, signalized intersections that provide pedestrian signals, and bike lanes. These conditions encourage the use of other modes of transportation and reduce the vehicular impact on the roadway network.

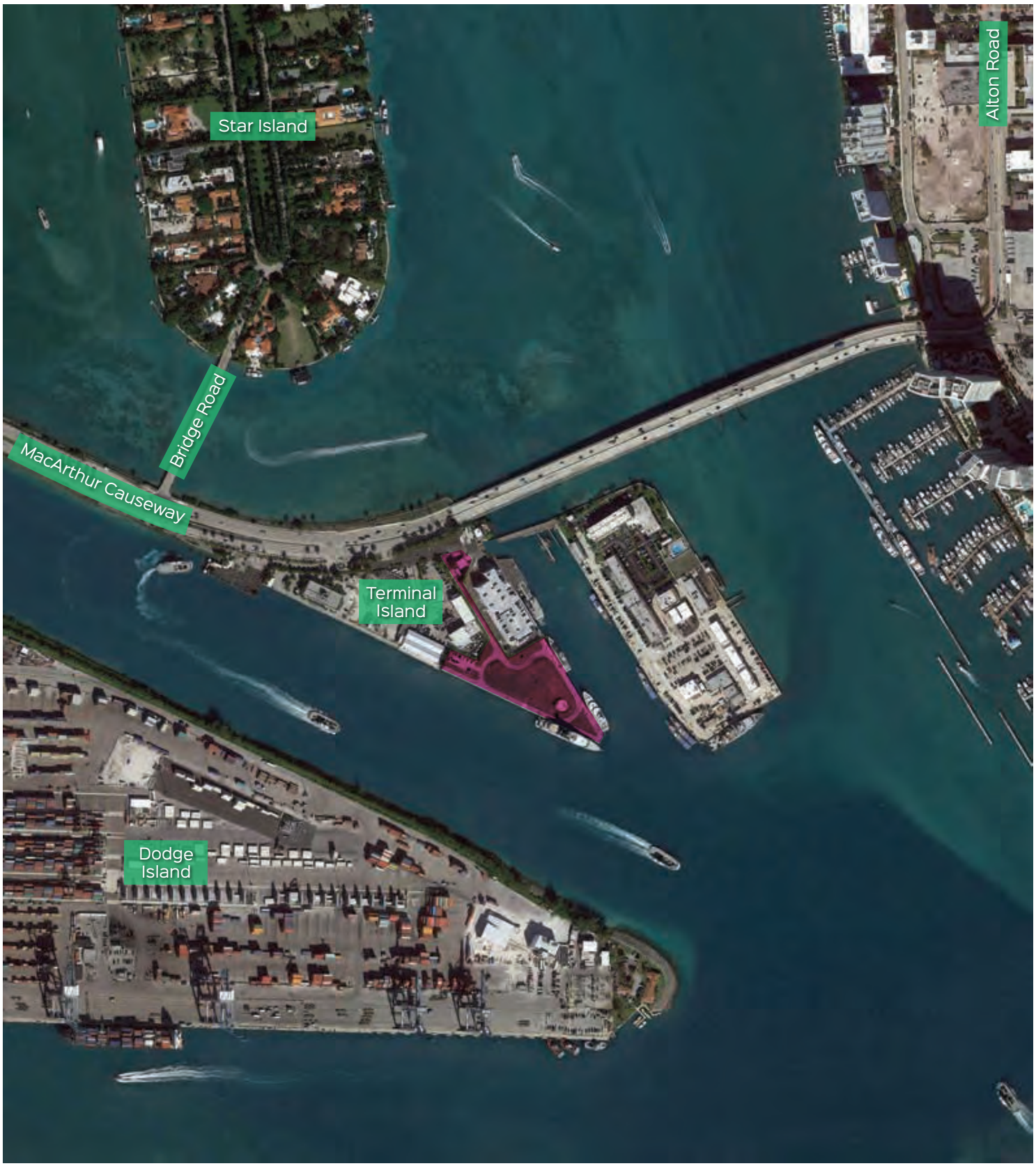
1.0 INTRODUCTION

1.1 Project Background

The project is located at 120 MacArthur Causeway (on Terminal Island) in Miami Beach, Florida (see Exhibit 1). The project proposes a new 171,305 SF office complex (with two buildings, A and B) with an on-site parking garage, located on the northwest side of Building B. The offices will accommodate approximately 932 employees and a 100-seat restaurant (located within Building A). The existing six boat berth marina will remain. Access to the site will be provided via Terminal Isle (the internal roadway on Terminal Island) which provides access to MacArthur Causeway. The loading area for the two buildings is located on the west side of Building A. Access to the loading area is provided via the project's internal roadway. The proposed site plan is included in Appendix A. For the purpose of this traffic study, project build-out is anticipated by 2023.

1.2 Study Objective

The project will be applying for permits from the City. As part of this permit, the City of Miami Beach will require traffic related studies. The purpose of this study is to assess the traffic impacts associated with the proposed project and to conduct a mobility and circulation analysis. At the request of the City, the traffic study will analyze the effect of the project at normal conditions (with the traffic generation based on office square footage) and at the project's maximum occupancy (with the trip generation based on the maximum employee occupancy).



Project Location

Exhibit 1

Location Map

NORTH
MAP NOT TO SCALE

1.3 Study Area and Methodology

The revised and approved methodology is included in Appendix B. The following is a brief description of the study components and analysis undertaken:

- Ninety-six-hour traffic counts were collected on the MacArthur Causeway between Bridge Road and Terminal Island and Terminal Island between MacArthur Causeway and the crosswalk to the Employee and Contractor Garage and Ferry Terminal East. The 96-hour counts were used to determine the AM and PM peak hours of a regular weekday and the AM and PM peak hours of a regular Saturday.
- Traffic Counts (Intersections) – Available turning movement counts were collected during the AM and PM peak hour conditions of a regular weekday and weekend, as determined by the collected 96-hour counts and approved by the City. The counts were used to analyze the following intersections:
    - MacArthur Causeway / Bridge Road (Star Island) (Signalized)
    - MacArthur Causeway / Terminal Isle (Signalized)
    - Alton Road / 5th Street (Signalized)
    - Terminal Isle / Project Driveway (Un-signalized)
    - MacArthur Causeway / Terminal Isle Exclusive Right-turn (east of the MacArthur Causeway / Terminal Isle signalized intersection)
- Signal Location and Timing – Existing signal phasing and timing for the signalized intersections were obtained from Miami-Dade County. Signal timing plans are included in Appendix C.
- Future Transportation Projects – The *2022 Transportation Improvement Program* (TIP), the *2045 Long Range Transportation Plan* (LRTP), and the City of Miami Beach's Transportation Master Plan Final Report and Related TMP updates were reviewed and considered in the analysis at the project build-out.
- Background Traffic – Available Florida Department of Transportation (FDOT) and Miami-Dade County (MDC) traffic counts (excluding 2020 data) were consulted to determine a growth factor consistent with historical annual growth in the area. As the growth factor was

negative, a growth factor of 0.5% was applied to the existing traffic volumes to establish background traffic.

- Committed Developments – As no committed developments were found in the area a 0.5% growth rate, as approved by the City, was applied to the analysis to account for any unknown committed developments in the area.
- Project Trip Generation – Trip generation for the project was estimated using trip generation information published by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition and site-specific data. Based on U.S. Census Bureau data, an 8.5% deduction for other modes of transportation may be applied. As discussed and agreed with the City reviewer on February 24, 2022 the full 8.5% transportation deduction was used for other modes of transportations. Furthermore, as discussed with the City reviewer, a 10% reduction was used for pass-by trips applied to restaurant trips. Trip generation and analysis for the restaurant use will be performed for the weekend AM and PM peak period (as determined by the 96-hour counts).
- Project Trip Distribution / Trip Assignment – Net new external project vehicular trips were assigned to the adjacent street network using the appropriate cardinal distribution from the *2045 Miami-Dade Long Range Transportation Plan Update*, published by the *Transportation Planning Organization*. Normal area traffic patterns were considered when assigning project trips. A figure showing all of the assigned project trips to the adjacent transportation network was provided as part of the study.
- Circulation Analysis / Plan – A circulation plan is provided depicting the project site, driveways, location of street signs/signals, crosswalks, sidewalks, location of bus facilities, and bike facilities in the vicinity of this project.
- Intersection Capacity Analysis – The intersection capacity analyses will be conducted for the following conditions:
    - o Existing conditions
    - o Future conditions with background traffic / Committed Developments
    - o Future conditions with Project and background traffic

Intersection analysis will be done using the Synchro software based on the Highway Capacity Manual (HCM). Figures depicting trip distribution for each of these scenarios will be provided as part of this study. In addition to the intersections identified above, all projects driveways will be analyzed. If the results of the analysis show any intersection operating below the City's Level of Service standards, specific mitigation measures will be recommended.

- An extensive Transportation Demand Management plan (TDM) will be included in the report.
- Queuing Observations were done at the east and west Fisher Island ferry terminals for the AM and PM peak hours of a typical weekday.
- Queuing Observations were done at the MacArthur Causeway / Terminal Isle intersection for the AM and PM peak hours of a typical weekday.

1.4 Project Site Information

The project is located at 120 MacArthur Causeway (Terminal Island) in Miami Beach, Florida. The project proposes a new 171,305 SF office complex (with two buildings, A and B) with an on-site parking garage, which will accommodate approximately 932 employees, a 100-seat restaurant and 383 parking spaces. The existing six boat berth marina will remain. Access to the site will be provided via Terminal Isle (the internal roadway on Terminal Island) which provides access to MacArthur Causeway. The project's security gate and guard house (which will remain open during normal business hours) will be located approximately 115 feet from the Terminal Isle roadway. The proposed parking garage will be located on the northwest side of Building B. The site's internal roadway will provide access to the parking garage. Vehicles entering the site will have the option to self-park or use the optional valet services, 10% of the parking spaces within the garage will be reserved for valet parking (the majority of the valet parking spaces will be located within the first floor of the parking garage). The valet drop-off / pick-up area will be located along the loop of the internal roadway, between buildings A and B. The loading area for the two buildings is located west of Building A, between Building A and the west-most surface parking lot. A basement service corridor will span between both buildings, creating easy access between the two building's service areas. Access to the loading area is provided via the project's internal roadway. Project build-out is anticipated by 2023.

2.0 EXISTING CONDITIONS

Data collection for this study included roadway characteristics, intersection traffic counts, signal timing, and seasonal adjustment factors. The data collection effort is described in the following sections.

2.1 Roadway Characteristics

MacArthur Causeway (SR A1A)

MacArthur Causeway is a principal arterial roadway that provides east/west access. It is the only roadway connecting Terminal Island, Star Island, Palm Island, Hibiscus Island, and Watson Island to the mainland and the Miami Beach Island. Within the study area, the MacArthur Causeway is a six-lane, two-way, divided roadway with exclusive left-turn and right-turn lanes at major intersections. The causeway also provides merge lanes at intersections to incorporate left turning vehicles into the roadway. Bike lanes are provided along both sides of the roadway. FDOT has jurisdiction over this portion of the MacArthur Causeway. The posted speed limit is 40 mph.

Terminal Isle

Terminal Isle is the perimeter road within Terminal Island. The road is a two-lane, two-way undivided roadway east of the MacArthur Causeway intersection and a two-lane, one-way, undivided roadway west of the intersection with MacArthur Causeway. It provides access to the FPL Miami Beach Plant, the Fisher Island Ferry terminals: Resident Terminal West (west ferry) and Employee and Contractor Garage and Terminal East (east ferry), and the US Coast Guard Station (located on the east side of Terminal Island). The City of Miami Beach has jurisdiction over Terminal Isle.

Bridge Road

Bridge Road is a two-lane, two-way undivided roadway bridge connecting Star Island to MacArthur Causeway. Bike lanes are provided along both sides of the bridge. The City of Miami Beach has jurisdiction over Bridge Road.

Alton Road

Alton Road, north of 5th Street, is a minor arterial roadway that provides north/south access all along the City of Miami Beach. South of 5th Street, Alton Road is a collector roadway. Within the study area, Alton Road is a two-way, four-lane divided roadway. The posted speed limit is 30 mph. There is on-street parking provided on portions of the roadway. Bike lanes are provided along both sides of Alton Road south of 4th Street. The City of Miami Beach has jurisdiction over Alton Road south of 5th Street.

5th Street

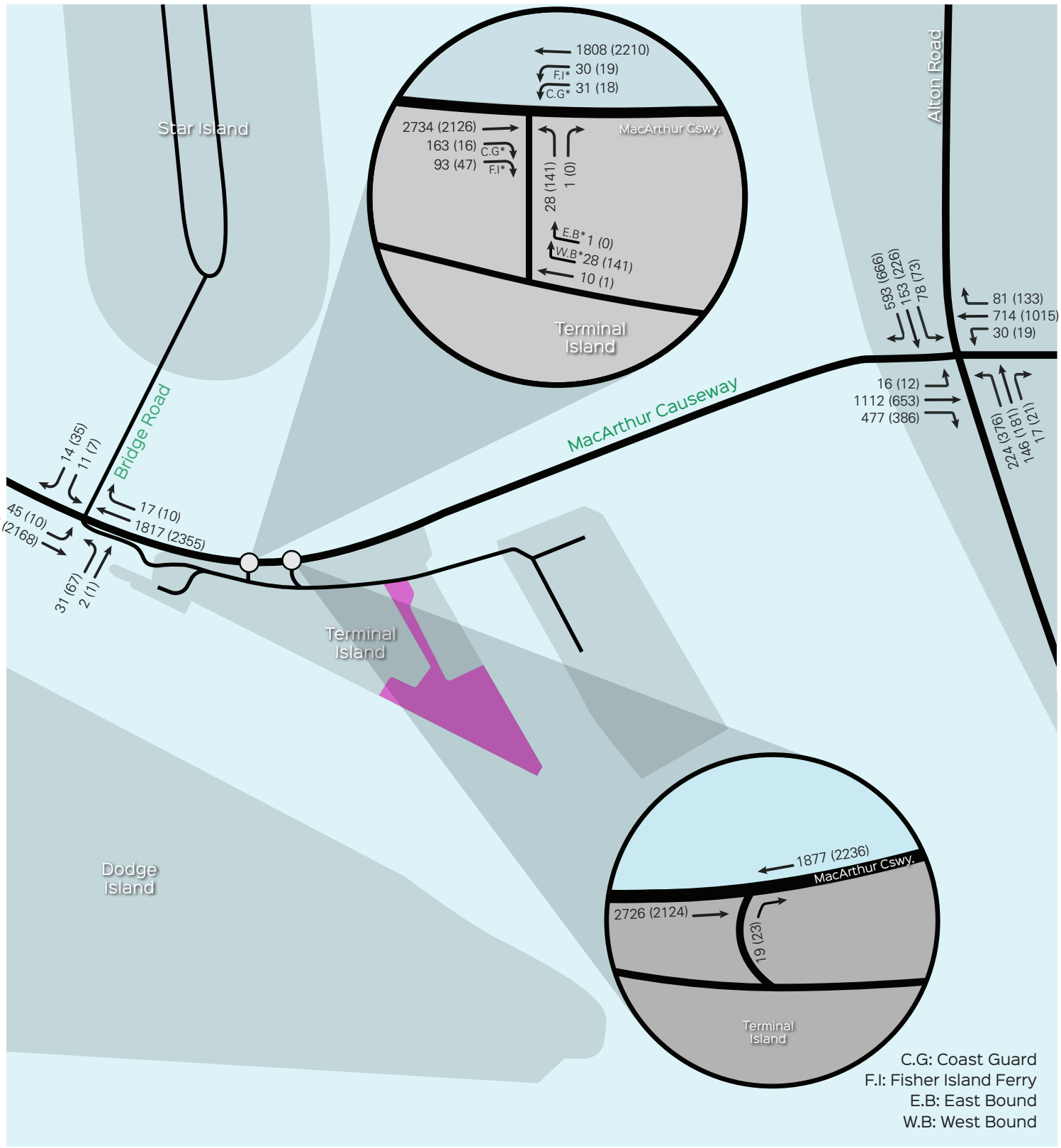
5th Street is a principal arterial roadway that runs east/west across the City of Miami Beach between east of Ocean Drive and Alton Road. The roadway is a two-way, six-lane divided road. There is no on-street parking provided. Bike lanes are provided along both sides of 5th Street east of Lenox Avenue. FDOT has jurisdiction over 5th Street. The posted speed limit is 35mph.

2.2 Traffic Counts

Consistent with the methodology submitted and approved by the City, 96-hour directional counts were collected from August 26, 2021 through August 29, 2021 (Thursday – Sunday) to determine the AM and PM peak hours of a regular weekday and the AM and PM peak hours of a weekend. The counts were collected at the MacArthur Causeway between Bridge Road and Terminal Island and on the Terminal Isle roadway between the MacArthur Causeway / Terminal Isle intersection and the crosswalk to the Employee and Contractor Garage and Terminal East ferry parking garage. Turning movement counts (TMCs) were collected at the intersections under study during the approved AM (5:30 – 9:30 am) and PM (2:30 – 6:30 pm) peak periods of a typical weekday and the AM (10 am – 12:00 pm) and PM (2:30 pm – 4:30 pm) peak periods of a Saturday (found via the collected 96-hour traffic counts). Traffic counts were collected on Wednesday, September 15, 2021 and Saturday, September 18, 2021. A peak seasonal conversion adjustment factor of 1.06 (Miami-Dade North) corresponding with the date of the counts were obtained from the Florida Department of Transportation (FDOT). Traffic counts are included in Appendix C. Exhibits 2 and 3 show the adjusted existing weekday and weekend AM and PM peak hour traffic volumes at the study intersections.

2.3 Intersection Data

Existing signal phasing and timing for all the intersections were obtained from Miami-Dade County. This information was used for the signal phasing and timing required for the intersection capacity analysis and can be seen in Appendix C. A field survey was conducted to obtain the intersection lane configurations to be used in the intersection analysis. Exhibit 4 shows the existing lane configurations at the analyzed intersections.

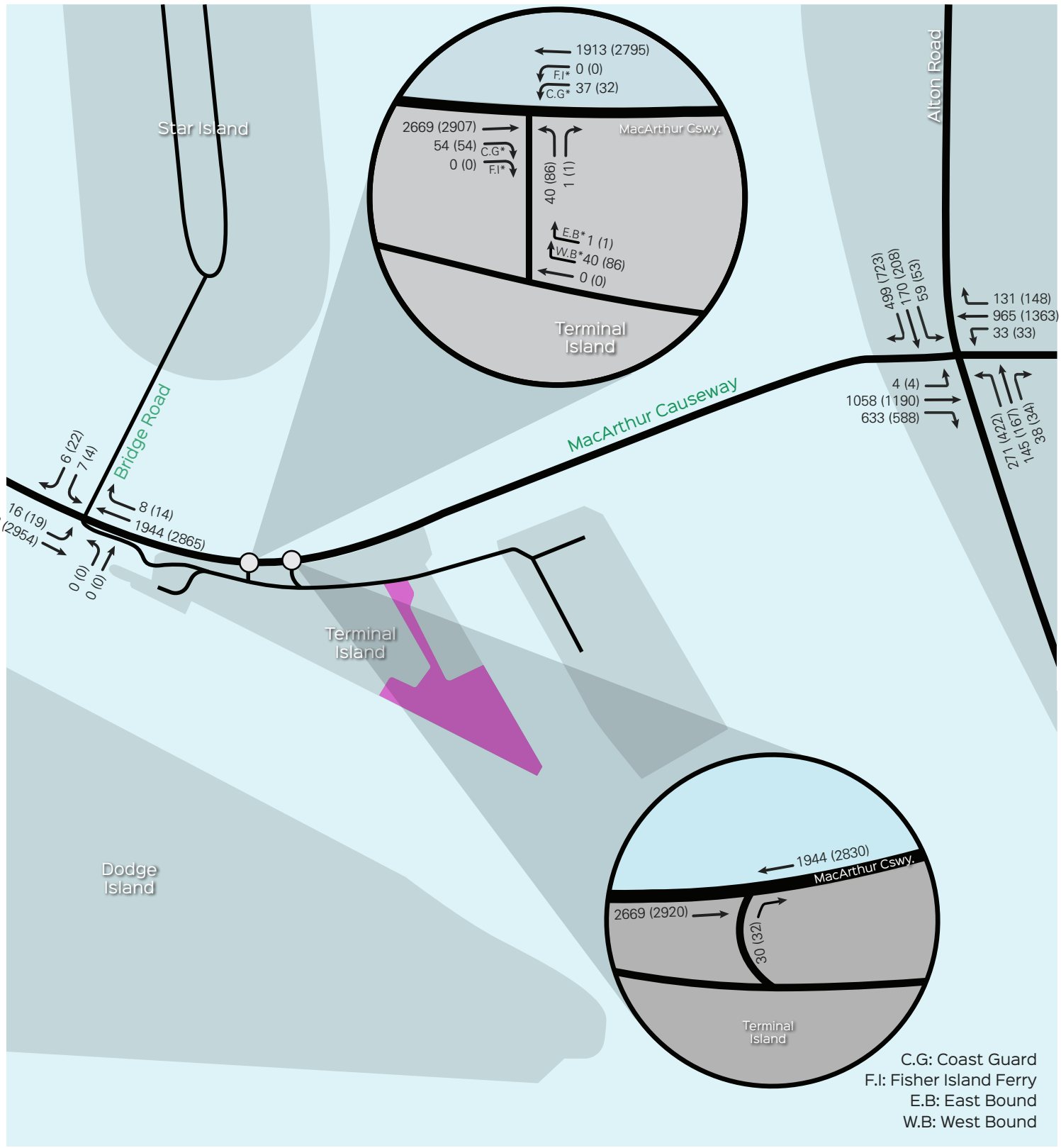


00 AM
(00) PM
Project Location

Exhibit 2

Existing Weekday AM & PM Peak Traffic Volumes

NORTH
MAP NOT TO SCALE

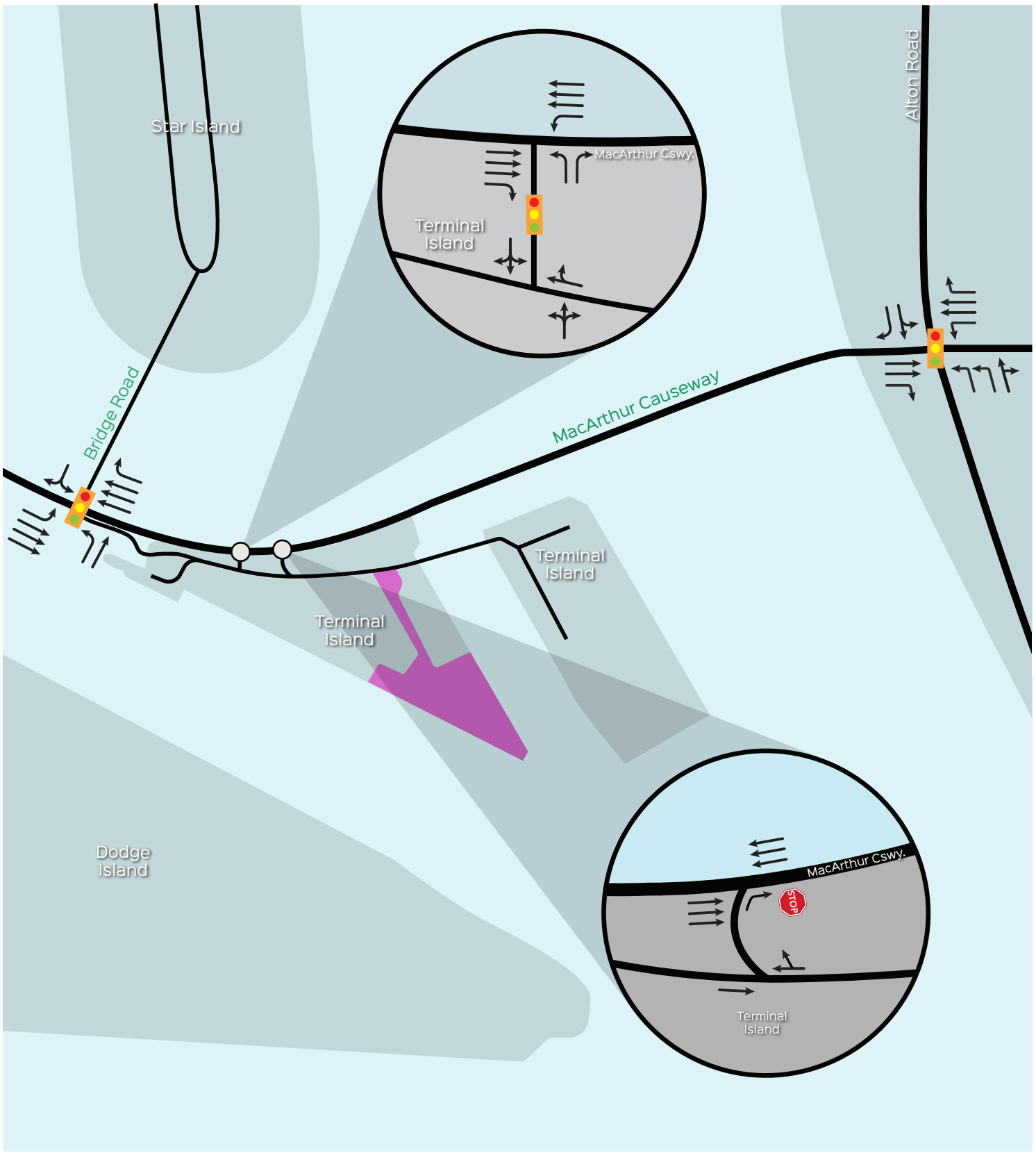


00 AM
(00) PM
Project Location

Exhibit 3

Existing Weekend AM & PM Peak Traffic Volumes

NORTH
MAP NOT TO SCALE



Project Location

Exhibit 4

Existing Lane Configurations

NORTH
MAP NOT TO SCALE

2.4 Intersection Capacity Analysis

The Synchro Software, based on procedures of the *Highway Capacity Manual*, was used to perform intersection capacity analysis at the analyzed intersections for the weekday and weekend peak hours. Synchro is a macroscopic analysis and optimization software application that implements the intersection capacity utilization method for determining intersection capacity.

2.4.1 Weekday Intersection Capacity Analysis

Results for the existing weekday conditions intersection analysis show that the overall LOS for the following intersections currently operate at acceptable LOS:

- MacArthur Causeway / Bridge Road
- MacArthur Causeway / Terminal Isle
- Alton Road / 5th Street
- MacArthur Causeway / Terminal Island exclusive right-turn

The westbound left approach and the northwest bound approach (Terminal Island approach) of the MacArthur Causeway / Terminal Isle intersection currently experience delays during the morning and afternoon peak hours. Despite the delays shown by Synchro, it should be noted that field observations of the MacArthur Causeway / Terminal Isle intersection (Section 6.2) showed that on average, one cycle of green time for the MacArthur Causeway westbound left turning movement was sufficient to clear any vehicles queued in the westbound left turn lane; during observations it took a maximum of two cycles to clear the queue within the lane.

The MacArthur Causeway / Bridge Road intersection experiences delays at the northbound and southbound approaches during the AM and PM peak hours. The northbound approach of the Alton Road / 5th Street intersection also currently experiences delays during both the morning and afternoon peak hours. These delays may be due to the fact that the County gives priority to vehicles traveling east/west along MacArthur Causeway, therefore, accepting delays on cross-streets. Exhibit 5 shows the resulting LOS for the existing weekday AM and PM peak hour conditions. Analysis worksheets are included in Appendix D.

Exhibit 5: Existing Weekday Intersection Capacity Analysis
Weekday AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Bridge Road (Star Island)	S	NB	F	124.1	F	128.9	D
		SB	F	104.7	F	107.3	D
		EB	A	9.9	B	13.7	D
		WB	B	10.1	B	20.5	D
		Overall	***B***	***11.2***	***B***	***19.7***	***D***
MacArthur Causeway / Terminal Isle	S	NB_{FPL}	A	0.0	A	0.0	D
		$NWB_{T.I}$	E	69.8	F	91.9	D
		$EB_{Cswy.}$	B	15.6	B	12.1	D
		$WBL_{Cswy.}$	F	83.5	E	78.2	D
		Overall	***B***	***17.6***	***B***	***17.9***	***D***
Alton Road / 5th Street	S	NB	F	84.3	F	91.5	D+50
		SB	C	25.5	C	26.3	D+50
		EB	C	31.9	C	24.0	D+50
		WB	C	21.2	C	22.5	D+50
		Overall	***C***	***33.6***	***C***	***34.5***	***D+50***
MacArthur Causeway / Terminal Isle exclusive right-turn	U	NB	C	19.1	C	16.0	D

Source: David Plummer & Associates

2.4.2 Weekend Intersection Capacity Analysis

Results for the weekend existing conditions intersection analysis show that the overall LOS for all of the study intersections currently operate at acceptable LOS. The westbound left approach and the northwest bound approach (Terminal Island approach) of the MacArthur Causeway / Terminal Isle intersection currently experience delays during the morning and afternoon peak hours. The southbound approach of the MacArthur Causeway / Bridge Road intersection currently experiences delays during both the morning and afternoon peak hours. The northbound approach of the Alton Road / 5th Street intersection also experiences delays during the morning and afternoon peak hours. This may be due to the fact that the County gives priority to vehicles travelling east / west along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets. Exhibit

6 shows the resulting LOS for the existing weekend AM and PM peak hour conditions. Analysis worksheets are included in Appendix D.

Exhibit 6: Existing Weekend Intersection Capacity Analysis
Weekend AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Bridge Road (Star Island)	S	NB SB EB WB ***Overall***	A F A A ***A***	0.0 93.1 6.7 7.9 ***7.4***	A F A A ***A***	0.0 93.7 4.6 8.3 ***6.8***	D D D D ***D***
MacArthur Causeway / Terminal Isle	S	NB_{FPL} $NWB_{T.I}$ $EB_{Cswy.}$ $WBL_{Cswy.}$ ***Overall***	A E A E ***B***	0.0 69.7 8.6 72.2 ***10.4***	A E B E ***B***	0.0 68.6 10.3 71.6 ***12.6***	D D D D ***D***
Alton Road / 5th Street	S	NB SB EB WB ***Overall***	F C C B ***C***	86.0 28.7 27.6 18.7 ***31.9***	F C C C ***D***	114.6 27.3 29.7 22.7 ***37.8***	D+50 D+50 D+50 D+50 ***D+50***
MacArthur Causeway / Terminal Isle exclusive right-turn	U	NB	C	19.5	C	22.2	D

Source: David Plummer & Associates

3.0 PLANNED AND PROGRAMMED ROADWAY IMPROVEMENTS

The 2021 and 2022 Miami-Dade County *Transportation Improvement Program* (TIP) documents, the *2045 Long Range Transportation Program* (LRTP), and the City of Miami Beach's Transportation Master Plan Final Report (with updates) were reviewed to identify any programmed projects within the limits of the established study area. The following improvements were found within the study area:

Roadway Improvements

DT2511563 – Port of Miami Tunnel – New Road Construction from Port of Miami to SR 836 / I-395

DT2516881 – SR 836/I-395 – Bridge, replace and add lanes from West of I-95 to MacArthur Causeway Bridge

Transit / Pedestrian Improvements

DT4434321 – SR A1A/MacArthur Causeway Pedestrian/ Bicycle Bike Path Trial from SR-5/Biscayne Blvd to SR-907/Alton Road

TA4445421 – City of Miami Beach – Transit (trolley) Service Demonstration

TA000109 – DTPW – Smart Plan Corridors T.R.I.P. Capital Expenditures, Transit improvements

MDT135 – Beach Corridor – Rapid transit from Midtown Miami/Downtown to Miami Beach Convention Center

MDT231 – Beach Express South – Implement bus express rapid transit service from downtown intermodal terminal to Miami Beach convention Center

TAMDT287 – Beach Corridor- Downtown to Miami Beach Convention Center Area – Project Development and Environment (PD&E) Phase for the SMART Plan Beach Corridor project. Design district - midtown - downtown to MB Convention Center area. FDOT program # 438749-1

TA4466531 – City of Miami Beach – South Beach Trolley Service Route

TA4389421 – MDT Beach Connection South – Beach connection express bus service

SR A1A / MacArthur Causeway Complete Streets Feasibility Study – Review of multimodal feasibility alternatives along MacArthur Causeway

SR A1A / 5th Street and SR 907 / Alton Road Intersection Improvements – Bike/Pedestrian improvements, enhanced crosswalks and sidewalk crossings

SR A1A / MacArthur Causeway and SR A1A / 5th Street's Feasibility Study of Adaptive Signal Controls – Roadway adaptive signal improvements (not included in study per discussions with reviewer and area signal engineer as project is still in planning stages and no construction / improvement schedule has been implemented)

SR A1A / MacArthur Causeway Light Rail Connection / Shared-Use Path – Light rail connection across the bay, bike lane and pedestrian improvements. (Still in planning stages)

These improvements show no officially programmed or planned capacity improvement projects at the study intersections prior to completion of the proposed project. Therefore, no capacity improvements were included in the analysis. Committed roadway project documentation is included in Appendix E.

4.0 FUTURE TRAFFIC CONDITIONS

4.1 Background Traffic and Committed Developments

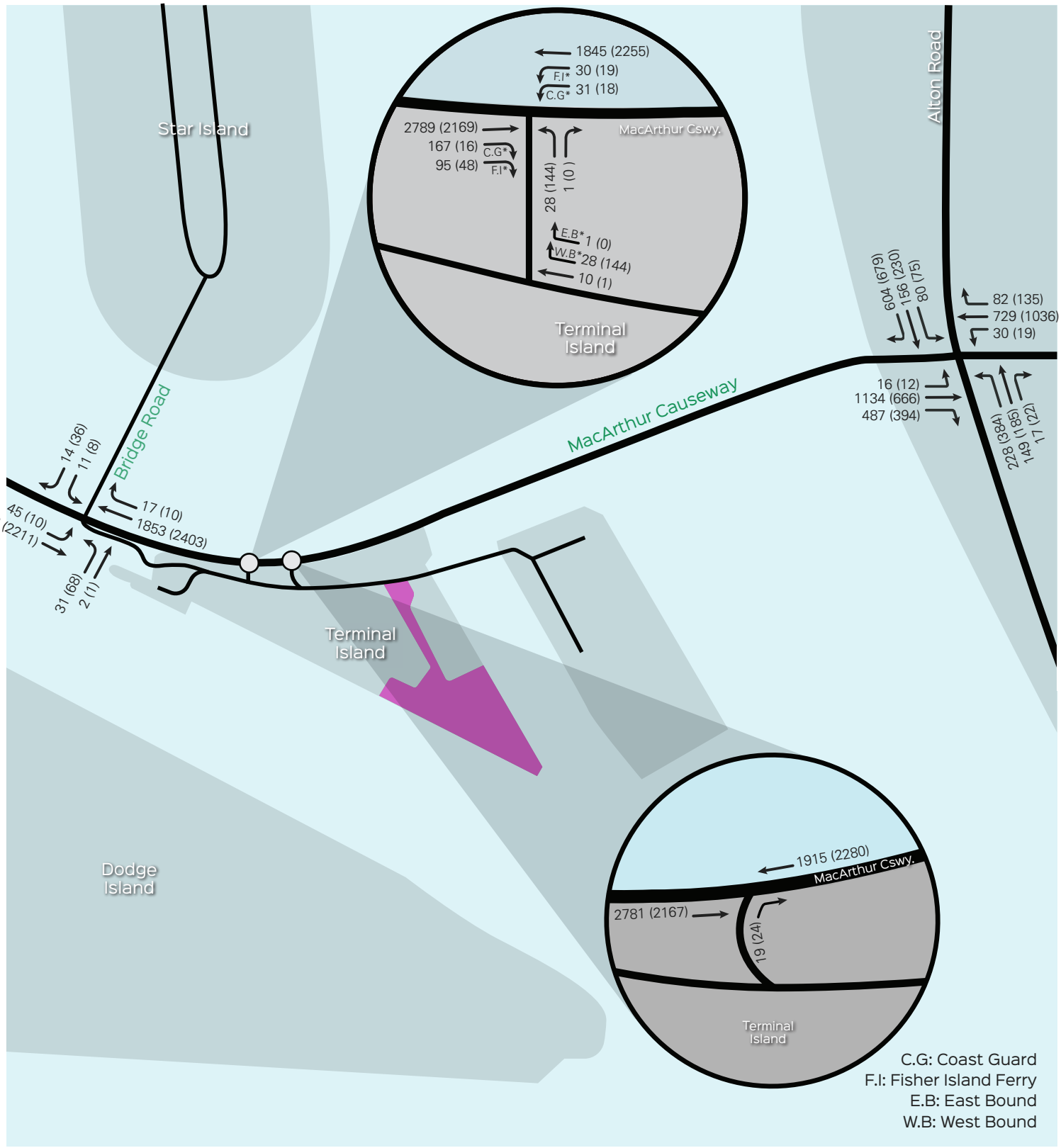
Average Daily Traffic (ADT) counts published by FDOT were reviewed to determine historic growth in the area. This analysis indicated that the annual growth rate from 2015 to 2019 is -1.3% for the past five years; year 2020 data was excluded due to the irregular traffic patterns caused by the Covid-19 pandemic. However, for a conservative analysis, an annual growth rate of 0.5% was used to project future background traffic conditions. In order to account for traffic associated with any additional, unknown committed developments in the area, an additional 0.5% of growth was applied to the growth rate used in the analysis. Historic growth rate documentation is included in Appendix C.

4.2 Future without Project Intersection Capacity Analysis

4.2.1 Weekday Intersection Capacity Analysis

Future without project weekday turning movement volumes were obtained by applying two additional years of background growth to the existing network. Exhibit 7 shows the projected weekday AM and PM peak hour turning movement counts for future without project conditions. The Synchro Software was used to perform intersection capacity analysis at the analyzed intersections for the weekday and weekend peak hours. Exhibit 8 shows the resulting LOS for the future without project conditions during the weekday AM and PM peak hours. Results for intersection analysis for future without project weekday conditions show that the overall LOS for all of the study intersections continue to operate at acceptable LOS.

As with existing conditions, the westbound left approach and the northwest bound approach (Terminal Island approach) of the MacArthur Causeway / Terminal Isle intersection, the northbound and southbound approaches of the MacArthur Causeway / Bridge Road intersection and the northbound approach of the Alton Road / 5th Street intersection all continue to experience delays during both the morning and afternoon peak hours. These delays may be due to the fact that the County gives priority to vehicles traveling east / west along MacArthur Causeway (5th Street), therefore, accepting delays on cross streets. Analysis worksheets are included in Appendix D.



00 AM
(00) PM
Project Location

Exhibit 7

Future Without Project Weekday AM and PM Peak Hour Volumes

NORTH
MAP NOT TO SCALE

Exhibit 8: Future without Project Weekday Intersection Capacity Analysis
Weekday AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Bridge Road (Star Island)	S	NB	F	124.1	F	128.9	D
		SB	F	101.4	F	108.6	D
		EB	A	8.7	B	14.1	D
		WB	A	9.0	C	21.2	D
		Overall	***B***	***10.0***	***C***	***20.3***	***D***
MacArthur Causeway / Terminal Isle	S	NB_{FPL}	A	0.0	A	0.0	D
		$NWB_{T.I}$	E	69.8	F	94.2	D
		$EB_{Cswy.}$	B	16.1	B	12.3	D
		$WBL_{Cswy.}$	F	83.5	E	78.2	D
		Overall	***B***	***18.1***	***B***	***18.2***	***D***
Alton Road / 5th Street	S	NB	F	84.8	F	96.1	D+50
		SB	C	25.7	C	27.1	D+50
		EB	C	32.8	C	24.3	D+50
		WB	C	21.6	C	22.8	D+50
		Overall	***C***	***34.2***	***D***	***35.6***	***D+50***
MacArthur Causeway / Terminal Isle exclusive right-turn	U	NB	C	19.5	C	16.3	D

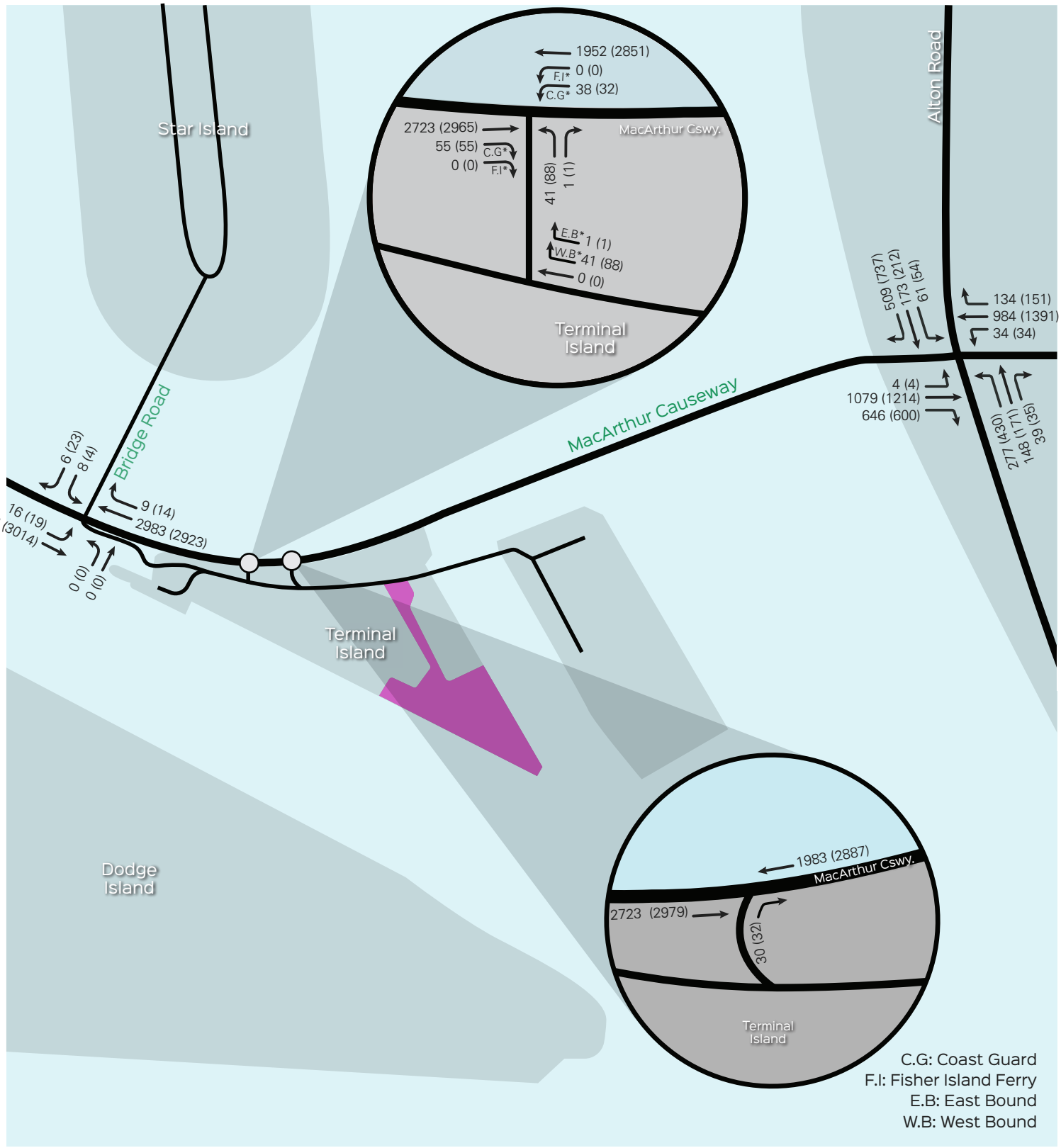
Source: David Plummer & Associates

4.2.2 Weekend Intersection Capacity Analysis

Future without project weekend turning movement volumes were obtained by applying two additional years of background growth to the existing network. Exhibit 9 shows the projected weekend AM and PM peak hour turning movement counts for future without project conditions.

The Synchro Software was used to perform intersection capacity analysis at the analyzed intersections for the weekend peak hours. Exhibit 10 shows the resulting LOS for the future without project conditions during the weekend AM and PM peak hours. Results for intersection analysis for future without project weekday conditions show that the overall LOS for all of the studied intersections continue to operate at an acceptable LOS.

As with existing conditions, the southbound approach of the MacArthur Causeway / Bridge Road intersection and the northbound approach of the Alton Road / 5th Street intersection continue to experience delays during both the morning and afternoon peak hours. The westbound left approach and the northwest bound approach (Terminal Isle approach) at the MacArthur Causeway / Terminal Isle intersection also continue to experience delays during the morning and afternoon peak hours. The westbound left approach and the northwest bound approach (Terminal Isle approach) at the MacArthur Causeway / Terminal Isle intersection also continue to experience delays during the morning and afternoon peak hours. Analysis worksheets are included in Appendix D.



00 AM
(00) PM
Project Location

Exhibit 9

Future Without Project Weekend AM and PM Peak Hour Volumes

NORTH
MAP NOT TO SCALE

Exhibit 10: Future without Project Weekend Intersection Capacity Analysis
Weekend AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Bridge Road (Star Island)	S	NB	A	0.0	A	0.0	D
		SB	F	93.6	F	93.8	D
		EB	A	6.9	A	4.8	D
		WB	A	8.0	A	8.7	D
		Overall	***A***	***7.6***	***A***	***7.1***	***D***
MacArthur Causeway / Terminal Isle	S	NB_{FPL}	A	0.0	A	0.0	D
		$NWB_{T.I}$	E	69.7	E	68.6	D
		$EB_{Cswy.}$	A	8.9	B	10.7	D
		$WBL_{Cswy.}$	E	72.0	E	71.6	D
		Overall	***B***	***10.7***	***B***	***13.0***	***D***
Alton Road / 5th Street	S	NB	F	87.5	F	119.9	D+50
		SB	C	29.2	C	27.8	D+50
		EB	C	28.3	C	30.5	D+50
		WB	C	19.0	C	23.3	D+50
		Overall	***C***	***32.6***	***D***	***39.0***	***D+50***
MacArthur Causeway / Terminal Isle exclusive right-turn	U	NB	C	20.0	C	22.6	D

Source: David Plummer & Associates

4.3 Project Trip Generation

Weekday trip generation for the proposed project was estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition, which provides gross trip generation rates and/or equations by land use type. These rates and equations estimate vehicle trip ends at a free-standing site's driveways.

The proposed development plan incorporates office and restaurant land uses, which can satisfy the lunch/diner trip for some employees and visitors without making a trip off-site. An internalization matrix was developed to establish the appropriate number of internal project trips. Internal capture rates used are also included in Appendix F.

ITE research shows that a certain percent of restaurant trips are "*pass-by*" trips. These are described as trips "attracted from the traffic passing the site on an adjacent street." These are not new trips, but trips already using the existing roadway network that stop at the proposed use and go back to their original path. Pass-by trips for this use were established based on guidelines provided in ITE's *Trip Generation Handbook* 3rd Edition. The average pass-by rate published by ITE for Restaurant use is 44% during the PM peak hour however, at the request of the City reviewer, a 10% reduction was used for pass-by trips applied to restaurant trips.

The study area is pedestrian and bicyclist friendly and transit is readily available (see Section 5 of this report for additional pedestrian and transit information). US Census data shows an existing 8.5% overall use of other modes of transportation in the US Census Tract 41.02 where the project is located (see Appendix F).

As previously mentioned, the City requested that the analysis analyze the normal and maximum impacts that the project could have on the nearby roadway network. As such trip generation analysis was performed for the project based on the square footage of the office building and based on the maximum number of office employees (based on occupancy per floor). The weekday project trip generation summaries for office employees and office square footage are provided in Exhibits 11 and 12.

Exhibit 11: Weekday (Office – Employees) AM and PM Peak Hour Project Trip Generation Summary

Proposed ITE Land Use Designation[1]	Size/Units	Daily (Two-way)	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
			In	Out	Total	In	Out	Total
Office (Land Use 710)	932 Employees	2,922	200	41	241	55	220	275
Restaurant (Land Use 931)	100 Seats	260	1	1	2	19	9	28
Gross External Trips		**3,182**	**201**	**42**	**243**	**74**	**229**	**303**
Internalization AM, PM		0%, 0%	0	0	0	0	0	0
Other Modes of Transportation[2]		8.5%	-17	-3	-20	-7	-20	-27
Pass-By Restaurant (PM)[3]		10%	0	0	0	-1	-1	-2
Proposed Net External Trips			**184**	**39**	**223**	**66**	**208**	**274**

[1] Based on ITE Trip Generation Manual, 10th Edition

[2] Based on US Census Tract 41.02

[3] Based on ITE Trip Generation Handbook, 3rd Edition (PM pass-by) is 44%, however 10% was used per City's request.

Exhibit 12: Weekday (Office – SF) AM and PM Peak Hour Project Trip Generation Summary

Proposed ITE Land Use Designation[1]	Size/Units	Daily (Two-way)	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
			In	Out	Total	In	Out	Total
Office (Land Use 710)	171,305 SF	1,788	161	26	187	30	159	189
Restaurant (Land Use 931)	100 Seats	260	1	1	2	19	9	28
Gross External Trips		**2,048**	**162**	**27**	**189**	**49**	**168**	**217**
Internalization AM, PM		0%, 0%	0	0	0	0	0	0
Other Modes of Transportation[2]		8.5%	-14	-2	-16	-5	-15	-20
Pass-By Restaurant (PM)[3]		10%	0	0	0	-1	-1	-2
Proposed Net External Trips			**148**	**25**	**173**	**43**	**152**	**195**

[1] Based on ITE Trip Generation Manual, 10th Edition

[2] Based on US Census Tract 41.02.

[3] Based on ITE Trip Generation Handbook, 3rd Edition (PM pass-by) is 44%, however 10% was used per City's request.

Based on the 96-hour counts collected on the roadways, it was determined that Saturday experiences the most weekend trips to/from Terminal island. Thus, the weekend trip generation was based on the Saturday trip generation. As only the office is proposed to be open on the weekends, the restaurant use (LU 931) was excluded from the trip generation. Weekend trip

generation for the proposed project was estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition, which provides gross trip generation rates and/or equations by land use type. As the *Trip Generation Manual* does not provide an AM and PM peak hour trip generation for the office use on Saturday, the Saturday trip generation was based on the Saturday peak hour of generator. An 8.5% reduction was applied to the trip generation to account for other modes of transportation. The weekend project trip generation summaries for the office employees and office square footage are provided in Exhibits 13 and 14. ITE trip generation worksheets are provided in Appendix F.

Exhibit 13: Saturday (Office – Employees) Peak Hour Project Trip Generation Summary

Proposed ITE Land Use Designation[1]	Size/Units	Saturday (Two-way)	Saturday Peak Hour of Generator Vehicle Trips		
			In	Out	Total
Office (Land Use 710)	932 Employees	400	45	39	84
Restaurant (Land Use 931)	(Closed)	-	-	-	-
Gross External Trips		**400**	**45**	**39**	**84**
Other Modes of Transportation[2] 8.5%		-34	-4	-3	-7
Proposed Net External Trips		366	**41**	**36**	**77**

[1] Based on ITE Trip Generation Manual, 10th Edition

[2] Based on US Census Tract 41.02.

Exhibit 14: Saturday (Office – SF) Peak Hour Project Trip Generation Summary

Proposed ITE Land Use Designation[1]	Size/Units	Saturday (Two-way)	Saturday Peak Hour of Generator Vehicle Trips		
			In	Out	Total
Office (Land Use 710)	171,305 SF	378	49	42	91
Restaurant (Land Use 931)	(Closed)	-	-	-	-
Gross External Trips		**378**	**49**	**42**	**91**
Other Modes of Transportation[2] 8.5%		-32	-4	-4	-8
Proposed Net External Trips		346	**45**	**38**	**83**

[1] Based on ITE Trip Generation Manual, 10th Edition

[2] Based on US Census Tract 41.02.

4.4 Project Trip Assignment

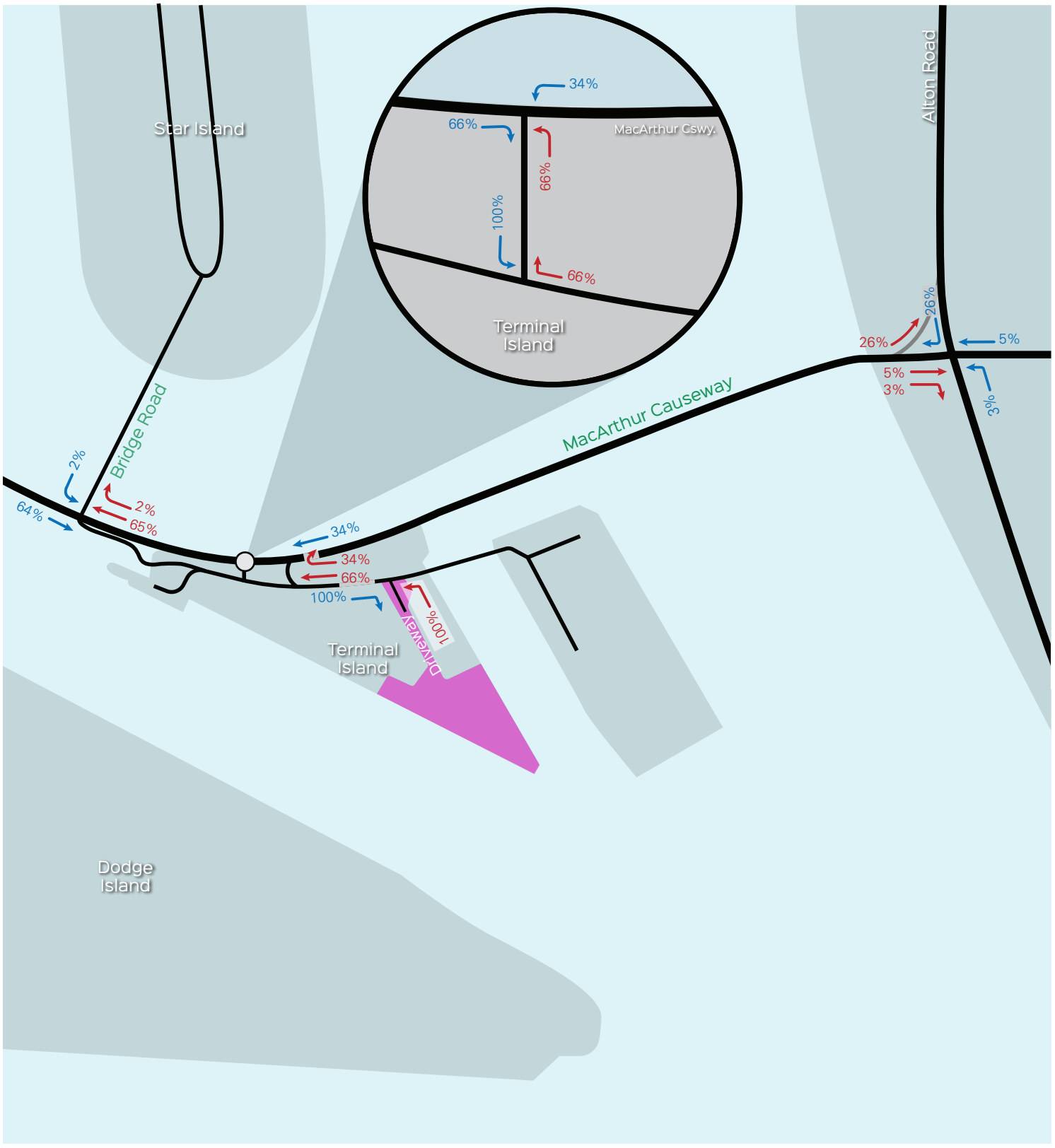
Project traffic was distributed and assigned to the study area using the Cardinal Distribution for TAZ 651 shown in Exhibit 15. The Cardinal Distribution gives a generalized distribution of trips from a TAZ to other parts of Miami-Dade County (see Appendix C). The TAZ can be summarized as 46% to the north, 1% from the south, 8% from the east, and 45% to the west.

Exhibit 15: Cardinal Distribution (TAZ 651)

DIRECTION	2015	2045	2023
NNE	30.2%	18.6%	27.11%
ENE	2.0%	1.2%	1.79%
ESE	6.3%	4.4%	5.79%
SSE	0.0%	0.0%	0.00%
SSW	1.2%	1.6%	1.31%
WSW	13.4%	22.7%	15.88%
WNW	27.2%	35.8%	29.49%
NNW	19.6%	15.8%	18.59%

Source: Long Range *Transportation Plan*

For estimating trip distribution for the project traffic, consideration was given to conditions such as the roadway network accessed by the project traffic, roadways available to travel in the desired direction, and attractiveness of traveling on a specific roadway. Exhibit 16 shows the trip distribution for the project. Exhibits 17 and 18 show the project trip assignment for the weekday AM and PM peak hours for the project based on the office employee and office square footage trip generations. (For a more conservative analysis, PM peak hour pass-by trips were not deducted in the analysis as the pass-by trips would be diverted from MacArthur Causeway onto Terminal Island). Exhibits 19 and 20 show the project trip assignment for the weekend peak hour for the project based on the office employee and office square footage trip generations.



Project Location

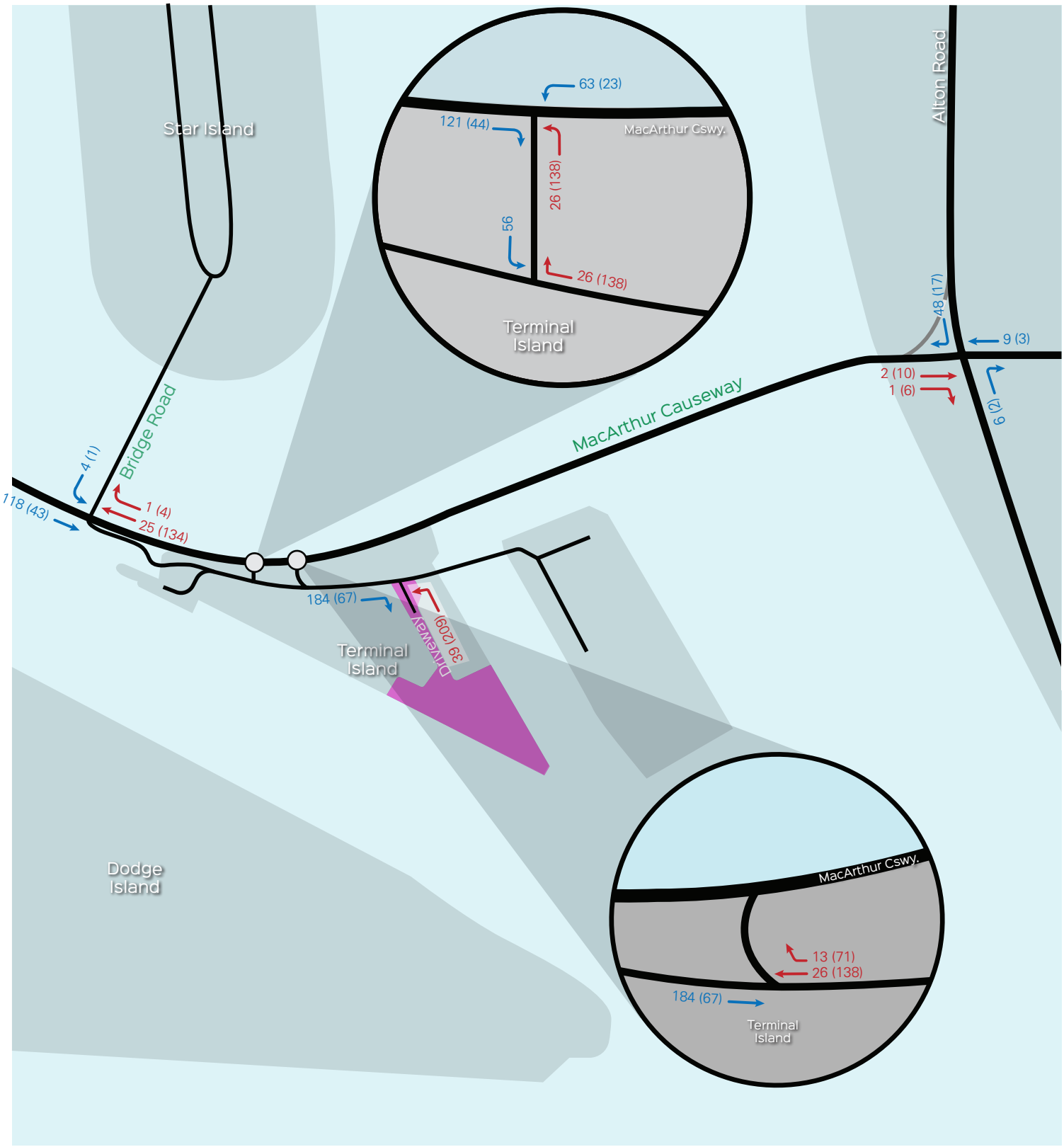
% In

% Out

Exhibit 16

Project Trip Distribution

NORTH
MAP NOT TO SCALE



Project Location

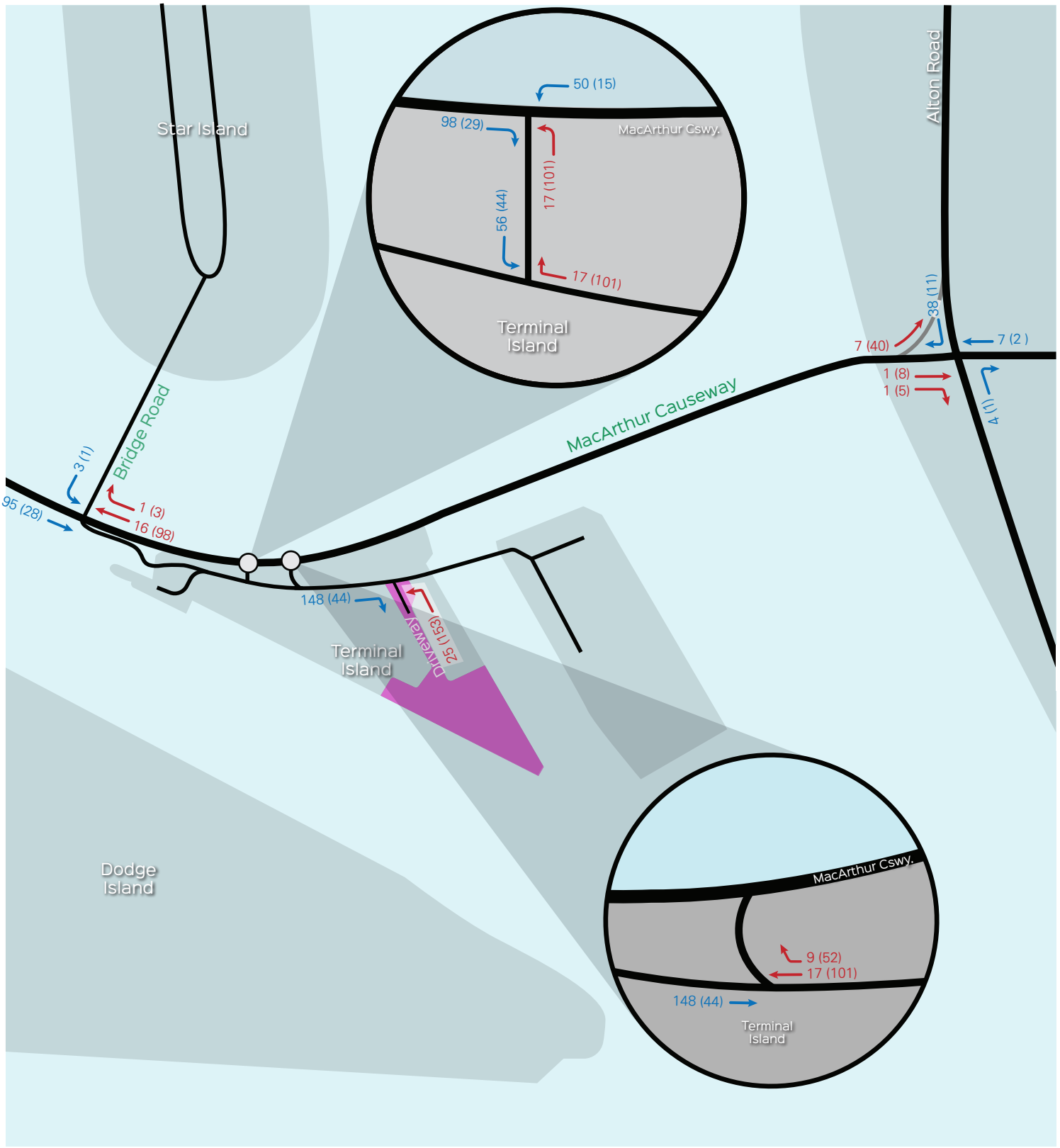
In
Out

00 AM
(00) PM

Exhibit 17

Project Trip Assignment - Weekday Office Employees

NORTH
MAP NOT TO SCALE



Project Location

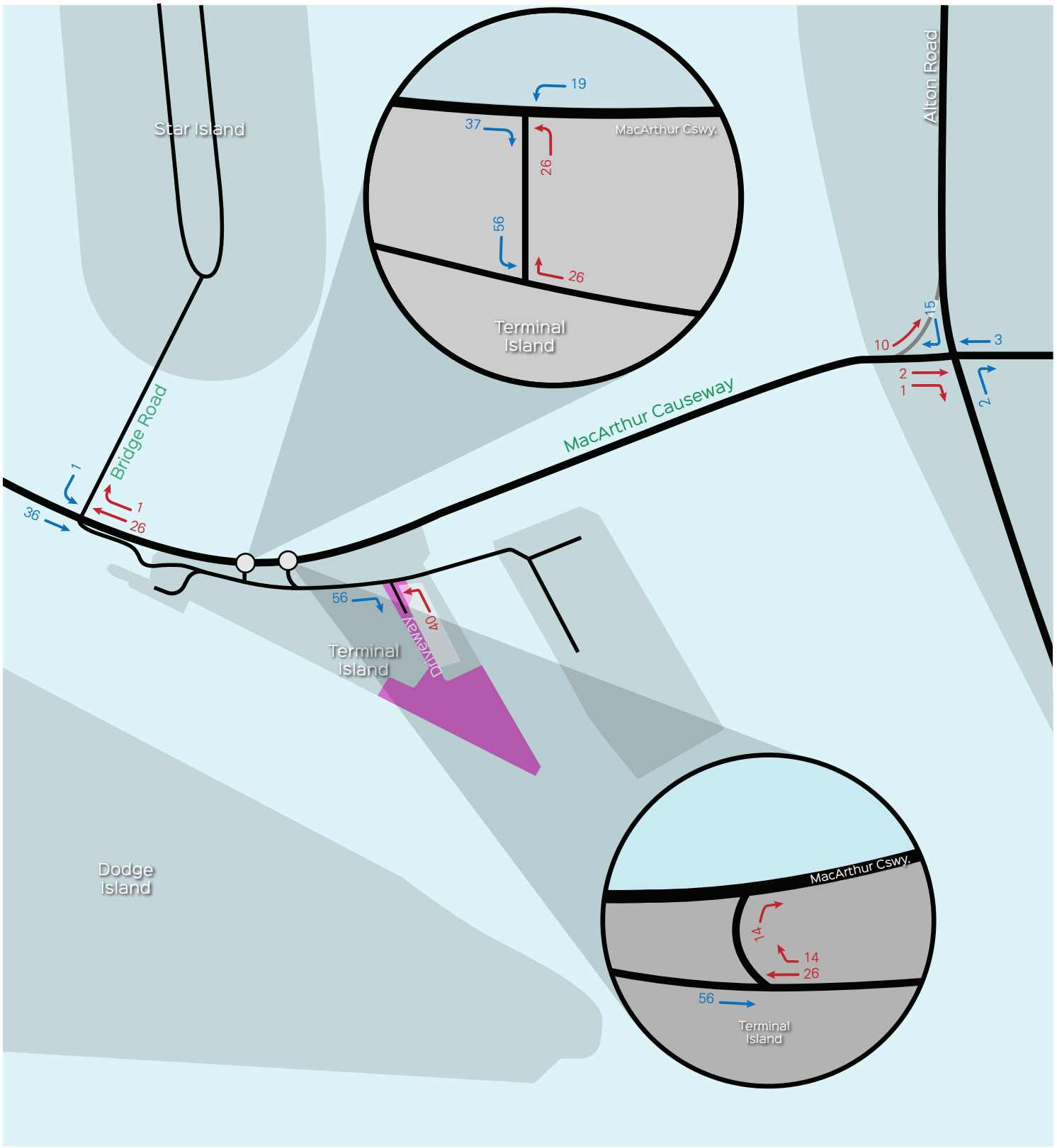
In
Out

00 AM
(00) PM

Exhibit 18

Project Trip Assignment - Weekday Office Square Footage

NORTH
MAP NOT TO SCALE



Project Location

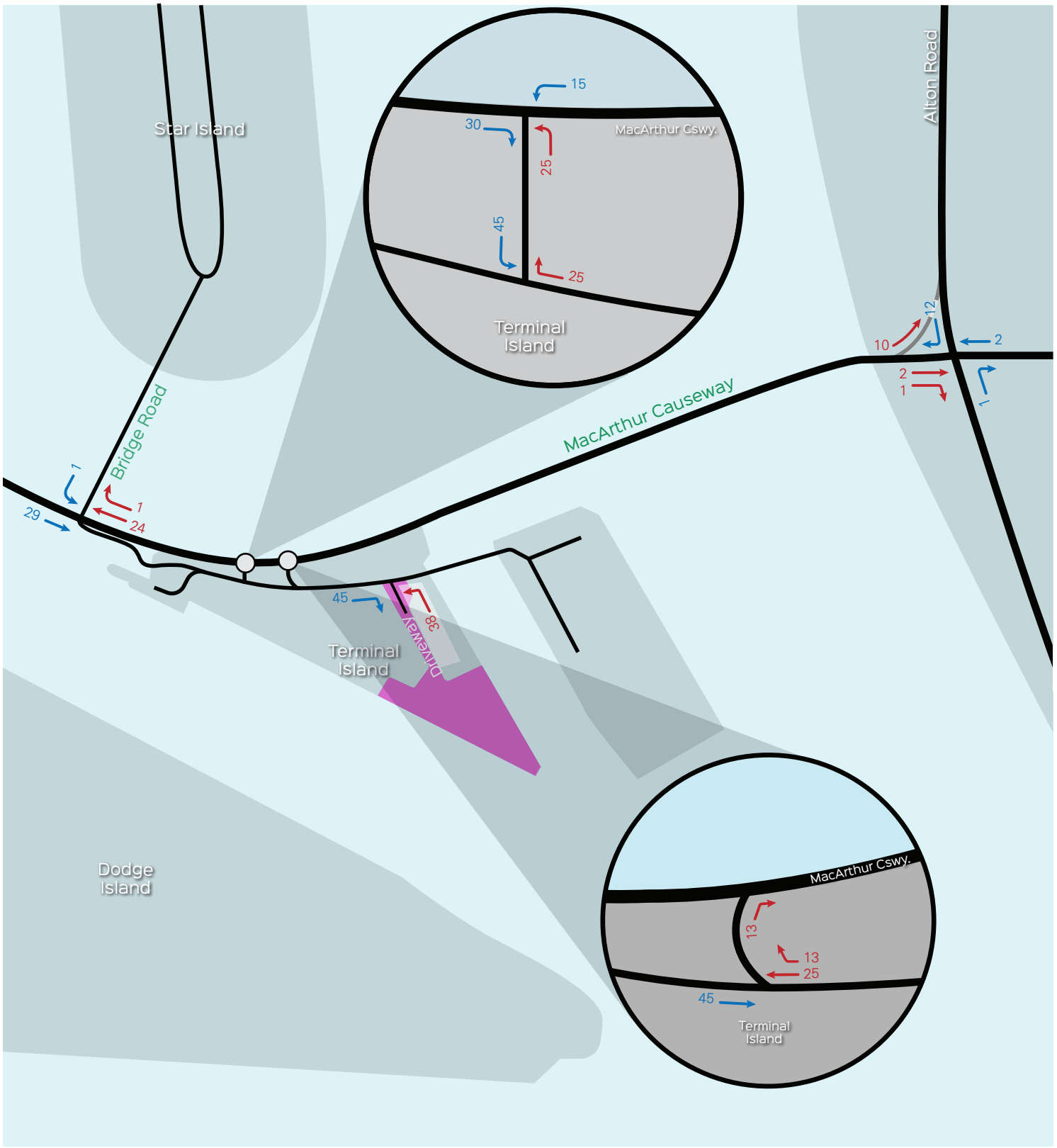
In

Out

Exhibit 19

Project Trip Assignment - Weekend Office Employees

NORTH
MAP NOT TO SCALE



Project Location
In
Out

Exhibit 20

Project Trip Assignment - Weekend Office Square Footage

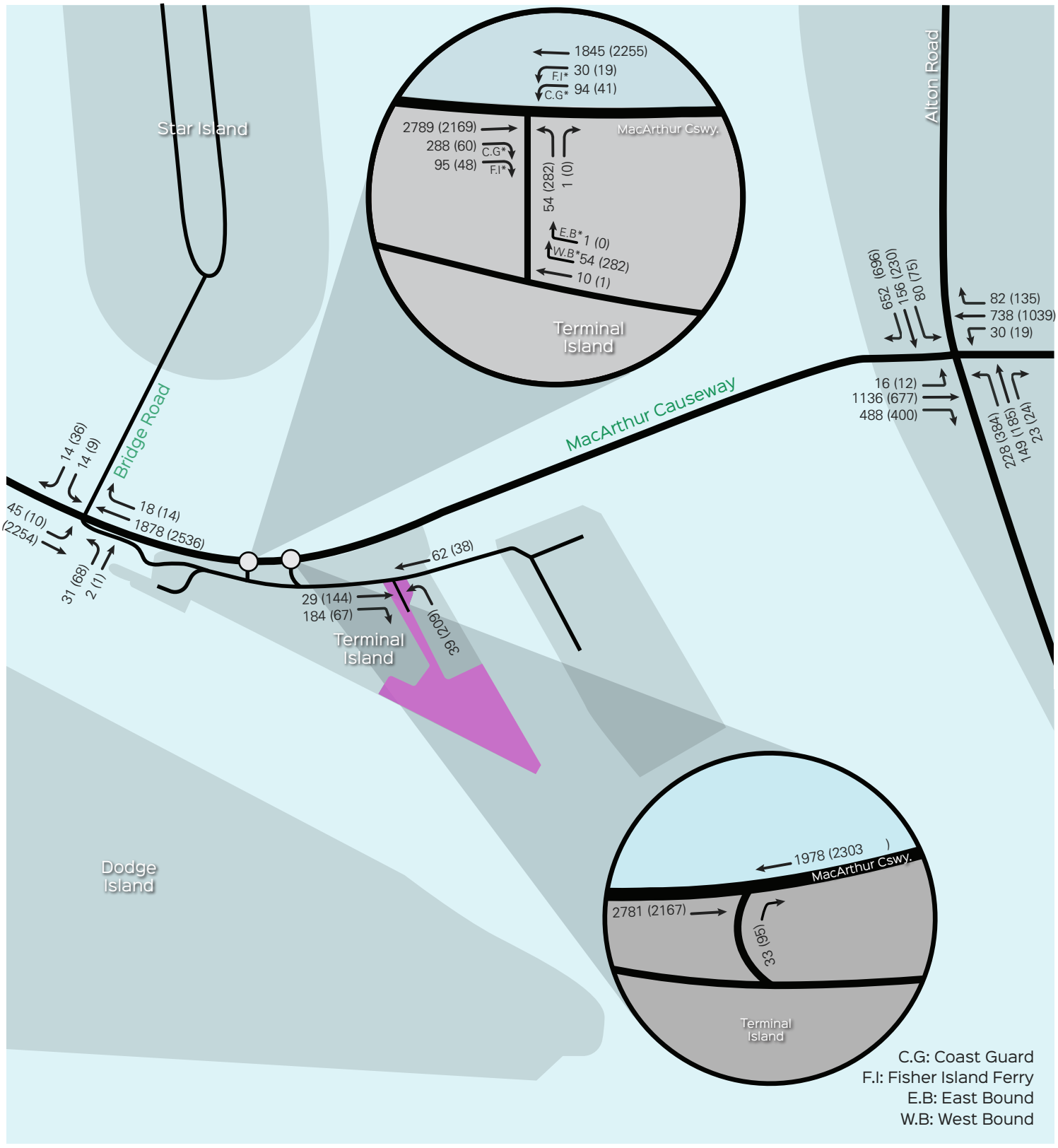
NORTH
MAP NOT TO SCALE

4.5 Future with Project Intersection Capacity Analysis

4.5.1 Weekday Intersection Capacity Analysis (Office – Employees)

Future background traffic and traffic projections for the project were combined to obtain weekday future traffic with project conditions at the analyzed intersections. Exhibit 21 shows the projected turning movement volumes for weekday future with project conditions (based on employee occupancy). Results of the future with the project conditions intersection analysis are displayed in Exhibit 22. The results show that the overall LOS for the studied intersections are projected to continue to operate within the LOS standards established by the City of Miami Beach.

As with the existing and future without project conditions, the northbound and southbound approaches of the MacArthur Causeway / Bridge Road intersection continue to experience delays during both the morning and afternoon peak hours. This is an existing condition; the project adds no delay to the northbound approach during the AM and PM peak hours and adds only 3.6 seconds of delay to the southbound approach during the AM peak hour and 0.6 seconds of delay to the southbound approach during the PM peak hour. The northbound approach of the Alton Road / 5th Street intersection also continues to experience delays during both the morning and afternoon peak hours. It should be noted that the project adds less than one second of delay to the northbound approach during the AM and PM peak hours. These delays may be due to the fact that the County gives priority to vehicles travelling east / west through this area, therefore, accepting delays on cross-streets. As with existing and future without project conditions, the westbound left approach of the Terminal Isle / MacArthur Causeway intersection continues to experience delays during the AM and PM peak hour. This is an existing condition; the project adds no delay during the AM and PM peak hours. The northwest bound approach (Terminal Isle approach) at the MacArthur Causeway / Terminal Isle intersection experiences delays during the morning and afternoon peak hours. The project adds no delay to this approach during the AM peak hour. It should be noted that the project represents less than 5% of the total projected intersection volume during the morning and afternoon peak hours. The project driveway was analyzed and the results show adequate operations. Intersection capacity worksheets are included in Appendix D.



Project Location 00 AM
(00) PM

Exhibit 21

Future With Project Weekday AM and PM Peak Hour Volumes - Office Empoyees

NORTH
MAP NOT TO SCALE

Exhibit 22: Future with Project Weekday (Office – Employees) Intersection Capacity Analysis
Weekday AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Bridge Road (Star Island)	S	NB	F	124.1	F	128.9	D
		SB	F	105.0	F	109.2	D
		EB	B	11.0	B	14.4	D
		WB	B	10.5	B	23.0	D
		Overall	***B***	***12.1***	***B***	***21.3***	***D***
MacArthur Causeway / Terminal Isle	S	NB_{FPL}	A	0.0	A	0.0	D
		$NWB_{T.I}$	E	68.7	F	372.8	D
		$EB_{Cswy.}$	C	27.8	B	14.2	D
		$WBL_{Cswy.}$	E	71.3	E	76.0	D
		Overall	***C***	***30.2***	***D***	***54.4***	***D***
Alton Road / 5th Street	S	NB	F	85.3	F	97.0	D+50
		SB	C	24.5	C	26.7	D+50
		EB	C	33.2	C	24.4	D+50
		WB	C	21.9	C	22.9	D+50
		Overall	***C***	***34.1***	***D***	***35.6***	***D+50***
MacArthur Causeway / Terminal Isle exclusive right-turn	U	NB	C	20.4	C	19.9	D
Terminal Isle / Project Driveway	U	NB	A	9.2	B	10.7	N/A

Source: David Plummer & Associates

Signal Timing Adjustments are recommended to mitigate some of the effects of the project at the MacArthur Causeway / Terminal Island. Adding two seconds of green time to the westbound left turning movement during the AM peak hour and adding green time to the northwest bound movement during the PM peak hour reduces delays and improves the intersection's overall delay.

Signal Timing Adjustments are recommended to mitigate some of the effects of the project at the Alton Road / 5th Street intersection. During the AM peak hour, adding four seconds of green time to the northbound phase reduces delays at the northbound approach. During the PM peak hour, adding three seconds of green time to the northbound phase reduces delays at the northbound

approach and improves the intersection's overall LOS. Exhibit 23 shows the results of the future with the project conditions intersection analysis after signal timing adjustments.

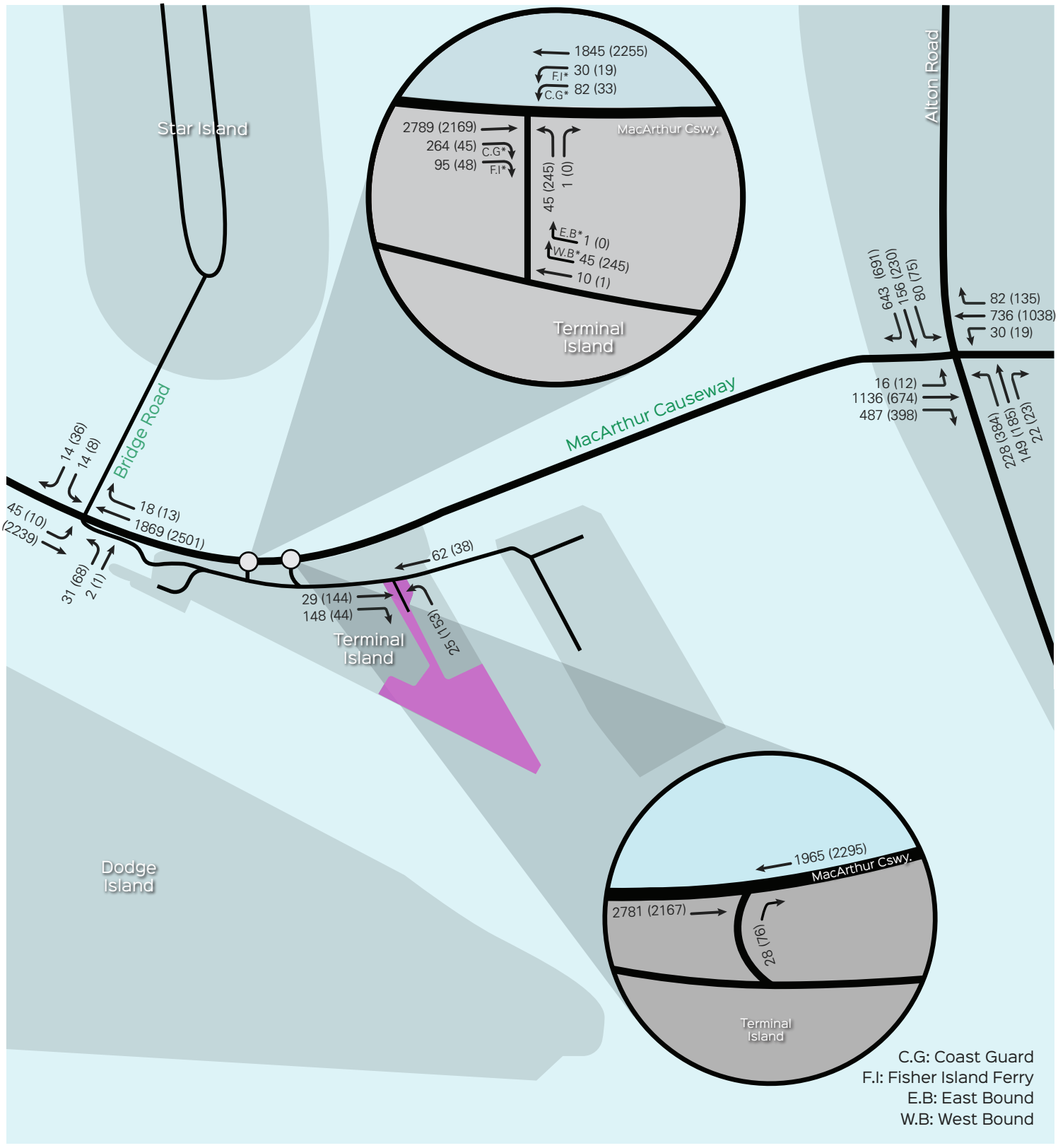
Exhibit 23: Future with Project Weekday (Office – Employees) Intersection Capacity Analysis with Signal Timing Improvements
Weekday AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Terminal Isle	S	NB_{FPL}	A	0.0	A	0.0	D
		$NWB_{T.I}$	E	68.7	F	82.1	D
		$EB_{Cswy.}$	C	25.1	C	24.5	D
		$WBL_{Cswy.}$	E	77.6	E	76.0	D
		Overall	***C***	***27.9***	***C***	***31.9***	***D***
Alton Road / 5th Street	S	NB	D+49	81.8	E+37	75.0	D+50
		SB	C	25.5	C	31.2	D+50
		EB	C	33.2	C	24.9	D+50
		WB	C	22.3	C	23.3	D+50
		Overall	***C***	***34.1***	***C***	***33.7***	***D+50***

4.5.2 Weekday Intersection Capacity Analysis (Office – SF)

Future background traffic and traffic projections for the project were combined to obtain weekday future traffic with project at the analyzed intersections. Exhibit 24 shows the projected turning movement volumes for weekday future with project conditions. Results of the future with the project conditions intersection analysis are displayed in Exhibit 25. The results show that the overall LOS for the studied intersections are projected to continue to operate within the LOS standards established by the City of Miami Beach.

As with the existing and future without project conditions, the northbound and southbound approaches of the MacArthur Causeway / Bridge Road intersection continue to experience delays during both the morning and afternoon peak hours. This is an existing condition; the project adds no delay to the northbound approach during the AM and PM peak hours and adds only 3.6 seconds and no delay to the southbound approach during the AM and PM peak hours. The northbound approach of the Alton Road / 5th Street intersection also continues to experience delays during both the morning and afternoon peak hours. It should be noted that the project adds less than one second of delay to the northbound approach during the AM and PM peak hours. These delays may be due to the fact that the County gives priority to vehicles travelling east / west through this area, therefore, accepting delays on cross-streets. As with existing and future without project conditions, the westbound left approach and at the MacArthur Causeway / Terminal Isle intersection experiences delays during the morning and afternoon peak hours. It should be noted that the project adds no delay to this movement during the AM peak hour. The northwest bound approach (Terminal Isle approach) at the MacArthur Causeway / Terminal Isle intersection continues to experience delays during the morning and afternoon peak hours. It should be noted that this is an existing condition; the project is projected to add no delay and only 4.3 seconds of delay to this movement during the respective AM and PM peak hours. Furthermore, the project represents approximately 3% of the total projected intersection volume during the morning and afternoon peak hours. The project driveway was analyzed and the results show adequate operations. Intersection capacity worksheets are included in Appendix D.



Project Location 00 AM
(00) PM

Exhibit 24

Future With Project Weekday AM and PM Peak Hour Volumes
- Office Square Footage

NORTH
MAP NOT TO SCALE

Exhibit 25: Future with Project Weekday (Office – SF) Intersection Capacity Analysis
Weekday AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Bridge Road (Star Island)	S	NB	F	124.1	F	128.9	D
		SB	F	105.0	F	108.6	D
		EB	A	10.9	B	14.3	D
		WB	A	10.5	C	22.5	D
		Overall	***B***	***12.0***	***C***	***21.0***	***D***
MacArthur Causeway / Terminal Isle*	S	NB_{FPL}	A	0.0	A	0.0	D
		$NWB_{T.I}$	E	69.9	F	282.1	D
		$EB_{Cswy.}$	B	16.0	C	13.0	D
		$WBL_{Cswy.}$	F	83.5	F	82.5	D
		Overall	***B***	***18.2***	***D***	***40.3***	***D***
Alton Road / 5th Street	S	NB	F	85.3	F	96.6	D+50
		SB	C	24.7	C	26.9	D+50
		EB	C	33.2	C	24.4	D+50
		WB	C	21.8	C	22.8	D+50
		Overall	***C***	***34.2***	***D***	***35.6***	***D+50***
MacArthur Causeway / Terminal Isle exclusive right-turn	U	NB	C	19.5	C	18.7	D
Terminal Isle / Project Driveway	U	NB	A	9.5	B	10.1	N/A

*LOS after PM peak hour signal timing

Source: David Plummer & Associates

Signal Timing Adjustments are recommended to mitigate some of the effects of the project at the MacArthur Causeway / Terminal Island intersection. Adding green time to the northwest bound movement reduces delays and improves the intersection's overall LOS during the PM peak hour.

Signal Timing Adjustments are recommended to mitigate some of the effects of the project at the MacArthur Causeway / Alton Road intersection. During the AM peak hour, adding nine seconds of green time to the northbound phase reduces delays at the northbound approach. During the PM peak hour, adding two seconds of green time to the northbound phase reduces delays at the northbound approach and improves the intersection's overall LOS. Exhibit 26 shows the results of the future with project conditions intersection analysis after signal timing adjustments.

Exhibit 26: Future with Project Weekday (Office – SF) Intersection Capacity Analysis with Signal Timing Improvements
Weekend AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Terminal Isle	S	NB_{FPL}	-	-	A	0.0	D
		$NWB_{T.I}$	-	-	E	68.9	D
		$EB_{Cswy.}$	-	-	C	22.8	D
		$WBL_{Cswy.}$	-	-	F	82.5	D
		Overall	-	-	***C***	***28.5***	***D***
Alton Road / 5th Street	S	NB	E+46	80.1	E+46	80.0	D+50
		SB	C	25.0	C	28.5	D+50
		EB	C	34.6	C	25.0	D+50
		WB	C	22.3	C	23.5	D+50
		Overall	***C***	***34.4***	***C***	***33.9***	***D+50***

The approximate existing storage length and the projected 95th percentile back of queue at all the exclusive turn lanes for the weekday AM and PM peak hour conditions are displayed in Exhibit 27. The results show that the existing storage lengths at the intersection of MacArthur Causeway and Bridge Road has enough capacity to accommodate the projected 95th percentile back of queues.

The projected 95th percentile back of queue for the eastbound right turn lane at the MacArthur Causeway / Terminal Isle intersection is currently and projected to exceed the storage length during the AM peak hour. It should be noted that the Synchro software may be overestimating the 95th percentile back of queue (BOQ) for the eastbound right turn lane. Field observations of the eastbound right turn lane made during the AM peak hour (see Section 6 for more information) showed a maximum queue of six vehicles. However, the software is reporting an existing queue length of 210 feet, approximately 10 vehicles, during the AM peak hour. The westbound left turn lane at the MacArthur Causeway / Terminal Isle intersection is also projected to exceed the storage length during the AM and PM peak hours of the future with project conditions during the maximum employee scenario. The Synchro analysis shows a maximum queue of 214 feet, approximately 10 vehicles (during the worst-case scenario of full employee occupancy). Based on the length of the turn lane, the queue is not projected to fit within the provided left turn lane. However, field observations show that the westbound left-turn lane on the MacArthur Causeway wider and longer

than a standard turn-lane. The taper was measured to still be at least 9 feet wide at 214 feet in length. Furthermore, during the queuing observations of the MacArthur Causeway / Terminal Island intersection (see Section 7.2) a maximum queue of 9 vehicles (many of which were work trucks) was observed to fit within the existing westbound left-turn lane without blocking the westbound through lanes on MacArthur Causeway.

The Alton Road / 5th Street intersection eastbound right turning lane's 95th percentile back of queue is projected to exceed the existing storage length during the AM peak hour. The Alton Road / 5th Street intersection northbound left turning lane's 95th percentile back of queue is also projected to exceed the existing storage length during the PM peak hour. It should be noted that these are existing conditions, the project adds no queue to the BOQ at these turning lanes.

Exhibit 27: Weekday Projected 95th Percentile Back of Queues and Existing Storage Length (Feet)

Intersection	Direction	Existing		Future without Project		Future with Project - Employees		Future with Project - SF		Existing Storage Length
		AM	PM	AM	PM	AM	PM	AM	PM	
MacArthur Causeway / Bridge Road (Star Isle)	EBL WBR	118 0	26 0	118 0	26 0	65 0	26 0	118 0	26 0	145 110
MacArthur Causeway / Terminal Isle	$EBR_{Cswy.}$ $WBL_{Cswy.}$ WB_{Ter}	210 123 0	57 85 215	214 123 0	58 85 218	384 214 0	95 120 448	311 123 0	81 108 369	170 155 300[3]
Alton Road / 5th Street	EBR WBL WBR NBL SBR[2]	332 115 30 192 0	59 49 32 299 0	332 115 30 192 0	59 49 32 299 0	332 115 30 192 0	59 49 32 299 0	332 115 30 192 0	59 49 32 299 0	260 140 280 240 350+

[1]SBL movement occurs from continues through lane
[2]SBR movement is a through lane that becomes an exclusive turn lane
[3]Distance along Terminal Island Road before the queue blocks a driveway

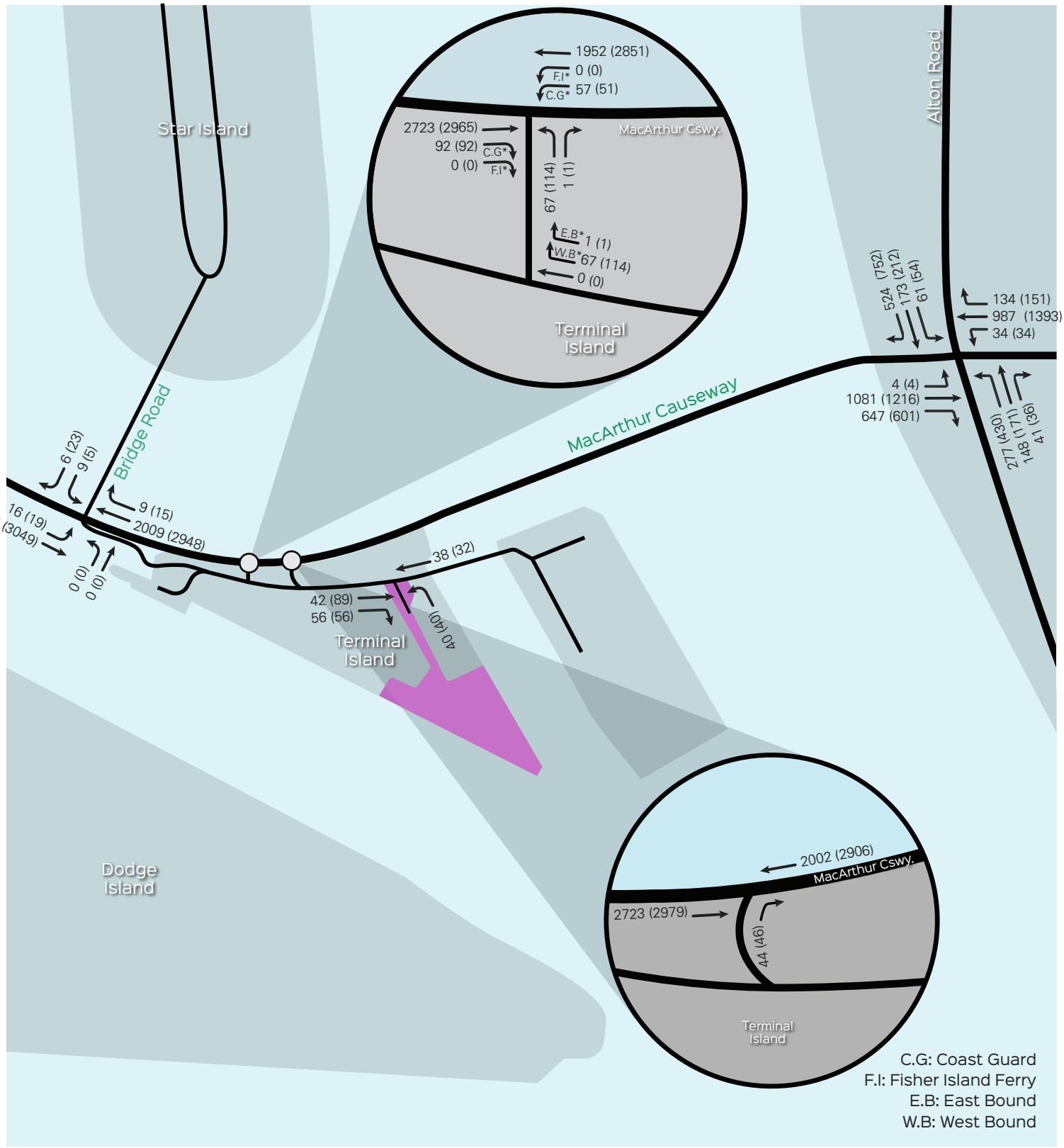
Source: David Plummer & Associates

4.5.3 Weekend Intersection Capacity Analysis (Office – Employees)

Future background traffic and traffic projections for the project were combined to obtain the weekend future traffic with project at the analyzed intersections. Since the timing for the Saturday peak hour is undefined it was assumed that the office would experience its peak hour at the same times of day that the roadway peaks. To provide a more conservative analysis the Saturday peak hour of generator trips were applied to both the AM and PM weekend peak hours. Exhibit 28 shows the projected turning movement volumes for the weekend future with project conditions during the AM and PM peak hours. Results of the future with project conditions intersection analysis are displayed in Exhibit 29. The results show that the overall LOS for all of the studied intersections are projected to operate within the overall LOS standards established by the City of Miami Beach.

As with the existing and future without project conditions, the southbound approach of the MacArthur Causeway / Bridge Road intersection continues to experience delays during both the morning and afternoon peak hours. This is an existing condition; the project adds no delay and only 0.3 seconds of delay to this movement during the respective AM and PM peak hours. The northbound approach of the Alton Road / 5th Street intersection also continues to experience delays during both the morning and afternoon peak hours. This is an existing condition; the project adds less than one second of delay to this movement during the AM and PM peak hours. These delays may be due to the fact that the County gives priority to vehicles travelling east / west along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets.

During the existing, future without project, and future with project conditions, the westbound left approach and the northwest bound approach (Terminal Isle approach) of the Terminal Isle / MacArthur Causeway intersection experience delays during the AM and PM peak hours. These delays are an existing condition; the project adds no delays to the northwest bound approach during the AM and PM peak hours. The project adds only 6.7 seconds and 3.9 seconds of delay to the AM and PM peak hours. The project driveway was analyzed and the results show adequate operations. Intersection capacity worksheets are included in Appendix D.



Project Location 00 AM
(00) PM

Exhibit 28

Future With Project Weekend AM and PM Peak Hour Volumes - Office Employees

NORTH
MAP NOT TO SCALE

Exhibit 29: Future with Project Weekend (Office – Employees) Intersection Capacity Analysis
Weekend AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Bridge Road (Star Island)	S	NB	A	0.0	A	0.0	D
		SB	F	90.2	F	94.1	D
		EB	A	6.7	A	4.9	D
		WB	A	7.8	A	8.8	D
		Overall	***A***	***7.4***	***A***	***7.2***	***D***
MacArthur Causeway / Terminal Isle	S	NB_{FPL}	A	0.0	A	0.0	D
		$NWB_{T.I}$	E	68.5	E	68.7	D
		$EB_{Cswy.}$	B	10.5	B	11.6	D
		$WBL_{Cswy.}$	E	78.7	E	75.2	D
		Overall	***B***	***13.2***	***B***	***14.6***	***D***
Alton Road / 5th Street	S	NB	F	88.4	F	120.4	D+50
		SB	C	28.7	C	27.4	D+50
		EB	C	28.4	C	30.6	D+50
		WB	B	19.1	C	23.3	D+50
		Overall	***C***	***32.7***	***D***	***39.0***	***D+50***
MacArthur Causeway / Terminal Isle exclusive right-turn	U	NB	C	20.9	C	23.9	D
Terminal Isle / Project Driveway	U	NB	A	9.0	A	9.1	N/A

Source: David Plummer & Associates

Signal Timing Adjustments are recommended to mitigate some of the effects of the project at the MacArthur Causeway / Terminal Island. Adding three seconds and two seconds of green time to the respective eastbound and westbound left turning movements reduces delays and improves the intersection's overall delay during the PM peak hour.

Signal Timing Adjustments are recommended to mitigate some of the effects of the project at the Alton Road / 5th Street intersection. During the AM peak hour, adding three seconds of green time to the northbound phase reduces delays at the northbound approach and improves the intersection's overall delay. During the PM peak hour, adding six seconds of green time to the northbound phase

reduces delays at the northbound approach and improves the intersection's overall delay. Exhibit 30 shows the results of the future with project conditions intersection analysis after signal timing adjustments.

Exhibit 30: Future with Project Weekend (Office – Employees) Intersection Capacity Analysis with Signal Timing Improvements
Weekend AM and PM Peak Hour Conditions

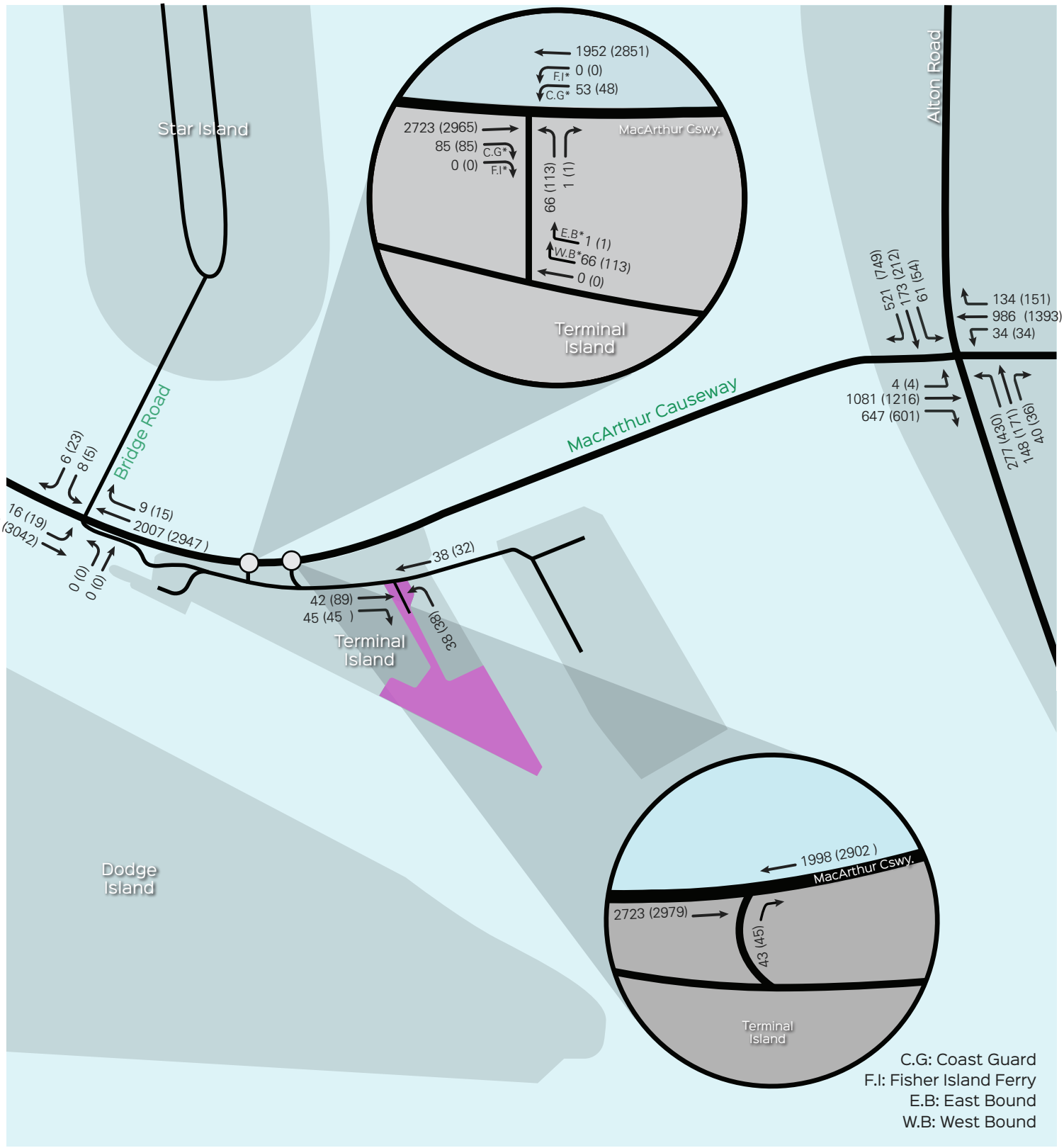
Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Terminal Isle	S	NB_{FPL}	-	-	A	0.0	D
		$NWB_{T.I}$	-	-	E	71.8	D
		$EB_{Cswy.}$	-	-	B	9.7	D
		$WBL_{Cswy.}$	-	-	E	75.2	D
		Overall	**-**	**-**	***B***	***13.0***	***D***
Alton Road / 5th Street	S	NB	D+44	79.2	D+42	77.9	D+50
		SB	C	29.8	C	26.8	D+50
		EB	C	29.4	C	35.0	D+50
		WB	B	19.7	C	26.8	D+50
		Overall	***C***	***32.4***	***D***	***36.2***	***D+50***

4.5.4 Weekend Intersection Capacity Analysis (Office – SF)

Future background traffic and traffic projections for the project were combined to obtain the weekend future traffic with project at the analyzed intersections. Since the timing for the Saturday peak hour is undefined it was assumed that the office would experience its peak hour at the same times of day that the roadway peaks. To provide a more conservative analysis the Saturday peak hour trips were applied to both the AM and PM weekend peak hours. Exhibit 31 shows the projected turning movement volumes for the weekend future with project conditions during the weekend AM and PM peak hours. Results of the future with the project conditions intersection analysis are displayed in Exhibit 32. The results show that the overall LOS for all of the studied intersections are projected to operate within the LOS standards established by the City of Miami Beach.

As with the existing and future without project conditions, the southbound approach of the MacArthur Causeway / Bridge Road intersection continues to experience delays during both the morning and afternoon peak hours. The project only adds no delay and 0.3 seconds to the approach during the AM and PM peak hours, respectively. The northbound approach of the Alton Road / 5th Street intersection also continues to experience delays during both the morning and afternoon peak hours. This may be due to the fact that the County gives priority to vehicles travelling east / west through this area, therefore, accepting delays on cross-streets. This is an existing condition; the project adds less than one second of delay to this approach during the AM and PM peak hours.

As with existing and future without project conditions, the westbound left approach and the northwest bound approach (Terminal Isle approach) at the MacArthur Causeway / Terminal Isle intersection continue to experience delays during the morning and afternoon peak hours. These delays are an existing condition; the project adds no delays to the northwest bound approach during the AM and PM peak hours. The project adds only 6.7 seconds and 3.6 seconds of delay to the AM and PM peak hours. The project shows adequate operations at the driveway. Analysis worksheets are included in Appendix D.



Project Location 00 AM
(00) PM

Exhibit 31

Future With Project Weekend AM and PM Peak Hour Volumes
- Office Square Footage

NORTH
MAP NOT TO SCALE

Exhibit 32: Future with Project Weekend (Office – SF) Intersection Capacity Analysis
Weekend AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Bridge Road (Star Island)	S	NB SB EB WB ***Overall***	A F A A ***A***	0 93.6 7.0 8.1 ***7.7***	A F A A ***A***	0.0 94.1 4.9 8.8 ***7.2***	D D D D ***D***
MacArthur Causeway / Terminal Isle	S	NB_{FPL} $NWB_{T.I}$ $EB_{Cswy.}$ $WBL_{Cswy.}$ ***Overall***	A E C E ***B***	0.0 69.9 9.6 76.7 ***12.2***	A E B E ***B***	0.0 68.7 14.4 73.4 ***17.9***	D D D D ***D***
Alton Road / 5th Street	S	NB SB EB WB ***Overall***	F C C B ***C***	87.4 28.8 25.9 19.1 ***33.3***	F C C C ***D***	120.4 27.5 30.6 23.3 ***39.0***	D+50 D+50 D+50 D+50 ***D+50***
MacArthur Causeway / Terminal Isle exclusive right-turn	U	NB	C	20.9	C	23.8	D
Terminal Isle / Project Driveway	U	NB	A	9.0	A	9.1	N/A

Source: David Plummer & Associates

Signal Timing Adjustments are recommended to mitigate some of the effects of the project at the MacArthur Causeway / Terminal Island intersection. Adding three seconds and two seconds of green time to the respective eastbound and westbound left turning movements reduces delays and improves the intersection's overall delay during the AM and PM peak hours.

Signal Timing Adjustments are recommended to mitigate some of the effects of the project at the Alton Road / 5th Street intersection. During the AM and PM peak hours, adding three seconds of green time to the northbound phase reduces delays at the northbound approach and improves the intersection's overall delay. Exhibit 33 shows the results of the future with project conditions intersection analysis after signal timing adjustments.

Exhibit 33: Future with Project Weekend (Office – SF) Intersection Capacity Analysis with Signal Timing Improvements Weekend AM and PM Peak Hour Conditions

Intersection	Signalized/ Un-signalized	Direction	AM Peak LOS	Delay (Sec)	PM Peak LOS	Delay (Sec)	LOS Standard
MacArthur Causeway / Terminal Isle	S	NB_{FPL}	A	0.0	A	0.0	D
		$NWB_{T.I}$	E	71.5	E	71.8	D
		$EB_{Cswy.}$	A	8.7	B	12.3	D
		$WBL_{Cswy.}$	E	76.7	E	73.6	D
		Overall	***B***	***11.4***	***B***	***15.9***	***D***
Alton Road / 5th Street	S	NB	D+44	79.1	F	89.1	D+50
		SB	C	29.9	C	29.1	D+50
		EB	C	26.2	C	32.3	D+50
		WB	B	19.7	C	24.7	D+50
		Overall	***C***	***32.6***	***D***	***36.5***	***D+50***

The approximate existing storage length and the projected 95th percentile back of queue (BOQ) at all the exclusive turn lanes for the weekday AM and PM peak hour conditions are displayed in Exhibit 34. The results show that the existing storage lengths at the MacArthur Causeway / Bridge Road and the MacArthur Causeway / Terminal Isle intersections have enough capacity to accommodate the projected 95th percentile back of queues.

The Alton Road / 5th Street intersection eastbound right turning lane's 95th percentile back of queue is projected to exceed the existing storage length during the AM and PM peak hours. It should be noted that this is an existing condition, the project (Office – Employees) adds only four and two feet of queue (less than one vehicle) to this movement during the respective AM and PM peak hours, and the project (Office – SF) adds no queue and two feet of queue to this movement during the respective AM and PM peak hours. The Alton Road / 5th Street intersection northbound left turning lane's 95th percentile back of queue is also projected to exceed the existing storage length during the AM peak hour. This is an existing condition. The project adds no queue to this movement.

Exhibit 34: Weekend Projected 95th Percentile Back of Queues and Existing Storage Length (Feet)

Intersection	Direction	Existing		Future without Project		Future with Project - Employees		Future with Project - SF		Existing Storage Length
		AM	PM	AM	PM	AM	PM	AM	PM	
MacArthur Causeway / Bridge Road (Star Isle)	EBL WBR	40 0	58 0	40 0	58 0	40 0	58 0	40 0	58 0	145 110
MacArthur Causeway / Terminal Isle	$EBR_{Cswy.}$ $WBL_{Cswy.}$ WB_{Ter}	26 77 0	25 71 27	26 79 0	25 71 30	40 100 0	44 144 62	44 105 2	42 99 64	170 155 300[3]
Alton Road / 5th Street	EBR WBL WBR NBL SBR[2]	256 77 29 202 0	263 74 42 361 0	279 79 30 207 0	282 77 43 370 0	176 79 30 207 0	284 77 43 370 0	283 79 30 207 0	284 77 43 370 0	260 140 280 240 350+

[1]SBL movement occurs from continues through lane

Source: David Plummer & Associates

[2]SBR movement is a through lane that becomes an exclusive turn lane

[3]Distance along Terminal Island Road before the queue blocks left turn movements out of a driveway

5.0 CIRCULATION PLAN

The project is located at 120 MacArthur Causeway (on Terminal Island) in Miami Beach, Florida. Access to the site will be provided via Terminal Isle which provides access to MacArthur Causeway. MacArthur Causeway is the only roadway connecting Terminal Island to the mainland and to the Miami Beach Island. The Terminal Isle roadway also provides access to the FPL Miami Beach Plant, the Fisher Island Ferry terminals and the US Coast Guard Station all located within Terminal Island. The driveway to the project will be located on Terminal Isle between the driveway access for the Miami Beach Fleet Management and the entrance to the US Coastguard access road. The project is proposing a gated entrance to the development. Per the developer, the gate will remain open through the day with a security guard and will close at night. (The gates will also remain open during restaurant operations). At night the building and gate can only be accessed with an FOB system. A queuing analysis for the gated entrance was previously submitted to and approved by the City of Miami Beach. A revised queuing letter is available in Appendix G.

The proposed 100-seat restaurant will be located within the roof level of Building A. An office employee only café / lounge area will also be provided on the first floor of Building A. The parking garage will be located on the northwest side of Building B. The project is also providing an optional valet service. The valet drop-off / pick-up area is located between the two buildings, near the entrance of Building B. Valet parking will be reserved on the first floor of the parking garage. All other vehicles will self-park on the upper levels of the parking garage. (See Section 6 for the valet queuing analysis). Access to/from the parking garage is provided via the project's internal roadway leading to a two-way entrance located on the southwest side of the parking garage.

The loading area for the two buildings is located just west of Building A. A basement level service corridor spans between both buildings, connecting the two buildings and allowing the two buildings easy access to the shared loading and service area. Access to the loading area is provided via the project's internal roadway. A loading plan and a maneuverability analysis of the access and loading area is provided in Appendix H. Fire truck access to the project is provided via the internal roadway and an outbound driveway located on the northwest side of the parking garage. The fire truck access is also shown in Appendix H.

The project area offers accommodations and access points for pedestrian and cyclist activity. MacArthur Causeway provides sidewalks on both sides of the road starting from the bus stop bays just west of Fountain Street and just west of Bridge Road. Both of the signalized intersections have clearly marked crosswalks with pedestrian refuge areas, and provide pedestrian signals. The signalized intersection with Terminal Isle has clearly marked crosswalks and provides pedestrian signals. The sidewalk along both sides of the causeway continues toward Miami Beach Island protected by a guardrail/concrete barrier across the causeway bridge, protecting pedestrians and cyclists. Starting at the mainland, MacArthur Causeway provides bike lanes on both sides of the roadway which terminate at the base of the causeway bridge (just east of the MacArthur Causeway / Terminal Isle intersection). East of the MacArthur Causeway / Terminal Isle intersection, bicyclists are directed to use the protected bridge sidewalk. The project is also offering bicycle parking on the southeast corner of the site for employees and guests and is providing a pedestrian pathway along the site that connects to Terminal Isle and the crosswalk connecting Terminal Isle to the MacArthur Causeway (at the west corner of the intersection of Terminal Isle, the Fisher Island Ferry entrance and the US Coast Guard Entrance. The proposed pedestrian path is available in Appendix I. A mobility plan was prepared for the site (see Exhibit 35). The plan shows the project location, bike lanes, sidewalk connections, and pedestrian crosswalks.

The project area is also served by public transit. There are four bus routes that traverse this area of Miami Beach (Routes: 103, 113, 119, and 120). The closest bus stop to the project site is located on the south side of the MacArthur Causeway just east of the Terminal Isle intersection, approximately 300 feet west of the project. The City of Miami Beach Trolley provides the South Beach Loop which traverses along Alton Road. Exhibit 36 shows the available bus routes and bus stops in the area. Transit documentation is provided in Appendix I.

Project Location
Sidewalk
Crosswalk
Bike Lanes

Exhibit 35

Mobility - Pedestrians

NORTH
MAP NOT TO SCALE

Bus Stop

Project Location

Miami Beach Trolley

Miami-Dade Bus Routes

- 120 Beach Max
- 119 (S)
- 103 (C)
- 113 (M)

NORTH
MAP NOT TO SCALE

Exhibit 36

Mobility - Transit

6.0 VALET QUEUING ANALYSIS

Queuing analysis was performed based on the methodology outlined in the *Institute of Transportation Engineers (ITE) Transportation and Land Development*, to determine the number of valet parking attendants required during the AM and PM peak hours of a regular weekday (worst case scenario) so that the queue does not extend past the valet storage area (95% confidence level analysis). The potential queues for were calculated based on the AM and PM peak hours of the adjacent street for a typical weekday published by the *Institute of Transportation Engineers* (ITE) trip generation rates and/or equations for the proposed development plan.

As previously mentioned, vehicles entering the site will have the option to self-park or use the optional valet services. The project is reserving 10% of the parking spaces within the garage to be for valet parking. The parking spaces will mainly be located on the first floor of the parking garage with two additional spaces located on the second floor of the garage. The valet drop-off / pick-up area for both buildings is located between Buildings A and B (see site plan in Appendix A for Valet location). As only 10% of the parking is being reserved for valet, it was assumed that 10% of the AM and PM peak hours would utilize the valet parking. For a more conservative analysis, the valet queuing analysis was based on the highest project trip generator scenario, office employees. Exhibit 37 provides the trip generation for the demand at the valet station during the AM and PM peak hours of the adjacent street for the project at the valet station.

Exhibit 37: Weekday (Office – Employees) Demand at the Valet Station

Proposed ITE Land Use Designation[1]	Size/Units	Daily (Two-way)	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
			In	Out	Total	In	Out	Total
Office (Land Use 710)	932 Employees	2,922	200	41	241	55	220	275
Restaurant (Land Use 931)	100 Seats	260	1	1	2	19	9	28
Gross External Trips		**3,182**	**201**	**42**	**243**	**74**	**229**	**303**
Internalization AM, PM		0%, 0%	0	0	0	0	0	0
Other Modes of Transportation[2]		8.5%	-17	-3	-20	-7	-20	-27
Pass-By Restaurant (PM)[3]		10%	0	0	0	0	0	0
Proposed Net External Trips			**184**	**39**	**223**	**67**	**209**	**276**
Demand at the Valet Station		10.0%	18	4	22	7	21	28

[1] Based on ITE Trip Generation Manual, 10th Edition

[2] Based on US Census Tract 41.02

The valet queuing analyses used the single-channel waiting line model with Poisson arrivals and exponential service times. The analysis is based on the coefficient of utilization (ρ) which is the ratio of the average arrival rate of vehicles to the average service rate.

$$\rho = \frac{Average\ Demand\ Rate}{Average\ Service\ Rate}$$

The average service rate corresponds to the time it will take a valet parking attendant to park or retrieve a vehicle. If the coefficient of utilization is greater than 1, then the calculation will yield an infinite queue length.

The required queue storage (M) is determined using the following equation:

$$M = \left[\frac{\ln P(x > M) - \ln Q_M}{\ln \rho}\right] - 1$$

In this equation, *P(x > M)* is set at 5% to yield a 95% confidence that the queue will not back-up onto the adjacent street.

The processing rate was calculated by adding the time it will take a valet attendant to process the vehicles (**processing time**), the time it will take him to circulate to / from the parking space (**driving time**), the time it will take him to park or retrieve a vehicle (**park processing time**), and the time it will take him to walk to/from the parking area (**walking time**). A processing time of 51 seconds per vehicle was used in the analysis. This information is based on data collected from a hotel on Miami Beach (see Appendix J). The driving time for the valet attendant was calculated on a speed of 10 mph. This speed is relatively slow compared to the actual speed a valet attendant can potentially achieve on adjacent roadways. This assumption is meant to account for any delays, since valet attendants will need to circulate around the property. The walking time for the valet attendant was calculated on a jogging speed of 8 ft/sec.

6.1 AM Peak Hour Queuing Analysis

Since the distance from the valet drop-off / pick-up area differs for inbound / outbound, a weighted average was taken of the inbound / outbound valet processing times. The weighted average was based on the inbound / outbound valet trip distribution, which is 82% inbound and 18% outbound during the AM peak hour. The valet processing times can be seen in Exhibit 38.

Exhibit 38: AM Peak Hour Inbound / Outbound Valet Processing Rate

Inbound Valet Processing Time	
***Processing time*:**	51 sec / 60 sec / 1 min = ***0.85 min***
***Driving time*:**	516 ft * 1 mile / 5280 ft * 1hr / 10 miles * 60 min / hr = ***0.59 min***
Park Processing time:	***0.25 min***
Walking time:	141 ft / 8 ft / sec / 60 sec / min = ***0.29 min***
Total	**= 1.98 min**
Outbound Valet Processing Time	
***Processing time*:**	51 sec / 60 sec / 1 min = ***0.85 min***
***Driving time*:**	627 ft * 1 mile / 5280 ft * 1hr / 10 miles * 60 min / hr = ***0.71 min***
Park Processing time:	***0.25 min***
Walking time:	141 ft / 8 ft / sec / 60 sec / min = ***0.29 min***
Total	**= 2.11 min**

Exhibit 38 (Continued): AM Peak Hour Inbound / Outbound Valet Processing Rate

Weighted Inbound / Outbound Valet Time

82% Inbound:	0.82 * 1.98 min = ***1.62 min***
18% Outbound:	0.18 * 2.11 min = ***0.38 min***
Total	**= 2.00 min**

Exhibit 39 shows the queuing calculations for the valet drop-off / pick-up area during the AM peak hour of the adjacent street.

Exhibit 39: AM Peak Hour Valet Drop-off / Pick-up Queuing Calculations

Q = Processing rate = $\frac{60\ min/hr}{2.00\ min/process} = 30.00\ process/hr$

q = Demand Rate = $22\ \frac{veh}{hr}$

N = Service Positions = 2 attendants

ρ = Utilization factor = $\frac{q}{(NQ)} = \frac{22\ veh/hr}{2 \times 30.00\ process/hr} = 0.3667$

Q_m = Table Value = 0.1986

M = queue length which is exceeded 5% of the time [P(x>M)]

$M = \frac{\ln P(x>M) - \ln(Q_m)}{\ln(\rho)} - 1 = \frac{\ln(0.05) - \ln(0.1986)}{\ln(0.3667)} - 1 = 0.37,\ say$ 1 Vehicle on queue

The results of the analysis show that a total of two valet attendants would be able to handle the inbound / outbound demand at the drop-off / pick-up area with a queue of one vehicle or less during the AM peak hour. The project is providing stacking space for approximately five vehicles (114 feet).

6.2 PM Peak Hour Queuing Analysis

Since the distance from the valet drop-off / pick-up area differs for inbound / outbound, a weighted average was taken of the inbound / outbound valet processing times. The weighted average was based on the inbound / outbound valet trip distribution for the PM peak hour, which is 25% inbound and 75% outbound. The valet processing times can be seen in Exhibit 40.

Exhibit 40: PM Peak Hour Inbound / Outbound Valet Processing Rate

Inbound Valet Processing Time

***Processing time*:**	51 sec / 60 sec / 1 min = ***0.85 min***
***Driving time*:**	516 ft * 1 mile / 5280 ft * 1hr / 10 miles * 60 min / hr = ***0.59 min***
Park Processing time:	***0.25 min***
Walking time:	141 ft / 8 ft / sec / 60 sec / min = ***0.29 min***
Total	**= 1.98 min**

Outbound Valet Processing Time

***Processing time*:**	51 sec / 60 sec / 1 min = ***0.85 min***
***Driving time*:**	627 ft * 1 mile / 5280 ft * 1hr / 10 miles * 60 min / hr = ***0.71 min***
Park Processing time:	***0.25 min***
Walking time:	141 ft / 8 ft / sec / 60 sec / min = ***0.29 min***
Total	**= 2.11 min**

Weighted Inbound / Outbound Valet Time

25% Inbound:	0.25 * 1.98 min = ***0.50 min***
75% Outbound:	0.75 * 2.11 min = ***1.58 min***
Total	**= 2.07 min**

Exhibit 41 shows the queuing calculations for the valet drop-off / pick-up area during the PM peak hour of the adjacent street.

Exhibit 41: PM Peak Hour Valet Drop-off / Pick-up Queuing Calculations

Q = Processing rate = $\frac{60\ min/hr}{2.07\ min/process} = 28.99\ process/hr$

q = Demand Rate = 28 $\frac{veh}{hr}$

N = Service Positions = 3 attendants

ρ = Utilization factor = $\frac{q}{(NQ)} = \frac{28\ veh/hr}{3 \times 28.99\ process/hr} = 0.322$

Q_m = Table Value = 0.0856

M = queue length which is exceeded 5% of the time [P(x>M)]

$M = \frac{\ln P(x>M) - \ln(Q_m)}{\ln(\rho)} - 1 = \frac{\ln(0.05) - \ln(0.0856)}{\ln(0.322)} - 1 = -0.52,\ say$ No Vehicles on queue

The results of the analysis show that a total of three valet attendants would be able to handle the inbound / outbound demand at the drop-off / pick-up area with no vehicles expected in the queue during the PM peak hour. As previously stated, the queuing analysis considers the worst-case scenario during the peak hours to ensure that the queue fits within the provided storage. Once operational the development can assess the actual need for valet attendants. Queuing Documentation is provided in Appendix J.

7.0 FIELD OBSERVATIONS

7.1 Fisher Island Ferry Observations

Field observations of the Terminal Island: Resident Terminal West (west ferry) and Employee and Contractor Garage and Terminal East (east ferry) were conducted on October 6, 2021 during the AM (8 – 9 am) and PM (5 – 6 pm) peak hours.

7.1.1 Resident Terminal West Observations

The Resident ferry terminal is located on the west side of Terminal Island. The terminal has three inbound lanes and two exit lanes for vehicles entering / exiting the ferry. The two outbound lanes are one-way and funnel vehicles out of Terminal Island. The right lane ends as a right-turn lane onto eastbound MacArthur Causeway and the left exit lane guides vehicles to an internal westbound roadway that connects to the MacArthur Causeway / Bridge Road intersections and provides westbound access onto the MacArthur Causeway. The three inbound queuing lanes allow guests and residents to queue and enter the ferry. The lanes are segregated by passenger type:

- property owners and equity members
- resident guests and diamond passes
- and resident employees and approved passes

Once in queue, residents and members of Fisher Island have their identification verified by the guard. Visitors and employees are required to show the guard identification and have their license plate number verified.

Upon the ferry's arrival, the guards open the ferry gates to allow vehicles to exit the ferry. Once the ferry is cleared the guards load the ferry one lane at a time to avoid congestion. The data collected revealed that during the AM peak hour, the lanes with the longest queues were the guest and employee lanes with an average queue of three and four vehicles, respectively. The resident lane had an average queue of two vehicles during the morning peak hour. There were the instances during the morning observations where the inbound queue spilled onto the Terminal Isle roadway, with an average queue of two vehicles.

During the PM peak hour, the resident lane had the largest queue of seven vehicles and an average of three vehicles. At times this queue would back up onto the Terminal Isle roadway and cause an

average queue of one vehicle. The guest and employee lanes each had an average queue of one vehicle during the evening peak hour. (See Appendix K for queuing observations)

7.1.2 Employee and Contractor Garage & Terminal East Observations

The ground floor of the parking garage has six queuing lanes in the northwest corner (front) for vehicles to queue within while waiting for the ferry. There is also a drop-off / pick-up lane and limited visitor parking area adjacent to the queuing lanes in the garage. Access to the drop-off area is provided along the northeast side of the garage just south of the pedestrian crosswalk between the ferry and garage.

Access to the employee parking and contractor / vehicle queues is provided on the west side of the parking garage. Fisher Island employees that park within the garage and walk aboard the ferry as a pedestrian turn right into the parking area when entering the garage. Access to the area is controlled via a mechanical arm gate with a card reader. Contractors and vehicles taking the ferry turn left when entering the garage to enter the ferry queue lanes.

Garage employees control access to the garage queueing lanes and entrance to the ferry. While awaiting the ferry, guards verify the identification and permission for the vehicles / companies waiting within the ferry queue. (During high inbound demand hours, vehicles were also queued on the hashing in front of the garage as an extra queue lane). Vehicles that don't fit within the garage queue lanes are circulated around the garage into the drop-off lane that becomes a one-way roadway that wraps around the end of the garage and leads back at the employee / contractor entrance. It was also observed that the operators leave the inbound and outbound lanes clear for vehicles departing the ferry. During the morning peak hours (highest inbound hours) vehicles to board the ferry were queued within the garage and stacked within the hashing spaces to the left and right of the ferry inbound / outbound lanes to allow room for larger vehicles exiting the ferry. The highest queue at the ferry entrance was five vehicles during the AM peak hour, with an average queue of three vehicles. The queue into the terminal spilled back onto the Terminal Isle roadway with an average queue of two vehicles. The highest inbound queue along Terminal Isle was four vehicles.

Once the ferry arrives, the gate is opened and the vehicles exit the ferry. It was observed that the ferry pedestrians are held on the ferry for approximately 1-2 minutes after all vehicles have

disembarked the ferry. This helped prevent long queues on the Terminal Isle roadway and at the MacArthur Causeway / Terminal Isle intersection. The operator then allows one lane at a time to enter the ferry, while the employees embark as well. During the PM peak hour, the ferry inbound lane had an average queue of three vehicles; the longest queue was seven vehicles. The highest queue leaving the parking garage was two vehicles during the PM peak hour. The highest queue in the ferry outbound lane was one vehicle.

7.2 MacArthur Causeway / Terminal Island Intersection Observations

Field observations of the eastbound right and westbound left turning lanes of the MacArthur Causeway and Terminal Isle intersection were conducted on October 7, 2021 during the AM (8 – 9 am) and PM (5 – 6 pm) peak hours. The results of the queuing field observations of the MacArthur Causeway/Terminal Isle intersection show that, during the AM peak hour, the existing inbound westbound left turning lane experiences a maximum queue of nine vehicles and an average of three vehicles. The eastbound right turning lane experiences a maximum queue of six vehicles and an average of three vehicles during the morning peak hour. The Terminal Isle roadway outbound lane had an average queue of two vehicles and a maximum queue of seven vehicles.

The data collected during the PM peak hour revealed that the westbound left turning lane had a maximum queue of three vehicles and an average of one vehicle, and the eastbound right turning lane experienced a maximum queue of two vehicles and an average of one vehicle. The Terminal Isle roadway outbound lane had an average queue of nine vehicles and a maximum queue of 21 vehicles. Occasionally, this caused an average queue of one vehicle at the ferry outbound lane. It was observed during both the afternoon and evening peak hours that on average, one cycle of green time for the MacArthur Causeway westbound left turning movement was sufficient to clear any vehicles queued in the westbound left turn lane and that it took a maximum of two cycles to clear the lane. (See Appendix K for queuing observations)

8.0 TRANSPORTATION MANAGEMENT PLAN

A Transportation Development Management is proposed as part of this project with the following goals:

- ***Reducing congestion*** – by encouraging patrons to shift from single occupancy vehicle trips to use other available modes of transportation.
- ***Conserving energy and reducing emissions*** - the damage caused by vehicle emissions and greenhouse gases is a major contributor to environmental degradation. Therefore, getting people to make better use of shared transportation options is one of the most important ways in which communities can do their part to encourage greener thinking.
- ***Improving community health and fitness levels*** - TDM can lead to better levels of health and fitness among community members by encouraging people to be more active as they move around town. Improving the walkability of cities and adding cycling features are two of the most important ways TDM strategies can be used to promote healthier and more active lifestyles.
- ***Boosting urban livability*** - Studies have shown that community-oriented modes of transportation can lead to significant improvements in personal satisfaction and happiness. People are more engaged when they are active stakeholders in the communities they live in. By improving social quality for residents, commuters, and visitors alike, TDM helps improve the overall livability of cities.

The development will promote the following strategies to further reduce vehicle trips:

- Encourage patrons to participate in ridesharing programs through South Florida Commuter Services. Available information will be obtained and distributed to employees in the development.
- Miami-Dade County Transportation Agency current local and regional mass transit route and schedule information will be provided to potential transit users in a prominent public area of the development. The information provided and maintained on the premises will be updated, when necessary, at no less than six-month intervals.

- Promote mass transit use by encouraging employers to purchase transit passes and make them available to employees at discounted prices or no charge, or in lieu of subsidized parking.
- Encourage employers to implement staggered work hours to reduce impacts on the Ferry and Coast Guard traffic.

Implementation of these items will generate a shift from single vehicle drivers to use other modes of transportation and, thus, reducing the peak hour vehicle trips.

9.0 CONCLUSIONS

An assessment of the weekday and weekend AM and PM peak hour traffic associated with the proposed Terminal Island project was performed in accordance with the approved methodology submitted to the City of Miami Beach and the requirements of the *City of Miami Beach Comprehensive Plan*. Intersection capacity analysis was performed for the following intersections:

- MacArthur Causeway / Bridge Road (Star Island)
- MacArthur Causeway / Terminal Isle
- Alton Road / 5th Street
- MacArthur Causeway / Terminal Isle Exclusive Right-turn (east of the MacArthur Causeway / Terminal Isle signalized intersection)

At the request of the City the analysis of the project's traffic impact was performed under two conditions. The first condition was a typical office analysis, where the trips generated for the project were based on the size (square footage) of the office use and the restaurant seats. The second analysis was performed to determine the maximum traffic impacts that the development may have on the surrounding roadway network; the trips generated in this analysis were based on the maximum occupancy of office employees and the number of restaurant seats.

Results based on the Office Square footage

The results of the intersection analysis during the AM and PM peak hours of a typical weekday show that all of the analyzed intersections currently operate and are projected to operate within the overall LOS standards established in the *City of Miami Beach Comprehensive Plan* for existing, future without project, and future with project conditions. The analysis also shows adequate operations at the unsignalized project driveway.

For existing, future without project, and future with project conditions, the northbound and southbound approaches of the MacArthur Causeway / Bridge Road intersection experience delays during the AM and PM peak hours. This is an existing condition; the project adds no delay to the northbound approach and only 3.6 seconds of delay to the southbound approach during the AM peak hour and adds no delay to these approaches during the PM peak hour. The northbound approach of the Alton Road / 5th Street intersection experiences delays during the AM and PM

peak hours for existing, future without project, and future with project conditions. This is an existing condition; the project adds less than one second of delay to the northbound approach during the AM and PM peak hours. The westbound left approach and the northwest bound approach (Terminal Isle approach) of the Terminal Isle / MacArthur Causeway intersection experience delays during the AM and PM peak hours. It should be noted that the project adds no delay to these approaches during the AM peak hour and only 4.3 seconds of delay to the northwest bound approach (Terminal Isle approach) during the PM peak hour. It should also be noted that the project represents only 3% of the total projected intersection volume during the morning and afternoon peak hours. The delays at these intersections may be due to the fact that the County gives priority to vehicles travelling east / west along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets. Signal timing improvements are recommended at the Alton Road / 5th Street and Terminal Isle / MacArthur Causeway intersections to improve approach delays and mitigate the effects of the project.

The results of the intersection analysis for the AM and PM peak hours of a typical weekend show that all of the analyzed intersections currently operate and are projected to operate within the overall LOS standards established in the *City of Miami Beach Comprehensive Pla*n for existing, future without project, and future with project conditions.

For existing, future without project, and future with project conditions, the southbound approach of the MacArthur Causeway / Bridge Road intersection experiences delays during the morning and afternoon peak hours. The northbound approach of the Alton Road / 5th Street intersection also experiences delays during both the morning and afternoon hours. These are existing delays; the project adds no delay or less than one second of delay to these approaches during the AM and PM peak hours of a typical weekend. This may be due to the fact that the County gives priority to vehicles travelling along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets. During the existing, future without project, and future with project conditions, the westbound left approach and the northwest bound approach (Terminal Isle approach) of the Terminal Isle / MacArthur Causeway intersection experience delays during the AM and PM peak hours. These delays are an existing condition; the project adds no delays to the northwest bound approach during the AM and PM peak hours. The project adds only 6.7 seconds and 3.6 seconds of delay to the AM and PM peak hours, respectively. The project driveway was analyzed and the

results show adequate operations. Signal timing improvements are recommended at the Alton Road / 5th Street and Terminal Isle / MacArthur Causeway intersections to improve approach delays and mitigate the effects of the project.

Results based on the Maximum number of Office Employees

The results of the intersection analysis during the AM and PM peak hours of a typical weekday show that all of the analyzed intersections currently operate and are projected to operate within the overall LOS standards established in the *City of Miami Beach Comprehensive Plan* for existing, future without project, and future with project conditions. The analysis also shows adequate operations at the unsignalized project driveway.

For existing, future without project, and future with project conditions, the northbound and southbound approaches of the MacArthur Causeway / Bridge Road intersection experience delays during the AM and PM peak hours. This is an existing condition; the project adds no delays to the northbound approach, and only 3.6 and 0.6 seconds of delay to the southbound approach during the respective AM and PM peak hours. The northbound approach of the Alton Road / 5th Street intersection experiences delays during the AM and PM peak hours for existing, future without project, and future with project conditions. This is an existing condition; the project adds less than one second of delay to the northbound approach during the AM and PM peak hours. These delays may be due to the fact that the County gives priority to vehicles travelling along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets.

The westbound left approach of the Terminal Isle / MacArthur Causeway intersection experiences delays during the AM and PM peak hours. It should be noted, that the project adds no delay to this approach during the AM and PM peak hours. The northwest bound approach (Terminal Isle approach) of the Terminal Isle / MacArthur Causeway intersection also experiences delays during the AM and PM peak hours. The project adds no delay to this approach during the AM peak hour. It should be noted that the project represents only about 5% of the total projected intersection volume during the morning and afternoon peak hours. Signal timing improvements are recommended at the Alton Road / 5th Street and Terminal Isle / MacArthur Causeway intersections to improve approach delays and mitigate the effects of the project.

The results of the intersection analysis during the AM and PM peak hours of a typical weekend show that all of the analyzed intersections currently operate and are projected to operate within the overall LOS standards established in the *City of Miami Beach Comprehensive Pla*n for existing, future without project, and future with project conditions.

For existing, future without project, and future with project conditions, the southbound approach of the MacArthur Causeway / Bridge Road intersection experiences delays during the morning and afternoon peak hours. The northbound approach of the Alton Road / 5th Street intersection also experiences delays during both the morning and afternoon hours. These are existing delays; the project adds no delay or less than one second of delay to these approaches during the AM and PM peak hours of a typical weekend. This may be due to the fact that the County gives priority to vehicles travelling along MacArthur Causeway (5th Street), therefore, accepting delays on cross-streets.

During the existing, future without project, and future with project conditions, the westbound left approach and the northwest bound approach (Terminal Isle approach) of the Terminal Isle / MacArthur Causeway intersection experience delays during the AM and PM peak hours. These delays are an existing condition; the project adds no delays to the northwest bound approach during the AM and PM peak hours. The project adds only 6.7 seconds and 3.9 seconds of delay to the AM and PM peak hours, respectively. The project driveway was analyzed and the results show adequate operations. Signal timing improvements are recommended at the Alton Road / 5th Street and Terminal Isle / MacArthur Causeway intersections to improve approach delays and mitigate the effects of the project.

A valet queuing analysis was performed to ensure that the drop-off / pick-up demand at the proposed valet station would not extend past the provided storage space at the valet station during the AM and PM peak hours. The analysis was performed based on the employee occupancy to ensure that the valet can accommodate the maximum trips generated by the project. The results of the queuing analysis show that with two valet attendants during the AM peak hour and three valet attendants during the PM peak hour the queue will not extend past the valet station storage area.

As part of the study, field observations were performed at the Fisher Island Ferry terminals located on the east and west ends of Terminal Island. The observations showed that the operations at the ferry terminals did not interfere with the operations along MacArthur Causeway.

A mobility and circulation plan was completed as part of the study. The plan shows that the project area is currently served by four Miami-Dade Transit bus routes and a Miami Beach Trolley route. The project is located in an area that provides sidewalk connectivity, clearly marked crosswalks, signalized intersections that provide pedestrian signals, and bike lanes. These conditions encourage the use of other modes of transportation and reduce the vehicular impact on the roadway network.

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Appendix A
Site Plan

Zoning Information

Lot addresses: 120 MacArthur Causeway, Miami Beach, FL 331319

Folio numbers: 02-4204-000-0060

Zoning District: Division 11. I-1 Light Industry District
FEMA Zone: Flood Zone AE - Elevation : 10'-0" NGVD
FFE Grade: 15'-0" NGVD (BFE +5'-0")

One Island Park				
1_Lot Occupation	Required	Proposed	Allowed / Required	Provided
Lot Area				161,694 sf (3.71 acre)
FAR	1.0 FAR max.		161,716 x 1 = 161,716 sf	161,580 sf
2_Building Setbacks	Required	Proposed	Allowed / Required	Provided
Front	0'-0" min.	0'-0" min.	0'-0" min.	0'-0"
Side (South)	0'-0" min.	25'-0" min. from edge of sea wall	0'-0" min.	25'-0"
Side (North)	0'-0" min.	25'-0" min. from edge of sea wall	0'-0" min.	25'-0"
Rear	0'-0" min.	0'-0" min.	0'-0" min.	0'-0"
4_Building Height	Required	Proposed	Allowed / Required	Provided
Max. building height	75'-0" max. above FFE (BFE +5'-0")			75'-0"
5_Office Floorplate FAR	Required	Proposed	Allowed / Required	Provided
Office Floorplate				varies / 23,652 SF max.
6_Open Space	Required	Proposed	Allowed / Required	Provided
Open Space	20%		161,716 sf x 0.2 = 32,343.2 sf	35,541 sf (22%)

Parking District #1				
7_Parking Requirements	Required	Proposed	Allowed / Required	Provided
Office	Office parking: min. 1 space per 400 sf of Usable SF		123,560 SF / 400 SF = 309 spaces	**335 spaces**
	Office parking: min. 1 space per 300 sf of Usable SF for Grnd lvl		7,885 SF / 300 SF = 26 spaces	
	Total office parking req.		**335 spaces**	
F&B	1 space per 4 seats		**136 seats / 4 = 34 spaces**	**34 spaces**
Valet		Office: 10% of parking spaces, 10% of 385 spaces = 39 spaces		**39 spaces** (included in total above)
Marina	2 space per 1 wet slip		7 wet slips x 2 = 14 spaces	**14 spaces**
			14 spaces	
ADA Spaces	6 standard spaces + 2 van spaces (for a facility with 301-400 spaces)		**8 spaces** (included in total below)	**8 spaces** (included in total below)
TOTAL			**383 spaces**	**383 spaces**
Parking spaces for electric vehicle	2 % of total required parking		8 spaces (included in total below)	8 spaces (included in total below)
TOTAL			**383 spaces**	**383 spaces**

15_Loading Requirements	Required		Allowed/Required	Provided (current)
Office	Over 100,000 sf but not over 200,000 sf: 3 spaces		3 loading bays	3 loading bays
	For each additional 100,000 over 200,000 sf: 1 space			
F&B	Over 2,000 but not over 10,000: 1 space		1 loading bays	1 loading bays
TOTAL			**4 loading bays**	**4 loading bays**

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PB FIRST SUBMITTAL
120 MACARTHUR CAUSEWAY
MIAMI BEACH, FL

ZONING DATA

SCALE:

DATE:
03/23/2022

A0-03

BLOCK A

	Office Usable SF	Restaurant / Outdoor Amenity	Kitchen (included in Lvl 03 sf)	GSF	FAR	Floorplate
Roof Level				3,520 SF	0 SF	3,520 SF
Level 06		5,660 SF		3,520 SF	2,300 SF	11,560 SF
Level 05	10,380 SF		1,765 SF	11,560 SF	11,560 SF	11,235 SF
Level 04	11,965 SF			11,235 SF	11,235 SF	15,050 SF
Level 03	13,735 SF			15,050 SF	15,050 SF	17,000 SF
Level 02	15,645 SF			17,000 SF	17,000 SF	18,785 SF
Level 01	3,340 SF			10,355 SF	5,000 SF	10,355 SF
Lower Level	0 SF			5,030 SF	5,030 SF	5,030 SF
TOTAL	**55,015 SF**			**79,270 SF**	**72,135 SF**	**94,535 SF**

BLOCK B

	Office Usable SF	Outdoor Amenity	GSF	FAR	Floorplate
			5,230 SF	0 SF	5,230 SF
		4,460 SF	5,230 SF	4,230 SF	11,605 SF
	18,760 SF		21,605 SF	11,605 SF	21,652 SF
	15,700 SF		17,125 SF	17,125 SF	18,930 SF
	17,345 SF		18,890 SF	18,890 SF	20,660 SF
	19,080 SF		20,660 SF	20,660 SF	20,660 SF
	4,545 SF		2,890 SF	4,705 SF	4,705 SF
				See Block A	See Block A
	76,430 SF	**4,460 SF**	**91,630 SF**	**85,000 SF**	**116,902 SF**

Office Usable SF (Lvl 02-05)	123,560 SF
Office Usable SF (Lvl 01)	7,885 SF
Total Office Usable SF	131,445 SF
Total Office GSF	171,305 SF
Total Office Floorplate	211,842 SF

Total Parking Count	383 Spaces
Total Parking SF	114,548 SF
Total Parking GSF	136,932 SF
Total Parking Floorplate	136,932 SF

Total FAR	161,580 SF
Total GSF	305,237 SF
Total Floorplate	348,774 SF

Leftover FAR
136 SF

Surface Parking

(Max FAR Allowed: 161,716 SF)

	15 Spaces
TOTAL	

Parking Garage

	Parking Spaces	Parking SF	Core SF	GSF	FAR	Floorplate
P Level 06	50 Spaces		660 SF	19,084 SF	660 SF	19,084 SF
P Level 05	68 Spaces	21,735 SF	660 SF	24,395 SF	660 SF	24,395 SF
P Level 04	68 Spaces	23,735 SF	660 SF	24,395 SF	660 SF	24,395 SF
P Level 03	68 Spaces	23,735 SF	660 SF	24,395 SF	660 SF	24,395 SF
P Level 02	56 Spaces	21,655 SF	660 SF	22,315 SF	660 SF	22,315 SF
P Level 01	58 Spaces	21,088 SF	660 SF	22,348 SF	660 SF	22,348 SF
	368 Spaces	**114,548 SF**	**5,960 SF**	**136,932 SF**	**3,960 SF**	**136,932 SF**

Guard House

(Max FAR Allowed: 161,716 SF)

Office Usable SF	Guard	GSF	FAR	Floorplate
0 SF	405 SF	405 SF	405 SF	405 SF
0 SF	**405 SF**	**405 SF**	**405 SF**	**405 SF**

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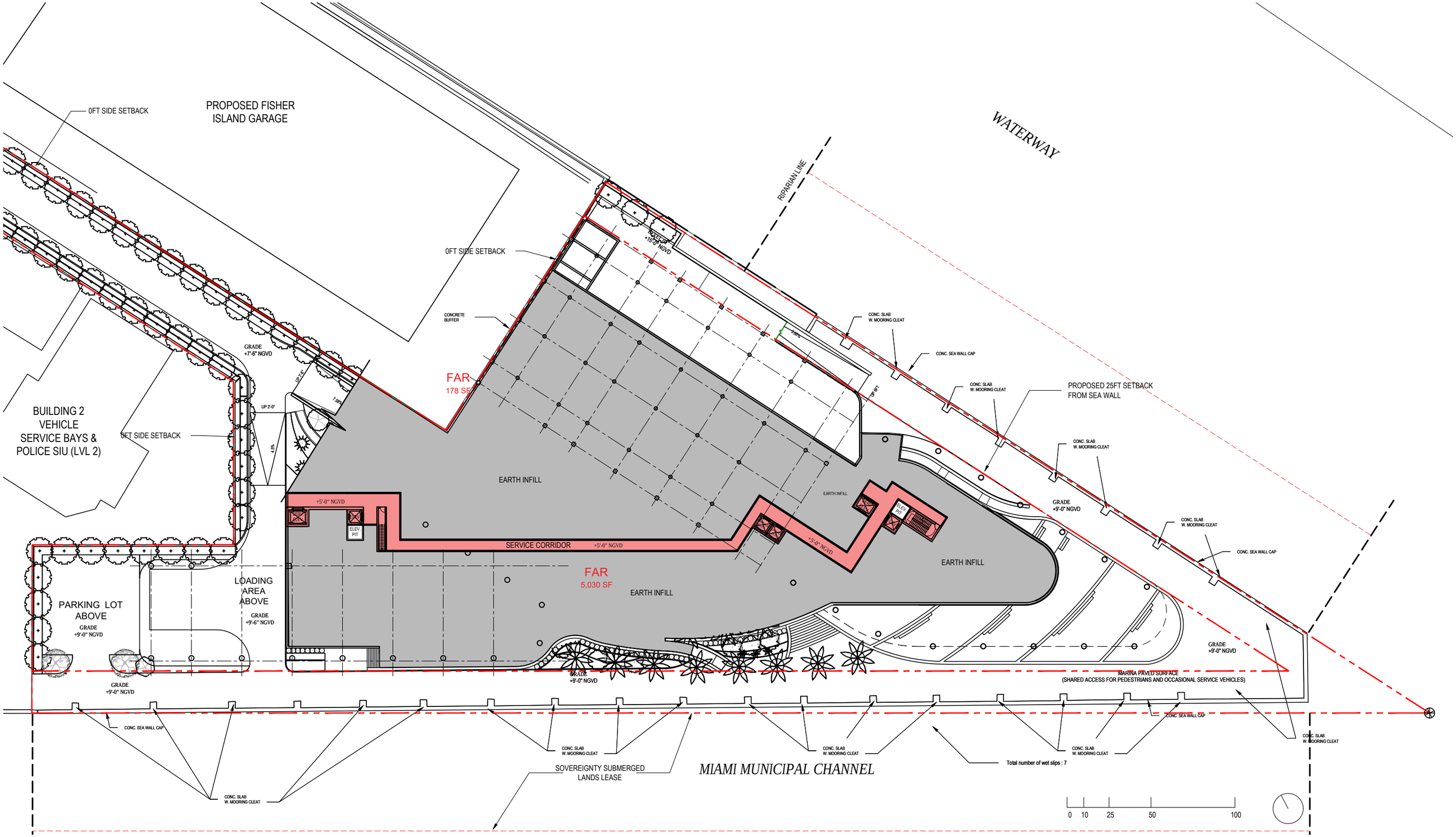
SELF PARKING OPTION
PROJECT DATA
SCALE: REVISED VERSION

DATE:
03/23/2022

AX-300



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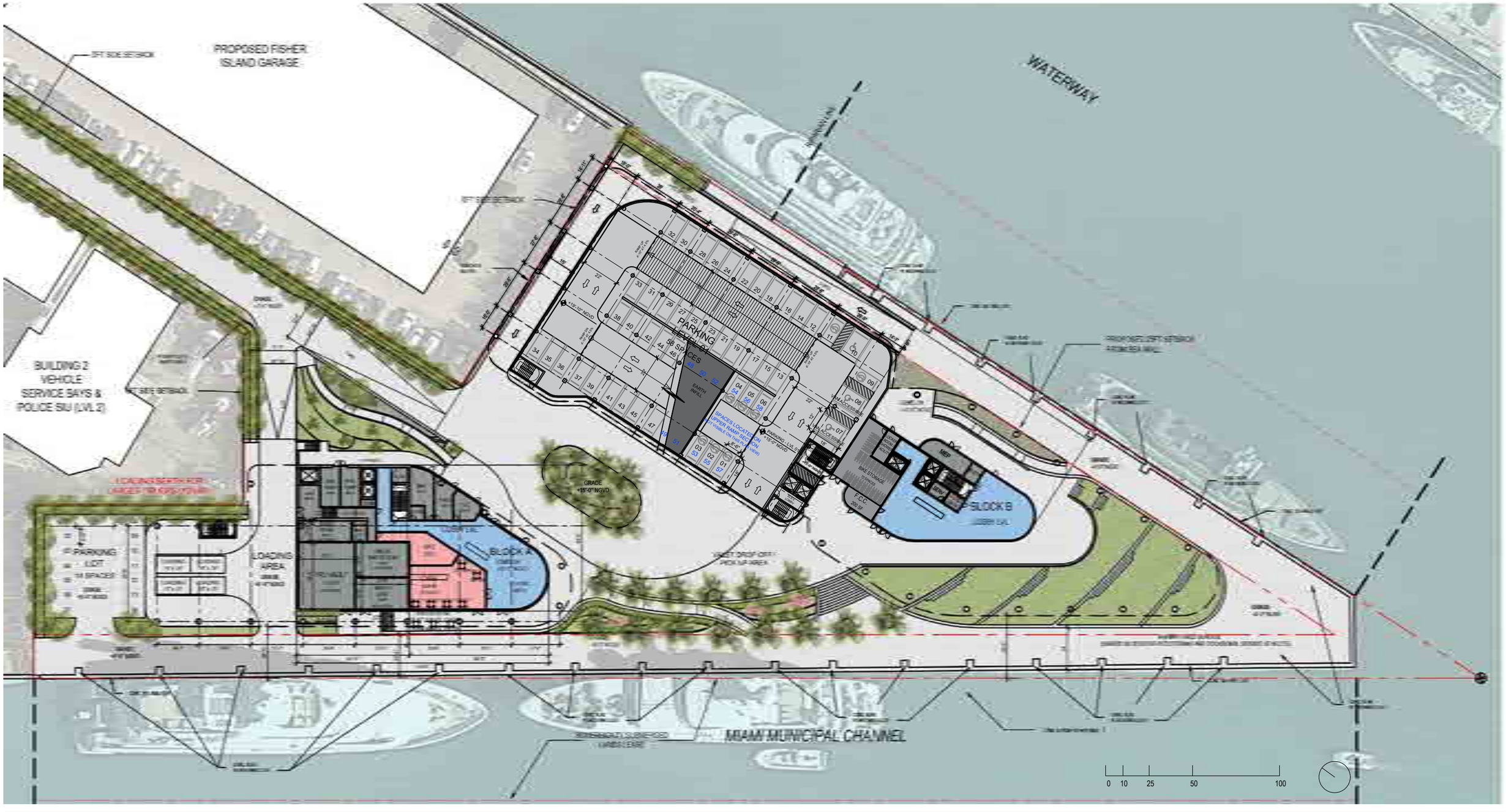
PB FIRST SUBMITTAL
120 MACARTHUR CAUSEWAY
MIAMI BEACH, FL

OVERALL OFFICE BUILDINGS
LOWER LEVEL - FAR
SCALE: 1:640

DATE:
03/23/2022

A0-09



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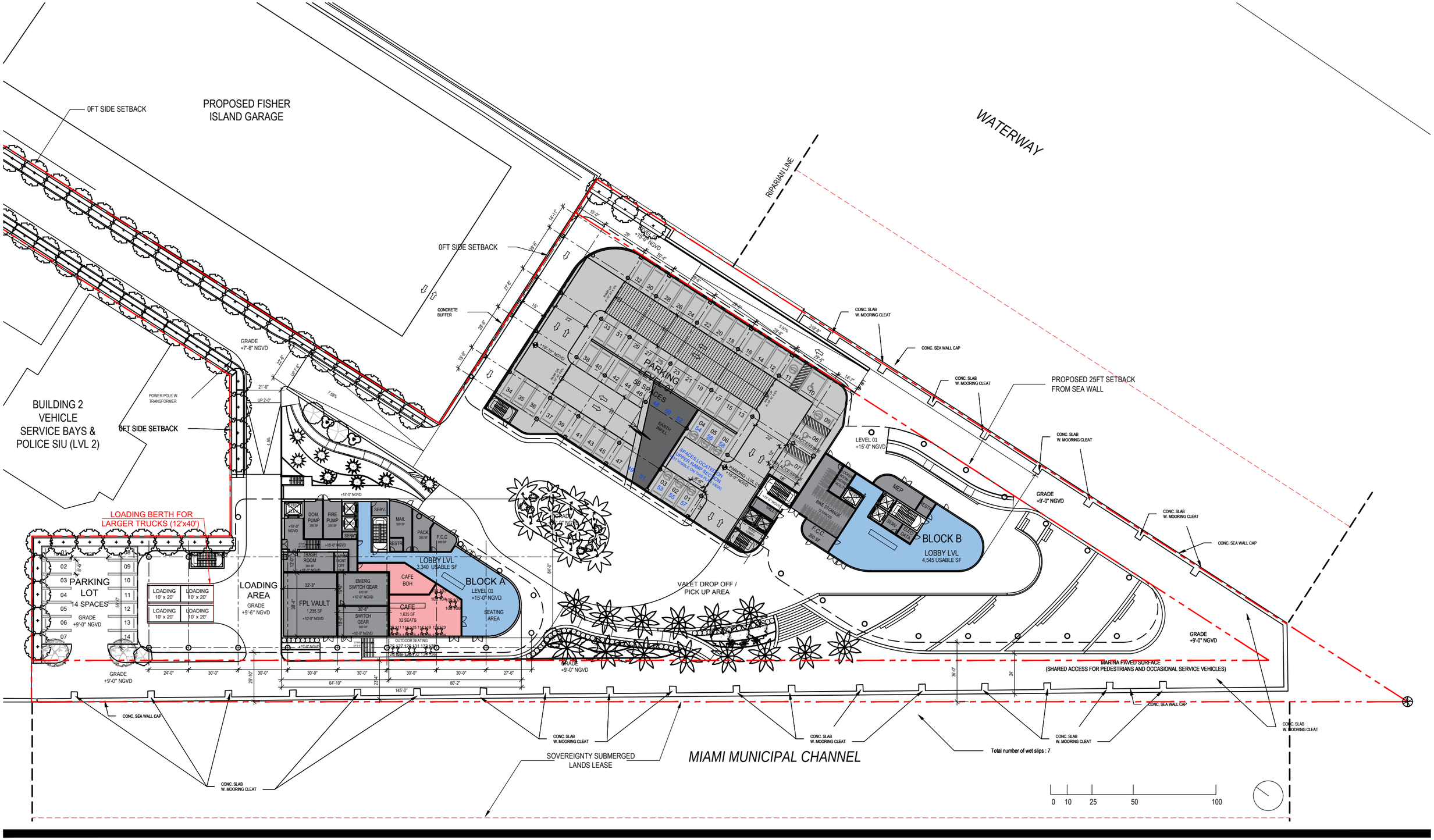
120 MACARTHUR CAUSEWAY
MIAMI BEACH, FL

RENDERED SITE PLAN

SCALE: 1:640

DATE:
03/28/2022

A1-00



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PB FINAL SUBMITTAL

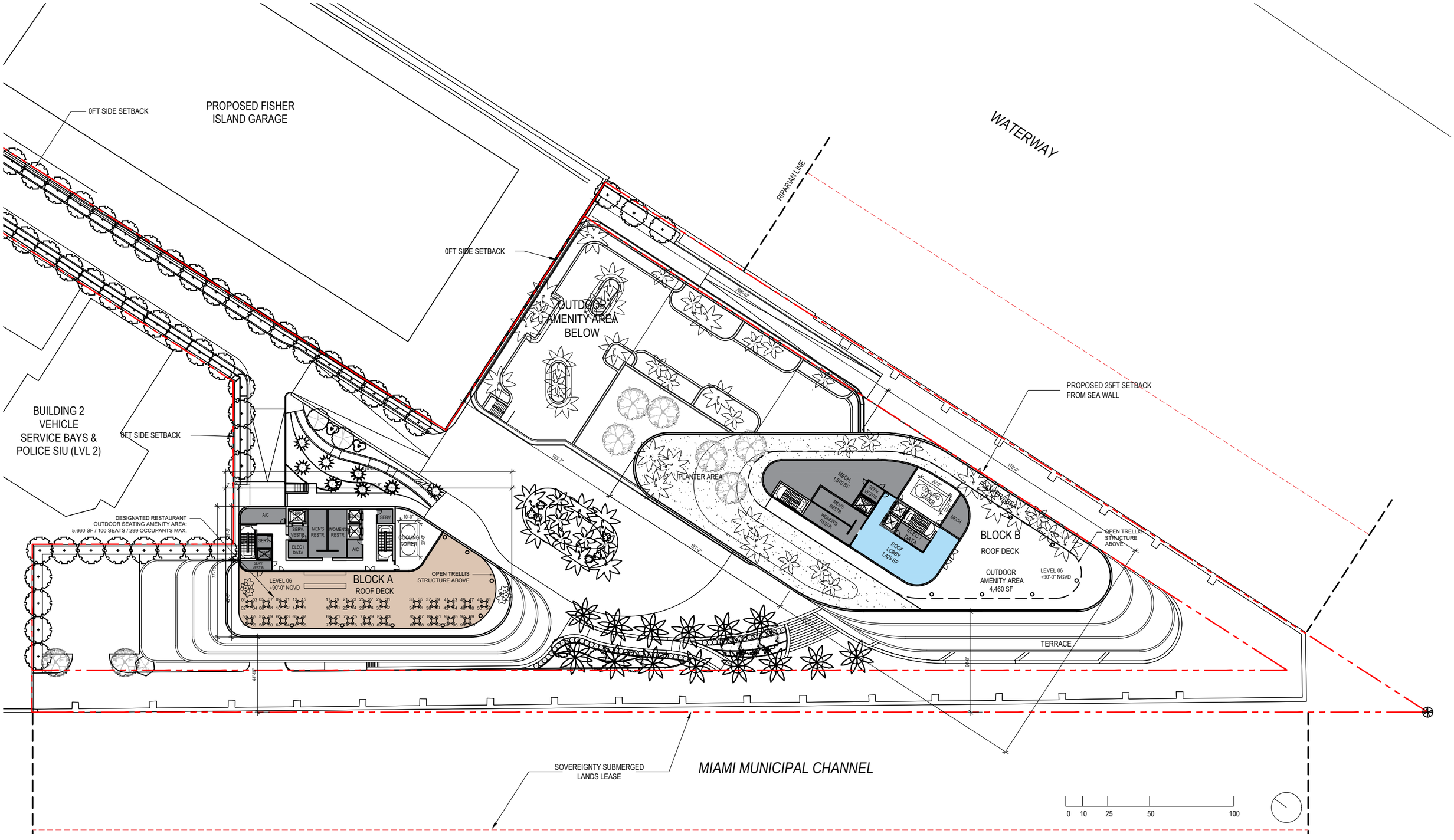
120 MACARTHUR CAUSEWAY
MIAMI BEACH, FL

OVERALL OFFICE BUILDINGS LEVEL 01

SCALE: 1:640

DATE: 03/28/2022

A1-02



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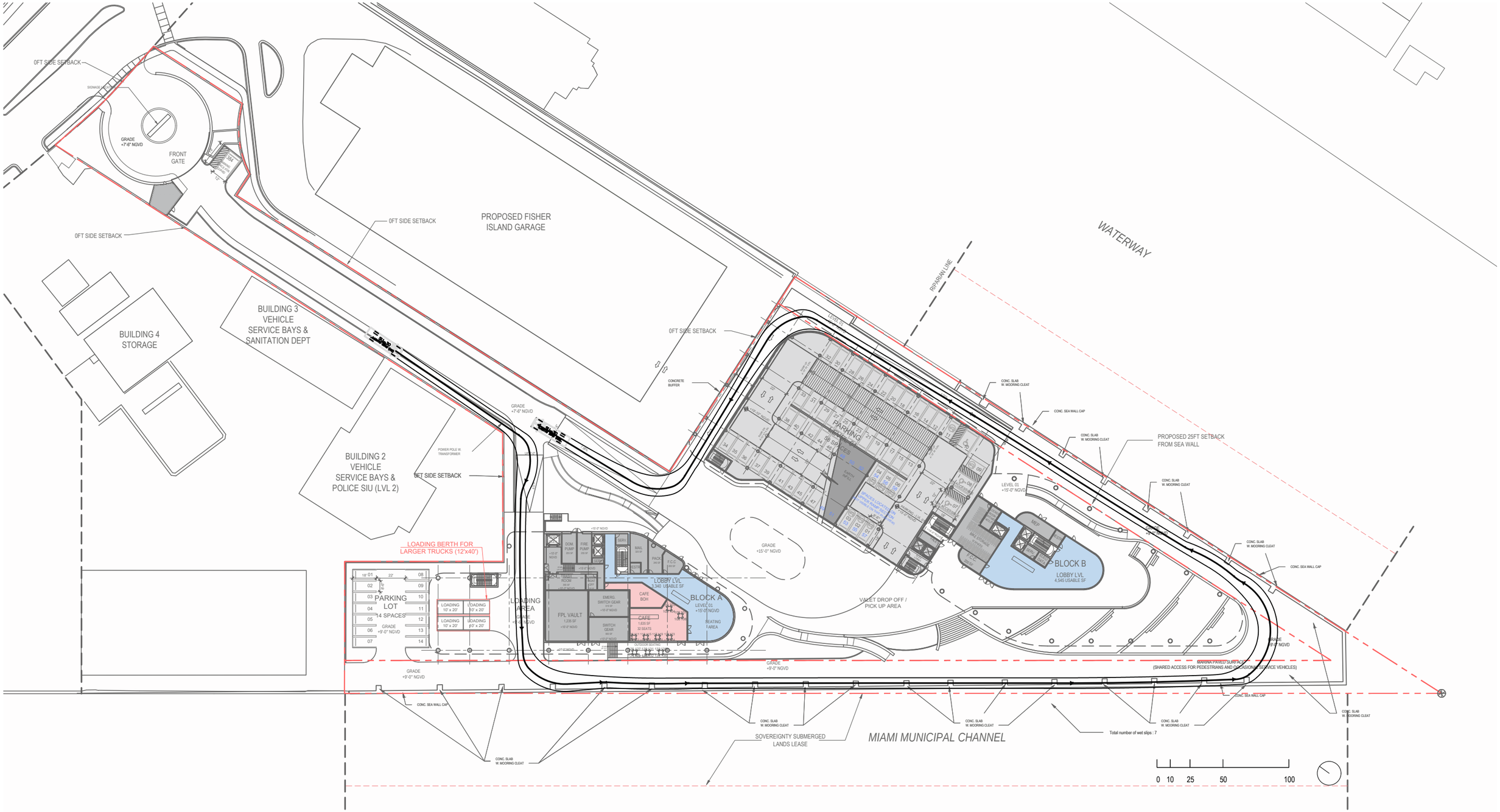
PB FINAL SUBMITTAL
120 MACARTHUR CAUSEWAY
MIAMI BEACH, FL

OVERALL OFFICE BUILDINGS
LEVEL 06
SCALE: 1:640

DATE:
03/28/2022

A1-07



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DRB FINAL SUBMITTAL
120 MACARTHUR CAUSEWAY
MIAMI BEACH, FL

MANEUVERING DIAGRAM
SU-30 TRUCK
SCALE: 1"=70'-0"

DATE:
03/28/2022

A1-25

Appendix B
Methodology

DAVID PLUMMER & ASSOCIATES
TRAFFIC ENGINEERING • CIVIL ENGINEERING • TRANSPORTATION PLANNING

1750 PONCE DE LEON BOULEVARD | CORAL GABLES, FLORIDA 33134
305•447•0900 | DPA@DPLUMMER.COM

Terminal Island Miami Beach
Traffic Study Methodology

February 28, 2022
(Based on Approved August 3, 2021 Methodology & the Traffic study submitted November 2021)

PROJECT LOCATION

The project is located at 120 MacArthur Causeway (Terminal Island) in Miami Beach, Florida. The project proposes a new 173,302 SF office building with approximately 932 employees and a 92-seat restaurant with a fully automated parking garage. The existing six boat berth marina will remain.

PURPOSE

This methodology will provide the details of the revised Transportation Impact Study for the proposed development. Confirmation of this methodology will be requested from the City and/or its traffic consultant prior to performing the study.

TRAFFIC STUDY

- Traffic Counts (Intersections) – Turning movement counts (TMCs) previously collected on Wednesday, September 15, 2021 and Saturday, September 18, 2021 during the approved AM (5:30 am – 9:30 am) and PM (2:30 – 6:30 pm) peak periods of a typical weekday and the AM (10 am – 12pm) and PM (2:30 pm – 4:30 pm) peak periods of a Saturday (previously approved by the City and found via previously collected 96-hour traffic counts) will be used to analyze the following intersections:

    - MacArthur Causeway / Bridge Road (Star Island) (Signalized)
    - MacArthur Causeway / Terminal Island (Signalized)
    - Alton Road / 5th Street (Signalized)
    - Terminal Island / Project Driveway (Un-signalized)

- MacArthur Causeway / Terminal Island Un-Signalized right-turn (east of the MacArthur Causeway / Terminal Island signalized intersection)

Traffic counts used as part of this project will be included in the appendix of the Transportation Impact Study submitted to the City.

- Trip Generation – When applicable, trip generation for the project will be estimated using trip generation information published by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, otherwise engineering judgement will be used. Based on U.S. Census Bureau data for tract 41.02, an 8.5% deduction for other modes of transportation may be applied. Furthermore, as discussed with the City reviewer, a 10% reduction will be used for pass-by applied to restaurant trips. At the request of the City, multiple trip generations for the development will be performed. The trip generation will be performed for the AM and peak hours of a typical weekday based on both the office (LU 710) square footage and the number of office employees expected within the site. The trip generation will also be performed for the peak hour of a typical Saturday based on the office use's square footage and the number of office employees expected within the site. Below is the trip generation for a typical Weekday (7 – 9) AM and (4 – 6) PM peak hour. Trip generation documentation is available in Attachment A.

Proposed Trip Generation for a Typical Weekday (Sq. Ft)

Proposed ITE Land Use Designation[1]	Size/Units	Daily (Two-way)	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
			In	Out	Total	In	Out	Total
Office (Land Use 710)	173,302 SF	1,808	163	27	190	31	161	192
Restaurant (Land Use 931)	92 Seats	240	1	1	2	19	9	28
Gross External Trips		**2,048**	**164**	**28**	**192**	**50**	**170**	**220**
Internalization AM, PM		1.6%, 1.1%	0	0	0	0	0	0
Other Modes of Transportation[2]		8.5%	-14	-2	-16	-5	-15	-20
Pass-By Restaurant (PM)[3]		10%	0	0	0	-1	-1	-2
Proposed Net External Trips			**150**	**26**	**176**	**44**	**154**	**198**

[1] Based on ITE Trip Generation Manual, 10th Edition

[2] Based on US Census Tract 41.02.

[3] Based on ITE Trip Generation Handbook, 3rd Edition (PM pass-by) is 44%, however 10% was used.

Proposed Trip Generation for a Typical Weekday (Office Employees)

Proposed ITE Land Use Designation[1]	Size/Units	Daily (Two-way)	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
			In	Out	Total	In	Out	Total
Office (Land Use 710)	932 Employees	2,922	200	41	241	55	220	275
Restaurant (Land Use 931)	92 Seats	240	1	1	2	19	9	28
Gross External Trips		**3,162**	**201**	**42**	**243**	**74**	**229**	**303**
Internalization AM, PM		0%, 0%	0	0	0	0	0	0
Other Modes of Transportation[2]		8.5%	-17	-3	-20	-7	-20	-27
Pass-By Restaurant (PM)[3]		10%	0	0	0	-1	-1	-2
Proposed Net External Trips			**184**	**39**	**223**	**66**	**208**	**274**

[1] Based on ITE Trip Generation Manual, 10th Edition

[2] Based on US Census Tract 41.02

[3] Based on ITE Trip Generation Handbook, 3rd Edition (PM pass-by) is 44%, however 10% was used.

Below is the trip generation for a typical Saturday peak hour. Trip generation documentation is available in Attachment A.

Proposed Trip Generation for a Typical Saturday (Sq. Ft)

Proposed ITE Land Use Designation[1]	Size/Units	Saturday (Two-way)	Saturday Peak Hour of Generator Vehicle Trips		
			In	Out	Total
Office (Land Use 710)	173,302 SF	382	50	42	92
Restaurant (Land Use 931)	(Closed)	-	-	-	-
Gross External Trips		**382**	**50**	**42**	**92**
Other Modes of Transportation[2] 8.5%		-32	-4	-4	-8
Proposed Net External Trips		350	**46**	**38**	**84**

[1] Based on ITE Trip Generation Manual, 10th Edition

[2] Based on US Census Tract 41.02.

Proposed Trip Generation for a Typical Saturday (Office Employees)

Proposed ITE Land Use Designation[1]	Size/Units	Saturday (Two-way)	Saturday Peak Hour of Generator Vehicle Trips		
			In	Out	Total
Office (Land Use 710)	932 Employees	400	45	39	84
Restaurant (Land Use 931)	(Closed)	-	-	-	-
Gross External Trips		**400**	**45**	**39**	**84**
Other Modes of Transportation[2] 8.5%		-34	-4	-3	-7
Proposed Net External Trips		366	**41**	**36**	**77**

[1] Based on ITE Trip Generation Manual, 10th Edition

[2] Based on US Census Tract 41.02.

- Signal Location and Timing – Existing signal phasing and timing for the signalized intersections will be obtained from Miami-Dade County. Signal data collected from the county will be included in the appendix of this study.

- Trip Distribution / Trip Assignment – Net new external project traffic will be assigned to the adjacent street network using the appropriate cardinal distribution from the *2045 Miami-Dade Long Range Transportation Plan Update*, published by the *Transportation Planning Organization*. Normal area traffic patterns will also be considered when assigning project trips. A figure showing all of the assigned trips to the adjacent transportation network will be provided as part of the study.

- Background Traffic – Available Florida Department of Transportation (FDOT) and Miami-Dade County (MDC) traffic counts (excluding 2020 data) will be consulted to determine a growth factor consistent with historical annual growth in the area. The growth factor will be applied to the existing traffic volumes to establish background traffic. This will be documented in the study. The analysis indicated that the annual growth rate from 2015 to 2019 is -1.3% for the past five years; however, an annual growth rate of 0.5% will be used to project future background traffic conditions for a more conservative analysis.

- Committed Developments – As no committed developments were found in the area a 0.5% growth rate will be added to the analysis to account for any unknown committed developments in the area.

- Future Transportation Projects – The 2020 TIP, 2045 LRTP, and the City of Miami Beach's Transportation Master Plan Final Report and Related TMP updates will be reviewed and considered in the analysis at project build-out.

- Intersection Capacity Analysis – The intersection capacity analyses will be conducted for the following conditions:
    - Existing conditions
    - Future (2023) conditions with Committed Developments
    - Future (2023) conditions with Project and Committed Development

  Intersection analysis will be done using the Synchro software based on the Highway Capacity Manual (HCM 6th Ed). Figures depicting trip distribution for each of these scenarios will be provided as part of this study. In addition to the intersections identified above, all projects driveways will be analyzed. If the results of the analysis show any intersection operating below the City's Level of Service standards, specific mitigation measures will be recommended.

- An extensive Transportation Demand Management plan (TDM) will be included in the report.

CIRCULATION ANALYSIS/PLAN

The study will provide a circulation plan depicting the parking garage circulation. The plan will also include a clear site plan defining all of the various land use categories assigned to the project site, driveways, delivery areas, location of street signs/signals, crosswalks, sidewalks, location of bus facilities, bike facilities, adjacent streets configuration (travel lanes, etc.) including names, on-street parking and any other pertinent transportation feature in the vicinity of this project.

As part of the study, any proposed/existing driveways will be analyzed. This analysis will include sight distance for vehicles entering/exiting the proposed driveway. An Auto-turn analysis will be conducted for the proposed building loading area. If deficiencies are determined, mitigation measures will be recommended.

Multimodal – Pedestrian, bicycle and transit facilities will be defined in the Circulation Plan. Existing bus routes including schedule and bus stop locations will be discussed as part of the study. An effort will be made to include bicycle parking facilities within the project site to be utilized either by employees or tenants.

QUEUING ANALYSIS

A queuing analysis will be performed at the gated entrance per the methods outlined in the Institute of Transportation Engineers (ITE) Transportation and Land Development. The vehicle queue (M) will be calculated based on processing rate, demand rate, service positions and utilization factor as necessary. The analysis will be done to ensure that there is sufficient on-site vehicle stacking so that there is no vehicle back-up onto the public right-of-way. Peak hour demand will be estimated at the project's entrances. The analysis will consider both demand and typical service times per vehicle. The gated entrances capacity will be a function of the numbers of lanes, type of service provided, and geometrics. The analysis, conclusions and recommendations will be documented in the traffic report.

DOCUMENTATION

The applicant will submit an electronic copy of the report including the Synchro program output calculations for consideration/review by the consultant acting as the peer reviewer. Also included will be the latest version of the site plan, with an AutoCAD version.

Other Considerations from the City

- As part of the intersection analysis, a table summarizing/comparing the 95th percentile vehicle stacking / queues and existing storage length for all exclusive turn lanes will be provided.
- The future layout of the Terminal Island Roadway configuration and intersections will be considered in the future scenario analysis if the latest FDOT plans are provided by the City reviewer.
- Per the City reviewer's request, a current copy of a signed and sealed pavement marking and signage plan prepared by a Professional Engineer in the state of Florida will be provided.

- ~~Per the City reviewer's request, the specifications for the automated parking garage will be submitted. Case studies justifying the service times and effectiveness of the proposed parking system will be provided in the appendix of the traffic study.~~ (No longer applicable).
- Queuing observations at the east and west terminal island ferry landings to observe the effects of the queues caused by the ferry landings will have on the project intersections (performed on October 6, 2021 and October 7, 2021 during the weekday AM and PM peak hours) will be documented within the report.
- Queuing observations performed during the weekday AM and PM peak times at the terminal island road / MacArthur Causeway for intersection on October 6, 2021 and October 7, 2021 will be documented within the report.
- Per the City reviewer's request, any related comments in regards to the traffic study made by MDC's DTPW, the FDOT, or any other related government agency will be provided to the City.

If you have any questions you can contact us at (305) 447-0900.

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