

# Critical Infrastructure Improvements – Stormwater in Upper US 31 Vestavia Hills

City of Vestavia Hills, Alabama

EPA Community Grant (FY 2024 Consolidated Appropriations Act)

Workplan

## I. Project Objective(s) and Need

The project “Critical Infrastructure Improvements – Stormwater in Upper US 31 Vestavia Hills” impacts a vulnerable watershed which is not only a source of drinking water but is also a globally significant place of biodiversity. The Cahaba River is the primary drinking water source for one-fifth of the state of Alabama’s people in the Birmingham metro area. However, the project site is downstream of all Birmingham Water Works water intakes. The project site is very near to the Shades Mountain Filter Plant of Birmingham Water Works, the largest filtration plant in Alabama. In regards to biodiversity, although the Cahaba River watershed is a fraction of a size to other notable biodiverse watersheds, its biodiversity is several times greater<sup>1</sup>, and it was named as one of eight “Hotspots of Biodiversity” out of 2,111 watersheds in the



contiguous United States. However, more than half of its mainstream is under Alabama’s §303(d) list, and 30 miles of Cahaba River tributaries are also on this list. In addition to its significance for biodiversity, the Cahaba River is beloved for its recreational value.

According to the EPA, polluted runoff is one of the greatest threats to clean water in the U.S.<sup>2</sup> Improving the drainage system will lessen nonpoint pollution by reducing the amount of water which backs up on city streets and onto areas which have materials which wash into the

storm sewer system. Currently the areas served by this project frequently flood, with the runoff sometimes flowing like a river, washing dirt, debris, and other materials into the storm sewer. An improved drainage system would better control the flow so that the storm water would pick up less pollutants along the way. It will also prevent damage to property. Property owners who seek to install driveways or other surfaces are required to first obtain a permit through our Engineering department. The use of pervious/permeable materials for driveways and other surfaces is encouraged and, in many cases, required by ordinance.



## II. Project Description

### Narrative

In 2023, the City of Vestavia Hills made request to Senator Katie Britt for consideration of federal assistance to help tackle the problem of aged and inadequate stormwater infrastructure in our community. The request made was to support critical infrastructure improvements to the upper US 31 corridor of Vestavia Hills. Areas within this Vestavia Hills watershed experience frequent flooding, with much of the flooding occurring in the eastern portion of the watershed, specifically Trousdale Street and Southwood Road vicinity. The area experiences flooding from storm events as small as a 1-year, 6-hour return period. These properties, which are not located in a FEMA defined flood hazard area and most of which are not covered by flood insurance, are vulnerable with the occurrence of a 2" rain event (within an hour). The Birmingham area has experienced a greater than 3" rainfall at least once annually for 10 of the past 15 years.<sup>3</sup> In 2021, the City engaged an engineering firm to study the corridor and develop a stormwater master plan for it. The full master plan document may be viewed at [https://vhal.org/wp-content/uploads/2023/05/Vestavia-Hills-Report\\_FINAL\\_signed.pdf](https://vhal.org/wp-content/uploads/2023/05/Vestavia-Hills-Report_FINAL_signed.pdf), and specific sections of the master plan are included in the Appendix to this Workplan as referenced. The \$3M appropriation awarded will greatly accelerate the City's ability to implement the stormwater master plan. The proposed project is to replace aged and undersized drainage infrastructure estimated to cost \$8M. That includes over \$4.8M public and \$2.9M private investment needed to mitigate the effects of stormwater runoff.

Residents concerned about the flooding and heavy, debris-filled runoff, have sought relief from the City for a number of years. In Alabama, public funds may not be used for a private purpose, but expenditures that serve "a public purpose" are valid. Therefore, after a thorough review of the issue, City leadership engaged an engineering firm to conduct a hydrologic study and prepare an assessment of affected areas. This report was published in 2022.

The hydrologic study identified a 345-acre drainage basin that was divided into a number of subbasins. Project focus areas were established according to which major storm drainage "trunkline" an area drained to, and recommendations were outlined for each project focus area. These include: "East Trunkline", "West Trunkline", and "Central Trunkline" along with two other project areas carved out to be treated independently (Lakewood Drive, and Sunset Drive/Biltmore Avenue/Southwood Road).

Walter Garner  
2126 Shades Avenue  
(My house is located on the corner of Shades Avenue and Trousdale Street)  
Bricks, gravel, small and large rocks wash down the hill onto Trousdale Street each time there is a heavy rain. Please see the pictures below.  
Is there something the City can do to permanently fix the problem?  
Can the City Maintenance Department come and clean the street?



I picked up the large ones and placed them in a pile:





In nearly half of the affected properties, the infrastructure issues are almost entirely in the public right-of-way. For the other properties, where many of the issues exist 25-50% within public ROW, it is critical that there is private property participation in order for the efforts on public property to be effective. With much of the infrastructure issues lying within public ROW, property owners are looking to the City to address the problems. The City has maximized its financing ability in order to make \$10M of infrastructure improvements city-wide and has limited resources to undertake additional projects. However, the need for these stormwater infrastructure improvements is pressing, and without the assistance neither the City nor the homeowners can make sufficient progress in a timely manner to prevent further significant property damage.

### Project Description

Due to the pressing need to mitigate the damage and environmental impact that occurs with each heavy rain, the City began implementation on critical issues before it was known whether federal assistance would be available. Further work is on hold until it is known what expenditures qualify and what may qualify as pre-award expenditures. The master plan is sectioned so that areas are prioritized but do not necessarily have to be improved sequentially. The City had planned to proceed with improvements within budget constraints, working in segments as is feasible. This Workplan is based upon what may be accomplished with the \$3M appropriation, assuming availability around June 2025. If the timing of funding availability is shifted and for some reason it becomes apparent that another segment of the project is either more feasible, more critical, or more advantageous, it is requested that the City may have the flexibility to modify its workplan to another portion of the master plan.

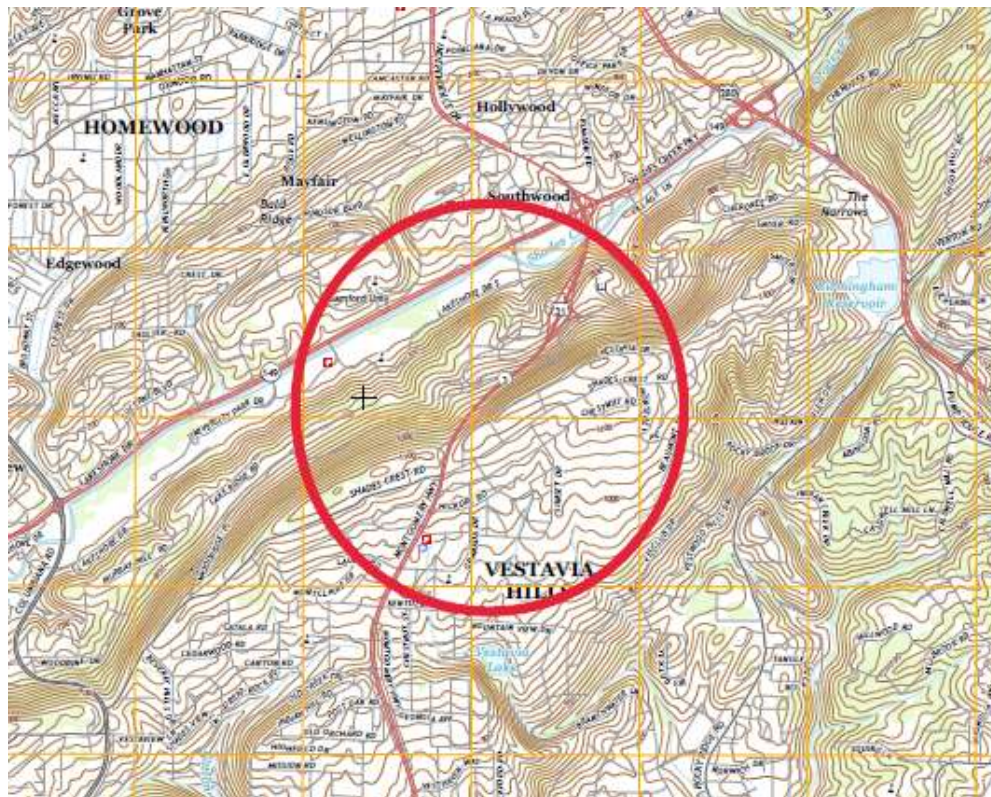
The Upper US 31 Stormwater Master Plan defines the four major storm drainage trunklines through the study area, each with an estimated cost for implementation. Within the subbasins draining to those trunklines are segments named for the streets with which they most closely align. General outlays of the needs for improvements within these segments have been described in the master plan, but construction designs remain to be developed. This limits the level of detail which the City may provide in the Workplan and the associated budget.

Completed improvements within the Sunset Drive and Southwood Road segments of the East Trunkline provides an example of the work being done and the costs. The Engineer's Estimate of Probable Construction Cost is included in the Appendix. This Workplan proposes similar work within the area defined by the master plan, focusing on the following areas:

- East Trunkline – design and construction
- Central Trunkline – design and construction
- Lakewood Drive – design and construction

Note that the City's project will only involve the public portion of the improvements defined in the Stormwater Master Plan. Some areas have improvements which are private responsibility, i.e. the property owners must pay for the work to be performed.

The project area is on the "upper" (northern) end of US 31 in Vestavia Hills, Alabama. It is situated mostly in an elevated area as shown below. The location map and USGS 1:24 quadrangle map, and a map illustrating the location of the project area within the Cahaba River watershed are included in the Appendix.



The Appendix includes the Engineer's Estimate of Probable Construction Cost which was prepared for each project area as part of the master plan prepared in 2022. The estimates describe improvements including:

- Replacing valley gutter with curb
- Removal and replacement of driveway spanners
- Replacing, reconstructing, and installing headwalls and culverts
- Installing drainage pipe/replacing drainage pipe to increase diameter
- Replacing storm drains with wider, angled entry drains to better capture stormwater
- Channel modifications
- General activities associated with a drainage project, e.g. repaving, sod replacement, rock excavation, clearing and grubbing, sidewalk replacement, utility adjustments, etc.

Each of these estimates go into further detail about the quantities, e.g. *18 lf of 36" diameter RCP CL III Storm Drain at Southwood Road*. Also in the Appendix is the Analysis of Mitigation Alternatives (Section 5 of the Master Plan). This section describes the recommendations from the 2022 study. A sample is shown below.

### **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**).

Construction designs have not been developed for these recommendations. Therefore, engineering survey and design are included in the scope of this proposed project. These designs will be needed to provide any further detailed description of the proposed project. The Appendix includes a document with photographs showing some of the improvements already made (along Southwood Road and Sunset Drive) and examples of infrastructure issues to be addressed.

### Scope of Work

Based upon an estimated availability of the funds around June 2025, these are the focus areas selected for the scope of this proposed project:

- East Trunkline – design and construction
- Central Trunkline – design and construction
- Lakewood Drive – design and construction

Activities to be performed under the grant include:

- Survey, engineering, and design for each of the focus areas
- Development of bid specifications
- Communication and coordination with property owners regarding progress of the project and options for performance of the private property portions of the work
- Coordination of temporary easements
- Bidding of project
- Management of contracts and monitoring performance of the work
- Administration of the grant
- Preparation for evaluation
- Communication with stakeholders

### Summary of Deliverables

These are the deliverables of the proposed project:

1. Designs
  - a. East Trunkline
  - b. Central Trunkline
  - c. Lakewood Drive
  
2. Completed infrastructure improvements
  - a. East Trunkline
  - b. Central Trunkline
  - c. Lakewood Drive

3. Report on Master Plan implementation progress
  - a. Readiness to proceed for future phases of implementation
  - b. Budget comparisons of 2022 estimates with the actual 2026/2027 costs
  - c. Challenges encountered
  - d. Photographs of the improvements
4. Compliance and reporting documents prescribed in the guidelines and grant agreement
5. Preliminary data for evaluation

#### Framework for Project Management

The City of Vestavia Hills is experienced in managing large public works projects and has very recently completed a small portion of the improvements recommended in the master plan. The City also has existing routine practices in place such as the City Manager meeting regularly together with the Public Services Director and the Deputy Finance Director. The City Manager's assistant serves as the Grants Administrator and reports weekly to the City Manager and Assistant City Manager concerning active grants. Grants Administrator has effectively completed multiple training sessions in preparation for expanded roles in grant administration.

The Public Services Director, Deputy Finance Director, and Grants Administrator have collaborated in the preparation of this proposal. Upon award, they will each continue to perform their established roles:

- Grants Administrator – coordinate compliance activities and documentation, prepare reports, prepare reimbursement requests, monitor progress in terms of project milestones.
- Public Services Director – coordinate with the contractor and suppliers throughout the performance of the project; oversee/manage design, bidding, construction activities for project; coordinate with property owners and other stakeholders; respond to the Grants Administrator for documents and information needed. This will be done with the assistance of the City Engineering staff.
- Deputy Finance Director – review and submit reimbursement requests, ensure funds are in separate accounts, monitor project encumbrances and expenditures per the City's budget and accounting practices, coordinate with auditors.
- City Manager - oversee the process of procurement and performance of contracts. The City Manager also serves as the Risk Manager and will oversee the fulfillment of insurance requirements, coordination of claims, response to reports of hazardous situations, etc. The City Manager and the Assistant City Manager will be active in communicating with the property owners and other residents regarding any concerns or questions they may have.
- City Engineering Staff - monitor the project site and performance of the work.

- Engineering Consultant who designs the project will also have within their scope of work to prepare the bid specifications and coordinate the bidding process. The Grants Administrator will work with the Public Services Director and City Clerk to ensure that grant requirements are included within the bid specification or RFP documents. The Engineering Consultant will also have within the scope of their work to perform the Construction Engineering and Inspection, to the level as required.
- Contractor will have within the scope of their work to, in addition to the construction, provide safety measures such as traffic control, securing the site, etc. as needed.
- The Engineering Consultant or another qualified Consultant will be responsible for making a plan for data collection and evaluation and will perform the work.

### Financial Management and Accounting

The City of Vestavia Hills has a Finance department that is separate of the City Clerk's Office or Administration. The entire organization utilizes INCODE, a Tyler product, for accounting. This product includes a module for project accounting. For contracts and permitting, the City uses an OpenGov product which has a workflow for each department that prompts review and approvals for the progression of the contract to be established.

The non-federal cost share of the project, which is the work occurring in the public right-of-way only, will be paid using the City's funds. The City has healthy reserves and excellent financial ratings and will be able to supply the needed match. The master plan area where the proposed project is located does include portions which will be private responsibility. This amount is not included in the proposed project budget or the match. The proposed project can be completed entirely within the proposed budget, although private participation will be required for full implementation of the master plan. Even without the private participation, the performance of the public portion will result in a significant improvement to the stormwater conditions.

### Budget Narrative

The Budget Justification Worksheet is included in the Appendix to this Workplan. The \$3.75m budget as presented in the Budget Justification Worksheet relate to the Workplan tasks as follows:

- PERSONNEL – No personnel salaries will be paid directly from the grant. Indirect costs will be used towards personnel and operational costs for the existing City staff who will be implementing the project.
- FRINGE BENEFITS – See PERSONNEL above.
- TRAVEL – Not applicable.

- d. EQUIPMENT – No equipment will be purchased for this project, and it is not anticipated that equipment will be rented by the City for the project.
- e. SUPPLIES – Materials for the project will be included within the construction contract costs.
- f. CONTRACTUAL – Engineering services are listed as the Contractual costs in the Budget Justification. The costs for the construction contractor are listed in the CONSTRUCTION section of the Budget Justification. Engineering costs were listed as a line item in the Engineer’s Estimate. Adjustments were made for inflation and other factors. The Contractual section of the Budget Justification is broken down by areas as follows:

Focus Area	Scope	Contractual Cost
East Trunkline	Design	\$ 448,500
Central Trunkline	Design	\$ 27,500
Lakewood Drive	Design	\$ 131,500
Data Collection & Evaluation Strategy	Baseline Data Collection & Evaluation Strategy	\$ 5,000
Total		\$ 612,500

- g. CONSTRUCTION –The construction contracts will include the cost of materials. The Construction section of the Budget Justification is broken down by areas as follows:

Focus Area	Scope	Construction Cost
East Trunkline	Construction	\$ 2,300,000
Central Trunkline	Construction	\$ 135,000
Lakewood Drive	Construction	\$ 670,000
Total		\$ 3,105,000

- h. OTHER – None

- i. INDIRECT COSTS – \$32,500

There is no indirect cost rate for the City of Vestavia Hills. The amount included for indirect costs is below the *de minimus* rate of 10%.

- The base used to calculate the indirect cost rate is the operational budget for the Engineering and Public Works Department (also described as “Public Services”) for the City of Vestavia Hills. To determine the Modified Total Direct Cost, the following categories were excluded from that departmental budget: Equipment, Capital Expenditures, Rentals, Sanitation Contracts, Street Maintenance, Personnel costs except for the Administrative Assistant. The remaining departmental overhead budget for FY2026 is \$333,963. The amount \$32,500 is 9.7% of that amount.
- The nature of operations included under Indirect Costs includes administration of the department, departmental operations (utilities, communications, vehicle maintenance, etc.), and similar expenses not charged specifically to the project.

### III. Milestone Schedule

This milestone schedule is based on the availability of funds June 2025 with a period of performance of three years and assuming that design will be an allowable pre-award expenditure. A Gantt chart is included in the Appendix.

#### Pre-Award

- Selection of engineer(s) for construction design of East Trunkline, Central Trunkline, and Lakewood Drive.

#### June 2026 – October 2026

- Complete design of East Trunkline improvements.
- Engage property owners regarding private components of project.
- Coordinate temporary easements as needed.
- Development of Evaluation Strategy.
- Deliverables: East Trunkline construction drawings and bid package.

#### October 2026 – March 2027

- Complete design of Central Trunkline improvements.
- Coordinate temporary easements as needed.
- Advertisement and bid for East Trunkline construction contract.
- Selection of contractor for construction of East Trunkline
- Gathering of preliminary data for evaluation.
- Engage property owners regarding private components of project.
- Deliverables: Central Trunkline construction drawings and bid package.

#### April 2027 – September 2027

- Coordinate temporary easements as needed.
- Deliverables: complete construction of East Trunkline improvements.
- Deliverables: Lakewood Drive construction drawings and bid package.
- Advertisement and bid for Central Trunkline construction contract.
- Selection of contractor for construction of Central Trunkline.
- Engage property owners regarding private components of project.
- Advertisement and bid for Lakewood Drive construction contract.

#### October 2027 – August 2028

- Coordinate temporary easements as needed.
- Deliverables: photographs of East Trunkline improvements.
- Deliverables: complete construction of Central Trunkline improvements.
- Deliverables: possible complete construction of Lakewood Drive improvements.
- Collection of baseline data (post-completion of East Trunkline).\*
- Deliverables: photographs of Central Trunkline improvements.
- Report on master plan implementation progress.
- Collection of baseline data (post-completion of Central Trunkline).\*
- Collection of baseline data (post-completion of Lakewood Drive).\*

\*Because this area will continue to have construction activity throughout the project and runoff will remain pervasive until much of the project is completed, post implementation data on water quality will not be collected until after the project has been completed.

#### IV. Environmental Results/Benefits

##### Goals

This initiative directly supports the U.S. Environmental Protection Agency’s commitment to prioritizing infrastructure investments in communities that need them most. This project aligns with EPA’s Pillar 1: Clean Air, Land, and Water for Every American.”

<b>Additional Goals</b>
Public Safety
<ul style="list-style-type: none"><li>• Reducing stormwater which floods the road presents hazards for motorists during heavy rain events.</li><li>• Reducing stormwater which does not drain from the road can create black ice during freezing conditions.</li><li>• Increasing the capacity of the stormwater system will reduce the quantity of water which remains on the road and will reduce the amount of time it takes to drain from the road.</li></ul>
Economic
<ul style="list-style-type: none"><li>• It is important that homeowners, both present and future, are able to insure their homes and not have to commit significant parts of their family income towards repairing and replacing losses.</li></ul>

## Outputs

*Note: The Outputs below only consider a) the public portion of the project to be funded by the EPA grant and b) the portions planned for completion within the grant period, i.e. not those that are to be constructed in the future.*

Below is a summary of work to be performed according to the recommendations of the 2022 master plan. The Engineer’s Estimates in the Appendix provide further description of the items, and quantities and/or other specifications may be modified as construction designs become available. These are the efforts and/or associated work products which are measurable during the assistance agreement funding period and are related to the environmental goals and objectives described in the previous section of this Workplan.

	<u>East Trunkline</u>	<u>Central Trunkline</u>	<u>Lakewood Drive</u>	<u>West Trunkline</u>	<u>Total</u>	<u>Unit</u>
<b>Box Culvert Storm Drains</b>	633				633	l.f.
<b>Arch RCP Storm Drains</b>	449	85			534	l.f.
<b>Open Channel Modifications</b>	430				430	l.f.
RCP Storm Drain		98	614		712	l.f.
<b>Remove and Replace Driveway Spanners</b>					0	ea.
<b>Valley Gutter Replacement with Curb</b>					0	l.f.
Trench Grates					0	ea.
<b>Construction Design</b>	1	1	1		3	ea.
<b>Pavement Repair</b>	535	109	1105		1749	l.f.

## Outcomes

These are the quantitatively measurable Outcomes anticipated from the implementation of the Upper US 31 Stormwater Master Plan. It is hoped that the Outcomes will be observable during the assistance agreement funding period, but realistically the majority of the plan in its entirety – both public and private portions – will need to be implemented before a true quantification of impact can be measured. The types of measures may be altered upon consultation with engineers for an evaluation strategy.

- Environmental
  - The stormwater will be less likely to carry large debris into the system. *Note: this cannot be measured or quantified with accuracy. Whether storm runoff carries large items depend on the large items being present in order to be washed away.*  
Measures:
    - Controlled placement of a tethered object to observe whether it is displaced during a heavy rain event

- The stormwater will be less likely to carry small debris (dirt, gravel, leaves, etc.) from flowing fast over ground.  
Measures:
  - Silt concentration of water entering the storm drains
  - Silt concentration water in the streams following a heavy rain event
  
- The stormwater will be less likely to overwhelm siltation controls or pick up dirt from where there are active construction sites in the project area.  
Measures:
  - Frequency and severity of displacement and misshaping of controlled and tethered silt fences following a heavy rain event
  - Observation of silt washing from construction areas
  
- The stormwater will be less likely to flood areas where it is not intended for stormwater to be, e.g. garages and basements where chemicals, small items, and other potential pollutants may be stored.  
Measures:
  - Resident reports of flooding impact to their properties:
    - Frequency of flooding
    - Estimated depth of flooding
  
- The stormwater will be less likely to erode stream banks and areas where the runoff flows.  
Measures:
  - Bank retreat (ft/yr) at baseline vs. post-implementation
  
- The stormwater will be less likely to flow over the road where it would pick up oils, hydraulic fluid, etc.  
Measures:
  - Percent reduction in number of roads that flood (comparison of numbers of roads which flood at baseline vs. post implementation)
  - Downstream monitoring/testing of water conditions
  
- Behavioral
  - Residents who have been identified as having properties where private participation is needed in order to complete the implementation of the Upper US 31 Stormwater Master Plan will take the necessary actions for infrastructure improvements on their properties.
  - Residents who have concrete driveway spanners or have contemplated installing a driveway spanner will favor grate spanners, either by stated intention or by action.
  - Residents who plan to expand or replace their improved surfaces (driveways, patios, walkways, etc.) will favor permeable/semi-permeable surfaces over impermeable, either by stated intention or by action.

- Economic
  - Residents who have historically experienced losses due to flooding will have less frequent and/or severe damage following heavy rain events.
    - Reported costs /estimates from residents known to have incurred costs in the past
  - Where properties were being damaged in a way that would require corrective action if the situation was unchanged, there will be observable reduction in further damage.
    - Slowed/stopped erosion
    - Repairs to property not washing away or undercut

## V. Workplan Requirements for Identifying Contractors

Procurements prior to March 9, 2024 — This Community Grant project was identified in the FY 2024 Appropriations Act and therefore is not subject to compliance with Federal procurement requirements for competition and methods of procurement applicable to Federal financial assistance for 1) procured services or products through contracts entered into prior to March 9, 2024; and 2) complied with state and/or local laws governing competition. The City of Vestavia Hills has complied with all state and local laws including those governing competition for the procurements made.

- Prior to March 9, 2024, there were no procured goods or services which are part of the scope of the proposed project. The Upper US 31 Stormwater Master Plan was developed in 2022, and the designs for the Sunset Drive and Southwood Road portions were developed in 2023.
- The Sunset Drive and Southwood Road portions of the master plan were completed January 2024 but are not part of the project scope.
- Procurements prior to December 2023 are not eligible as pre-award expenditures.

Procurements to Date (March 9, 2024 – March 1, 2026) — For all other expenditures, contractual selection must comply with the competitive Procurement Standards set forth in 2 CFR 200.317 – 2 CFR 200.327.

- No procurements have been made in this period. The City was notified of the appropriation in May 2024 and halted further work to await further information on funding availability.

Anticipated Pre-Award Expenditures – None.

Projects inclusive of CWSRF-eligible activities, irrespective of whether such projects are co-funded with CWSRF funding, must comply with the procurement processes for architectural and engineering (A/E) services as identified in 40 U.S.C. 1101 et seq. (i.e., the Brooks Act), or an equivalent State qualifications-based requirement. Alabama has a Quality Based Selection (QBS) code which applies to all services by professional engineers and land surveyors procured regardless of the dollar value. In Alabama, engineers may not participate in bidding (§330-X-14-.05 (f)).

Assisted Funding Agreement Period Expenditures – Anticipated expenditures are described below based on a funding agreement period of June 2026 – August 2028.

Recipients must compete contracts for services and products, including consultant contracts, and conduct cost and price analyses, to the extent required by the procurement provisions of the regulations at 2 CFR Part 200.

- Construction Contractor Services \$3,105,000
- Contractual Services for Design Engineering and Evaluation \$612,500
- Indirect Costs \$32,500

No contractors or consultants are named as “partner” in this Workplan or in the grant application.

The Best Practice Guide for Procuring Services, Supplies, and Equipment Under EPA Assistance Agreements can assist Community Grant recipients in complying with procurement requirements. Additionally, the Community Grants: Reminders for Preparing Solicitation Documents discusses Community Grant specific procurement requirements. In general, all procurement transactions for professional engineering services and construction contractors must be conducted in a manner that promotes fair and open competition.

#### **VI. Workplan Requirements for Identifying Subrecipients**

There will be no subrecipients for this EPA funded project.

#### **References:**

1. <https://cahabariversociety.org/about-the-cahaba-river/cahaba-river-biodiversity/>
2. <https://www.epa.gov/soakuptherain/soak-rain-whats-problem#:~:text=Runoff%20picks%20up%20fertilizer%2C%20oil,clean%20water%20in%20the%20U.S.>
3. <https://www.currentresults.com/Yearly-Weather/USA/AL/Birmingham/extreme-annual-birmingham-precipitation.php>

## **Appendix**

1. Upper US 31 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. Photographs, "Eastern Trunkline of the Upper US 31 Stormwater Master Plan"
9. Budget Justification Worksheet
10. FY2025 Public Services Departmental Budget
11. Timeline\_EPA 2024 Community Grant as of 3-1-2026