

PROFESSIONAL SERVICES TASK ORDER

Task Order Number: 010
Task Order Date: November 21, 2023

Subject to the Master Services Agreement between *the City of Dalton, Georgia* [Client] and *Arcadis U.S., Inc.* [Arcadis], dated March 1st, 2020, Client hereby authorizes Arcadis to perform services as specified in this Task Order and in accordance with the above-mentioned Agreement.

1. Project Description: A description of Client’s Project for which work is requested is provided in Attachment 1, incorporated into this Task Order.

Client's Project Number: _____

Project Name: Crown Creek Regional Detention Study & Design
Client's Representative: Jackson Sheppard

2. Scope of Work: Arcadis shall perform its services as described in Attachment 1, incorporated into this Task Order.

Arcadis's Job Number: _____

Arcadis's Representative: Richard Greuel, P.E.

3. Time Schedule: Arcadis shall use reasonable efforts to complete its work by: 305 days from Notice to Proceed

4. Compensation: Arcadis's Compensation authorized under this Task Order, which shall not be exceeded without prior written authorization of Client, is:

\$ \$309,761 [] This Task Order's Method of Payment is incorporated and attached as Attachment 2.

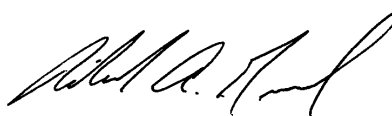
5. Special Conditions: This Task Order is subject to the special provisions as described in Attachment 3, attached, and incorporated into this Task Order:

6. Amendment: [] This Task Order amends a previously executed Task Order:

Previous Task Order Number: _____ Previous Task Order Date: _____

ISSUED AND AUTHORIZED BY:
Client

ACCEPTED AND AGREED TO BY:
Arcadis, INC.



By: _____

By: Richard A. Greuel, PE

Title: _____

Title: Principal Engineer

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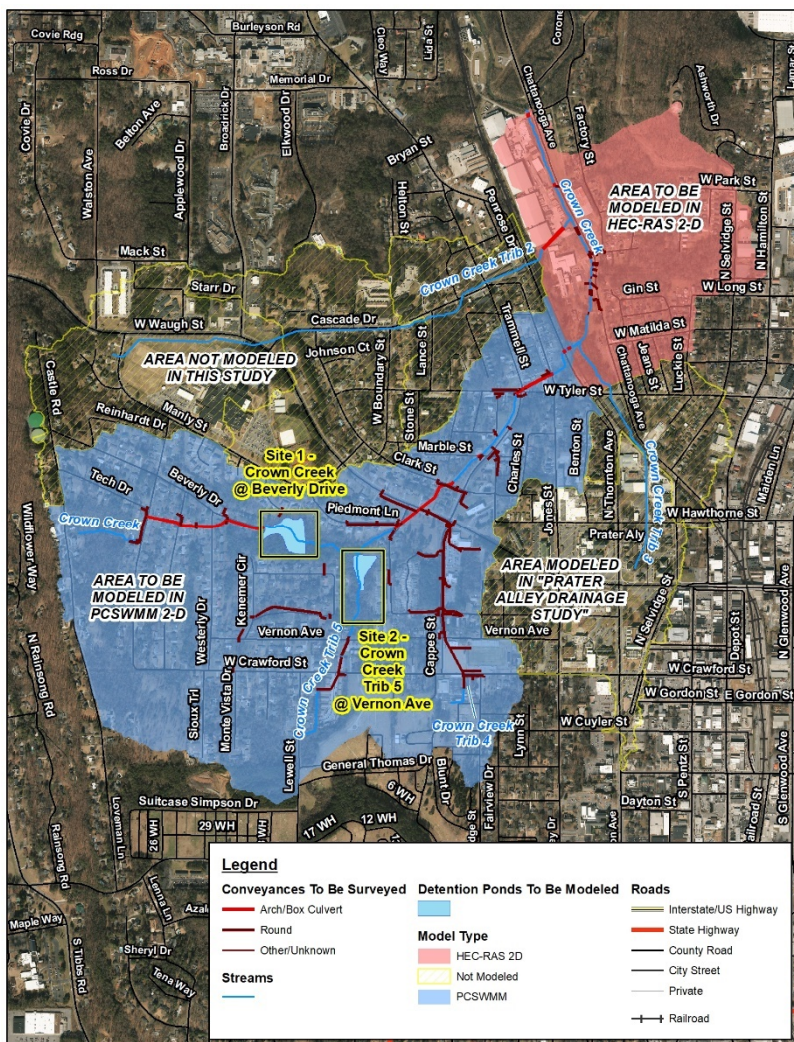
Attachment 1

Description of Project & Scope of Work

Introduction

To address flooding along Crown Creek, the City of Dalton Public Works Department has requested that Arcadis prepare this proposal to provide engineering analysis support for improvements within the watershed. Previously, Arcadis had created a hydrologic study of all watersheds within the city’s limits, which included the entire Crown Creek watershed (see report titled “Flood Abatement Plan – Hydrologic Modeling” dated November 2022). The goal of this study was to identify areas that significant detention facilities could be built that would have watershed scale impacts. Two such potential detention facilities were identified in the upper reaches of the Crown Creek watershed.

While it was demonstrated that these facilities could reduce flow rates in Crown Creek, no hydraulic evaluations of Crown Creek were performed to ascertain how much impact that would have on the flood elevations in the creek itself. For example, if flow rates were decreased 10%, how much would that affect road crossings favorably, and would that reduce the extents of flooding. This proposal provides engineering analysis and support to create a two-dimensional hydraulic model of the Crown Creek. This modeling will provide the engineering to design the two detention facilities as well as quantify the impacts along the creek channel from the two detention facilities to Mill Creek. Refer to the figure below for reference regarding limits of the proposed evaluations associated with this scope of work.



Phase 1 – Alternatives Evaluation

The purpose of Phase 1 is to analyze the drainage system's existing conditions and test different regional stormwater detention solutions to relieve flooding within downstream portions of Crown Creek.

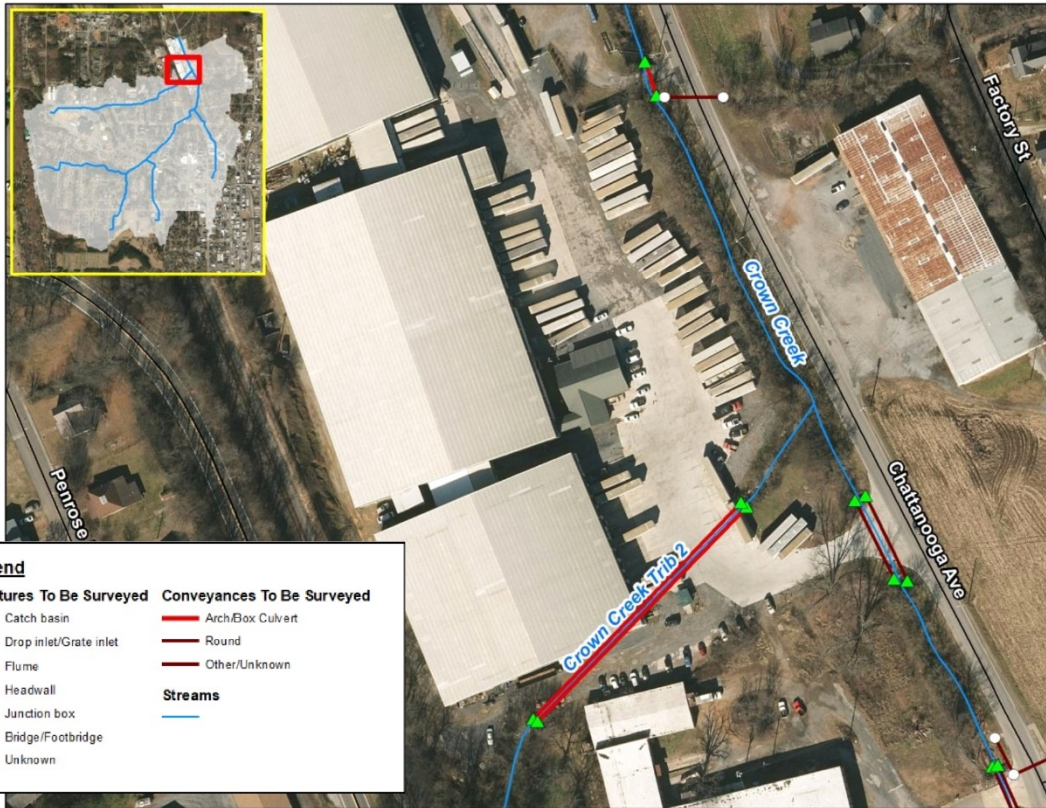
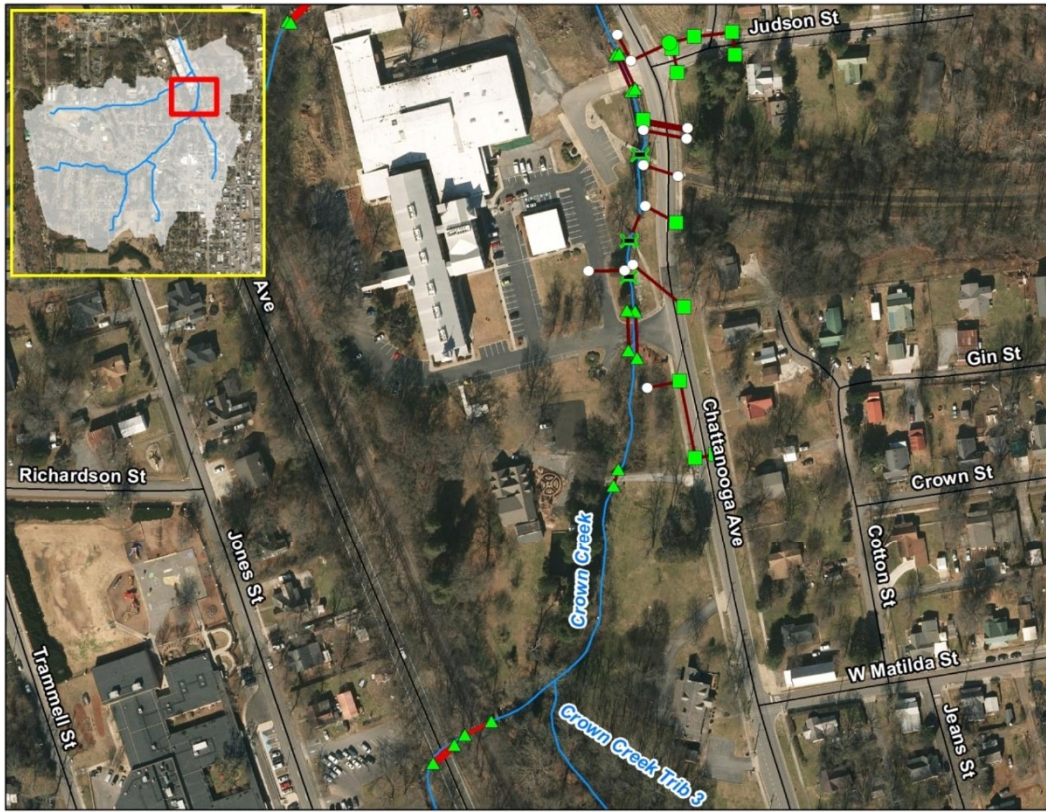
- Task 1 – Survey
- Task 2 – Existing Conditions Analysis
- Task 3 – Alternatives Analysis
- Task 4 – Report
- Task 5 – Public Meeting

Task 1 – Survey

Arcadis will subcontract Southeastern Engineering, Inc. (SEI) to conduct a survey of an estimated 111 conveyance pipes and corresponding structures directly connected or adjacent to Crown Creek, Crown Creek Tributary 4, and Crown Creek Tributary 5, and any others deemed necessary to conduct an accurate assessment. The surveying effort will be limited to that necessary to create a connection from the drainage system from Mill Creek and Chattanooga Ave. upstream to the two proposed detention areas on Crown Creek. The following figures highlight the 5 key drainage basin areas and storm systems to be surveyed.

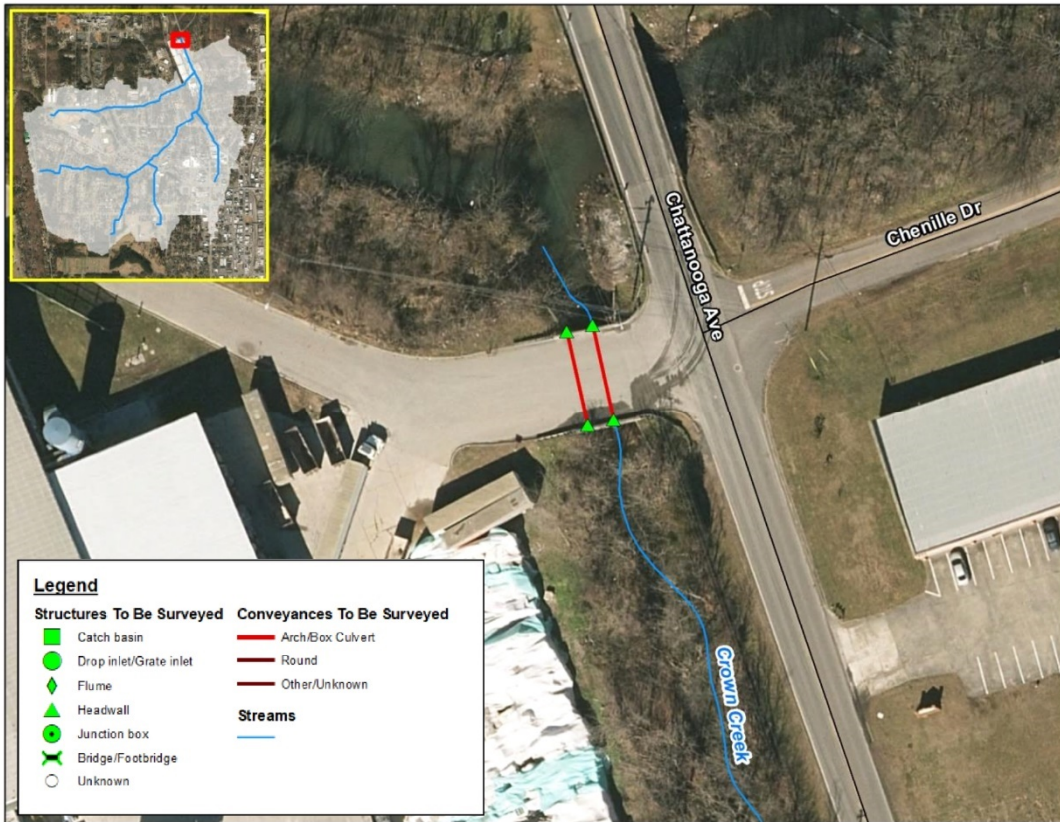


Legend	
Structures To Be Surveyed	Conveyances To Be Surveyed
■ Catch basin	— Arch/Box Culvert
● Drop inlet/Grate inlet	— Round
◆ Flume	— Other/Unknown
▲ Headwall	Streams
⊕ Junction box	—
⊗ Bridge/Footbridge	
○ Unknown	



Legend

Structures To Be Surveyed	Conveyances To Be Surveyed
■ Catch basin	— Arch/Box Culvert
● Drop inlet/Grate inlet	— Round
◆ Flume	— Other/Unknown
▲ Headwall	Streams
● Junction box	—
✕ Bridge/Footbridge	
○ Unknown	



Number of Conveyance Pipes	111
Length (ft) of Conveyance Pipes	8,776
Length (mi) of Conveyance Pipes	1.66
Number of Structures	141

Structure Type	Count
Bridge/Footbridge	3
Catch basin	52
Drop inlet	12
Headwall	26
Hooded grate inlet	9
Junction box	8
Unknown	31
TOTAL	141

Task 2 – Existing Conditions Analysis

Task 2 will consist of development of appropriate hydraulic computer models to quantify the nature of the drainage conditions that currently exist within the Crown Creek basin. Arcadis will develop an existing conditions model based on the data collected or provided. The following 24-hour storms will be modeled; 1-year, 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year. The results will be analyzed and discussed with City staff.

PCSWMM 2D Hydraulic Modeling

Arcadis will use 2D PCSWMM to conduct the hydrologic and hydraulic (H&H) modeling needed for both this task and Task 3. PCSWMM is primarily used to evaluate closed drainage systems which are prevalent in the upper portions of Crown Creek. By utilizing a 2D analysis software, Arcadis will be able to identify overflows in the drainage system as well as identify flooding extents and patterns under various storm events. Arcadis will coordinate with the city to obtain any geographic information systems (GIS) data for the drainage area's pipes and structures along with stormwater survey data collected during Task 1.

The focus of the 2D PCSWMM modeling effort will be the upper portions of the main stem of the Crown Creek drainage system including a portion of Crown Creek Tributary 5 that runs downstream of the two potential stormwater detention facilities located at 1299 Beverly Drive and 502 Leighton's Landing and at 206 Auburn Drive and 297 N. Boundary Street ultimately extending down to where Crown Creek flows under the existing CSX Railway line. Refer to the previous figure which depicts the watershed area and details of proposed survey collected to support this effort. Arcadis staff will also conduct a limited field reconnaissance within the project area to assess existing drainage patterns including open channel and culvert connectivity.

HEC-RAS 2D Hydraulic Modeling

In addition to PCSWMM, Arcadis will use HEC-RAS 2D to conduct two-dimensional hydraulic modeling for the lower portion of the Crown Creek watershed. HEC-RAS 2D is primarily used to evaluate open drainage systems (example bridges and culverts) and natural streams which are prevalent in the lower portion of Crown Creek. Information from the PCSWMM model will be used as the starting point for the HEC-RAS modeling. The ultimate downstream point of analysis for the H&H modeling will be Crown Creek's confluence with Mill Creek.

This modeling effort will focus on the main stem of Crown Creek from just past where the CSX Railroad crosses over Crown Creek above W. Tyler Street, to the outlet into Mill Creek. In addition, the most downstream portions of Crown Creek from the CSX Railroad track to its outlet and Crown Creek Tributary 3 from W. Tyler Street to its outlet will be included in the model. Rain-on-grid hydrology will be used for the model area, and three inflows from the upstream portion of Crown Creek, Tributary 2 and Tributary 3 will be used as boundary conditions. Survey data collected will be specific to that best fit for HEC-RAS 2D which is singular linear culverts/bridges/pipes that ensure flow travels through high ground in accordance with the conveyance systems.

Assumptions:

- GIS Data transfer from County and City will be via electronic means.
- Land use will be based on parameters previously completed as part of the Flood Abatement Plan – Hydrologic Modeling
- The runoff hydrographs from the previously completed Prater Alley Drainage Study will be used to represent Crown Creek Tributary 3.
- The runoff hydrographs generated during the previously completed Flood Abatement Plan – Hydrologic Modeling will be used for Crown Creek Tributary 2.

Deliverables:

- Limited Technical Memorandum outlining means and methods as well as results of the analysis.

Task 3 – Alternatives Analysis

The purpose of this task is to test different alternatives' flood reduction effectiveness. Three scenarios have been discussed with City staff and are described below:

Scenario 1 – Regional Detention of Crown Creek at the Site Along Beverly Drive

Scenario 1 will evaluate the impacts and conceptual size of a stormwater regional detention facility at two land parcels on Crown Creek along Beverly Drive to mitigate flooding downstream in the study area. This site is referred to as Site 1 in the figure in Attachment 4. In "Flood Abatement Study – Hydrologic Modeling", it was found that a pond with 14.7 ac-ft of storage and a depth of 14 feet would result in significant reductions in downstream flows, particularly for the 100-year storm event. Further hydraulic modeling is required to evaluate the true detention area needed to mitigate flooding downstream. Target levels of service and/or reductions in peak flow values for detention capacity will be determined before the evaluations are performed based on discussions with City staff. Arcadis will compare the results of Scenario 1 with the existing conditions modeling results. Please note that this evaluation will be conceptual in nature to determine the storage volume and outlet structures required to provide reduction of flows downstream. This effort will not include detailed design of the detention facilities.

Scenario 2 – Regional Detention of Crown Creek Tributary 5 at the Site Along Vernon Avenue

Scenario 2 will evaluate the impacts and conceptual size of a regional detention facility at Site 2 in the figure in Attachment 4. In "Flood Abatement Study – Hydrologic Modeling", it was found that a pond with 6.5 ac-ft of storage and a depth of 11 feet would result in significant reductions in downstream flows, particularly for the 100-year storm event. Further hydraulic modeling is required to evaluate the true detention area needed to mitigate flooding downstream. Target levels of service and/or reductions in peak flow values for detention capacity will be determined before the evaluations are performed based on discussions with City staff. As is the case with Scenario 1, Arcadis will compare the results of Scenario 1 with the existing conditions modeling results. Please note that this evaluation will be conceptual in nature to determine the storage volume and outlet structures required to provide reduction of flows downstream. This effort will not include detailed design of the detention facilities.

Scenario 3 – Both Detention Systems at the Sites Along Beverly Drive and Vernon Avenue

Scenario 3 will include both conceptual sized regional detention ponds from Scenario 1 and Scenario 2. This scenario will evaluate the maximum mitigation benefit downstream based on the results of the first two scenarios. A target level of service and/or reductions in peak flow values for detention capacity will be determined before the evaluations are performed based on discussions with City staff. As was the case with Scenario 1 and 2, Arcadis will compare the results of Scenario 3 with the existing conditions modeling results.

Meetings and Deliverables:

- Up to two remote meetings to discuss findings prior to moving to Task 4.

Task 4 – Report

Arcadis will submit a draft technical memorandum summarizing the methodology utilized to conduct the analysis as well as the results of the alternative analysis outlined in Task 3. A final version of the report will be submitted two weeks after receipt of City comments. Following completion of the draft report, we will schedule a meeting with city staff to discuss the report prior to finalization.

Assumptions:

- Draft and final reports will be electronic format.

Deliverables:

- Draft Report
- Final Report that incorporates appropriate revisions resulting from City comments received.
- Review meeting of Draft Report

Task 5 – Public Meeting

Following acceptance of the report, it is our understanding that the city will schedule a public meeting to present the findings of the effort to the city officials and public. Arcadis will prepare a Power Point presentation outlining the analysis and findings and present at a public meeting at City Hall.

Assumptions:

- Arcadis will present at one Public Meeting.
- All coordination for time, location, and notifications to the public will be handled by the city.

Deliverables:

- Power Point Presentation

Phase 2 – Regional Detention Design

Following completion of Phase 1, we understand that the city wishes to immediately begin design of a regional detention facility. This facility will consist of one of the two facilities previously identified in the Flood Abatement Plan. The decision of which facility to begin design of will be based on the results of the findings in Phase 1 and consultation with the city. The purpose of Phase 2 will be to create construction drawings for the selected regional detention facility. The following tasks will guide the development of such plans.

Task 5 – Design Survey

Arcadis will subcontract Southeastern Engineering, Inc. (SEI) to conduct a survey of proposed detention facility site. The survey will consist of a field run 1-foot contour interval topographic survey. Horizontal projection will be Georgia State Plane (NAD83-2011 Datum). Elevations will be based on NAVD88 Datum. All main features of the topography will be delineated including but not limited to the following; creeks, streams, ditches, lakes, adjacent property lines, above ground utilities, marked underground utilities, roadway markings, traffic control devices, speed humps, gates, landscape areas, mailboxes, storm and sanitary sewer fixtures with size, type and invert, edge of pavement, curb lines with top and gutter elevation (irregular stone or rock curb lines will only be located at edge of pavement), bridges, walls, stairs, sidewalks, concrete pads, driveways, buildings, signs, benches, bleachers, fences, power poles and overhead lines, guy wires, pedestals, fire hydrants, valves, meters and other above ground features. Contours shown will be based on spot elevations taken at an approximate 50' grid pattern to ensure that not less than 90% of the contours shown will be out of vertical position by more than ½ of the contour interval according to Georgia Technical Standards for Property Surveys. SEI will show the location of all trees with a diameter of 8-inches at breast height and larger. Additionally, property lines contiguous to the proposed detention pond will also be identified.

Additionally, the survey will include an aquatic resource delineation by qualified Ecologist/Biologist observing the United States Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual and will include:

- Review of available USGS topographic maps, U.S. Fish & Wildlife Service National Wetland Inventory Maps, and USDA Soil Survey;
- Field study by qualified Ecologist/Biologist to identify and delineate jurisdictional waters of the U.S. (including wetlands) within the property using the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual. Limits of the jurisdictional areas will be marked with surveyor's tape;
- Limits of natural wretched vegetation (due to water movement) within the on-site stream channels will be clearly marked in the field with pin flags and surveyor's ribbon;
- If necessary, the on-site stream will be scored using the North Carolina Division of Water Quality Methodology for Identification of Intermittent and Perennial Streams and their Origins (Version 4.11 – dated September 1, 2010);

- Once the survey of the wetland delineation boundary will be completed, a written report summarizing the findings will be provided.

Task 6 – Geotechnical Evaluation

Arcadis will subcontract Terracon to conduct a limited geotechnical investigation of the proposed detention facility site. Arcadis will provide a proposed work plan for the site once the detention facility has been identified and the approximate footprint of the pond dam has been sited. For the purposes of this analysis, it is assumed that the detention pond will not hold a permanent pool of water, the dam will be less than 25-feet high (as measured from the downstream toe to the crest of the dam), and the maximum storage capacity of the pond will be less than 100 acre-feet. For the purposes of this proposal, Arcadis has provided a budget of \$11,000 for this task. This fee is subject to change pending final site selection and accessibility to the site with drilling equipment.

Task 7 – Construction Plans

Following completion of the design survey and geotechnical evaluation, Arcadis will work with the city to create construction plans for the detention facility.

30% Plans

Arcadis will prepare a design submittal at the 30-percent design stage and submit to the City of Dalton Public Works Department for review. The purpose of the 30% plans is to provide a engineering design that identifies all constraints to the design and provide “proof of concept”. The 30-percent design drawings and deliverables will include:

- 30% Submittal Construction Plan Sheets
 - Title Sheet
 - Existing Conditions Plan
 - Demolition Plan
 - Site, Grading and Drainage Plan
 - Limited Construction Details

Arcadis will provide a brief stormwater management memo outlining the hydrologic / hydraulic performance of the proposed improvements. As such, this memo will focus on illustrating the differences between the existing and proposed conditions of the design / plan.

Deliverables:

- 30% Construction Plans (PDF Format)
- Technical Memo outlining anticipated performance of the detention facility and the impacts to Crown Creek

Assumptions:

- No more than 2 Design Iterations for Final Concept.
- Arcadis will address one round of review comments for the 30-percent design.
- The City will provide one set of consolidated review comments for the 30% Design Plan submittal.
- The scale of plan drawings will be 1-inch equals 20-feet.
- This project will be exempt from water quality, channel protection, and detention requirements of the City’s Land Development Ordinance.
- It is anticipated that the disturbed area of the project will be greater than 1 acre, as such, a NPDES Construction permit will be required for this project. Additionally, the city will need to issue a Land Disturbance Permit for the project under the Georgia Erosion & Sedimentation Act.
- GDOT standard details and specifications will be sufficient for the project for drainage elements.
- No structural design services will be required for the project.

60% Plans

Arcadis will prepare a design submittal at the 60-percent design stage and submit to the city for review. The 60-percent design drawings and deliverables will include:

- 60% Submittal Construction Plan Sheets
 - Title Sheet
 - General Notes
 - Existing Conditions Plan
 - Demolition Plan
 - Tree Protection Plan (if required)
 - Site, Grading and Drainage Plan
 - Pipe Profiles
 - Traffic Control Plan (if required)
 - Erosion & Sedimentation Plans
 - Erosion & Sedimentation Details
 - Standard Details

Deliverables:

- 60% Construction Plans (PDF Format and 1 hardcopy)
- Stormwater Management Analysis memo (PDF Format) – If changed from the previous submittal.

Assumptions:

- Arcadis will address one round of review comments for the 60-percent design.
- The City will provide one set of consolidated review comments for the 60% Design Plan submittal prior to the plan review meeting.
- The scale of plan drawings will be 1-inch equals 20-feet
- No renderings are included in the scope of work

90% Plans

Arcadis will prepare a design submittal at the 90-percent design stage and submit to the city for review. The 90-percent design drawings and deliverables will include:

- 90% Submittal Construction Plan Sheets
 - Title Sheet
 - General Notes
 - Existing Conditions Plan
 - Demolition Plan
 - Tree Protection Plan (if required)
 - Site, Grading and Drainage Plan
 - Pipe Profiles
 - Traffic Control Plan (if required)
 - Erosion & Sedimentation Plans
 - Erosion & Sedimentation Details
 - Standard Details

It is the intent of the 90% drawings to be sufficient for permitting. Following completion of the effort, Arcadis will provide a 90% set of construction plans marked “For Permitting” signed and sealed by a Georgia Registered Engineer with a Level II Design certification by the Georgia Soil and Water Conservation Commission.

Deliverables:

- 90% Construction Plans (PDF Format and 1 hardcopy)
- Stormwater Management Analysis memo (PDF Format) – If changed from the previous submittal.

Assumptions:

- Arcadis will address one round of review comments for the 90% design.
- The city will provide one set of consolidated review comments for the 90% Design Plan submittal prior to the plan review meeting.
- Following completion of this task, the plans will be considered final and sealed / signed drawings will be provided.

Task 8 - Permitting

It is assumed that no significant permitting will be encountered. The proposed project will attempt avoid impacts to wetlands, buffers, and other environmentally sensitive areas. Finally, it is anticipated that there will be no impacts to FEMA floodplains. Should permitting with Georgia EPD, US Fish & Wildlife, US Army Corps of Engineers, or FEMA, a budget of \$20,000 has been allocated. Prior to finalization of the design, a permitting effort will be evaluated to determine the permitting requirements. This will be presented to the city at that time to determine if the design should be modified or if the budget needs to be adjusted.

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Attachment 2

Task Order Payment Terms

All work will be completed on a time and materials basis for a fee not to exceed the amount listed in this Task Order based on the 2023 rate table below.

2023 Rate Schedule

Title	Rate \$/hr
Project Administrative Assistant	\$70
Project Assistant	\$90
Sr Project Assistant	\$120
Project Manager	\$215
Engineering Technician I	\$90
Engineering Technician II	\$110
Staff Engineer/Scientist/Architect I	\$90
Staff Engineer/Scientist/Architect II	\$100
Staff Engineer/Scientist/Architect III	\$110
Project Engineer/Scientist/Architect I	\$120
Project Engineer/Scientist/Architect II	\$135
Project Engineer/Scientist/Architect III	\$150
Senior Engineer/Scientist/Architect I	\$165
Senior Engineer/Scientist/Architect II	\$180
Senior Engineer/Scientist/Architect III	\$195
Principal Engineer/Scientist/Architect I	\$240
Principal Engineer/Scientist/Architect II	\$265
Principal Engineer/Scientist/ Architect III	\$290
Registered Land Surveyor	\$150
2-man Survey Crew	\$150
3-man Survey Crew	\$225

* A rate schedule will be provided with each Task Order proposal based on the specific services that will be provided and the rates effective at that time.

*All direct expenses will be billed at cost plus 10%

*Mileage will be billed at the current federal mileage rate

* Additional Services requested by the City beyond those in Scope of Work will be billed on an hourly basis in accordance with this rate schedule

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Attachment 3
Special Conditions

None.

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Attachment 4 Project Area Map

