



TOWN OF PALM BEACH

Town Manager's Office

PUBLIC WORKS COMMITTEE MEETING

TOWN HALL
COUNCIL CHAMBERS – SECOND FLOOR
360 SOUTH COUNTY ROAD

AGENDA
THURSDAY, OCTOBER 22, 2020
9:30 A.M.

WELCOME!

- I. CALL TO ORDER AND ROLL CALL
Danielle H. Moore, Committee Chair
Bobbie Lindsay, Committee Member
- II. PLEDGE OF ALLEGIANCE
- III. APPROVAL OF AGENDA
- IV. COMMUNICATIONS FROM CITIZENS
- V. TOWN OF PALM BEACH TRUCK REGULATION STUDY
Patricia Strayer, P.E., Town Engineer
- VI. ONGOING CONSTRUCTION PROJECTS UPDATE 2020
Patricia Strayer, P.E., Town Engineer
- VII. GREEN INITIATIVE / FICUS REMOVAL PROGRAM STATUS
H. Paul Brazil, P.E., Director, Public Works
- VIII. CISTERN UTILIZATION
Patricia Strayer, P.E., Town Engineer
- IX. ANY OTHER MATTERS
- X. ADJOURNMENT

PLEASE TAKE NOTE:

The progress of this meeting may be monitored by visiting the Town's website (www.townofpalmbeach.com) and clicking on "Meeting Audio" in the left column. If you have questions regarding that feature, please contact the Office of Information Systems (561) 227-6315. The audio recording of the meeting will appear within 24 hours after the conclusion of the meeting.

Disabled persons who need an accommodation in order to participate in the Public Works Committee Meeting are requested to contact the Town Manager's Office at 838-5410 or through the Florida Relay Service by dialing 1-800-955-8770 for voice callers or 1-800-955-8771 for TDD callers, at least two (2) working days before this meeting.

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Telephone (561) 838-5410 * Facsimile (561) 838-5411 * townmanager@townofpalmbeach.com

TOWN OF PALM BEACH

Information for Public Works Committee Meeting: October 22, 2020

TO: Public Works Committee

FROM: H. Paul Brazil, P.E., Director of Public Works

RE: Town of Palm Beach Truck Regulation Study

DATE: August 18, 2020

STAFF RECOMMENDATION

Kimley-Horn and Associates, Inc. will make a presentation of the Truck Regulation Study.

GENERAL INFORMATION

At the September 10, 2019, the Town Council authorized a purchase order for Engineering Services to Kimley-Horn and Associates, Inc. (KHA) for the study and development of a truck traffic regulation plan. This action was the culmination of years of discussions about the challenges of large trucks trying to navigate safely and without causing property damage or traffic impacts. The draft report is attached excluding the appendices which are too voluminous to include in an email.

The draft report provides an analysis of truck volumes and circulation patterns within the Town. A review of Florida Municipalities that have implemented truck restrictions is also included. Based on these analyses, a truck restriction plan was developed and outlined in the draft report along with recommendations for codification, education, and enforcement to allow for limiting large trucks to enter restricted areas.

Attachment

cc: Kirk W. Blouin, Town Manager
Jay Boodheshwar, Deputy Town Manager
Eric B. Brown, P.E., Assistant Director of Public Works
Patricia Strayer, P.E., Town Engineer

TRUCK REGULATION STUDY

**TOWN OF PALM BEACH,
TRUCK STUDY
PALM BEACH, FL**

DRY

**PREPARED FOR:
TOWN OF PALM BEACH**

Kimley»»Horn

March 2020
Revised May 2020
Kimley-Horn Project #044063244
CA 00000696
Kimley-Horn and Associates, Inc.
1920 Wekiva Way
West Palm Beach, Florida 33411
561/845-0665 TEL

TRUCK REGULATION STUDY

TOWN OF PALM BEACH, TRUCK STUDY PALM BEACH, FL

Prepared by:
Kimley-Horn and Associates, Inc.
West Palm Beach, Florida

Kimley»Horn

March 2020
Revised May 2020
Kimley-Horn Project #044063244
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Adam B. Kerr, P.E.
Florida Registration Number 64773

TABLE OF CONTENTS

INTRODUCTION..... 1

IDENTIFICATION OF ISSUE..... 2

CASE STUDY REVIEW 3

 City of Tampa..... 3

 City of Jacksonville..... 4

 St. Augustine..... 4

DATA AND ANALYSIS 9

 Review of Existing Conditions..... 9

 Jamaica Lane & North Ocean Boulevard..... 9

 Arabian Road & North Ocean Boulevard 10

 Debra Lane & North Lake Way 11

 Truck Counts..... 13

 Location 1: Lake Way, north of Tradewinds Drive 16

 Location 2: Ocean Boulevard, north of Jamaica Lane 17

 Location 3: Bradley Place, south of Seminole Avenue 18

 Location 4: County Road, south of Seminole Avenue 19

 Location 5: Royal Poinciana Way, west of Coconut Row (North Bridge) 20

 Location 6: Coconut Row, north of Seaview Avenue..... 21

 Location 7: County Road, north of Seaview Avenue 22

 Location 8: Royal Palm Way, west of Lake Drive (Central Bridge)..... 23

 Location 9: Coconut Row, south of Royal Palm Way 24

 Location 10: County Road, south of Royal Palm Way 25

 Location 11: Ocean Boulevard, north of Via Bellaria 26

 Location 12: Southern Boulevard, west of Ocean Boulevard (Southern Bridge)..... 27

 Location 13: Ocean Boulevard, south of Regents Park Road 28

 Turning Movement Analysis..... 29

RECOMMENDATIONS..... 39

 Description of the Recommended Restriction..... 39

 Permitting of Exceptions 42

 Codification..... 42

 Education 43

CONCLUSION 44

LIST OF TABLES

Table 1: Location 1 Truck Percentage Summary..... 16

Table 2: Location 2 Truck Percentage Summary..... 17

Table 3: Location 3 Truck Percentage Summary..... 18

Table 4: Location 4 Truck Percentage Summary..... 19

Table 5: Location 5 Truck Percentage Summary..... 20

Table 6: Location 6 Truck Percentage Summary..... 21

Table 7: Location 7 Truck Percentage Summary..... 22

Table 8: Location 8 Truck Percentage Summary..... 23

Table 9: Location 9 Truck Percentage Summary..... 24

Table 10: Location 10 Truck Percentage Summary..... 25

Table 11: Location 11 Truck Percentage Summary..... 26

Table 12: Location 12 Truck Percentage Summary..... 27

Table 13: Location 13 Truck Percentage Summary..... 28

LIST OF FIGURES

Figure 1: Narrow Street with Truck Restriction in St. Augustine 6

Figure 2: Example of Truck Restriction Sign in St. Augustine..... 7

Figure 3: Truck Restriction Informational Sign..... 8

Figure 4: Jamaica Lane & North Ocean Boulevard 9

Figure 5: Arabian Road & North Ocean Boulevard..... 10

Figure 6: Debra Lane & North Lake Way..... 11

Figure 7: Debra Lane & North Lake Way..... 12

Figure 8: Data Collection Locations..... 14

Figure 9: Vehicle Classification Chart..... 15

Figure 10: Percent Truck Volumes 30

Figure 11: Average Peak Hour Truck Percentages 31

Figure 13: Autoturn Intersection Locations - 1 36

Figure 14: Autoturn Intersection Locations - 2..... 37

Figure 15: Autoturn Intersection Locations - 3..... 38

Figure 16: Truck Restriction Boundaries 41

INTRODUCTION

The Town of Palm Beach currently allows unrestricted movement of all legal vehicles on all streets within the Town. As such, larger vehicles have been observed to damage private property when they cannot adequately maneuver narrow streets and can cause congestion and unsafe conditions when they have to make multi-point turns at Town intersections.

The Town of has therefore requested an analysis of truck volumes and circulation patterns within the Town to assist in the determination if the restriction of certain large vehicles on certain streets should be enacted. In addition, if a restriction is enacted, the framework for implementation and enforcement of the restriction is included in this document. The goal of any restriction is to change the behaviors to force deliveries with smaller vehicles. Although any restriction will not completely eliminate property damage and congestion, the goal of implementing the restrictions is to substantially reduce the frequency of occurrences.

Traffic counts were collected along various roadways and at certain intersections within the Town to determine the location and circulation patterns of large vehicles. Truck movements for several types and lengths of trucks were then analyzed at several intersections representative of typical conditions throughout the Town to determine which, if any, trucks can maneuver local streets without encroaching on private property.

A review was performed to identify Florida municipalities that have implemented truck restrictions. Based on these analyses, a truck restriction plan was developed, identifying streets that should have truck restrictions.

IDENTIFICATION OF ISSUE

Town residents have raised concern to Town staff that certain trucks have caused property damage when navigating local streets, including damage to turf, vegetation and minor structures. Additionally, trucks have been observed to cause congestion when attempting to turn onto and from local streets; especially with large trucks, multiple-point turns have been observed to be required, often also creating property damage.

Enforcement of trucks causing the damage and congestion is challenging, because by the time the incident is reported and responded to, the truck has moved to a different location within the Town or has left the Town entirely. Furthermore, truck drivers may not be aware that they are driving into parts of Town that are difficult to navigate, and may find themselves trapped, requiring them to damage property to maneuver and leave the Town.

This study has been limited to Town-maintained roadways only. The Town does not have jurisdiction to control vehicular movement on State Roads, such as County Road and all three bridges to the Town. State roads are also typically designed and constructed to accommodate larger vehicles, and the known problem areas are in residential districts in the north end and midtown.

Nonetheless, it is important to consider the need for large trucks to occasionally circulate even on narrow neighborhood streets. Events such as residential construction or delivery of large items must be allowed as matter of course for the Town. Therefore, a system of permitting and monitoring are required.

CASE STUDY REVIEW

A review of municipalities which have implemented truck restrictions was performed. In general, it was determined that many municipalities have developed plans and implemented enforcement of truck *parking* and *loading*, but very few have implemented restriction plans for the movement of trucks through neighborhoods and on specific streets. In some areas, truck routes have been developed to direct trucks around certain areas, but no actual restriction is established. A summary of a few relevant examples is included.

City of Tampa

The City of Tampa has established truck routes throughout the central part of the City. Truck routes were approved by Ordinance in 2011 and updated in 2016. The purpose of the truck route study was, similar to the intent of the Town, to balance the needs of commerce and truckers with the desire to be sensitive to certain land uses and neighborhoods.

Truck routes were established in the City. Any truck driver that is determined to be in violation of using designated truck routes (i.e. by using a local neighborhood street) is subject to a civil violation, similar to a parking ticket, if the driver cannot provide evidence of need for travelling off of designated truck routes.

Per Tampa's Code of Ordinances:

All regulated trucks within the city shall be operated only over and along the designated truck routes established in subsection (a) above.

Enforcement is also established in the Code:

...[T]he driver of a regulated truck may travel over and along a street not designated as a truck route only as necessary whereto perform its business its destination lies on or within in a manner that minimizes the distance traveled over and along the non-truck route street, or as necessary to perform its business, in a manner that minimizes the distance traveled over and along the non-truck route street.

An advantage of this type of restriction plan is that government resources are not burdened by pre-approving certain types of trucks, or types of trucks for certain events; a truck driver must simply convince an officer that they are required to circulate on local streets to perform their duties. A disadvantage of this system is that there is little incentive for trucking companies to change their routing or types of trucks to accommodate the nature of the street network, and little can be done

to prevent damage to private property if officers allow large trucks to continue to operate. Once a truck enters a neighborhood with narrow streets, it may have to physically damage private property to turn and exit the neighborhood.

City of Jacksonville

The City of Jacksonville recently adopted a truck routing ordinance in 2019. Much like Tampa, the City adopted a map identifying truck routes, does not specifically prohibit trucks from any roadway, and establishes the ability to ticket truck drivers not using designated routes. Deliveries are still allowed on local streets.

City streets are designated as Blue (preferred truck route), Gray (non-regulated) and Red (restricted for trucks except deliveries). Jacksonville's Code regulates trucks on red routes:

The driver of a regulated truck may travel on a Restricted Road (Red) for the primary purpose of delivery and pickup. The driver of the regulated truck must return to the Preferred (Blue) or non-regulated (Gray) truck route network by the shortest possible distance after completion of the delivery and/or pickup.

If the driver is observed on the Red route by an officer, the following Code applies:

Any person driving or in charge or control of any regulated truck operating on a Restricted Road (Red) shall be prepared to present for the inspection to the Jacksonville Sheriff's Office ("JSO") officers, the truck's log book, weight slips, delivery slips, or other written records of the regulated truck's origin and destination to justify the operation on the Restricted Road (Red).

Like Tampa's truck routing system, the decision to enforce truck routing falls to police enforcement, and only once a truck has travelled on restricted road.

City staff indicated that they would not sign each individual street or neighborhood discouraging trucks but would assess the situations on individual bases based on resident complaints.

St. Augustine

The City of St. Augustine has a truck restriction plan in place in their downtown historic district. This plan expressly prohibits trucks on certain roadways. Unlike Tampa and Jacksonville, certain streets are expressly prohibited for use by trucks, without exception for local deliveries; all trucks can be cited. Any truck needing to travel the prohibited streets must get a permit to do so. The City's Code specifically states:

It shall be unlawful for any person to operate any motor vehicle having a greater length than twenty-four (24) feet or greater width than eight (8) feet or greater height than eight (8) feet upon any of the following designated narrow streets or portions thereof of the city without a permit from the chief of police as hereinafter provided; provided that this section shall not be applicable to any authorized public service vehicle, nor shall the same be applicable to any franchised sight-seeing motor vehicles.

St. Augustine's restriction was based on physical constraints of the City's narrow streets, with limited turning ability for larger vehicles, whereas most other truck restriction plans were developed to reduce cut-through trips, or trips within residential areas. Much like St. Augustine, the Town has narrow streets in the residential areas with limited ability for larger vehicles to turn. Based on observation, the trucking industry has adapted to the restriction, since no vehicles larger than a delivery van were observed in the area. Furthermore, this area serves a large tourist population, with many restaurants and retail shops; therefore, deliveries occur in this area on a consistent basis.

The City of St. Augustine allows the Chief of Police to issue permits as necessary to allow larger trucks in the restriction area:

The chief of police is hereby authorized to issue special permits, in writing, under the provisions of F.S. § 316.550 and shall charge therefor such fees as shall have been set by the city manager pursuant to the provisions of section 2-74 and as shall be consistent with the provisions of F.S. § 316.550.

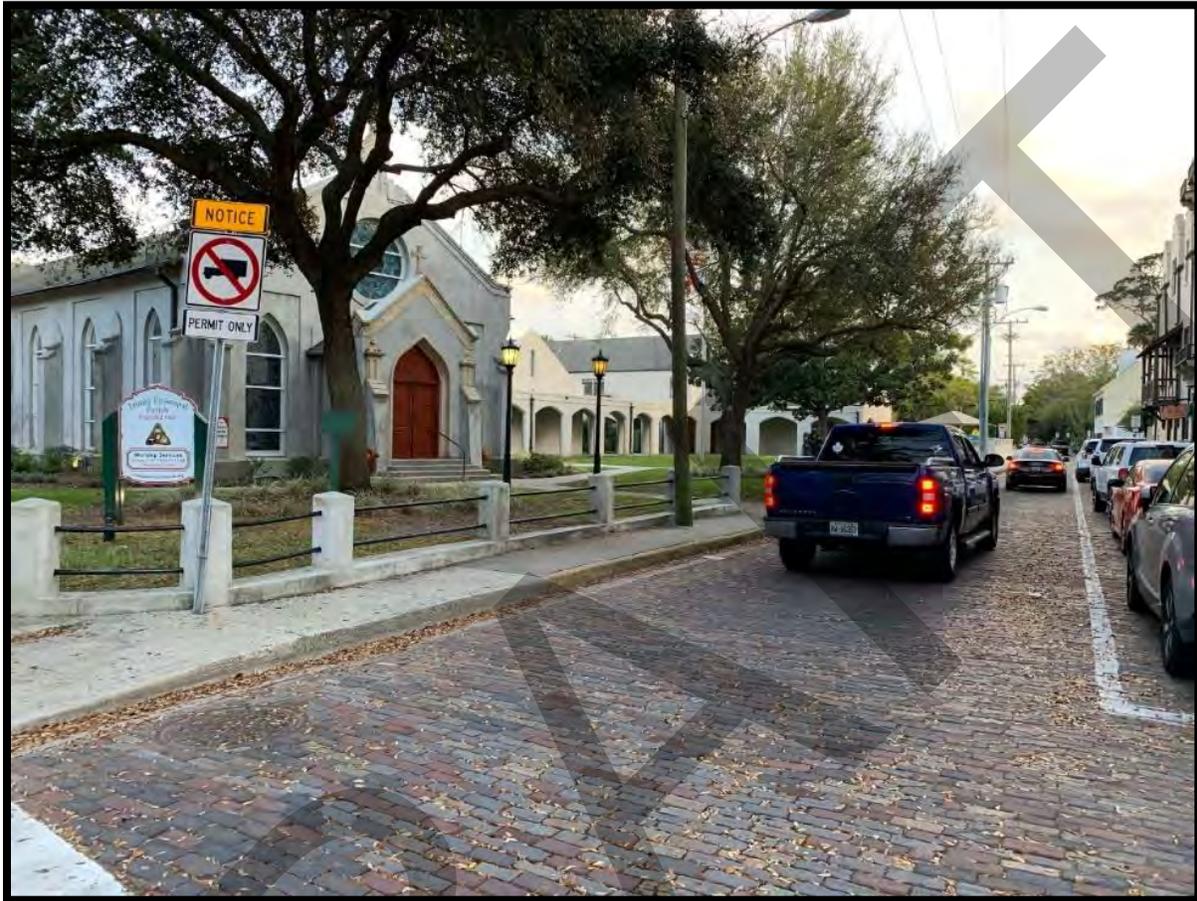


Figure 1: Narrow Street with Truck Restriction in St. Augustine



Figure 2: Example of Truck Restriction Sign in St. Augustine



Figure 3: Truck Restriction Informational Sign

DATA AND ANALYSIS

Review of Existing Conditions

A field review was performed to confirm that large vehicles are creating physical damage to private property. Below are photos confirming the effects of the large vehicles unable to make turns within the roadway.

Jamaica Lane & North Ocean Boulevard

The intersection of Jamaica Lane & North Ocean Boulevard was observed to have damage to grassy areas adjacent to the intersection. This is consistent with large vehicles being unable to turn with the paved surface area.



Figure 4: Jamaica Lane & North Ocean Boulevard

Arabian Road & North Ocean Boulevard

The curb at the intersection of Arabian Road & North Ocean Boulevard was observed to be cracked and broken. This is indicative of heavy vehicles mounting the curb, most likely as a result of not being able to navigate the intersection. The drainage inlet at this location was also observed to be damaged. It should be noted that several intersections throughout town were observed to have cracked and broken curbing; it was not limited to this intersection.



Figure 5: Arabian Road & North Ocean Boulevard

Debra Lane & North Lake Way

Damage to the landscaped area outside of the paved area at the intersection of Debra Lane & North Lake Way was observed. Furthermore, damage to the turn on the west side of the T intersection was observed, indicating that large vehicles are not able to maneuver without exiting the paved intersection.



Figure 6: Debra Lane & North Lake Way



Figure 7: Debra Lane & North Lake Way

Truck Counts

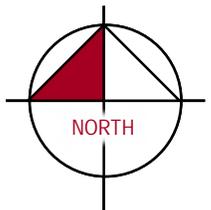
Vehicle classification counts were performed at several locations through the Town to provide an understanding of the number of trucks, types of trucks, and overall number of vehicles.

Figure 8 illustrates the locations of data collection. The locations were chosen to provide an understanding of where the trucks circulate within the town, and the overall impact of truck traffic.

Data was collected on four consecutive weekdays and two weekend days in January 2020. This represents peak season in the Town and represents the peak amount of truck traffic. It should be noted that some truck traffic is consistent throughout the year (such as landscaping vehicles), but deliveries and service trucks increase in the peak season due to increased population.

The data was summarized for each of the 13 count locations, to determine what percentage of trucks are present on each of the study roads throughout the day. The counts were averaged over a 96-hour period to determine an average weekday daily volume, and the counts were averaged over a 48-hour period to determine an average weekend daily volume.

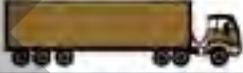
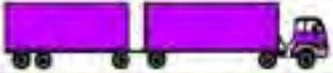
Truck data was summarized into three categories, single-unit (SU) trucks, SU articulated trucks (SU artic.), and any trucks larger than the SU articulated truck (Large). Figure 9 illustrates the types of trucks expected for each class. For this analysis SU trucks are comprised of classes 3-7, SU articulated trucks are class 8, and classes 9-13 comprise the Large truck class. The data is summarized for each location by truck type in the following pages. Percentages represent percent of total traffic for that time period.



LEGEND

- # MACHINE COUNT LOCATIONS
- # TMC LOCATIONS

FIGURE 8
PALM BEACH TRUCK PROHIBITION
 KH #044063244
 DATA COLLECTION LOCATIONS

Class 1 Motorcycles		Class 7 Four or more axle, single unit	
Class 2 Passenger cars		Class 8 Four or less axle, single trailer	
			
			
			
Class 3 Four tire, single unit		Class 9 5-Axle tractor semitrailer	
			
			
Class 4 Buses		Class 10 Six or more axle, single trailer	
			
			
Class 5 Two axle, six tire, single unit		Class 12 Six axle, multi-trailer	
			
			
Class 6 Three axle, single unit		Class 13 Seven or more axle, multi-trailer	
			
			

Source: Traffic Survey Specialists, Inc.

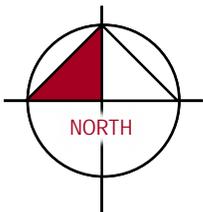


FIGURE 9
PALM BEACH TRUCK PROHIBITION
KH #044063244
VEHICLE CLASSIFICATION CHART

Location 1: Lake Way, north of Tradewinds Drive

Continuous tube counts were collected along Lake Way, just north of Tradewinds Drive on the north side of the Palm Beach Country Club. It was determined that weekday total truck volumes make up about 2.8% of total vehicle traffic. The average weekend total truck percentages are about half of that on weekends, at 1.5% of the total vehicle traffic. Table 1 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 1: Location 1 Truck Percentage Summary

Weekday					Weekend					
Time Period	SU			Time Period	SU					
	SU	Artic.	Large		SU	Artic.	Large			
AM	0:00-1:00	0.0%	0.0%	0.0%	AM	0:00-1:00	0.0%	0.0%	0.0%	
	1:00-2:00	0.0%	0.0%	0.0%		1:00-2:00	0.0%	0.0%	0.0%	
	2:00-3:00	0.0%	0.0%	0.0%		2:00-3:00	0.0%	0.0%	0.0%	
	3:00-4:00	0.0%	0.0%	0.0%		3:00-4:00	0.0%	0.0%	0.0%	
	4:00-5:00	0.0%	0.0%	0.0%		4:00-5:00	0.0%	0.0%	0.0%	
	5:00-6:00	0.0%	0.0%	0.0%		5:00-6:00	0.0%	0.0%	0.0%	
	6:00-7:00	1.1%	0.0%	0.0%		6:00-7:00	0.0%	0.0%	0.0%	
	7:00-8:00	1.1%	0.0%	0.0%		7:00-8:00	2.9%	0.0%	0.0%	
	8:00-9:00	3.8%	0.0%	0.0%		8:00-9:00	3.6%	0.0%	0.0%	
	9:00-10:00	4.1%	0.1%	0.0%		9:00-10:00	1.4%	0.0%	0.0%	
	10:00-11:00	3.4%	0.1%	0.0%		10:00-11:00	1.2%	0.0%	0.0%	
11:00-12:00	3.7%	0.0%	0.0%	11:00-12:00	2.7%	0.0%	0.0%			
PM	12:00-1:00	3.3%	0.0%	0.0%	PM	12:00-1:00	2.3%	0.0%	0.0%	
	1:00-2:00	3.8%	0.0%	0.0%		1:00-2:00	1.8%	0.0%	0.0%	
	2:00-3:00	2.7%	0.1%	0.0%		2:00-3:00	1.8%	0.0%	0.0%	
	3:00-4:00	3.1%	0.1%	0.0%		3:00-4:00	0.8%	0.0%	0.0%	
	4:00-5:00	2.2%	0.1%	0.0%		4:00-5:00	0.9%	0.0%	0.0%	
	5:00-6:00	1.3%	0.0%	0.0%		5:00-6:00	0.9%	0.0%	0.0%	
	6:00-7:00	0.4%	0.0%	0.0%		6:00-7:00	0.9%	0.0%	0.0%	
	7:00-8:00	0.3%	0.0%	0.0%		7:00-8:00	2.9%	0.0%	0.0%	
	8:00-9:00	0.6%	0.0%	0.0%		8:00-9:00	0.0%	0.0%	0.0%	
	9:00-10:00	0.4%	0.0%	0.0%		9:00-10:00	0.0%	0.0%	0.0%	
	10:00-11:00	1.3%	0.0%	0.0%		10:00-11:00	3.3%	0.0%	0.0%	
11:00-12:00	1.3%	0.0%	0.0%	11:00-12:00	0.0%	0.0%	0.0%			
Total 24-hour				2.7%	0.1%	0.0%	Total 24-hour			
							1.5%			
							0.0%			
							0.0%			

Location 2: Ocean Boulevard, north of Jamaica Lane

Continuous tube counts were collected along Ocean Boulevard, just north of Jamaica Lane on the north side of the Palm Beach Country Club. It was determined that weekday total truck volumes make up about 3.2% of total vehicle traffic. The average weekend total truck percentages are about half of that on weekends, at 1.6% of the total vehicle traffic. Table 2 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 2: Location 2 Truck Percentage Summary

		Weekday					Weekend		
		SU					SU		
	Time Period	SU	Artic.	Large		Time Period	SU	Artic.	Large
AM	0:00-1:00	14.3%	0.0%	0.0%	AM	0:00-1:00	0.0%	0.0%	0.0%
	1:00-2:00	0.0%	0.0%	0.0%		1:00-2:00	0.0%	0.0%	0.0%
	2:00-3:00	5.6%	0.0%	0.0%		2:00-3:00	0.0%	0.0%	0.0%
	3:00-4:00	0.0%	0.0%	0.0%		3:00-4:00	0.0%	0.0%	0.0%
	4:00-5:00	0.0%	0.0%	0.0%		4:00-5:00	25.0%	0.0%	0.0%
	5:00-6:00	1.5%	0.0%	0.0%		5:00-6:00	0.0%	0.0%	0.0%
	6:00-7:00	1.8%	0.0%	0.0%		6:00-7:00	2.7%	0.0%	0.0%
	7:00-8:00	2.0%	0.1%	0.2%		7:00-8:00	2.4%	0.0%	0.0%
	8:00-9:00	4.2%	0.1%	0.1%		8:00-9:00	1.4%	0.0%	0.0%
	9:00-10:00	4.4%	0.1%	0.1%		9:00-10:00	1.1%	0.5%	0.0%
	10:00-11:00	3.9%	0.2%	0.1%		10:00-11:00	3.2%	0.4%	0.0%
11:00-12:00	3.9%	0.1%	0.1%	11:00-12:00	2.2%	0.0%	0.0%		
PM	12:00-1:00	3.4%	0.1%	0.0%	PM	12:00-1:00	1.6%	0.0%	0.0%
	1:00-2:00	3.7%	0.1%	0.1%		1:00-2:00	1.3%	0.0%	0.0%
	2:00-3:00	3.5%	0.1%	0.1%		2:00-3:00	1.6%	0.0%	0.0%
	3:00-4:00	3.9%	0.0%	0.0%		3:00-4:00	1.6%	0.0%	0.0%
	4:00-5:00	2.4%	0.1%	0.0%		4:00-5:00	1.4%	0.0%	0.0%
	5:00-6:00	1.2%	0.0%	0.0%		5:00-6:00	0.7%	0.0%	0.0%
	6:00-7:00	0.7%	0.0%	0.0%		6:00-7:00	1.0%	0.0%	0.0%
	7:00-8:00	0.4%	0.0%	0.0%		7:00-8:00	0.6%	0.0%	0.0%
	8:00-9:00	0.5%	0.0%	0.0%		8:00-9:00	0.9%	0.0%	0.0%
	9:00-10:00	0.3%	0.0%	0.0%		9:00-10:00	1.2%	0.0%	0.0%
	10:00-11:00	0.4%	0.0%	0.0%		10:00-11:00	1.2%	0.0%	0.0%
11:00-12:00	0.9%	0.0%	0.0%	11:00-12:00	2.4%	0.0%	0.0%		
Total 24-hour		3.1%	0.1%	0.0%	Total 24-hour		1.5%	0.1%	0.0%

Location 3: Bradley Place, south of Seminole Avenue

Continuous tube counts were collected along Bradley Place, just south of Seminole Avenue on the west side of the island. It was determined that weekday total truck volumes make up about 2.3% of total vehicle traffic. There were a number of large trucks that were counted at this location and is due to the commercial land uses in the vicinity of the count site. The average weekend total truck percentages are more than half of that on weekends, at 1.5% of the total vehicle traffic. Table 3 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 3: Location 3 Truck Percentage Summary

Weekday				Weekend					
Time Period	SU			Time Period	SU				
	SU	Artic.	Large		SU	Artic.	Large		
AM	0:00-1:00	0.0%	0.0%	0.0%	AM	0:00-1:00	3.8%	0.0%	0.0%
	1:00-2:00	0.0%	0.0%	0.0%		1:00-2:00	0.0%	0.0%	0.0%
	2:00-3:00	0.0%	0.0%	0.0%		2:00-3:00	0.0%	0.0%	0.0%
	3:00-4:00	0.0%	0.0%	0.0%		3:00-4:00	0.0%	0.0%	0.0%
	4:00-5:00	2.2%	0.0%	0.0%		4:00-5:00	7.7%	0.0%	0.0%
	5:00-6:00	0.9%	0.0%	0.0%		5:00-6:00	4.0%	0.0%	0.0%
	6:00-7:00	0.7%	0.0%	0.0%		6:00-7:00	2.1%	0.0%	0.0%
	7:00-8:00	1.5%	0.1%	0.0%		7:00-8:00	1.5%	0.0%	0.0%
	8:00-9:00	2.8%	0.0%	0.1%		8:00-9:00	2.6%	0.0%	0.0%
	9:00-10:00	2.9%	0.1%	0.0%		9:00-10:00	1.8%	0.0%	0.0%
	10:00-11:00	2.6%	0.1%	0.0%		10:00-11:00	1.7%	0.0%	0.0%
11:00-12:00	2.5%	0.0%	0.0%	11:00-12:00	2.1%	0.0%	0.0%		
PM	12:00-1:00	2.5%	0.0%	0.0%	PM	12:00-1:00	1.7%	0.0%	0.0%
	1:00-2:00	2.4%	0.1%	0.0%		1:00-2:00	1.0%	0.0%	0.0%
	2:00-3:00	2.2%	0.0%	0.0%		2:00-3:00	1.2%	0.0%	0.0%
	3:00-4:00	2.5%	0.1%	0.1%		3:00-4:00	1.1%	0.0%	0.0%
	4:00-5:00	2.4%	0.1%	0.7%		4:00-5:00	1.1%	0.3%	0.0%
	5:00-6:00	1.1%	0.1%	0.1%		5:00-6:00	1.1%	0.0%	0.0%
	6:00-7:00	0.7%	0.0%	0.2%		6:00-7:00	0.9%	0.0%	0.0%
	7:00-8:00	0.8%	0.0%	0.1%		7:00-8:00	1.7%	0.0%	0.4%
	8:00-9:00	0.9%	0.2%	0.2%		8:00-9:00	1.8%	0.0%	0.0%
	9:00-10:00	1.0%	0.0%	0.2%		9:00-10:00	1.3%	0.0%	0.0%
	10:00-11:00	0.6%	0.0%	0.3%		10:00-11:00	2.5%	0.0%	0.0%
11:00-12:00	0.0%	0.0%	0.0%	11:00-12:00	2.6%	0.0%	0.0%		
Total 24-hour	2.1%	0.1%	0.1%	Total 24-hour	1.5%	0.0%	0.0%		

Location 4: County Road, south of Seminole Avenue

Continuous tube counts were collected along County Road, just south of Seminole Avenue located in the center of the island. It was determined that weekday total truck volumes make up about 3.5% of total vehicle traffic. The average weekend total truck percentages are more than half of that on weekends, at 1.9% of the total vehicle traffic. Table 4 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 4: Location 4 Truck Percentage Summary

		Weekday					Weekend		
		SU					SU		
	Time Period	SU	Artic.	Large		Time Period	SU	Artic.	Large
AM	0:00-1:00	6.7%	0.0%	0.0%	AM	0:00-1:00	0.0%	0.0%	0.0%
	1:00-2:00	0.0%	0.0%	0.0%		1:00-2:00	3.2%	0.0%	0.0%
	2:00-3:00	0.0%	0.0%	0.0%		2:00-3:00	0.0%	0.0%	0.0%
	3:00-4:00	0.0%	0.0%	0.0%		3:00-4:00	0.0%	0.0%	0.0%
	4:00-5:00	0.0%	0.0%	0.0%		4:00-5:00	10.0%	0.0%	0.0%
	5:00-6:00	1.0%	0.0%	0.0%		5:00-6:00	5.0%	0.0%	0.0%
	6:00-7:00	2.1%	0.0%	0.0%		6:00-7:00	3.1%	0.0%	0.0%
	7:00-8:00	3.3%	0.1%	0.1%		7:00-8:00	2.3%	0.5%	0.0%
	8:00-9:00	4.8%	0.2%	0.1%		8:00-9:00	1.6%	0.0%	0.0%
	9:00-10:00	4.7%	0.1%	0.1%		9:00-10:00	2.1%	0.2%	0.0%
	10:00-11:00	4.2%	0.1%	0.1%		10:00-11:00	2.8%	0.0%	0.0%
11:00-12:00	4.1%	0.1%	0.1%	11:00-12:00	2.9%	0.0%	0.0%		
PM	12:00-1:00	3.8%	0.1%	0.1%	PM	12:00-1:00	2.1%	0.2%	0.0%
	1:00-2:00	3.7%	0.1%	0.1%		1:00-2:00	1.7%	0.0%	0.2%
	2:00-3:00	3.6%	0.1%	0.1%		2:00-3:00	1.5%	0.2%	0.2%
	3:00-4:00	3.6%	0.1%	0.1%		3:00-4:00	2.0%	0.0%	0.2%
	4:00-5:00	2.7%	0.1%	0.2%		4:00-5:00	1.4%	0.0%	0.0%
	5:00-6:00	1.6%	0.0%	0.0%		5:00-6:00	1.3%	0.0%	0.0%
	6:00-7:00	0.8%	0.0%	0.0%		6:00-7:00	1.2%	0.0%	0.0%
	7:00-8:00	0.6%	0.0%	0.0%		7:00-8:00	0.6%	0.0%	0.0%
	8:00-9:00	0.4%	0.0%	0.0%		8:00-9:00	1.4%	0.0%	0.0%
	9:00-10:00	0.4%	0.0%	0.0%		9:00-10:00	1.4%	0.0%	0.0%
	10:00-11:00	0.3%	0.0%	0.0%		10:00-11:00	1.0%	0.0%	0.0%
11:00-12:00	0.8%	0.0%	0.0%	11:00-12:00	1.1%	0.0%	0.0%		
Total 24-hour		3.3%	0.1%	0.1%	Total 24-hour		1.8%	0.1%	0.0%

Location 5: Royal Poinciana Way, west of Coconut Row (North Bridge)

Continuous tube counts were collected on the northern bridge, Royal Poinciana Way. It was determined that weekday total truck volumes make up about 2.6% of total vehicle traffic. The average weekend total truck percentages are similar on weekends, at 2.1% of the total vehicle traffic. Table 5 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 5: Location 5 Truck Percentage Summary

		Weekday					Weekend		
		SU					SU		
	Time Period	SU	Artic.	Large		Time Period	SU	Artic.	Large
AM	0:00-1:00	4.2%	0.0%	0.0%	AM	0:00-1:00	1.1%	0.0%	0.0%
	1:00-2:00	1.8%	0.0%	0.0%		1:00-2:00	1.3%	0.0%	0.0%
	2:00-3:00	3.4%	0.0%	0.0%		2:00-3:00	0.9%	0.0%	0.0%
	3:00-4:00	3.1%	0.0%	0.0%		3:00-4:00	1.9%	0.0%	0.0%
	4:00-5:00	4.0%	0.4%	0.4%		4:00-5:00	4.5%	0.0%	0.0%
	5:00-6:00	2.4%	0.2%	0.3%		5:00-6:00	5.2%	0.0%	0.0%
	6:00-7:00	3.2%	0.1%	0.1%		6:00-7:00	3.5%	0.0%	0.0%
	7:00-8:00	3.2%	0.1%	0.1%		7:00-8:00	2.0%	0.0%	0.0%
	8:00-9:00	3.4%	0.1%	0.1%		8:00-9:00	1.2%	0.0%	0.0%
	9:00-10:00	3.3%	0.1%	0.1%		9:00-10:00	1.8%	0.3%	0.0%
	10:00-11:00	3.1%	0.2%	0.1%		10:00-11:00	1.8%	0.2%	0.2%
11:00-12:00	2.9%	0.1%	0.1%	11:00-12:00	2.4%	0.1%	0.1%		
PM	12:00-1:00	2.9%	0.1%	0.1%	PM	12:00-1:00	2.0%	0.1%	0.1%
	1:00-2:00	2.8%	0.1%	0.2%		1:00-2:00	2.3%	0.2%	0.2%
	2:00-3:00	2.5%	0.2%	0.1%		2:00-3:00	1.7%	0.1%	0.1%
	3:00-4:00	2.7%	0.1%	0.1%		3:00-4:00	2.4%	0.1%	0.1%
	4:00-5:00	2.2%	0.1%	0.1%		4:00-5:00	2.1%	0.2%	0.1%
	5:00-6:00	1.5%	0.0%	0.0%		5:00-6:00	2.2%	0.3%	0.2%
	6:00-7:00	0.9%	0.0%	0.0%		6:00-7:00	1.4%	0.1%	0.0%
	7:00-8:00	0.8%	0.1%	0.0%		7:00-8:00	1.3%	0.0%	0.0%
	8:00-9:00	0.8%	0.0%	0.0%		8:00-9:00	1.3%	0.0%	0.0%
	9:00-10:00	0.9%	0.0%	0.0%		9:00-10:00	1.8%	0.0%	0.0%
	10:00-11:00	0.6%	0.0%	0.0%		10:00-11:00	1.7%	0.0%	0.0%
11:00-12:00	0.6%	0.0%	0.0%	11:00-12:00	1.5%	0.0%	0.0%		
Total 24-hour		2.4%	0.1%	0.1%	Total 24-hour		1.9%	0.1%	0.1%

Location 6: Coconut Row, north of Seaview Avenue

Continuous tube counts were collected along Coconut Row, just north of Seaview Avenue. It was determined that weekday total truck volumes make up about 1.6% of total vehicle traffic. The average weekend total truck percentages are greater on weekends, at 1.8% of the total vehicle traffic. This was found to be one of only two locations where weekend truck percentages exceed that found on weekdays. Table 6 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 6: Location 6 Truck Percentage Summary

		Weekday					Weekend		
		SU	Artic.	Large			SU	Artic.	Large
Time Period		SU	Artic.	Large	Time Period	SU	Artic.	Large	
AM	0:00-1:00	0.0%	0.0%	0.0%	AM	0:00-1:00	2.1%	0.0%	0.0%
	1:00-2:00	2.6%	0.0%	0.0%		1:00-2:00	0.0%	0.0%	0.0%
	2:00-3:00	5.6%	0.0%	0.0%		2:00-3:00	4.5%	0.0%	0.0%
	3:00-4:00	0.0%	0.0%	0.0%		3:00-4:00	7.1%	0.0%	0.0%
	4:00-5:00	1.4%	0.0%	1.4%		4:00-5:00	4.2%	0.0%	4.2%
	5:00-6:00	1.7%	0.0%	1.1%		5:00-6:00	2.3%	0.0%	0.0%
	6:00-7:00	1.6%	0.2%	0.0%		6:00-7:00	4.0%	0.0%	0.0%
	7:00-8:00	1.8%	0.1%	0.1%		7:00-8:00	2.1%	0.3%	0.0%
	8:00-9:00	2.6%	0.0%	0.0%		8:00-9:00	2.8%	0.0%	0.0%
	9:00-10:00	2.3%	0.0%	0.0%		9:00-10:00	2.3%	0.2%	0.2%
	10:00-11:00	2.2%	0.1%	0.0%		10:00-11:00	2.1%	0.0%	0.1%
	11:00-12:00	1.8%	0.0%	0.0%		11:00-12:00	1.8%	0.0%	0.0%
PM	12:00-1:00	1.5%	0.0%	0.0%	PM	12:00-1:00	1.5%	0.0%	0.0%
	1:00-2:00	1.7%	0.0%	0.1%		1:00-2:00	1.6%	0.0%	0.2%
	2:00-3:00	1.6%	0.1%	0.1%		2:00-3:00	1.1%	0.2%	0.0%
	3:00-4:00	1.9%	0.1%	0.1%		3:00-4:00	1.1%	0.0%	0.2%
	4:00-5:00	1.5%	0.1%	0.2%		4:00-5:00	1.3%	0.0%	0.2%
	5:00-6:00	0.8%	0.0%	0.1%		5:00-6:00	1.6%	0.0%	0.2%
	6:00-7:00	0.4%	0.0%	0.0%		6:00-7:00	1.6%	0.0%	0.2%
	7:00-8:00	0.4%	0.0%	0.0%		7:00-8:00	0.7%	0.0%	0.0%
	8:00-9:00	0.3%	0.0%	0.0%		8:00-9:00	0.9%	0.0%	0.0%
	9:00-10:00	0.2%	0.0%	0.0%		9:00-10:00	1.0%	0.0%	0.0%
	10:00-11:00	0.3%	0.0%	0.0%		10:00-11:00	0.5%	0.0%	0.0%
	11:00-12:00	0.6%	0.0%	0.0%		11:00-12:00	2.2%	0.0%	0.0%
Total 24-hour		1.5%	0.0%	0.1%	Total 24-hour		1.7%	0.0%	0.1%

Location 7: County Road, north of Seaview Avenue

Continuous tube counts were collected along County Road, just north of Seaview Avenue. It was determined that weekday total truck volumes make up about 2.8% of total vehicle traffic. The average weekend total truck percentages are about half of that on weekends, at 2.0% of the total vehicle traffic. Table 7 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 7: Location 7 Truck Percentage Summary

		Weekday				Weekend			
		SU			SU				
Time Period		SU	Artic.	Large	Time Period	SU	Artic.	Large	
AM	0:00-1:00	2.1%	0.0%	0.0%	AM	0:00-1:00	0.6%	0.0%	0.0%
	1:00-2:00	1.1%	0.0%	0.0%		1:00-2:00	1.0%	0.0%	0.0%
	2:00-3:00	0.0%	0.0%	0.0%		2:00-3:00	3.2%	0.0%	0.0%
	3:00-4:00	1.1%	0.0%	0.0%		3:00-4:00	0.0%	0.0%	0.0%
	4:00-5:00	1.4%	0.0%	0.0%		4:00-5:00	2.4%	0.0%	0.0%
	5:00-6:00	1.9%	0.0%	0.0%		5:00-6:00	4.2%	0.0%	0.0%
	6:00-7:00	3.5%	0.0%	0.0%		6:00-7:00	3.2%	0.5%	0.0%
	7:00-8:00	4.1%	0.1%	0.1%		7:00-8:00	3.7%	0.3%	0.3%
	8:00-9:00	5.3%	0.2%	0.0%		8:00-9:00	4.5%	0.2%	0.2%
	9:00-10:00	4.2%	0.1%	0.0%		9:00-10:00	2.9%	0.0%	0.0%
	10:00-11:00	4.0%	0.2%	0.1%		10:00-11:00	3.0%	0.1%	0.1%
11:00-12:00	3.3%	0.1%	0.1%	11:00-12:00	2.0%	0.1%	0.1%		
PM	12:00-1:00	2.9%	0.1%	0.0%	PM	12:00-1:00	1.5%	0.0%	0.0%
	1:00-2:00	2.9%	0.1%	0.1%		1:00-2:00	1.3%	0.1%	0.1%
	2:00-3:00	2.5%	0.1%	0.1%		2:00-3:00	1.7%	0.1%	0.0%
	3:00-4:00	2.8%	0.1%	0.1%		3:00-4:00	1.7%	0.0%	0.2%
	4:00-5:00	1.9%	0.1%	0.1%		4:00-5:00	1.7%	0.2%	0.1%
	5:00-6:00	1.3%	0.0%	0.0%		5:00-6:00	0.8%	0.1%	0.1%
	6:00-7:00	0.7%	0.0%	0.0%		6:00-7:00	1.0%	0.0%	0.0%
	7:00-8:00	0.5%	0.0%	0.0%		7:00-8:00	0.8%	0.2%	0.0%
	8:00-9:00	0.4%	0.1%	0.0%		8:00-9:00	0.9%	0.2%	0.0%
	9:00-10:00	0.5%	0.0%	0.0%		9:00-10:00	1.4%	0.0%	0.0%
	10:00-11:00	0.4%	0.0%	0.0%		10:00-11:00	0.9%	0.0%	0.0%
11:00-12:00	0.6%	0.0%	0.0%	11:00-12:00	1.1%	0.0%	0.0%		
Total 24-hour		2.6%	0.1%	0.1%	Total 24-hour	1.8%	0.1%	0.1%	

Location 8: Royal Palm Way, west of Lake Drive (Middle Bridge)

Continuous tube counts were collected on the middle bridge, Royal Palm Way. It was determined that weekday total truck volumes make up about 1.7% of total vehicle traffic. The average weekend total truck percentages are greater on weekends, at 1.9% of the total vehicle traffic. This was found to be one of only two locations where weekend truck percentages exceed that found on weekdays. Table 8 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 8: Location 8 Truck Percentage Summary

		Weekday					Weekend		
		SU	Artic.	Large			SU	Artic.	Large
Time Period		SU	Artic.	Large	Time Period	SU	Artic.	Large	
AM	0:00-1:00	2.4%	0.0%	0.0%	AM	0:00-1:00	1.1%	0.3%	0.0%
	1:00-2:00	1.1%	0.0%	0.6%		1:00-2:00	0.6%	0.0%	0.6%
	2:00-3:00	2.5%	0.0%	0.0%		2:00-3:00	1.4%	0.0%	0.0%
	3:00-4:00	0.9%	0.0%	0.0%		3:00-4:00	1.8%	0.0%	1.8%
	4:00-5:00	1.3%	0.0%	0.3%		4:00-5:00	2.8%	0.0%	0.0%
	5:00-6:00	0.9%	0.3%	0.1%		5:00-6:00	1.8%	0.6%	0.0%
	6:00-7:00	1.6%	0.1%	0.1%		6:00-7:00	2.6%	0.3%	0.0%
	7:00-8:00	1.8%	0.1%	0.1%		7:00-8:00	2.2%	0.1%	0.2%
	8:00-9:00	2.5%	0.1%	0.2%		8:00-9:00	2.9%	0.1%	0.0%
	9:00-10:00	2.4%	0.1%	0.3%		9:00-10:00	2.3%	0.3%	0.2%
	10:00-11:00	2.3%	0.1%	0.2%		10:00-11:00	2.0%	0.2%	0.2%
11:00-12:00	1.9%	0.1%	0.1%	11:00-12:00	1.8%	0.3%	0.1%		
PM	12:00-1:00	1.7%	0.1%	0.1%	PM	12:00-1:00	1.7%	0.2%	0.1%
	1:00-2:00	1.9%	0.1%	0.1%		1:00-2:00	1.4%	0.2%	0.1%
	2:00-3:00	1.7%	0.1%	0.1%		2:00-3:00	1.4%	0.2%	0.1%
	3:00-4:00	1.5%	0.1%	0.0%		3:00-4:00	1.4%	0.1%	0.1%
	4:00-5:00	1.2%	0.1%	0.1%		4:00-5:00	1.3%	0.2%	0.1%
	5:00-6:00	1.0%	0.1%	0.2%		5:00-6:00	1.7%	0.3%	0.2%
	6:00-7:00	0.5%	0.1%	0.0%		6:00-7:00	1.0%	0.1%	0.1%
	7:00-8:00	0.4%	0.1%	0.1%		7:00-8:00	0.9%	0.2%	0.0%
	8:00-9:00	0.4%	0.0%	0.0%		8:00-9:00	1.0%	0.0%	0.1%
	9:00-10:00	0.3%	0.0%	0.0%		9:00-10:00	0.8%	0.2%	0.0%
	10:00-11:00	0.5%	0.0%	0.0%		10:00-11:00	0.6%	0.0%	0.0%
11:00-12:00	0.3%	0.0%	0.0%	11:00-12:00	1.4%	0.0%	0.0%		
Total 24-hour		1.5%	0.1%	0.1%	Total 24-hour		1.6%	0.2%	0.1%

Location 9: Coconut Row, south of Royal Palm Way

Continuous tube counts were collected along Coconut Row, just south of Royal Palm Way on the southern side of the island. It was determined that weekday total truck volumes make up about 2.6% of total vehicle traffic. The average weekend total truck percentages are greater than half of that on weekends, at 1.9% of the total vehicle traffic. Table 9 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 9: Location 9 Truck Percentage Summary

		Weekday				Weekend				
		SU			SU					
	Time Period	SU	Artic.	Large	Time Period	SU	Artic.	Large		
AM	0:00-1:00	0.0%	0.0%	0.0%	AM	0:00-1:00	1.5%	0.0%	0.0%	
	1:00-2:00	0.0%	0.0%	0.0%		1:00-2:00	0.0%	0.0%	0.0%	
	2:00-3:00	0.0%	0.0%	0.0%		2:00-3:00	0.0%	0.0%	0.0%	
	3:00-4:00	0.0%	0.0%	0.0%		3:00-4:00	0.0%	0.0%	0.0%	
	4:00-5:00	5.3%	0.0%	0.0%		4:00-5:00	0.0%	0.0%	0.0%	
	5:00-6:00	2.1%	0.0%	0.0%		5:00-6:00	0.0%	0.0%	0.0%	
	6:00-7:00	1.7%	0.0%	0.0%		6:00-7:00	2.6%	0.0%	0.0%	
	7:00-8:00	3.0%	0.0%	0.0%		7:00-8:00	3.5%	0.0%	0.0%	
	8:00-9:00	4.5%	0.0%	0.0%		8:00-9:00	4.3%	0.0%	0.0%	
	9:00-10:00	4.8%	0.0%	0.0%		9:00-10:00	2.3%	0.0%	0.0%	
	10:00-11:00	4.1%	0.2%	0.1%		10:00-11:00	2.8%	0.0%	0.0%	
11:00-12:00	3.4%	0.2%	0.1%	11:00-12:00	3.0%	0.0%	0.0%			
PM	12:00-1:00	2.8%	0.1%	0.0%	PM	12:00-1:00	2.8%	0.0%	0.0%	
	1:00-2:00	2.3%	0.1%	0.1%		1:00-2:00	1.4%	0.0%	0.0%	
	2:00-3:00	2.7%	0.1%	0.2%		2:00-3:00	2.4%	0.0%	0.0%	
	3:00-4:00	3.2%	0.0%	0.0%		3:00-4:00	1.9%	0.0%	0.0%	
	4:00-5:00	2.3%	0.1%	0.1%		4:00-5:00	2.5%	0.4%	0.0%	
	5:00-6:00	1.9%	0.1%	0.1%		5:00-6:00	0.7%	0.0%	0.0%	
	6:00-7:00	1.1%	0.0%	0.0%		6:00-7:00	2.0%	0.0%	0.0%	
	7:00-8:00	0.6%	0.0%	0.0%		7:00-8:00	1.1%	0.0%	0.0%	
	8:00-9:00	0.4%	0.0%	0.0%		8:00-9:00	0.7%	0.0%	0.0%	
	9:00-10:00	0.5%	0.0%	0.0%		9:00-10:00	0.7%	0.0%	0.0%	
	10:00-11:00	0.6%	0.0%	0.0%		10:00-11:00	0.7%	0.0%	0.0%	
11:00-12:00	0.4%	0.0%	0.0%	11:00-12:00	1.0%	0.0%	0.0%			
Total 24-hour		2.5%	0.1%	0.0%	Total 24-hour	1.9%	0.0%	0.0%		

Location 10: County Road, south of Royal Palm Way

Continuous tube counts were collected along County Road, just south of Royal Palm Way on the southern side of the island. It was determined that weekday total truck volumes make up about 3.3% of total vehicle traffic. The average weekend total truck volumes are slightly less on weekends, at 2.8% of the total vehicle traffic. Table 10 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 10: Location 10 Truck Percentage Summary

		Weekday					Weekend		
		SU					SU		
	Time Period	SU	Artic.	Large		Time Period	SU	Artic.	Large
AM	0:00-1:00	0.0%	0.0%	0.0%	AM	0:00-1:00	1.1%	0.0%	0.0%
	1:00-2:00	0.0%	0.0%	0.0%		1:00-2:00	0.0%	0.0%	1.7%
	2:00-3:00	0.0%	0.0%	0.0%		2:00-3:00	0.0%	0.0%	0.0%
	3:00-4:00	2.1%	0.0%	0.0%		3:00-4:00	6.3%	0.0%	0.0%
	4:00-5:00	5.4%	0.0%	0.0%		4:00-5:00	4.5%	0.0%	0.0%
	5:00-6:00	2.7%	0.0%	0.0%		5:00-6:00	4.2%	0.0%	0.0%
	6:00-7:00	3.6%	0.0%	0.0%		6:00-7:00	3.1%	0.0%	0.0%
	7:00-8:00	4.7%	0.1%	0.0%		7:00-8:00	3.2%	0.0%	0.0%
	8:00-9:00	5.1%	0.1%	0.1%		8:00-9:00	3.9%	0.4%	0.0%
	9:00-10:00	4.9%	0.1%	0.2%		9:00-10:00	3.0%	0.0%	0.0%
	10:00-11:00	5.1%	0.1%	0.2%		10:00-11:00	2.9%	0.2%	0.2%
11:00-12:00	4.1%	0.2%	0.1%	11:00-12:00	3.7%	0.2%	0.2%		
PM	12:00-1:00	3.6%	0.1%	0.2%	PM	12:00-1:00	2.5%	0.1%	0.1%
	1:00-2:00	3.3%	0.2%	0.2%		1:00-2:00	2.3%	0.1%	0.1%
	2:00-3:00	3.2%	0.2%	0.2%		2:00-3:00	2.8%	0.1%	0.1%
	3:00-4:00	3.5%	0.1%	0.2%		3:00-4:00	2.9%	0.3%	0.1%
	4:00-5:00	2.9%	0.1%	0.1%		4:00-5:00	2.8%	0.1%	0.0%
	5:00-6:00	1.9%	0.1%	0.1%		5:00-6:00	2.1%	0.3%	0.2%
	6:00-7:00	1.2%	0.1%	0.1%		6:00-7:00	1.7%	0.0%	0.2%
	7:00-8:00	0.8%	0.0%	0.0%		7:00-8:00	2.1%	0.0%	0.0%
	8:00-9:00	0.9%	0.0%	0.0%		8:00-9:00	1.4%	0.0%	0.0%
	9:00-10:00	1.0%	0.0%	0.0%		9:00-10:00	1.9%	0.0%	0.0%
	10:00-11:00	1.0%	0.0%	0.0%		10:00-11:00	2.5%	0.0%	0.0%
11:00-12:00	1.0%	0.0%	0.0%	11:00-12:00	2.7%	0.0%	0.0%		
Total 24-hour		3.1%	0.1%	0.1%	Total 24-hour		2.6%	0.1%	0.1%

Location 11: Ocean Boulevard, north of Via Bellaria

Continuous tube counts were collected along Ocean Boulevard, just north of Via Bellaria on the southern side of the island. It was determined that weekday total truck volumes make up about 2.3% of total vehicle traffic. The average weekend total truck volumes are slightly less on weekends, at 1.5% of the total vehicle traffic. There was not a discernable number of trucks larger than the single-unit truck. Table 11 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 11: Location 11 Truck Percentage Summary

		Weekday					Weekend		
		SU	Artic.	Large			SU	Artic.	Large
Time Period		SU	Artic.	Large	Time Period	SU	Artic.	Large	
AM	0:00-1:00	4.3%	0.0%	0.0%	AM	0:00-1:00	0.0%	0.0%	0.0%
	1:00-2:00	0.0%	0.0%	2.5%		1:00-2:00	0.0%	0.0%	0.0%
	2:00-3:00	0.0%	0.0%	0.0%		2:00-3:00	3.0%	0.0%	0.0%
	3:00-4:00	0.0%	0.0%	0.0%		3:00-4:00	0.0%	0.0%	0.0%
	4:00-5:00	2.4%	0.0%	0.0%		4:00-5:00	9.1%	0.0%	0.0%
	5:00-6:00	1.1%	0.0%	0.0%		5:00-6:00	2.3%	0.0%	0.0%
	6:00-7:00	1.5%	0.0%	0.0%		6:00-7:00	0.9%	0.0%	0.0%
	7:00-8:00	2.9%	0.0%	0.0%		7:00-8:00	2.1%	0.0%	0.0%
	8:00-9:00	3.6%	0.1%	0.0%		8:00-9:00	2.8%	0.0%	0.0%
	9:00-10:00	3.2%	0.1%	0.1%		9:00-10:00	1.8%	0.0%	0.0%
	10:00-11:00	3.2%	0.1%	0.1%		10:00-11:00	1.8%	0.0%	0.0%
11:00-12:00	2.9%	0.1%	0.1%	11:00-12:00	2.0%	0.0%	0.0%		
PM	12:00-1:00	2.6%	0.0%	0.1%	PM	12:00-1:00	1.4%	0.1%	0.1%
	1:00-2:00	2.6%	0.1%	0.0%		1:00-2:00	1.7%	0.1%	0.0%
	2:00-3:00	2.2%	0.1%	0.0%		2:00-3:00	1.7%	0.1%	0.1%
	3:00-4:00	3.0%	0.0%	0.0%		3:00-4:00	1.7%	0.1%	0.0%
	4:00-5:00	2.0%	0.0%	0.1%		4:00-5:00	1.4%	0.0%	0.1%
	5:00-6:00	1.0%	0.0%	0.0%		5:00-6:00	1.3%	0.0%	0.1%
	6:00-7:00	0.6%	0.0%	0.0%		6:00-7:00	0.8%	0.0%	0.0%
	7:00-8:00	0.4%	0.0%	0.0%		7:00-8:00	0.5%	0.0%	0.0%
	8:00-9:00	0.4%	0.0%	0.0%		8:00-9:00	0.6%	0.0%	0.0%
	9:00-10:00	0.5%	0.0%	0.0%		9:00-10:00	0.7%	0.0%	0.0%
	10:00-11:00	0.7%	0.0%	0.0%		10:00-11:00	0.8%	0.0%	0.0%
11:00-12:00	0.4%	0.0%	0.0%	11:00-12:00	0.8%	0.0%	0.0%		
Total 24-hour		2.3%	0.0%	0.0%	Total 24-hour		1.5%	0.0%	0.0%

Location 12: Southern Boulevard, west of Ocean Boulevard (Southern Bridge)

Continuous tube counts were collected along the southern bridge, Southern Boulevard. It was determined that weekday total truck percentages make up about 2.4% of total vehicle traffic. The average weekend total truck percentages are greater than half of that on weekdays, at 1.7% of the total vehicle traffic. Table 12 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 12: Location 12 Truck Percentage Summary

		Weekday					Weekend		
		SU					SU		
	Time Period	SU	Artic.	Large		Time Period	SU	Artic.	Large
AM	0:00-1:00	3.6%	0.0%	0.0%	AM	0:00-1:00	1.2%	0.0%	0.0%
	1:00-2:00	2.4%	0.0%	2.4%		1:00-2:00	0.0%	0.0%	0.0%
	2:00-3:00	0.0%	0.0%	0.0%		2:00-3:00	0.0%	0.0%	0.0%
	3:00-4:00	0.0%	0.0%	0.0%		3:00-4:00	0.0%	0.0%	0.0%
	4:00-5:00	0.0%	0.0%	0.0%		4:00-5:00	5.3%	0.0%	0.0%
	5:00-6:00	0.3%	0.0%	0.0%		5:00-6:00	1.4%	0.0%	0.0%
	6:00-7:00	0.9%	0.0%	0.0%		6:00-7:00	1.7%	0.0%	0.0%
	7:00-8:00	2.5%	0.1%	0.0%		7:00-8:00	2.2%	0.3%	0.0%
	8:00-9:00	3.2%	0.1%	0.1%		8:00-9:00	2.1%	0.0%	0.0%
	9:00-10:00	2.7%	0.1%	0.1%		9:00-10:00	2.0%	0.0%	0.0%
	10:00-11:00	2.9%	0.1%	0.1%		10:00-11:00	2.4%	0.0%	0.0%
11:00-12:00	2.9%	0.1%	0.1%	11:00-12:00	2.0%	0.1%	0.0%		
PM	12:00-1:00	2.6%	0.1%	0.1%	PM	12:00-1:00	1.5%	0.0%	0.0%
	1:00-2:00	2.5%	0.1%	0.1%		1:00-2:00	2.1%	0.0%	0.1%
	2:00-3:00	2.1%	0.1%	0.2%		2:00-3:00	1.3%	0.0%	0.1%
	3:00-4:00	3.2%	0.1%	0.1%		3:00-4:00	1.8%	0.0%	0.0%
	4:00-5:00	2.3%	0.1%	0.1%		4:00-5:00	2.0%	0.0%	0.0%
	5:00-6:00	1.3%	0.0%	0.1%		5:00-6:00	1.3%	0.0%	0.0%
	6:00-7:00	0.7%	0.0%	0.0%		6:00-7:00	1.2%	0.0%	0.0%
	7:00-8:00	0.5%	0.0%	0.0%		7:00-8:00	0.7%	0.0%	0.0%
	8:00-9:00	0.6%	0.0%	0.0%		8:00-9:00	1.2%	0.0%	0.0%
	9:00-10:00	0.6%	0.0%	0.0%		9:00-10:00	0.9%	0.0%	0.0%
	10:00-11:00	0.6%	0.0%	0.0%		10:00-11:00	1.4%	0.0%	0.0%
11:00-12:00	0.8%	0.0%	0.0%	11:00-12:00	0.7%	0.0%	0.0%		
Total 24-hour		2.2%	0.1%	0.1%	Total 24-hour		1.7%	0.0%	0.0%

Location 13: Ocean Boulevard, south of Regents Park Road

Continuous tube counts were collected along Ocean Boulevard, just south of Regents Park Road on the southern end of the island. It was determined that weekday total truck percentages make up about 1.4% of total vehicle traffic. The average weekend total truck percentages are about equal on weekends, at 1.3% of the total vehicle traffic. Table 13 summarizes the hourly truck volumes at this location as a percentage of total vehicle traffic.

Table 13: Location 13 Truck Percentage Summary

		Weekday				Weekend			
		SU			SU				
	Time Period	SU	Artic.	Large	Time Period	SU	Artic.	Large	
AM	0:00-1:00	0.0%	0.0%	0.0%	AM	0:00-1:00	0.0%	0.0%	0.0%
	1:00-2:00	3.6%	0.0%	0.0%		1:00-2:00	0.0%	0.0%	0.0%
	2:00-3:00	0.0%	0.0%	0.0%		2:00-3:00	0.0%	0.0%	0.0%
	3:00-4:00	0.0%	0.0%	0.0%		3:00-4:00	0.0%	0.0%	0.0%
	4:00-5:00	0.0%	0.0%	0.0%		4:00-5:00	0.0%	0.0%	0.0%
	5:00-6:00	0.9%	0.0%	0.0%		5:00-6:00	0.0%	0.0%	0.0%
	6:00-7:00	1.5%	0.0%	0.0%		6:00-7:00	2.7%	0.0%	0.0%
	7:00-8:00	1.9%	0.0%	0.1%		7:00-8:00	2.6%	0.0%	0.0%
	8:00-9:00	2.2%	0.1%	0.0%		8:00-9:00	1.8%	0.4%	0.0%
	9:00-10:00	2.0%	0.0%	0.0%		9:00-10:00	1.4%	0.0%	0.0%
	10:00-11:00	2.3%	0.0%	0.0%		10:00-11:00	2.1%	0.0%	0.0%
11:00-12:00	1.7%	0.1%	0.0%	11:00-12:00	1.4%	0.0%	0.0%		
PM	12:00-1:00	1.6%	0.0%	0.0%	PM	12:00-1:00	1.5%	0.0%	0.1%
	1:00-2:00	1.7%	0.0%	0.0%		1:00-2:00	1.3%	0.0%	0.3%
	2:00-3:00	1.7%	0.0%	0.0%		2:00-3:00	1.1%	0.0%	0.0%
	3:00-4:00	1.8%	0.0%	0.0%		3:00-4:00	1.3%	0.1%	0.0%
	4:00-5:00	1.1%	0.0%	0.0%		4:00-5:00	1.2%	0.0%	0.0%
	5:00-6:00	0.7%	0.0%	0.0%		5:00-6:00	0.9%	0.0%	0.2%
	6:00-7:00	0.5%	0.0%	0.0%		6:00-7:00	0.7%	0.0%	0.0%
	7:00-8:00	0.4%	0.0%	0.0%		7:00-8:00	0.6%	0.0%	0.0%
	8:00-9:00	0.5%	0.1%	0.0%		8:00-9:00	0.7%	0.0%	0.0%
	9:00-10:00	0.5%	0.0%	0.0%		9:00-10:00	0.4%	0.0%	0.0%
	10:00-11:00	0.3%	0.0%	0.0%		10:00-11:00	0.5%	0.0%	0.5%
11:00-12:00	0.0%	0.0%	0.0%	11:00-12:00	0.0%	0.0%	0.0%		
Total 24-hour		1.4%	0.0%	0.0%	Total 24-hour	1.2%	0.0%	0.1%	

Analysis of Truck Counts

The locations of the traffic counts were selected to determine if trucks are circulating within residential areas. The counts performed indicate that large vehicles are circulating throughout the Town, including within residential areas. The majority of the observed trucks were single unit trucks, which are non-articulated trucks, such as moving vans, furniture delivery trucks, and general delivery trucks. These trucks were observed throughout the Town, accounting for 2.1 to 3.3 percent of the traffic in the north end, 1.5 to 3.1 percent in the central part of town, including the business district, and 1.4 percent in the south part of Town on weekdays. The percentage of truck traffic on the roadway is illustrated in Figure 10. It is interesting to note that the percentage of trucks in the central part of town is not significantly different than in residential areas and is actually lower as a percentage of overall trips compared to the north end. This is notable because business districts typically see more truck deliveries than residential areas.

The locations of the observations in the north end were specifically chosen to capture truck traffic within the residential area (i.e., Publix delivery trucks are not included in these counts). The only significant commercial activities in this area are the Sailfish Club and the Palm Beach Country Club; therefore, delivery trucks should be minimal as a percentage of overall traffic. Nonetheless, the number of trucks ranged from 2.1 percent to 3.3 percent in this area, which is not significantly different than at other locations within the Town. Articulated trucks and large semi-trucks account for a small percentage of overall traffic in the north end; however, there is evidence of these trucks circulating based on the counts.

Truck counts were performed at several intersections throughout the Town to further analyze truck circulation. Turning movement counts provide the data necessary to determine circulation patterns, such as potential origins and destinations. The turning movement counts are illustrated in Figure 11. Based on review of the turning movements, the following patterns were observed.

At the intersection of County Road & Royal Poinciana Way, the majority of trucks were observed to be in the northbound through movement. This indicates that trucks are serving the north end and are originating at a location south of the north bridge. Another large movement is the eastbound left and southbound right movement. This indicates that trucks entering the Town at the north bridge are accessing the north end at this intersection.

Truck Type	Weekday	Weekend
Single Unit	2.7%	1.5%
SU Articulated	0.1%	0.0%
Large	0.0%	0.0%

Truck Type	Weekday	Weekend
Single Unit	3.1%	1.5%
SU Articulated	0.1%	0.1%
Large	0.0%	0.0%

Truck Type	Weekday	Weekend
Single Unit	2.1%	1.5%
SU Articulated	0.1%	0.0%
Large	0.1%	0.0%

Truck Type	Weekday	Weekend
Single Unit	3.3%	1.8%
SU Articulated	0.1%	0.1%
Large	0.1%	0.0%

Truck Type	Weekday	Weekend
Single Unit	2.4%	1.9%
SU Articulated	0.1%	0.1%
Large	0.1%	0.1%

ROYAL POINCIANA WAY

Truck Type	Weekday	Weekend
Single Unit	2.6%	1.8%
SU Articulated	0.1%	0.1%
Large	0.1%	0.1%

Truck Type	Weekday	Weekend
Single Unit	1.5%	1.7%
SU Articulated	0.0%	0.0%
Large	0.1%	0.1%

OKEECHOBEE BOULEVARD

Truck Type	Weekday	Weekend
Single Unit	1.5%	1.6%
SU Articulated	0.1%	0.2%
Large	0.1%	0.1%

Truck Type	Weekday	Weekend
Single Unit	3.1%	2.6%
SU Articulated	0.1%	0.1%
Large	0.1%	0.1%

Truck Type	Weekday	Weekend
Single Unit	2.5%	1.9%
SU Articulated	0.1%	0.0%
Large	0.0%	0.0%

Truck Type	Weekday	Weekend
Single Unit	2.2%	1.7%
SU Articulated	0.1%	0.0%
Large	0.1%	0.0%

SOUTHERN BOULEVARD

Truck Type	Weekday	Weekend
Single Unit	2.3%	1.5%
SU Articulated	0.0%	0.0%
Large	0.0%	0.0%

Truck Type	Weekday	Weekend
Single Unit	1.4%	1.2%
SU Articulated	0.0%	0.0%
Large	0.0%	0.1%

COCOANUT ROW

N COUNTY ROAD

LEGEND



MACHINE COUNT LOCATIONS

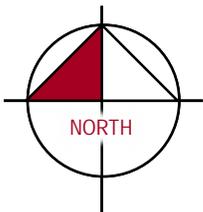
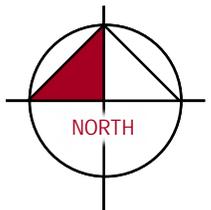


FIGURE 10
PALM BEACH TRUCK PROHIBITION
KH #044063244
PERCENT TRUCK VOLUMES



LEGEND

 % TRUCKS
 (XX/XX) (AM VOLUME/PM VOLUME)

FIGURE 11
PALM BEACH TRUCK PROHIBITION
 KH #044063244
AVERAGE PEAK HOUR TRUCK PERCENTAGES

Although some commercial activity is present north of Royal Poinciana Way, the number of trucks for these movements is not consistent with the small amount of commercial activity. Therefore, it is reasonable to conclude, based on these turning movements and on the link data described above, that that trucks in the north end are arriving from locations south of Royal Poinciana Way as well as via the north bridge.

Truck circulation patterns at the intersection of Royal Palm Way & South County Road were less conclusive. The movement with the highest truck volume is the eastbound left-turn movement. A substantial amount of truck traffic is destined for locations east of this intersection as well. Based on this data, no clear patterns were determined with respect to truck impacts on residential streets.

DRAFT

Turning Movement Analysis

An analysis of truck turns was performed at twenty-four intersections throughout the Town. These intersections were chosen to represent typical truck routes, based on observations and conversations with Town staff and residents. The focus of the intersection selection was to capture truck turns from the main arterials (such as County Road and North Lake Way) with narrower residential streets. Based on observation, these are the locations where trucks have damaged property. Figure 12, Figure 13, and Figure 14 illustrate the locations of the turning analyses.

Three truck types were analyzed for each of the turning movements at the twenty-four intersections. The trucks analyzed are summarized as follows:

- Single Unit Box Truck
 - 30 feet in length, 8 feet wide, with a 42-foot curb to curb turning radius
 - Similar to food delivery trucks, moving vans, mail delivery trucks
- Intermediate Semi-Trailer
 - 45.5 feet in length, 8 feet wide, with a 40-foot curb to curb turning radius
 - Similar to large delivery trucks and furniture delivery vehicles
- Interstate Semi-Trailer
 - 73.5 feet in length, 8.5 feet wide, with a 45-foot curb to curb turning radius
 - Similar to long distance freight vehicles

The intersections analyzed are further defined based on their roadway characteristics and locations below:

Mediterranean

Mediterranean Road is a narrow two-lane undivided residential road. It is the furthest north roadway analyzed in this study and intersects with Lake Way to the west and Ocean Boulevard to the east. Both of these intersections were analyzed.

La Puerta

La Puerta Way is a two-lane undivided residential road. It intersects with Lake Way to the west and Ocean Boulevard to the east. Both of these intersections were analyzed.

Orange Grove

Orange Grove Road is a two-lane undivided residential road. It intersects with Lake Way to the west and Ocean Boulevard to the east. Both of these intersections were analyzed.

List

List Road is a narrow two-lane undivided residential road. It intersects with Lake Way to the west and Ocean Boulevard to the east. Both of these intersections were analyzed. It is located just south of Orange Grove Road.

Windsor

Windsor Court is a two-lane undivided residential road. It intersects with Cherry Lane to the south and County Road to the east. Both of these intersections were analyzed.

Cherry

Cherry Lane is a narrow two-lane undivided residential road. It intersects with Lake Way to the west and County Road to the east. Both of these intersections were analyzed.

Atlantic

Atlantic Avenue is a two-lane undivided road. It intersects with Lake Way to the west and County Road to the east. Both of these intersections were analyzed. Further east Atlantic Avenue intersects with Ocean Boulevard.

Everglade

Everglade Avenue is a two-lane undivided eastbound one-way road. It intersects with Lake Way to the west and County Road to the east. Both of these intersections were analyzed. Further east Everglade Avenue intersects with Ocean Boulevard.

Seabreeze

Seabreeze Avenue is a two-lane undivided residential road. It intersects with Lake Way to the west and County Road to the east. Further east Seabreeze Avenue intersects with Ocean Boulevard. All three intersections were analyzed.

El Brillo

El Brillo Way is a two-lane undivided residential road. It intersects with County Road to the west and Ocean Boulevard to the east. Both of these intersections were analyzed.

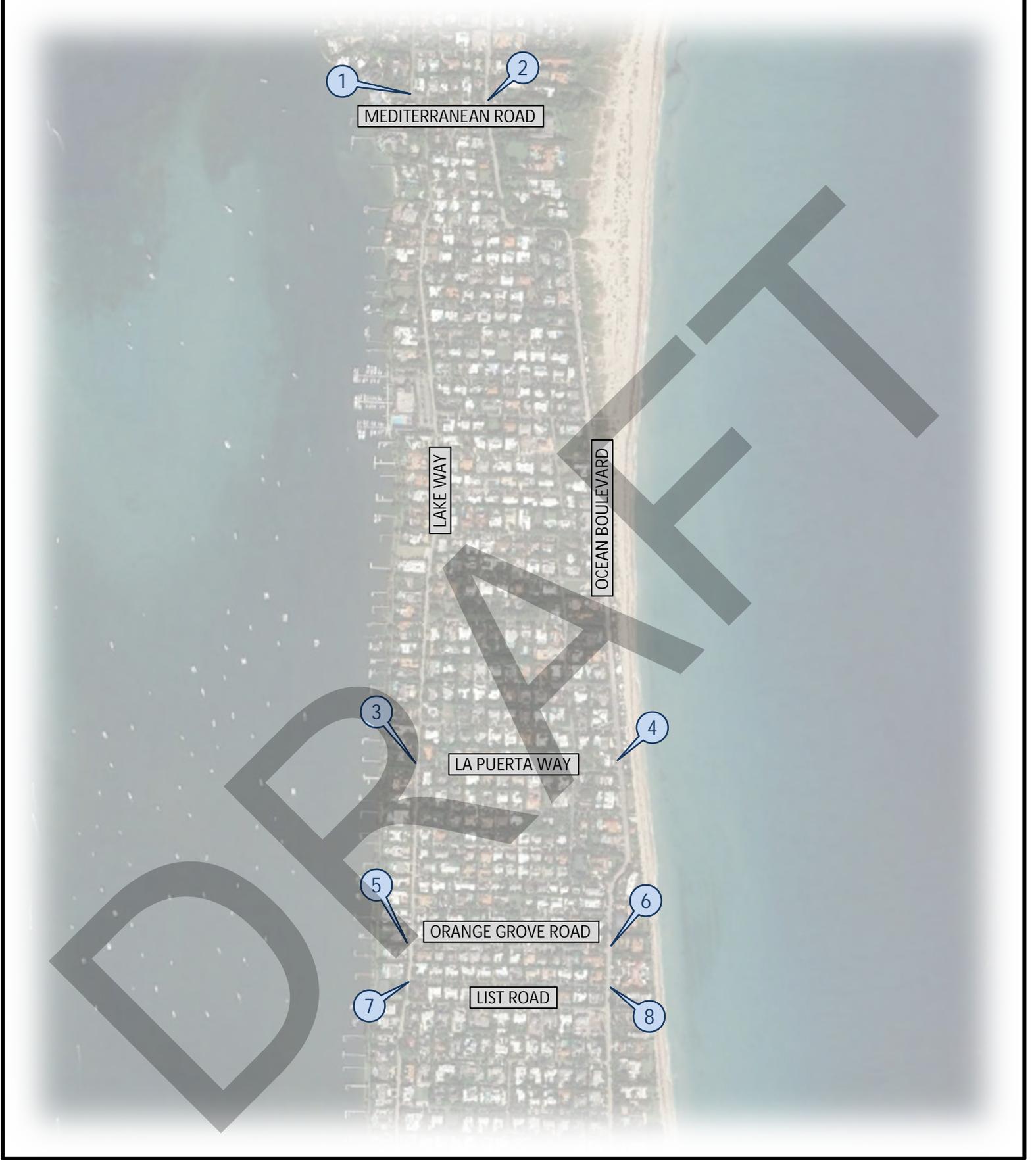
Jungle

Jungle Road is a two-lane undivided residential road. It intersects with County Road to the west and Ocean Boulevard to the east. Both of these intersections were analyzed.

Clarendon

Clarendon Avenue is a two-lane undivided residential road. It intersects with Vita Serena to the west and Ocean Boulevard to the east. The intersection of Clarendon Avenue and Ocean Boulevard was analyzed.

Individual plots for each movement are attached in Appendix C.



1
2
MEDITERRANEAN ROAD

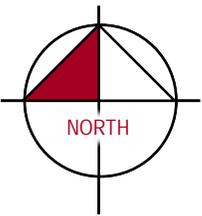
LAKE WAY

OCEAN BOULEVARD

3
4
LA PUERTA WAY

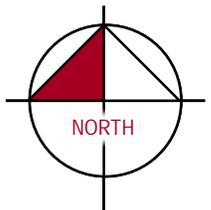
5
6
ORANGE GROVE ROAD

7
8
LIST ROAD



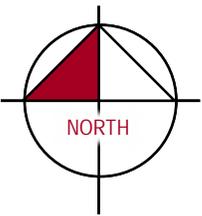
LEGEND
AUTOTURN LOCATIONS

FIGURE 12
PALM BEACH TRUCK PROHIBITION
KH #044063244
AUTOTURN ANALYSIS LOCATIONS - 1



LEGEND
 # AUTOTURN LOCATIONS

FIGURE 13
 PALM BEACH TRUCK PROHIBITION
 KH #044063244
 AUTOTURN ANALYSIS LOCATIONS - 2



LEGEND

AUTOTURN LOCATIONS

FIGURE 14
PALM BEACH TRUCK PROHIBITION
 KH #044063244
 AUTOTURN ANALYSIS LOCATIONS - 3

RECOMMENDATIONS

Based on our review of truck volumes, the ability of trucks to maneuver local streets, observed damage to private property, and a review of Florida municipalities with similar street networks, it is recommended to restrict trucks on certain Town streets. This recommendation is intended to mitigate damage to private property, eliminate congestion due to the inability of certain trucks to maneuver certain streets, and provide a mechanism for permit and enforcement of truck traffic in certain areas of Town. The data collected confirms that trucks are circulating within residential areas of Town, as noted by high numbers of trucks north of Royal Poinciana Way in comparison with expected volumes for a residential area. Truck volume percentages in the residential areas of the north end are higher than in the commercial parts of Town. Review of the specific turning movement counts indicates that many of the trucks in the north end are arriving via the north bridge.

Florida Statute provides guidance on establishing restriction of trucks on local roads. Per FS 316.008:

(1) The provisions of this chapter shall not be deemed to prevent local authorities, with respect to streets and highways under their jurisdiction and within the reasonable exercise of the police power, from:

(n) Prohibiting or regulating the use of heavily traveled streets by any class or kind of traffic found to be incompatible with the normal and safe movement of traffic.

Description of the Recommended Restriction

Figure 15 illustrates the recommended physical boundaries of the truck restriction. It is recommended to implement broad area-wide restrictions rather than street-by-street restrictions; if only certain streets in a part of Town are restricted, trucks would use the non-restricted streets in larger numbers. In residential areas such as the north end, certain residents would see an increase in trucks on their street if their street was the non-restricted street. Area-wide restrictions also require less signage and are easier to understand by truckers. Without an area-wide restriction, individual streets would have to be signed restricting trucks, leading to sign clutter. It should be noted that the following roads will have NO Town-imposed restrictions:

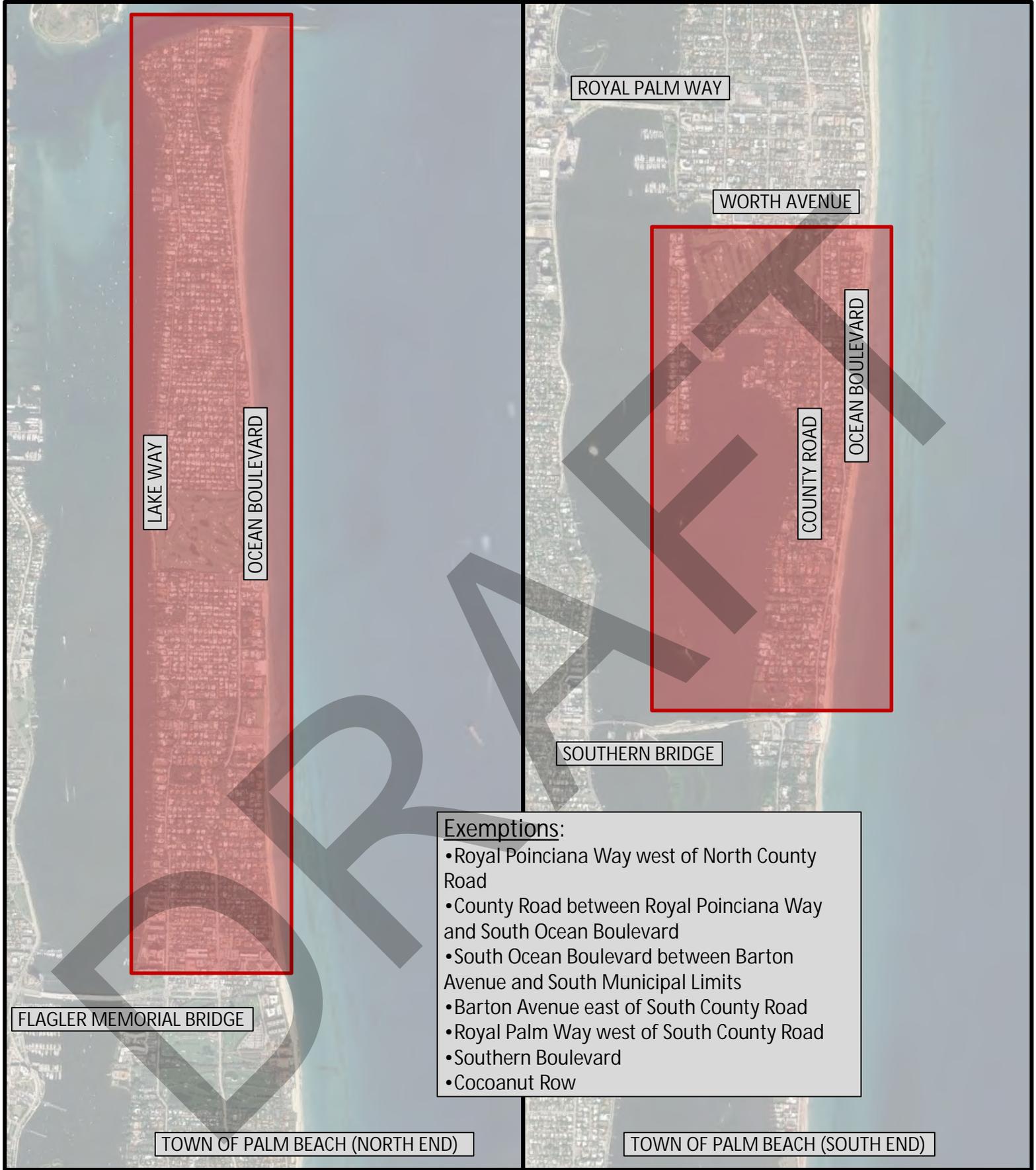
- Royal Poinciana Way west of North County Road
- County Road between Royal Poinciana Way and South Ocean Boulevard

- South Ocean Boulevard between Barton Avenue and South Municipal Limits
- Barton Avenue east of South County Road
- Royal Palm Way west of South County Road
- Southern Boulevard
- Coconut Row

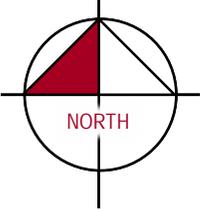
The exclusion of these roads from truck restrictions allows trucks entering the Town to be able to circulate onto and off of the island without the need for U-turns or dangerous turning maneuvers.

It should be noted that areas between Worth Avenue and Royal Poinciana Way were excluded from truck restrictions. This is due to the nature of the land uses in this area, with the majority of the Town's commercial operations occur in this area. Fewer single-family residential units are located in this part of town. Furthermore, the streets are generally wider in this area, accommodating larger trucks.

Based on the turning movement analysis, restrictions should be placed on larger trucks. Delivery trucks, such as those operated by postal and package delivery services, have been shown to be able to maneuver residential streets without encroaching on private property. Larger box trucks (two-axle) are also generally able to maneuver most residential streets. Truck-trailer combinations, however, of any size, have been shown to not be able to maneuver the residential streets, and should be restricted. Also, trucks longer than 30 feet should be restricted. It should be noted that although combination vehicles can make some movements (especially left-turns) on some streets, they are not generally able to make right-turns without impacting private property. Therefore, a restriction should be placed on all combination vehicles.



- Exemptions:**
- Royal Poinciana Way west of North County Road
 - County Road between Royal Poinciana Way and South Ocean Boulevard
 - South Ocean Boulevard between Barton Avenue and South Municipal Limits
 - Barton Avenue east of South County Road
 - Royal Palm Way west of South County Road
 - Southern Boulevard
 - Coconut Row



LEGEND
■ PROHIBITION BOUNDARY

FIGURE 15
PALM BEACH TRUCK PROHIBITION
 KH #044063244
TRUCK RESTRICTION BOUNDARIES

Permitting of Exceptions

In certain cases, there may be a need for restricted vehicles to utilize the restricted streets. An example of this would be the need for a construction crane to access a private residence on a residential street. Another example could be a small combination truck that is needed to access a commercial property to deliver items that are too large for smaller delivery trucks. The Town should establish a permitting process to allow for special circumstances. As part of the process, the applicant should provide:

- Explanation/Narrative of the request
- Explanation of why smaller trucks cannot be used. The applicant must demonstrate that smaller, more frequent trucks cannot be used due to the nature of the delivery or equipment, or that more frequent trips will negatively impact the neighborhood.
- A routing plan that demonstrates that the truck movements will not impact private property.
- A plan for restoration of private property in case of damage.

The Town could then issue a permit listing types and numbers of vehicles allowed, allowable times and days of operations, and expiration (if any). The applicant will be required to pay for staff burden costs, any citations for operating outside of the conditions of the permit and restoration of private property.

Codification

Based on a review of other municipalities in Florida, the truck restrictions should be placed in the Town's Code of Ordinances by means of Resolution. The Code should include the following elements:

- Definition of the restriction, including types of trucks (defined by length) that are restricted.
- A map of the restricted area.
- Any exclusions to the restriction; possible exclusions to the restriction include emergency vehicles and municipal services vehicles.
- Mechanism for citation
- Permitting process for exceptions

The Code update will be subject to the Town's process for amending the Code of Ordinances.

Education

The Town should develop an educational campaign to educate stakeholders, including residents, business, and trucking companies, of proposed restrictions. The goal should be to reach the widest range of potential drivers. It should be noted that the input from stakeholders is imperative to determining if restrictions should be enacted, and what scope the ultimate restrictions should encompass.

The Town should publicly notice proposed restrictions in visible locations to drivers throughout Town prior to implementation. Although it is recognized that not every truck driver entering the Town will know in advance of new restrictions, every effort should be made to educate the highest number of drivers as possible. Nonetheless, a grace period between adoption of a Code and initial citations should be considered.

CONCLUSION

The Town of Palm Beach currently allows unrestricted movement of all legal vehicles on all streets within the Town. However, larger vehicles have been observed to damage private property when they cannot adequately maneuver narrow streets and can cause congestion and unsafe conditions when they have to make multi-point turns at Town intersections. To mitigate the damage to private property, and to minimize congestion due to the maneuvering of larger vehicles, the Town is considering a restriction on certain streets of larger vehicles. The goal of any restriction is to change the behaviors to force deliveries with smaller vehicles. Although any restriction will not completely eliminate property damage and congestion, the goal of implementing the restrictions is to substantially reduce the frequency of occurrences.

This study analyzed truck volumes, circulation patterns, and their ability to maneuver intersections without impacting private property. Furthermore, a review of other municipalities throughout Florida which have implemented truck routing Ordinances was performed. Based on this analysis, it is recommended to restrict movement of larger trucks on certain streets, as defined throughout this study. Codification, education, and enforcement are also discussed. To allow for unique circumstances where large trucks must enter the recommended restricted area, a permit process should be implemented to identify the types of trucks, routing, and process for assessing damages to private property should it occur.

TOWN OF PALM BEACH

Information for Public Works Committee Meeting: October 22, 2020

TO: Public Works Committee
FROM: H. Paul Brazil, P.E., Director of Public Works
RE: Ongoing Construction Projects Update 2020
DATE: August 20, 2020

STAFF RECOMMENDATION

Town staff will make a presentation providing an update of the 2020 construction projects.

GENERAL INFORMATION

Below is a list of ongoing construction projects within the Town of Palm Beach. Staff will present an overall summary of the status of these projects.

Current Town Construction Projects for 2020

- D16/D18 Stormwater Pumpstation
- Seminole Avenue Drainage Improvements
- Crescent Drive Stormwater Improvements
- Sand Transfer Plant Rehabilitation
- South Fire Station Chiller Replacement
- Undergrounding Phase 2 North Paving
- City of West Palm Beach Paving Repairs – Watermain Related Repairs
- Town Marina– on going
- Undergrounding – on going

cc: Kirk W. Blouin, Town Manager
Jay Boodheshwar, Deputy Town Manager
Eric B. Brown, P.E., Assistant Director of Public Works
Patricia Strayer, P.E., Town Engineer
Jason Debrincat, P.E., Senior Project Engineer
Jane Le Clainche, Director of Finance

TOWN OF PALM BEACH

Information for Public Works Committee Meeting: October 22, 2020

TO: Public Works Committee

FROM: H. Paul Brazil, P.E., Director of Public Works

RE: Green Initiative Update

DATE: August 18, 2020

STAFF RECOMMENDATION

Town staff is providing an update on the progress pertaining to the Town's Green Initiative Program and requests the Public Works Committee members to provide any direction deemed necessary.

GENERAL INFORMATION

Green Initiative Update:

The items outlined below are topics which the Public Works Committee discussed previously and which Staff will continue to watch closely, track, and provide updates at future Committee meetings.

1. Pesticides

The Town currently treats for lethal yellowing, Royal Palm bug, and white fly utilizing synthetics. All other pests are treated with environmentally friendly applications on an as-needed-basis. All applications are applied at or below label rates, are applied using Best Management Practices (BMP), and according to Town ordinances.

2. Fertilizers

The Town currently has a quarterly fertilization program for the green spaces in the medians and at large turf areas such as Bradley Park, Lakeside Park, and Wrightsman/Dean Park. These areas are utilizing 0-0-20, a nitrogen and phosphorus free product in the 'black-out' period. The Worth Avenue turf and plantings are fertilized monthly. Staff also utilizes nitrogen and phosphorus-free products during the blackout period. Due to the limited green space adjacent to the palms, the trees are treated via deep root injections which provides proper nutrients to the palms. All applications are applied at or below label rates and are applied using Best Management Practices (BMP), and according to Town ordinances.

3. Lethal Yellowing

Lethal Yellowing (LY) is a fatal but preventable disease caused by bacteria. LY currently affects 40% of palm species, most common is Coconut and Date Palms. This disease affects the vascular system of the palms by clogging its vessels, not allowing nutrients to migrate through the tree. It is spread by a palm sap feeding leafhopper.

Treatment for LY consists of drilling a small hole in the tree and inserting a valve. The valve is then penetrated with a syringe. The chemical injected is a water-soluble antibiotic, oxytetracycline hydrochloride (OTC). Because it is water based, as is the palm, it dissipates over a short period of time, requiring treatment three (3) times per year to maintain effective control. An average size coconut palm would be injected with 4 grams of OTC per tree, per year. All applications are applied at or below label rates and are applied using Best Management Practices (BMP), and according to Town ordinances.

4. Ficus Replacement Program

As previously reported, ficus hedges have been removed in Lakeside Park at Brazilian and Australian dock parking lots, replaced with turf, and added low flow irrigation. Staff anticipates removing ficus hedges at the Peruvian Dock this fiscal year. Native hedge material will be installed as part of the Marina Project. Additionally, staff anticipates replacing hedges at D-9 (Mediterranean), Phipps Ocean Park, and the Town owned property near Crescent Drive. In addition, staff was able to remove a diseased ficus tree located near Crescent Drive. This is an on-going project which staff will continue with the efforts. Staff will continually review, modify, and update the list to include replacement totals and species types in an effort to avoid establishing a mono-culture of hedge materials and to promote species diversity.

The following is a brief summary of the collection and disposal of ficus hedge material from private properties.

The first sign up began on December 16, 2019 and by May 15, 2020, nineteen (19) residents were on a scheduling list. The program was scheduled for residents to begin removal starting May 2020, however due to the pandemic, the Town delayed the start of the program to July. At that time the list decreased to eight (8) properties.

The program collected and disposed of approximately 45 tons of material involving ten (10) trips/loads for a total cost of roughly \$9,700. This was accomplished over four (4) Saturdays totaling 114 labor hours.

Currently there are no new confirmed collection requests.

5. Other Issues

- a. The treatment of the North County Road ficus canopy treatments continue at the reduced rate of two (2) treatments per year, Altus (a non-neonicotinoid systemic) is used for the alternate treatments. This has reduced our neonicotinoid exposure in the area by 50%. Unfortunately, staff needed to remove four (4) trees from the canopy since the last Committee meeting. All of the trees removed had structural damage unrelated to white fly but from hypoxylon canker.

Public Works has begun researching the existing Town codes relating to insect infestation and tree diseases to see if hypoxylon canker (HC) is enforceable by Code Enforcement.

- b. Staff continues to work with the Town's arborist for alternate treatments or reduced traditional treatments, for the Royal Palm bug. This testing is currently being performed at the Town's nursery. Once staff has sustainable results, they will be shared with the Committee.

- c. The Town's bee removal program has had great results. Staff is excited to report that the Town has not eradicated any bees since the last Committee meeting. Our vendor sets up an alternative hive and relocates the queen, or introduces a new one, and the worker bees follow into the alternate hive. A recent hive in the canopy has been set-up for relocation.
- d. There has been a Nematode activity at Town Hall and Staff has been trying to control them for several months. Nematodes are microscopic worms that live in the soil. While there are many kinds that are beneficial, feeding on fungi, bacteria, and other organisms, some harmful nematodes feed on plants. These plant-parasitic nematodes damage root systems and reduce a plant's ability to get water and nutrients from the soil. When nematode populations are large, you may see signs of their damage on the plants like yellowing and wilting. If planted into beds that already have high numbers of nematodes, plants may become stunted and slowly die. Transplants may not grow at all after planting.
- e. There is also an issue with Pythium root rot. In the past few years, there has been occasional outbreaks at Bradley Park and at the Living Wall turf area. Pythium root rot is a persistent problem in areas that are poorly drained. The disease can also occur in well-drained areas following extended periods of rainfall. Pythium root rot can occur at any time of the year as long as the soil remains saturated for several days or weeks. We are addressing the areas with improved cultural practices, which include soil remediation, aerification and verticutting.
- f. The Town has assembled a Green Initiative Team (GIT) to further provide structure and focus on policies and initiatives in order to successfully enhance the Town. This team consist of Town staff and consultants. There are two (2) new members of the team, Town staff, Project Coordinator, Alisa Cox. Alisa worked previously in Wyoming supervising a similar initiative as well as a plant native movement. Tammy Cook of Calvin Giordano & Associates has worked with local municipalities assisting them in policy review, and implementation of enhanced environmentally-friendly, non-toxic, native programs, as well as a comprehensive tree maintenance and cataloging software which keeps a log of all tree attributes. Exhibit A attached is a list of what the team has been working on.

Attachment

cc: Kirk W. Blouin, Town Manager
Jay Boodheshwar, Deputy Town Manager
Eric B. Brown, P.E., Assistant Director of Public Works
Paul Colby, Facility Maintenance Division Manager
John Lawrence, Grounds Supervisor

Town of Palm Beach Green Initiatives:

Guiding Principles:

The Green Initiative Plan provides structure and focus to policies and initiatives in order to successfully enhance community sustainability. The following principles are intended to serve as an overarching theme and basis for the plan and provide a framework within which to execute sustainability planning:

- The Town of Palm Beach will lead by example.
- Healthy natural systems are the basis for sustainable communities and economies.
- Local decisions and policies have regional and global impacts.
- Policies and programs that enhance, protect and restore our natural resources, such as our airshed, waterways, shorelines, vegetation, wildlife, and greenspaces, support the sustainability of our community.
- Policies and programs that improve environmental regulatory compliance support the sustainability of our community.
- An educated community acting as a steward of the environment supports the sustainability of our community.

Assessing and Reporting Progress

The Green Initiative Plan was developed as a first step in creating a comprehensive green sustainability master plan for the Town. The intent is to develop a baseline report and an implementation plan. Baseline data is the point from which all future measurable outcomes will be compared and ultimately assessed.

Natural Resource and Ecosystem Management

Implementing natural resource and ecosystem management will also:

- Restore, enhance and protect natural resources, which increases the biodiversity and resiliency the city's ecosystems.
- Increase canopy coverage and reduce stormwater runoff, improve air quality, beautify neighborhoods and provide shade for pedestrians.
- Decrease heat island effect, which reduces energy costs.

Goals:

- Enhance, restore and protect natural resources and ecosystems.
- Increase compliance with regulations governing natural resources.

<u>Indicators</u>	<u>Baseline</u>	<u>Targets</u>
Landscaping		
Review Chemical Applications	Downward Trend	Inventory all chemicals & Products used In Municipal operations
Reduce Ficus Hedges	Upward Trend	Monitor # of ficus on municipal lands Native Hedge replacements
System-wide landscape	Upward Trend	Review soils on municipal lands Provide aeration, soil amendments, improve nutrient levels
Tree Canopy	Evaluate Software	Initiate Tree & Palm Master Plan Inventory Tree & Palm Locations Track Pruning Schedules Track Tree & Palm Replacement Schedule Inventory Historic and Specimen trees
Coconut Palm Treatment	Chemicals Required	No Alternative for Lethal Yellow Treatment
Ficus Tree Treatment	Downward Trend	Testing less treatments reducing #
Ficus Tree Replacements	Upward Trend	Replace nitida/benjamina with altissima
Nitrogen and Phosphorus ban	Upward Trend	No "N" or "P" June 1 - September 30th
Water Conservation	Upward Trend	Smart Irrigation system installation

Green Philosophy

Almost everything created or purchased has a life cycle that impacts the environment from the moment of production to the final disposal stage. By practicing and encouraging the purchasing of environmentally-friendly or non-toxic products, the Town will reduce the amount of toxic or hazardous material introduced into neighborhoods, waterways, and landfills.

TOWN OF PALM BEACH

Information for Public Works Committee Meeting: October 22, 2020

TO: Public Works Committee
FROM: H. Paul Brazil, P.E., Director of Public Works
RE: Cistern Utilization
DATE: August 20, 2020

STAFF RECOMMENDATION

Town staff recommends Committee members' direction concerning further investigation of the potential use of cisterns to meet water use demands.

GENERAL INFORMATION

The Town has retained Kimley-Horn (KHA) to perform a Water Supply Feasibility Study which will evaluate the feasibility of alternative potable water service providers. As part of this study, KHA is currently in the process of examining potential options that may be available to provide potable water service to the residents and property owners within the Town. The Town currently receives potable water service from the City of West Palm Beach (the City). The City owns and operates a potable water supply system, which also supplies water to the City, the Town, and South Palm Beach. Potable water service is provided to the Town by the City pursuant to a thirty (30) year franchise agreement executed in 1999. According to this agreement, the City owns and maintains all the water facilities throughout the Town through the duration of the agreement. The Town receives approximately ten (10) MGD of potable water (maximum daily demand) through a series of pipelines that cross the Lake Worth Lagoon.

At the time Town Council approved the award of this study, members of Town Council suggested an investigation of the use of cisterns to offset the water use demands within the Town. Attached is an article that the former Director of Planning, Zoning, and Building Department distributed regarding the use of cisterns in historic neighborhoods confronting increased sea levels.

While staff has not initiated a study, they have researched existing codes to determine if there are any restrictions in place in Town codes that would interfere with the use of cisterns. There are three (3) Town codes that actually reference cisterns. They are briefly referenced below:

Sec. 42-127. - Breeding Places Enumerated:

1. Code of Ordinances
2. Chapter 42 - ENVIRONMENT
3. ARTICLE III. - MOSQUITO CONTROL

ditches, ponds, pools, excavations, holes, depressions, open cesspools, fountains, cisterns, tanks, shallow wells, barrels, troughs, urns, cans, boxes, bottles, tubs, buckets.

Sec. 66-212. - Purpose and Intent:

1. Code of Ordinances
2. Chapter 66 - NATURAL RESOURCE PROTECTION
3. ARTICLE IV. - VEGETATION
4. DIVISION 1. - GENERALLY

Encourage the use of rain harvesting systems, such as cisterns, as a means to conserve water by reducing overwatering of landscapes.

Sec. 88-16. - Exterior Property Areas:

1. Code of Ordinances
2. Chapter 88 - PROPERTY MAINTENANCE CODE
3. ARTICLE III. - GENERAL REQUIREMENTS

Water pollution. The pollution of any public well or cistern, stream, lake, canal, or body of water by sewage, dead animals, commercial wastes

Attachment

cc: Kirk W. Blouin, Town Manager
Jay Boodheshwar, Deputy Town Manager
Eric B. Brown, P.E., Assistant Director of Public Works
Wayne Bergman, Director of Planning, Zoning, and Building
Patricia Strayer, P.E., Town Engineer
Craig Hauschild, P.E., Civil Engineer

'We Cannot Save Everything': A Historic Neighborhood Confronts Rising Seas

Colonial-era homes line the streets of The Point in Newport, R.I. Climate change is forcing experts to reimagine the future of historic preservation here.

By **Cornelia Dean**

July 8, 2019

NEWPORT, R.I. — The Point, a waterfront neighborhood here, is one of the largest, best preserved and most important Colonial-era communities in the United States. Its grid of 18th-century streets contains scores of houses built before the American Revolution, and dozens more that are almost as old.

“It’s incredible to walk around a neighborhood like this that is so intact,” Mark Thompson said one morning this spring as he strolled along Washington Street, past the Jahleel Brenton Counting House, the 200-year-old home of a prosperous merchant. “There is a very organic feel to the neighborhood.”

Mr. Thompson heads the Newport Restoration Foundation, one of the organizations that in recent decades have purchased and restored many of Newport’s historic properties, saving them from the tourism development that has overtaken much of the city’s waterfront.

Today, the neighborhood faces a new threat. The Point sits only a few feet above sea level, and because of climate change, the ocean is rising. So people have been thinking again about how to preserve the neighborhood.

Similar efforts are underway in many communities on the East Coast, where European colonists settled centuries ago. The task is complicated, and success is far from assured.

[Read about efforts to protect the Farnsworth House, a midcentury marvel in Plano, Ill., from rising floodwaters.]

According to a 2014 report by the Union of Concerned Scientists, sea level rise threatens sites ranging from Faneuil Hall, where the Sons of Liberty planned the Boston Tea Party, to the launchpads of Cape Canaveral.

The National Park Service says a quarter of its properties are on or near the coast, and most of them contain historic structures — many of them Civil War forts vulnerable to sea level rise.

In 2016, the N.R.F. organized a conference, “Keeping History Above Water,” to address the problem of historic properties being threatened by sea level rise. The Point was its case study.

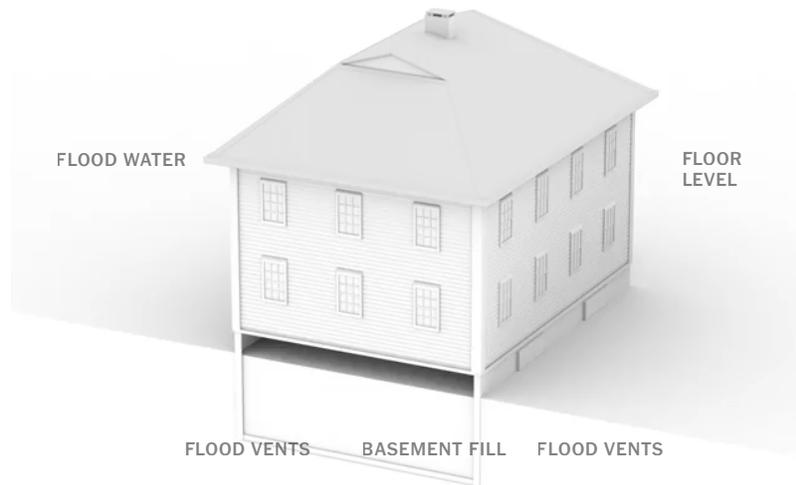
Since then, experts in preservation have gathered in Annapolis, Md., whose Colonial Annapolis Historic District is threatened; in St. Augustine, Fla., where the Castillo de San Marcos, a 17th-century fort built of light and porous coquina limestone, is highly vulnerable; and last month in Nantucket. That entire island is designated a National Historic District, and much of it is subject to flooding and erosion.

Wherever the threat occurs, the underlying problem is much the same: Tactics used in ordinary contexts — building sea walls, raising buildings on stilts, or even moving them to higher ground — are of limited utility in historic neighborhoods. They can destroy the very characteristics that make the properties worth saving.

So architects, planners and engineers are devising novel approaches, such as allowing water to flow through threatened structures; turning basements into cisterns; installing building-size flotation systems; or re-plumbing entire neighborhoods to direct storm water and high tides out of the way.

Flowing Through

Flood vents on cellar walls open automatically. Water is allowed to flow through, reducing the risk of water pressure damaging the foundation. The basement has been filled above the water table, and utilities have been relocated to higher floors.



By Mika Gröndahl

“There is a definite urgency,” said Mr. Thompson. “We certainly don’t feel we have a luxury of time.”

A historic home, a modern experiment

The tobacco heiress Doris Duke, who inherited a Gilded Age estate as a young woman in 1925 and kept it until her death in 1993, created the N.R.F. in 1968. Since then, the foundation has acquired and restored scores of Colonial-era properties, which it rents to “stewards” who agree to care for them according to foundation standards.

The aim is to preserve the buildings not as silent relics or museum exhibits, but as vital parts of vibrant communities. More than two dozen foundation properties, including the Jahleel Brenton Counting House, are in The Point.

The Point was settled in the 17th century by Quaker refugees from Massachusetts. Then, it was little more than a spit of land sticking out into what became Newport Harbor. Soon, as its edges were filled in, a marsh became Marsh Street, and a wet area became Water Street; the path of a span that once linked The Point to the rest of Newport turned into Bridge Street.

Newport grew prosperous through trading, including a substantial slave trade. The city — and The Point — supported a vibrant class of artisans, one of whom was Christopher Townsend, a member of a prominent family of furniture makers. In 1725, he built a two-story house at 74 Bridge Street; the restoration foundation acquired it in 2013.



The Christopher Townsend House at 74 Bridge Street. The home has been a test case for architects and engineers searching for ways to rescue Colonial-era buildings from rising seas. Kayana Szymczak for The New York Times

To prepare for the 2016 conference, Union Studio, an architecture and community planning concern in Providence, R.I., conducted an “adaptation workshop” that considered an array of possible approaches to the preservation of historic structures in general — and 74 Bridge Street in particular.

The ideas included so-called “dry flood-proofing,” more complicated “wet flood-proofing,” altering the grade of the surrounding landscape, and making structures buoyant.

So far, 74 Bridge Street, which is unoccupied, relies on dry flood-proofing, a combination of relatively simple steps. Sandbags and door barriers are deployed when floods threaten, and its water heater, furnace and other mechanical equipment have been moved from the cellar to the first floor. (There is a space heater in the cellar, but it is bolted to the ceiling.)

Techniques for Protecting Historic Structures

Basements can be turned into cisterns to collect floodwater and slowly release it into the stormwater system once the flood has passed. Entire neighborhoods can be equipped with larger capacity storm water pipes, or houses can be made to float on the rising floodwater.

Cistern

Replumbing

Flotation

Source: Historyabovewater.org • By Mika Gröndahl

It helps that 74 Bridge Street was built in a fashion common in Colonial-era New England, with heavy, vertical planks attached to the building's wooden frame. This plank-on-frame construction is relatively resilient to minor flooding, preservationists say. Plus, its interior walls were finished with lime plaster, a sand-lime-aggregate material in use since ancient times that is durable and mold-resistant.

Still, a sump pump runs in the basement 24/7. The water table is now so high that without it, there would probably be a foot of standing water there at all times.

Dry flood-proofing is "low-hanging fruit," said Stephanie Zurek, an architect at Union Studio who studied the home. Other remedies, like wet flood-proofing, are more complex.

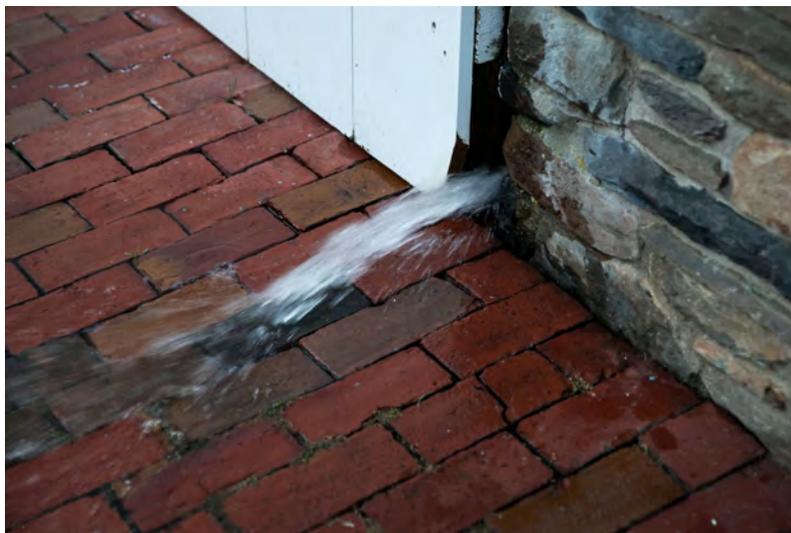
Wet flood-proofing does not involve making basement walls watertight because, the theory goes, foundation walls would be vulnerable to collapse if water pressure built up in the soil around them.

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Instead, basement walls are left permeable, like the stone foundation walls of 74 Bridge Street. If walls are already watertight, architects may propose flood vents, windowlike devices fitted into cellar walls that open automatically to let the building flood in a storm. Water can be pumped out later.

Or homeowners may install rain barrels or even cisterns in their cellars to store storm water till the threat has passed.

Mr. Thompson said the foundation is considering whether steps like these might be advisable at 74 Bridge Street, but he added that deliberations may take a while because the foundation hopes to develop techniques that may have wider use. "Whatever we do should inform the community at large," he said.



Water gushes from the Thomas Townsend House, built in 1735, during a recent high tide. Kayana Szymczak for The New York Times

'Lollipopping' and 'blue streets'

Sometimes, the site of a historic structure can be regraded so that water runs away from it. Unfortunately, this step is generally considered impractical on a neighborhood scale. Though visitors to The Point probably do not notice it, the neighborhood as a whole is "a little bit of a bowl," as Mr. Thompson put it, and its low point is almost exactly at 74 Bridge Street.

In many coastal districts, including The Point, there is an additional problem: storm sewers that run into nearby rivers or, in the case of Newport, the harbor. In a storm, these outlets can actually send seawater flooding into a historic community like The Point.

The Union Studio project put forward a few suggestions for dealing with the problem: setting up a tax district to raise money to redesign the storm sewers, installing tide gates in the outfall pipes, and installing permeable pavement to encourage better draining.

Architects at the Rhode Island School of Design took the idea further, suggesting that streets be designed so that storms can turn them into “a water feature,” said professor Liliane Wong, an architect whose specialty is the adaptive reuse of buildings. “The students called them ‘blue streets.’”

Elevating buildings has become a more common response to the threat of coastal flooding; often, building codes require it. But in historic neighborhoods, elevating individual structures is controversial. The process can turn a harmonious streetscape into an unsightly hodgepodge of rooflines, some far higher than others.

“We call it ‘lollipopping,’” said Ms. Wong. Post-Katrina New Orleans experienced “lollipopping at its extreme,” she added, with some buildings raised as much as 20 feet in the air.

“That’s exactly anti-historic-neighborhood,” she said.

In places like The Point, elevation raises another issue: access. Many structures there were built right up to their lot lines, with front doors opening onto the sidewalk. If a house is elevated, it can be hard to find space for the now-needed front stoop.

The owners of some elevated properties in The Point have solved the problem by building stairs running along the building’s facade to a landing at the new level of the front door. That’s what happened with the house at 70 Bridge Street, built in the 18th century by Christopher Townsend’s son, John.



The John Townsend House, which has been elevated for protection from sea level rise. Kayana Szymczak for The New York Times

A number of other houses in The Point have been elevated. “It is concerning to me,” said state Rep. Lauren Carson, who until recently lived in The Point. “I think we are going to lose the streetscape integrity.”

By far the most dramatic approach to preserving historic structures involves equipping them with devices to make them buoyant. They would sit on dry land — as long as the land is dry. Only when it is dangerously wet would the buildings be set afloat.

A leading advocate for the approach is Elizabeth C. English, an architectural theorist and engineer at the University of Waterloo in Canada and the founder of the Buoyant Foundation Project.

Dr. English believes making houses amphibious can maintain their important architectural features while keeping them dry. To “amphibiate” a structure, she said, it must be hoisted so that engineers can install buoyancy elements and supportive framing under the first floor.

Around the world, Dr. English said, empty barrels or even empty plastic water bottles have been used for buoyancy. In Louisiana, where she has tested the approach, she favors polystyrene foam blocks.

“And then you have a vertical guidance system,” she said, such as steel pipes driven into the ground near the building’s corners. The building’s frame is attached to these poles with sliding rings or sleeves so that the building remains positioned over its foundation, rising when a flood comes and sinking back into place as waters recede.

“We can do telescopic vertical guidance posts,” she said. “It works like the handle on a roll-aboard suitcase.” She added: “Anything that can be elevated can be amphibiated.”

Dr. English said the biggest barrier to the use of this technology is the lack of engineering standards, which she is working to develop, as well as a lack of building codes and other regulations.

Amphibiating historic structures has yet to find wide use (though it was used in a shotgun house in New Orleans rehabilitated through the efforts of the actor Brad Pitt). But experts like Dr. Wong say the notion must be considered: “We need to think about ideas that seem like they would be unfeasible in order to prepare for the future.”



The Jahleel Brenton Counting House, located in The Point. Kayana Szymczak for The New York Times

Let it ‘fall to ruin’?

If all else fails, endangered buildings can be moved. The practice has a long history on the coast, common on Cape Cod, the Outer Banks of North Carolina — and in Newport. Some of the houses in Queen Anne Square, in the city’s touristic heart, were moved there, at least one from a neighboring town.

In fact, the Jahleel Brenton Counting House is in The Point because the restoration foundation moved it there decades ago, literally hours ahead of its planned demolition. Few worried then that the neighborhood would ever be threatened by rising seas.

But moving a house or two is one thing. Relocating an entire neighborhood, especially a neighborhood whose significance derives in large part from its coastal position, is another matter. As Ms. Zurek, the Union Studio architect, put it: "Whatever the solutions they choose to make or not make, there are going to be huge financial repercussions."

Increasingly, experts and residents alike realize that it may not be possible to prevent rising seas from drowning treasured buildings, neighborhoods and landscapes.

The architects at the R.I.S.D. project developed a poignant response: a plan to cast the facades of threatened buildings in concrete. The casts would be used to create a kind of water garden "memory park," Ms. Wong said. Once the buildings washed away, the casts would remain, reminders of what had been lost.

"We cannot save everything," she said. "But we can have a memory of it."

In a memorandum issued in 2014, Jonathan B. Jarvis, then director of the National Park Service, wrote about the preservation of the nation's cultural heritage in an era of climate change. Done sensitively, adaptations of historic structures can preserve their integrity, said Mr. Jarvis, who retired in 2017.

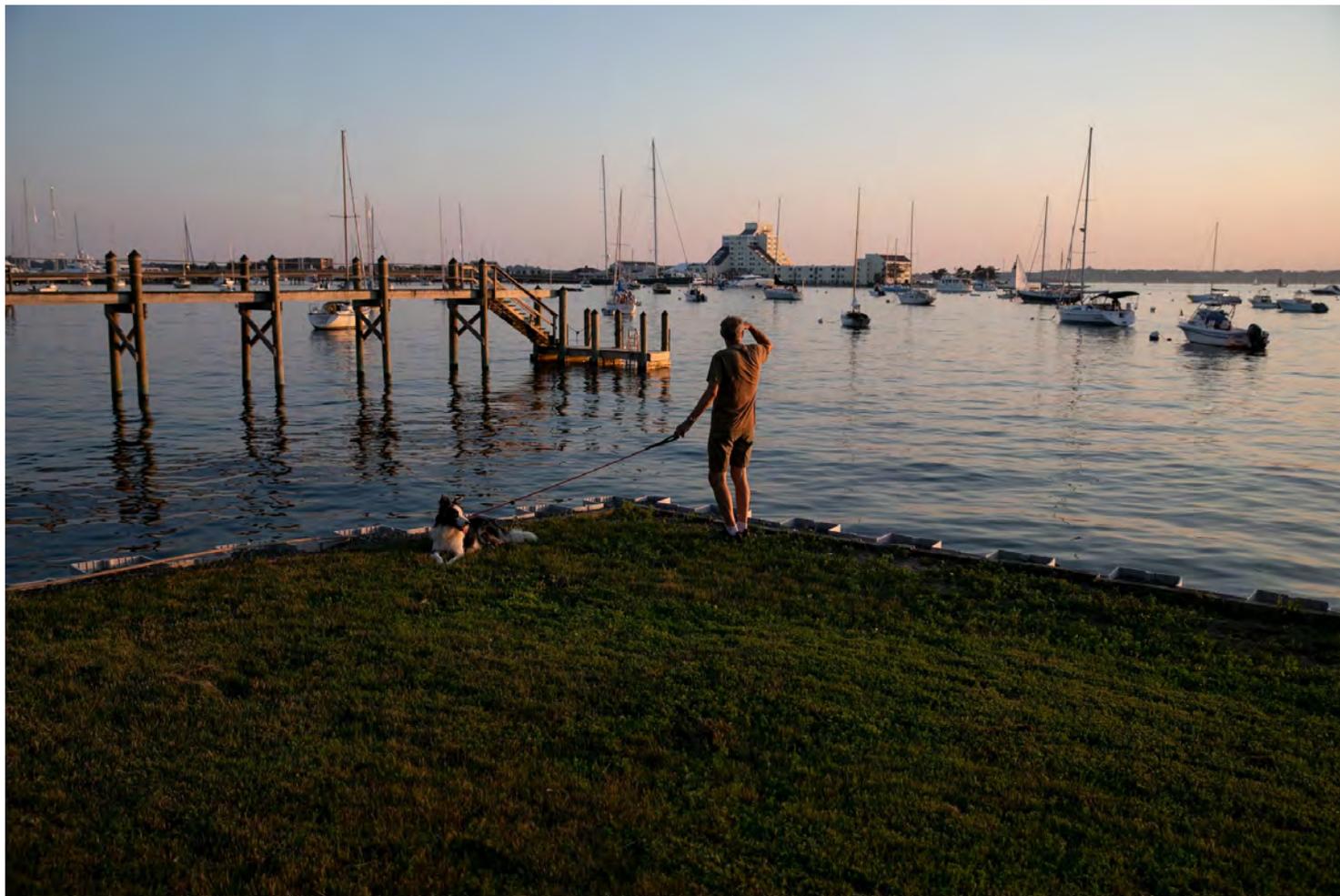
But, he added, managers must recognize the possibility that some historically or culturally important properties may be doomed.

"Funding temporary repairs for resources that cannot, because of their location or fragility, be saved for the long term demands careful thought," he wrote.

It may be better to document the properties — with photographs or charts, for example — and allow "them to fall into ruin rather than rebuilding after major storms."

Mr. Thompson of the restoration foundation said he could not agree.

"Doris Duke did a wonderful thing fifty-some years ago when she preserved these Colonial houses," he said. "Here we are 50 years later, and it is our responsibility to ensure that the work she did is not lost. To do for Newport a second time what she did for Newport the first time — to save these Colonial properties."



Ned Reynolds stands on his elevated backyard overlooking the ocean in Newport, R.I. Mr. Reynolds owns a colonial home built in 1720, which was moved from Providence, R.I., in 1965 and is now situated on the water. Kayana Szymczak for The New York Times

