Workplan: Critical Infrastructure Improvements – Stormwater in Upper US31 Vestavia Hills

APPENDIX

1. Upper US31 Stormwater Master Plan (2022)
2. Location Map
3. USGS 1:24 Birmingham South Quadrangle
4. The Cahaba River Watershed
5. Project Area
6. Partial Data Series Precipitation Intensity (Zip Code 35216)
7. Engineer's Estimate of Probable Construction Cost (each project area)
8. Analysis of Mitigation Alternatives (Section 5 of Master Plan)
9. Photographs, "Eastern Trunkline of the Upper US31 Stormwater Master Plan"
10. Budget with Sample Calculation and Budget Justification Worksheet
11. MTDC - FY2025 Public Services Departmental Budget
12. Gantt Chart of Project Milestones as of 2-25-2025

1.

Upper US31 Stormwater Master Plan (2022)

City of Vestavia Hills

Vestavia Hills Stormwater Masterplan Project and Drainage Study

Drainage Assessment Report

October 11, 2022

Full Master Plan can be found at https://vhal.org/wp-content/uploads/2023/05/Vestavia-Hills-Report_FINAL_signed.pdf

Prepared by:

Schoel Engineering Company, Inc.
1001 22nd Street South
Birmingham, AL 35205
205-323-6166

Table 3 – Prioritization and ranking tables.

PROJECTS	RANKINGS	NO. OF PROPERTIES THAT BENEFIT (RANK 1-HIGH, 10-LOW)	PROPERTY SCORE	COST	COST SCORE	PUBLIC ROW %	PUBLIC % SCORE	OCCURANCE OF FLOODING	FLOODING SCORE	TOTAL SCORE
EAST TRUNK LINE	**1**	34								
SUNSET DRIVE	PHASE 1A	10 HOMES								
SOUTHWOOD ROAD	PHASE 1B	4 HOMES								
TROUSDALE STREET (LOWER)	PHASE 2	5 HOMES	1	$ 2,830,447.20	10	95	1	1-YR	1	**13**
TROUSDALE STREET (UPPER)	PHASE 3	5 HOMES								
CHANTICLEER LANE	PHASE 4	4 HOMES								
CHESTNUT ROAD	PHASE 5	3 HOMES								
CENTRAL TRUNK LINE	2	26								
SOUTHWOOD ROAD	PHASE 1	4 HOMES								
HICKORY ROAD	PHASE 2	6 HOMES	2	$ 938,683.20	4	25	8	2-YR	3	**17**
CHESTNUT ROAD	PHASE 3	3 HOMES								
CHURCH	PHASE 4	1 CHURCH								
FERNWOOD	PHASE 5	12 HOMES								
LAKEWOOD DRIVE	**3**	4	9	$ 891,222.00	3	85	2	5-YR	5	**19**
WEST TRUNK LINE	**4**	19								
VESTAVIA HILLS CHURCH	PHASE 1	1 CHURCH								
KENTUCKY AVE	PHASE 2	4 HOMES	4	$ 2,918,957.40	10	55	5	1-YR	1	**20**
EASTWOOD	PHASE 3	14 HOMES								
ALDOT	TBD	0								

COST RANKINGS

SCORE	COST RANGE	
1	$ -	$ 300,000.00
2	$ 300,001.00	$ 600,000.00
3	$ 600,001.00	$ 900,000.00
4	$ 900,001.00	$ 1,200,000.00
5	$ 1,200,001.00	$ 1,500,000.00
6	$ 1,500,001.00	$ 1,800,000.00
7	$ 1,800,001.00	$ 2,100,000.00
8	$ 2,100,001.00	$ 2,400,000.00
9	$ 2,400,001.00	$ 2,700,000.00
10	$ 2,700,001.00	$ 3,000,000.00

PUBLIC % RANKINGS

SCORE	PUBLIC ROW % RANGE	
1	91	100
2	81	90
3	71	80
4	61	70
5	51	60
6	41	50
7	31	40
8	21	30
9	11	20
10	0	10

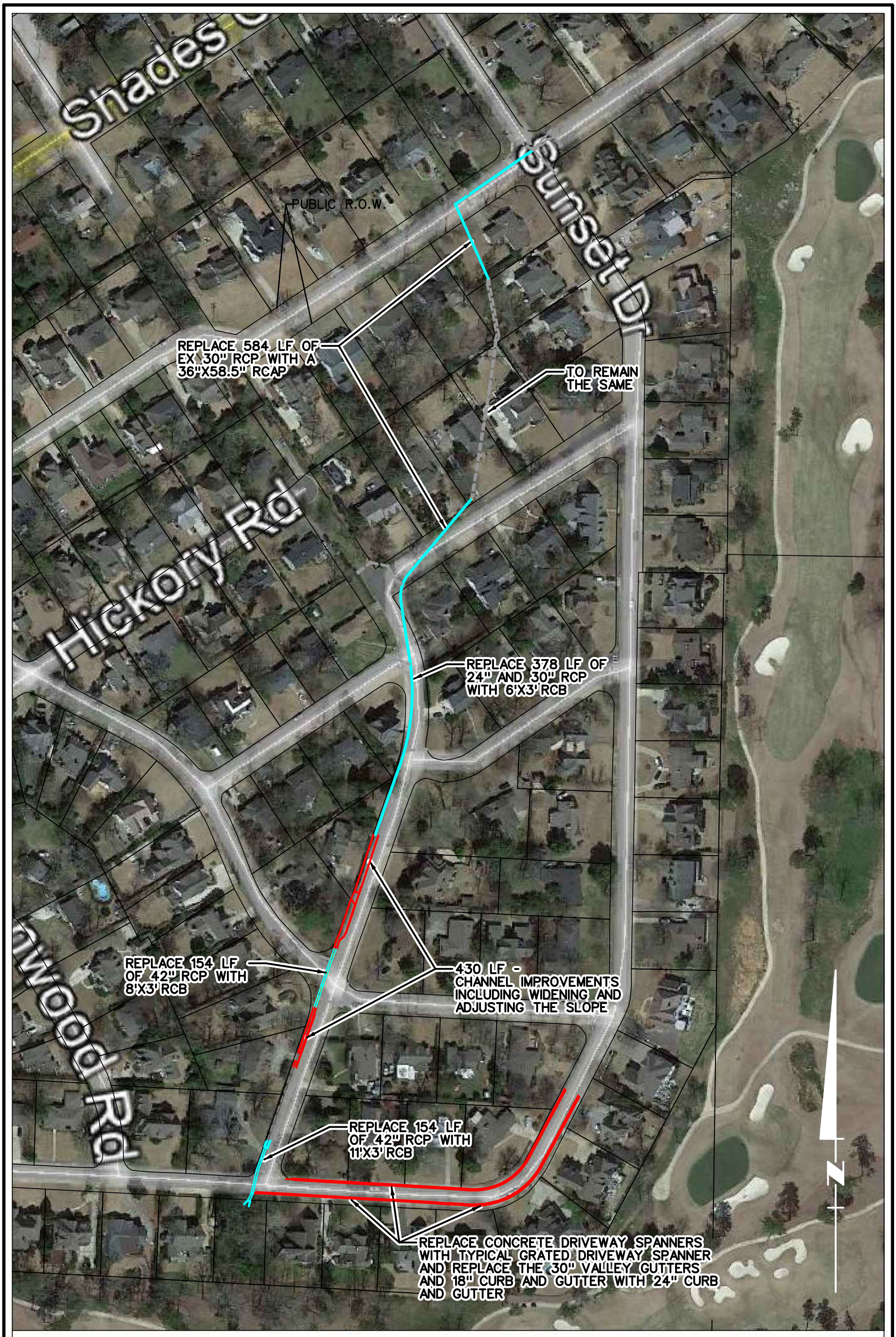
PROPERTY RANKINGS

SCORE	# OF STRUCTURES	
1	28	29+
2	25	27
3	22	24
4	19	21
5	16	18
6	13	15
7	10	12
8	7	9
9	4	6
10	0	3

FLOODING RANKINGS

SCORE	STORM OCCURANCE
1	1-YR OR BELOW
3	2-YR
5	5-YR
7	10-YR
10	25-YR OR GREATER

The Engineer's Estimate of Probable Construction Costs is in **Appendix C**.



CITY OF VESTAVIA HILLS
DRAINAGE IMPROVEMENTS
EASTERN TRUNKLINE

DATE: SEPTEMBER 2022

SCALE: 1 IN = 200 FT

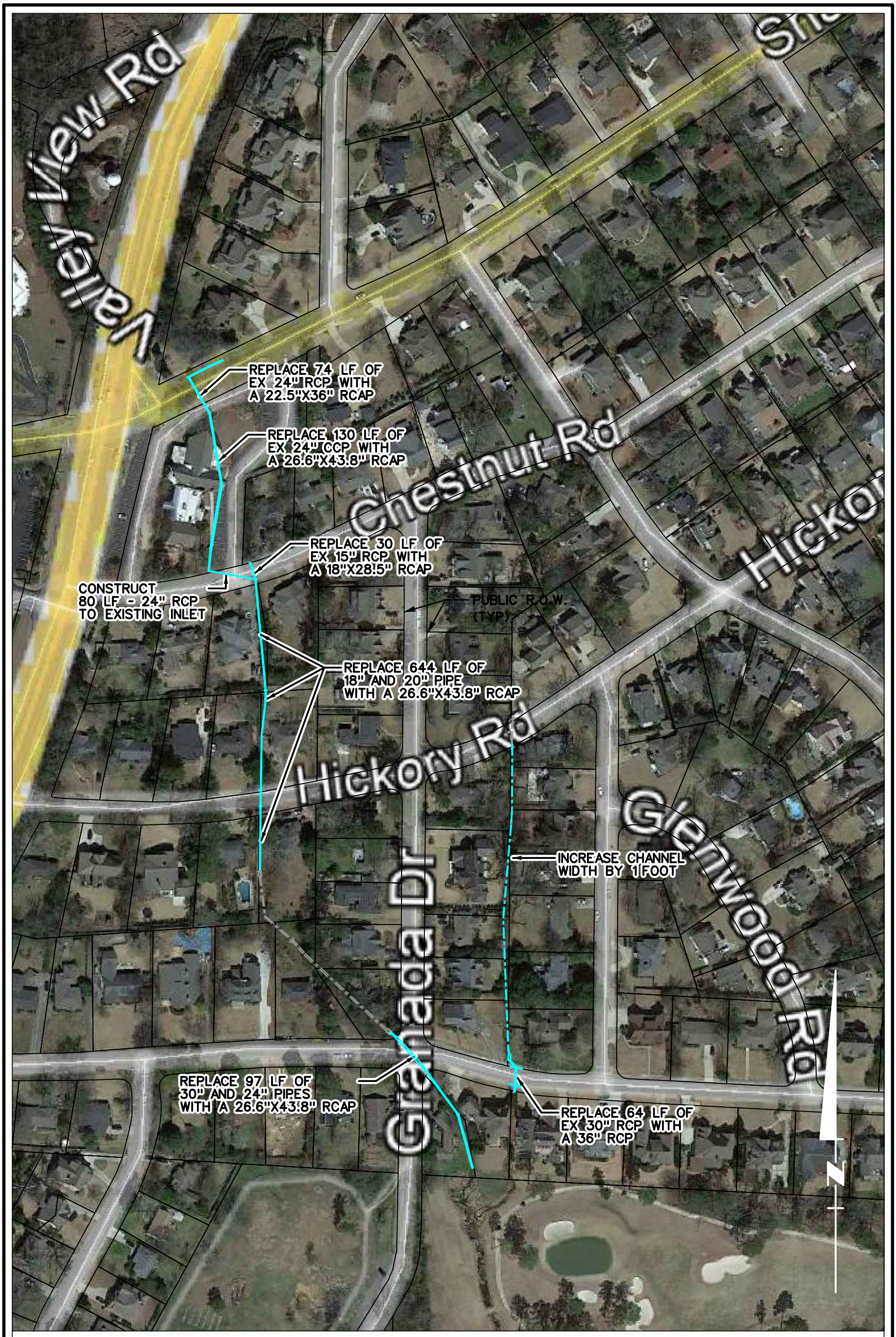
Civil Engineering | Land Surveying | Landscape Architecture
Environmental | Water Resources | Laser Scanning + Modeling

SCHOEL

1001 22nd Street South
Birmingham, Alabama 35205
205.323.6166

7500 Memorial Pkwy SW, Ste 209
Huntsville, Alabama 35802
256.539.1221

SCHOEL.COM



CITY OF VESTAVIA HILLS
DRAINAGE IMPROVEMENTS
CENTRAL TRUNKLINE

DATE: SEPTEMBER 2022

SCALE: 1 IN = 200 FT

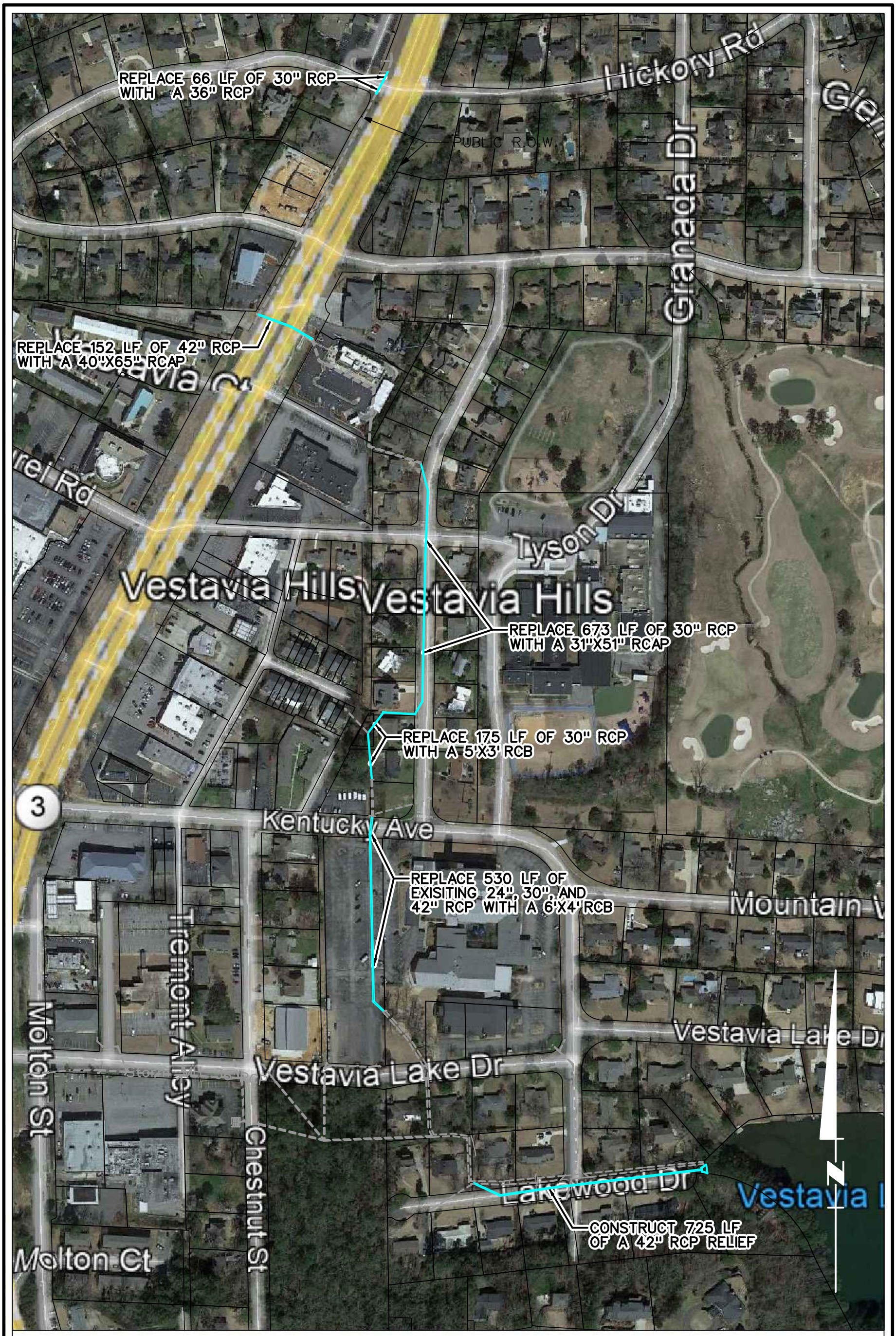
Civil Engineering | Land Surveying | Landscape Architecture
Environmental | Water Resources | Laser Scanning + Modeling

SCHOEL

1001 22nd Street South
Birmingham, Alabama 35205
205.323.6166

7500 Memorial Pkwy SW, Ste 209
Huntsville, Alabama 35802
256.539.1221

SCHOEL.COM



CITY OF VESTAVIA HILLS
DRAINAGE IMPROVEMENTS
WESTERN TRUNKLINE AND
LAKEWOOD DRIVE

DATE: SEPTEMBER 2022
SCALE: 1 IN = 300 FT

Civil Engineering | Land Surveying | Landscape Architecture
Environmental | Water Resources | Laser Scanning + Modeling

SCHOEL

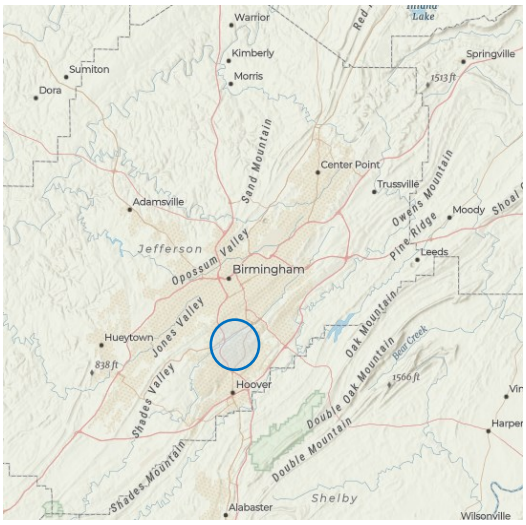
1001 22nd Street South | 7500 Memorial Pkwy SW, Ste 209
Birmingham, Alabama 35205 | Huntsville, Alabama 35802
205.323.6166 | 256.539.1221
SCHOEL.COM

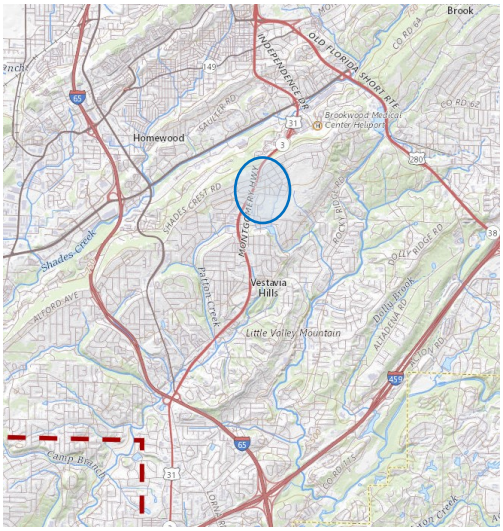
2.

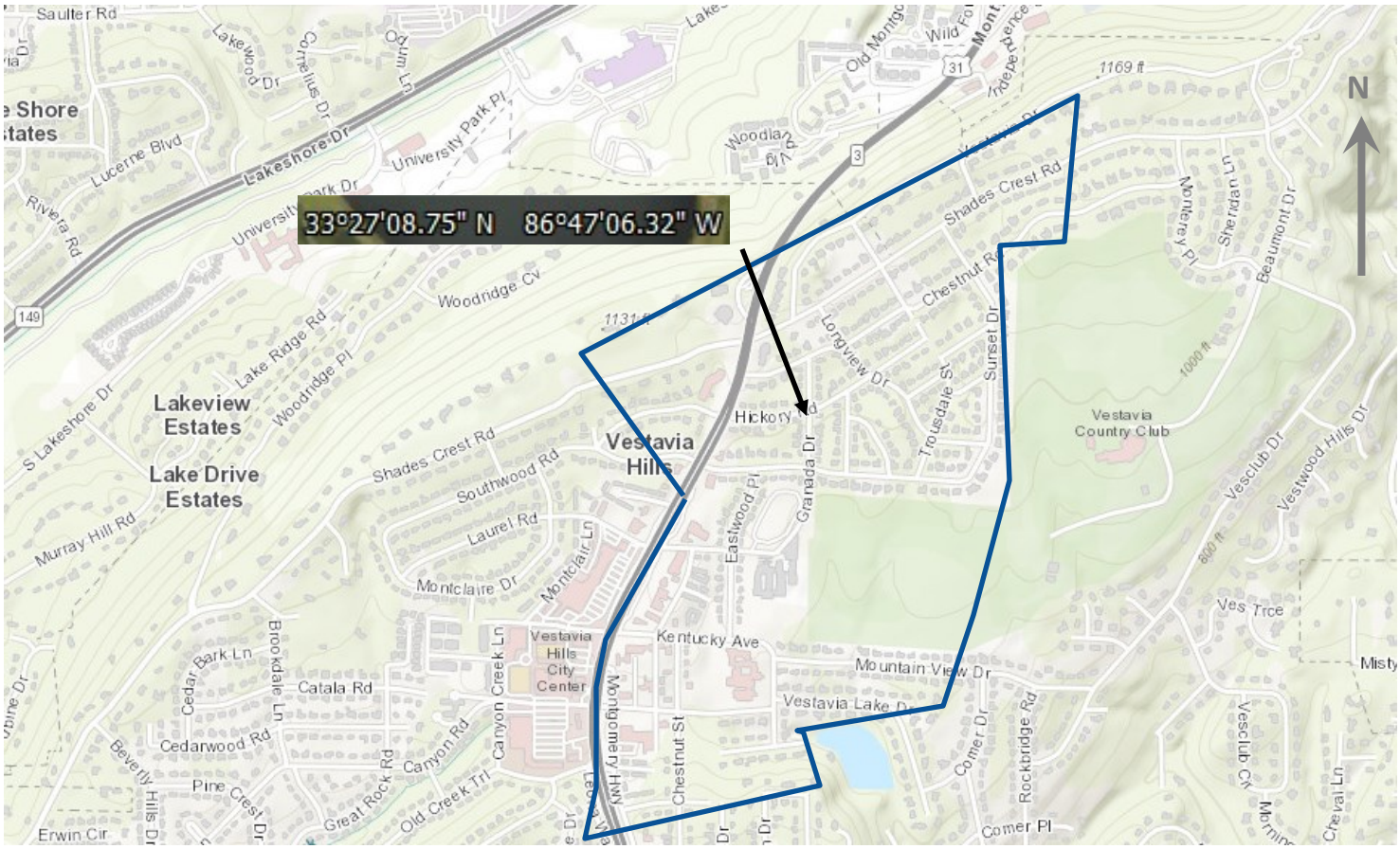
Location Map

Location Map

Critical Infrastructure Improvements — Stormwater in Upper US 31 Vestavia Hills







3.

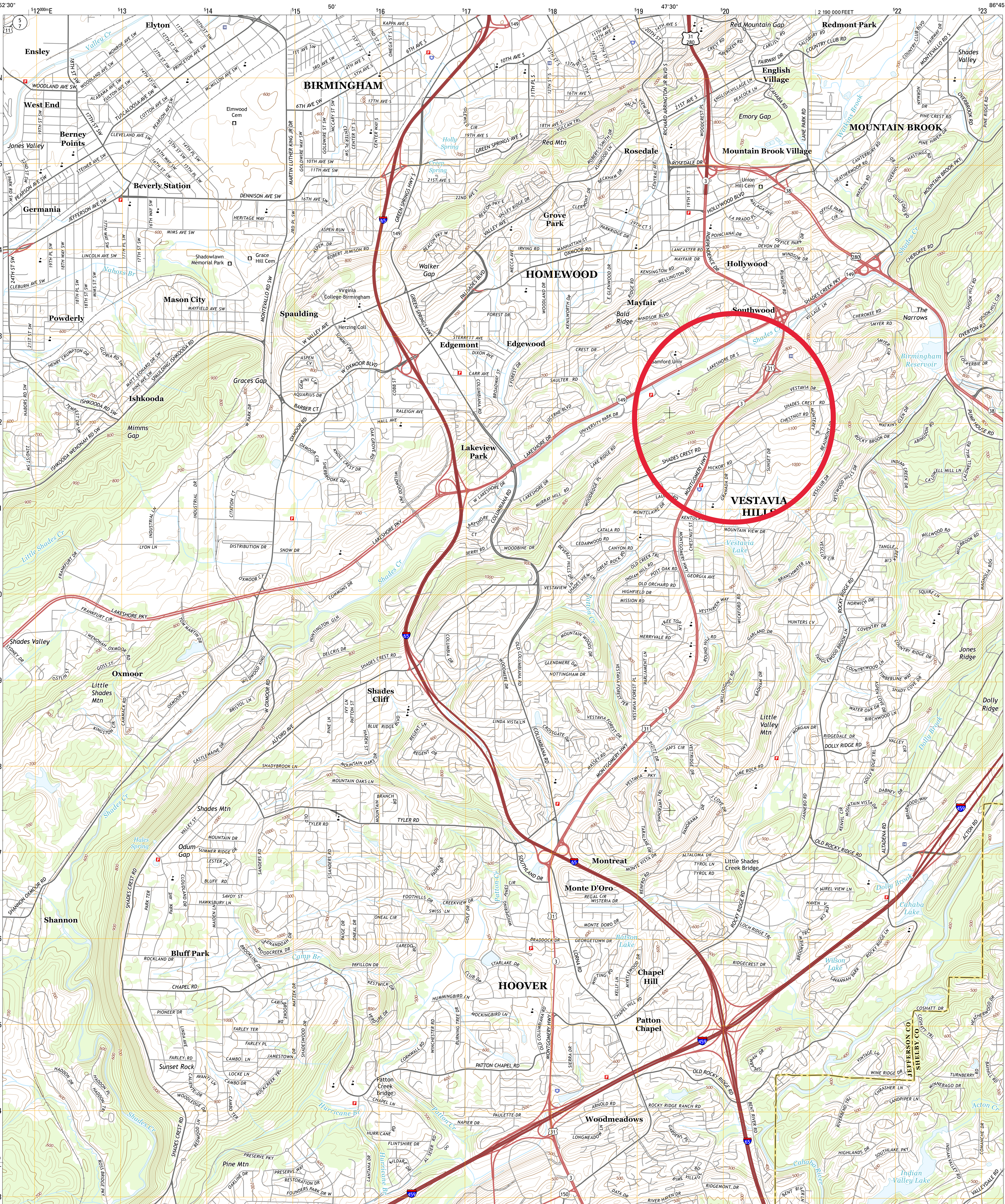
USGS 1:24 Birmingham South Quadrangle

USGS science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

BIRMINGHAM SOUTH QUADRANGLE
ALABAMA
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid: Universal Transverse Mercator, Zone 16S
10 000-foot ticks: Alabama Coordinate System of 1983 (west zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery....................NAIP, December 2013
Roads....................HERE, ©2013
Names....................GNIS, 2013
Hydrography....................National Hydrography Dataset, 2013
Contours....................National Elevation Dataset, 2002
Boundaries............Multiple sources; see metadata file 1972 - 2013

MN GN 3° 6´ 55 MILS 0° 6´ 2 MILS
UTM GRID AND 2014 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
EC / EB 37 00
Grid Zone Designation
16S

SCALE 1:24 000
KILOMETERS 1 0.5 0 1 2
METERS 1000 500 0 1000 2000
MILES 1 0.5 0 1
FEET 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.16

ALABAMA
QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES

1 Adamsville
2 Birmingham North
3 Irondale
4 Bessemer
5 Cahaba Heights
6 Greenwood
7 Helena
8 Chelsea

ROAD CLASSIFICATION
Expressway — Local Connector
Secondary Hwy — Local Road
Ramp — 4WD
Interstate Route — US Route — State Route

BIRMINGHAM SOUTH, AL
2014

NSN. 7643016351942
NGA REF NO. USGSX24K4003

Workplan Appendix 1.14.2025

4.

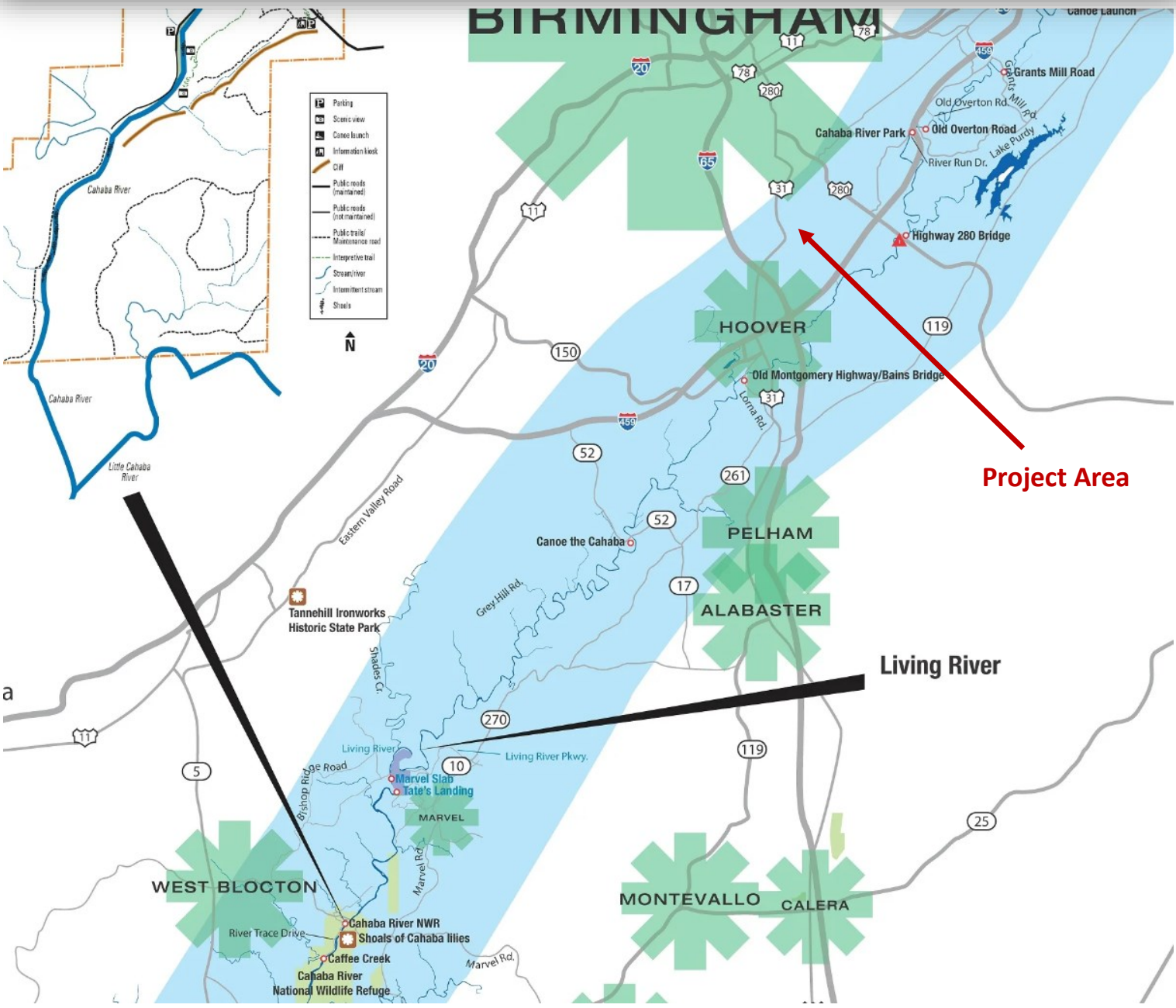
The Cahaba River Watershed

The Cahaba River Watershed - a Global Treasure and Critical Alabama Resource

Screenshots from https://cahabariversociety.org/

About the Cahaba River

The Cahaba River is Alabama's longest remaining stretch of free-flowing river and a global treasuretrove of biological diversity. It is the primary drinking water source for one-fifth of the state's people in the Birmingham metro area. Flowing from its headwaters northeast of Birmingham, AL until it reaches the Alabama River southwest of Selma, the Cahaba River is 194 miles long and drains an area of 1,870 square miles.



See full map at https://cahabariversociety.org/wp-content/uploads/2018/07/Cahaba-Full-Length-w-CNWR-detail-sm.jpg

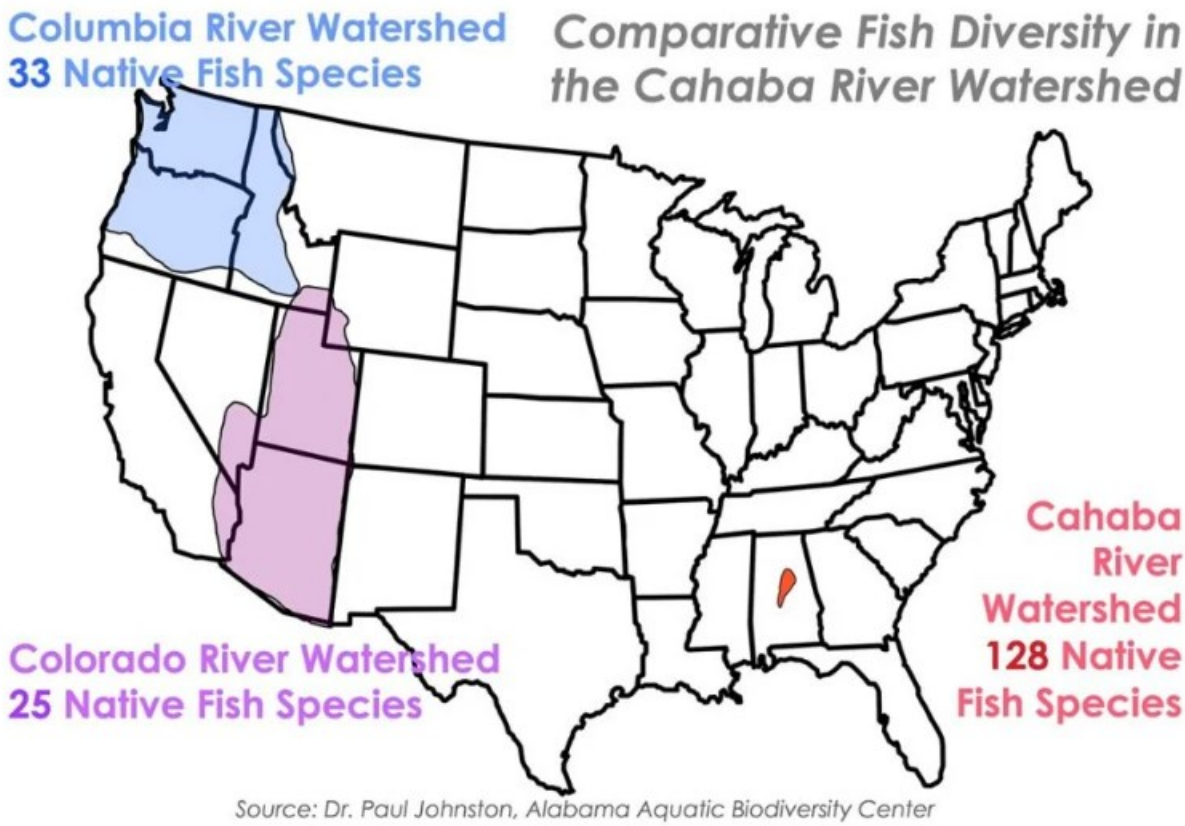
About the Cahaba River Watershed

The 1,870 square mile Cahaba watershed drains urban and rural areas, farms and forests on its course from the southern Appalachian Mountains through the coastal plain to the Alabama River. About 200 square miles of the headwaters are the primary raw water source for the Birmingham Water Works Board system, the largest water provider in Alabama.

Cahaba River Biodiversity

A great diversity of life depends on the Cahaba River, with Alabama's longest remaining stretch of free-flowing river, the primary drinking water source for one-fifth of the state's people in the Birmingham metro area, and a treasure of biological diversity of national and global importance.The Cahaba River is one of the most biodiverse waterways on Earth. It has more species of fish than any other river of its size in North America.

The Cahaba River
(Click to enlarge.)



The Cahaba River has more species than any river its size or larger in North America.

Click here to read more about Cahaba River biodiversity.

International Recognition for the Cahaba River

International conservation organizations consider our southeastern rivers to be globally significant ecosystems and the Cahaba to be especially important to conserve for its rich biological diversity and scenic beauty. The Cahaba has more fish species per mile than any other river in North America and a similar richness of turtle, crayfish, snail, and mussel species. That rich biodiversity has merited these accolades:

1. Cahaba named by The Nature Conservancy as one of eight "hotspots of aquatic biodiversity" in the U.S. that must be saved
2. Cahaba protection is part of a global partnership between The Coca-Cola Company and the World Wildlife Fund
3. Named in 2007 edition of National Geographic College Atlas of the World, along with southeastern rivers, as one of six global examples of biological diversity

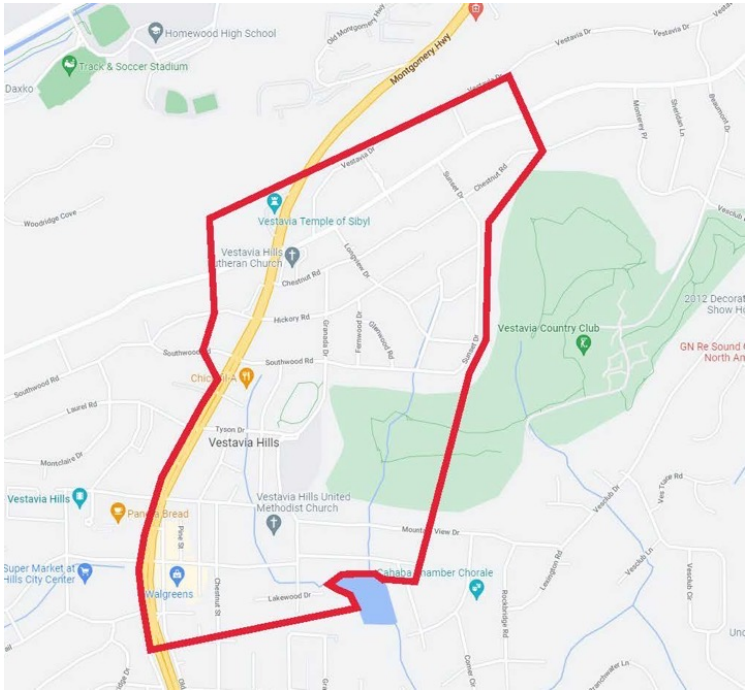
5.

Project Area

Overview of City-Wide Storm Drainage Projects

CITY COUNCIL WORK SESSION – JULY 18, 2022

Upper Hwy 31/Shades Crest/Vestavia Lake



Scope of Work:

Stormwater Masterplan to inventory and analyze existing storm drainage system and develop plans to improve deficiencies

Consultant:

Schoel

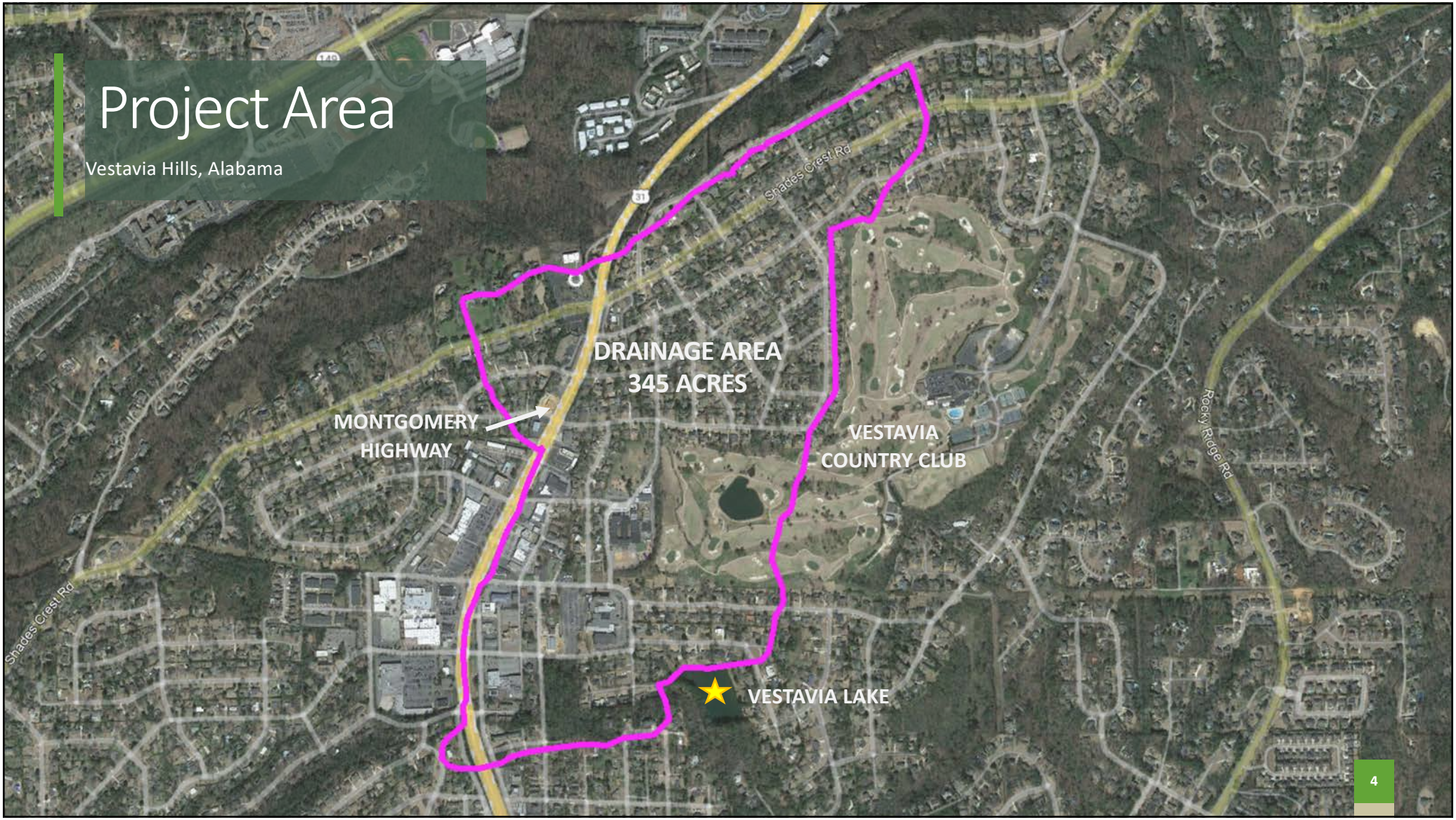
Project Status Update:

VESTAVIA HILLS LAKE WATERSHED

DRAINAGE ASSESSMENT - VESTAVIA HILLS, AL

Project Area

Vestavia Hills, Alabama



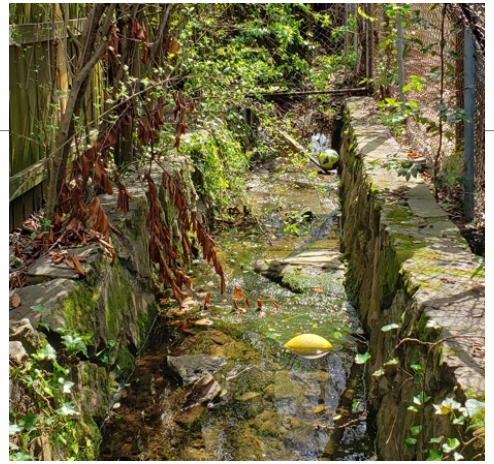
Study Methodology

Identify the problems
- What are the complaints?
- Site Visit

Model the Storm Drainage System
- Field survey storm drainage system
- Develop model of the watershed and storm infrastructure

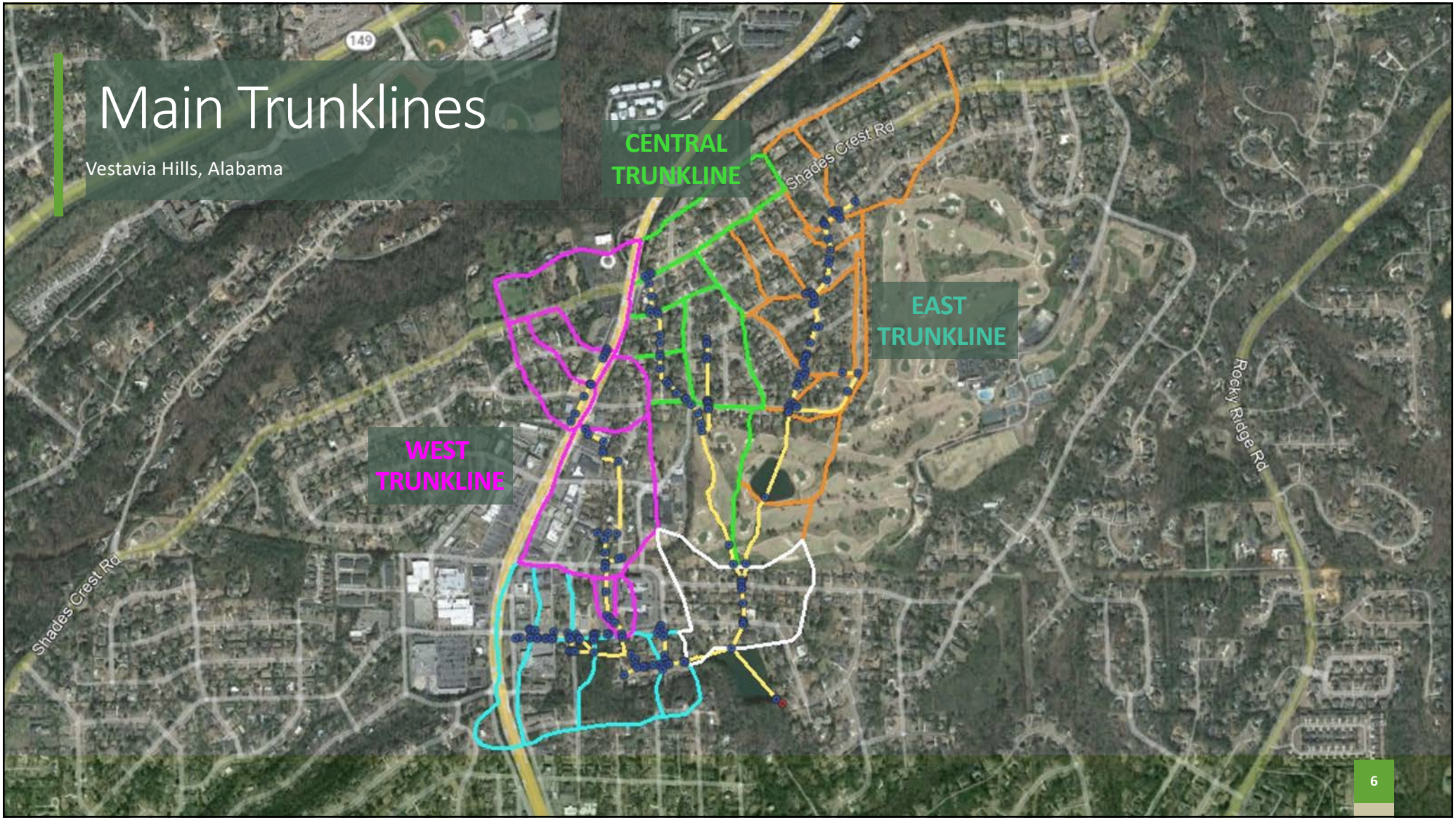
Identify Restrictions

Evaluate Improvements



Main Trunklines

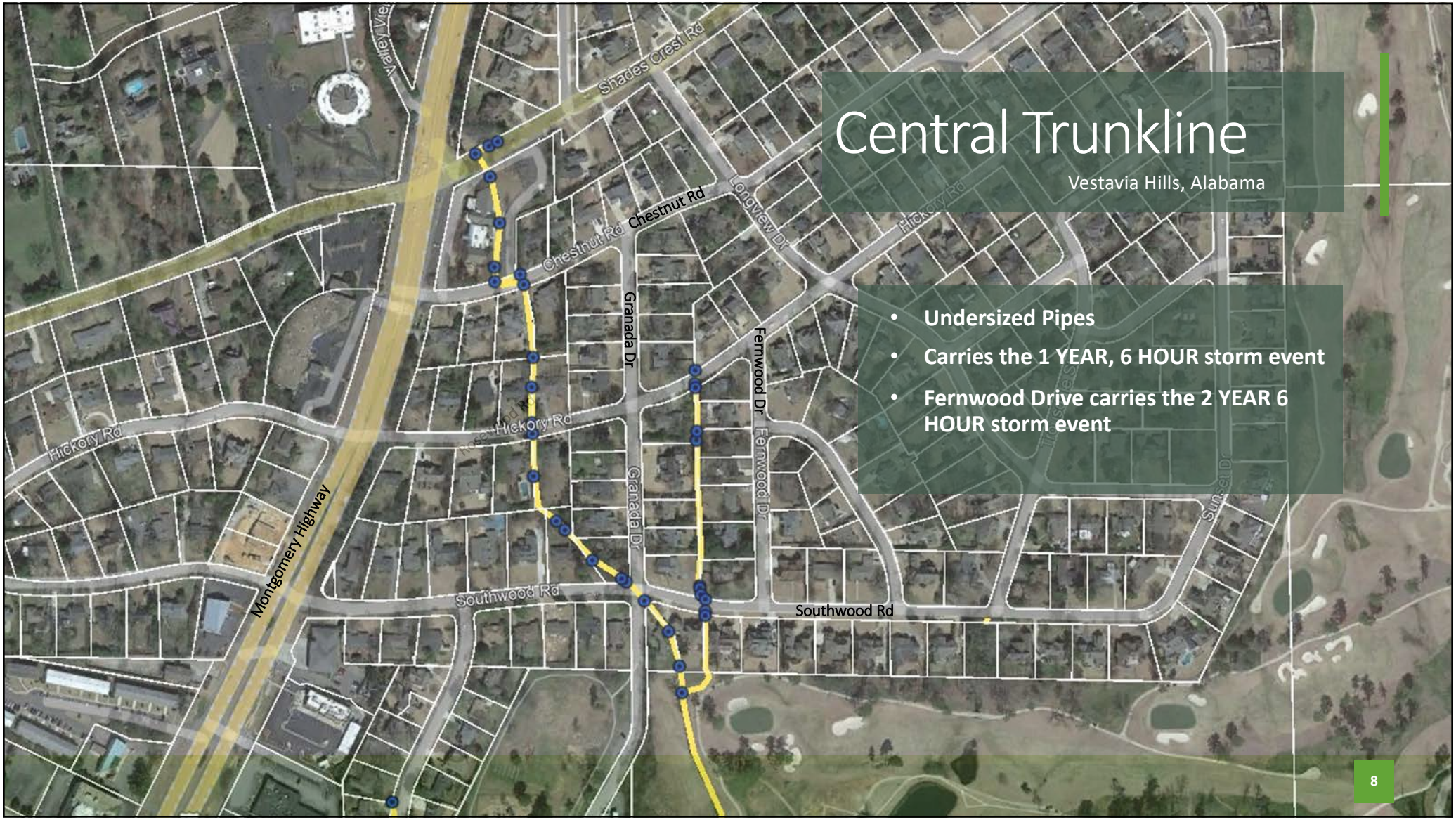
Vestavia Hills, Alabama



East Trunkline

Vestavia Hills, Alabama

- **Undersized Pipes**
- **Cannot Contain 1 YEAR, 6 HOUR storm event**


Central Trunkline
Vestavia Hills, Alabama
• Undersized Pipes
• Carries the 1 YEAR, 6 HOUR storm event
• Fernwood Drive carries the 2 YEAR 6 HOUR storm event
Shades Crest Rd
Chestnut Rd
Longview Dr
Hickory Rd
Granada Dr
Fernwood Dr
Montgomery Highway
Southwood Rd
Sunset Dr

West Trunkline

Vestavia Hills, Alabama

- **Some undersized Pipes**
- **Chick-Fil-A drainage network and Vestavia Lake Drive culvert crossing carries the 25 YEAR, 6 HOUR storm event**
- **Remaining system carries the 1 YEAR, 6 HOUR storm event.**

Lakewood Drive

Vestavia Hills, Alabama

- **Some undersized pipes**
- **System carries the 5 YEAR, 6 HOUR storm event.**

Next Steps

Development of Final Components of Report

- Include Cost Estimates
- Prioritization of Improvement Areas
- Development of Regulations Review

Public Involvement Meetings Scheduled with Staff

Field Maps for Stormwater Asset Collection

- Final QA/QC

William Thomas, PE, CFM
Senior Project Manager
Schoel Engineering

Mark Simpson, PE, CFM
Project Manager
Schoel Engineering

Kaitlin Braun, CFM
Project Hydrologist
Schoel Engineering

6.

Partial Data Series Precipitation Intensity (Zip Code 35216)

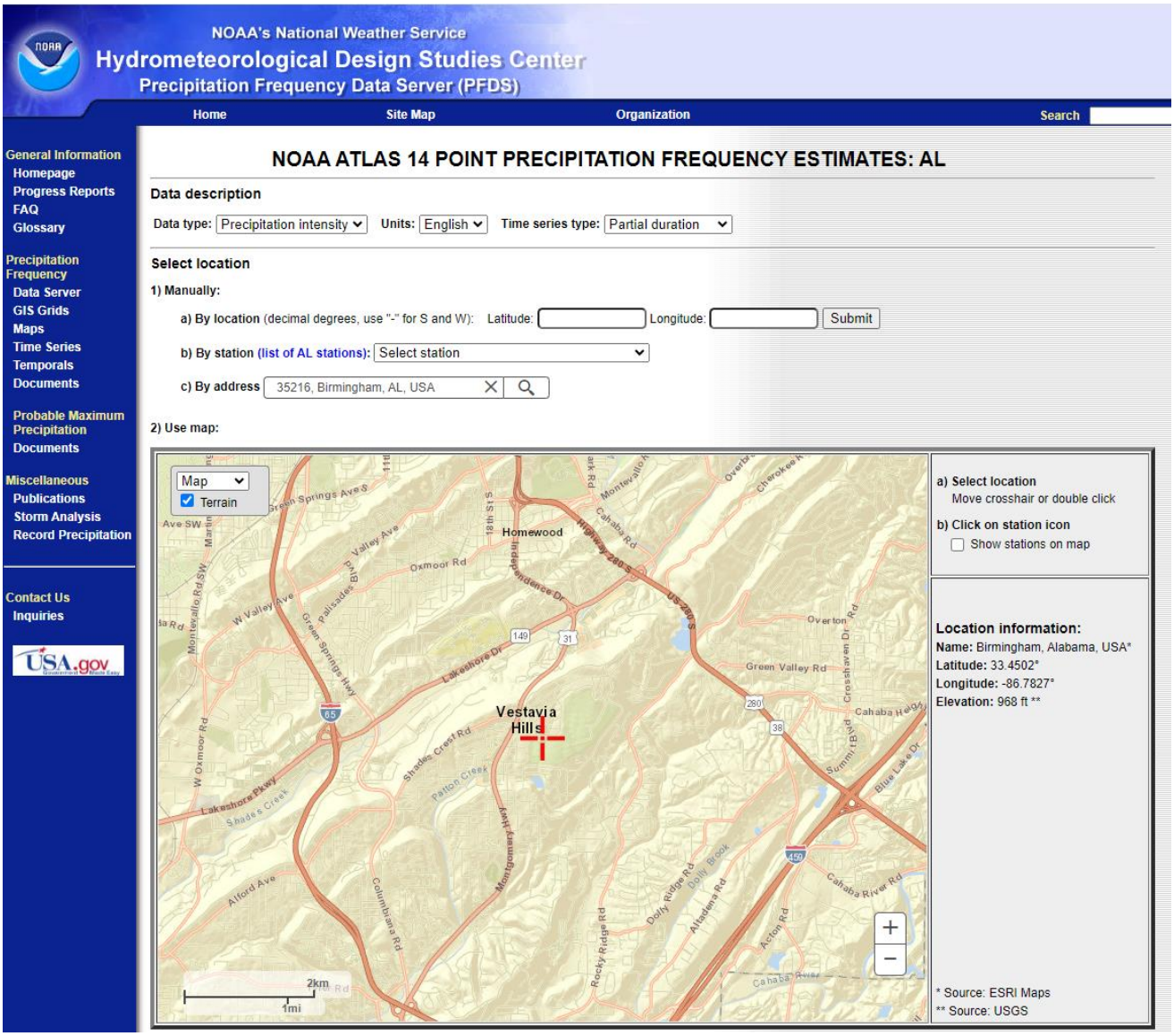
Partial Data Series Precipitation Intensity

The table below shows precipitation frequency estimates in inches based on Partial Data Series precipitation events. According to https://www.sciencedirect.com/topics/earth-and-planetary-sciences/partial-duration-series:

A Partial Duration Series (PDS) is a model used in hydrology to select only the most severe events for extreme value analysis, assuming a Poisson distribution of events above an upper limit and independent magnitudes. It provides a consistent definition of the extreme value region, particularly suited for high flow scenarios.

The data comes from the National Oceanic and Atmospheric Administration.

https://hdsc.nws.noaa.gov/pfds/pfds_map_cont.html?bkmrk=ca Accessed 9/27/2024



POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 9, Version 2

PF tabular | PF graphical | Supplementary information

Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**5.20** (4.15-6.50)	**5.94** (4.74-7.45)	**7.20** (5.72-9.05)	**8.26** (6.53-10.4)	**9.76** (7.45-12.7)	**10.9** (8.15-14.4)	**12.1** (8.71-16.3)	**13.4** (9.18-18.4)	**15.1** (9.92-21.2)	**16.4** (10.5-23.3)
10-min	**3.80** (3.04-4.76)	**4.35** (3.47-5.46)	**5.27** (4.19-6.62)	**6.05** (4.78-7.63)	**7.15** (5.45-9.27)	**8.01** (5.96-10.5)	**8.89** (6.38-11.9)	**9.81** (6.73-13.4)	**11.0** (7.26-15.5)	**12.0** (7.67-17.1)
15-min	**3.09** (2.47-3.87)	**3.54** (2.82-4.44)	**4.28** (3.41-5.38)	**4.92** (3.89-6.20)	**5.81** (4.44-7.54)	**6.51** (4.85-8.55)	**7.23** (5.19-9.69)	**7.98** (5.47-10.9)	**8.98** (5.90-12.6)	**9.76** (6.24-13.9)
30-min	**2.27** (1.82-2.85)	**2.60** (2.08-3.27)	**3.16** (2.51-3.97)	**3.63** (2.87-4.58)	**4.30** (3.29-5.59)	**4.83** (3.60-6.35)	**5.38** (3.86-7.21)	**5.94** (4.08-8.15)	**6.71** (4.41-9.42)	**7.31** (4.67-10.4)
60-min	**1.49** (1.19-1.87)	**1.71** (1.36-2.14)	**2.08** (1.65-2.61)	**2.39** (1.89-3.02)	**2.84** (2.18-3.70)	**3.21** (2.39-4.22)	**3.58** (2.57-4.80)	**3.97** (2.72-5.45)	**4.51** (2.96-6.34)	**4.93** (3.15-7.00)
2-hr	**0.924** (0.746-1.15)	**1.06** (0.853-1.31)	**1.29** (1.03-1.60)	**1.48** (1.18-1.85)	**1.77** (1.37-2.28)	**2.00** (1.50-2.60)	**2.24** (1.62-2.98)	**2.48** (1.72-3.39)	**2.83** (1.88-3.95)	**3.10** (2.00-4.37)
3-hr	**0.690** (0.560-0.851)	**0.788** (0.639-0.973)	**0.957** (0.773-1.18)	**1.10** (0.887-1.37)	**1.32** (1.03-1.70)	**1.50** (1.14-1.95)	**1.68** (1.23-2.24)	**1.88** (1.31-2.56)	**2.16** (1.44-3.00)	**2.37** (1.54-3.33)
6-hr	**0.420** (0.345-0.514)	**0.476** (0.390-0.582)	**0.576** (0.470-0.706)	**0.667** (0.541-0.820)	**0.804** (0.634-1.03)	**0.919** (0.705-1.19)	**1.04** (0.770-1.38)	**1.18** (0.830-1.59)	**1.36** (0.923-1.89)	**1.52** (0.994-2.11)
12-hr	**0.254** (0.210-0.307)	**0.285** (0.236-0.345)	**0.344** (0.284-0.417)	**0.400** (0.327-0.487)	**0.486** (0.389-0.620)	**0.560** (0.435-0.720)	**0.641** (0.479-0.842)	**0.730** (0.521-0.982)	**0.859** (0.588-1.18)	**0.964** (0.638-1.33)
24-hr	**0.151** (0.126-0.180)	**0.171** (0.143-0.205)	**0.209** (0.173-0.250)	**0.244** (0.202-0.294)	**0.299** (0.242-0.378)	**0.347** (0.272-0.442)	**0.399** (0.301-0.519)	**0.456** (0.329-0.608)	**0.538** (0.372-0.734)	**0.606** (0.404-0.830)
2-day	**0.087** (0.073-0.103)	**0.100** (0.084-0.119)	**0.124** (0.105-0.148)	**0.147** (0.123-0.175)	**0.181** (0.147-0.226)	**0.210** (0.166-0.264)	**0.241** (0.183-0.311)	**0.275** (0.200-0.363)	**0.324** (0.226-0.438)	**0.363** (0.245-0.494)
3-day	**0.063** (0.054-0.075)	**0.073** (0.062-0.086)	**0.090** (0.076-0.106)	**0.106** (0.089-0.126)	**0.130** (0.107-0.162)	**0.151** (0.120-0.189)	**0.173** (0.133-0.222)	**0.197** (0.144-0.259)	**0.232** (0.163-0.313)	**0.261** (0.177-0.353)
4-day	**0.051** (0.044-0.060)	**0.058** (0.050-0.069)	**0.071** (0.061-0.084)	**0.084** (0.070-0.099)	**0.102** (0.084-0.126)	**0.118** (0.094-0.147)	**0.135** (0.104-0.172)	**0.154** (0.113-0.201)	**0.181** (0.127-0.242)	**0.203** (0.138-0.274)
7-day	**0.035** (0.030-0.041)	**0.039** (0.034-0.046)	**0.047** (0.040-0.054)	**0.054** (0.045-0.063)	**0.064** (0.053-0.078)	**0.073** (0.059-0.090)	**0.083** (0.064-0.105)	**0.093** (0.069-0.121)	**0.108** (0.077-0.145)	**0.121** (0.083-0.162)
10-day	**0.028** (0.024-0.033)	**0.031** (0.027-0.036)	**0.037** (0.031-0.042)	**0.041** (0.035-0.048)	**0.049** (0.040-0.059)	**0.055** (0.044-0.068)	**0.062** (0.048-0.078)	**0.069** (0.051-0.089)	**0.079** (0.056-0.105)	**0.088** (0.060-0.117)
20-day	**0.019** (0.016-0.021)	**0.021** (0.018-0.024)	**0.024** (0.021-0.028)	**0.027** (0.023-0.031)	**0.031** (0.026-0.037)	**0.034** (0.028-0.041)	**0.038** (0.029-0.047)	**0.041** (0.031-0.052)	**0.046** (0.033-0.060)	**0.050** (0.035-0.066)
30-day	**0.015** (0.013-0.017)	**0.017** (0.015-0.019)	**0.019** (0.017-0.022)	**0.022** (0.019-0.025)	**0.025** (0.021-0.029)	**0.027** (0.022-0.032)	**0.029** (0.023-0.036)	**0.032** (0.024-0.040)	**0.035** (0.025-0.045)	**0.037** (0.026-0.049)
45-day	**0.012** (0.011-0.014)	**0.014** (0.012-0.015)	**0.016** (0.014-0.018)	**0.017** (0.015-0.020)	**0.020** (0.016-0.023)	**0.021** (0.017-0.025)	**0.023** (0.018-0.028)	**0.024** (0.018-0.031)	**0.026** (0.019-0.034)	**0.028** (0.019-0.036)
60-day	**0.011** (0.010-0.012)	**0.012** (0.011-0.013)	**0.014** (0.012-0.015)	**0.015** (0.013-0.017)	**0.017** (0.014-0.020)	**0.018** (0.015-0.021)	**0.019** (0.015-0.023)	**0.020** (0.015-0.025)	**0.022** (0.016-0.028)	**0.023** (0.016-0.030)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in CSV format: Precipitation frequency estimates | Submit

7.

Engineer’s Estimate of Probable Cost (each project area)

From 2022 Master Plan

APPENDIX A

Engineer's Estimate of Probable Construction Costs

Vestavia Hills Storm Drainage Project - East Trunkline
Engineer's Estimate of Probable Construction Cost

August 31, 2022

Item No.	Estimated Quantity <Public>	Estimated Quantity <Private>	Unit	Description	Unit Price	Total Cost <Public>	Total Cost <Private>	Total Cost
1	0.5	0.5	l.s.	Mobilization and Demobilization	$ 10,000.00	$ 5,000.00	$ 5,000.00	$ 10,000.00
2	430	0	l.f.	Channel Modification for the existing ditch on Trousdale St	$ 125.00	$ 53,750.00	$ -	$ 53,750.00
3	378	0	l.f.	6'x3' Box Culvert Storm Drain	$ 1,550.00	$ 585,900.00	$ -	$ 585,900.00
4	154	0	l.f.	8'x3' Box Culvert Storm Drain	$ 1,900.00	$ 292,600.00	$ -	$ 292,600.00
5	449	135	l.f.	36"x58.5" Arch Culvert Storm Drain (Eq. 48")	$ 475.00	$ 213,275.00	$ 64,125.00	$ 277,400.00
6	101	0	l.f.	11'x3' Box Culvert Storm Drain	$ 3,000.00	$ 303,000.00	$ -	$ 303,000.00
7	535	0	s.y.i.p.	Superpave Bituminous Concrete Binder Layer, Patching, ALDOT 424B, 1" Maximum Aggregate Size Mix, ESAL Range E, (440 lb/sy)	$ 50.00	$ 26,750.00	$ -	$ 26,750.00
8	535	0	s.y.i.p.	Superpave Bituminous Concrete Wearing Surface, ALDOT 424A, 1/2" Maximum Aggregate Size Mix, ESAL Range C/D, (165 lb./sy) (Includes Tack Coat)	$ 40.00	$ 21,400.00	$ -	$ 21,400.00
9	1082	135	l.f.	Rock Excavation	$ 100.00	$ 108,200.00	$ 13,500.00	$ 121,700.00
10	25	155	s.y.i.p.	Solid Sod Replacement	$ 20.00	$ 500.00	$ 3,100.00	$ 3,600.00
				Construction Sub-Total		**$ 1,610,375.00**	**$ 85,725.00**	**$ 1,696,100.00**
				Construction Allowance (10%)		**$ 161,037.50**	**$ 8,572.50**	**$ 169,610.00**
				Engineering (20%)		**$ 322,075.00**	**$ 17,145.00**	**$ 339,220.00**
				Easement Acquisition (Assumed 3 tracts) ($2,500/tract)		**$ 7,500.00**	**$ -**	**$ 7,500.00**
				Project Subtotal		**$ 2,100,987.50**	**$ 111,442.50**	**$ 2,212,430.00**
				Project Budget Contingency (20%)		**$ 420,197.50**	**$ 22,288.50**	**$ 442,486.00**
				Total Estimated Project Budget Total		**$ 2,521,185.00**	**$ 133,731.00**	**$ 2,654,916.00**

Completed

Vestavia Hills Storm Drainage Project - Sunset Drive, Biltmore Avenue, and Southwood Road

Engineer's Estimate of Probable Construction Cost

August 31, 2022

Item No.	Estimated Quantity <Public>	Estimated Quantity <Private>	Unit	Description	Unit Price	Total Cost <Public>	Total Cost <Private>	Total Cost
1	1	0	l.s.	Mobilization and Demobilization	$ 10,000.00	$ 10,000.00	$ -	$ 10,000.00
2	580	0	l.f.	30" Valley Gutter Replacement to 24" curb and	$ 85.00	$ 49,300.00	$ -	$ 49,300.00
3	266	0	l.f.	18" Valley Gutter Replacement to 24" curb and	$ 70.00	$ 18,620.00	$ -	$ 18,620.00
4	7	0	each	Removal and replacement of driveway spanners	$ 2,500.00	$ 17,500.00	$ -	$ 17,500.00
5	190	0	s.y.i.p.	Superpave Bituminous Concrete Binder Layer, Patching, ALDOT 424B, 1" Maximum Aggregate Size Mix, ESAL Range E, (440 lb.sy)	$ 50.00	$ 9,500.00	$ -	$ 9,500.00
6	190	0	s.y.i.p.	Superpave Bituminous Concrete Wearing Surface, ALDOT 424A, 1/2" Maximum Aggregate Size Mix, ESAL Range C/D, (165 lb./sy) (Includes Tack Coat)	$ 40.00	$ 7,600.00	$ -	$ 7,600.00
				Construction Sub-Total		**$ 112,520.00**	**$ -**	**$ 112,520.00**
				Construction Allowance (10%)		**$ 11,252.00**	**$ -**	**$ 11,252.00**
				Engineering (20%)		**$ 22,504.00**	**$ -**	**$ 22,504.00**
				Easement Acquisition (Assumed 0 tracts) ($2,500/tract)		**$ -**	**$ -**	**$ -**
				Project Subtotal		**$ 146,276.00**	**$ -**	**$ 146,276.00**
				Project Budget Contingency (20%)		**$ 29,255.20**	**$ -**	**$ 29,255.20**
				Total Estimated Project Budget Total		**$ 175,531.20**	**$ -**	**$ 175,531.20**

Vestavia Hills Storm Drainage Project - Central Trunkline
Engineer's Estimate of Probable Construction Cost

August 31, 2022

Item No.	Estimated Quantity <Public>	Estimated Quantity <Private>	Unit	Description	Unit Price	Total Cost <Public>	Total Cost <Private>	Total Cost
1	0.2	0.8	l.s.	Mobilization and Demobilization	$ 10,000.00	$ 2,000.00	$ 8,000.00	$ 10,000.00
2	55	20	l.f.	22.5"x36" Arch Culvert Storm Drain (Eq. 30")	$ 400.00	$ 22,000.00	$ 8,000.00	$ 30,000.00
3	0	746	l.f.	26.6"x43.8" Arch Culvert Storm Drain (Eq. 36")	$ 425.00	$ -	$ 317,050.00	$ 317,050.00
4	30	0	l.f.	18"x28.5" Arch Culvert Storm Drain (Eq. 24")	$ 350.00	$ 10,500.00	$ -	$ 10,500.00
5	80	0	l.f.	24" Diameter RCP CL III Storm Drain at Chestnut Road	$ 200.00	$ 16,000.00	$ -	$ 16,000.00
6	0	96	l.f.	Removal of flume upstream of Hickory Road	$ 100.00	$ -	$ 9,600.00	$ 9,600.00
7	0	34	l.f.	36"x58.5" RCAP Storm Drain (Eq. 48")	$ 475.00	$ -	$ 16,150.00	$ 16,150.00
8	18	44	l.f.	36" Diameter RCP CL III Storm Drain at Southwood Road	$ 250.00	$ 4,500.00	$ 11,000.00	$ 15,500.00
9	0	0.06	ac	Clearing and Grubbing Fernwood Channel	$ 15,000.00	$ -	$ 900.00	$ 900.00
10	109	89	s.y.i.p.	Superpave Bituminous Concrete Binder Layer, Patching, ALDOT 424B, 1" Maximum Aggregate Size Mix, ESAL Range E, (440 lb.sy)	$ 50.00	$ 5,450.00	$ 4,450.00	$ 9,900.00
11	109	89	s.y.i.p.	Superpave Bituminous Concrete Wearing Surface, ALDOT 424A, 1/2" Maximum Aggregate Size Mix, ESAL Range C/D, (165 lb./sy) (Includes Tack Coat)	$ 40.00	$ 4,360.00	$ 3,560.00	$ 7,920.00
12	248	845	l.f.	Rock Excavation	$ 100.00	$ 24,800.00	$ 84,500.00	$ 109,300.00
13	115	1080	s.y.i.p.	Solid Sod Replacement	$ 20.00	$ 2,300.00	$ 21,600.00	$ 23,900.00
				Construction Sub-Total		**$ 91,910.00**	**$ 484,810.00**	**$ 576,720.00**
				Construction Allowance (10%)		**$ 9,191.00**	**$ 48,481.00**	**$ 57,672.00**
				Engineering (20%)		**$ 18,382.00**	**$ 96,962.00**	**$ 115,344.00**
				Easement Acquisition (Assumed 13 tracts) ($2,500/tract)		**$ 32,500.00**	**$ -**	**$ 32,500.00**
				Project Subtotal		**$ 151,983.00**	**$ 630,253.00**	**$ 782,236.00**
				Project Budget Contingency (20%)		**$ 30,396.60**	**$ 126,050.60**	**$ 156,447.20**
				Total Estimated Project Budget Total		**$ 182,379.60**	**$ 756,303.60**	**$ 938,683.20**

Vestavia Hills Storm Drainage Project - West Trunkline
Engineer's Estimate of Probable Construction Cost

August 31, 2022

Item No.	Estimated Quantity <Public>	Estimated Quantity <Private>	Unit	Description	Unit Price	Total Cost <Public>	Total Cost <Private>	Total Cost
1	0.5	0.5	l.s.	Mobilization and Demobilization	$ 10,000.00	$ 5,000.00	$ 5,000.00	$ 10,000.00
2	66	0	l.f.	36" Diameter RCP CL III Storm Drain at Montgomery Hwy	$ 250.00	$ 16,500.00	$ -	$ 16,500.00
3	673	0	l.f.	31"x51" RCAP Storm Drain (Eq. 42")	$ 425.00	$ 286,025.00	$ -	$ 286,025.00
4	152	0	l.f.	40"x65" RCAP Storm Drain (Eq. 54")	$ 750.00	$ 114,000.00	$ -	$ 114,000.00
5	0	175	l.f.	5'x3' Box Culvert Storm Drain	$ 1,400.00	$ -	$ 245,000.00	$ 245,000.00
6	45	485		6'x4' Box Culvert Storm Drain	$ 1,750.00	$ 78,750.00	$ 848,750.00	$ 927,500.00
7	1036	0	s.y.i.p.	Superpave Bituminous Concrete Binder Layer, Patching, ALDOT 424B, 1" Maximum Aggregate Size Mix, ESAL Range E, (440 lb.sy)	$ 50.00	$ 51,800.00	$ -	$ 51,800.00
8	1036	0	s.y.i.p.	Superpave Bituminous Concrete Wearing Surface, ALDOT 424A, 1/2" Maximum Aggregate Size Mix, ESAL Range C/D, (165 lb./sy) (Includes Tack Coat)	$ 40.00	$ 41,440.00	$ -	$ 41,440.00
9	936	660	l.f.	Rock Excavation	$ 100.00	$ 93,600.00	$ 66,000.00	$ 159,600.00
10	30	260	s.y.i.p.	Solid Sod Replacement	$ 20.00	$ 600.00	$ 5,200.00	$ 5,800.00
				Construction Sub-Total		**$ 687,715.00**	**$ 1,169,950.00**	**$ 1,857,665.00**
				Construction Allowance (10%)		**$ 68,771.50**	**$ 116,995.00**	**$ 185,766.50**
				Engineering (20%)		**$ 137,543.00**	**$ 233,990.00**	**$ 371,533.00**
				Easement Acquisition (Assumed 7 tracts) ($2,500/tract)		**$ 17,500.00**	**$ -**	**$ 17,500.00**
				Project Subtotal		**$ 911,529.50**	**$ 1,520,935.00**	**$ 2,432,464.50**
				Project Budget Contingency (20%)		**$ 182,305.90**	**$ 304,187.00**	**$ 486,492.90**
				Total Estimated Project Budget Total		**$ 1,093,835.40**	**$ 1,825,122.00**	**$ 2,918,957.40**

Vestavia Hills Storm Drainage Project - Lakewood Drive
Engineer's Estimate of Probable Construction Cost

August 31, 2022

Item No.	Estimated Quantity <Public>	Estimated Quantity <Private>	Unit	Description	Unit Price	Total Cost <Public>	Total Cost <Private>	Total Cost
1	0.8	0.2	l.s.	Mobilization and Demobilization	$ 5,000.00	$ 4,000.00	$ 1,000.00	$ 5,000.00
2	0	200	s.y.i.p.	Concrete Driveway Replacement	$ 40.00	$ -	$ 8,000.00	$ 8,000.00
3	0	1	each	Storm Drainage Structure, Box Culvert Headwall	$ 5,000.00	$ -	$ 5,000.00	$ 5,000.00
4	0	2	each	Storm Drainage Structure, Reconstruct Headwall at Lakewood Drive and Vstavia Lake	$ 7,500.00	$ -	$ 15,000.00	$ 15,000.00
5	614	111	l.f.	42" Diameter RCP CL III Storm Drain at Lakewood Drive	$ 400.00	$ 245,600.00	$ 44,400.00	$ 290,000.00
6	1105	0	s.y.i.p.	Superpave Bituminous Concrete Binder Layer, Patching, ALDOT 424B, 1" Maximum Aggregate Size Mix, ESAL Range E, (440 lb.sy)	$ 50.00	$ 55,250.00	$ -	$ 55,250.00
7	1105	0	s.y.i.p.	Superpave Bituminous Concrete Wearing Surface, ALDOT 424A, 1/2" Maximum Aggregate Size Mix, ESAL Range C/D, (165 lb./sy) (Includes Tack Coat)	$ 40.00	$ 44,200.00	$ -	$ 44,200.00
8	614	111	l.f.	Rock Excavation	$ 200.00	$ 122,800.00	$ 22,200.00	$ 145,000.00
				Construction Sub-Total		**$ 471,850.00**	**$ 95,600.00**	**$ 567,450.00**
				Construction Allowance (10%)		**$ 47,185.00**	**$ 9,560.00**	**$ 56,745.00**
				Engineering (20%)		**$ 94,370.00**	**$ 19,120.00**	**$ 113,490.00**
				Easement Acquisition (Assumed 2 tracts) ($2,500/tract)		**$ 5,000.00**	**$ -**	**$ 5,000.00**
				Project Subtotal		**$ 618,405.00**	**$ 124,280.00**	**$ 742,685.00**
				Project Budget Contingency (20%)		**$ 123,681.00**	**$ 24,856.00**	**$ 148,537.00**
				Total Estimated Project Budget Total		**$ 742,086.00**	**$ 149,136.00**	**$ 891,222.00**

8.

Analysis of Mitigation Alternatives

4.4 Overview of Primary Conveyance System on Lakewood Drive

An open channel runs through the front yard of the residents that live along Lakewood Drive. Water overtops the property side of the channel and gets kicked out from the driveway bridge culvert at 2064 Lakewood Drive around the 5-year 6-hour storm event (**Figure 8**).

A 10x4.5-foot arch culvert crosses the road at the intersection of Eastwood Place and Lakewood Drive. This culvert has the capacity to carry the 10-year, 6-hour storm event.

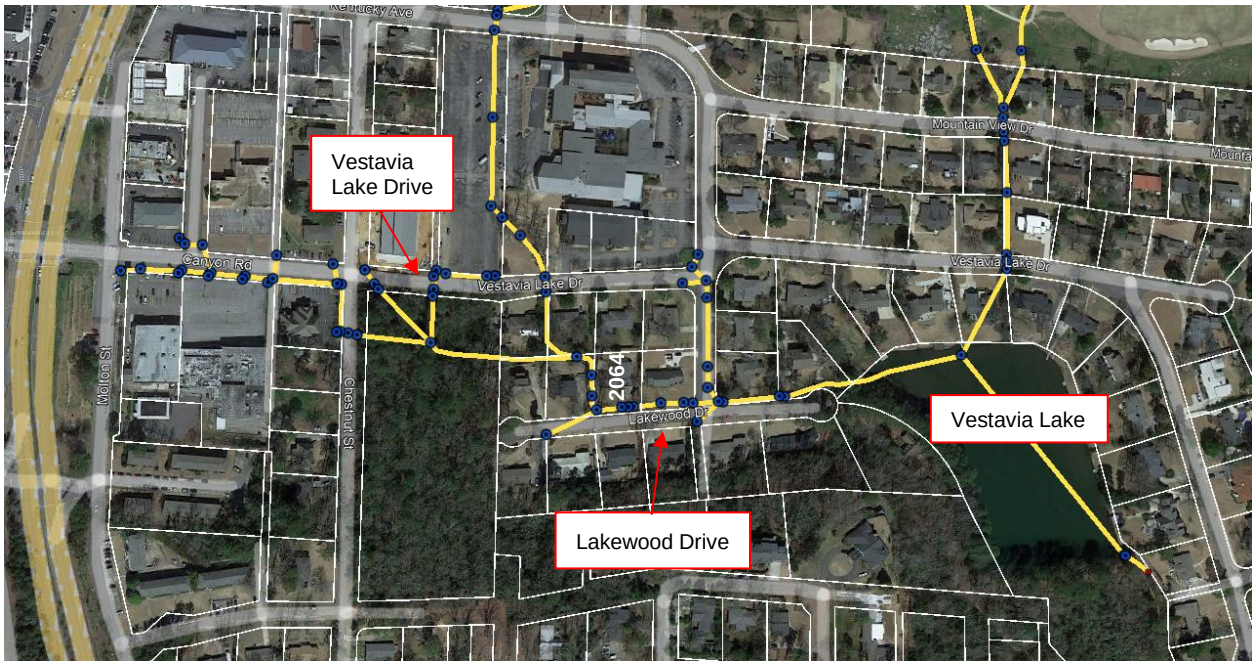


Figure 8 – Overview of the Lakewood Drive and the Southern trunkline. Google Earth Imagery dated March 2022.

5. Analysis of Mitigation Alternatives

5.1 Mitigation Alternatives for the Primary Stormwater Conveyance System in Eastern Trunkline

The most upstream part of the stormwater study in the eastern part of the watershed begins at the crossing of Chestnut Road and Sunset Drive. West of the intersection, Schoel Engineering recommends increasing the pipe size from a 30-inch RCP to a 36X58.5-inch arch pipe (a 48-inch circular pipe equivalent). This pipe travels west and turns south between the properties at 2211 Chestnut Road and 300 Sunset Drive.

This pipe will then discharge into the open channel behind the residences located at 304 Sunset Drive.

During the frequent stormwater events, water in the open channel overtops and travels through the properties of 2208 and 2212 Chanticleer Road. The existing 30-inch pipe travels too close to the residence's homes, so there is not a recommended alternative for this section of pipe. However, there is an inlet located in the front right corner of 2204 Chanticleer Lane and it is recommended to increase the pipe size at that location from a 30-inch RCP to continue with the 36X58.5-inch arch pipe (a 48-inch circular pipe equivalent) until the inlet north of the intersection of Trousdale Street and Shades Avenue.

At the intersection of Trousdale Street and Shades Avenue, Schoel Engineering recommends increasing the 24-inch pipe to a 6X3-foot RCB all the way to the open channel in front of the property at 428 Trousdale Street.

The open channel located on Trousdale Street between residence 428 Trousdale Street and Longview Drive will need to be modified to accommodate a 6x3-foot RCB culvert. Downstream of the first section of open channel on Trousdale Street, the existing 42-inch RCP is recommended to increase to an 8X3-foot RCB. This culvert will continue to travel south along Trousdale Street and will cross Longview Drive. The new box culvert will terminate at the next section of the open channel along Trousdale Street. It will flow through the driveway culvert located at 440 Trousdale Street, which will need to increase to an 8X3-foot RCB culvert as well.

The lower section of the open channel on Trousdale Street will need to be modified to accommodate the 8X3-foot RCB culvert along Trousdale. Also, it is recommended that the channel downstream of the 440 Trousdale Street driveway bridge be lowered slightly to create a smoother slope.

At the intersection of Trousdale Street and Southwood Road, the existing 42-inch culvert is recommended to increase to an 11X3-foot RCB culvert that will discharge into the open channel west of the home located at 2135 Southwood Road. These recommendations carry the 25-year, 6-hour storm event. A schematic of the Eastern trunkline is in **Appendix B, Exhibit 1**.

5.1.1 Local Flooding in the Eastern Basins – Sunset Drive

The homeowners located at 308 Sunset Drive encounter water entering their basement during frequent storm events. It is recommended that the homeowner at 304 Sunset drive remove the brick wall located in the right-of-way. It is also

recommended that the driveway spanners be replaced with a grated spanner and maintained regularly.

It is recommended to replace all existing driveways spanners on the section of Sunset Drive south of the intersection of Biltmore Avenue and Sunset Drive, except for the driveway spanner located at 2211 Southwood Road.

5.1.2 Local Flooding in the Eastern Basins – Biltmore Avenue

A 12-inch pipe on Sunset Drives collects stormwater runoff from the northern portion of Sunset Drive. The 12-inch pipe moves water west down Biltmore Avenue. It is suggested that the driveway spanners be updated to the new typical spanner provided in **Appendix B, Exhibit 5**. On occasion, some storm events create issues with water inside the garage of the residence at 444 Biltmore Avenue. It is suggested that the driveway spanners be updated to the new typical spanner.

5.1.3 Local Flooding in the Eastern Basins – Sunset Drive to Southwood Road

South on Sunset Drive at the intersection of Biltmore Avenue and Sunset Drive, it is recommended to remove all existing driveway spanners, except for the driveway spanner located at 2211 Southwood Road. It is recommended that from the curb along Southwood Road, all the valley gutters be replaced to a 24” curb and gutter, all the driveway spanners would need to be reworked (apart from 2211 Southwood Road) for a smoother transition to the driveway. The typical driveway spanner is grated (**Figure 9**). A 24-inch curb and gutter is recommended from the Sunset Drive/Southwood Road street transition to the Southwood Road/Trousdale Street intersection (**Figure 10**).

It is recommended to replace all existing driveways spanners on the section of Sunset Drive south of the intersection of Biltmore Avenue and Sunset Drive, except for the driveway spanner located at 2211 Southwood Road.

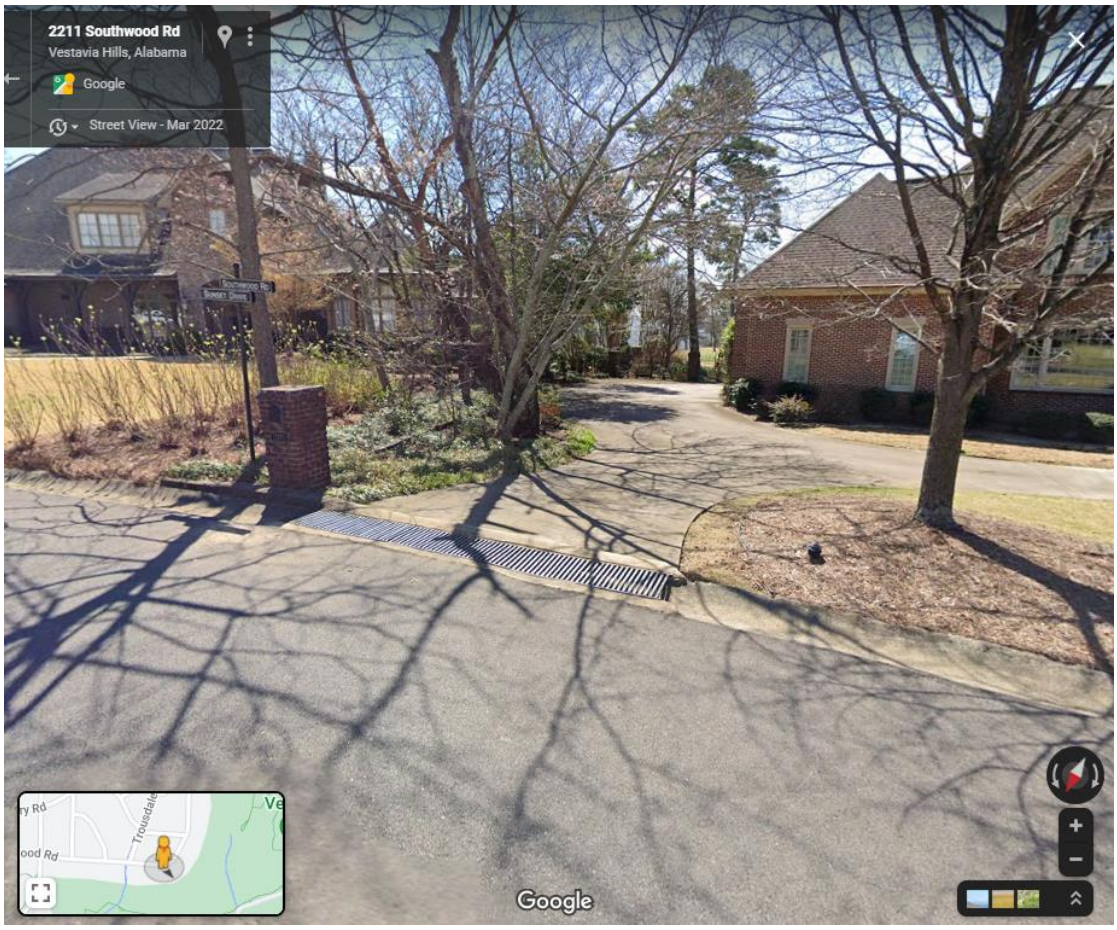


Figure 9 – The typical grated driveway spanner that is recommended is located at the property of 2211 Southwood Road. Google Imagery dated March 2022.

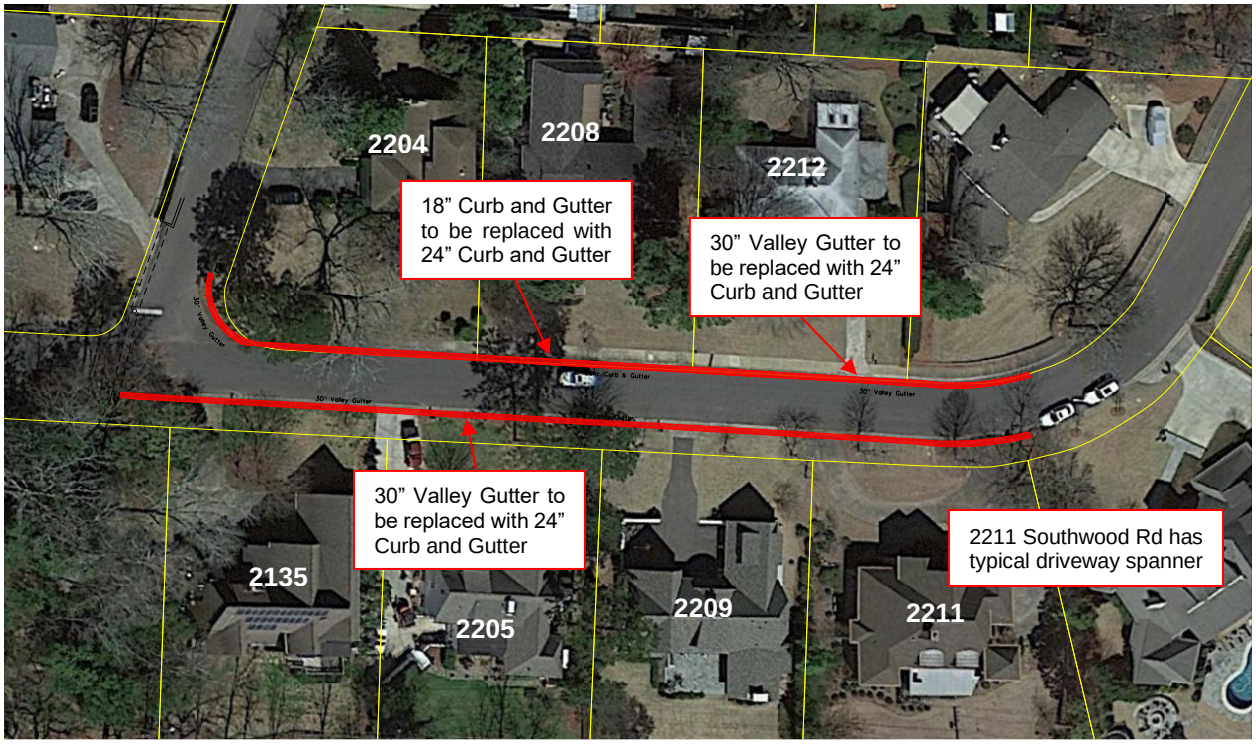


Figure 10 – Red hatch illustrates the section of Valley Gutters that need to be converted to the 24" curb and gutter on Southwood Road.

5.2 Mitigation Alternatives for the Primary Stormwater Conveyance System in Central Trunkline

The upper extent of the central trunkline begins at Shades Crest Road just east of the Highway 31 intersection. In exiting conditions, a 24-inch RCP crosses the road and infringes on the Vestavia Hills Lutheran Church property. It is recommended that the 24-inch pipe increase to a 22.5x36-inch arch pipe (equivalent to a 30-inch circular pipe). The next pipe downstream is another 24-inch CPP that needs to increase to a 26.6X43.8-inch arch culvert (equivalent to a 36-inch circular pipe). The inlet in the parking lot on the east side of the church has existing 2~18-inch pipes that discharge into an open channel. Schoel Engineering recommends increasing the width of the open channel by a foot and performing routine maintenance on cleaning out the channel.

North of Chestnut Road, an open channel discharges stormwater runoff into the valley gutters on Chestnut Road. The valley gutter on the north side of Chestnut Road flows into an inlet with an existing 15-inch RCP that crosses Chestnut Road. It is recommended that the 15-inch culvert crossing be increased to a 18X28.5-inch arch

culvert (equivalent to a 24-inch circular pipe). Water that emits from the open channel also travels across the road and enters the valley gutter south of Chestnut Road. An alternative to the valley gutters and stormwater runoff in the roadway, it is recommended to add a 24-inch culvert from the open channel beneath Chestnut Road to the downstream inlet on Chestnut Road.

Downstream of the Chestnut Road crossing, is a 20-inch RCP that is recommended to increase to a 26.6X43.8-inch arch pipe (equivalent to a 36-inch circular pipe) and replace the existing system until the open channel south of the Hickory Road crossing. Please note that the upstream culvert of Hickory Road also has a flume on top of the culvert. The recommended replacement to a 36-inch equivalent pipe is to replace the flume as well.

Between the two open channel sections just upstream of the Southwood Road crossing, an existing 36-inch pipe needs to be replaced by a 36x58.5-inch arch pipe (equivalent to a 48-inch circular pipe).

The Southwood Road and Granada Drive culvert crossings vary from 30-inch to 24-inch pipes. The roadway crossing was recently replaced by the City of Vestavia Hills to be a 48x24-inch RCP. Schoel Engineering recommends the next segment of pipe be increased to be a 26.6x43.8-inch arch pipe (equivalent to a 36-inch circular pipe) until the stormwater discharges into the open channel at the golf course. These recommendations carry the 25-year, 6-hour storm event. The schematic for the Central trunkline is in **Appendix B, Exhibit 2**.

5.2.1 Local Flooding in the Central Basins – Fernwood Drive

Schoel Engineering recommends increasing the channel width downstream of Hickory Road from 3 feet to 4 feet wide. Another alternative to this section is to clean out the vegetation from the channel and perform routine channel maintenance. In addition, it is recommended that the 30-inch culvert crossing Southwood Road increases to a 36-inch culvert to carry the 25-year, 6-hour storm event.

5.3 Mitigation Alternatives for the Primary Stormwater Conveyance System in Western Trunkline

The western side of the Vestavia Hills watershed study begins upstream at the intersection of Hickory Road and Montgomery Highway. The pipes to the north vary in size from 30- to 36-inch pipes. It's recommended that the 30-inch pipes increase to 36-inch pipes down Montgomery Highway before it crosses at the Chick-fil-A. An existing 42-inch pipe crosses Montgomery Highway, which is an ALDOT right-of-way,

and enters the Chick-fil-A stormwater network. It is recommended the crossing pipe increase to a 40x65-inch (equivalent to a 54-inch circular pipe).

Eastwood Place is a 30-inch pipe that needs to increase to a 31x51-inch arch pipe (equivalent to a 42-inch circular pipe). When the pipe ends at a manhole and transitions to a 30-inch CPP Schoel recommends that it changes to a 5x3-foot reinforced concrete box that travels between 616 and 620 Eastwood place and behind 620 Eastwood Place. Behind the property of 624 Eastwood Place, the culvert is recommended to increase to be a 5x4-foot box from a 30-inch RCP.

The Kentucky Avenue culvert crossing currently is a 30-inch pipe. Schoel Engineering recommends increasing the crossing to a 6x4-foot concrete box that travels through the parking lot of the Vestavia Hills Methodist church. A schematic for the western trunkline is in **Appendix B, Exhibit 3**.

5.4 Mitigation Alternatives for the Primary Stormwater Conveyance System on Lakewood Drive

An open channel runs through the front yard of the residents that live along Lakewood Drive. Water exits the channel and the driveway bridge culvert around the 5-year, 6-hour storm event. An alternative would be to make the channel wider in these sections along the residences home.

An additional suggestion would be to add a 42-inch relief culvert along Lakewood Drive that outfalls at Vestavia Lake. The relief culvert would begin on the west end of Lakewood Drive at the bend in the open channel in front of the property located at 2064 Lakewood Drive. The alternatives at Lakewood Drive carry the 25-year, 6-hour return period.

Schematic design exhibits for each trunkline alternative are included in **Appendix B** of this report.

6. Prioritization

In order to determine the projects that provide the most benefit and are cost-effective, Schoel developed criteria used to prioritize the recommended improvements. Each project was then scored based on the prioritization criteria and ranked. The prioritization criteria used for this project was 1) number of properties that benefit, 2) cost, 3) percent of project within public right-of-way, and 4) flooding frequency (**Table 3**). The ranking criteria was based on a 1-10 scale and scored accordingly. The Eastern trunkline ranked the highest in prioritization and has an estimated budget of $2,830,447.20.

Table 3 – Prioritization and ranking tables.

PROJECTS	RANKINGS	NO. OF PROPERTIES THAT BENEFIT (RANK 1-HIGH, 10-LOW)	PROPERTY SCORE	COST	COST SCORE	PUBLIC ROW %	PUBLIC % SCORE	OCCURANCE OF FLOODING	FLOODING SCORE	TOTAL SCORE
EAST TRUNK LINE	**1**	34								
SUNSET DRIVE	PHASE 1A	10 HOMES								
SOUTHWOOD ROAD	PHASE 1B	4 HOMES								
TROUSDALE STREET (LOWER)	PHASE 2	5 HOMES	1	$ 2,830,447.20	10	95	1	1-YR	1	**13**
TROUSDALE STREET (UPPER)	PHASE 3	5 HOMES								
CHANTICLEER LANE	PHASE 4	4 HOMES								
CHESTNUT ROAD	PHASE 5	3 HOMES								
CENTRAL TRUNK LINE	2	26								
SOUTHWOOD ROAD	PHASE 1	4 HOMES								
HICKORY ROAD	PHASE 2	6 HOMES	2	$ 938,683.20	4	25	8	2-YR	3	**17**
CHESTNUT ROAD	PHASE 3	3 HOMES								
CHURCH	PHASE 4	1 CHURCH								
FERNWOOD	PHASE 5	12 HOMES								
LAKEWOOD DRIVE	**3**	4	9	$ 891,222.00	3	85	2	5-YR	5	**19**
WEST TRUNK LINE	**4**	19								
VESTAVIA HILLS CHURCH	PHASE 1	1 CHURCH								
KENTUCKY AVE	PHASE 2	4 HOMES	4	$ 2,918,957.40	10	55	5	1-YR	1	**20**
EASTWOOD	PHASE 3	14 HOMES								
ALDOT	TBD	0								

COST RANKINGS

SCORE	COST RANGE	
1	$ -	$ 300,000.00
2	$ 300,001.00	$ 600,000.00
3	$ 600,001.00	$ 900,000.00
4	$ 900,001.00	$ 1,200,000.00
5	$ 1,200,001.00	$ 1,500,000.00
6	$ 1,500,001.00	$ 1,800,000.00
7	$ 1,800,001.00	$ 2,100,000.00
8	$ 2,100,001.00	$ 2,400,000.00
9	$ 2,400,001.00	$ 2,700,000.00
10	$ 2,700,001.00	$ 3,000,000.00

PUBLIC % RANKINGS

SCORE	PUBLIC ROW % RANGE	
1	91	100
2	81	90
3	71	80
4	61	70
5	51	60
6	41	50
7	31	40
8	21	30
9	11	20
10	0	10

PROPERTY RANKINGS

SCORE	# OF STRUCTURES	
1	28	29+
2	25	27
3	22	24
4	19	21
5	16	18
6	13	15
7	10	12
8	7	9
9	4	6
10	0	3

FLOODING RANKINGS

SCORE	STORM OCCURANCE
1	1-YR OR BELOW
3	2-YR
5	5-YR
7	10-YR
10	25-YR OR GREATER

The Engineer's Estimate of Probable Construction Costs is in **Appendix C**.

9.

Photographs: “Eastern Trunkline of the Upper US31 Stormwater Master Plan”

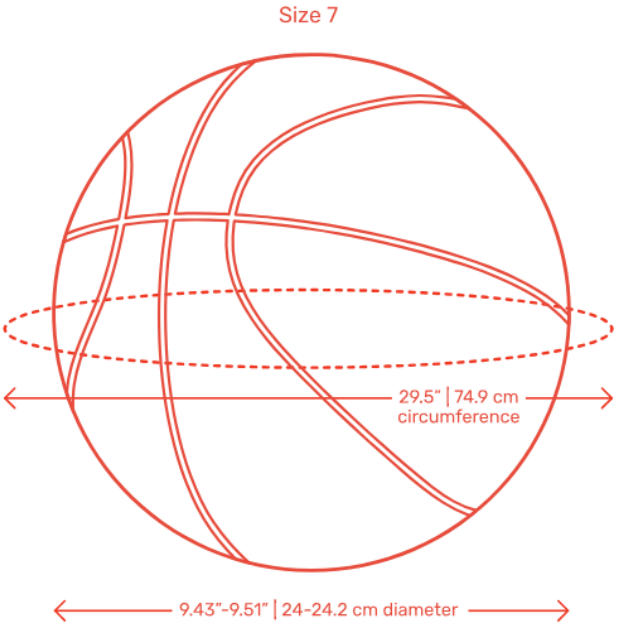
Shows Southwood Road and Sunset Drive

Eastern Trunkline of the Upper US31 Stormwater Master Plan

Images in this document are from the Eastern Trunkline of the Upper US31 Stormwater Master Plan. These images were taken May of 2024, after a portion of the first phase had been completed. Images show the character of the project area. Where new curbing, storm drains, etc. are shown, those are representative of the work being done. An estimated 10% of the stormwater infrastructure will be replaced in the project area. While the upgrades and rehabilitation are minor in that sense, the impact to the local flooding conditions will be significant.

Small concrete covered storm drains which have limited capacity and are easily crushed will be replaced with wide drains which are designed to highway standards.

Concrete driveway spanners as shown on the left are common in the project area. These will be replaced as shown in the images above. These will allow water to flow, whereas concrete spanners restrict flow, divert water to the road, and frequently crumble (which could end up in the storm drain).



Many residences in Vestavia Hills have basketball goals in the driveway, and basketballs can become stuck in pipes that have diameters of 12-15”.

Description

Basketball sizes come in variations for different ages, genders, and level of play. The official NBA and competitive professional basketball is 29.5" | 74.9 cm in circumference with a diameter between 9.43"-9.51" | 24-24.2 cm. Professional basketballs must be inflated to a pressure between 7.5-8.5 PSI and cannot exceed the maximum weight of 22 ounces. When choosing a basketball, consider whether the play environment will be primarily outdoor or indoor because indoor basketballs perform best as full-grain leather constructions and outdoor basketballs are better as rubber.

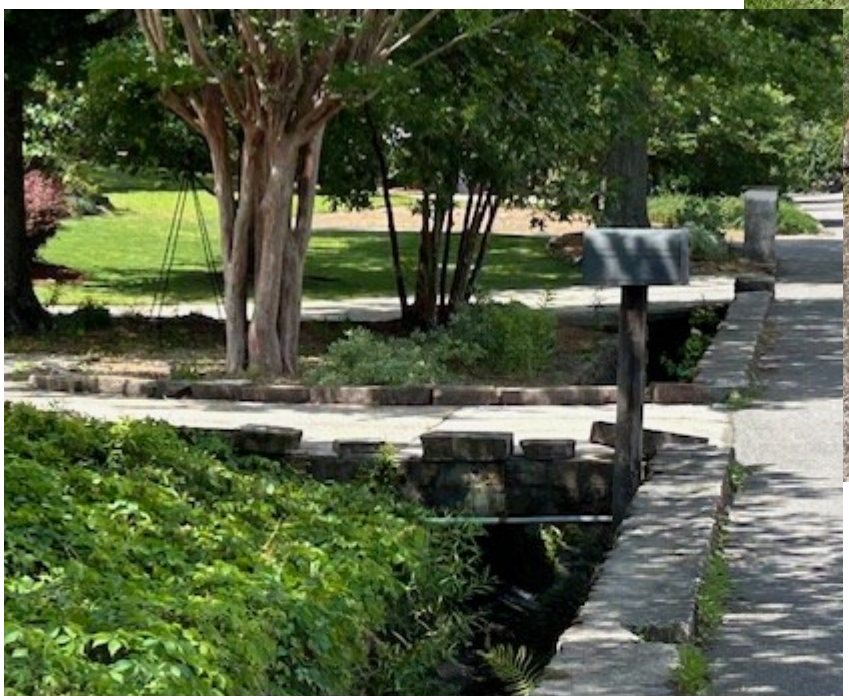
These residences are served by the drainage grate shown. Looking into the grate, one can see how shallow it is. Across the road, the surprisingly small pipe becomes visible.


Valley gutter is in the majority of project area. In some locations, drainage and flooding concerns may be alleviated by converting valley gutter system to a curb gutter system.


Valley gutter is throughout the project area.

This picture shows how water must make a turn in order to flow into the old style storm drain. This increases the likelihood that water will flow across the street or other surfaces before entering the stormwater system. The new storm drains are designed so that water can flow into the drain without making a turn.

This section of open drain will be lined, wider pipe installed, and covered. Currently the brick/rock wall lining of the ditch is deteriorating, sending rock and mortar into the drain and causing sinkholes in nearby areas. Some driveways cross the open ditch with little support.



10.

Budget Justification Worksheet

Rationale for Calculations of 2022 Construction Estimates for 2025 Implementation

1. Price inflation for concrete pipe, estimating 15% 2022 vs. 2024. https://www.statista.com/statistics/1046602/inflation-construction-materials-us/. Then apply 1/10 of that to the construction subtotal, so 1.5% inflation added.
2. The Construction Subtotal includes both labor and materials, but it wasn't broken down. So that I could account for Build America Buy America and Davis Bacon, I arbitrarily divided it 30% materials/70% labor.
3. Increased the materials portion 20% to account for BABA.
4. Increased the labor portion 7% to account for DBA.
5. Added all of the original construction allowance
6. Added 70% of the Project Contingency (The other 30% was put on Contractual.)

East Trunkline Example Calculations

Item	2022	2024	
		$1,610,375.00	Construction Sub-Total (Original)
		$24,155.63	add 1.5% for inflation
Construction Sub-Total	$1,610,375.00	$483,112.50	Materials (30% of original Construction sub-total)
		$96,622.50	Add 20% for BABA
		$1,127,262.50	Construction (70% of original Constructiuon sub-total)
		$78,908.38	Add 7% for DBA
Construction Allowance (10%)	$161,037.50	$161,037.50	full Construction Allowance included in Construction
		$294,138.25	Add 70% of Project Contingency included in Construction
		$2,265,237.25	**Construction (Budget Justification Worksheet)**
Engineering (20%)	$322,075.00	$448,134.25	Design (includes 30% of Project Contingency)
Easement Acquisition	$7,500.00	$7,500.00	Easement Acquisition
Project Subtotal, Original before Contingency	$2,100,987.50	**$2,720,871.50**	**Project Subtotal, 2024 Federal-project adjusted**
Project Budget Contingency (20%)	$420,197.50		
Total Estimated Project Budget Total	$2,521,185.00		

Original Engineers Estimate (2022)

Construction Sub-Total	**$**	**1,610,375.00**
Construction Allowance (10%)	**$**	**161,037.50**
Engineering (20%)	**$**	**322,075.00**
Easement Acquisition (Assumed 3 tracts) ($2,500/tract)	**$**	**7,500.00**
Project Subtotal	**$**	**2,100,987.50**
Project Budget Contingency (20%)	**$**	**420,197.50**
Total Estimated Project Budget Total	**$**	**2,521,185.00**

BUDGET JUSTIFICATION WORKSHEET

You must provide a detailed cost justification for the estimated budget amounts reflected in Section B of your SF-424A application form. This detailed information will enable the EPA project officer to perform the required analysis to determine if the costs are reasonable and necessary. You may use the following format or a format of your choice to provide this information.

[NOTE: Please indicate any pre-award costs with a star (*).]

a. PERSONNEL

POSITION	NUMBER	SALARY	WORK YEARS	AMOUNT
NOT APPLICABLE				
a. PERSONNEL TOTAL				$

b. FRINGE BENEFITS

BASE NOT APPLICABLE	$
RATE	**X**
b. FRINGE BENEFITS TOTAL	$

c. TRAVEL

If the grant is not for a continuing environmental program or if travel is not well documented in the work plan, provide a breakdown of the number of trips, destinations, number of travelers, etc. to document estimated travel costs.
NOT APPLICABLE
c. TRAVEL TOTAL: $

OBJECT CLASS CATEGORIES WORKSHEET

d. EQUIPMENT

Tangible, non-expendable, personal property having a useful life of more than one year and an acquisition cost of $5,000 or more per unit. Please list equipment items (i.e., vehicles, boats, etc.) and provide adequate detail to enable the EPA project officer to make an eligibility determination and to verify cost. For "equipment" with a cost of less than $5,000 per unit, list under supplies.

ITEM	NUMBER	COST PER UNIT	TOTAL
NOT APPLICABLE			
d. EQUIPMENT TOTAL:			$

e. SUPPLIES

List by groups (as appropriate), such as office supplies, lab supplies, field supplies. If the cost for a particular group is over $50,000, please provide a list of the more costly items or subsets.

e. SUPPLIES TOTAL	

f. CONTRACTUAL

List <u>each</u> planned contract and the type of services/project activity to be procured. Agreements/contracts with other governmental agencies (state, local or Federal) should be listed under category h. OTHER.

East Trunkline*	$ 448,134*
Central Trunkline*	$ 27,501*
Lakewood Drive	$ 131,474
Data Collection and Evaluation*	$ 5,000*
f. CONTRACTUAL TOTAL	$ 612,110

OBJECT CLASS CATEGORIES WORKSHEET

g. CONSTRUCTION

List all construction costs	
East Trunkline	$ 2,265,237
Central Trunkline	$ 133,775
Lakewood Drive	$ 664,121
g. CONSTRUCTION TOTAL	$ 3,063,133

h. OTHER

List other items that would not be appropriately included elsewhere, such as costs for maintenance, operations, repairs, motor pools, rental, training, publication, and printing, and Intergovernmental Agreements	
East Trunkline - Easements	$ 7,500
Central Trunkline - Easements	$ 32,500
Lakewood Drive - Easements	$ 5,000
	$
h. OTHER TOTAL	$ 45,000

i. TOTAL DIRECT COSTS: (Sum of categories A through H)	$3,720,243
j. INDIRECT COSTS: de minimus (RATE: 9.8 %)	$ 29,757
k. TOTAL PROPOSED COSTS: (Sum of categories I through J)	$ 3,750,000
FEDERAL FUNDS REQUESTED:	$3,000,000
RECIPIENT SHARE OF TOTAL PROPOSED COSTS:	$ 750,000

11.

Modified Total Direct Cost (MTDC)
FY2025 Public Services Departmental Budget

Modified Total Direct Cost

Public Services Department Total FY2025 Budget $5,654,131

CFR Exclusions	
Equipment	n/a
Capital Expenditures	n/a
Rentals	below
Other	

These expenditures are as they are listed in the approved budget.

Sanitation	$4,282,644
Sanitation	$50,500
Street Maintenance	$4,000
Uniforms	$20,700
Rental	$4,500
Rental	$4,000
Membership and Dues	$2,050
Professional Consultants	$30,000
Travel and Conference	$8,300
	$4,406,694

Public Services Budget less Exclusions	$1,247,437
Indirect Costs Proposed	$29,757
IDC Percentage of Public Services Operational Budget	2.4%

Prior to October 1, 2024, the de minimus rate for indirect costs was 10%.
Following October 1, 2024, the de minimus rate for IDC was raised to 15%.

For this project, less than the de minimus is proposed.

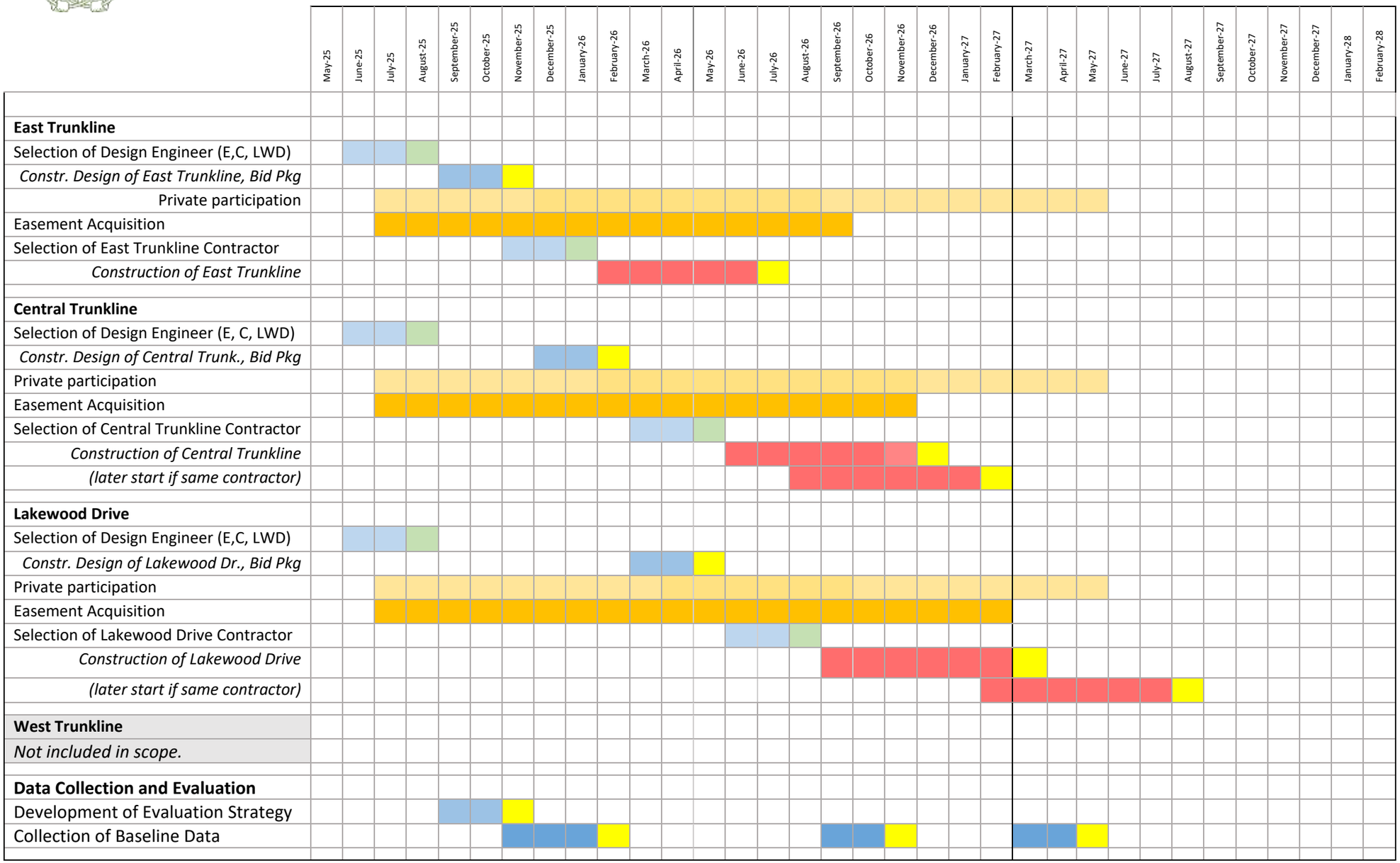
$187,115.55	15%
$124,743.70	10%

12.

Gantt Chart of Project Milestones

2024 EPA Community Grant: Critical Infrastructure Improvements — Stormwater in Upper US 31 Vestavia Hills

STUDY/DESIGN/BID PROCESS | PROCUREMENT PROPOSALS | AWARD CONTRACT/PURCHASE | ROW/EASEMENT ACQUISITION | **POSSIBLE WEATHER ISSUES** | CONSTRUCTION / INSTALLATION | COMPLETION



February 25, 2025 – Draft for Workplan based on availability of funds June 2025 with pre-award expenditures allowed upon approval of Workplan.

Note: **This chart reflects the bullet points of the Workplan for the 2024 EPA application based on the 2024 appropriation. If changes are made, they need to be made in both places.**