Section 5
Mud Swamp Creek Basin

Mud Swamp Creek is located on the southern side of the City of Valdosta, flowing from west to east. The Mud Swamp Creek basin is about 43 square miles in total area and is tributary to the Alapahoochee River. Within the City, significant drainage features tributary to Mud Swamp Creek include the Dukes Bay Canal and Knights Creek. The Dukes Bay Canal represents approximately 10 percent of the total tributary area of Mud Swamp Creek, while Knights Creek accounts for nearly 40 percent. During the April 2009 storm, some flooding was experienced along Mud Swamp Creek; however, the severity of the flooding was minimal when compared to flooding associated with the Withlacoochee River. Severe flooding, however, was noted downstream of Mud Swamp Creek along the Alapahoochee and Alapaha Rivers.

This evaluation currently focuses only on the Dukes Bay Canal. Evaluation of the primary stormwater management system in the Knight's Creek basin will be performed at a later stage.

5.1 Dukes Bay Canal

5.1.1 Introduction

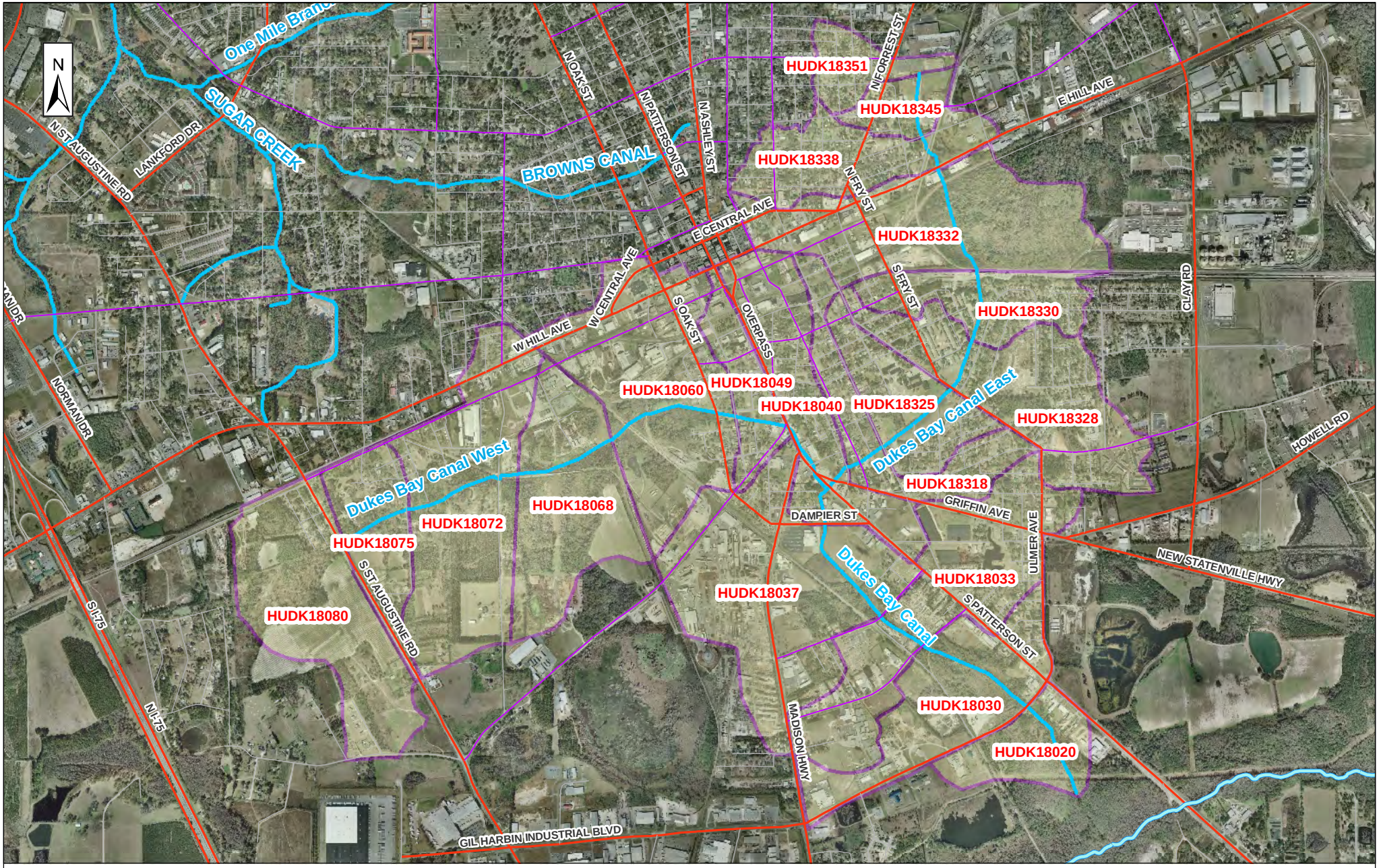
The information presented in this sub-basin plan for Dukes Bay Canal is intended to provide the reader with information necessary to understand the physical setting, methodology used, water quantity problems, results, alternatives evaluation, and recommendations. Section 2 of this study describes in greater details the general methodology, including data collection, engineering methods, and regional analysis.

5.1.2 Sub-basin Information

This section outlines information on the Dukes Bay Canal Sub-basin infrastructure, and its ability to meet level of service requirements.

5.1.2.1 Physical Description

The Dukes Bay Canal sub-basin extends from the intersection of E. Force and Mystic Streets in the north, the intersection of Jones Road and S. St. Augustine Road in the west, to its confluence with Mud Creek in the south. The area of the sub-basin is approximately 4.2 sq mi (2,700 acres), which was divided into 19 hydrologic units ranging from 38 to 280 acres in size. The hydrologic unit boundaries and the In-stream PSWMS are shown on **Figure 5.1.1**. The HU delineation, along with the areas and the loading node for each HU, is shown in **Table 5.1.1**.



Legend

Hydrologic Units
HUDK18020
Streams
Arterial Roads
Collector Roads
Local Roads

0 0.5 1 2 Miles

Figure 5.1.1
City of Valdosta, GA
Dukes Bay Canal Sub-Basin
Hydrologic Unit Boundaries

CDM

Table 5.1.1. Hydrologic Unit Areas

Hydrologic Unit ID	Area (Acres)	Loading Node
HUDK18020	71.1	DK80280
HUDK18030	155.2	DK80300S
HUDK18033	220.7	DK80330APS
HUDK18037	279.7	DK80370S
HUDK18040	142	DK80420AP
HUDK18049	56	DK80500S
HUDK18060	235.5	DK80600S
HUDK18068	167.6	DK80680S
HUDK18072	233.7	DK80720S
HUDK18075	83.6	DK80750S
HUDK18080	197	DK80800S
HUDK18318	92.3	DK83180S
HUDK18325	91.9	DK83260
HUDK18328	178.8	DK83280S
HUDK18330	87.1	DK83300
HUDK18332	219	DK83320S
HUDK18338	107.3	DK83380S
HUDK18345	37.8	DK83470AP
HUDK18351	44.2	DK83510AP
Total	**2,700.5**	

The predominant land uses in the sub-basin are quartered into Forest, Open, & Park; Medium Density Residential; Light Industrial, Commercial, & Industrial; and Heavy Industrial & Roadways, which account for 24 percent, 23 percent, 22 percent, and 27 percent of the total land use, respectively. The land use categories along with their respective associated area and percentage for all of Dukes Bay Canal sub-basin are shown in **Table 5.1.2**. The predominant soils within the sub-basin are HSG B, C, and D, which account for 39 percent, 36 percent, and 20 percent of the total soils, respectively. **Table 5.1.3** shows the soils breakdown based on Hydrologic Soil Group. The soil coverage, infiltration and storage capacity were based on the available data from the NRCS Lowndes County soil survey. Detailed discussion on the Soils and Land Use is available in the Methodology Section of the report.

The In-stream PSWMS consists of a main stem channel, which at its most downstream section confluences with the Mud Creek, and two east and west tributary channels that meet near the intersection of S. Patterson Street and Griffin Avenue to form the main stem of the canal. A schematic showing the model representation (hydraulic network along with nodes) of the sub-basin is presented on **Figure 5.1.2.1**.

Table 5.1.2. Land Use

Land Use Category	Area (Acres)	Area (Percent)
Forest, Open & Park	652.7	24.2
Pasture	0.0	0.0
Agricultural	67.2	2.5
Low Density Residential	0.0	0.0
Medium Density Residential	625.7	23.2
High Density Residential	19.3	0.7
Light Industrial, Commercial & Institutional	589.5	21.8
Heavy Industrial & Roadways	728.1	27.0
Wetlands	0.0	0.0
Watercourses & Water bodies	17.9	0.7
Total	**2700.5**	**100.0**

Table 5.1.3. Soils

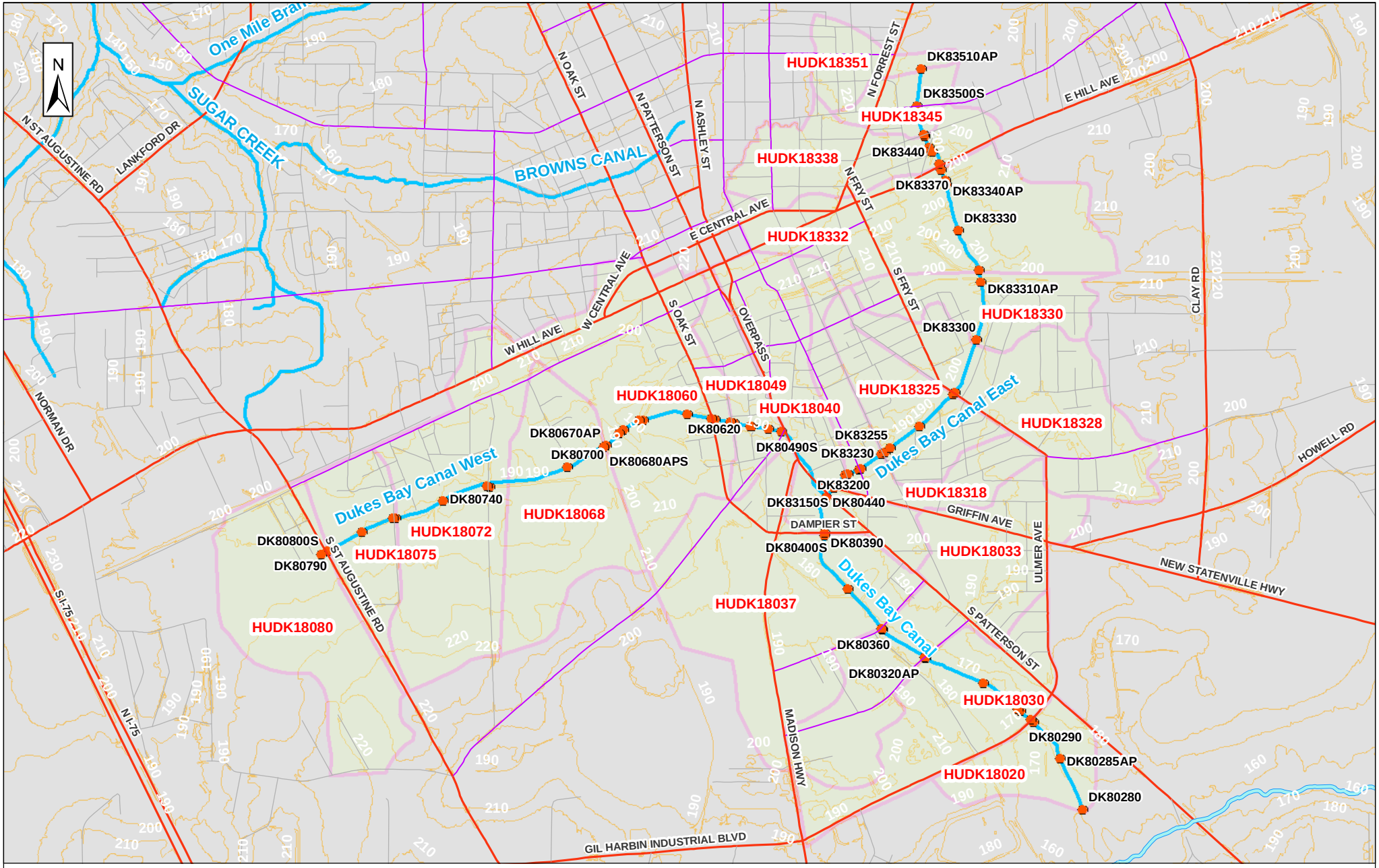
Hydrologic Soil Group	Area (Acres)	Area (Percent)
A	130.7	4.8
B	1040.2	38.5
C	983.7	36.4
D	545.9	20.2
Total	**2700.5**	**100.0**

5.1.3 Existing Conditions

Dukes Bay Canal has experienced some developments and improvements since the 1996 MSMP. The following projects in the Dukes Bay Canal sub-basin have been implemented as per the recommendations of the previous master plan:

- Railroad Improvements on Dukes Bay South: In January 1998, the City completed the railroad improvements on the main stem of Dukes Bay Canal in the vicinity of Gil Harbin Industrial Boulevard. The improvements included removal of abandoned railroad tracks downstream of Tucker Road and maintenance of several channel sections. Replacement of the culvert under the now abandoned railroad tracks upstream of Gil Harbin Industrial Boulevard was not completed.

- Detention Pond at Holliday and Samuel Streets: The 1996 SWMP proposed to construct an 18-acre detention facility near Samuel and Holliday Streets on both the north side and south side of Dukes Bay Canal East. The City purchased several parcels of land and has constructed a 5-acre in-line dry detention facility between Dukes Bay Canal East and Samuel Street. This pond is referred to by City staff as the Samuel Street pond.



Legend

Hydrologic Units
HUDK18020

Streams

Model Nodes
DK80280

Arterial Roads
Collector Roads
Local Roads
Topographic Contours (ft)*

** Elevations shown are based on NGVD datum. Refer to Section 2.2.1 for conversion to NAVD datum.*

0 0.5 1 2 Miles

Figure 5.1.2.1
City of Valdosta, GA
Dukes Bay Canal Sub-Basin
Hydraulic Network

CDM

- Cypress Street Improvements: The 1996 SWMP recommended upsizing the culvert under Cypress Street to a 3 ft H x 5 ft W box culvert. The City has designed this upgrade; however, the new culvert was never constructed. Currently, there is a double 30-inch circular culvert crossing under Cypress Street.

An important feature of the Dukes Bay Canal is the large number of railroad crossings. Culvert sizes under these crossings are often observed to be undersized. These undersized culverts act as tailwater controls for upstream roadway crossings and result in slow drawdown times in the Canal after a storm event. Unfortunately, the City has no right-of-way at the railroad crossings and is limited in its ability to implement upgrades at these locations.

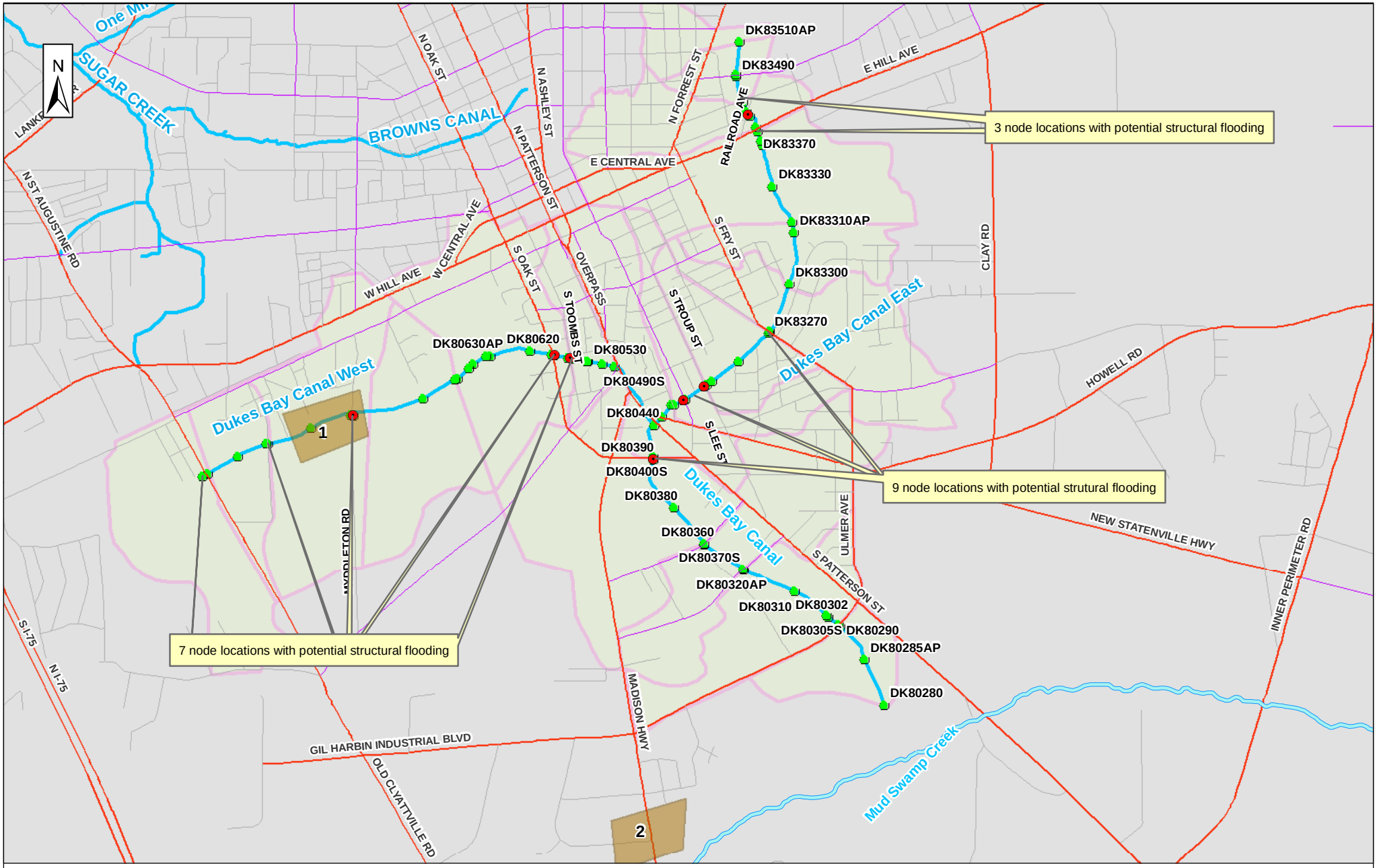
No locations of significant in-channel erosion were observed during field visits to the Dukes Bay Canal, nor did City staff identify known locations suffering from erosion. This may likely be due to the generally low bed slope of the Dukes Bay Canal. Several segments of Dukes Bay Canal pass through wetlands or were observed to be holding stagnant water.

5.1.4 Water Quantity Problem Areas

1. Myddleton Road – The Dukes Bay Canal crossing at Myddleton Road experiences repeated flooding, even during small storm events. The water level at this location is very high, completely submerging the culverts. The culverts could not be located during field visits to this site. **Figure 5.1.2.2** shows the water quantity problem areas along with Level of Service violation locations for Dukes Bay Canal.

2. **Secondary System (Stormwater Infrastructure) Problem Areas:** City staff identified an existing culvert along Madison Highway, located just north of the Mud Creek crossing, to be in need of emergency replacement. The culvert consists of two 48-inch circular corrugated metal pipes and one 48" x 67" elliptical corrugated metal pipe and is approximately 260 feet in length. The pipes are corroded and failing, resulting in the soil above the pipes being washed away and the pipes becoming separated from the headwall. The location of this culvert is shown on **Figure 5.1.3**.

   CDM proposes to replace the existing culvert in-kind. The City has performed survey on the existing culvert. No permitting, engineering, or additional surveying will be required. It is recommended that the City publish a Request for Proposals requesting a contractor to simply replace the existing culverts with reinforced concrete piping of the same size. The survey of the existing structure should be provided to the contractor to serve as construction plans. This project is "shovel-ready" and can be implemented immediately.



Legend

Hydrologic Units
- HUDK18020
- Streams

Model Nodes
- DK80280

- Arterial Roads
- Collector Roads
- Local Roads
- Roads - Level of Service Violations
- Water Quantity Problem Areas discussed in Section 5.1.4

Figure 5.1.2.1
City of Valdosta, GA
Dukes Bay Canal Sub-Basin
Level of Service Violations and Water Quantity Problem Areas

CDM

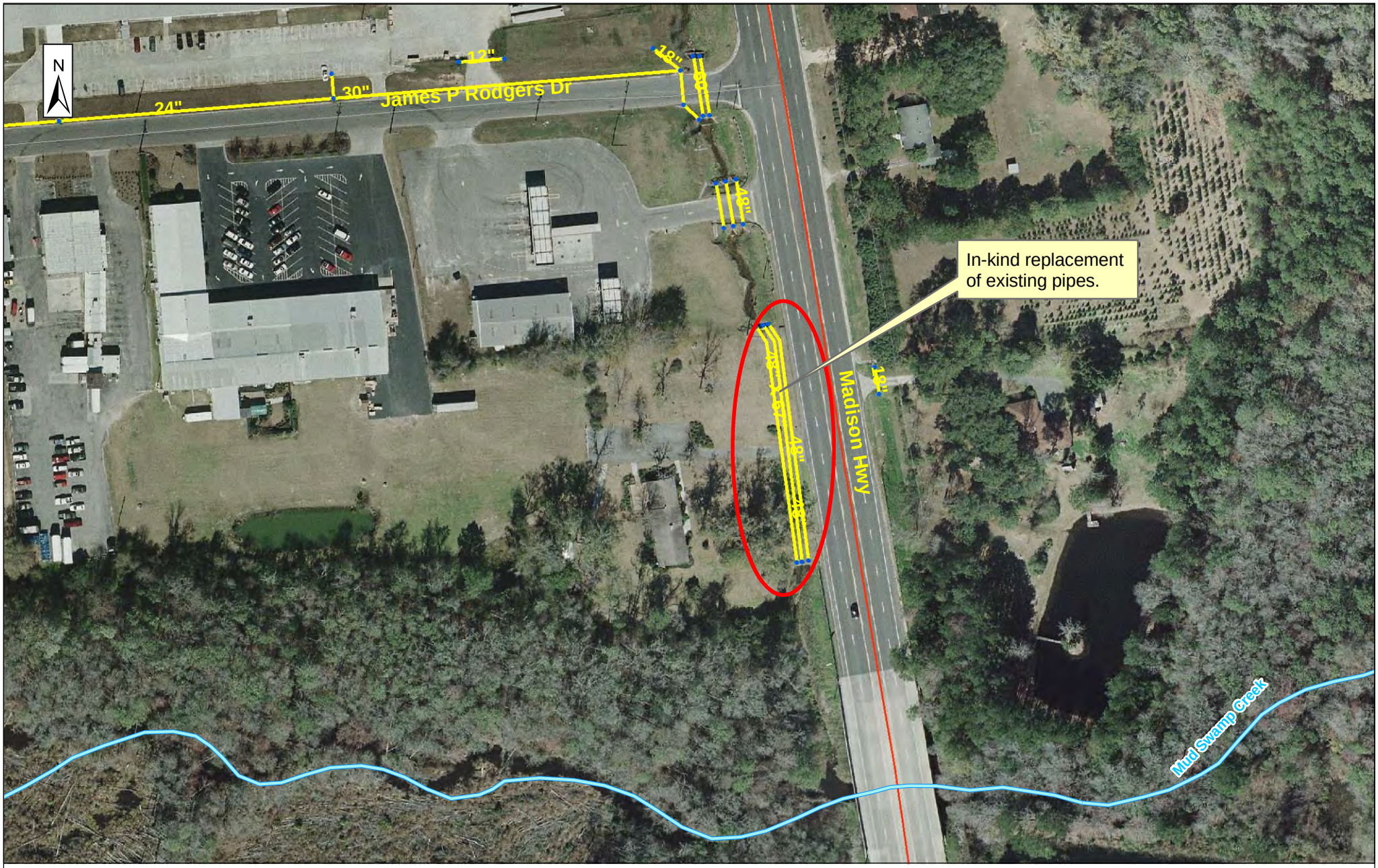


Figure 5.1.3
City of Valdosta, GA
Mud Swamp Creek Basin
Madison Highway Culvert Replacement

CDM

The City also identified this culvert replacement to be eligible for shared funding from GDOT. It is recommended that the City investigate the source and possibility of funding as soon as possible, to ensure that the shared funding is not lost. **Table 5.1.4** shows the conceptual cost estimates for this improvement.

5.1.5 Results

The following paragraphs discuss the water quantity model results, the existing level of service in terms of roads flooding, and sediment loads due to erosion.

5.1.5.1 Water Quantity Results

The stages for the 1.2-in, 5-, 25-, 50-, and 100–year, 24-hour design storms model runs are presented in **Table 5.1.5**. Road crown elevation, road names, and road classification (local, collector, arterial) are also shown in the table.

5.1.5.2 Total Suspended Solids Evaluation

While highly eroded stream banks have not been observed in Dukes Bay Canal, significant sediment loads are still generated in the Dukes Bay sub-basin. Yearly TSS loads were calculated based on standard EMC of TSS; yearly rainfall; tributary area; and land use characteristics, like percent imperviousness, for Valdosta. Yearly TSS loads from various hydrologic units for each sub-basin were computed in lbs/ year. The total TSS loading for Dukes Bay Canal was estimated to be approximately 685,000 lbs/year.

The Georgia Stormwater Manual states the sizing criteria for any stormwater control/mitigation system to treat the runoff from 85 percent of the storms that occur in an average year. For Georgia, this equates to providing water quality treatment for the runoff resulting from a rainfall depth of 1.2 inches. This runoff is also termed as the Water Quality treatment volume (WQ_V). Please refer to Georgia Stormwater Manual Volume 2 (technical handbook) Section 1.3 for a detailed discussion on WQ_V and the unified stormwater sizing criteria. The 1.2-inch storm event was simulated alternative projects evaluation.

Channel Bank Erosion: About 1,200 linear feet of Dukes Bay Canal show velocities greater than 5 ft/sec. The threshold velocity for erosive velocity in Dukes Bay Canal sub-basin is 5 ft/sec. Several locations were verified in the field and showed signs of channel bank erosion.

5.1.5.3 Level of Service Summary

Under the present land use conditions, the 1.2-in, 5-, 25-, 50-, and 100–year design storms were simulated to determine the problem areas as defined below:

Dukes Bay Canal Sub-basin

Table 5.1.4 - Madison Highway In-Kind Culvert Replacement

Conceptual Cost Estimate

Item	Units	Unit Cost	Quantity	Total Cost
1. Weirs/Inlet/Outlet Structures	Lump Sum	$65,000	-	$0
2. Erosion Control	LF	$4.0	1,750	$7,000
3. Excavation/Earth Work	Cu. Yd.	$6.0	-	$0
4. Land Acquisition	Acre	$40,000	-	$0
5. Sod at Pond Sites/Channel Banks	Sq. Yd.	$4.5	1,000	$5,000
6. Berm Stabilization	Cu. Yd.	$4.0	-	$0
7. Service Road on top of Berm	Sq. Yd.	$5.0	-	$0
8. Dewatering	Lump Sum	$3,000	1	$3,000
9. Mobilization	Lump Sum	$20,000	1	$20,000
10. Site Preparation (Clearing and Grubbing)	Acre	$3,000	-	$0
11. Culvert [4] (48" Circular RCP)	LF	$131	530	$69,000
12. Culvert [4] (48" x 67" Elliptical RCP)	LF	$206	265	$55,000
13. Concrete Endwall	Lump Sum	$12,000	2	$24,000
14. Replace Driveway	Sq. Yd.	$40	45	$2,000
Subtotal 1				$185,000
Contingency (30% of Subtotal 1)[5]				$56,000
Subtotal 2				$241,000
Engineering, Survey, & Permitting (0% of Subtotal 2)				$0
Total Construction Cost				**$241,000**
30 Year Operation & Maintenance Cost Estimate [6]				**$18,000**
Total Estimated Cost (Construction and O&M)				**$259,000**

(1) Costs based on 2010 dollars.
(2) Does not include potential hazardous waste material remediation nor potential wetland mitigation.
(3) Does not include replacement, relocation, or rehabilitation of non stormwater infrastructure (water, sewer, gas, cable, telephone, etc.)
(4) Culvert costs include maintenance of traffic, installation, and roadway reconstruction costs
(5) Includes contractor's overhead and profit, and design contingencies.
(6) Operation and Maintenance costs discussed in detail in the Methodology Section.

Table 5.1.5 Dukes Bay Canal Existing Condition Model Results

					Design Event				
					Peak Water Surface Elevation (ft-NAVD)				
Node ID	Road Name	Road Class	Road Crown Elevation (ft-NAVD)	Potential Structure Flooding	1.2 in	5 Year	25 Year	50 Year	100 Year
DK80270					162.5	163.6	164.5	165.3	165.9
DK80280					163.8	166.2	167.1	167.3	167.4
DK80285AP					165.1	167.2	167.8	167.9	168.1
DK80290					166.6	168.8	169.3	169.4	169.5
DK80300S	GIL HARBIN INDUSTRIAL BLVD	ARTERIAL	175.0		166.7	170.4	172.8	173.5	174.0
DK80302AP					166.9	170.8	172.9	173.6	174.1
DK80305APS	OLD RAILROAD CROSSING	N/A	172.0		167.7	173.4	173.9	174.1	174.3
DK80310					168.1	173.6	174.2	174.4	174.6
DK80320AP					170.9	174.9	175.7	175.9	176.1
DK80330APS	TUCKER ROAD	COLLECTOR	179.0		171.3	176.6	177.6	177.8	178.1
DK80360					172.8	176.9	177.9	178.2	178.5
DK80370S	SMITH AVENUE	COLLECTOR	183.0		174.0	178.4	179.6	180.0	180.3
DK80380					174.7	178.9	180.1	180.5	180.8
DK80390				YES	179.3	182.7	183.5	183.7	183.8
DK80400S	DAMPIER STREET	ARTERIAL	183.3	YES	179.4	183.4	184.0	184.0	184.1
DK80440					180.5	183.5	183.9	184.0	184.2
DK80490APS					181.1	184.0	184.8	184.8	184.8
DK80500S	S PATTERSON STREET	ARTERIAL	189.3		183.2	184.9	188.0	188.4	188.7
DK80530					183.2	184.9	188.0	188.4	188.7
DK80540S					183.4	185.6	188.1	188.4	188.7
DK80545	GRASSED CROSSING	N/A	187.0		183.8	186.4	188.1	188.4	188.7
DK80550				YES	183.8	186.4	188.1	188.4	188.7
DK80560S	S TOOMBS STREET	LOCAL	186.6	YES	184.0	187.2	188.1	188.4	188.7
DK80590				YES	184.0	187.2	188.1	188.4	188.7
DK80600S	S OAK STREET	ARTERIAL	187.3		184.7	188.1	188.5	188.6	188.7
DK80620					184.7	188.1	188.5	188.6	188.7
DK80630AP					184.7	188.1	188.5	188.6	188.7
DK80640S	RAILROAD CROSSING	N/A	197.2		184.9	187.9	188.3	188.6	188.9
DK80650					184.9	187.9	188.3	188.6	188.9
DK80660S	RAILROAD CROSSING	N/A	195.4		185.2	188.6	189.7	190.0	190.3
DK80670					185.2	188.6	189.7	190.0	190.3
DK80680S	RAILROAD CROSSING	N/A	193.9		185.6	189.9	191.8	192.3	192.7
DK80700					185.8	189.9	191.8	192.3	192.7
DK80705AP					187.4	189.9	191.8	192.3	192.7
DK80710					187.8	189.9	191.8	192.3	192.7
DK80720S	MYDDLETON ROAD	LOCAL	189.3	YES	188.1	189.9	191.8	192.3	192.7
DK80740				YES	187.9	189.9	191.8	192.3	192.7
DK80745					188.3	189.9	191.8	192.3	192.7
DK80750S	JONES ROAD	LOCAL	190.4	YES	188.3	190.0	191.8	192.3	192.7
DK80760					188.6	190.0	191.8	192.3	192.7
DK80790					192.2	193.4	193.8	193.9	194.0
DK80800S	S ST AUGUSTINE ROAD	ARTERIAL	198.9	YES	193.2	194.6	195.7	196.1	196.4
DK83150S	GRIFFIN AVE/S PATTERSON ST	ARTERIAL	188.4		181.7	184.1	186.7	187.1	187.5
DK83170				YES	182.4	184.6	186.9	187.2	187.6
DK83180S	WISENBAKER LANE	LOCAL	186.0	YES	182.6	186.2	187.1	187.3	187.6

Notes:

1. Roads not meeting the City's defined Level of Service.
2. Roads not meeting the City's define Level of Service due to Withlacoochee flooding.
3. Water surface elevations due to Withlacoochee River Staging.
4. 'Y' depicts potential structure flooding near the corresponding node location.
5. Potential Stucture flooding estimated by comparing model results with the regional 2 foot contours dataset.
   Additional finished floor elevations data should be acquired for further investigation.
6. All design storm events are 24 hour duration.

In the Dukes Bay Canal sub-basin the following roads do not meet the City's Level of Service as described in Section 2. The Dukes Bay Canal stage Table 5.1.5 highlights all roads not meeting the level of service in red. For a road to be classified as not meeting the level of service, it has greater than 6 inches of flooding for the storm event under consideration for that particular road classification (5-year event for a local road and 50-year event for a collector and arterial road).

- Roads

Three local roads (S. Toombs Street, Myddleton Road, and Railroad Avenue) do not meet the defined level of service, (greater than 6 inches of flooding for a 5-year storm event). One collector road (S. Lee Street) does not meet the defined level of service, (greater than 6 inches of flooding for a 50-year storm event). Three arterial roads (Dampier Street, S. Oak Street, and S. Troup Street) also do not meet the defined level of service, (greater than 6 inches of flooding for a 50-year storm event).

- Structures

Nineteen locations, as represented by model nodes, were identified in the Dukes Bay Canal sub-basin for potential structural flooding for the 100-year event.

Please refer to Figure 5.1.2.2 for Level of Service violation locations.

5.1.6 Alternatives Evaluation

This section describes the alternatives evaluated for the Dukes Bay Canal Sub-basin. Based on the screening process for the alternatives evaluation, the following alternatives representing different levels of service were developed. Detailed public safety options and standards should be considered and used during final design.

- Alternative DK1: Dampier Street Culvert Upgrade and Regional Stormwater Facility
- Alternative DK2: Toombs Street Culvert Upgrade & Channel Improvements
- Alternative DK3 – Myddleton Street and Railroad Culvert Improvements and a railroad Regional Stormwater Facility
- Alternative DK4 – Retrofit of Existing Samuel Street Pond
- Alternative DK5 – Railroad Avenue and Railroad Crossing Culvert Improvements and Hill Ave Regional Stormwater Facility

Alternative DK1 – Dampier Street Culvert Upgrade and Regional Stormwater Facility

The existing culvert at Dampier Street was found to be undersized and is causing Dampier Street (arterial road) to not meet the 50-year level of service. The improvement includes replacing the existing 5 ft H x 7 ft W triple box culvert (including the 1.5 ft H x 3 ft W low flow channel) with a 6 ft H x 10 ft W triple box culvert.

A 4.9-acre RSF is also proposed to be constructed. This facility consists of an offline retention basin and is proposed to be located directly downstream of Dampier Street on property currently owned by Langdale Forest Products. Primarily, the RSF needs to be constructed to provide additional storage and peak flow attenuation in order to prevent increased water levels downstream of Dampier Street, as a result of the increased conveyance at the Dampier Street crossing. A secondary benefit of this facility is that it will partially treat and attenuate 1,974 acres of tributary area currently receiving little treatment. The proposed RSF occupies approximately 7 acres and provides a permanent pool volume of 16.7 ac-ft and a residence time of 2.4 days. The location of the RSF is shown on **Figure 5.1.4**.

Implementation of this alternative will allow Dampier Street, classified as an arterial road, to meet the 50-year level of service. Additionally, the RSF has the ability to capture more than 100,000 pounds of sediment annually. Because the RSF is proposed to be located on privately owned property, approximately 7 acres of land will need to be acquired for this alternative. Maintenance of traffic along Dampier Street will also need to be addressed, as replacing the culvert under Dampier Street will result in significant traffic disruption. **Table 5.1.6** shows the conceptual cost estimates for this alternative.

Alternative DK2 – Toombs Street Culvert Upgrade & Channel Improvements

Both S Toombs Street (local road) and S Oak Street (arterial road), at their crossing with Dukes Bay Canal, were found to be not meeting their respective level of service. The City owns several parcels in the vicinity of S Toombs Street and has constructed two ponds at the intersection of Hines and Bay Streets. In the Dukes Bay Canal near these two ponds, a complex weir structure Alternative DK2 proposes the following, as shown in **Figure 5.1.5**:

- Replace the existing double 48-inch reinforced concrete pipes under S. Toombs Street with a new 4 ft H x 5 ft W box culvert.
- Incorporate improvements to the existing ponds along Hines Street by constructing a diversion structure to improve the function of the ponds and to remove the existing berm between the two ponds to increase storage.
- Demolish and remove the existing in-channel berm, weir structure, and piping at the grassed crossing between the two existing ponds.

Legend
- Arterial Roads
- Collector Roads
- Local Roads
- Model Nodes
- Streams

0 250 500 1,000 Feet

Figure 5.1.4
City of Valdosta, GA
Dukes Bay Canal Sub-Basin
Alternative DK1
Dampier Street Culvert Upgrade and Regional Stormwater Facility

CDM

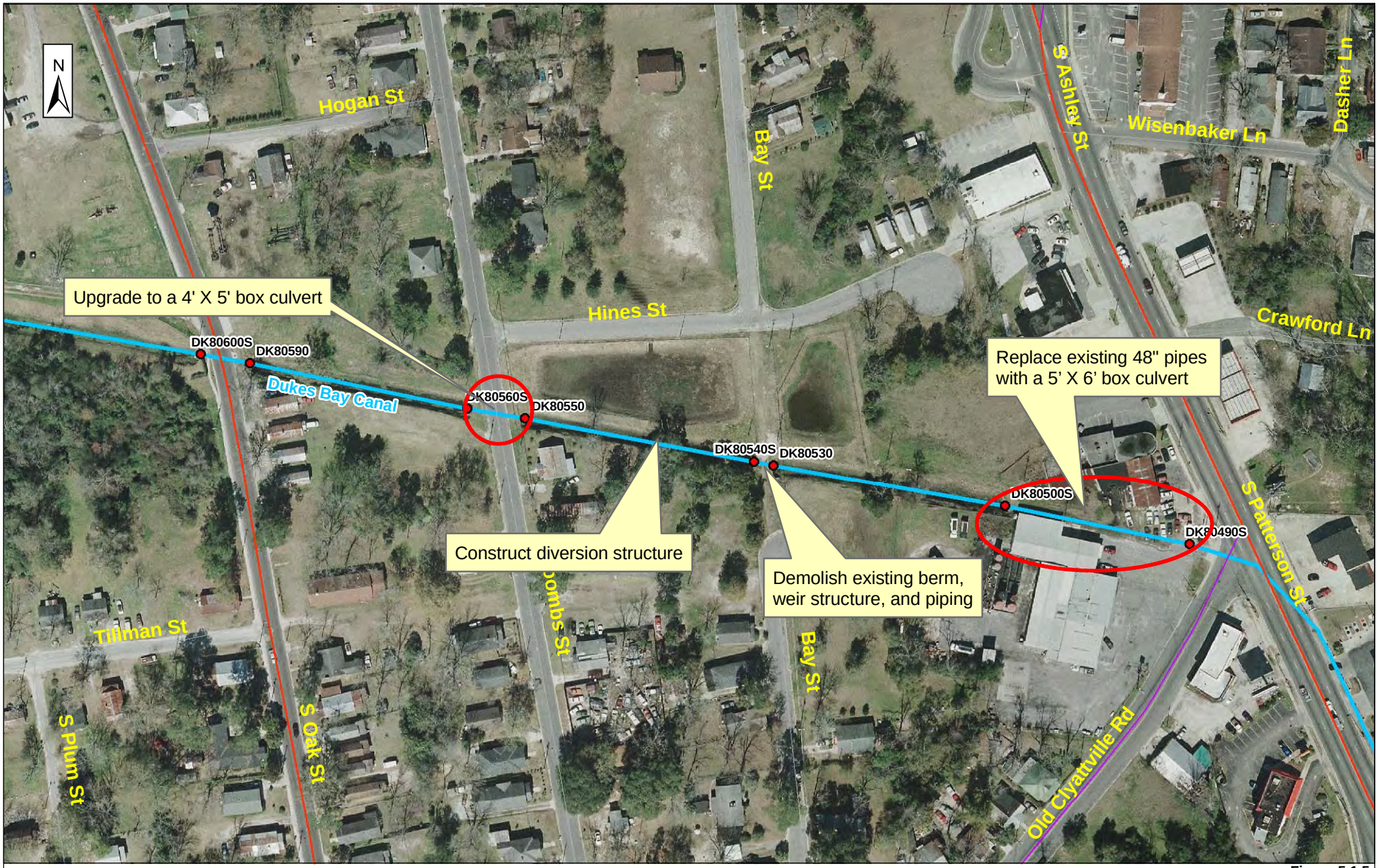
Dukes Bay Canal Sub-basin

Table 5.1.6 - DK1 Dampier Street Culvert Improvement and Regional Stormwater Facility

Conceptual Cost Estimate

Item	Units	Unit Cost	Quantity	Total Cost
1. Weirs/Inlet/Outlet Structures	Lump Sum	$65,000	2	$130,000
2. Erosion Control	LF	$4.0	1,750	$7,000
3. Excavation/Earth Work	Cu. Yd.	$6.0	68,611	$414,000
4. Land Acquisition	Acre	$15,000	7.0	$105,000
5. Sod at Pond Sites/Channel Banks	Sq. Yd.	$4.5	6,067	$27,000
6. Berm Stabilization	Cu. Yd.	$4.0	-	$0
7. Service Road on top of Berm	Sq. Yd.	$5.0	-	$0
8. Dewatering	Lump Sum	$60,000	1	$60,000
9. Mobilization	Lump Sum	$20,000	1	$20,000
10. Site Preparation (Clearing and Grubbing)	Acre	$3,000	4.9	$15,000
11. Culvert [4] (Upgrade to a triple 6' X 10')	Lump Sum	$420,000	1	$420,000
Subtotal 1				$1,198,000
Contingency (30% of Subtotal 1) [5]				$359,000
Subtotal 2				$1,557,000
Engineering, Survey, & Permitting (20% of Subtotal 2)				$311,000
Total Construction Cost				**$1,868,000**
30 Year Operation & Maintenance Cost Estimate [6]				**$342,000**
Total Estimated Cost (Construction and O&M)				**$2,210,000**

(1) Costs based on 2010 dollars.
(2) Does not include potential hazardous waste material remediation nor potential wetland mitigation.
(3) Does not include replacement, relocation, or rehabilitation of non stormwater infrastructure (water, sewer, gas, cable, telephone, etc.)
(4) Culvert costs include maintenance of traffic, installation, and roadway reconstruction costs
(5) Includes contractor's overhead and profit, and design contingencies.
(6) Operation and Maintenance costs discussed in detail in the Methodology Section.



Legend
- Arterial Roads
- Collector Roads
- Local Roads
- Model Nodes
- Streams

0 125 250 500 Feet

Figure 5.1.5
City of Valdosta, GA
Dukes Bay Canal Sub-Basin
Alternative DK2
Toombs Street Culvert Upgrade and Channel/Pond Improvements

CDM

- Demolish the existing double 48-inch RCPs immediately upstream of Patterson Street and replace with a 5′ x 6′ box culvert.

Implementation of this alternative will allow S. Toombs Street, classified as a local road, to meet the 5-year level of service. Existing sewer lines in the area will need to be protected and/or relocated as part of this alternative.

Maintenance of traffic along S. Toombs Street will also need to be addressed, as replacing the culvert will result in significant traffic disruption along S. Toombs Street. The City also identified this area to be in need of recreational opportunities and any work in this area should attempt to incorporate park features and amenities. **Table 5.1.7** shows the conceptual cost estimates for this alternative.

Alternative DK3 – Myddleton Street and Railroad Culvert Improvements and Railroad and a Regional Stormwater Facility

Myddleton Road has been identified as a road that overtops frequently at the Dukes Bay Canal crossing. The existing culvert at Myddleton Road was also found to be undersized and is causing Myddleton Road (local road) to not meet the 5-year level of service. This deficiency was found to be caused by the undersized culverts at both Myddleton Road and a railroad crossing downstream. Alternative DK3 proposes to install a 3 ft H x 5 ft W box culvert under both Myddleton Road and the downstream railroad crossing. Currently, two 24-inch RCPs cross under Myddleton Road and the railroad crossing is served by a single 42-inch RCP.

A 2.7-acre RSF is also proposed to be constructed. This facility consists of an offline retention basin and is proposed to be located downstream of the upgraded railroad crossing, on property currently owned by the railroad. Primarily, the RSF needs to be constructed to provide additional storage and peak flow attenuation in order to prevent increased water levels downstream of the Myddleton Road and railroad crossings, as a result of the increased conveyance at these crossings. A secondary benefit of this facility is that it will treat and attenuate 731 acres of tributary area currently receiving no treatment, much of which is industrial land. The proposed RSF will require land acquisition of about 5.5 acres and provides a permanent pool volume of 8 ac-ft and a residence time of 2.9 days. The location of the RSF is shown on **Figure 5.1.6**.

Implementation of this alternative will allow Myddleton Road and S. Toombs Street, both classified as local roads, to meet the 5-year level of service. Additionally, the RSF has the ability to capture approximately 42,000 pounds of sediment annually. Because the RSF is proposed to be located on privately owned property, approximately 5.5 acres of land will need to be acquired for this alternative. Maintenance of traffic along Myddleton Road will also need to be addressed, as replacing the culvert under Myddleton Road will result in traffic disruption at this location. Additionally, close coordination with the railroad will be required, as both crossings will have to pass under working railways and the proposed RSF will be located adjacent to railways.

Dukes Bay Canal Sub-basin

Table 5.1.7 - DK2 Toombs Street Culvert Improvement and Channel Improvements

Conceptual Cost Estimate

Item	Units	Unit Cost	Quantity	Total Cost
1. Weirs/Inlet/Outlet Structures	Lump Sum	$65,000	2	$130,000
2. Erosion Control	LF	$4.0	900	$4,000
3. Excavation/Earth Work	Cu. Yd.	$6.0	25,000	$151,000
4. Land Acquisition	Acre	$40,000	-	$0
5. Sod at Pond Sites/Channel Banks	Sq. Yd.	$4.5	7,000	$32,000
6. Berm Stabilization	Cu. Yd.	$4.0	-	$0
7. Service Road on top of Berm	Sq. Yd.	$5.0	-	$0
8. Dewatering	Lump Sum	$30,000	1	$30,000
9. Mobilization	Lump Sum	$20,000	1	$20,000
10. Site Preparation (Clearing and Grubbing)	Acre	$3,000	0.5	$2,000
11. Culvert [4] (Upgrade to a 4' X 6')	Lump Sum	$240,000	1	$240,000
12. Demolish Existing Structures	Lump Sum	$50,000	1	$50,000
Subtotal 1				$659,000
Contingency (30% of Subtotal 1)[5]				$198,000
Subtotal 2				$857,000
Engineering, Survey, & Permitting (20% of Subtotal 2)				$171,000
Total Construction Cost				**$1,028,000**
30 Year Operation & Maintenance Cost Estimate [6]				**$41,000**
Total Estimated Cost (Construction and O&M)				**$1,069,000**

(1) Costs based on 2010 dollars.
(2) Does not include potential hazardous waste material remediation nor potential wetland mitigation.
(3) Does not include replacement, relocation, or rehabilitation of non stormwater infrastructure (water, sewer, gas, cable, telephone, etc.)
(4) Culvert costs include maintenance of traffic, installation, and roadway reconstruction costs
(5) Includes contractor's overhead and profit, and design contingencies.
(6) Operation and Maintenance costs discussed in detail in the Methodology Section.

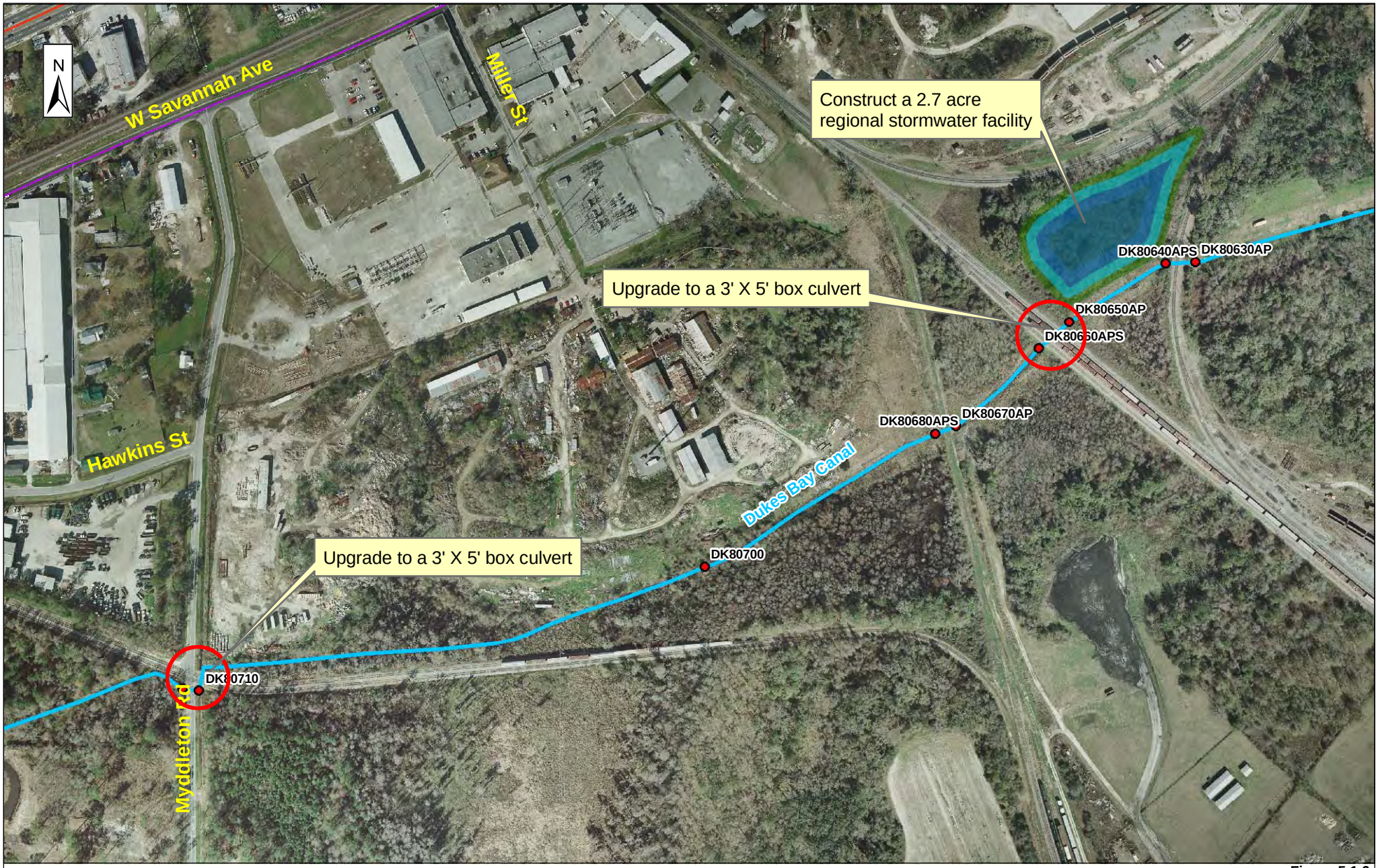


Figure 5.1.6
City of Valdosta, GA
Dukes Bay Canal Sub-Basin
Alternative DK3
Myddleton Street & Railroad Culvert Upgrade and Regional Stormwater Facility

CDM

It should be noted that the Georgia Environmental Protection Division has listed several parcels in the general vicinity of Alternative DK3 on its Hazardous Site Inventory. This hazardous site is known as the Atlanta Gas Light Company-Valdosta MGP Site. Investigations of soil and groundwater contamination should be undertaken before performing any excavation in this area. **Table 5.1.8** shows the conceptual cost estimates for this alternative.

Alternative DK4 – Retrofit of Existing Samuel Street Pond

At the recommendation of the 1996 SWMP, the City constructed 5-acre dry detention facility downstream of Lake Park Road, now known as the Samuel Street pond. This is an in-line dry detention facility, which acts as storage during large storm events, but is dry the majority of the time. Because the Samuel Street pond has no permanent pool of water, the pond provides no significant water quality benefit through removal of sediment and requires significant maintenance. The City spends approximately $6,000 annually on mowing costs alone for the Samuel Street pond.

Alternative DK4 proposes to modify the existing Samuel Street pond by excavating a permanent pool, converting the pond from a dry detention facility to a wet detention facility. This conversion will create a permanent pool of 24 acre-feet, with a residence time of 3.8 days, and allow the pond to capture up to 64,000 pounds of sediment annually from its 744-acre tributary area. The modification to the Samuel Street Pond is shown on **Figure 5.1.7**.

The City currently owns the Samuel Street pond property; therefore, no land will need to be purchased due to this alternative. It should be noted that the existing operation of the pond is an in-line facility. Permitting in-line facilities can be very difficult; however, because this is a modification to an existing in-line facility, permitting will be complicated, but less difficult than for a newly proposed in-line facility. **Table 5.1.9** shows the conceptual cost estimates for this alternative.

Alternative DK5 – Railroad Avenue and Railroad Crossing Culvert Improvements and Hill Ave Regional Stormwater Facility

Railroad Avenue, at the crossing with Dukes Bay Canal, was found to be not meeting the 5-year level of service for a local road. This deficiency was found to be caused by the undersized culverts at both Railroad Avenue and a railroad crossing immediately downstream of Railroad Avenue. Currently, there are three 36-inch RCPs serving Railroad Avenue and two 36-inch RCPs serving the downstream railroad crossing. Alternative DK5 proposes to install an additional 48-inch RCP under Railroad Avenue and two additional 48-inch RCPs under the railroad crossing.

Dukes Bay Canal Sub-basin

Table 5.1.8 - DK3 Myddleton Street & Railroad Crossing Culvert Improvements and Regional Stormwater Facility

Conceptual Cost Estimate

Item	Units	Unit Cost	Quantity	Total Cost
1. Weirs/Inlet/Outlet Structures	Lump Sum	$65,000	2	$130,000
2. Erosion Control	LF	$4.0	1,470	$6,000
3. Excavation/Earth Work	Cu. Yd.	$6.0	31,793	$192,000
4. Land Acquisition	Acre	$15,000	5.5	$83,000
5. Sod at Pond Sites/Channel Banks	Sq. Yd.	$4.5	7,600	$34,000
6. Berm Stabilization	Cu. Yd.	$4.0	-	$0
7. Service Road on top of Berm	Sq. Yd.	$5.0	-	$0
8. Dewatering	Lump Sum	$60,000	1	$60,000
9. Mobilization	Lump Sum	$20,000	1	$20,000
10. Site Preparation (Clearing and Grubbing)	Acre	$3,000	2.7	$8,000
11. Culvert [4] (Upgrade to a 3' X 5')	Lump Sum	$210,000	2	$420,000
12. Wetland Mitigation	Acre	$43,000	3	$116,000
Subtotal 1				$1,069,000
Contingency (30% of Subtotal 1)[5]				$321,000
Subtotal 2				$1,390,000
Engineering, Survey, & Permitting (20% of Subtotal 2)				$278,000
Total Construction Cost				**$1,668,000**
30 Year Operation & Maintenance Cost Estimate [6]				**$282,000**
Total Estimated Cost (Construction and O&M)				**$1,950,000**

(1) Costs based on 2010 dollars.
(2) Does not include potential hazardous waste material remediation nor potential wetland mitigation.
(3) Does not include replacement, relocation, or rehabilitation of non stormwater infrastructure (water, sewer, gas, cable, telephone, etc.)
(4) Culvert costs include maintenance of traffic, installation, and roadway reconstruction costs
(5) Includes contractor's overhead and profit, and design contingencies.
(6) Operation and Maintenance costs discussed in detail in the Methodology Section.

Legend
- Arterial Roads
- Collector Roads
- Local Roads
- Model Nodes
- Streams

0 250 500 1,000 Feet

Figure 5.1.7
City of Valdosta, GA
Dukes Bay Canal Sub-Basin
Alternative DK4
Samuel Street Pond Modification

CDM

Dukes Bay Canal Sub-basin

Table 5.1.9 - DK4 Retrofit of Samuel Street Ponds

Conceptual Cost Estimate

Item	Units	Unit Cost	Quantity	Total Cost
1. Weirs/Inlet/Outlet Structures	Lump Sum	$65,000	-	$0
2. Erosion Control	LF	$4.0	2,830	$11,000
3. Excavation/Earth Work	Cu. Yd.	$6.0	49,167	$296,000
4. Land Acquisition	Acre	$40,000	-	$0
5. Sod at Pond Sites/Channel Banks	Sq. Yd.	$4.5	1,711	$8,000
6. Berm Stabilization	Cu. Yd.	$4.0	-	$0
7. Service Road on top of Berm	Sq. Yd.	$5.0	-	$0
8. Dewatering	Lump Sum	$60,000	1	$60,000
9. Mobilization	Lump Sum	$20,000	1	$20,000
10. Site Preparation (Clearing and Grubbing)	Acre	$3,000	-	$0
11. Culvert (4)	Lump Sum	$0	-	$0
Subtotal 1				$395,000
Contingency (30% of Subtotal 1) (5)				$119,000
Subtotal 2				$514,000
Engineering, Survey, & Permitting (20% of Subtotal 2)				$103,000
Total Construction Cost				**$617,000**
30 Year Operation & Maintenance Cost Estimate (6)				**$422,000**
Total Estimated Cost (Construction and O&M)				**$1,039,000**

(1) Costs based on 2010 dollars.
(2) Does not include potential hazardous waste material remediation nor potential wetland mitigation.
(3) Does not include replacement, relocation, or rehabilitation of non stormwater infrastructure (water, sewer, gas, cable, telephone, etc.)
(4) Culvert costs include maintenance of traffic, installation, and roadway reconstruction costs
(5) Includes contractor's overhead and profit, and design contingencies.
(6) Operation and Maintenance costs discussed in detail in the Methodology Section.

A 1.9-acre RSF is also proposed to be constructed. This facility consists of an offline retention basin and is proposed to be located immediately upstream of the E. Hill Avenue crossing, on privately owned property. Primarily, the RSF needs to be constructed to provide additional storage and peak flow attenuation in order to prevent increased water levels downstream of the Railroad Avenue and railroad crossing, as a result of the increased conveyance at these crossings. A secondary benefit of this facility is that it will treat and attenuate 173 acres of tributary area currently receiving minimal treatment. The proposed RSF occupies approximately 3.1 acres and provides a permanent pool volume of 4.4 ac-ft and a residence time of 7.3 days. The location of the RSF is shown on **Figure 5.1.8**. **Table 5.1.10** shows the conceptual cost estimates for this alternative.

Figure 5.1.8
City of Valdosta, GA
Dukes Bay Canal Sub-Basin
Alternative DK5
Railroad Avenue & Railroad Culvert Upgrade and Regional Stormwater Facility

CDM

Dukes Bay Canal Sub-basin

Table 5.1.10 - DK5 Railroad Avenue & Railroad Crossing Culvert Improvement and Regional Stormwater Facility

Conceptual Cost Estimate

Item	Units	Unit Cost	Quantity	Total Cost
1. Weirs/Inlet/Outlet Structures	Lump Sum	$65,000	2	$130,000
2. Erosion Control	LF	$4.0	1,270	$5,000
3. Excavation/Earth Work	Cu. Yd.	$6.0	17,600	$106,000
4. Land Acquisition	Acre	$15,000	3.1	$47,000
5. Sod at Pond Sites/Channel Banks	Sq. Yd.	$4.5	8,200	$37,000
6. Berm Stabilization	Cu. Yd.	$4.0	-	$0
7. Service Road on top of Berm	Sq. Yd.	$5.0	-	$0
8. Dewatering	Lump Sum	$40,000	1	$40,000
9. Mobilization	Lump Sum	$20,000	1	$20,000
10. Site Preparation (Clearing and Grubbing)	Acre	$3,000	1.9	$6,000
11. Culvert [4] (Jack & Bore 48" RCPs)	Lump Sum	$110,000	3	$330,000
Subtotal 1				$721,000
Contingency (30% of Subtotal 1) [5]				$216,000
Subtotal 2				$937,000
Engineering, Survey, & Permitting (20% of Subtotal 2)				$187,000
Total Construction Cost				**$1,124,000**
30 Year Operation & Maintenance Cost Estimate [6]				**$229,000**
Total Estimated Cost (Construction and O&M)				**$1,353,000**

(1) Costs based on 2010 dollars.
(2) Does not include potential hazardous waste material remediation nor potential wetland mitigation.
(3) Does not include replacement, relocation, or rehabilitation of non stormwater infrastructure (water, sewer, gas, cable, telephone, etc.)
(4) Culvert costs include maintenance of traffic, installation, and roadway reconstruction costs
(5) Includes contractor's overhead and profit, and design contingencies.
(6) Operation and Maintenance costs discussed in detail in the Methodology Section.