Regular Workshop – March 23, 2015
Agenda Item 10

Agenda Item: Presentation and Discussion Regarding Roundabout Feasibility Concept Designs at the Intersections of Broadway and Gulf of Mexico Drive and Longboat Club Road and Gulf of Mexico Drive

Presenter: Town Manager; and
Michael Wallwork, P.E.

Summary: Based on ongoing efforts to investigate improvements to Gulf of Mexico Drive, concept designs have been developed for potential roundabouts at Broadway and Gulf of Mexico Drive and at Longboat Club Road and Gulf of Mexico Drive.

Attachments: 3-5-15 Memo, Manager to Town Commission;
2-12-15 Memo, Michael Wallwork, P.E.
Presentation; Michael Wallwork, P.E.

Recommended Action: None, informational only.

M E M O R A N D U M

Date: March 5, 2015

TO: Town Commission

FROM: Dave Bullock, Town Manager

SUBJECT: Presentation and Discussion Regarding Roundabout Feasibility Concept Designs at the Intersections of Broadway and Gulf of Mexico Drive and Longboat Club Road and Gulf of Mexico Drive

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Based on ongoing efforts to investigate improvements to Gulf of Mexico Drive, the Town engaged the professional services of Michael Wallwork, P.E., of Alternate Street Designs, P.A., to develop concept designs for potential roundabouts at Broadway and Gulf of Mexico Drive and Longboat Club Road and Gulf of Mexico Drive. Mr. Wallwork has extensive experience designing roundabouts worldwide. His information can be found on his company's website at www.roundabouts.net.

As part of this conceptual design study, the Florida Department of Transportation conducted peak hour traffic data collection at both potential locations on January 22, 2015. The attached memo from Michael Wallwork discusses the methodology and analysis utilized for the development of the conceptual designs.

Please contact me if you have any questions.

Alternate Street Design, P.A.

Technical Memorandum

To:	Alaina Ray, Director Planning Zoning & Building Department Town of Longboat Key
From:	Michael J. Wallwork, P.E.
Date:	March 18, 2015
Re:	Roundabout Feasibility Study

The Town of Longboat Key requested that Alternate Street Design, PA to evaluate the feasibility of using a roundabout at two intersections, Gulf of Mexico Drive at Broadway Street and at Longboat Club Road. This memo sets out the evaluation of the two roundabouts.

Capacity Analyses

Following the receipt of traffic counts from the Florida Department of Transportation capacity analyses for both roundabouts were undertaken using SIDRA 6.2, the most common roundabout analysis method. The results of these analyses showed that a one lane roundabout at Broadway Street is expected to provide an acceptable level-of-service. At Longboat Club Road, a one lane roundabout with a southbound right turn lane is also expected to provide an acceptable level-of-service. This right turn lane was added to reduce delays, provide some spare capacity to better accommodate the occasional higher peak vehicle flows that can occur.

Because of the pending expansion of development within Longboat Key Club, additional analyses using an approximate number of additional vehicles entering and leaving during an event. As a result of these analyses an additional left turn lane was added to Gulf of Mexico Drive. Alternate analyses were also considered that included a metering signal to stop southbound vehicles when the northbound left turn queue reached a certain limit, which enabled a free flow of the northbound to westbound left turn. Although a metering signal improved operation during the one period it had the opposite impact in the other peak. A bypass lane was then considered but rejected because of the impact on the utilities east of the intersection that had previously forced a realignment of the existing sidewalk.

These following analyses represent the “high” winter peak operation. Events that may cause an additional large influx of visitors is likely to lead to short term congestion but that congestion is expected to be lower than the existing signalized intersection. Typically, roundabouts have higher capacities, up to 30 percent or more than signalized intersections, usually with fewer lanes. The reason for the improved performance is that a roundabouts has no lost time, time lost during the

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red and yellow periods at a signal. Also, at signalized intersection drivers cannot take advantage of gaps in conflicting traffic flow except for right-turn-on red, whereas a driver waiting to enter a roundabout can do so whenever there is a gap in the vehicle flow.

It should be noted that Gulf of Mexico Drive is approaching saturation as evidenced by the existing low speed and almost continuous flow of vehicles in both directions.

Table 1 below summaries the capacity analyses. Copies of the capacity analyses summary sheets are in clouded in Appendix B

Intersection Control	Time Period	Level-of-Service	Average Delay (sec)	95th Percentile Queue (Ft)	Average Queue (Ft)	Volume/ capacity ratio
Longboat Club Road - one lane roundabout with southbound right turn lane	AM	A	4.0	259	104	0.741
	Midday	A	4.9	355	143	0.828
	PM	A	4.6	219	88	0.692
Longboat Club Road with right and left turn lanes	AM	A	3.7	114	46	0.519
	PM	B	14.6	560	233	0.975
Longboat Club Road , extra right lane from club	PM	A	5.8	160	64	0.656
Broadway Street	AM	A	5.6	67	27	0.411
	Midday	A	6.5	98	40	0.506
	PM	A	6.4	143	57	0.619

Roundabout layouts used for the southeast analyses are shown below.

Longboat Club Road

A roundabout at this intersection with the southbound right turn lane is expected to operate well during the morning and afternoon peak periods. However, during the midday peak period congestion is expected to be slightly higher due to the increased flow during this period. However, during all peak periods the expected performance is superior to the existing signalized intersection. During the off peak hours the roundabout operation is expected to be even better than the issued intersection with fewer vehicles required to stop , slow but necessarily stop.

Although the roundabout has vehicle queues as shown below these vehicle queues are shorter than at the existing signalized intersection even though the roundabout has one less vehicle lane. It is important to note that the average queue the one most drivers will typically experience is relatively short, just a few vehicles. Also, vehicle queues at roundabouts are not static queues as at signalized intersections, but moving queues that enable drives to pass through the roundabout in less time than the signalized intersection.

When a special event occurs at the Longboat Key Club the roundabout is expected to improve ingress assuming that they will be about 200 additional vehicles 200 from the south and 100 from the north wanting to enter Longboat Key Club. In the evening, after an event, if all 300 additional vehicles wish to exit the Club around the same time there will be considerable queuing within the club. Addition of a right turn exit lane from the Club is expected to improve this condition considerably. One reason is that it is easier to make a right turn at a roundabout than a left turn another is the separation of left and right turn vehicles into separate lanes.

The roundabout saturation level in the PM peak period is very high and significant queuing is expected within the Club for a short period of time depending on the exit rate from any special event. To reduce this queue and the delay to exiting vehicles a separate right turn lane on Longboat Club Road is suggested. If the addition of this extra right turn lane is considered desirable it would have a significant impact on the vehicle delay for drivers exiting the Club 24 hours a day especially at midday.

Broadway Street

This roundabout has plenty of spare to accommodate a significant increase in traffic.

Design Criteria

The following design criteria was used for these roundabout is as follows. A copy of both concepts is in included in Appendix A.

1. WB-50 trucks for all vehicle movements. Larger trucks can proceed through roundabout along Gulf of Mexico Drive. Emergency vehicles and most construction vehicles are able to make all movements.

2. Pedestrian crossings are 10-feet wide to accommodate pedestrians and bicyclists.
3. Pedestrian crossings are set back one vehicle per length so that when vehicles stop the crosswalk is open for pedestrian movements.
4. On-road bike lanes have been provided together with a shared path pathway around the roundabout for those on-road bicyclists who do not wish to “claim-the-lane” and ride through the roundabouts.

Safety

Although there have been few crashes at either intersection, roundabouts typically reduce them further. One item noted during the site inspection was the significant difficulty pedestrians and bicyclists have at Broadway Street when trying to cross either road specially, Gulf of Mexico Drive. Although, roundabouts provide a safer intersection for pedestrians and bicyclists they also change the priority so that drivers now have to yield to pedestrians, which significantly increases pedestrian and bicycle mobility.

Landscaping

One of the most important elements of a roundabout design is the central island landscaping. It provides long-range visibility of the roundabout without the necessity of advance warning signs or other geometric design elements. NCHRP 672 recommends mounding the central island at a rate not to exceed 6:1. Landscaping material should be selected help reduce headlight glare and improve the visibility of the central island. The clear zone around the island is 15 feet from the edge of the circulating roadway.

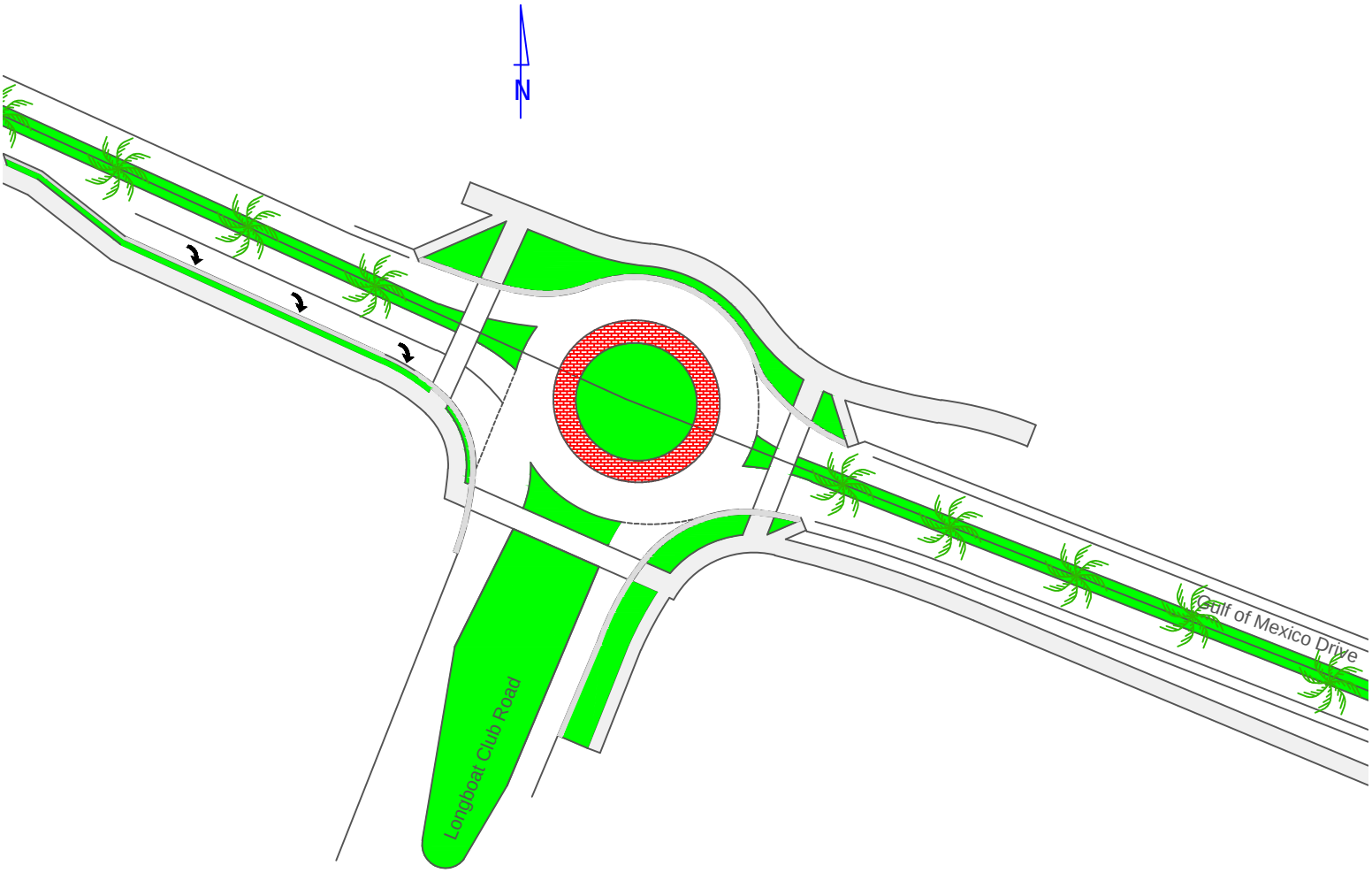
Lighting

Apart from normal lighting of the crosswalks and departure lanes, up lighting of the central island landscaping is highly recommended because reflected light is more effective than down lighting while creating a more attractive intersection.

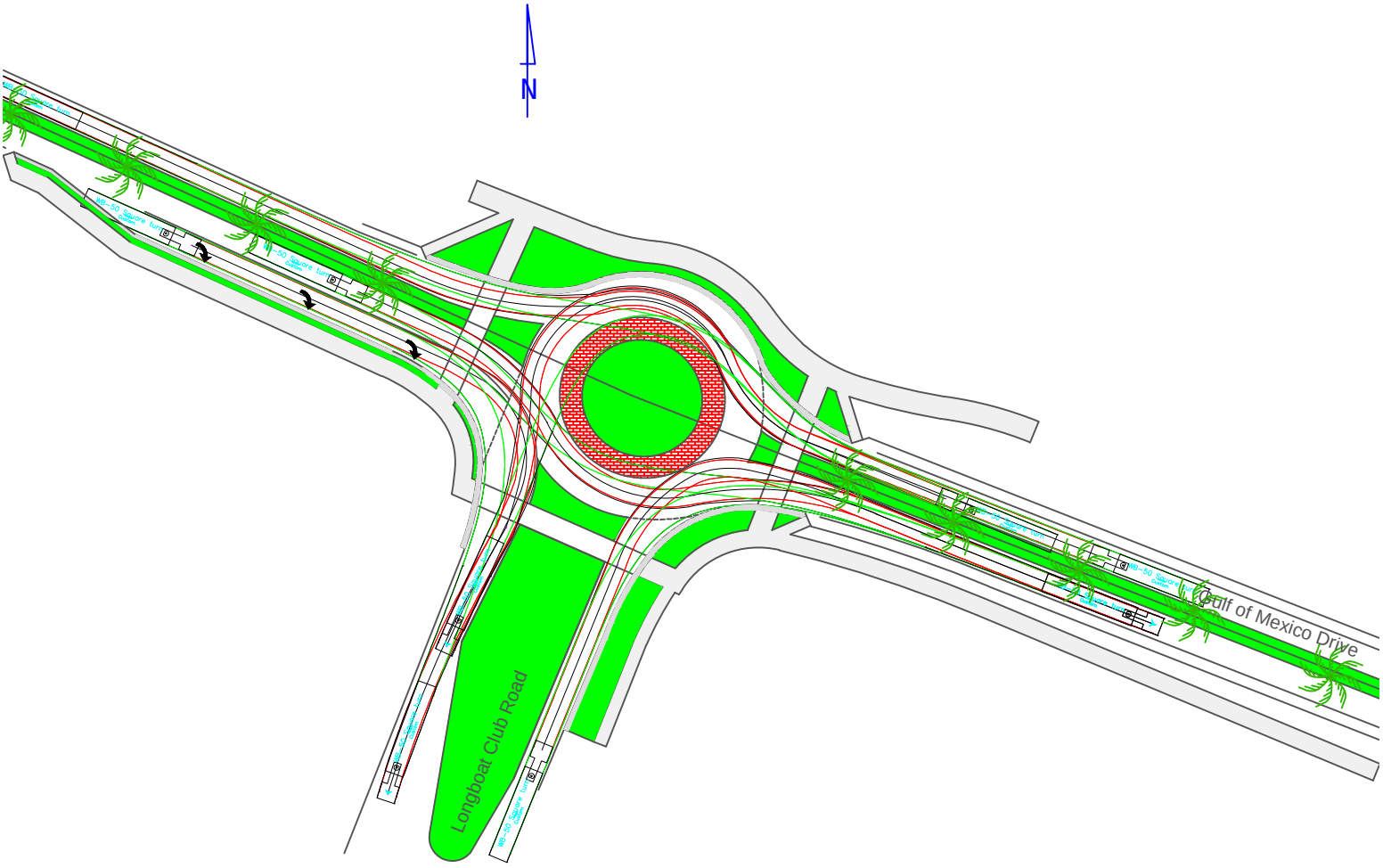
Appendix A

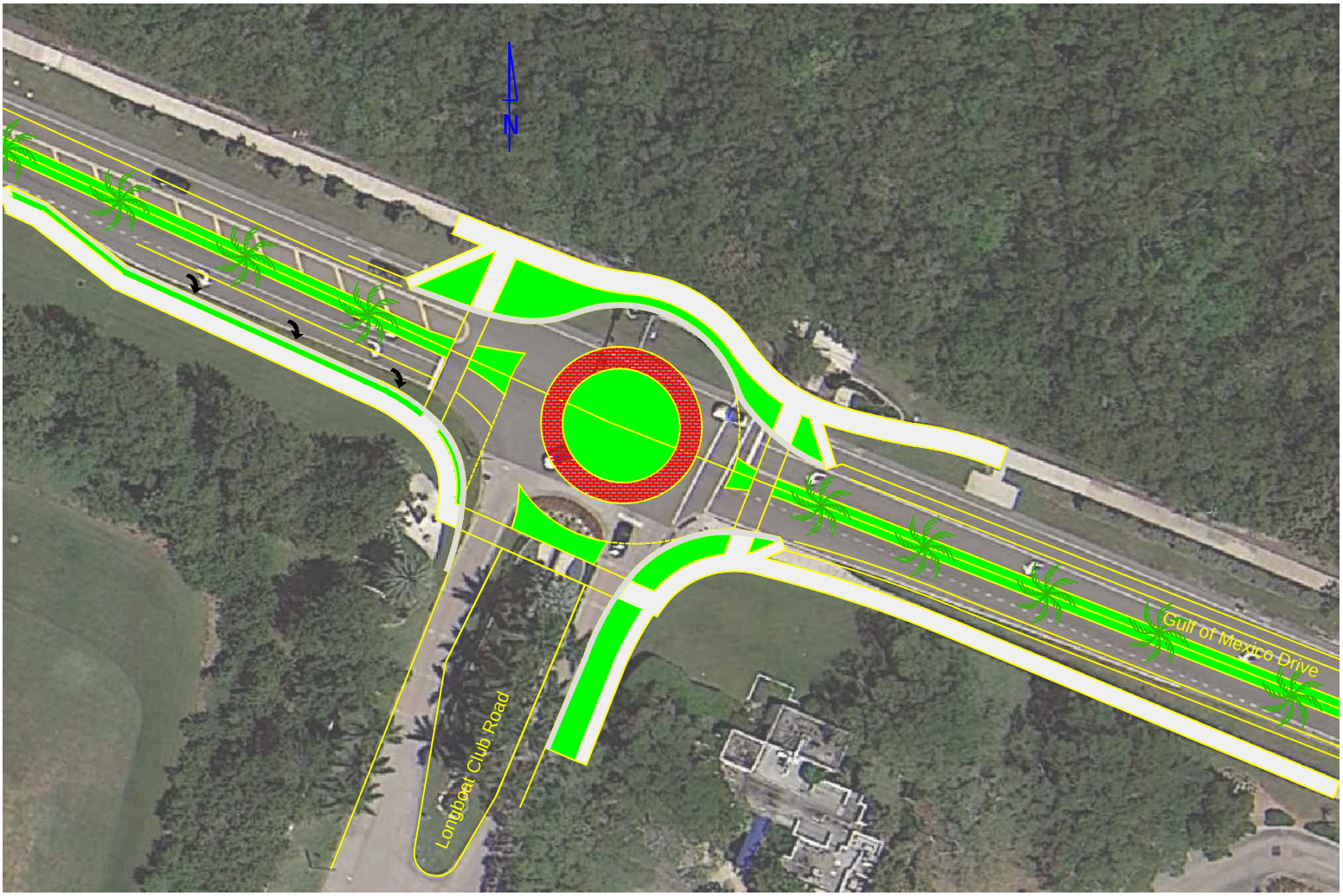
Roundabout Layouts

Longboat Club Road with Southbound Right Turn Lane

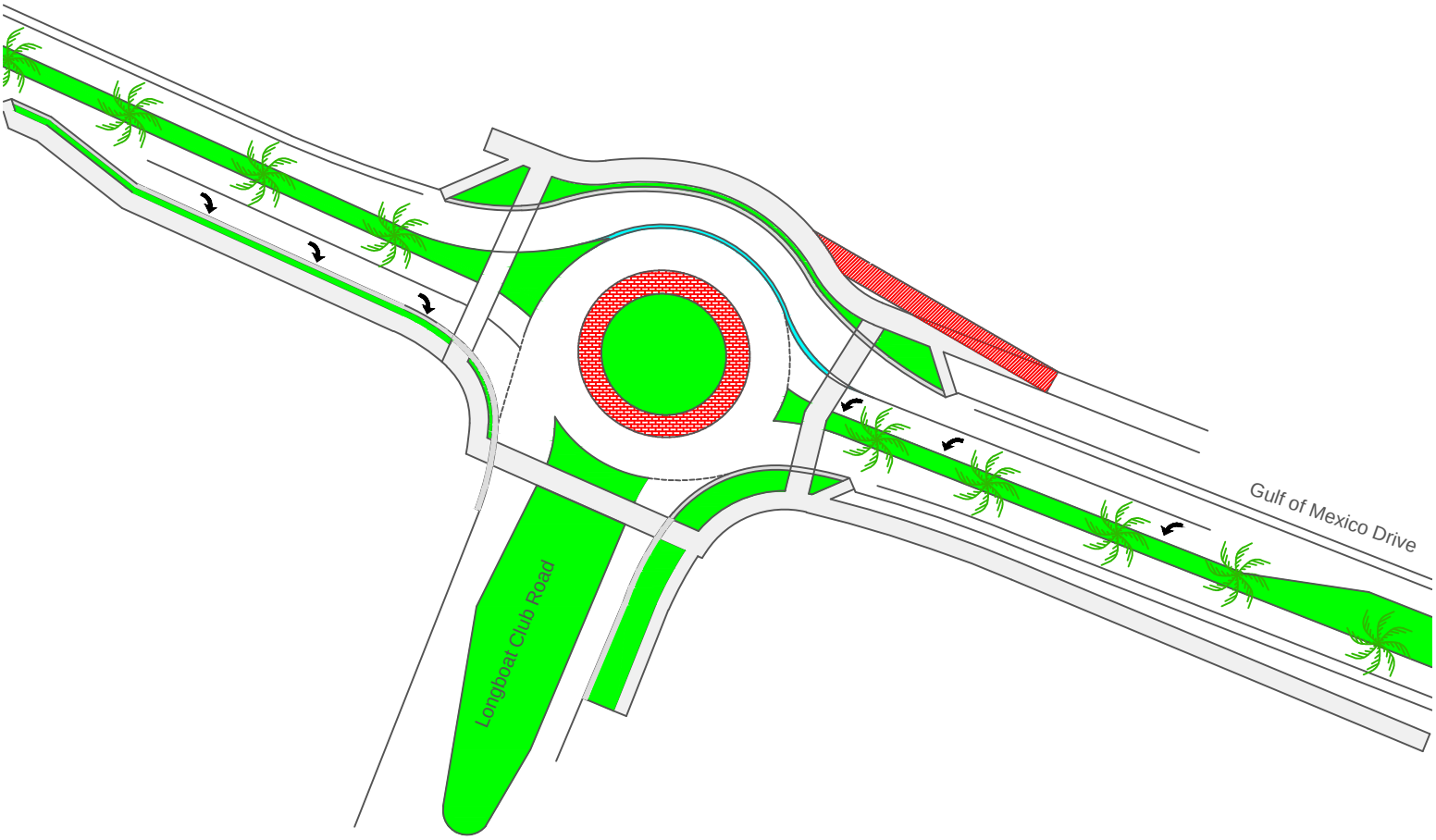


Vehicle Templates for Longboat Club Road
with Southbound Right Turn Lane

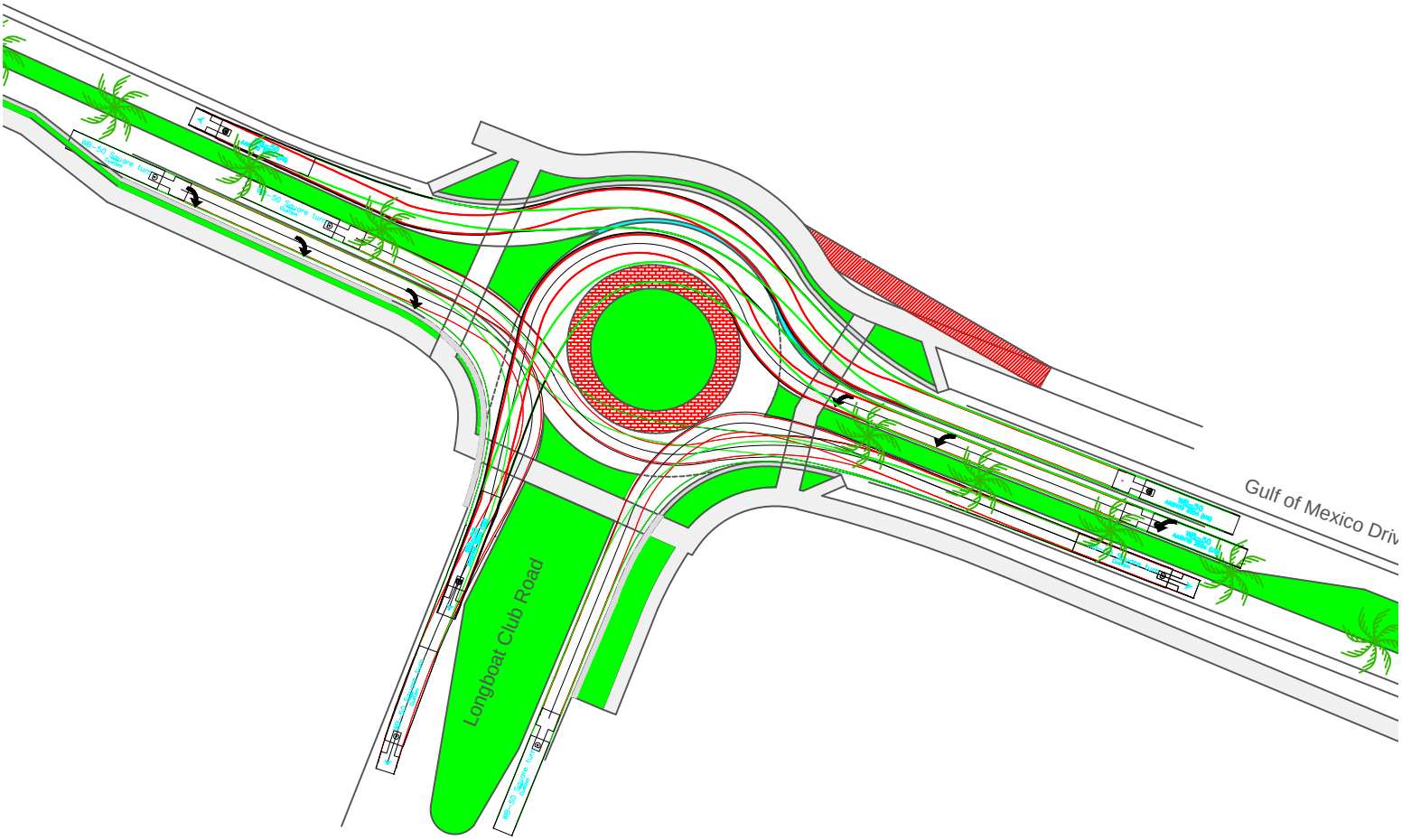


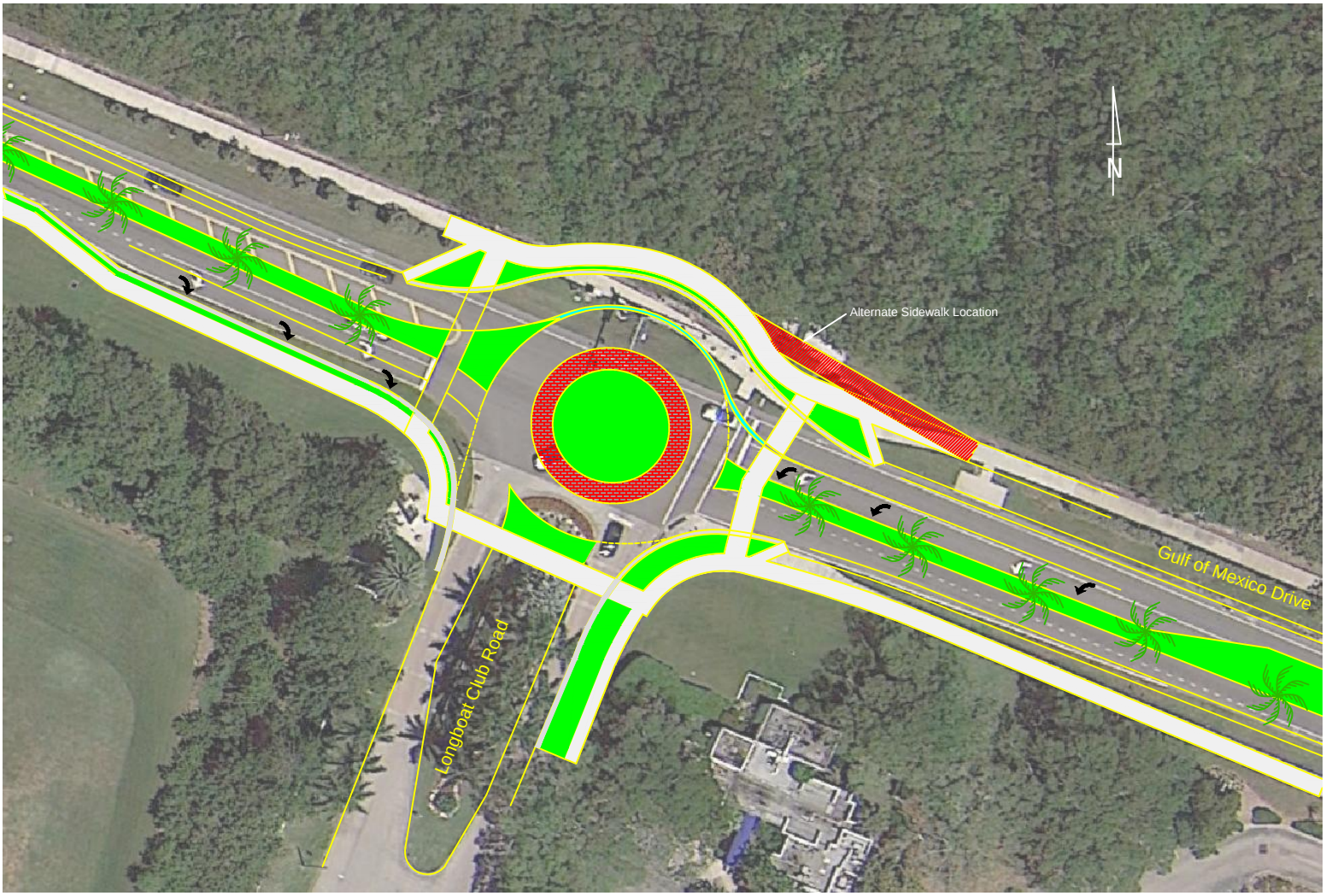

N
Longboat Club Road
Gulf of Mexico Drive

Longboat Club Road with southbound right turn
and northbound left turn

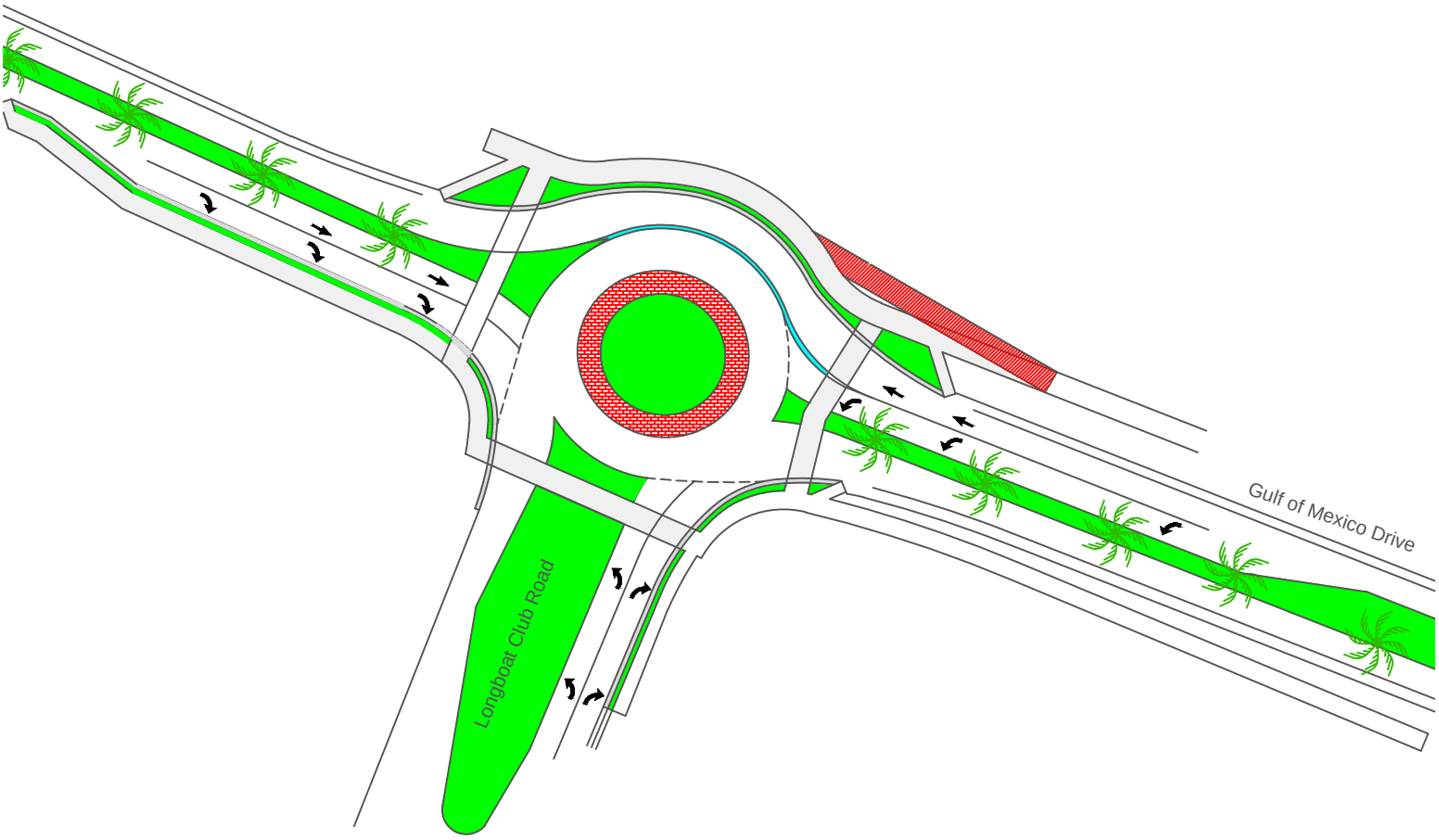


Vehicle Templates for Longboat Club Road, Southbound Right Turn Lane, Northbound Left Turn

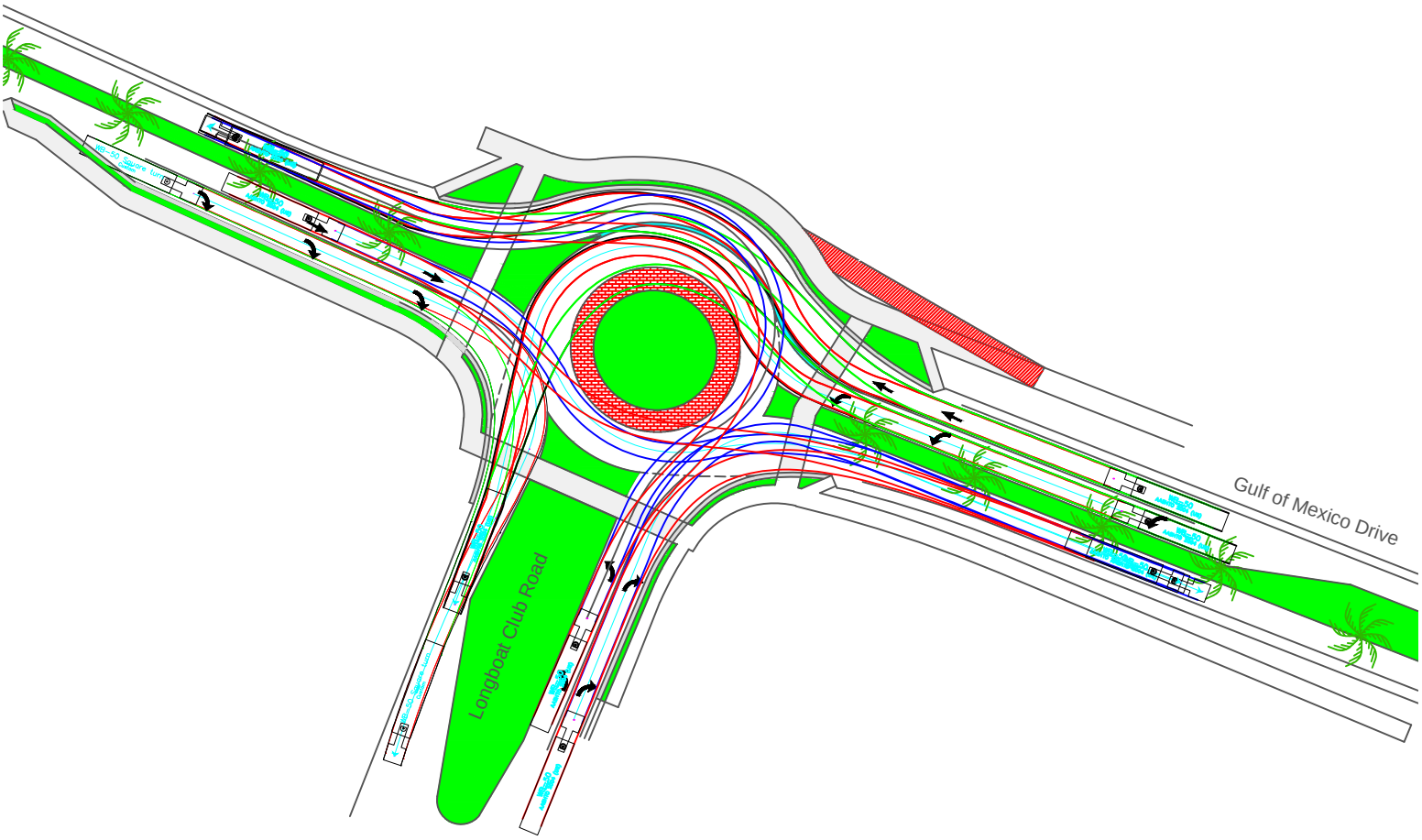


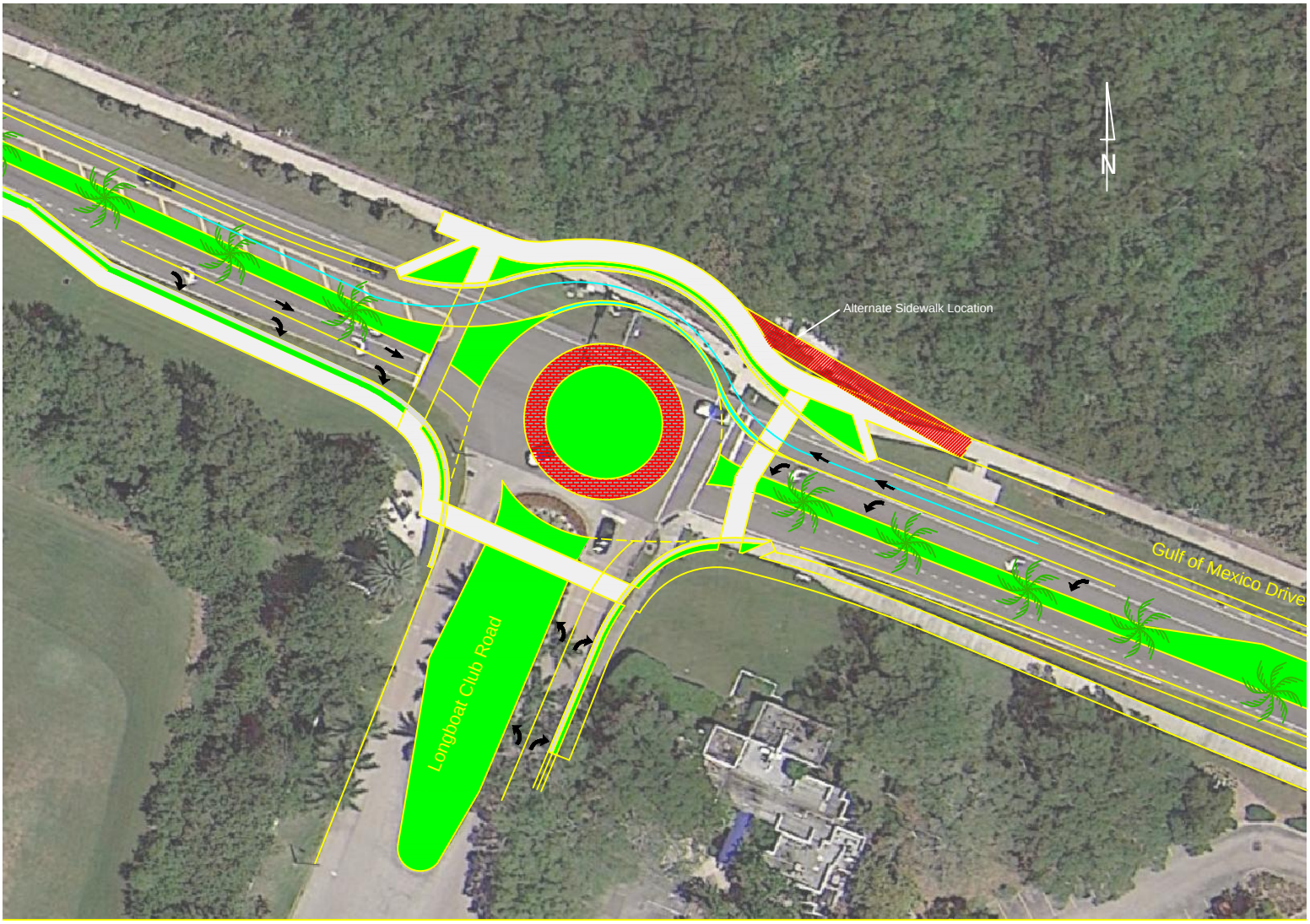

Alternate Sidewalk Location
Gulf of Mexico Drive
Longboat Club Road
N

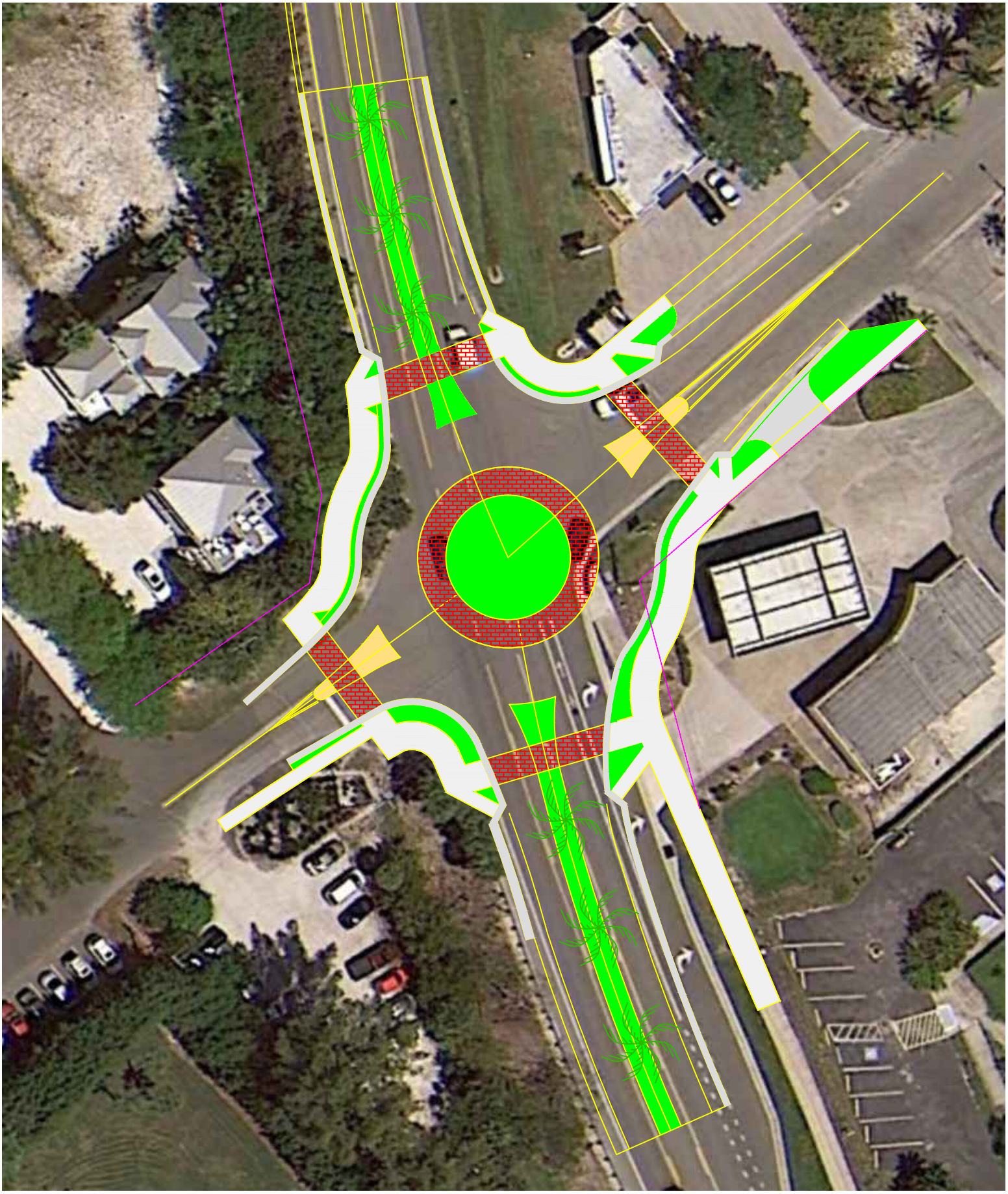
Longboat Club Road, Southbound Right Turn Lane, Northbound Left Turn Lane and Right Turn Lane on Longboat Club Road



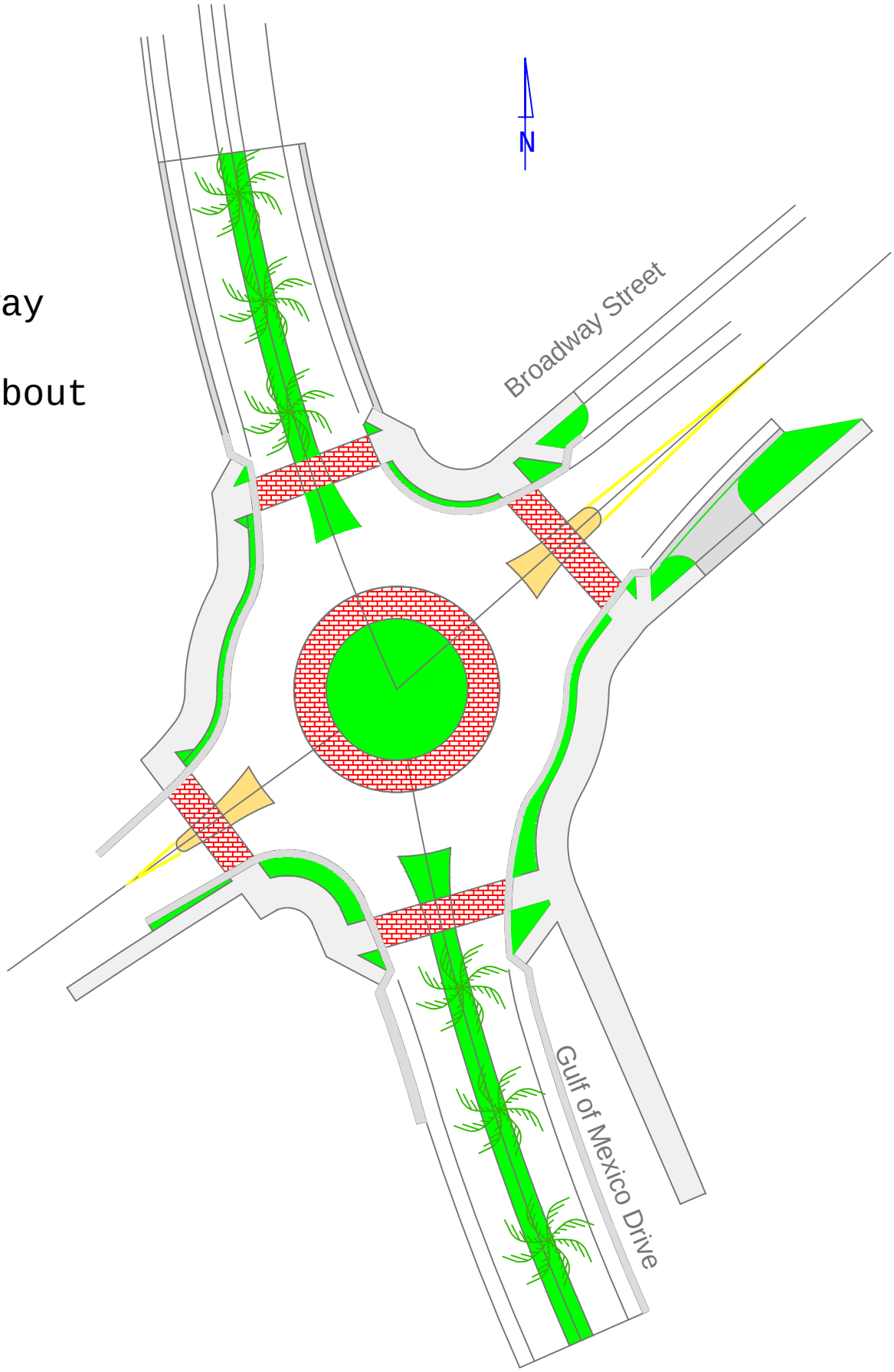
Vehicle Templates for Longboat Club Road, Southbound Right Turn Lane, Northbound Left Turn Lane and Right Turn Lane on Longboat Club Road



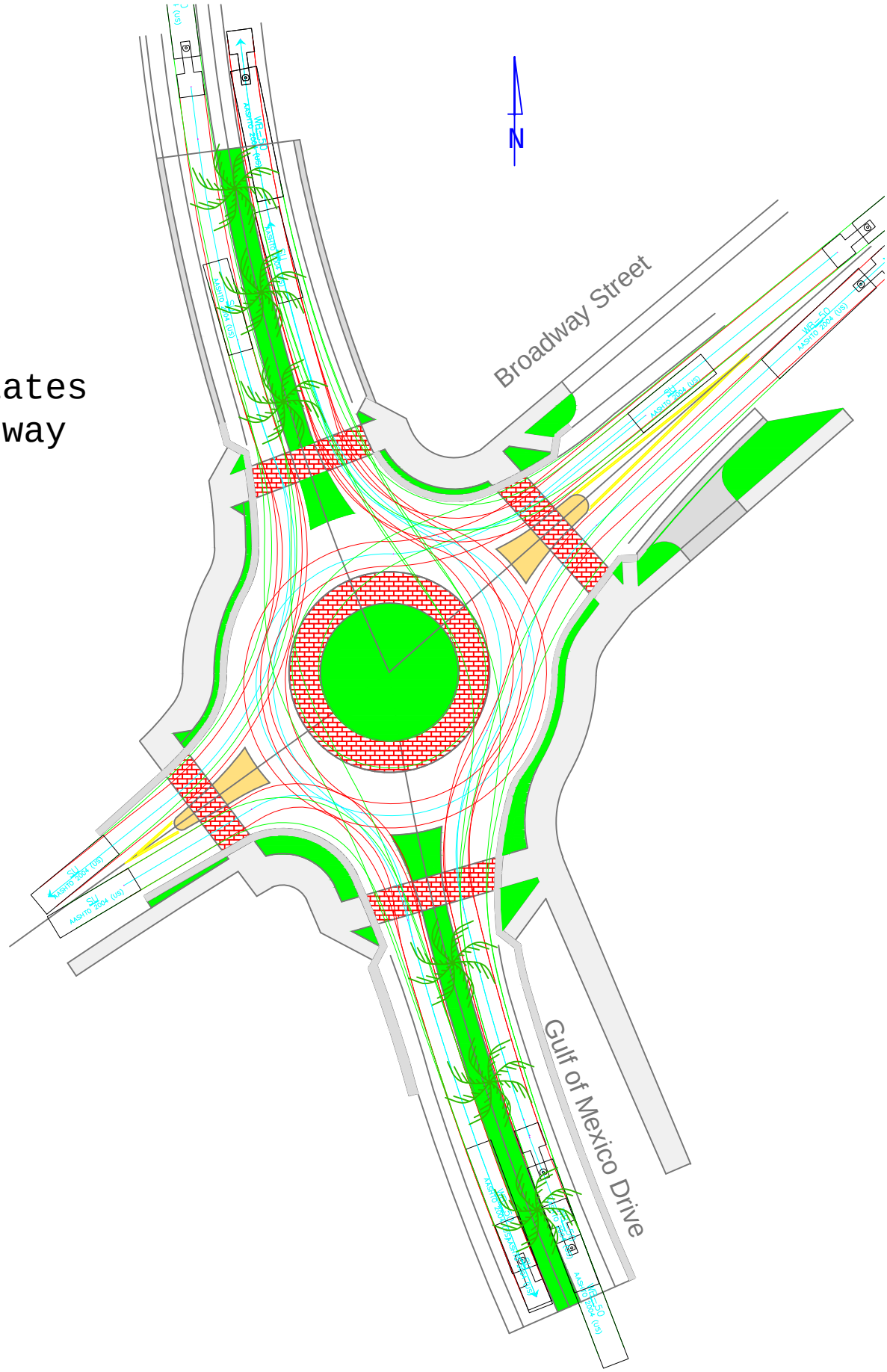

Alternate Sidewalk Location
Longboat Club Road
Gulf of Mexico Drive
N



Broadway Street Roundabout Layout



Templates
Broadway



Appendix B

Capacity Analysis Summary Sheets

MOVEMENT SUMMARY

Site: Broadway AM

Broadway AM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Gulf of Mexico Drive											
3	L2	11	2.0	0.234	9.5	LOS A	1.2	30.0	0.18	0.45	36.2
8	T1	219	2.0	0.234	4.8	LOS A	1.2	30.0	0.18	0.45	36.3
18	R2	20	2.0	0.234	4.7	LOS A	1.2	30.0	0.18	0.45	35.4
Approach		250	2.0	0.234	5.0	LOS A	1.2	30.0	0.18	0.45	36.2
East: Broadway Stret											
1	L2	37	2.0	0.072	10.5	LOS B	0.3	7.8	0.38	0.64	34.6
6	T1	1	2.0	0.072	5.9	LOS A	0.3	7.8	0.38	0.64	34.7
16	R2	25	2.0	0.072	5.7	LOS A	0.3	7.8	0.38	0.64	33.9
Approach		64	2.0	0.072	8.6	LOS A	0.3	7.8	0.38	0.64	34.3
North: Gulf of Mexico Drive											
7	L2	32	2.0	0.411	9.6	LOS A	2.7	67.4	0.25	0.46	35.9
4	T1	394	2.0	0.411	5.0	LOS A	2.7	67.4	0.25	0.46	36.0
14	R2	9	2.0	0.411	4.8	LOS A	2.7	67.4	0.25	0.46	35.1
Approach		435	2.0	0.411	5.3	LOS A	2.7	67.4	0.25	0.46	36.0
West: Broadway Street											
5	L2	9	2.0	0.024	11.8	LOS B	0.1	2.6	0.51	0.65	34.1
2	T1	1	2.0	0.024	7.2	LOS A	0.1	2.6	0.51	0.65	34.3
12	R2	7	2.0	0.024	7.0	LOS A	0.1	2.6	0.51	0.65	33.5
Approach		17	2.0	0.024	9.4	LOS A	0.1	2.6	0.51	0.65	33.9
All Vehicles		766	2.0	0.411	5.6	LOS A	2.7	67.4	0.25	0.48	35.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Broadway Midday

Broadway Midday
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Gulf of Mexico Drive											
3	L2	13	2.0	0.456	9.9	LOS A	3.0	76.5	0.32	0.48	35.8
8	T1	399	2.0	0.456	5.3	LOS A	3.0	76.5	0.32	0.48	35.9
18	R2	59	2.0	0.456	5.1	LOS A	3.0	76.5	0.32	0.48	35.0
Approach		471	2.0	0.456	5.4	LOS A	3.0	76.5	0.32	0.48	35.8
East: Broadway Stret											
1	L2	34	2.0	0.125	11.9	LOS B	0.6	15.0	0.53	0.70	34.4
6	T1	4	2.0	0.125	7.3	LOS A	0.6	15.0	0.53	0.70	34.6
16	R2	56	2.0	0.125	7.1	LOS A	0.6	15.0	0.53	0.70	33.8
Approach		94	2.0	0.125	8.8	LOS A	0.6	15.0	0.53	0.70	34.0
North: Gulf of Mexico Drive											
7	L2	53	2.0	0.506	9.7	LOS A	3.9	98.1	0.30	0.47	35.7
4	T1	468	2.0	0.506	5.1	LOS A	3.9	98.1	0.30	0.47	35.8
14	R2	13	2.0	0.506	4.9	LOS A	3.9	98.1	0.30	0.47	34.9
Approach		534	2.0	0.506	5.5	LOS A	3.9	98.1	0.30	0.47	35.8
West: Broadway Street											
5	L2	16	2.0	0.067	12.7	LOS B	0.3	7.9	0.58	0.71	34.0
2	T1	6	2.0	0.067	8.0	LOS A	0.3	7.9	0.58	0.71	34.2
12	R2	23	2.0	0.067	7.8	LOS A	0.3	7.9	0.58	0.71	33.4
Approach		45	2.0	0.067	9.6	LOS A	0.3	7.9	0.58	0.71	33.7
All Vehicles		1143	2.0	0.506	5.9	LOS A	3.9	98.1	0.34	0.50	35.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Broadway Midday

Broadway Midday
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Gulf of Mexico Drive											
3	L2	13	2.0	0.456	9.9	LOS A	3.0	76.5	0.32	0.48	35.8
8	T1	399	2.0	0.456	5.3	LOS A	3.0	76.5	0.32	0.48	35.9
18	R2	59	2.0	0.456	5.1	LOS A	3.0	76.5	0.32	0.48	35.0
Approach		471	2.0	0.456	5.4	LOS A	3.0	76.5	0.32	0.48	35.8
East: Broadway Stret											
1	L2	34	2.0	0.125	11.9	LOS B	0.6	15.0	0.53	0.70	34.4
6	T1	4	2.0	0.125	7.3	LOS A	0.6	15.0	0.53	0.70	34.6
16	R2	56	2.0	0.125	7.1	LOS A	0.6	15.0	0.53	0.70	33.8
Approach		94	2.0	0.125	8.8	LOS A	0.6	15.0	0.53	0.70	34.0
North: Gulf of Mexico Drive											
7	L2	53	2.0	0.506	9.7	LOS A	3.9	98.1	0.30	0.47	35.7
4	T1	468	2.0	0.506	5.1	LOS A	3.9	98.1	0.30	0.47	35.8
14	R2	13	2.0	0.506	4.9	LOS A	3.9	98.1	0.30	0.47	34.9
Approach		534	2.0	0.506	5.5	LOS A	3.9	98.1	0.30	0.47	35.8
West: Broadway Street											
5	L2	16	2.0	0.067	12.7	LOS B	0.3	7.9	0.58	0.71	34.0
2	T1	6	2.0	0.067	8.0	LOS A	0.3	7.9	0.58	0.71	34.2
12	R2	23	2.0	0.067	7.8	LOS A	0.3	7.9	0.58	0.71	33.4
Approach		45	2.0	0.067	9.6	LOS A	0.3	7.9	0.58	0.71	33.7
All Vehicles		1143	2.0	0.506	5.9	LOS A	3.9	98.1	0.34	0.50	35.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Longboat 1 - AM

Longboat Club Road AM RT lane
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Gulf of Mexico Drive											
3	L2	170	2.0	0.741	7.6	LOS A	10.2	258.7	0.44	0.40	28.6
8	T1	780	2.0	0.741	3.1	LOS A	10.2	258.7	0.44	0.40	28.5
Approach		950	2.0	0.741	3.9	LOS A	10.2	258.7	0.44	0.40	28.5
North: Gulf of Mexico Drive											
4	T1	564	2.0	0.409	3.3	LOS A	2.7	69.0	0.41	0.40	28.8
14	R2	75	2.0	0.083	4.1	LOS A	0.4	9.5	0.35	0.49	28.2
Approach		638	2.0	0.409	3.4	LOS A	2.7	69.0	0.40	0.41	28.7
West: Longboat Club Road											
5	L2	44	2.0	0.143	9.8	LOS A	0.8	19.6	0.61	0.69	28.1
12	R2	78	2.0	0.143	5.6	LOS A	0.8	19.6	0.61	0.69	27.4
Approach		121	2.0	0.143	7.1	LOS A	0.8	19.6	0.61	0.69	27.6
All Vehicles		1710	2.0	0.741	4.0	LOS A	10.2	258.7	0.44	0.42	28.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Longboat 2 Mid

Longboat Club Road RT Midday
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Gulf of Mexico Drive											
3	L2	163	2.0	0.828	8.4	LOS A	14.0	355.4	0.78	0.49	28.0
8	T1	851	2.0	0.828	3.9	LOS A	14.0	355.4	0.78	0.49	27.9
Approach		1014	2.0	0.828	4.6	LOS A	14.0	355.4	0.78	0.49	27.9
North: Gulf of Mexico Drive											
4	T1	886	2.0	0.650	3.6	LOS A	6.5	164.8	0.59	0.44	28.4
14	R2	123	2.0	0.137	4.1	LOS A	0.7	17.7	0.38	0.50	28.1
Approach		1009	2.0	0.650	3.7	LOS A	6.5	164.8	0.57	0.45	28.4
West: Longboat Club Road											
5	L2	86	2.0	0.395	14.0	LOS B	2.8	72.1	0.89	0.95	26.7
12	R2	141	2.0	0.395	9.8	LOS A	2.8	72.1	0.89	0.95	26.0
Approach		227	2.0	0.395	11.4	LOS B	2.8	72.1	0.89	0.95	26.3
All Vehicles		2250	2.0	0.828	4.9	LOS A	14.0	355.4	0.70	0.52	27.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Longboat 2 -PM Rt

Longboat Club Road RT PM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Gulf of Mexico Drive											
3	L2	134	2.0	0.692	7.7	LOS A	8.6	219.3	0.48	0.42	28.6
8	T1	734	2.0	0.692	3.2	LOS A	8.6	219.3	0.48	0.42	28.5
Approach		868	2.0	0.692	3.9	LOS A	8.6	219.3	0.48	0.42	28.5
North: Gulf of Mexico Drive											
4	T1	929	2.0	0.659	3.5	LOS A	6.4	162.4	0.52	0.43	28.6
14	R2	69	2.0	0.074	3.9	LOS A	0.3	8.6	0.31	0.47	28.2
Approach		998	2.0	0.659	3.5	LOS A	6.4	162.4	0.51	0.43	28.5
West: Longboat Club Road											
5	L2	62	2.0	0.400	14.8	LOS B	2.9	73.3	0.90	0.97	26.5
12	R2	162	2.0	0.400	10.6	LOS B	2.9	73.3	0.90	0.97	25.9
Approach		224	2.0	0.400	11.8	LOS B	2.9	73.3	0.90	0.97	26.1
All Vehicles		2090	2.0	0.692	4.6	LOS A	8.6	219.3	0.54	0.48	28.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Longboat 1 - AM - RT and LT lanes

Longboat Club Road AM RT and LT lanes
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Gulf of Mexico Drive											
3	L2	170	2.0	0.092	7.0	LOS A	0.0	0.0	0.00	0.61	28.2
8	T1	780	2.0	0.519	2.8	LOS A	4.5	113.8	0.25	0.32	29.1
Approach		950	2.0	0.519	3.5	LOS A	4.5	113.8	0.21	0.38	28.9
North: Gulf of Mexico Drive											
4	T1	564	2.0	0.401	3.3	LOS A	2.3	59.1	0.36	0.40	28.9
14	R2	75	2.0	0.081	4.1	LOS A	0.3	8.5	0.32	0.49	28.2
Approach		638	2.0	0.401	3.4	LOS A	2.3	59.1	0.35	0.41	28.8
West: Longboat Club Road											
5	L2	44	2.0	0.142	9.8	LOS A	0.8	19.2	0.60	0.69	28.1
12	R2	78	2.0	0.142	5.6	LOS A	0.8	19.2	0.60	0.69	27.4
Approach		121	2.0	0.142	7.1	LOS A	0.8	19.2	0.60	0.69	27.6
All Vehicles		1710	2.0	0.519	3.7	LOS A	4.5	113.8	0.29	0.41	28.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: Longboat 2 Mid - RT and LT lanes

Longboat Club Road Midday RT and LT lanes
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Gulf of Mexico Drive											
3	L2	163	2.0	0.169	7.6	LOS A	0.9	23.3	0.29	0.58	27.7
8	T1	851	2.0	0.589	3.1	LOS A	5.9	150.0	0.43	0.37	28.7
Approach		1014	2.0	0.589	3.8	LOS A	5.9	150.0	0.41	0.41	28.6
North: Gulf of Mexico Drive											
4	T1	886	2.0	0.635	3.6	LOS A	5.5	140.6	0.52	0.44	28.6
14	R2	123	2.0	0.134	4.1	LOS A	0.6	15.6	0.35	0.50	28.2
Approach		1009	2.0	0.635	3.7	LOS A	5.5	140.6	0.50	0.45	28.5
West: Longboat Club Road											
5	L2	86	2.0	0.384	13.8	LOS B	2.7	67.9	0.88	0.93	26.7
12	R2	141	2.0	0.384	9.6	LOS A	2.7	67.9	0.88	0.93	26.1
Approach		227	2.0	0.384	11.2	LOS B	2.7	67.9	0.88	0.93	26.3
All Vehicles		2250	2.0	0.635	4.5	LOS A	5.9	150.0	0.49	0.48	28.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
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Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Longboat Club Road RT and LT lanes PM

Longboat Club Road RT and LT lanes PM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Gulf of Mexico Drive											
3	L2	134	2.0	0.135	7.4	LOS A	0.7	18.4	0.24	0.57	27.8
8	T1	734	2.0	0.498	2.9	LOS A	4.5	113.3	0.32	0.35	29.0
Approach		868	2.0	0.498	3.6	LOS A	4.5	113.3	0.31	0.38	28.8
North: Gulf of Mexico Drive											
4	T1	929	2.0	0.652	3.5	LOS A	5.9	149.4	0.48	0.43	28.6
14	R2	69	2.0	0.073	3.9	LOS A	0.3	8.0	0.30	0.47	28.3
Approach		998	2.0	0.652	3.5	LOS A	5.9	149.4	0.47	0.43	28.6
West: Longboat Club Road											
5	L2	62	2.0	0.393	14.7	LOS B	2.8	71.1	0.89	0.96	26.6
12	R2	162	2.0	0.393	10.5	LOS B	2.8	71.1	0.89	0.96	25.9
Approach		224	2.0	0.393	11.7	LOS B	2.8	71.1	0.89	0.96	26.1
All Vehicles		2090	2.0	0.652	4.4	LOS A	5.9	149.4	0.45	0.47	28.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
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Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Longboat Key

Gulf of Mexico Roundabout Feasibility

Michael J. Wallwork, P.E.
Alternate street Design, PA

Roundabouts

Roundabouts are not Traffic Circles – Below Kingston, NY

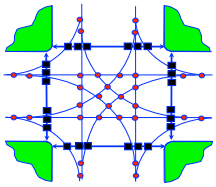
Roundabouts versus Traffic Circles

	Modern Roundabouts	Traffic Circles/Rotaries
Central Island Diameter	16 to 200 feet diameter	300 to 600 feet diameter
Design Principle	Low-speed entry, circulation and exit	High-speed entry, circulation and exit
Typical Operating Speed	15 to 23 mph	30 to 50+ mph

Many Shapes and Sizes

Fewer Conflicts

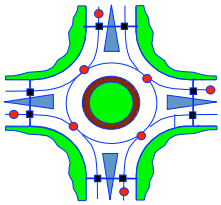
Standard Intersection - Stop or Signals



32 Vehicle to vehicle conflicts

24 Vehicle to pedestrian conflicts

Roundabouts



8 Vehicle to vehicle conflicts

8 Vehicle to pedestrian conflicts

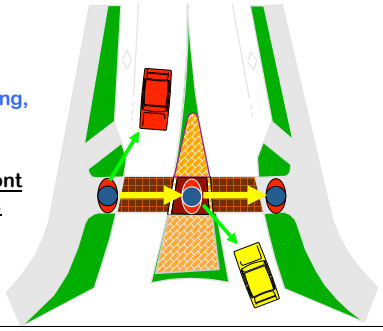
Pedestrians area safer - cross from curb to island, island to curb

Look one-way,

Slow cars

Walk behind moving, or in front of, stopped cars

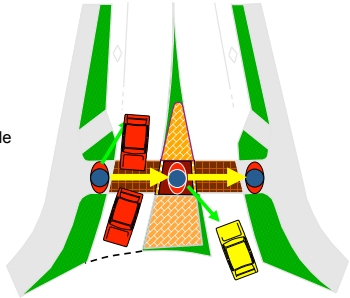
Do not walk in front of moving cars



Pedestrian Safety

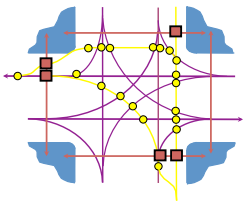
About 20-feet from yield line to pedestrian crossing

One physical vehicle length, measured when the vehicle is on an angle so that the crosswalk is open for pedestrians to use when a vehicle is stopped.



Bicycle - Conflicts

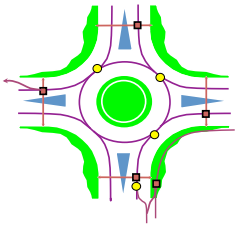
Standard Intersection - Stop or Signals



7 – 13 Bicycle to vehicle conflicts to make a left turn

2 Bicycle to pedestrian conflicts

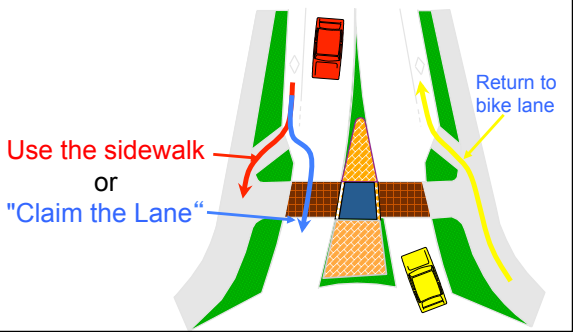
Roundabouts



4 Vehicle to vehicle conflicts

2 Bicycle to pedestrian conflicts

Bicyclists Are Given a Choice



Bicycle Ramps

Lower Speeds

East Approach
Lots of deflection

West Approach
No deflection

North - no crashes
East - 3 minor crashes

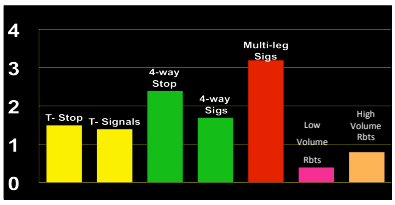
South - no crashes
West - 19 right angle crashes

Deflection is essential to control vehicle speeds and reduce crashes

Safety

Roundabouts Decrease Crashes:

- Overall: 39%
- Injury-producing: 76%
- Fatal or incapacitating: 90%



Capacity

College Street
Asheville, NC,
18,000 vpd

La Jolla Boulevard,
San Diego, CA,
22,000 vpd

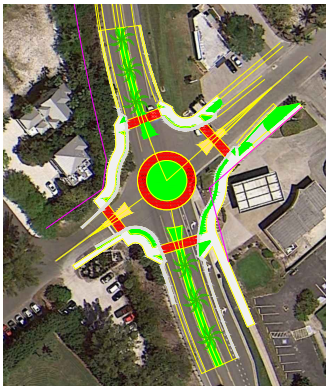
Broadway Street

Intersection Control	Time Period	Level-of-Service	Average Delay (sec)	95th Percentile Queue (Ft)	Average Queue (Ft)	Volume/capacity ratio
Broadway Street	AM	A	5.6	67	27	0.411
	Midday	A	6.5	98	40	0.506
	PM	A	6.4	143	57	0.619

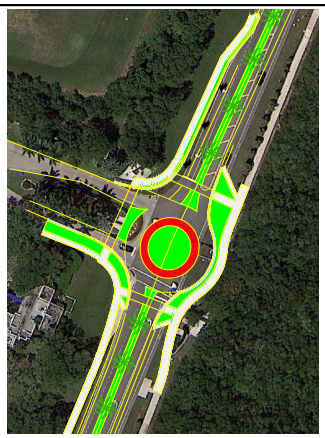
Longboat Club Drive

Intersection Control	Time Period	Level-of-Service	Average Delay (sec)	95th Percentile Queue (Ft)	Average Queue (Ft)	Volume/capacity ratio
Longboat Club Drive	AM	A	5.8	227	91	0.736
	Midday	A	6.3	296	119	0.814
	PM	A	5.8	177	71	0.682

Broadway Street Roundabout



Longboat Club Roundabout



Roundabout Benefits to Longboat Key

Pluses
- Safer intersections for all users, especially for pedestrians and bicyclists
- Less delay for pedestrians and bicyclists when crossing at both intersections – pedestrians now have priority over vehicles
- Gateways to Longboat key
- Improved traffic operations for all drivers, less delay, safer movements
- Almost no maintenance costs (landscape only)

Negatives
- Some people will not like change
- Some drivers will resent the need to slow down, particularly at Broadway Street
- Construction costs
- Some right-of-way acquisition
- Loss of vegetation on NE corner of Broadway Street intersection

End of Agenda Item