4.2 Cherry Creek & Stillhouse Branch

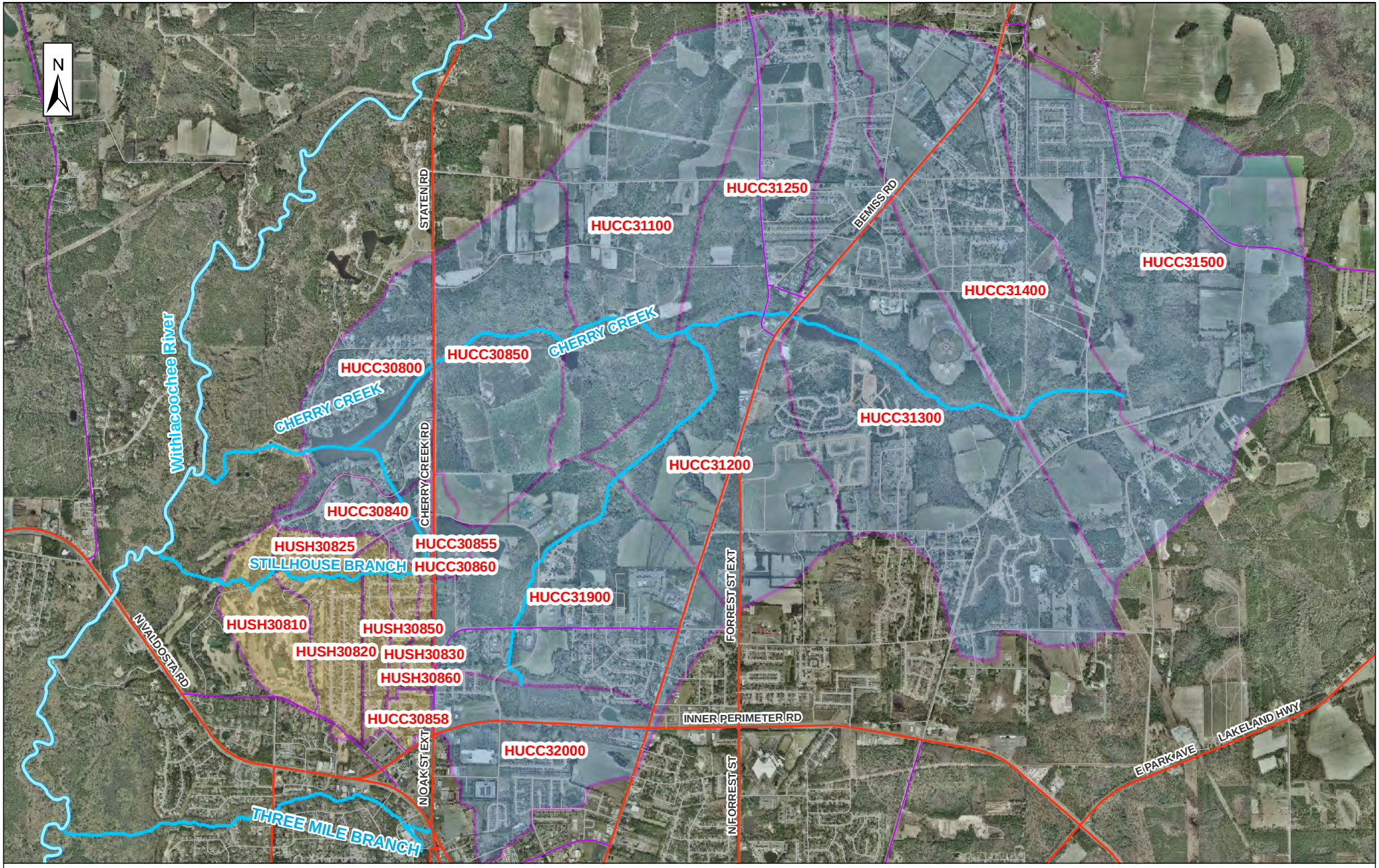
4.2.1 Introduction

The information presented in this sub-basin plan for Cherry Creek and Stillhouse Branch 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 detail the general methodology, including data collection, engineering methods, and regional analysis.

4.2.2 Sub-basin Information

This section outlines information on the Cherry Creek and Stillhouse branch sub-basin infrastructure, and its ability to meet level of service requirements. This sub-basin consists of two named streams having two outfalls to the Withlacoochee River. The northern stream is Cherry Creek and the southern creek is Stillhouse Branch. Cherry Creek also flows through three lakes – Lake Laurie, Lake Deborah, and Lake Cleeve. It flows from Lake Laurie in the south to Lake Deborah in the north, further flowing into Lake Cleeve and after that flowing into Withlacoochee River. This system is mainly the Cherry Creek sub-basin and is inside the city limits. There is a huge tributary area flowing from east to west into Lake Cleeve and therefore into Cherry Creek. All of these tributary areas were included in the models for the hydrologic and hydraulic analysis of Cherry Creek. This increases the tributary area to Cherry Creek significantly.

The Stillhouse Branch flows east to west and extends from Cherry Creek Road to its confluence with the Withlacoochee River. The total tributary area to Cherry Creek and Stillhouse Branch is 13.5 sq mi (8,692 acres), which was divided into 22 hydrologic units ranging from 7 to 1,382 acres in size. The majority of this tributary area is outside of the City of Valdosta boundaries. Stillhouse Branch has a tributary area of about 551 acres and Cherry Creek has a tributary area of 533 acres within the city limits. The hydrologic unit boundaries and the In-stream PSWMS are shown on **Figure 4.2.1**. The HU delineation along with the areas and the loading node for each HU is shown in **Table 4.2.1**.



Legend

Hydrologic Units
- HISH30820
- HUCC31500

- Arterial Roads
- Collector Roads
- Local Roads
- Streams

0 0.5 1 2 Miles

Figure 4.2.1
City of Valdosta, GA
Cherry Creek Sub-Basin
Stillhouse Branch Sub-Basin
Hydrologic Units Delineation

CDM

Table 4.2.1. Hydrologic Unit Areas

Hydrologic Unit ID	Acres	Loading Node
HUCC30800	374.3	CC80400S
HUCC30840	93.8	CC80440S
HUCC30850	609.2	CC80500S
HUCC30855	48.7	CC80460S
HUCC30858	34.9	CC80460S
HUCC30860	30.2	CC80460S
HUCC31100	826.5	CC81100
HUCC31200	694.0	CC81200
HUCC31250	484.7	CC81200
HUCC31300	1,382.3	CC81300
HUCC31400	1,112.1	CC81400
HUCC31500	1,250.5	CC81500
HUCC31900	783.2	CC81900
HUCC32000	416.8	CC82000
HUSH30810	173.9	SH80210S
HUSH30820	138.5	SH80220
HUSH30825	65.7	SH80220
HUSH30830	67.2	SH80230
HUSH30835	15.7	SH80230
HUSH30840	7.3	SH80250S
HUSH30850	43.2	SH80250S
HUSH30860	39.5	SH80260
HUCC30800	374.3	CC80400S
HUCC30840	93.8	CC80440S
HUCC30850	609.2	CC80500S
HUCC30855	48.7	CC80460S
HUCC30858	34.9	CC80460S
HUCC30860	30.2	CC80460S
Total	**8,692.1**	

The predominant land use in the sub-basin is Forest, Open and Park, which account for almost 30 percent of the total land use. Medium Density Residential and Agricultural land are the two other categories of major land use in this sub-basin. The land use categories along with their respective associated area and percentage for all of Cherry Creek and Stillhouse Branch sub-basin are shown in **Table 4.2.2**. The predominant soil within the sub-basin is B. **Table 4.2.3** shows the soils breakdown based on HSG. The soil coverage, infiltration and storage capacity was 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.

Table 4.2.2. Land Use Breakdown

Land Use Category	Area (Acres)	Area (Percent)
Forest, Open & Park	571.5	8.4
Pasture	0.0	0.0
Agricultural	2,194.4	0.0
Low Density Residential	357.1	0.1
Medium Density Residential	2,328.5	50.9
High Density Residential	0.0	0.7
Light Industrial, Commercial & Institutional	418.1	21.8
Heavy Industrial & Roadways	644.9	17.7
Wetlands	14.7	0.1
Watercourses & Water bodies	162.8	0.3
Total	**8,692.1**	**100.0**

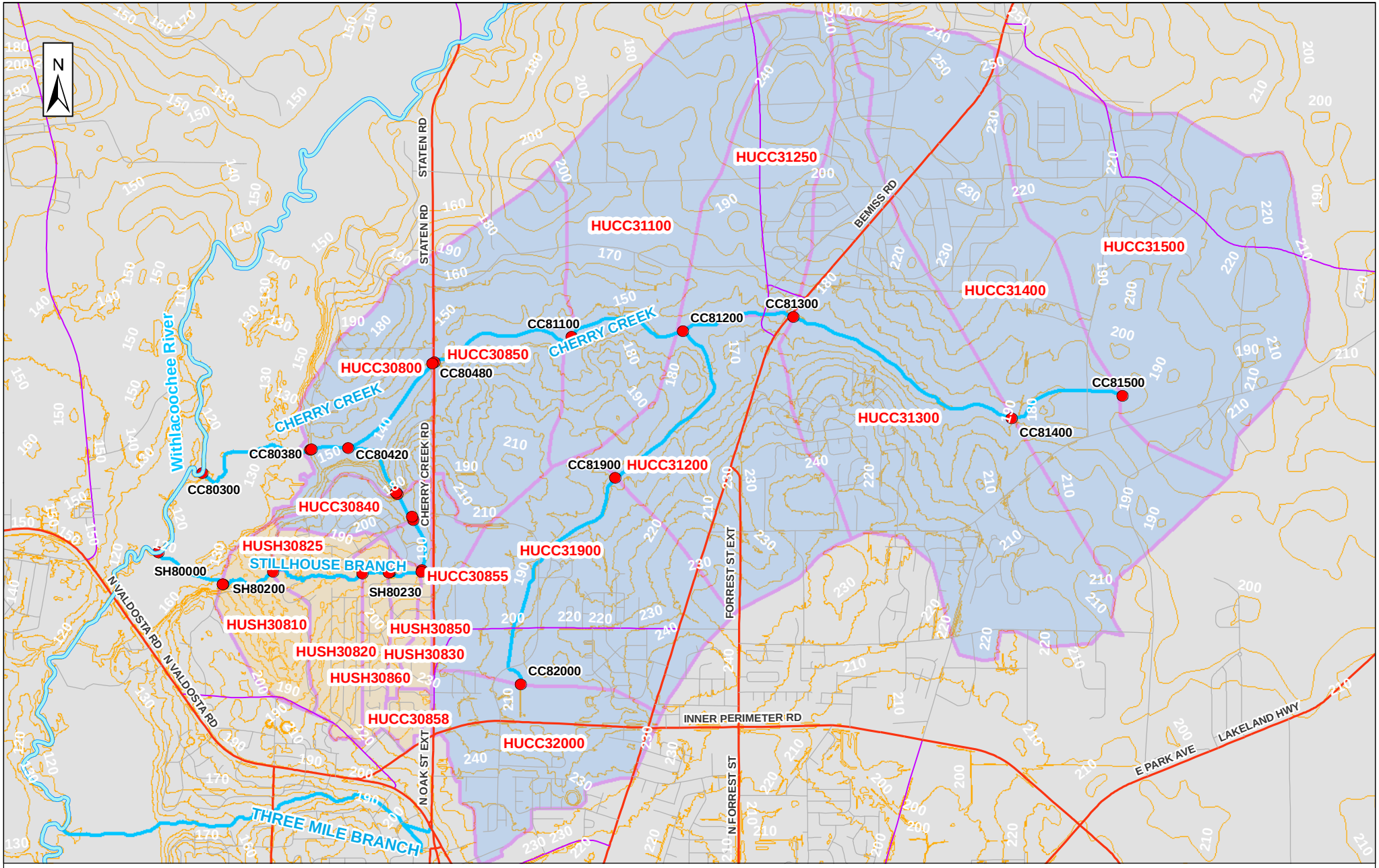
Table 4.2.3. Soils Breakdown

Hydrologic Soil Group	Area (Acres)	Area (Percent)
A	202.6	2.3
B	4,572.1	52.6
C	1,780.9	20.5
D	2,136.5	24.5
Total	**8,692.1**	**100.0**

The In-stream PSWMS of Cherry Creek consists of a series of three interconnected lakes starting with Lake Laurie, followed by Lake Deborah and Lake Cleeve, followed by a stream that at its most downstream section confluences with the Withlacoochee River. Stillhouse Branch In-stream PSWMS comprises of a stream flowing east to west from near Lake Laurie to its confluence with Withlacoochee River at its most downstream section. Due to the proximity of these streams and tributary areas and flow connection during high flow events, the hydrologic and hydraulic analyses of Cherry Creek and Stillhouse Branch were done together. A schematic showing the model representation (hydraulic network along with nodes) of the sub-basin is presented on **Figure 4.2.2**.1.

4.2.3 Existing Conditions

Cherry Creek and Stillhouse Branch sub-basins were not part of the detailed study of the 1996 MSMP. Most of the development in this area has been recent. This area is still undergoing a lot of construction in terms of residential complexes and houses. Stillhouse Branch and Cherry Creek are not connected physically. Stillhouse Branch originates just south of Lake Laurie. During high flow events reversal of flow from Lake Laurie (Cherry Creek) to Stillhouse Branch has been observed.



Legend

Hydrologic Units
- HISH30820
- HUCC31500
- Topographic Contours (ft)*

Model Nodes
- SH80230
- CC80430

- Arterial Roads
- Collector Roads
- Local Roads
- Streams

0 0.5 1 2 Miles

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

Figure 4.2.2.1
City of Valdosta, GA
Cherry Creek Sub-Basin
Stillhouse Branch Sub-Basin
Hydraulic Network

CDM

The most significant feature in this sub-basin that affects hydrology and hydraulics of the system is that most of Cherry Creek consists of lakes as described in Section 4.2.2.1. Another feature that is unique to this sub-basin is that most of the tributary area to Cherry Creek is coming from outside the City limits and is not part of the Cherry Creek stream.

4.2.4 Water Quantity Problem Areas

1. Shirley Place and Lauries Pointe: Houses near the Lake Laurie and Stillhouse Branch on Shirley Place have experienced repeated flooding of front and back yards. The main reason for flooding in this area is due to a non-functioning drainage pipe in Lake Laurie. This pipe is corroded and not functioning.

2. Shirley Place drainage: Limited capacity of the stormwater drain pipes running along Shirley Place have resulted in flooding in front yards of houses along Shirley Place. Channel erosion due to flooding has also resulted in loss of trees near houses along Stillhouse Branch on Shirley Place.

3. Breckinridge Drive: Some houses have experienced flooding due to insufficient drainage capacity of the stormwater infrastructure on this road.

4. Lake Laurie Drive: Some houses along Lake Laurie Drive have experienced flooding from Stillhouse Branch into the backyards. Significant stream erosion was also observed in the stream section along Country Club golf course and Lake Laurie Drive.

4.2.5 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.

4.2.5.1 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 4.2.4**. Road crown elevation, road names, and road classification (local, collector, arterial) are also shown in the table. The roads not meeting the City's defined Level of Service are highlighted in the model result tables. Due to lack of data for finished floor elevations of houses and other structures, available topographic data were utilized to estimate potential flooding of structures for each design storm and tabulated. The model results table indicates the nearest node to the structure location. If the peak flood stage at a node exceeded the closest ground topographic elevation near a structure (house or building), then it was identified as a potential flooded structure.

Table 4.2.4. Cherry Creek and Stillhouse Branch Existing Condition Model Results

Node ID	Road Name	Road Class	Road Crown Elevation (ft-NAVD)	Potential Structure Flooding	Design Event: Peak Water Surface Elevation (ft-NAVD)				
					1.2 Inch	5 Year	25 Year	50 Year	100 Year
CC80300					119.0	135.0	119.0	119.0	119.0
CC80380					127.4	135.0	131.6	132.1	132.5
CC80400S					138.0	139.9	141.0	141.4	141.8
CC80440S	Lakeshore Drive	Local	178.6		157.9	161.0	206.9	206.9	206.9
CC80450S	Lakeshore Drive	Local	178.6		174.7	174.7	174.7	174.8	174.8
CC80460S	Lake Laurie Drive	Local	187.7		184.1	185.8	186.6	186.8	187.0
CC80500S	Staten Road	Arterial	146.7		138.0	139.9	141.0	144.0	148.0
SH80000					118.0	134.0	139.0	143.0	147.0
SH80200					123.9	134.0	139.0	143.0	147.0
SH80210S	Golf Cart Path	Private	131.6		125.7	134.0	139.0	143.0	147.0
SH80220					137.9	141.3	142.3	143.0	147.0
SH80230					160.8	163.5	164.3	164.5	164.7
SH80232S					167.1	167.2	167.3	167.3	167.3
SH80240					168.6	169.4	169.7	169.8	169.9
SH80250S	Sunnymead Drive	Local	177.0		170.1	172.7	174.9	175.6	176.3
SH80260				Y	182.0	183.5	184.3	184.6	184.9

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.

4.2.5.2 Total Suspended Solids Evaluation

Significant sediment loads resulting from erosion of stream banks has been observed in the whole Sugar Creek basin and in One Mile Branch. Yearly TSS loads were calculated based on an EMC for TSS, yearly rainfall, tributary area; land use characteristics like percent imperviousness for Valdosta. Yearly TSS loads from various hydrologic units for each sub-basin were computed in lbs/year units. The total TSS loading for Cherry Creek and Stillhouse Branch sub-basin was estimated to be 166,000 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. This method and the 1.2 inch storm event were used for evaluation of potential TSS water quality benefits in the alternatives.

4.2.5.3 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 for roads and structures:

- Roads flooding

All roads in the Cherry Creek and Stillhouse Branch meet the Level of Service. For a road to be classified as not meeting the level of service, it has more 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).

- Structures flooding

One location, as represented by model node, was identified in the Cherry Creek and Stillhouse Branch sub-basins for probable structural flooding for the 100-year event.

Please refer to **Figure 4.2.2.2** for a map of Level of Service violations for Cherry Creek and Stillhouse Branch sub-basin. Other water quantity problem areas are also shown on this figure.

4.2.6 Alternatives Evaluation

This section describes the alternatives evaluated for the Cherry Creek and Stillhouse Branch 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.

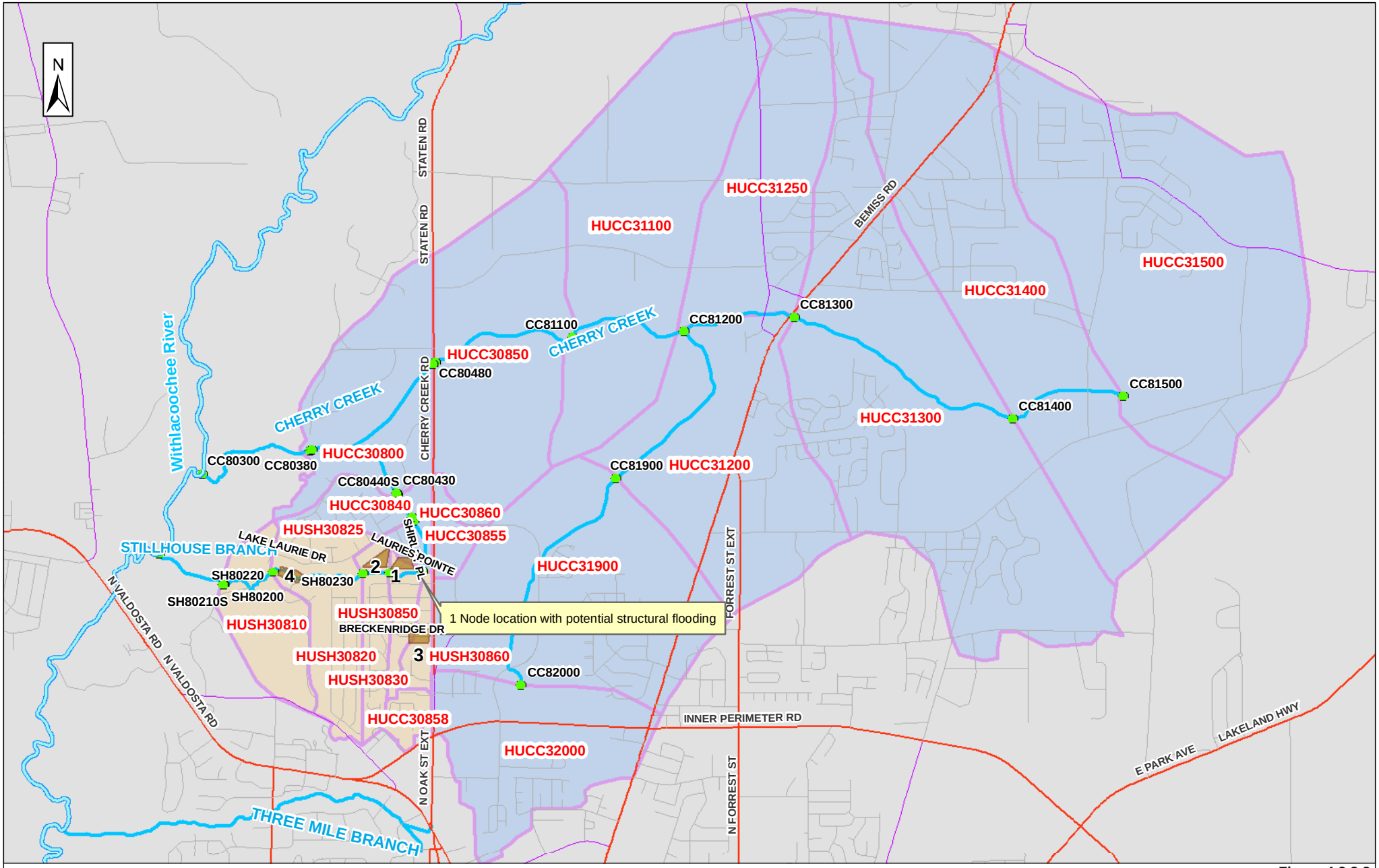


Figure 4.2.2.2
City of Valdosta, GA
Cherry Creek Sub-Basin
Stillhouse Branch Sub-Basin
Level of Service Violations and Water Quantity Problem Areas

CDM

- Alternative CC1: Lake Laurie Drainage Improvements
- Alternative SH1: Stream Restoration in Stillhouse Branch
- Alternative SH2: Shirley Place Detention Pond Rehabilitation

Alternative CC1 – Lake Laurie Drainage Pipe Improvements

There have been instances of flooding in the houses near the location of Lake Laurie and the most upstream part of Stillhouse Branch. During high flow events, it has been noted in Lake Laurie, that instead of flowing north, there is a reversal of flow into the Stillhouse Branch. This has further increased issues of channel erosion, loss of trees and flooding in houses along Stillhouse Branch. There is a larger flow in Stillhouse Branch due to this flow reversal occurring at Lake Laurie.

This alternative addresses this drainage issue of Lake Laurie. The 18-inch Pipe and Riser in Lake Laurie is corroded and blocked and is not functioning. It is proposed to completely remove this pipe and construct a culvert with a weir as a control structure under Lake Laurie Drive. Dewatering and maintenance of traffic on Lake Laurie Drive are critical factors in this project.

This alternative shows benefits in terms of reduced flooding near the houses located near Lake Laurie and Stillhouse Branch. Reduced flows in Stillhouse Branch lead to lower velocities and therefore reduced channel erosion. **Figure 4.2.3** shows the location for this alternative. **Table 4.2.5** shows the conceptual costs estimates for this alternative.

Alternative SH1 – Stream Restoration in Stillhouse Branch South of Lake Laurie Drive and near Country Club Golf course

Increased flows and high velocities in Stillhouse Branch have resulted in significant stream bank erosion. About 500 ft of channel between Lake Laurie Drive and Country Club Golf Course has undergone significant erosion and is causing a threat to existing trees and flooding in the backyards of houses along the stretch. There have been several instances of water rising out of the channel and into the backyards.

Upon field investigation of this location, it is proposed to restore this section of the stream using some method of stream restoration such as gabions, rip rap, etc. This project if implemented will protect the stream from further erosion, stabilize the trees, and also protect private property from future flooding. An access easement to the project site during construction and future maintenance would need to be acquired. The project will have partial impact on about 4-5 parcels (private property owners). **Figure 4.2.4** shows the location for the stream restoration project along with access easement. **Table 4.2.6** shows the conceptual costs estimates for this alternative.

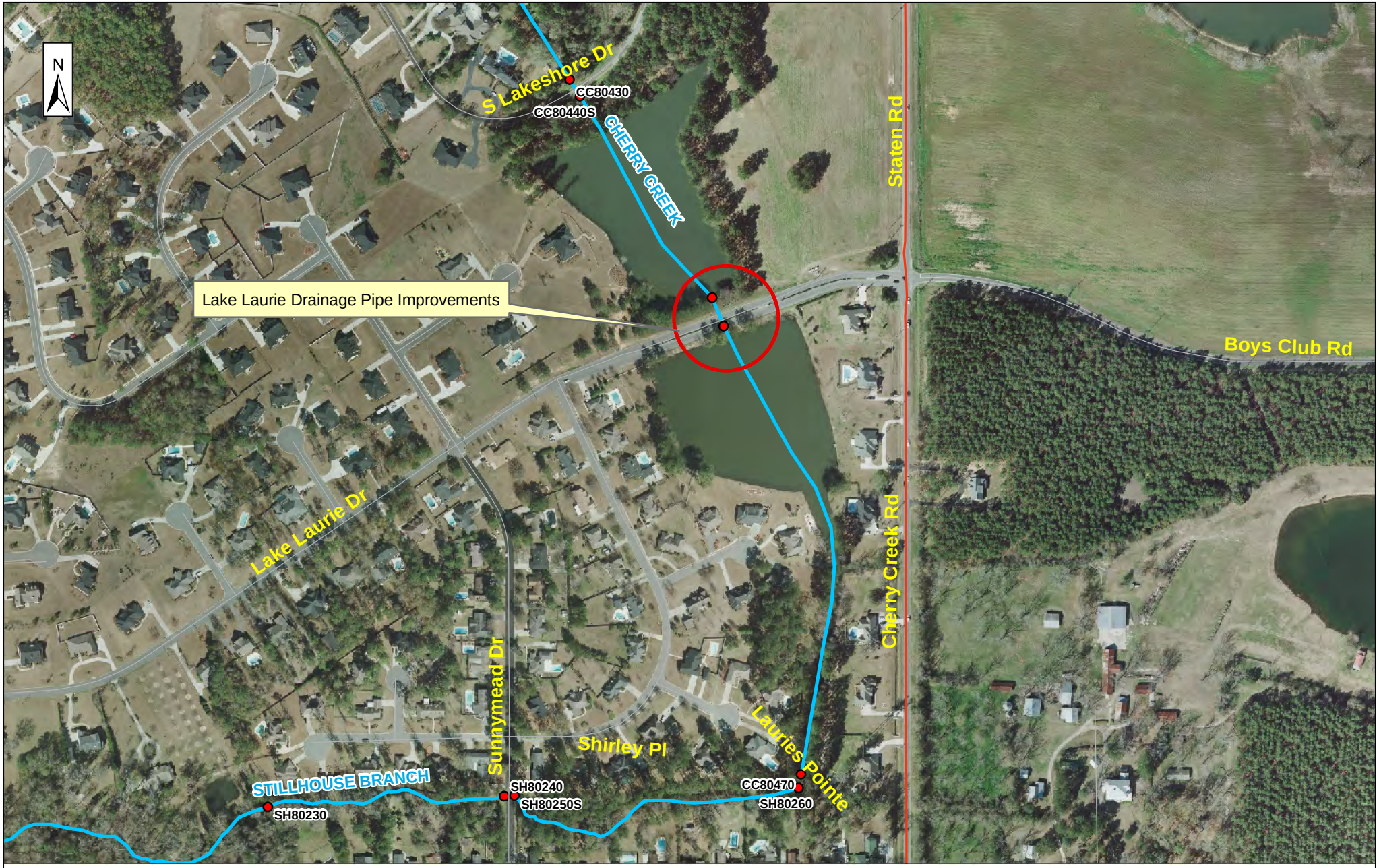


Figure 4.2.3
City of Valdosta, GA
Cherry Creek Sub-Basin
Alternative CC1
Lake Laurie Drainage Pipe Improvements

CDM

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

0 250 500 1,000 Feet

Figure 4.2.4
City of Valdosta, GA
Stillhouse Branch Sub-Basin
Alternative SH1
Stillhouse Branch Stream Restoration
South of Lake Laurie Drive

CDM

Alternative SH2 – Shirley Place Detention Pond Rehabilitation

A small detention pond already exists at this location near Shirley Place in the Stillhouse Branch sub-basin. The inlet to this pond is no longer functioning and the pond is filled up and does not provide any detention benefits to the area. Recently there have been several flooding instances just upstream of this pond, in houses located on Shirley Place. Significant channel erosion due to flooding has caused loss of trees at this location.

CDM proposes to rehabilitate this pond by constructing appropriate inlet control structures to the detention pond, routing the street stormwater drains to the pond, and excavating the pond to provide about 4 Ac-ft of live storage. This pond, once properly rehabilitated, will reduce flooding in houses located on Shirley Place and also protect the existing trees in the vicinity by preventing stream erosion. **Figure 4.2.5** shows the location of the Shirley Place detention pond. **Table 4.2.7** shows the conceptual costs estimates for this alternative.

Figure 4.2.5
City of Valdosta, GA
Stillhouse Branch Sub-Basin
Alternative SH2
Shirley Place Detention Facility Rehabilitation

CDM