CITY OF HIGH POINT
AGENDA ITEM

Title: **Amendment 2– Watershed Assessment Framework, Phase 3**
Tetra Tech

From: Terry Houk – Public Services Director
Derrick Boone – Public Services Asst. Director

Meeting Date: September 20, 2021

Public Hearing: N/A

Advertising Date: N/A
Advertised By: N/A

Attachments: Attachment A – Scope of Services – Amendment to Watershed Assessment Framework- Phase 3-Flood and Stormwater Modeling

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PURPOSE:
This amendment modifies the original agreement entered on July 24, 2020 (PO Number 103547) with Tetra Tech for Phase I of the project. The purpose of Phase 3 is to assist the City with flood model development, stormwater water model development, and support compliance with water supply protection regulations.

BACKGROUND:
The City of High Point is responsible to its citizens and businesses for managing water quantity and quality while maintaining compliance with state and federal regulations. This involves managing stormwater runoff, treating wastewater, protecting water quality, providing water supply for drinking water and a recreational destination for people interested in boating, fishing, golfing, camping, and other outdoor activities. Water is recognized as a lifeline for current citizens and businesses, and the projected growth of the community, and therefore maintaining an effective and efficient water management framework is essential for the City of High Point. Phase 1 was started in July 2020 and the team (Tetratech, Engineering Services, Parks and Recreation, and Public Services) established goals of assessment across the departments, specified objectives under each goal, identified water quantity and water quality indicators related to each objective. Phase 2 was initiated in March 2021which included the construction of watershed models to support watershed planning and management. Under Phase 3, Tetra Tech will assist the City with three primary tasks:

Task 1 – Flood model development for the headwaters of Richland Creek which has experienced frequent flooding and significant instream erosion. The resulting model will then be used in the next project phase to perform a flooding analysis to provide the hydrologic foundation for designing multiple stream restoration projects in Blair Park identified as high priority by the Parks and Recreation Department.

Task 2 – Stormwater model development for selected regions of the City experiencing problems related to excessive stormwater runoff volume. The resulting models will then be used in the next project phase to perform evaluations of proposed CIP projects or other mitigation measures including under future climate conditions.

Task 3 –Identify and locate Potential Contaminant Sources (PCSs) and evaluate their relative threat to the City's water supply to comply with G.S. 130A – 320 source water protection requirements (15A NCAC 18C .1305).

BUDGET IMPACT:
Funds for this are available in the adopted budget.

RECOMMENDATION / ACTION REQUESTED:
The Public Services Department recommends approval of Amendment No. 2 to Tetra Tech for $ 150,000.

Amendment to Watershed Assessment Framework Project PO #103547 -

Scope of Work for Flood and Stormwater Modeling

August 24, 2021

TO BE PERFORMED FOR

City of High Point
Public Services
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High Point, NC 27260

BY

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EXECUTIVE SUMMARY

This Amendment is required to continue developing the Watershed Assessment Framework co-designed by a team of City staff and Tetra Tech to meet multiple program needs for water-related project planning and program compliance. The original contract framework design phase was completed in March 2021, and in April 2022 the contract was amended to begin the development of HSPF watershed models for the entire City Planning Area and watersheds draining to it. Under this Scope amendment, Tetra Tech will assist the City in three primary additional tasks:

> **Task 1 – Flood Model Development:** develop a HEC-RAS model for the headwaters of Richland Creek which has experienced frequent flooding and significant instream erosion. The resulting model will then be used in the next project phase to perform a flooding analysis to provide the hydrologic foundation for designing multiple stream restoration projects in Blair Park identified as high priority by the City Parks Department, and help ensure that any such projects are designed to withstand extreme storm events in light of anticipated impacts of a changing climate in the region.

> **Task 2 – Stormwater Model Development:** develop SWMM models for selected regions of the City experiencing problems related to excessive stormwater runoff volume. The resulting models will then be used in the next project phase to perform evaluations of proposed CIP projects or other mitigation measures including under future climate conditions.

> **Task 3 – Support Compliance with 15A NCAC 18C .1305:** identify and locate Potential Contaminant Sources (PCSs), and evaluate their relative threat to the City's water supply to comply with G.S. 130A – 320 source water protection requirements. Information must be approved by the NC Department of Environmental Quality (NCDEQ) and implemented as part of the City's Source Water Resiliency and Response Plan (SWRRP) by December 31, 2022.

The cost for this phase of the Watershed Assessment Framework development is $150,000 with anticipated completion by June 30, 2022. Meeting this schedule assumes timely review and response from NCDEQ regarding SWRRP material submittals.

1.0 BACKGROUND

The purpose of this Scope of Work (SOW) is to continue developing the Watershed Assessment Framework development initiated in July 2020. Under Phase 1 of the project, the City team and Tetra Tech worked collaboratively to establish overarching goals of watershed assessment across each of the participating departments, specify objectives under each goal, identify water quantity and water quality indicators related to each objective, select models that would support the objectives and produce the indicators to support decision-making for capital projects or operations, review the data available for developing the models, and identify gaps, and produce a model development plan optimized for the City of High Point. The Model Development Plan was completed in March 2021.

Under the watershed assessment framework design, a linked watershed-lake modeling system is proposed for the City of High Point. The modeling system is envisioned to become the foundation for supporting water-related regulatory compliance and water infrastructure planning for the City of High Point. Tetra Tech began Phase 2 of the project in April 2021 initiating construction of HSPF watershed models that cover the City of High Point Planning Area and watersheds draining to it.

This SOW describes additional tasks to be performed under Phase 2 as a continuation of the framework elements that were defined by a City team representing multiple departments and the project consulting team under Phase 1 of the project. Tasks include developing flood and stormwater models for specific areas in the City that experience frequent flooding to evaluate the extents and magnitudes of the problems, and develop and evaluate flood mitigation strategies. The SOW presented herein identifies focus areas for flood and stormwater model development, and describes the modeling platforms and methods to determine the extent, magnitude and causes of flooding. The proposed methodology and models lay the foundation for development of future measures for flood mitigation.

Additionally, under this SOW, Tetra Tech will support the City in taking the final step needed to achieve compliance with 15A NCAC 18C .1305 regulations under G.S. 130A – 320 source water protection requirements. Although the City has received approval by NCDEQ for its completion of a Risk & Resilience Assessment and Emergency Response Plan which were required by the federal American Water Infrastructure Act of 2018, the City must supplement those materials with a list of PCSs in source water protection zones, a map showing their location, and an assessment of their relative risk.

The three technical tasks are outlined below along with a corresponding project management and coordination task.

2.0 SCOPE OF WORK

2.1 TASK 1 - FLOOD MODEL DEVELOPMENT

The objective of this task is to develop a model to support flooding analysis for a focus area in the City that has experienced frequent flooding. The flood modeling lays the foundation for future work to develop conceptual level designs for mitigation measures. Based on discussions with the City, the headwaters region of Richland Creek has been identified as a candidate for this study. Tetra Tech will develop hydrology and hydraulic (H&H) models using the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center (HEC) Hydrologic Modeling System (HMS) and River Analysis Package (RAS), respectively. The extent of the proposed analysis is the headwaters of Richland Creek to immediately upstream of Interstate 74, as shown in Figure 1.

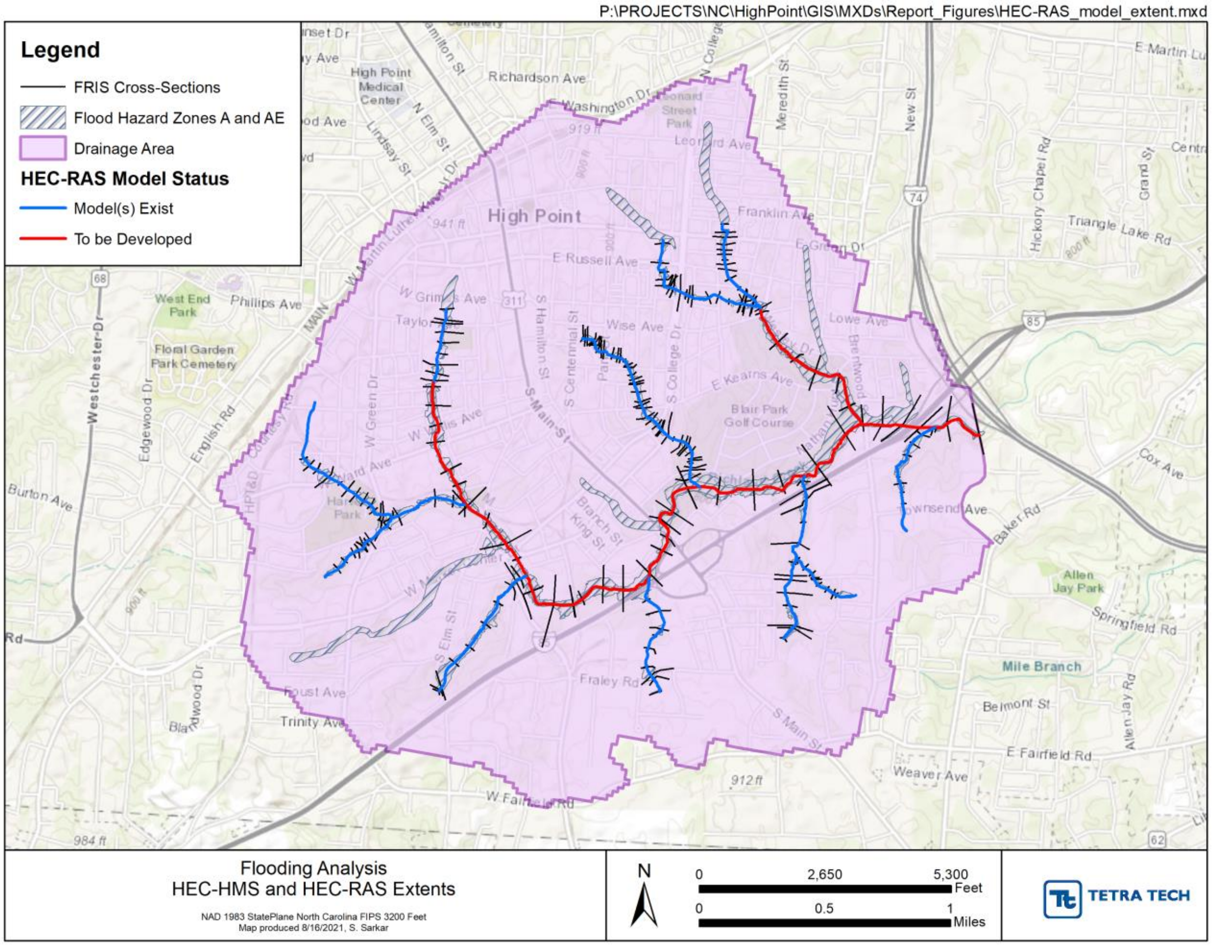

Figure 1. Proposed Extent of the Flood Study.

2.1.1 Model Development

Tetra Tech recommends conducting the H&H analysis for the 25-, 50- and 100-year recurrence interval storms derived from the National Oceanographic and Atmospheric Administration (NOAA) Atlas 14, and two historic stotms to be determined based on consultation with the City. We recommend using the Soil Conservation Service (SCS) Unit Hydrograph method in a HEC-HMS model for runoff generation from the drainage area. Lag time at the subbasin scale for the SCS Unit Hydrograph method will be calculated using the watershed lag method as described in the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) National Engineering Handbook. The lag time (in hours) for each subbasin will be calculated using the equation below.

$$L = \frac{l^{0.8}(S+1)^{0.7}}{1{,}900Y^{0.5}}$$

where,

l = flow length, ft

Y = average watershed slope, %

S = maximum potential retention, in = $\frac{1{,}000}{CN} - 1$

where,

CN = composite curve number

To maintain consistency with the watershed water quality model, the composite curve numbers at the subbasin scale will be determined based on the hydrologic response units (HRUs) developed for the Hydrological Simulation Program Fortran (HSPF) watershed model. HRUs are unique combinations of landuse and soil infiltration properties in the watershed model, shown in Figure 2 for the drainage area. The subbasin delineation for the HEC-HMS model will be based on the HEC-RAS model for Richland Creek (described below). The runoff time-series generated by the HEC-HMS model will be used as boundary conditions in the HEC-RAS hydraulic model.

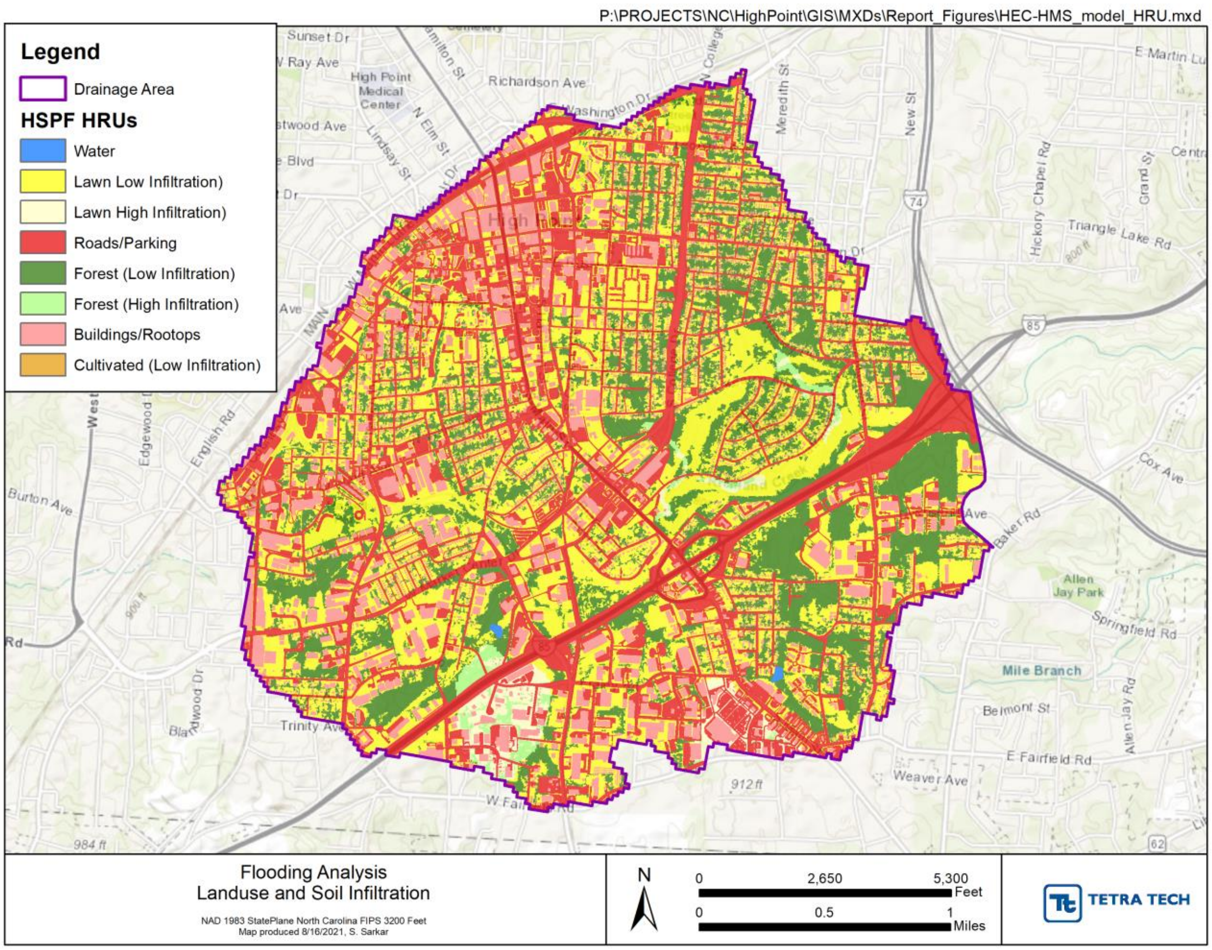

Figure 2. Drainage Area Landuse and Soil Infiltration.

Hydraulic analysis of the Richland Creek and its tributaries within the proposed extent will be conducted using the most recent official release of HEC-RAS. Older versions of HEC-RAS models for several tributaries of Richland Creek are readily available (and have been acquired) from the North Carolina Flood Risk Information System (FRIS). However, a considerable extent of the mainstem Richland Creek and Stream No. 33 (a tributary to Richland Creek from Wise Ave to Brentwood St) do not have existing HEC-RAS models (as shown in Figure 1). Tetra Tech proposes to develop a single unified HEC-RAS model combining existing models, and incorporating portions of the Richland Creek and Stream No. 33 that do not currently have HEC-RAS models. HEC-RAS models for the missing extents will be parameterized based on available cross-section information (as shown in Figure 1) from the FRIS augmented with field-based cross-sections and LiDAR data, and old HEC-2 models.

Unsteady flow analysis will be performed using the HEC-RAS model for the 25-, 50- and 100-year and two historic events. While we generally expect that a one-dimensional (1D) model will be sufficient to analyze flooding, specific areas (such as the Blair Park Golf Course) may be converted to two-dimensional (2D) for a more detailed asssessment. The key data requirement for a 2D model is ground surface elevation. We propose to use the best resolution LiDAR-based digital elevation model (DEM) to generate the 2D surface for the HEC-RAS model for the Blair Park area.

2.1.1.1 Field Work

Field work under this task will generally consist of augmenting the FRIS stream cross-sections with as needed additional cross-sections and hydraulic details associated with road crossings. Road crossings identified along the Richland Creek and Stream No. 33 that do not currently have existing models and may require survey are as follows (also shown in Figure 3):

1) Richland Creek (red pins shown in Figure 3)
    a. Vail Ave
    b. Tryon Ave
    c. W Willis Ave
    d. W Ward Ave
    e. Railroad Track nr Cassell St
    f. S Elm St
    g. W Market Center Dr, S College Dr
    h. Access Road on Woodmark Originals, 1920 Jarrell St
    i. Jarell St
    j. Railroad Track nr Jarrell St
    k. Road from Nathan Hunt Dr to 300 R 1 Nathan Hunt Dr
    l. S Main St
    m. Brentwood St
    n. I-85 Exit Ramp
    o. I-85
2) Stream No. 33 (green pins shown in Figure 3)
    a. Wise Ave
    b. Nathan Hunt Dr
    c. Golf Cart Crossing (3 locations)

Dimensions of the culverts or bridges at the above road crossings may be determined from as-built drawings and a LiDAR-based DEM. Subsequent field survey will be used to validate these dimensions, and collect at least one stream cross-section each immediately upstream and downstream of the road crossings. In the event that as-built information is not available for a road crossing, dimensions of the associated culvert or bridge will also be collected during the field survey.

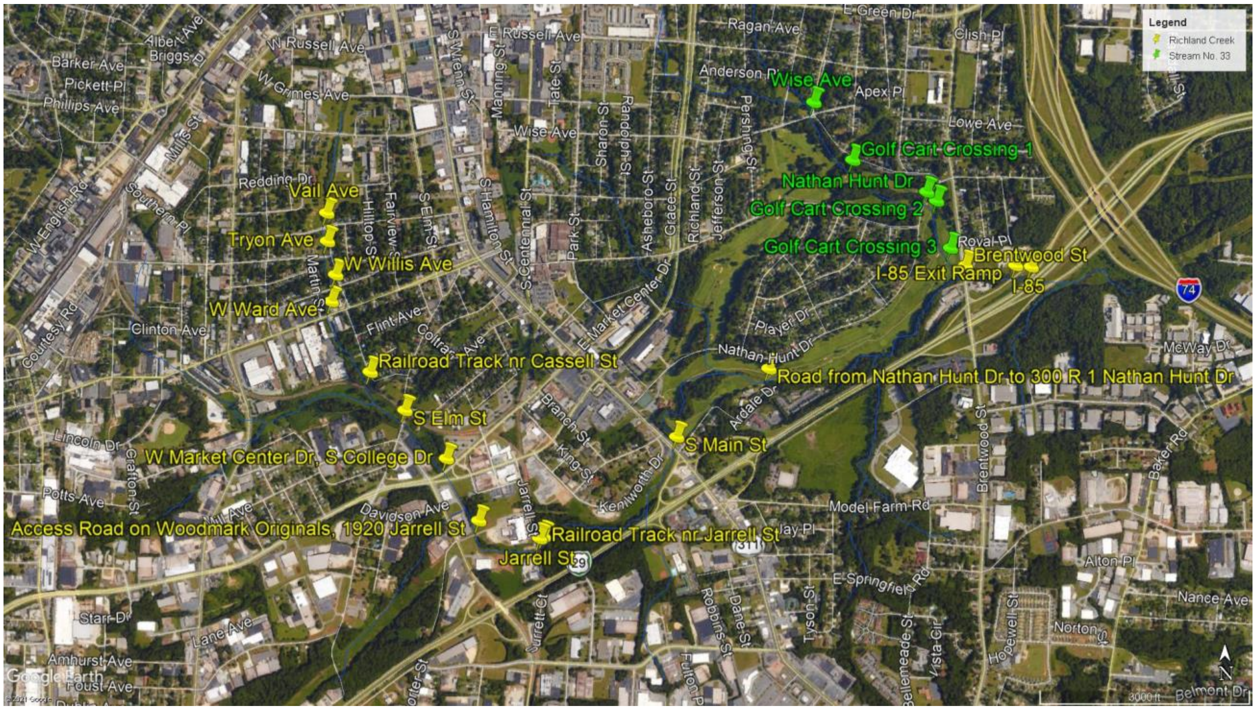

Figure 3. Proposed Stream Survey Locations.

2.1.2 Model Calibration

Calibration rigor of the H&H models will depend on the availability of observed data. Since observed runoff are rarely available, calibration of the H&H modeling system will largely rely on comparison of simulated water surface elevations and flood depths against high water marks or other anecdotal information. Flood hazard zones A and AE shown in Figure 1 represent areas that are subject to inundation by a 1% annual exceedance probability event or a 100-year recurrence interval storm. The floodplain extent simulated by the HEC-RAS model for the 100-year recurrence interval will be compared against the flood hazard zones A and AE as an additional check on the accuracy of the H&H models.

2.1.3 Model Application (to be performed in next stage of project)

The HEC models will be used in the next stage of the project to evaluate projected flooding under key scenarios including future climate conditions. It is anticipated that results will be summarized in tabular, graphical and map formats. A model report will be prepared documenting documenting the methods used to develop the models and results of the simulated storm events. The following results will be reported:

1) Peak runoff rate
2) Runoff volume
3) Peak stream discharge
4) Maximum flood depth
5) Maximum water surface elevation

Proposed Task 1 Deliverables (schedule)

1A - HEC-HMS development status update (within 60 days of NTP)

1B - HEC-RAS development status update (within 120 days of NTP)

1C - Flood model development memorandum (within 240 days of NTP)

2.2 TASK 2 - STORMWATER MODEL DEVELOPMENT

Stormwater modeling for focus areas in the City will be performed using the Storm Water Management Model (SWMM). The objective of the stormwater modeling is to determine the causes of flooding in frequently flooded areas of the City related to stormwater and eventually develop mitigation measures. Tetra Tech will also evaluate Capital Improvement Projects (CIPs) in design phase for flooding concerns under this task. The City has identified several "stormwater problem areas" (Figure 4) which will be used as the primary basis for selection of candidate locations for stormwater model development.

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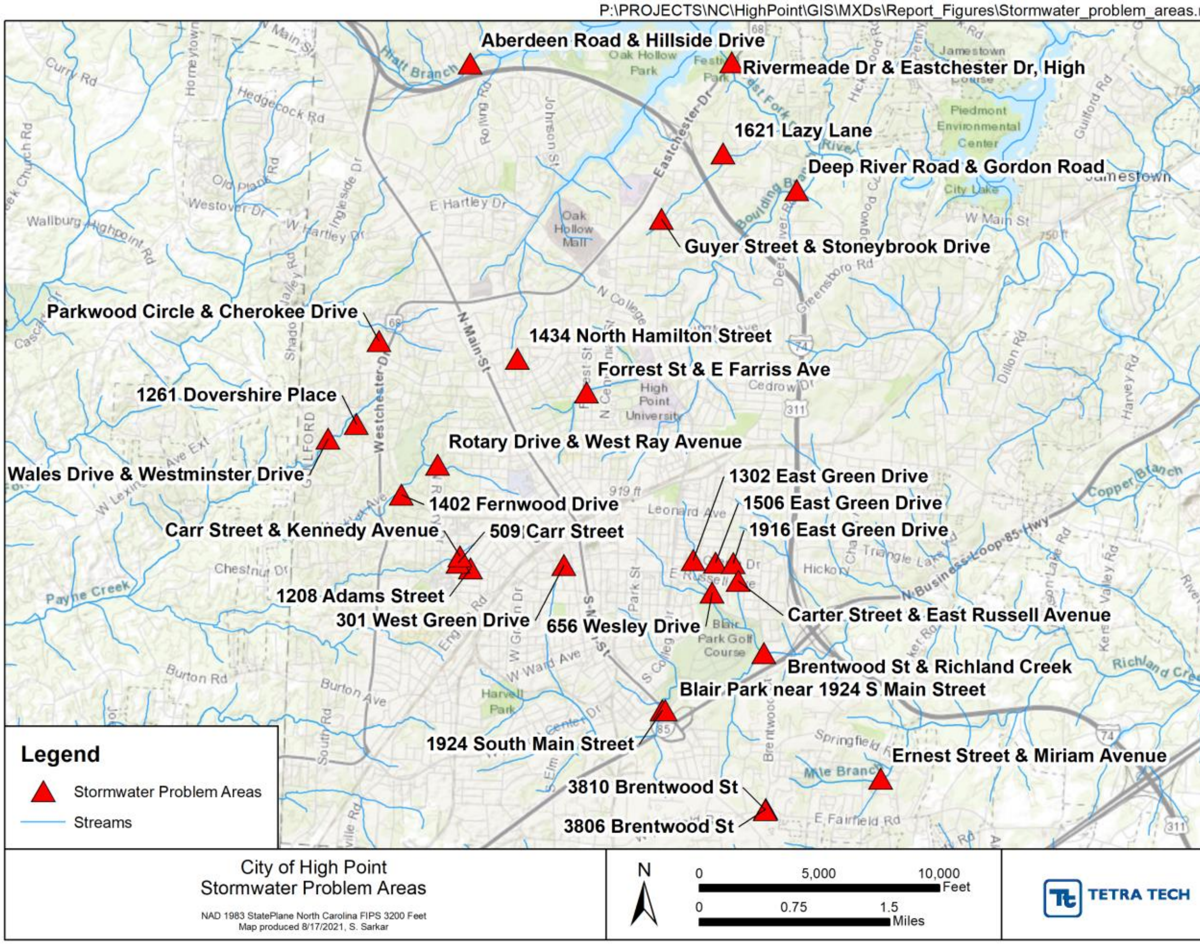

Figure 4. City of High Point Stormwater Problem Areas.

Candidate locations for stormwater modeling will also be selected based on the following list of CIPs (in different stages of design) provided to Tetra Tech by the City to evaluate stormwater flooding:

1) Jacob's Place JP-1 and JP-5 Stormwater Improvement (70% design)
2) Stream Stabilizaton and Infrastructure Improvements for Kensington Drive and Dovershire Place (preliminary design)
3) Hamilton-Montlieu Monroe Place Stream Restoration (100% design)
4) West Ray Drainage Improvements (70% design)

2.2.1 Model Development

Based on the above information and any additional information from the City, Tetra Tech will identify up to 3 focus areas for stormwater model development. Stormwater models will be primarily developed using U.S. Environmental Protection Agency (EPA) SWMM. The SWMM model will be used for the hydraulic analysis only. We propose to use HEC-HMS for the development of runoff hydrographs based on the SCS Unit Hydrograph method, as discussed above (section 2.1.1). The runoff hydrographs generated by the HEC-HMS model will be used as boundary condition inputs to the SWMM models. Development of the stormwater network in the SWMM models is a data intensive exercise that requires detailed information on stormwater infrastructure elements. Typical information required for the development of a SWMM model are as follows:

1) Junctions - Invert elevation, depth, storage capacity, ponding type.
2) Conduits - Material, shape, dimensions, invert elevation, slope

We believe that the City has a GIS database of its stormwater assets, that can be readily used to identify the stormwater elements in the focus areas. Information pertaining to the stormwater elements (such as those identified above) will be acquired from as-built drawings. In the event that as-builts are not available, a survey may be necessary.

2.2.2 Model Calibration

Calibration rigor of the SWMM models will depend on the availability of observed data. Since observed runoff are rarely available, calibration of the stormwater modeling system will largely rely on comparison of simulated water surface elevations and flood depths against high water marks or other information.

2.2.3 Model Application (to be performed in next stage of project)

For the next stage of the project (currently scheduled for after July 1, 2022), the SWMM models will be used to simulate up to 3 design storms and 2 historic storms. We propose stormwater modeling for the 25-, 50- and 100-year recurrence interval design storms derived from NOAA Atlas 14. The historic storms for simulation will be determined based on consultation with the City.

Note that EPA SWMM is a 1D model and is only capable of providing an estimate of the magnitude of flooding associated with a storm event. The model cannot provide a graphical representation of the resulting areal extent of flooding. We therefore propose using XPSWMM (a proprietary version of the EPA SWMM model that has 2D capabilities) for areas where a more detailed assessment is required. Stormwater modeling with XPSWMM in a 2D setting will provide more detailed results such as the areal extent of flooding, number of properties flooded, and depth of water on flooded properties. The 2D grid associated with an XPSWMM model will be generated using a LiDAR-based DEM.

Model results will be summarized in tabular, graphical and map formats. A model report will be prepared documenting the methods used to develop the models and results of the simulated storm events. It is anticipated that the following results will be reported:

1) Peak runoff rate
2) Runoff volume
3) Peak discharge rate in conduits
4) Locations of surcharging junctions
5) Duration of surcharge and flooding
6) Magnitude of flooding
7) Maximum flood depth and extent (2D)
8) Maximum water surface elevation and extent (2D)
9) Number of properties flooded and flood depth (2D)

Proposed Task 2 Deliverables (schedule)

2A - Present up to 3 locations to the City to conduct stormwater modeling (within 60 days of NTP)

2B - SWMM model development status update (within 120 days of NTP)

2C - Stormwater modeling development memorandum (within 240 days of NTP)

2.3 TASK 3 – SUPPORT POTENTIAL CONTAMINANT SOURCE IDENTIFICATION IN COMPLIANCE WITH 15A NCAC 18C .1305

2.3.1 Identify Potential Contaminant Sources (PCSs)

Tetra Tech will work with City staff and other government agencies to identify PCSs in compliance with 15A NCAC 18C .1305 section (b) requirements. The rule calls for listing PCSs that are located "within the critical area snf 1,000 feet from perennial streambanks within the protected area" for both class WS-II and WS-IV which apply to City Lake and Oak Hollow Lake, respectively. NCDEQ's Public Water Supply Section published a Source Water Assessment Program (SWAP) report in 2014 that listed PCSs from earlier data sets which will provide a starting point. Tetra Tech will follow NCDEQ's updated information guide published on its website for data sets to examine which include:

- Aboveground Storage Tank (AST) Incidents (NCDEQ)
- CERCLA-Federal Remediation Sites (USEPA)
- Contaminated Dry-Cleaning Sites (NCDEQ)
- Hazardous Waste Sites (NCDEQ)
- Inactive Hazardous Sites (NCDEQ)
- Non-Discharge Permits (NCDEQ)
- NPDES Stormwater Permits (NCDEQ)
- NPDES Wastewater General Permits (NCDEQ)
- NPDES Wastewater Individual Permits (NCDEQ)
- PCB Sites (USEPA)
- Permitted Animal Facilities (NCDEQ)
- Pre-regulatory Landfill Sites (NCDEQ)
- Septage Disposal Sites (NCDEQ)
- Soil Remediation Sites (NCDEQ)
- Solid Waste Facilities (NCDEQ)
- State Stormwater Post-Construction Permits (NCDEQ)
- Tier II Sites (NC Department of Public Safety, Division of Emergency Management)
- Underground Injection Control (UIC) Program Permits (NCDEQ)
- Underground Storage Tank (UST) Incidents (NCDEQ)
- UST Permits (NCDEQ)

2.3.2 Map PCSs and Evaluate Risk

PCSs found to be located within the regulated areas will be quality assured and maintained in a geospatial database. Locations will be mapped using an ESRI-based geospatial information system (GIS).

The HSPF watershed models being prepared by Tetra Tech for the City will be used to estimate time-of-travel from the various PCS locations under one or two flow conditions determined to be critical (i.e., high enough to deliver the pollutant quickly to each lake, yet low enough to not dilute the pollutant to levels that would not pose a threat to public health and safety). The relative volatility of the pollutant will be considered, for example whether the pollutant is conservative and is transported in full mass to the drinking water supply or whether the pollutant may experience some level of decay prior to reaching the water supply lakes. Additionally, Tetra Tech will consider factors used by the NCDEQ to assign Inherent Vulnerability Rating and Susceptability Rating values for each water supply lake.

Relative risks (e.g., Higher, Lower, Moderate) will be assigned to the PCSs for consideration by the City and NCDEQ in implementing its Source Water Resiliency and Response Plan (SWRRP).

2.3.3 Assist with NCDEQ Approval of SWRRP Requirements

Tetra Tech will assist the City in making it's submittal of the supplement PCS-related materials required under 15A NCAC 18C .1305 section (b) requirements. Contact will be made with appropriate NCDEQ staff to ensure that the content and format provided will be acceptable to the agency. Tetra Tech will monitor NCDEQ review status and assist the City in responding to NCDEQ requests for clarification or modification during the review and approval process.

Proposed Task 3 Deliverables (schedule)

3A – Draft list of PCSs for City review and discussion (target 1st quarter of 2022 calendar year)

3B – Final list of PCSs (30 days following review and discussion with City staff)

3C – Draft map of PCSs for City review and discussion (target 1st quarter of 2022 calendar year)

3D – Final map of PCSs (30 days following review and discussion with City staff)

3E – Draft assessment of relative threat from PCSs for City review and discussion (target 2nd Qtr 2022)

3F – Draft compilation of submittal materials for City review and discussion (target 2nd Qtr 2022)

3G – Draft submittal to NCDEQ (30 days following review and discussion with City staff)

3H – Revisions to materials as needed to obtain NCDEQ approval (as needed)

2.4 TASK 4 - QUALITY ASSURANCE/QUALITY CONTROL, MEETINGS, CORRESPONDENCE, AND CONTRACT COORDINATION WITH THE CITY OF HIGH POINT

2.4.1 Quality Assurance/Quality Control

Throughout implementation of this scope of work, Quality Assurance/Quality Control (QA/QC) will be conducted by the technical team. To support and document QA/QC activities, a QA/QC spreadsheet will be maintained for the flood and stormwater model development. It will contain records of data sources used in model development, processing notes, QA/QC review requirements, QA/QC events led by a senior scientist/engineer/modeler, and QA/QC outcomes for the project.

2.4.2 Meetings

Tetra Tech will participate in up to 6 meetings with the City of High Point regarding the flood and stormwater modeling effort. These could potentially include a model development and calibration status presentations, and periodic project update meetings. Tetra Tech will collaborate with the City of High Point regarding the timing and content of these project meetings.

2.4.3 Correspondence and Contract Coordination

Tetra Tech will coordinate with the City of High Point to manage this contract and plan work under its provisions. This includes corresponding with City staff, planning work, estimating level of effort, tracking accounting, and preparing work summaries to accompany billing invoices.

Proposed Task 4 Deliverables (schedule)

4A – Quality Assurance/Quality Control documentation (as requested by the City)

4B – Contract documents (as requested by the City)

4C – Project presentations and meeting summaries (via email within 1-5 days following calls/meetings)

4D – Invoices and progress reports (monthly or as invoiced)

3.0 PROPOSED BUDGET

The proposed budget amendment for this SOW is $150,000, bringing the total cost approved for the Watershed Assessment Framework project PO #103547 to $300,000. The amount represents a total not-to-exceed value without written approval from City contract manager. It is anticipated this will cover the development of the flood and stormwater models, and the assistance to obtain approval from NCDEQ for compliance with source water protection regulations. Flood mitigation scenarios which will be conducted under another scope for the 2022-23 fiscal year. Billing will be based on the following staff and rates as outlined in the master services contract for Tetra Tech with the City.

Time and Material rates for proposed staff (per Master Services Agreement)

Person	Role	Billing Category	Yr 4 - 5 ($/hr)
1. Trevor Clements	PM/Principal Manager	Principal Contract Manager	188
2. Jon Butcher	Principal Engineer	Principal Engineer	260
3. Holly Miller	Senior Planner	Senior Planner	183
4. Sam Sarkar	Project Engineer	Senior Engineer	150
5. Michelle Schmidt	Project Engineer	Project Engineer	150
6. Hillary Yonce	Project Scientist	Project Scientist	150
7. Allison Barker	Contract Administration	Contract Administration	100
8. Christina Buxton	Editor/Technician	Science Technician	90

Other direct costs (local travel, equipment/supplies) will be billed at cost plus 15% fee

4.0 SCHEDULE

HEC model and SWMM model development, including data acquisition will occur simultaneously. Therefore, the schedule is shown integrating the steps for both flood and stormwater model development. Model application and final report for both the flood modeling and stormwater modeling scenario applications will occur in the next stage of framework, with estimated schedule shown in green for future planning purposes.

Task #	Task Description	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Tasks 2.1 and 2.2 Schedules are Integrated																	
.1.1	**Data Acquisition**																
a.	Digital Data Acquisition																
b.	Field Work																
c.	Data Conversion to Model Ready Format																
d.	Memorandum																
1.2	**Model Development**																
a.	HEC-RAS Model Development																
b.	SWMM Model Development																
c.	Memorandum																
.1.3	**Model Calibration**																
a.	HEC-RAS Model Development																
b.	SWMM Model Development																
c.	Memorandum																
2.3	**Support PCS Identification Under 15A NCAC 18C .1305**																
2.3.1	Indentify Potential Contaminant Sources (PCSs)																
2.3.2	Map PCSs and Evaluate Risk																
2.3.3	Assist with NCDEQ Approval of SWRRP Requirements																
2.4	**Project Management and Contract Administration**												Next stage of framework model development				
	Next Stage of Framework Model Development																
	Results Assessment and Scenario Planning																
a.	HEC-RAS Model Scenarios (5)																
b.	SWMM Model Scenaros (5)																
c.	Memorandum																
	Report and Presentation																
a.	Draft Report																
b.	Final Report																
c.	Presentation																