



**TOWN OF GULF STREAM  
MINOR DRAINAGE & ROADWAY IMPROVEMENTS  
TECHNICAL MEMORANDUM  
May 5, 2020 (DRAFT)  
May 8, 2020 (DRAFT – Revised)**

## **BACKGROUND**

The Town of Gulf Stream (Town) has observed extended roadside ponding and the resulting tire rutting at the edge of pavement along many areas of the core. The Town has requested that Baxter & Woodman, Inc. (B&W) perform an inventory of these problem locations and provide recommendations and construction cost estimate to provide point solutions to alleviate the ponding. In addition, B&W has identified a number of roadway pavement sections within the study area that are narrower than the recommended minimum 18-foot width. These identified roadways are recommended herein for widening.

## **SCOPE OF WORK**

Following a significant rain event, B&W performed a field inventory of the roadway and drainage inlets along the following roadways:

1. Polo Drive
2. Gulfstream Road
3. Old School Road
4. Banyan (Gulfstream Road to Polo Drive)
5. Lakeview (Gulfstream Road to Polo Drive)

The inventory results are included in *Appendix A*. The inventory has assigned an ID number to each location of ponding, tire ruts along the edge of pavement, or existing drainage inlet, along with a photograph and a brief description of what was observed. The map with the ID numbers is included in the *Appendix A*. The field inventory was completed between February 27, 2020 and March 3, 2020.

The field information was reviewed and a recommendation made for improvements to alleviate the ponding within the roadway; to assist the runoff to flow to available drainage inlets; and for the addition of an asphalt shoulder to address rutting adjacent to the edge of pavement. Refer to *Table 1* and *Exhibit 1*. The exhibit shows a summary of the recommended improvement locations and includes the drainage structure number from the Town's GIS drainage inventory map referenced in *Table 1*. Some recommendations to help direct the runoff to the inlets include

provision of an asphalt drainage inlet apron; and grading of approximately 3-foot wide sodded swales along the edge of pavement. **Appendix B** includes standard details for these improvements.

In conjunction with this field inventory, B&W also reviewed the existing pavement width for these roadways relative to a minimum recommended roadway width of similar type.

*The Broward Complete Streets Guidelines* recommend a width of 9'-10' for residential streets with a posted speed limit of 20-25 mph.

The Palm Beach County Transportation Planning Agency *Complete Streets Design Guidelines* references the following Federal and State agencies for minimum lane width:

- ❖ American Association of State Highway & Transportation Officials (AASHTO):
  - Minimum 9'-12' lane width for Rural / Urban Local Roads
- ❖ Florida Department of Transportation (FDOT) – Florida Greenbook:
  - Recommended Width 9'-12' for Rural Local Roads
  - Recommended Width 10' for Urban Local Roads
  - Preferred minimum 10' width (only where less than 10% truck traffic, < 40mph)
  - Minimum 11' width for new construction

In keeping with the character of the Town, we recommend a standard paved lane width for a two-way local, residential road of 9 feet. This allows cars passing in each direction to comfortably pass without needing to pull to one side. In addition, the extra width allows for a vehicle to temporarily park within the roadway, while still allowing a full lane width for another car to pass. Referring to **Table 2**, the recommendations for pavement widening under this project are highlighted in blue. These two-way roadways were found to be narrower than the minimum 18-foot (two 9-foot lanes). Polo Drive is also included in the recommendation to widen the road between Old School Road to south of Palm Way; from an average existing 18-foot to a 20-foot width. This will make Polo Drive a consistent 20-foot width the entire length and will match the current 20-foot width of Polo Drive continuing south to Golfview Drive.

Note that the typical recommendation is to widen the road on each side of the pavement. The exception is along Gulfstream Road which is recommended to be widened only along the east side due to the road not being centered within the right-of-way.

This widening work will require the contractor to sawcut the edge of pavement where the widening is to occur; grade down approximately 9-inches; remove the material and replace it with 8-inches of compacted baserock; and overlay the rock with 1-inch of asphalt pavement. The Typical Pavement Section for the road widening is included in **Appendix B**. The driveways in the location of the widening will be removed. Asphalt and concrete driveways will be sawcut back the width of the widening. For paver driveways, the pavers will be removed and provided to the homeowner. The soldier course or header curb for the driveway will be relocated if pavers, or replaced if concrete. The landscaping and other improvements in the way of the widening will be removed.

Irrigation systems will be capped off and mailboxes will be relocated adjacent to their current location. The widened roadway section will follow the longitudinal elevation of the existing roadway, and will be sloped away from the road to allow the runoff to go to the adjacent grassed area.

## **RELATED TOWN PROJECTS**

Note that this roadway widening work discussed herein is intended to address the roadway ponding, trapped water along the roadways and roadside rutting on a *short-term basis*. Full roadway reconstruction or milling and overlaying an entire length of roadway to improve the slope along the road will be coordinated with the proposed excavation work required for the water main replacement, possible sewerage, and roadway rehabilitation projects outlined in the 10-Year Capital Improvement Plan (CIP).

The CIP is a fluid planning document which outlines the recommended water main replacement and roadway rehabilitation work Town-wide. The schedule as of the March 2019 update, includes water main and roadway work in the North Core Area (Banyan Road and north) scheduled for 2021-2022. The South Core Area (south of Banyan to Golfview Drive) water main and roadway work is scheduled for the years 2025-2026.

## **COST ESTIMATE**

**Table 3** is the Preliminary Construction Cost Estimate for the recommended improvements. The estimate includes general contractor items such as Contractor mobilization/demobilization, bonds and insurance, Maintenance of Traffic during construction and the requirement to provide a pre-construction video of the project site. This allows the construction manager to determine whether restoration has been completed to what was existing prior to the start of work. Also included is the pavement widening, driveway apron adjustments, improvements at the drainage inlets, swale grading and sodding, demolition and restoration. Root pruning is also included in some areas where tree roots are damaging the existing asphalt pavement. The estimate includes a 20% contingency line item for Town budgetary purposes.

*Table 1*  
**Town of Gulf Stream**  
**Minor Drainage Problem Location w/Recommendation**

ID No.	Location	Description	Notes	Recommendation
801	Old School Rd & Wright Way	Ponding water on pavement.		Pavement repair
802	Old School Rd & Wright Way	S-42A. Ponding water along south side of road to the east.		Swale
803	Old School Rd & Wright Way	S-42. Water ponding along north side of roadway. lots of water draining from <b>property</b>		Add apron, add swale
804	Old School Rd	Standing water cannot get to the west to drain to S-41A		Swale
805	Old School Rd	S-39. Large ponding water in roadway which cannot drain off roadway		Pavement repair (included w-widening), Reset driveway pavers
806	Old School Rd	S-38 Edge of pavement is lower than roadway and structure.		Swale
807	Polo Dr & Old School Rd	S-31. Pavement has settled lower than structure		Mill & overlay intersection
808	Old School Rd east of Polo Dr	Long rut along south edge pavement		One foot wide asphalt, baserock and swale
809	Old School Rd	Ponding water along edge of pavement doesn't drain		Swale
810	Old School Rd	Ponding water can't drain to the west. S-106		Swale, Add apron
811	Polo Dr & Old School Rd	Ponding water on each side of roadway. pavement is high near lift station which restricts water getting to the north		Swale
1202	Polo Dr	Ponding water along edge of pavement.		Swale
1204	Polo Dr	S-26A Ponding and rut along pavement. structure is higher than the pavement.		Add apron, add swale
1205	Polo Dr & Banyan Rd	Ponding water around southeast corner. parkway to high restricting water getting to S-23		Add apron, add swale
1602	Banyan Rd	Ponding water along edge of pavement		Swale
1603	Banyan Rd	Ponding water along edge of pavement		Remove rock, widen (included w-widening)
1604	Banyan Rd	s-20. Rutting along south edge of pavement. structure is about 2" lower than pavement. Add 1' (included in widening) and raise structure.		Raise structure
1605	Gulfstream Rd & Banyan Rd	S-19A. Concrete collar is broken	No ponding	Repair patch concrete collar, add apron
1606	Gulfstream Rd	S-6. Frame lower than pavement. Repair/patch asphalt	No ponding	Add apron, Repair/patch asphalt, grade back of inlet
1607	Gulfstream Rd (north of Lakeview)	S-7. Some pavement erosion along edge of pavement.	No ponding	Pavement repair (included w-widening)
1608	Gulfstream Rd & Lakeview Dr	Pavement breaking away along edge of roadway	No ponding	Pavement repair (included w-widening)
1609	Polo Dr & Golfview Dr	Rutting along edge of pavement on the radius	No ponding	One foot wide asphalt, baserock
1610	Polo Dr & Middle Rd	During heavy rain this area gets washed away along the edge of pavement	No ponding	One foot wide asphalt, baserock
1611	Polo Dr	Wet area along edge of pavement. probably from rut	No ponding	None
2001	Oleander Way & Banyan Rd	Erosion around corner at S-4 inlet.	No ponding	One foot wide asphalt, baserock and apron
2002	Oleander Way & Banyan Rd	Erosion/rutting around corner at S-3 inlet	No ponding	One foot wide asphalt, baserock and apron
2401	Gulfstream Rd	S-65. No apron from pavement	No ponding	None
2402	Gulfstream Rd	S-66. Structure could be cleaned	No ponding	None
2403	Gulfstream Rd	S-64. Pipe half full of water	No ponding	Add apron
2404	Gulfstream Rd	S-63. Asphalt eroding along pavement. could use <b>new</b> apron.	No ponding	Add apron
2405	Gulfstream Rd	S-61. Apron could be added on back side. structure should be cleaned	No ponding	Add apron
2801		GPS check point	No ponding	None
2802	Gulfstream Rd	S-60. Apron could be expanded	No ponding	None
2803	Polo Dr & Old School Rd	S-32. Something could be added on exposed ground on back side. structure also full of water.	No ponding	None
2804	Polo Dr & Old School Rd	Stormwater pump station manholes	No ponding	None

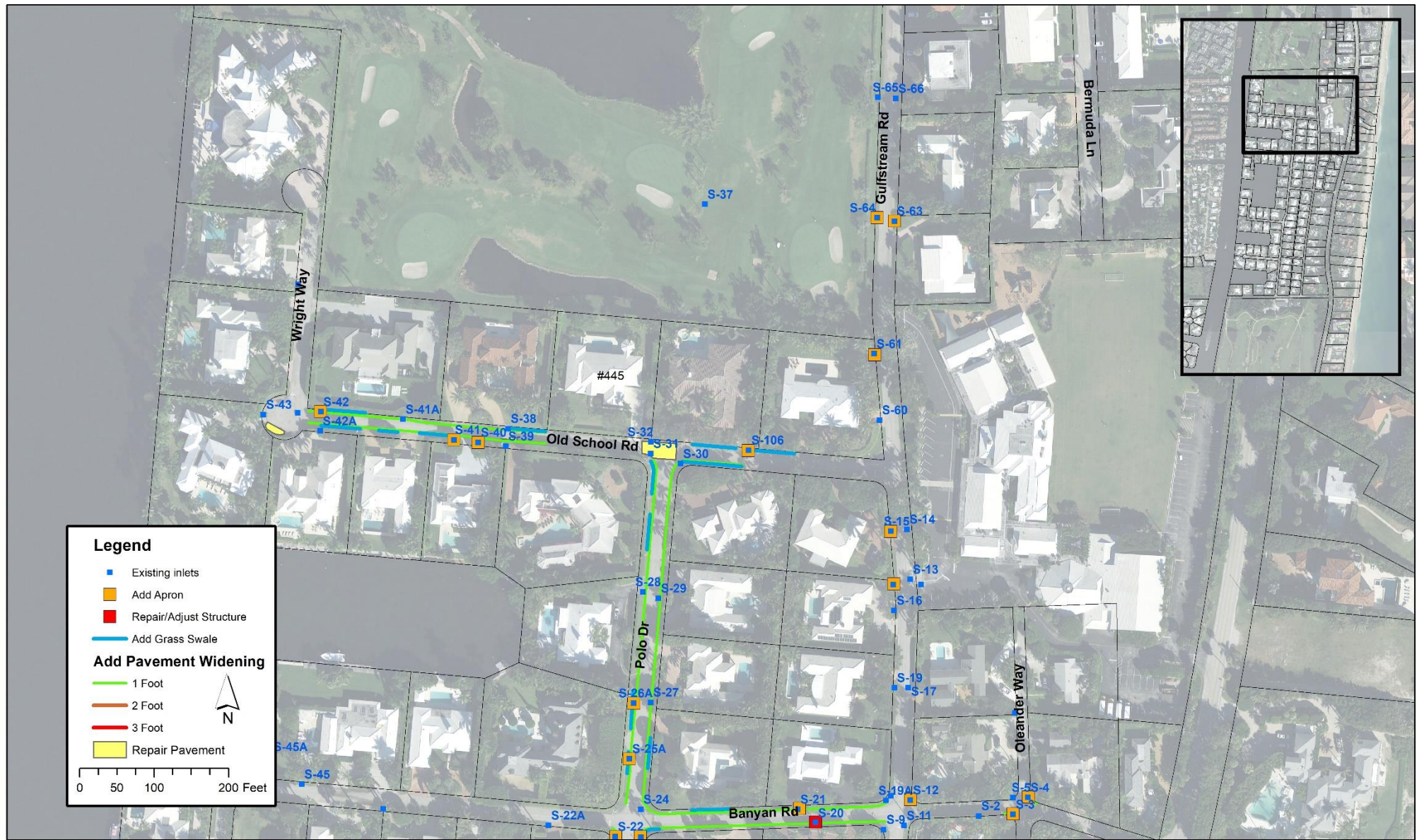


*Table 1*  
**Town of Gulf Stream**  
**Minor Drainage Problem Location w/Recommendation**

ID No.	Location	Description	Notes	Recommendation
2805	Polo Dr & Old School Rd	Swale could be added to help water trapped due to area being higher at lift station		Addressed by #811
2806	Polo Dr & Old School Rd	mill & overlay intersection		Addressed by #811
2807	Polo Dr & Old School Rd	Add an additional inlet on mainline storm sewer to pick up trapped water	No ponding	None
2808	Polo Dr & Old School Rd	S-30. Structure full of water	Low elevation	None
2809	Old School Rd	S-40. Inlet half full of water	No ponding	Add apron
2810	Old School Rd	S-41. Structure should be cleaned out	No ponding	Add apron
2811	Old School Rd	S-41A. Clean structure. apron in fair condition	No ponding	Clean Structure
2812	Old School Rd & Wright Way	S-43A	No ponding	None
2813	Old School Rd & Wright Way	S-43. Apron on back side is poor. structure should be cleaned	No ponding	Clean Structure
2814	Old School Rd & Wright Way	Small inlet added by homeowner in driveway. drains to S-42A	No ponding	None
2815	Polo Dr	Rutting along edge of pavement		Addressed by #811
2816	Polo Dr	A-28. In driveway. could use repair around inlet	No ponding	None
2817	Polo Dr	S-29. Structure half full of water	No ponding	None
2818	Polo Dr	S-27. Existing concrete apron has multiple cracks.	No ponding	Replace existing apron w-asphalt apron
2819	Polo Dr	S-26 Manhole	No ponding	None
2820	Polo Dr	S-25A. Needs apron around structure		Add swale, add apron
2821	Polo Dr	Could possibly add an inlet to help drain ponding water on east side		Addressed by #1202
2822	Polo Dr & Banyan Rd	S-24	No ponding	None
2823	Polo Dr & Banyan Rd	S-23. Parkway is high which hinders water getting to structure	No ponding	None
2824	Polo Dr & Banyan Rd	S-22. More apron could be added	No ponding	Add apron
3201	Banyan Rd	S-21. Needs apron around structure	No ponding	Add apron
3202	Gulfstream Rd & Banyan Rd	S-9.	No ponding	None
3203	Gulfstream Rd & Banyan Rd	S-11	No ponding	None
3204	Gulfstream Rd & Banyan Rd	S-11. Some touch up around pipe inside structure could be done.	No ponding	None
3205	Gulfstream Rd & Banyan Rd	S-13.	No ponding	None
3206	Gulfstream Rd	S-19. Structure is about 2" lower than asphalt. could use apron	No ponding	Add apron, pavement repair/patch
3207	Gulfstream Rd	S-17. No apron	No ponding	None
3208	Gulfstream Rd	S-16	No ponding	None
3209	Gulfstream Rd	S-15A. Frame sits about 1" lower than pavement. asphalt apron could be added	No ponding	Add apron
3210	Gulfstream Rd	S-16A. In brick driveway	No ponding	None
3211	Gulfstream Rd	S-13. Existing concrete apron in fair condition	No ponding	None
3212	Gulfstream Rd	S-15. Vegetation growing inside structure. strip along edge of pavement to the north would help with rutting and help drainage to structure	No ponding	One foot wide asphalt, baserock, add apron
3213	Gulfstream Rd	S-8. Structure in brick driveway	No ponding	None
3214	Gulfstream Rd	S-91. Existing apron in fair condition	No ponding	None
3215	Gulfstream Rd	S-92. No issues	No ponding	None
3216	Gulfstream Rd	S-125 Concrete apron in good condition	No ponding	None
3217	Polo Dr	S-130. Structure in pavement. no issues	No ponding	None

*Table 1*  
**Town of Gulf Stream**  
**Minor Drainage Problem Location w/Recommendation**

ID No.	Location	Description	Notes	Recommendation
3218	Polo Dr	S-129. No apron and ground cover plants growing along pavement	No ponding	None
3219	Polo Dr	New structure added October 2018. no issues	No ponding	None
3220	Polo Dr	New structure added October 2018. no issues	No ponding	None
3221	Polo Dr	Structure not on map. in pavement. no issues	No ponding	None
3222	Polo Dr	S-88. In pavement no issues	No ponding	None
3223	Polo Dr	S-87. Structure in pavement, no issues	No ponding	None
	Polo Dr - south line 3140 Polo to Old School	Widen by adding 1-ft wide asphalt at both sides EOP	Match rest of Polo Dr width	Widen to minimum 20' pavement section
	Gulfstream Rd - Lakeview Dr to Golfview Dr	Widen by adding 3-ft wide asphalt to east side EOP	Narrow pavement section	Widen to minimum 18' pavement section
	Old School Rd - 445 Old School to Wright Way	Widen by adding 1-ft wide asphalt at both sides EOP	Narrow pavement section	Widen to minimum 18' pavement section
	Banyan Rd - Polo Dr to Gulfstream	Widen by adding 1-ft wide asphalt at both sides EOP	Narrow pavement section	Widen to minimum 18' pavement section
	Lakeview Dr - west of Gulfstream Rd	Widen by adding 2-ft wide asphalt at both sides EOP	Narrow pavement section	Widen to minimum 18' pavement section
	Lakeview Dr - east of Gulfstream Rd	Widen by adding 1-ft wide asphalt at both sides EOP	Narrow pavement section	Widen to minimum 18' pavement section

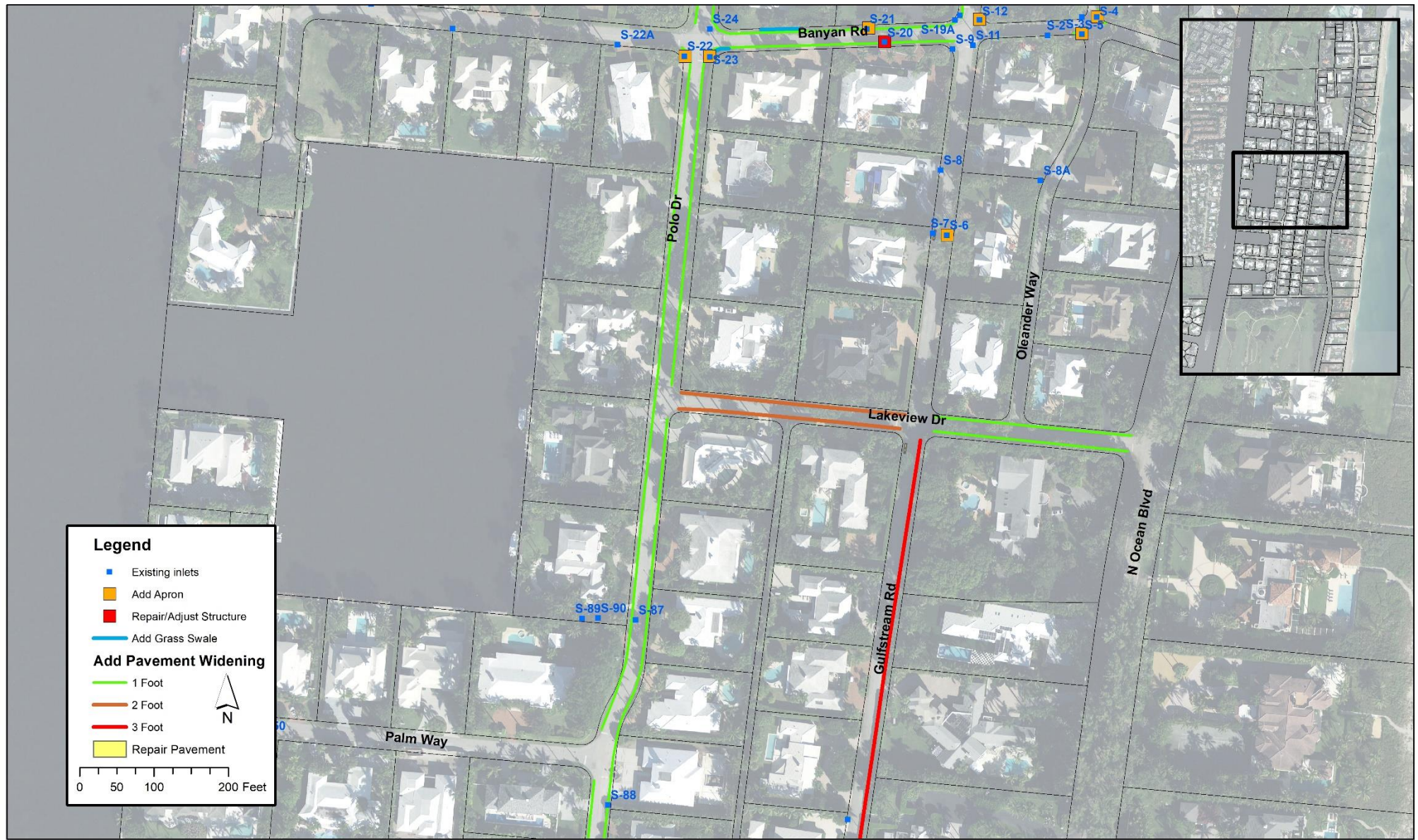


## Town of Gulf Stream Recommended Minor Drainage Repair Locations

DRAFT

**BAXTER & WOODMAN**  
Consulting Engineers





# **Town of Gulf Stream** **Recommended Minor Drainage Repair Locations**

**DRAFT**







## Town of Gulf Stream Recommended Minor Drainage Repair Locations

DRAFT

**BAXTER & WOODMAN**  
Consulting Engineers



**Table 2**  
**Town of Gulf Stream**  
**Preliminary Pavement & Right-of-Way Width Determination**

Street Name	Exist. Pavement Width (FT)	Right-Of-Way Width (FT)	Recommended Pavement Widening (this project - Yr 2020)
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***Two-Way, No Pavement Widening, Possible Swales***

Sea Road (Bermuda Ln to Gulfstream Road)	20	25	
Gulfstream Road (north of Lakeview Drive)	18	30	
Old School Road (east of 455 Old School Road)	18	30	
Wright Way	18	30	
Polo Drive (Golfview to south of 3140 Polo Dr)	20	30	
Polo Drive (So. side 3140 Polo Dr to Lakeview)	18 to 19	30	1-ft widen each side
Polo Drive (Lakeview to Old School Rd)	17 to 18	40	1-ft widen each side
Banyan Road (Ocean Blvd to Gulfstream Road)	18	20	
Banyan Road (west of Polo Dr)	18	30	
Palm Way	18	30	
Middle Road (west of Polo Dr)	18	40	
Golfview Drive	18	40	

***Two-Way, Widen Pavement, Possible Swales***

Sea Road (Bermuda Ln to Ocean Blvd)	16	25	
Gulfstream Road (Lakeview Drive to Golfview)	15	30	3-ft widen east side
Bermuda Lane	16	30	
Old School Road (W. side 445 Old School Road to Wright)	16	30	1-ft widen each side
Banyan Road (Polo Dr to Gulfstream Road)	16	30	1-ft widen each side
Lakeview Drive (west of Gulfstream Road)	14	30	2-ft widen each side
Lakeview Drive (east of Gulfstream Road)	16	30	1-ft widen each side
Hidden Harbor Drive	17	30	

***Two-Way, Widen Pavement, No Swales***

Oleander Way (Lakeview Dr to Banyan Road)	10	20	
Middle Road (between Polo Dr & Gulfstream Road)	12	20	
Pelican Lane (west of Andrews Avenue)	17	20	

***One-Way, No Widening, No Swales***

North County Road (N-S)	10 to 14	10	
North County Road (E-W)	18	47	

Original analysis completed 12-11-18

**Table 3**  
**Town of Gulf Stream**  
**Minor Drainage Roadway Widening Improvements Project**  
**PRELIMINARY CONTRUCTION COST ESTIMATE (5/4/2020)**

No.	ITEM DESCRIPTION	EST QTY	UNIT	UNIT PRICE	EXTENDED COST
<b>GENERAL ITEMS</b>					
1	MOBILIZATION / DEMOBILIZATION / BONDS / INSURANCE	1	LS	\$ 11,000.00	\$ 11,000.00
2	MAINTENANCE OF TRAFFIC	1	LS	\$ 10,000.00	\$ 10,000.00
3	NPDES / EROSION CONTROL	1	LS	\$ 3,000.00	\$ 3,000.00
4	PROFESSIONAL PRECONSTRUCTION VIDEO	1	LS	\$ 8,000.00	\$ 8,000.00
<b>SUB-TOTAL GENERAL ITEMS</b>					<b>\$ 32,000.00</b>
<b>ROADWAY &amp; DRAINAGE</b>					
5	MILLING EXISTING ASPHALT PAVEMENT (1" AVG DEPTH) PORTABLE MILLING MACHINE, HAUL OFF	120	SY	\$ 38.00	\$ 4,560.00
6	SAWCUT PAVEMENT EDGE, GRADE & PREPARE SUBGRADE FOR ASPHALT WIDENING	1340	SY	\$ 8.00	\$ 10,720.00
7	SAWCUT DRIVEWAY APRON / REMOVE PAVER APRON FOR WIDENING	72	EA	\$ 500.00	\$ 36,000.00
8	8" COMPACTED BASEROCK (LIMEROCK OR CRUSHED CONC.)(LBR100) (PRIMED)	1340	SY	\$ 17.00	\$ 22,780.00
9	1" SUPERPAVE ASPHALT CONCRETE SP 9.5 (SURFACE COURSE)	75	TN	\$ 200.00	\$ 15,000.00
10	ASPHALT APRON AT DRAINAGE INLET / PAVEMENT REPAIR LOCATIONS (2)	19	EA	\$ 500.00	\$ 9,500.00
11	REMOVE, REPLACE APRON WITH NEW ASPHALT APRON AT DRAINAGE INLET	3	EA	\$ 750.00	\$ 2,250.00
12	GRADE & SOD SWALE	240	SY	\$ 11.00	\$ 2,640.00
13	ST. AUGUSTINE SOD (OTHER THAN SWALE)	2300	SF	\$ 0.35	\$ 805.00
14	BERMUDA SOD (OTHER THAN SWALE)	600	SF	\$ 1.00	\$ 600.00
15	ADJUST DRAINAGE STRUCTURE RIM/GRATE, REPAIR	2	EA	\$ 500.00	\$ 1,000.00
16	REMOVE LANDSCAPE AREA, REMOVE & REINSTALL MAILBOXES, MISC DEMO	1	LS	\$ 10,000.00	\$ 10,000.00
17	MISCELLANEOUS RESTORATION (NO LANDSCAPE REPLACEMENT)	1	LS	\$ 50,000.00	\$ 50,000.00
18	ROOT PRUNE TREE	1	LS	\$ 800.00	\$ 800.00
<b>SUB-TOTAL ROADWAY &amp; DRAINAGE</b>					<b>\$ 166,655.00</b>
Sub-Total					\$ 198,655.00
Contingency (20%)					\$ 39,731.00
<b>TOTAL</b>					<b>\$ 238,386.00</b>





# ***Town of Gulf Stream***

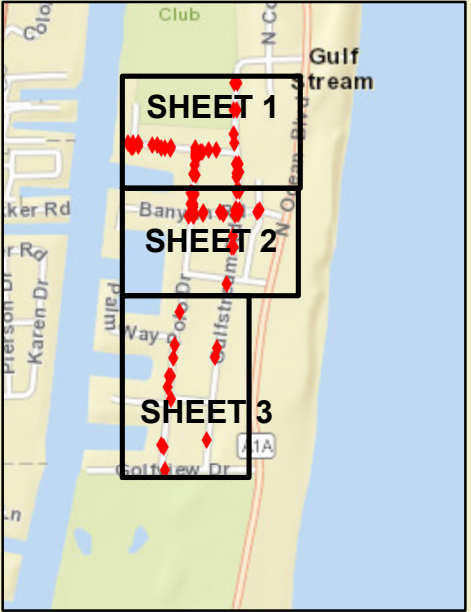
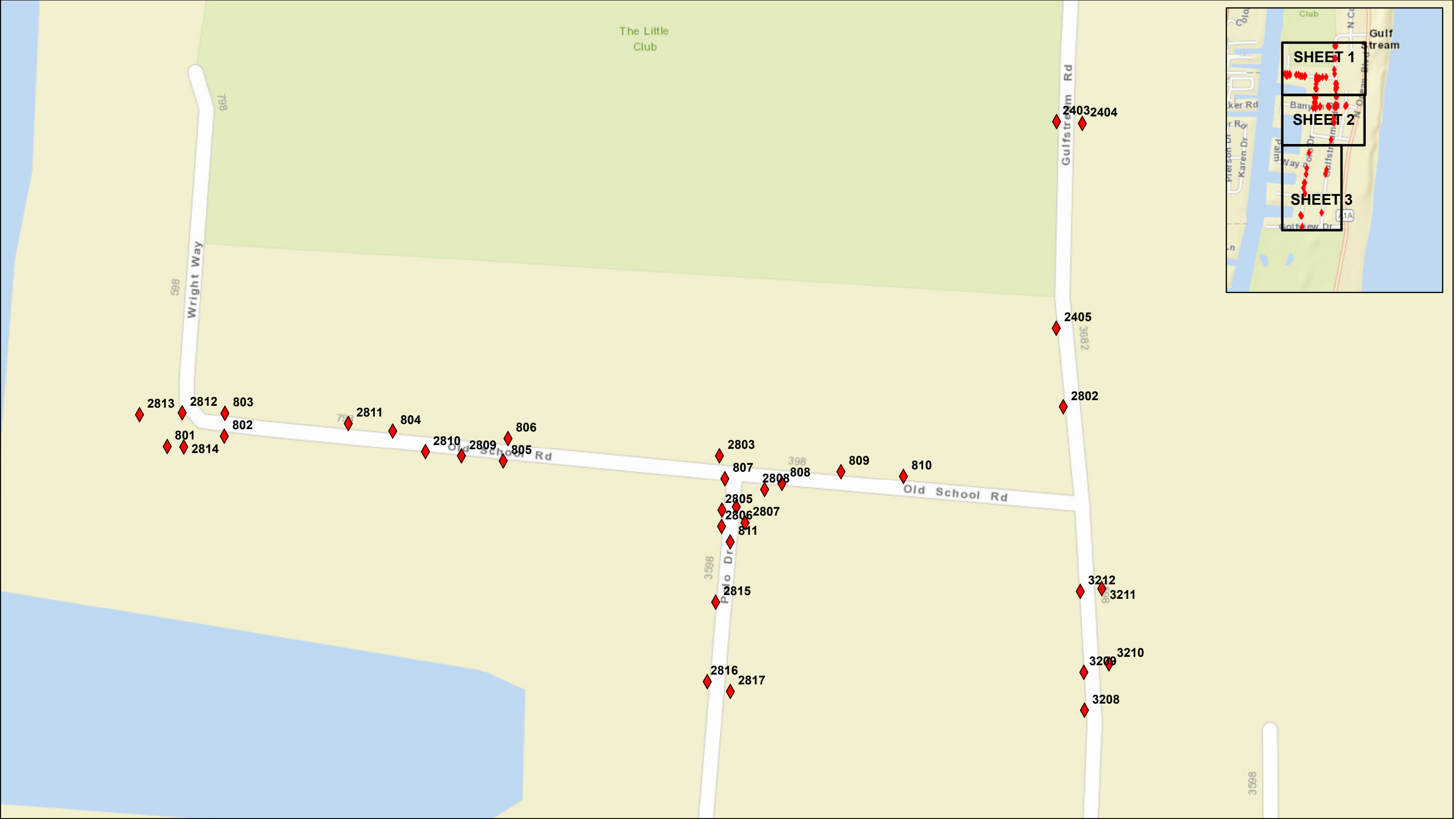
## ***Minor Drainage & Roadway Improvements***

# **APPENDIX A**

## **FIELD INVENTORY**

# TOWN OF GULFSTREAM - MINOR DRAINAGE IMPROVEMENTS

## LOCATION MAP - SHEET 1

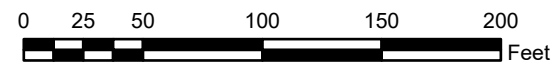


# TOWN OF GULFSTREAM - MINOR DRAINAGE IMPROVEMENTS

## LOCATION MAP - SHEET 2



# LOCATION MAP - SHEET 3



**BAXTER & WOODMAN**  
Consulting Engineers

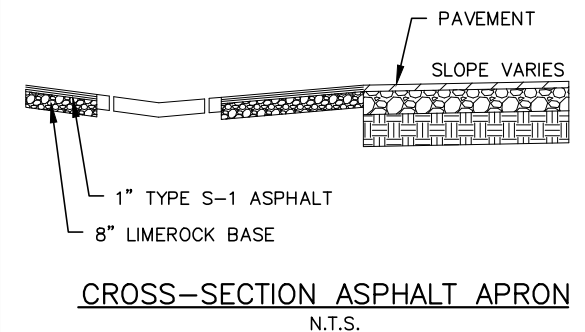
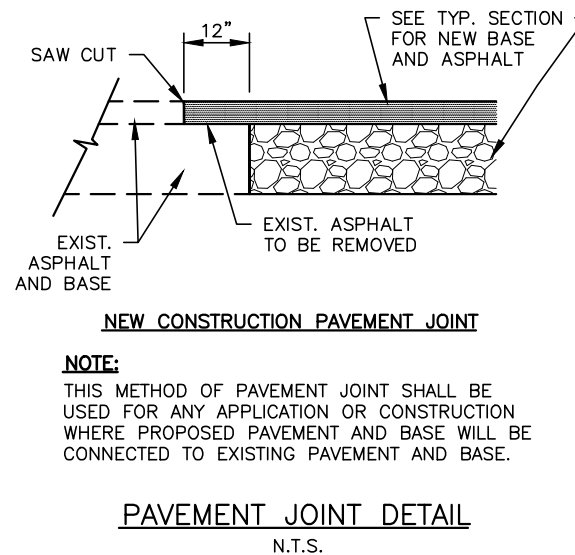
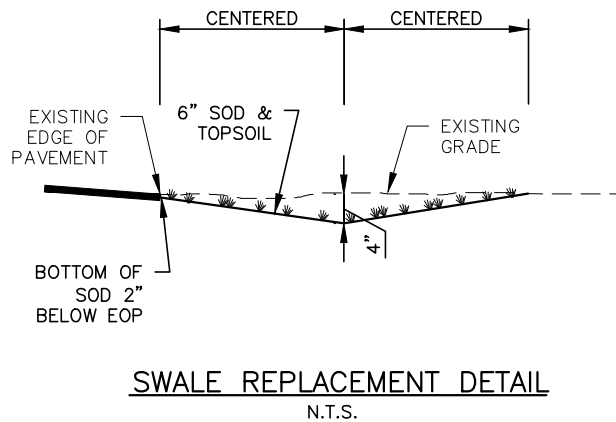
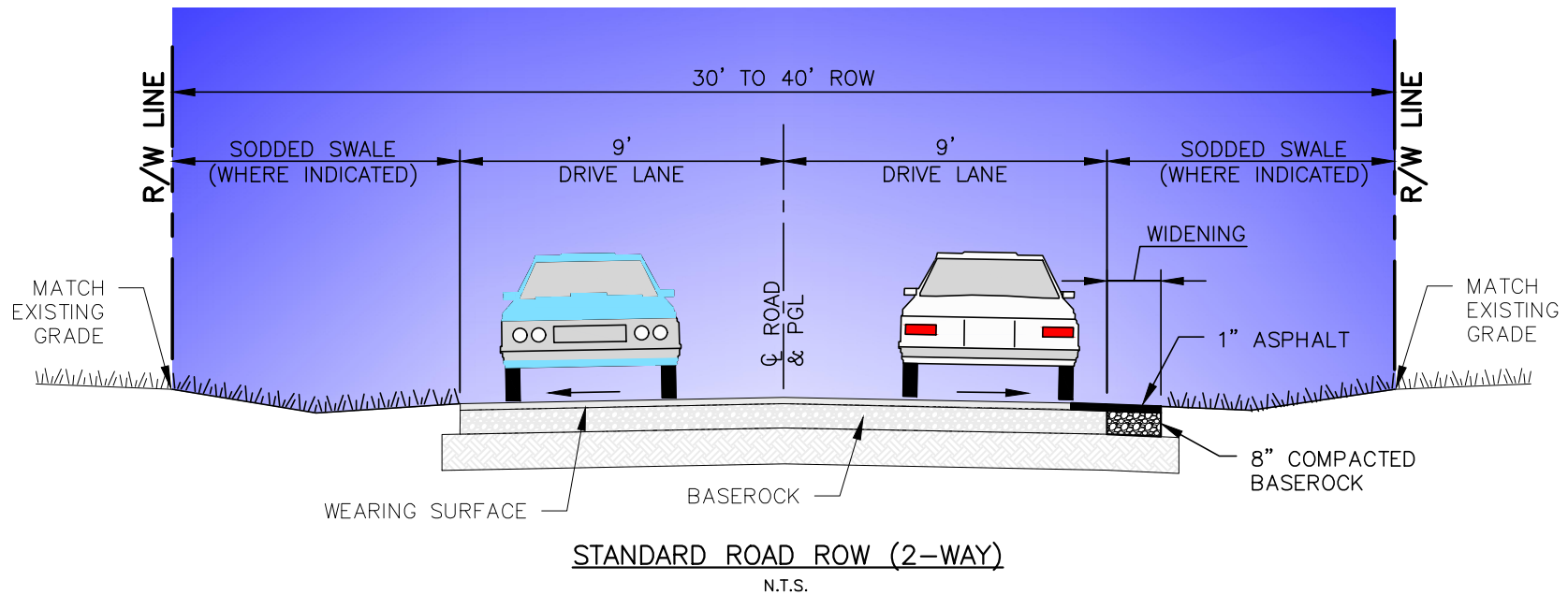


# ***Town of Gulf Stream***

## ***Minor Drainage & Roadway Improvements***

# **APPENDIX B**

## **STANDARD DETAILS**



THE TOWN OF GULF STREAM  
100 SEA ROAD  
GULF STREAM, FL 33483  
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## TOWN OF GULF STREAM

### MINOR DRAINAGE & ROADWAY IMPROVEMENTS - DETAILS

FIGURE:  
**1**