

CDBG Mitigation Grant Application Proposed Project: Calhoun County Bayou and Highway Drainage Improvements

The goal of this project is to improve two major drainage channels in Port Lavaca in order to increase excess water flow out of the city to prevent future flooding. The current channels drain approximately 18,500 acres. County and city channels are often strained during heavy storm events, but Hurricane Harvey showed that significant issues exist with the major channels. While the channels identified for this project have been maintained as governmental budgets allow, there was been inadequate capital for improvements. This has put nearby residential areas, businesses and highways in constant danger of flooding.

The project is split into three sections. Section A pertains to the north area of Port Lavaca, in-between FM 1090 and Hwy 35. Section B pertains to the center north of the city, which includes the stadium, high school, commercial district and residential areas. Both sections flow into Lynn Bayou. Section C pertains to the west side of the city, which includes residential areas, the intersection of Hwy 87 with Hwy 35 and agricultural areas. This channel flows into Chocolate Bayou. The major drainage channels in these sections will be improved to increase flood resilience, erosion resistance and prolong the longevity of the channels. In Section A, a new diversion channel will be constructed from Lynn Bayou to Lavaca Bay to divert upstream water before it flows into the city. In Section B, improvements will include the removal of vegetation along the channel and lining most of the channel with concrete rip-rap and box culverts to increase the flow rate and reduce erosion of the channel. In Section C, upstream water flow will be captured more quickly and key sections of the channel, such as under the train track and Hwy 35, will be concrete lined to address flooding in these areas. Dense vegetation in the downstream section of the channel will be removed.



CDBG-MIT: Budget Justification of Retail Costs (Former Table 2)

Cost Verification Controls must be in place to assure that construction costs are reasonable and consistent with market costs at the time and place of construction.

Applicant/Subrecipient:	County of Calhoun, Texas					
Site/Activity Title:	Calhoun County Bayou and Highway Drainage Improvements					
Eligible Activity:						
Materials/Facilities/Services	\$/Unit	Unit	Quantity	Construction	Acquisition	Total
Ditch Improvements 0-5 ft depth	\$ 60.00	LF	4000	\$ 240,000.00	\$ -	\$ 240,000.00
Ditch Improvements 5-10 ft depth	\$ 100.00	LF	6300	\$ 630,000.00	\$ -	\$ 630,000.00
Concrete Riprap	\$ 63.00	SY	36000	\$ 2,268,000.00	\$ -	\$ 2,268,000.00
Install 8'x8' box culvert	\$ 2,800.00	LF	200	\$ 560,000.00	\$ -	\$ 560,000.00
Install Double 10'x10' box culvert	\$ 6,000.00	LF	1800	\$ 10,800,000.00	\$ -	\$ 10,800,000.00
Install Headwall	\$ 50,000.00	EA	4	\$ 200,000.00	\$ -	\$ 200,000.00
Ditch Channel Widening	\$ 80.00	LF	2700	\$ 216,000.00	\$ -	\$ 216,000.00
Custom Box To Bridge Culvert Connection	\$ 100,000.00	EA	2	\$ 200,000.00	\$ -	\$ 200,000.00
Ditch Improvements, Clean Out and Vegetation Removal - Small Width / Light Vegetation	\$ 60.00	LF	1300	\$ 78,000.00	\$ -	\$ 78,000.00
Ditch Improvements, Clean Out and Vegetation Removal - Medium Width / Light Vegetation	\$ 80.00	LF	550	\$ 44,000.00	\$ -	\$ 44,000.00
Ditch Improvements, Clean Out and Vegetation Removal - Large Width / Light Vegetation	\$ 100.00	LF	150	\$ 15,000.00	\$ -	\$ 15,000.00
Ditch Improvements, Clean Out and Vegetation Removal - Medium Width / Medium Vegetation	\$ 120.00	LF	450	\$ 54,000.00	\$ -	\$ 54,000.00
Ditch Improvements, Clean Out and Vegetation Removal - Large Width / Medium Vegetation	\$ 250.00	LF	3800	\$ 950,000.00	\$ -	\$ 950,000.00
Ditch Improvements, Clean Out and Vegetation Removal - Large Width / Dense Vegetation	\$ 400.00	LF	1850	\$ 740,000.00	\$ -	\$ 740,000.00
Cleanout of Bridge Culverts	\$ 150.00	LF	350	\$ 52,500.00	\$ -	\$ 52,500.00
Upsize Storm Sewer Pipes with Headwall/Wingwall - Medium	\$ 1,200.00	LF	150	\$ 180,000.00	\$ -	\$ 180,000.00
Purchase Property/Easements Per Acre	\$ 15,000.00	EA	15		\$ 225,000.00	\$ 225,000.00
	\$ -		0	\$ -	\$ -	\$ -
TOTAL	\$ 176,463.00			\$ 17,227,500.00	\$ 225,000.00	\$ 17,452,500.00

1. Identify and explain the annual projected operation and maintenance costs associated with the proposed activities.

Occasional drainage channel clean out and grass maintenance approximately \$30,000.00 per year

2. Identify and explain any special engineering activities.

None known at this time.



Date: 10/02/2020
Phone Number: 361-552-4509

Scott P. Mason, P.E.
Signature of Registered Engineer/Architect Responsible For
Budget Justification:

MEMO

To: Calhoun County, Calhoun County Drainage District #11, The City of Port Lavaca

From: G&W Engineers, Inc.

Date: October 02, 2020

RE: Engineering Justification Memo for Calhoun County Bayou and Highway Drainage Improvements

Calhoun County is a coastal county located in South East Texas along the Gulf of Mexico with the City of Port Lavaca being the largest most densely populated cities. At the current time the City has four major drainage ditches that drain water from the rural counties and through the City into the bay. Calhoun County, the City of Port Lavaca, and the Calhoun County Drainage District #11 have a long-standing relationship of working together. The goal of this proposed project is to improve two of the four major drainage channels and increase or eliminate the flow rate of water out of the City to prevent future flooding.

The current drainage channels that are intended to be improved, drain an approximate combined area of 18,500 acres with channel widths varying from approximately 20 feet in width to upwards of approximately 120 feet in width.

The county and city experiences extreme weather events such as Hurricanes and Tropical Storms due to its proximity to the gulf. The County's and City's drainage channels are repeatedly strained and, in some cases, deemed inadequate for major storm events, with the most recent major Hurricane Harvey in 2017.

Past

The project sites of the drainage channels have been strained before on heavy storm events, but the Hurricane Harvey event in 2017 showed that there were issues with the major drainage channels. The channels identified in this project being the most in need of being upgraded. A large portion of land around these major drainage channels are in a 100-yr flood zone or 500-yr flood zone depending on the distance from the channel. The drainage channels identified for this project have been maintained over the years as governmental budgets allow. In the past, engineering studies have been performed for the City of Port Lavaca with future recommendations addressed on a preliminary scale. Due to the size and capital associated with the recommendations, most all of the projects have not received funding due to the financial burden. This has left the residents of these areas in a susceptible position, with no future reconciliation in sight.

Present

Recently the City of Port Lavaca, Calhoun County, and Calhoun County Drainage District #11 have repaired and maintained the current conditions of the drainage channels, but further repair and improvement are needed to better protect the County and City and their citizens from future flooding caused by heavy rainfall events. Many of the sections of the major drainage channels show signs of needing to be expanded or to have new channels to divert drainage away from other areas to help with channel capacity. The current project is split into three sections labeled A, B and C. Section A pertains to the north area of the city in-between FM 1090 and HWY35. Section B collects the runoff from the center north of the city including a stadium, high school, commercial district and residential areas finally connecting into the same major Drainage channel as Section A. Section C collects the runoff from the west side of the city including residential, a major highway and agricultural areas. All of the sections have parts that lie within the 500-yr and 100-yr flood plains and are subject to risk of causing severe damages to the commercial, residential and public sectors if the drainage channel are not improved by the next major disaster.

Future

To increase the flood resilience, erosion resistance and prolong the longevity of the existing major drainage channels for the County and City, the previously mentioned three sections of the channels will need to be improved upon. Section A needs to be diverted upstream before flowing too far into the city in order to help with flow capacity and to divert the large volume of water that the channel normally carries, in a direction away from residential housing and key highway structures. Section B improvements will include the removal of vegetation of the marked channel and lining most of the channel with a concrete rip-rap to increase the flow rate and reduce the erosion of the channel. The other major improvement of Section B is to install two side by side 10'x10' box culverts into the existing channel to protect the residential and commercial sections of the channel. Section C will be expanded further upstream to capture the runoff quicker and have more capacity as needed, and key sections will be concrete lined around two 90 degree turns that lead under a set of train tracks and a major highway. This will resolve issues that have been long standing in the County and City. The other improvement of Section C is to remove the dense vegetation from the downstream section of the channel and increase capacity. With the implementation of all of the improvements proposed the general safety of the community and its ability to resist disastrous storm events will help the community and will allow the City and County to be able to rapidly recover from future emergency situations. The improvements proposed will be significant impacts to the area.

NOTE: FLOODS ZONE ARE BASED ON FEMA FLOOD MAPS. FLOOD BASINS ARE SIMPLIFIED DRAINAGE CATCHMENTS FROM THE U.S. EPA NHDPLUS V2.1 WEB MAP SERVICE.

LEGEND

BASIN 1 - 1,458 AC

BASIN 2 - 859 AC

BASIN 3 - 11,389 AC

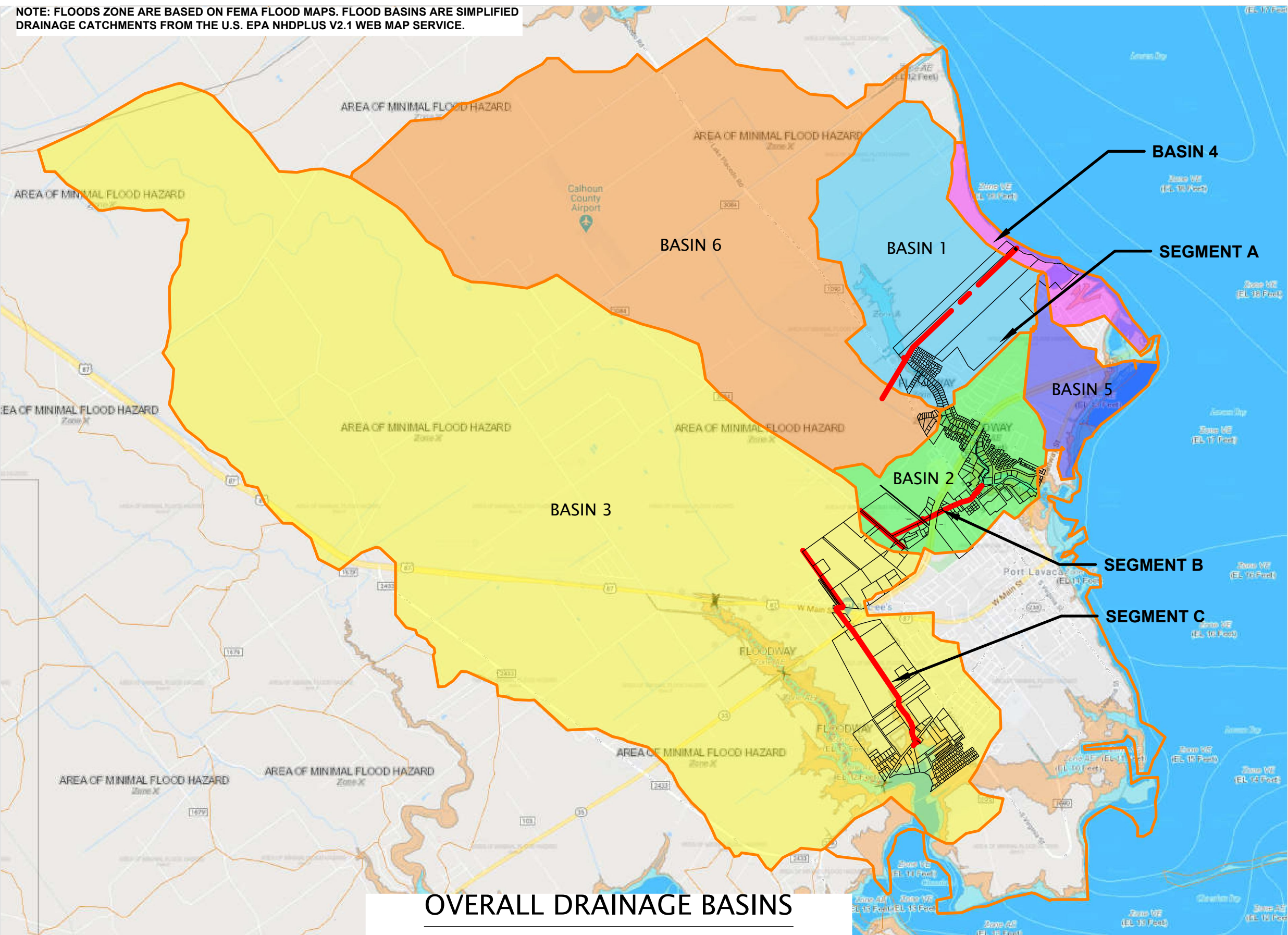
BASIN 4 - 265 AC

BASIN 5 - 396 AC

BASIN 6 - 4,522 AC

PROPERTY BOUNDARY

DRAINAGE CATCHMENT



OVERALL DRAINAGE BASINS

PRELIMINARY

CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS

CALHOUN COUNTY, TEXAS
GLO-CDBG-DR APPLICATION

G & W ENGINEERS, INC.

ENGINEERING SURVEYING PLANNING

205 W. LIVE OAK STREET, PORT LAVACA, TEXAS 77979
TBPE FIRM NO.: F04188
(361) 552-4509: PORT LAVACA (979) 323-7100: BAY CITY

DRAWN BY:
S.P.M.

CHECKED BY:
S.P.M.

DATE:
SEP. 22, 2020

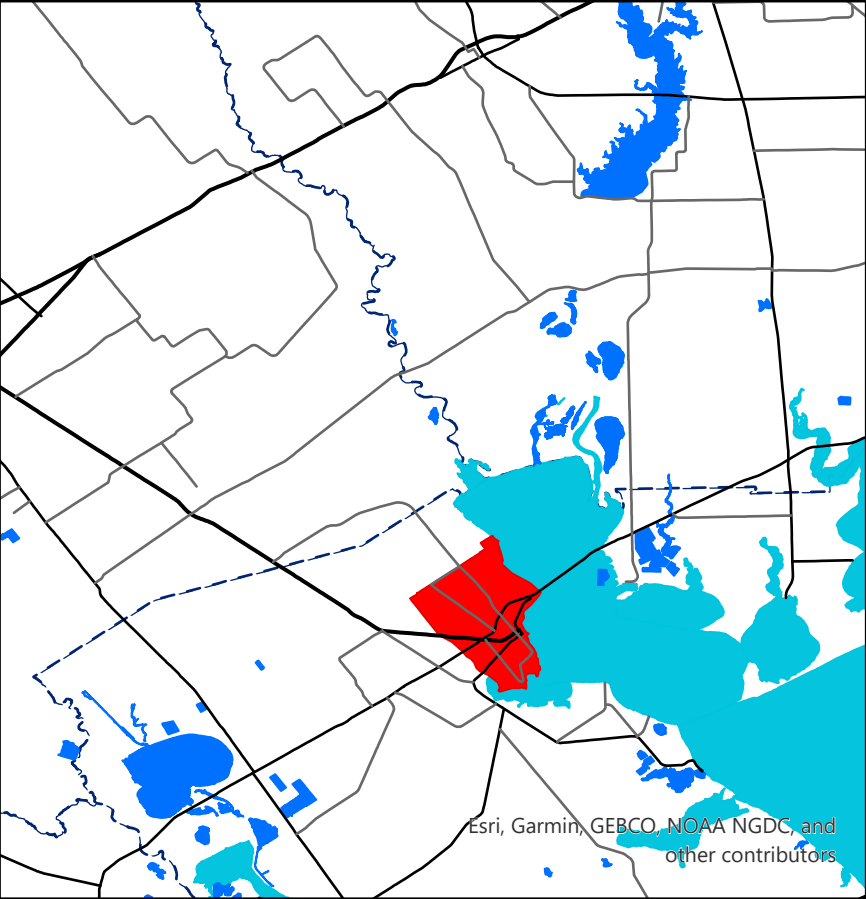
SCALE:
NTS

JOB NO.:
5310.013

SHEET NO.:
1

Calhoun County Drainage Improvements Census Map

- Seadrift Citywide Area of Benefit
- Drainage Improvements
- Enhanced Ingress/Egress to Streets



TxCDBG RACE AND ETHNICITY / GENDER CALCULATOR

INSTRUCTIONS AND DATA SOURCE

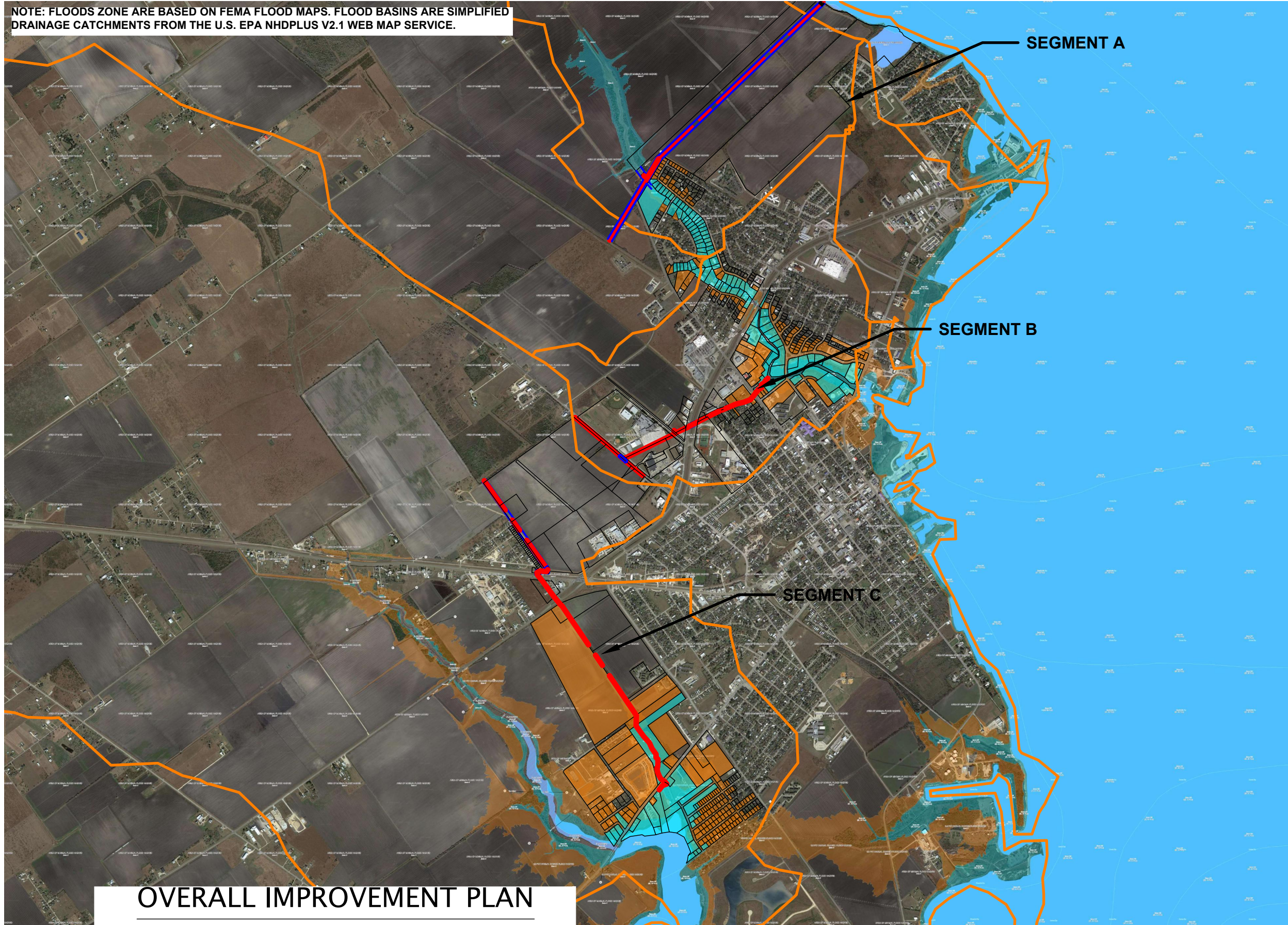
Data Source: Most Recent ACS 5-year Est. - Table DP05

City Applicants: Enter city-wide data as reflected on Table DP05

County Applicants: Enter census tract data as reflected on Table DP05

APPLICANT:		Calhoun County	
Sex and Age		ENTER DP05 DATA HERE	
Male:		11062	
Female:		10745	
One Race			
White:		18896	
Black or African American:		561	
American Indian and Alaska Native:		19	
Asian:		1032	
Native Hawaiian and Other Pacific Islander:		17	
Some Other Race:		339	
Two or more races:		943	
-White and Black or African American:		102	
-White and American Indian and Alaska Native:		739	
-White and Asian:		28	
-Black or African American and American Indian and Alaska Native:		0	
Hispanic or Latino and Race			
Hispanic or Latino (of any race):		10564	
Not Hispanic or Latino:		11243	
-White alone:		9314	
-Black or African American alone:		528	
-American Indian and Alaska Native alone:		3	
-Asian alone:		998	
-Native Hawaiian and Other Pacific Islander alone:		17	
-Some other race alone:		0	
-Two or more races:		383	
Enter Number of Project Beneficiaries:		13190	
Gender of Project Beneficiaries			
Male		6691	
Female		6499	
Race and Ethnicity of Project Beneficiaries		Hispanic	Non-Hispanic
White		5795	5634
Black/African American		20	319
American Indian/Alaska Native		10	2
Asian		21	604
Native Hawaiian/Other Pacific Islander		0	10
Some Other Race		205	0
White and Black/African American		36	25
White and American Indian/Alaska Native		266	181
White and Asian		10	7
Black/African American and American Indian/Alaska Native		0	0
Other multi racial		27	18
Total:		13190	

NOTE: FLOODS ZONE ARE BASED ON FEMA FLOOD MAPS. FLOOD BASINS ARE SIMPLIFIED DRAINAGE CATCHMENTS FROM THE U.S. EPA NHDPLUS V2.1 WEB MAP SERVICE.



OVERALL IMPROVEMENT PLAN

**CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS**
CALHOUN COUNTY, TEXAS
GLO-CDBG-DR APPLICATION

G & W ENGINEERS, INC.

● ENGINEERING ● SURVEYING ● PLANNING ●

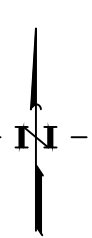
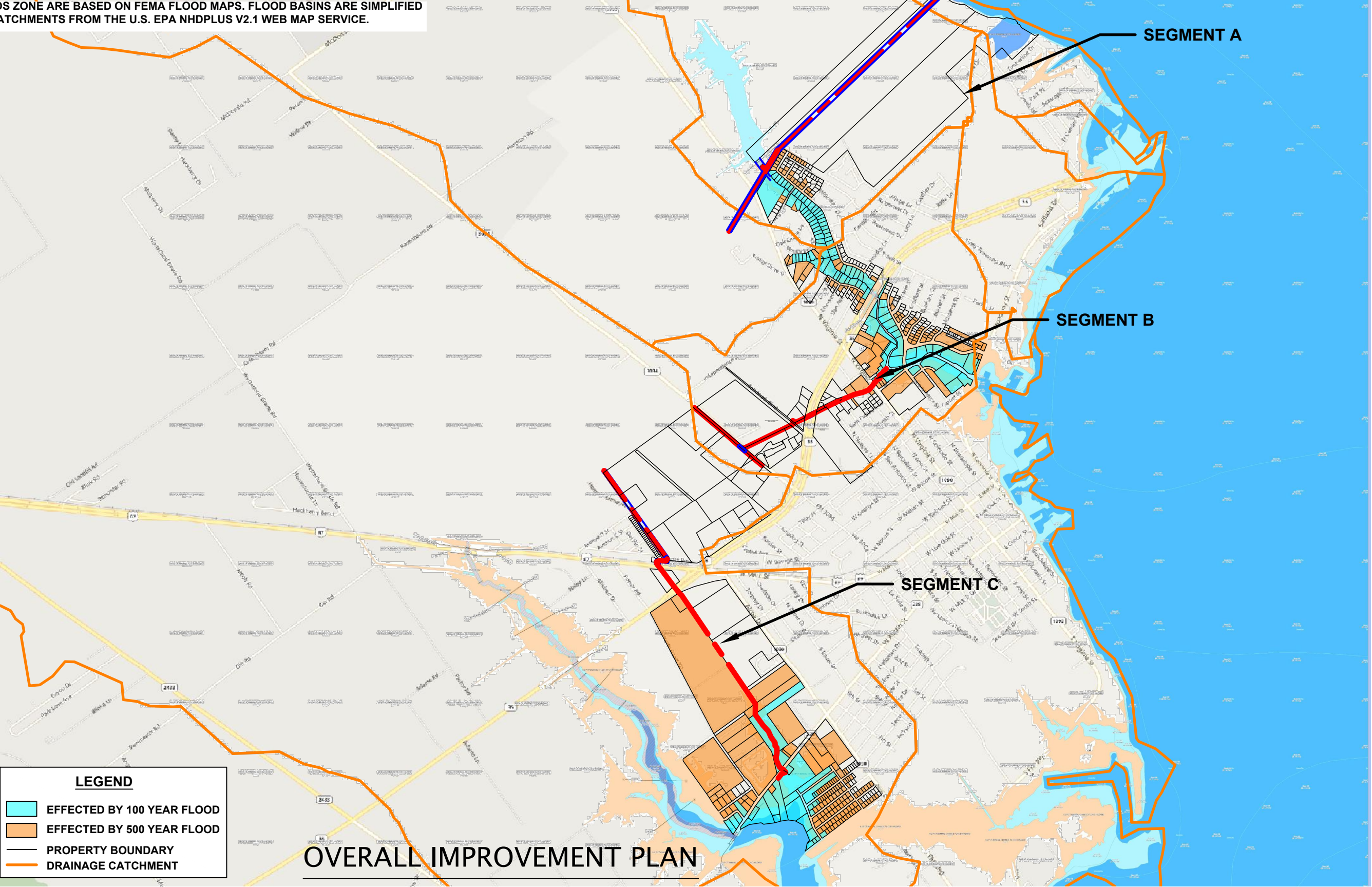
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2

PRELIMINARY

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PRELIMINARY

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HIGHWAY DRAINAGE
IMPROVEMENTS**
CALHOUN COUNTY, TEXAS
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LEGEND

EFFECTED BY 100 YEAR FLOOD

EFFECTED BY 500 YEAR FLOOD

PROPERTY BOUNDARY

DRAINAGE CATCHMENT

DITCH IMPROVEMENTS
5-10FT DEPTH
6,212± L.F. (120'± WIDE)

CONC RIPRAP
6,785± SY

DITCH IMPROVEMENTS
0-5FT DEPTH
1,717± L.F. (120'± WIDE)

SEGMENT A IMPROVEMENTS

CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS
CALHOUN COUNTY, TEXAS
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SCALE:
1" = 300'
JOB NO.:
5310.013
SHEET NO.:
A1

PRELIMINARY

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LEGEND

EFFECTED BY 100 YEAR FLOOD

EFFECTED BY 500 YEAR FLOOD

PROPERTY BOUNDARY

DRAINAGE CATCHMENT



PRELIMINARY

CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS

CALHOUN COUNTY, TEXAS
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JOB NO.:
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SHEET NO.:
A2

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LEGEND

EFFECTED BY 100 YEAR FLOOD

EFFECTED BY 500 YEAR FLOOD

PROPERTY BOUNDARY

DRAINAGE CATCHMENT



SEGMENT A IMPROVEMENTS

PRELIMINARY

CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS

CALHOUN COUNTY, TEXAS
GLO-CDBG-DR APPLICATION

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SHEET NO.:
A3

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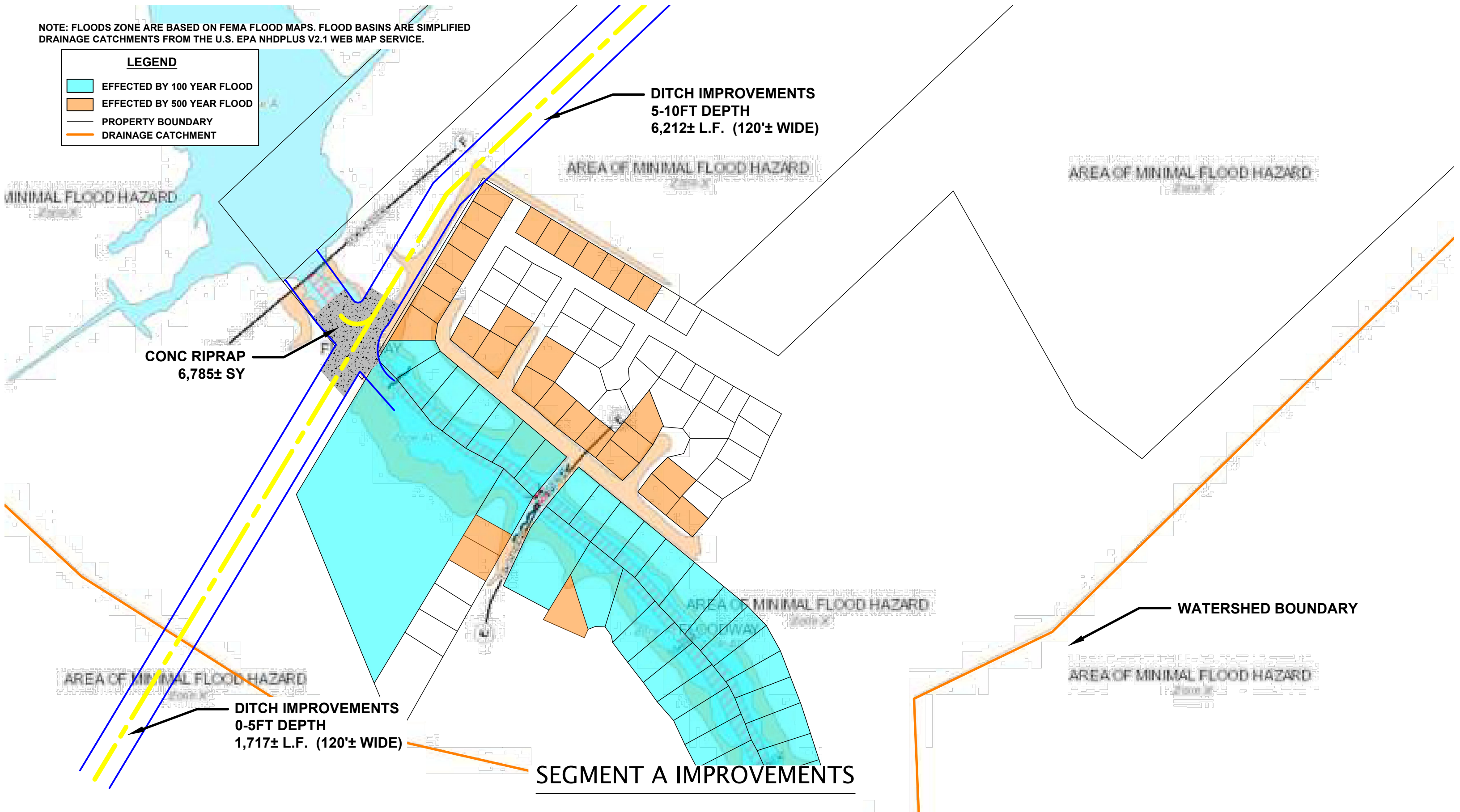
LEGEND

EFFECTED BY 100 YEAR FLOOD

EFFECTED BY 500 YEAR FLOOD

PROPERTY BOUNDARY

DRAINAGE CATCHMENT



SEGMENT A IMPROVEMENTS

PRELIMINARY

CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS

CALHOUN COUNTY, TEXAS
GLO-CDBG-DR APPLICATION

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SCALE:
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JOB NO.:
5310.013

SHEET NO.:
A4

LEGEND

	EFFECTED BY 100 YEAR FLOOD
	EFFECTED BY 500 YEAR FLOOD
	PROPERTY BOUNDARY
	DRAINAGE CATCHMENT

SEGMENT A IMPROVEMENTS

G & W ENGINEERS, INC.

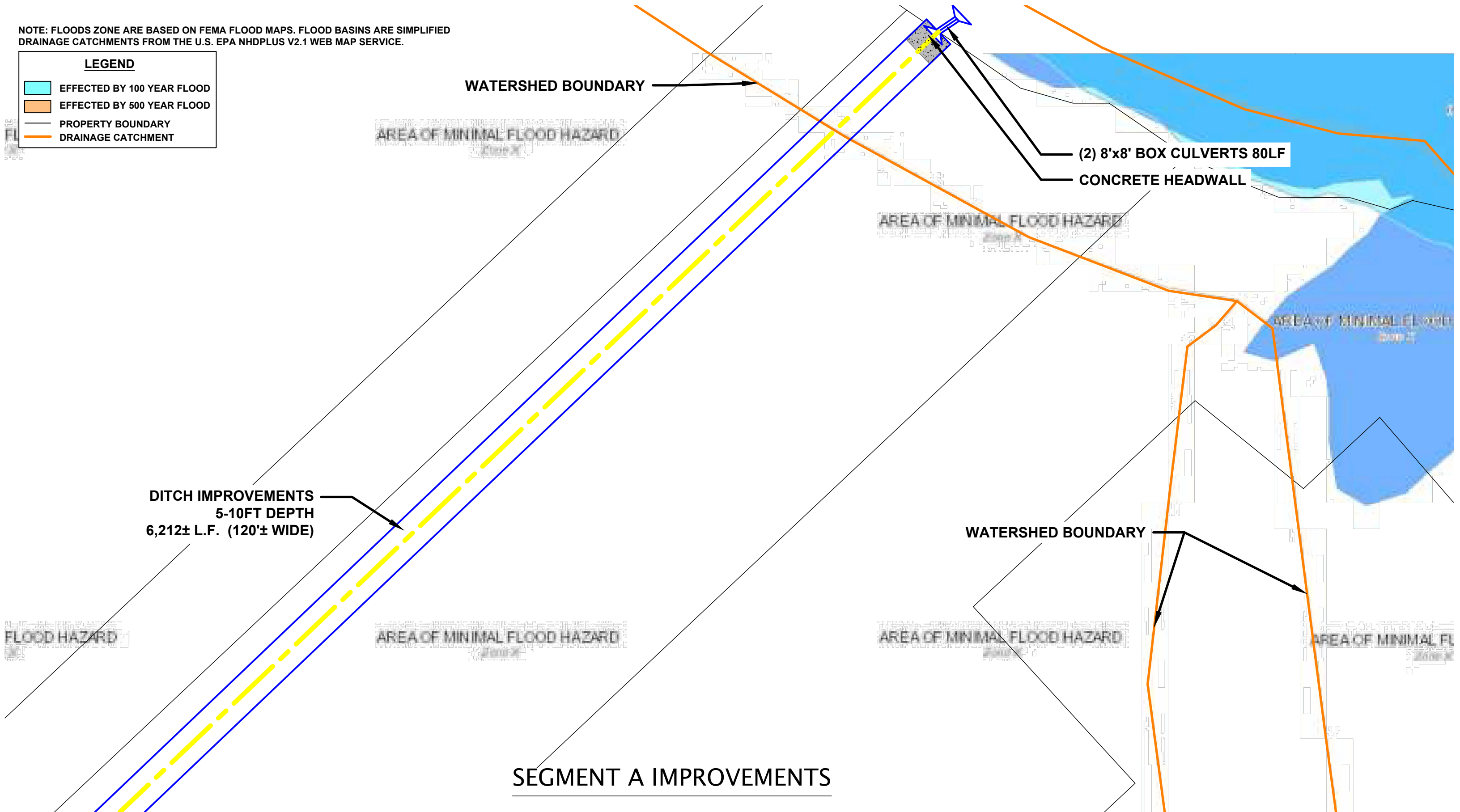
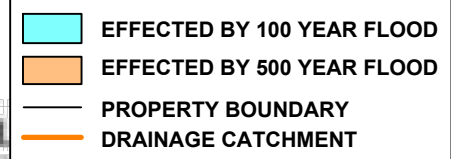
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A5

PRELIMINARY

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LEGEND





PRELIMINARY

**CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS**

CALHOUN COUNTY, TEXAS
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DATE:	SHEET NO.:
SEP. 22, 2020	A6

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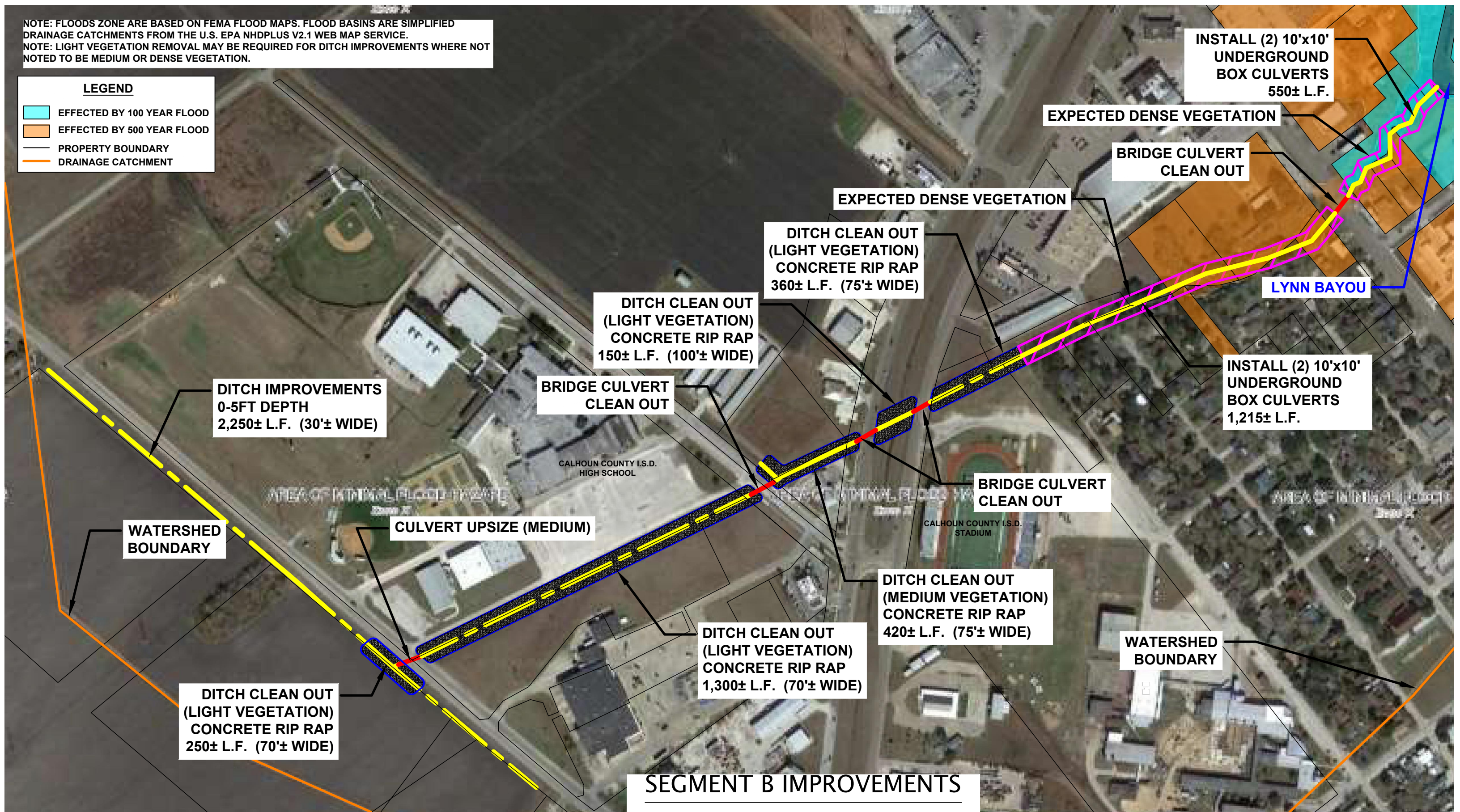
LEGEND

EFFECTED BY 100 YEAR FLOOD

EFFECTED BY 500 YEAR FLOOD

PROPERTY BOUNDARY

DRAINAGE CATCHMENT



SEGMENT B IMPROVEMENTS

PRELIMINARY

CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS

CALHOUN COUNTY, TEXAS
GLO-CDBG-DR APPLICATION

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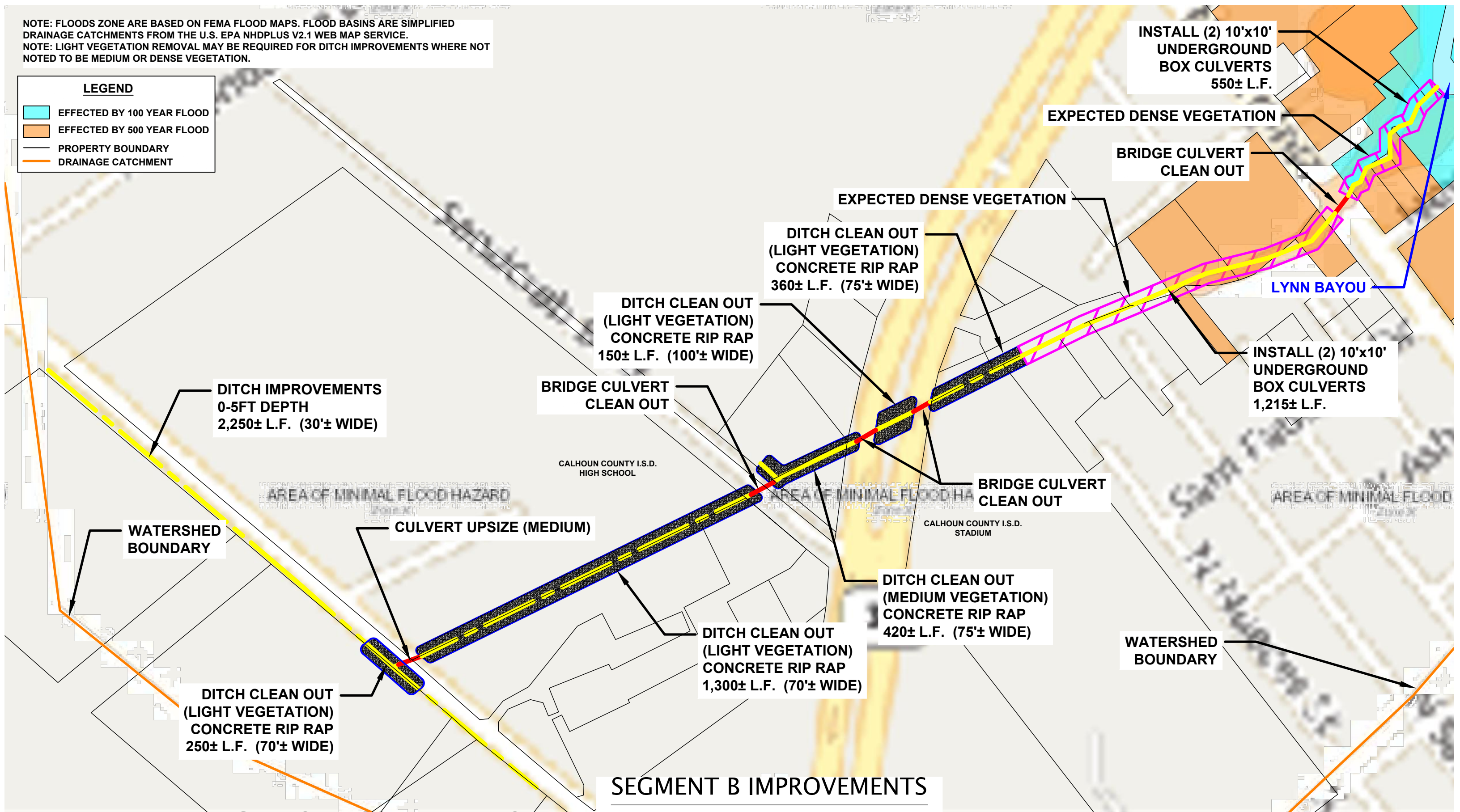
LEGEND

EFFECTED BY 100 YEAR FLOOD

EFFECTED BY 500 YEAR FLOOD

PROPERTY BOUNDARY

DRAINAGE CATCHMENT



PRELIMINARY

CALENDAR

CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS

CALHOUN COUNTY, TEXAS
GLO-CDBG-DR APPLICATION

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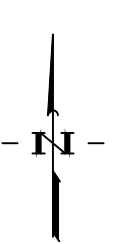
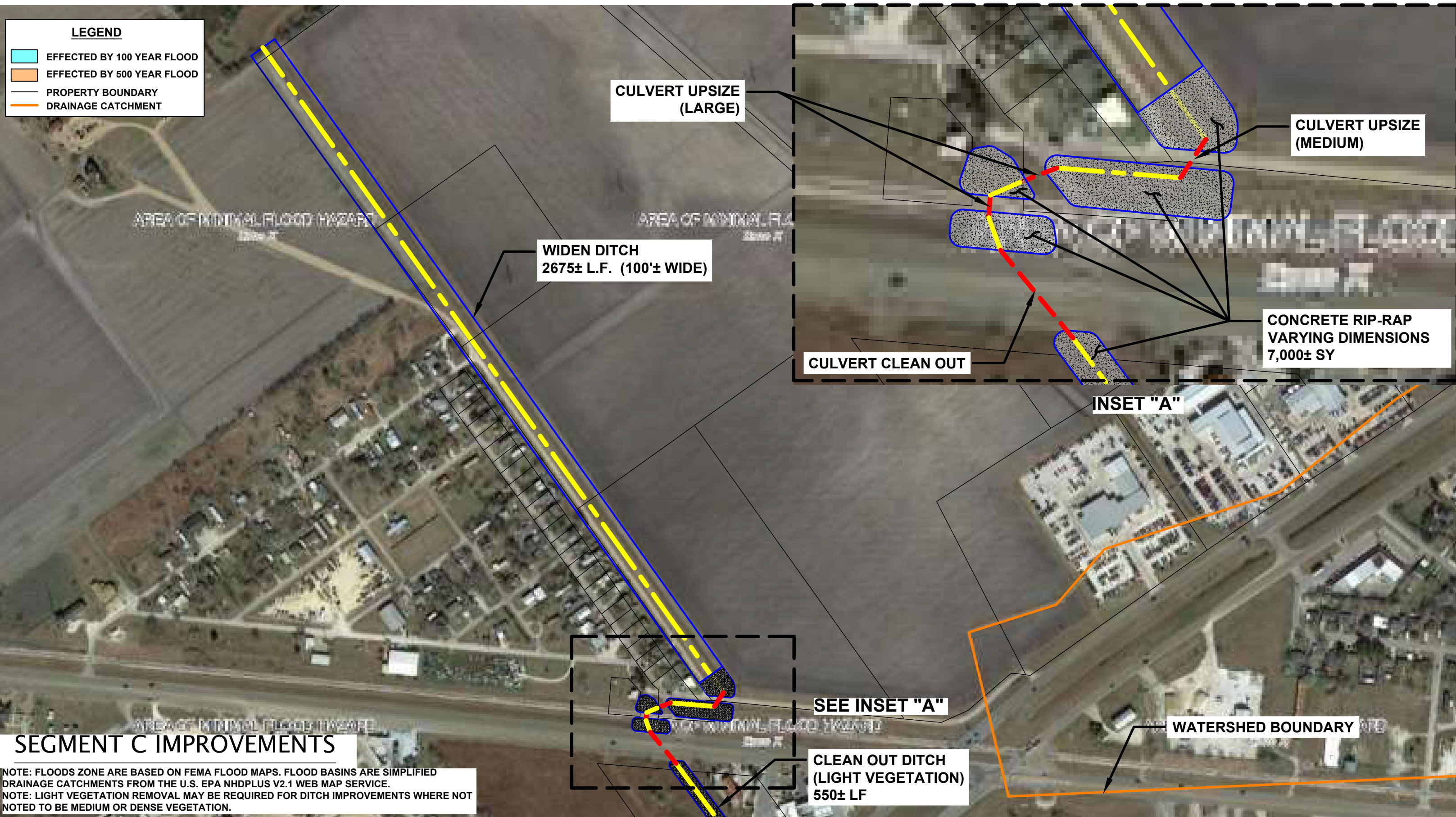
SCALE:
1" = 300'

JOB NO.:
5310.013

SHEET NO.:
B2

LEGEND

- EFFECTED BY 100 YEAR FLOOD
- EFFECTED BY 500 YEAR FLOOD
- PROPERTY BOUNDARY
- DRAINAGE CATCHMENT



PRELIMINARY

**CALHOUN COUNTY BAYOU AND
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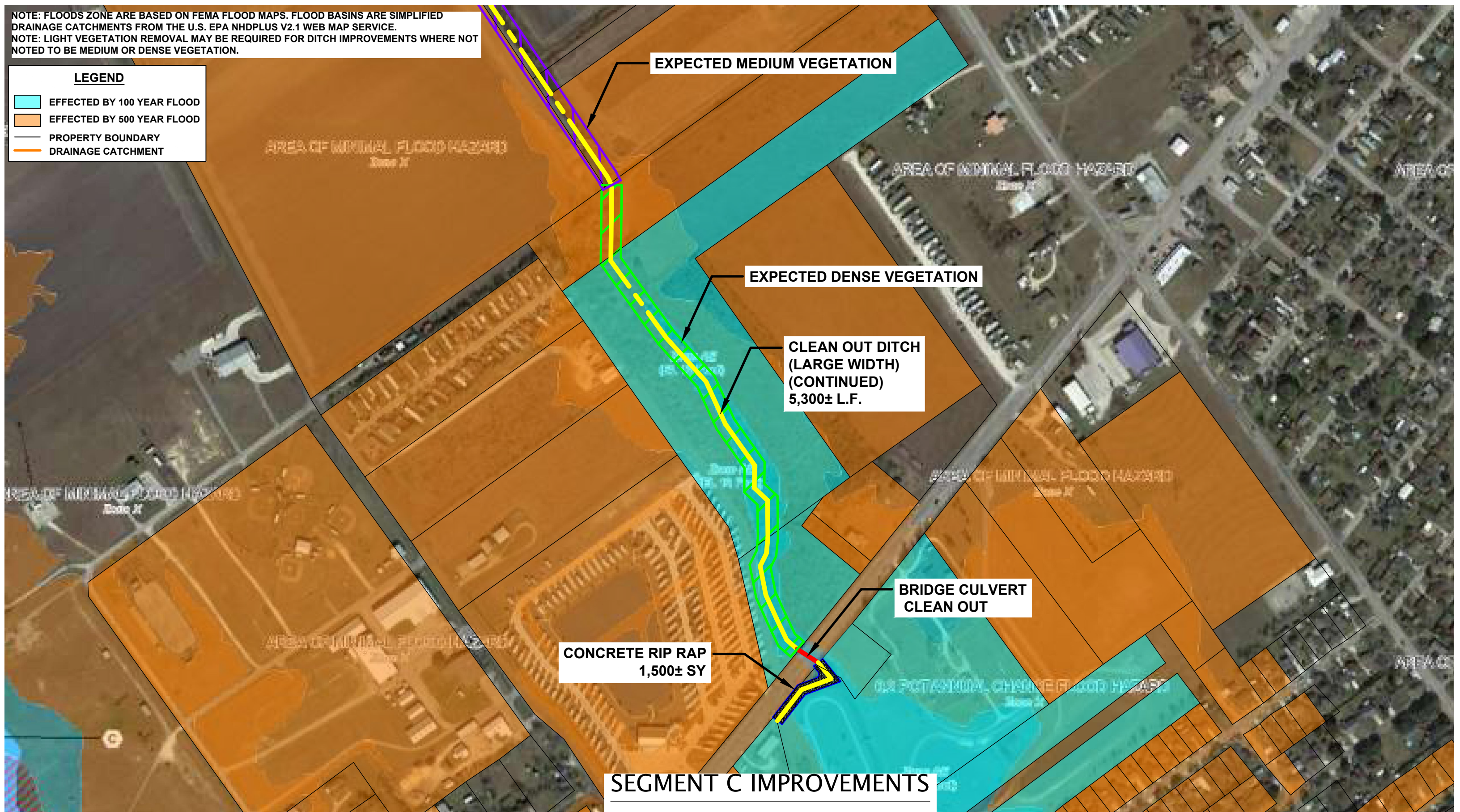
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EFFECTED BY 100 YEAR FLOOD

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PROPERTY BOUNDARY

DRAINAGE CATCHMENT



SEGMENT C IMPROVEMENTS

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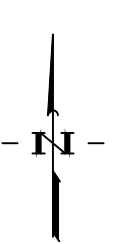
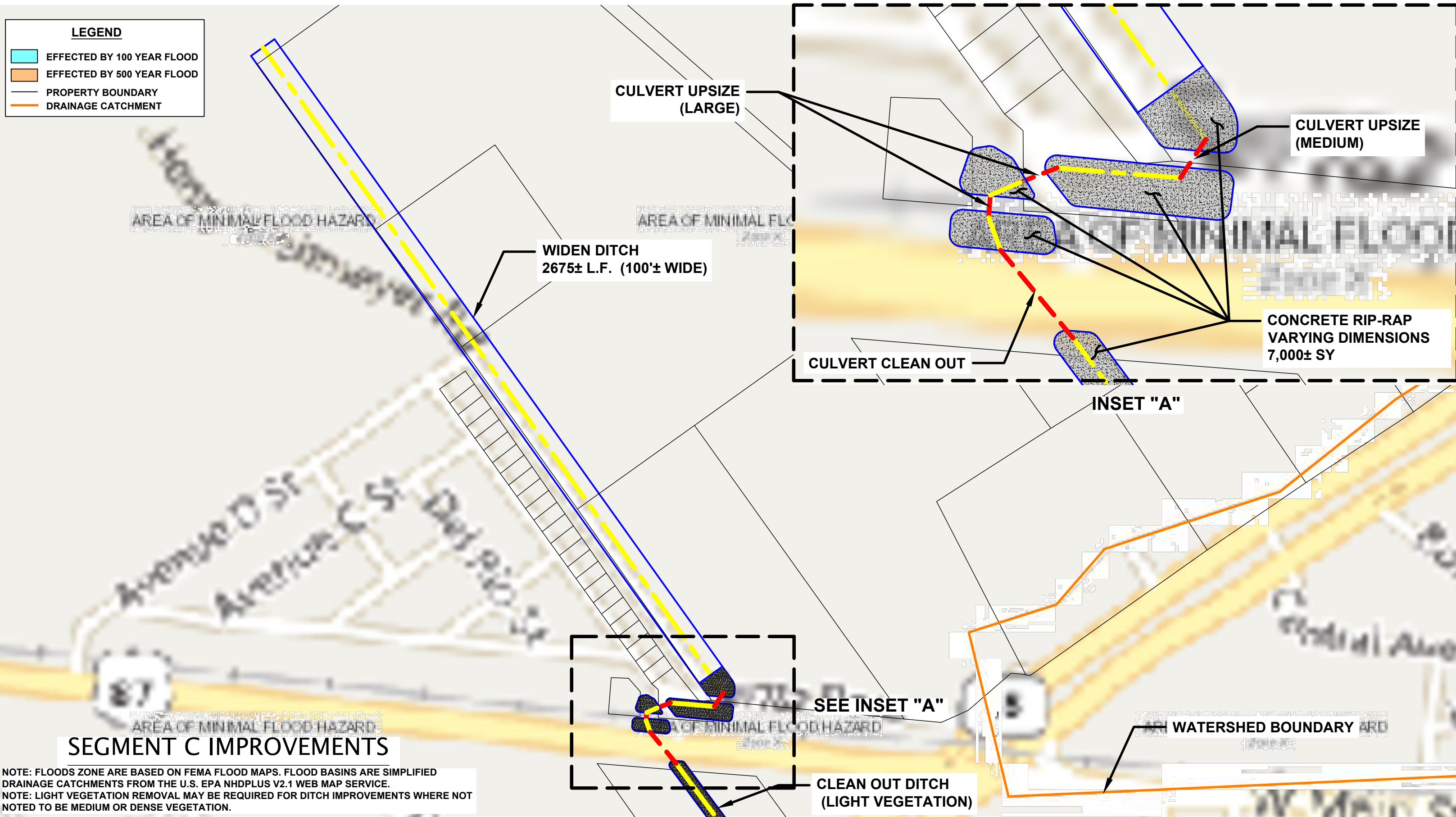
SCALE:
1" = 300'

JOB NO.:
5310.013

SHEET NO.:
C3

LEGEND

- EFFECTED BY 100 YEAR FLOOD
- EFFECTED BY 500 YEAR FLOOD
- PROPERTY BOUNDARY
- DRAINAGE CATCHMENT



PRELIMINARY

**CALHOUN COUNTY BAYOU AND
HIGHWAY DRAINAGE
IMPROVEMENTS**
CALHOUN COUNTY, TEXAS
GLO-CDBG-DR APPLICATION

G & W ENGINEERS, INC.

ENGINEERING

SURVEYING

PLANNING

205 W. LIVE OAK STREET, PORT LAVACA, TEXAS 77979
TBPE FIRM NO.: F04188
(361) 552-4509: PORT LAVACA (979) 323-7100: BAY CITY

DRAWN BY:

S.P.M.

CHECKED BY:

S.P.M.

DATE:

SEP. 22, 2020

SCALE:

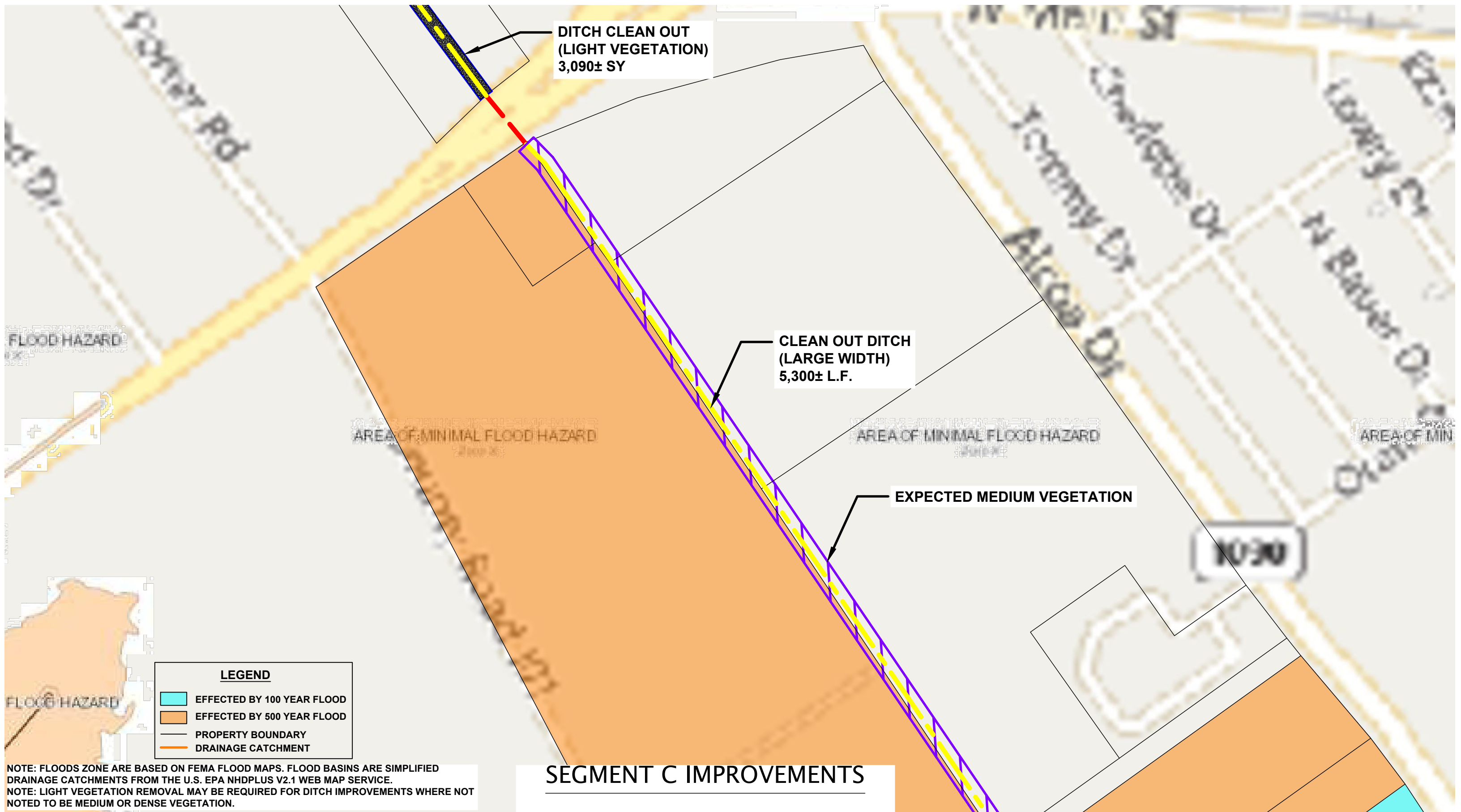
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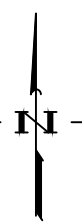
JOB NO.:

5310.013

SHEET NO.:

C4





PRELIMINARY

CALHOUN COUNTY BAYOU AND HIGHWAY DRAINAGE IMPROVEMENTS

CALHOUN COUNTY, TEXAS
GLO-CDBG-DR APPLICATION

G & W ENGINEERS, INC.

● ENGINEERING ● SURVEYING ● PLANNING ●

205 W. LIVE OAK STREET, PORT LAVACA, TEXAS 77979
TBPE FIRM NO.: F04188
(361) 552-4509: PORT LAVACA (979) 323-7100: BAY CITY

DRAWN BY:
S.P.M.

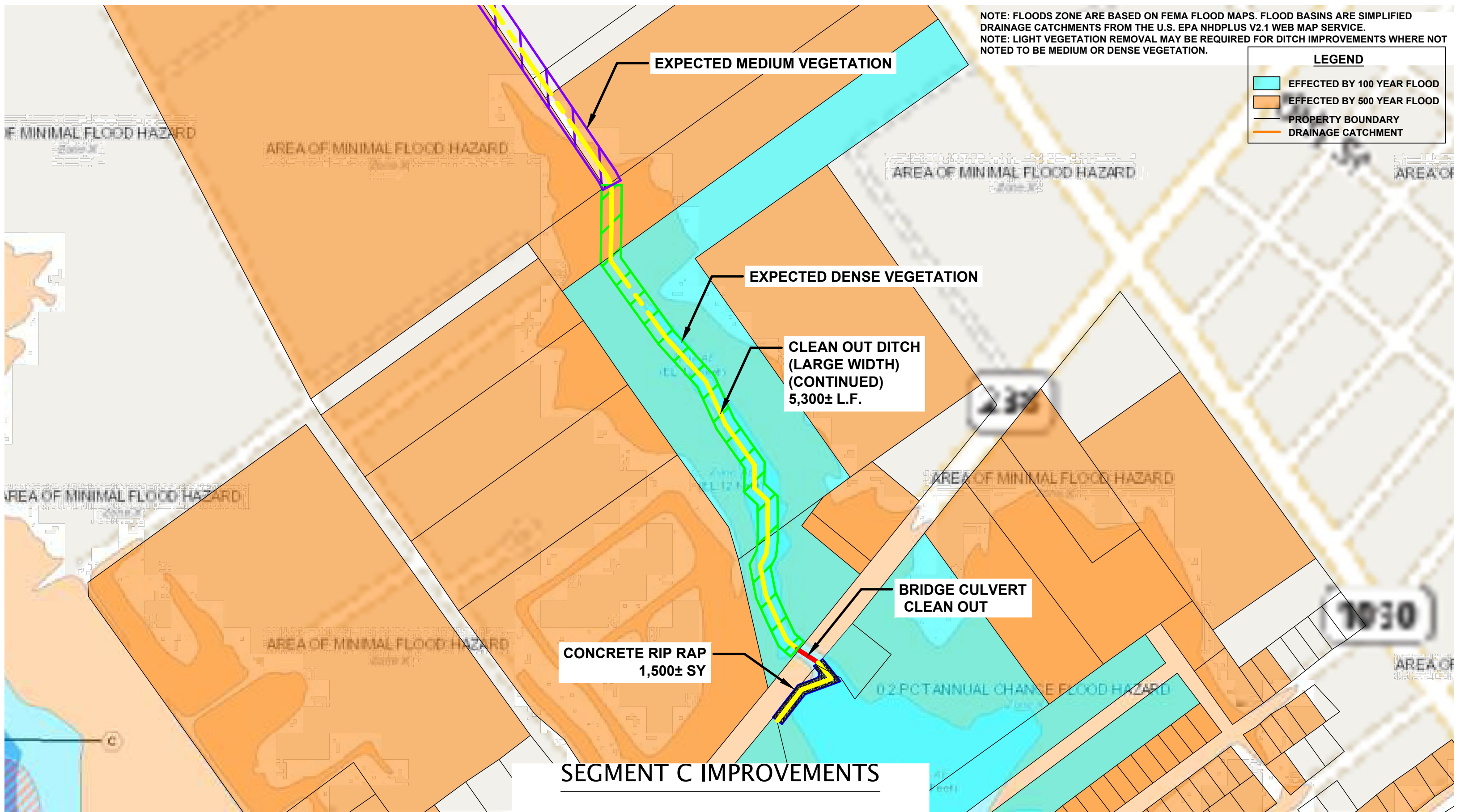
CHECKED BY:
S.P.M.

DATE:
SEP. 22, 2020

SCALE:
1" = 300'

JOB NO.:
5310.013

SHEET NO.:
C5



NOTE: FLOODS ZONE ARE BASED ON FEMA FLOOD MAPS. FLOOD BASINS ARE SIMPLIFIED DRAINAGE CATCHMENTS FROM THE U.S. EPA NHDPLUS V2.1 WEB MAP SERVICE.
NOTE: LIGHT VEGETATION REMOVAL MAY BE REQUIRED FOR DITCH IMPROVEMENTS WHERE NOT NOTED TO BE MEDIUM OR DENSE VEGETATION.

LEGEND

- EFFECTED BY 100 YEAR FLOOD
- EFFECTED BY 500 YEAR FLOOD
- PROPERTY BOUNDARY
- DRAINAGE CATCHMENT

EXPECTED MEDIUM VEGETATION

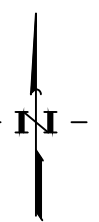
EXPECTED DENSE VEGETATION

CLEAN OUT DITCH
(LARGE WIDTH)
(CONTINUED)
5,300± L.F.

BRIDGE CULVERT
CLEAN OUT

CONCRETE RIP RAP
1,500± SY

SEGMENT C IMPROVEMENTS

	PRELIMINARY	CALHOUN COUNTY BAYOU AND HIGHWAY DRAINAGE IMPROVEMENTS CALHOUN COUNTY, TEXAS GLO-CDBG-DR APPLICATION	G & W ENGINEERS, INC. ● ENGINEERING ● SURVEYING ● PLANNING ● 205 W. LIVE OAK STREET, PORT LAVACA, TEXAS 77979 TBPE FIRM NO.: F04188 (361) 552-4509; PORT LAVACA (979) 323-7100; BAY CITY	DRAWN BY:	SCALE:
				S.P.M.	1" = 300'
				CHECKED BY:	JOB NO.:
				S.P.M.	5310.013
DATE:	SHEET NO.:				
SEP. 22, 2020	C6				