SCOPE OF SERVICES
CLINTONVILLE STORMWATER QUALITY/QUANTITY
MONITORING PROJECT

The consultant shall furnish all labor, materials, equipment and supervision necessary to complete the wet weather monitoring requirements specified herein. Tasks associated with this project include stormwater quantity monitoring, stormwater quality sampling, laboratory analysis, laboratory data evaluation, and project management. Analysis and collection of samples shall be done in accordance with the methods specified in 40 CFR Part 136 unless approved otherwise by the City. Where an approved Part 136 method does not exist, any suitable method may be used, but the consultant shall describe the analysis methods and document the reference. Work under this project shall continue for a period of six months.

Stormwater quantity monitoring shall be performed at twenty (20) locations; six (6) of these locations shall also receive stormwater quality sampling as specified herein. The locations of these flow monitoring and sampling points are shown in Exhibit 1.

Task 1 – Quality Assurance Project Plan
Prior to any sampling work, the Engineer shall modify the Quality Assurance Project Plan (QAPP) developed for the NPDES Stormwater Wet Weather Monitoring Project (Permit No. 4PI00000*CD) to include the six locations. The QAPP describes the activities that will be performed to complete the monitoring, sampling, analytical, and reporting tasks under this project. The QAPP documents the results of the project's technical planning process, provides a clear, concise, and complete plan for task performance, identifies quality assurance and quality control objectives and procedures, and identifies key project personnel that will be responsible for performing each task. At a minimum, the QAPP shall address and/or include each of the elements listed in the following table that are relevant to this project.

More information on these elements is provided in the U.S. EPA's Guidance for Quality Assurance Project Plans (EPA QA/G-5, 2002). Information pertaining to quality assurance practices and procedures used by the City's Surveillance Laboratory are available from the City and shall be incorporated by reference into the final QAPP for this project.

Procedures outlined in the QAPP shall be followed during the completion of each task and throughout the duration of the project. The City recognizes that there may be instances where procedures specified in the QAPP may require revision due to circumstances that were unknown at the beginning of the project. In instances where it is found that a procedure(s) specified the QAPP is impracticable, the QAPP shall be revised to incorporate an alternative procedure and justification of the change shall be provided. In no instance shall changes be made within the QAPP without prior approval by the City.

QAPP Elements[1]

Project Management	Data Generation and Acquisition	Assessment and Oversight	Data Validation and Usability
Title and Approval Sheet	Sampling Process Design (Experimental Design)	Assessments and Response Actions	Data Review, Verification, and Validation
Table of Contents	Sampling Methods	Reports to Management	Verification and Validation Methods
Distribution List	Sample Handling and Custody		Reconciliation with User Requirements
Project/Task Organization	Analytical Methods		
Problem Definition and Background	Quality Control		
Project/Task Description	Instrument/Equipment Testing, Inspection, and Maintenance		
Quality Objectives and Criteria	Instrument/Equipment Calibration and Frequency		
Special Training/ Certifications	Inspection/Acceptance of Supplies and Consumables		
Documentation and Records	Non-direct Measurements		
	Data Management		

Task 2 – Permits and Maintenance of Traffic

The following tasks shall be performed to comply with City permitting requirements and to ensure the safety of the Engineer's sampling/monitoring crews and traveling public.

Task 2.1: The Engineer shall procure all the necessary right-of-way permits from the City, including the City's Transportation Division where any flow monitoring, dry weather or wet weather field screening or sampling tasks are to be performed within city right-of-way.

Task 2.2: The Engineer shall provide for the maintenance of vehicular and pedestrian traffic to ensure that any flow monitoring, dry weather or wet weather field screening or sampling tasks are conducted safely where such tasks are to be performed in or around vehicular and pedestrian traffic.

Task 3 – Dry Weather Flow Characterization, If authorized

The following tasks shall be performed to characterize the constituents present in dry weather discharges. The results of this characterization shall be used by the Engineer to adjust the amount of constituents that are reported for wet weather flows.

Task 3.1: **If authorized**, the Engineer shall field screen each of the six designated sampling locations for the presence of dry weather flow and report his/her findings to the City. Dry weather flows shall be defined as discharges from stormwater outfalls that are occurring 72-

[1] Adapted from U.S. EPA Guidance for Quality Assurance Project Plans (EPA QA/G-5, 2002)

hours from the end of the last precipitation event. Dry weather screening shall be performed at each of the six monitoring locations during the first month of the project.

Task 3.2: **If authorized**, the Engineer shall characterize the constituents present in dry weather flows where applicable. The Engineer shall collect at least one dry weather sample per dry weather field screening visit from each location that was identified during field screening as having dry weather flow. The Engineer shall collect, maintain records of, and report on the amount of dry weather flow (if present) discharged from each location at the time when the dry weather samples were collected. Samples collected during dry weather flow events shall be analyzed for the constituents listed in Table 5.1 and Table 5.2. The Engineer shall evaluate the dry weather sampling data and characterize the constituents that were observed in the dry weather samples. The Engineer shall use these findings to adjust sampling data that will be collected to represent wet weather events.

For budgeting purposes, the Engineer shall assume that tasks associated with dry weather flow characterization will be performed at each of the six monitoring locations for this project.

Work under this sub-task shall only be performed "if authorized" in writing by the City prior to any execution of work. Such work would be performed only upon the approval of a cost estimate for dry weather flow characterization services prepared by the Engineer (under the rates and costs established by the agreement) and subsequent written authorization by the City.

In instances where the Engineer observes the occurrence of an illicit dry weather discharge (e.g. visible oil sheen, odor, color, etc.) during field screening, the Engineer shall immediately report the discharge to the City's Stormwater and Regulatory Management Section at (614) 645-0362.

Task 4 – Wet Weather Monitoring

The following tasks shall be performed to collect the necessary water quantity data, water quality samples, and flow information as required. No additional compensation will be considered beyond the negotiated cost of services for after-hours sampling.

Task 4.1: The Engineer shall collect, maintain records of, and report on the following information for each wet weather event that is monitored at each of the twenty (20) locations to be monitored as part of this project:

a. Date and duration (in hours) for all storm event(s) monitored at the twenty (20) flow monitoring locations. The Engineer may use City rainfall gages to acquire this information.

b. The rainfall measurements (in inches) of the storm event which generated each sampled runoff.

c. The duration (in hours) between the storm event sampled and the end of the previous measurable storm event for all storm events that are sampled. A written justification for the lag time between storms that was used must be documented.

d. Total runoff volumes (in gallons) of all discharges that are monitored and sampled for water quality constituents.

The Engineer shall perform any necessary hydrologic and hydraulic analyses on the monitored storm sewer systems to accomplish this task and to demonstrate the water quantity and quality responses for each monitored storm sewer system. Such analyses may include, but is not limited to, the development of rating curves, land use analysis, and sewer system modeling.

Task 4.2: The Engineer shall collect wet weather samples from the six (6) City-owned storm sewer structures that are located throughout the Integrated Planning Area as shown in Figure 1. Grab samples shall be taken during the first two hours of discharge if sampling for dissolved oxygen, pH, temperature, cyanide, oil & grease, and E.coli. For all other parameters, samples shall be collected and flow proportioned as described in the QAPP. The sampling frequency at the six (6) locations shall be twice per quarter for two quarters (total of six months). In instances where the Engineer is unable to collect samples due to adverse climatic conditions, the Engineer shall document in writing why samples could not be collected, including documentation of the event.

Wet weather sampling activities shall be performed early in a given quarter, rainfall conditions permitting, to allow sufficient time for re-sampling of a monitoring location within the same quarter. Re-sampling may be required in instances where sampling activities or generation of data are deemed "suspect" following review under the guidelines provided in the QAPP. Conditions of Section IV in the contract will apply in situations where re-sampling is required due to negligence by the Engineer.

In instances where it is determined that erroneous data is not the result of the Engineer's negligence (e.g. flow monitoring equipment damaged by debris during a storm event, etc.), re-sampling may be performed if authorized by the City. Costs for re-sampling activities where it is agreed the Engineer is not negligent shall be reallocated from project contingency funds upon written authorization by the City.

In instances where the Engineer observes the occurrence of an illicit wet weather discharge (e.g. visible oil sheen, odor, color, etc.) during sampling, the Engineer shall immediately report the discharge to the City's Stormwater and Regulatory Management Section at (614) 645-0362.

Task 4.3: **If authorized**, the Engineer shall relocate wet weather sampling locations. Conditions for which alternative sampling locations may be justified include:

a. The amount or depth of flow in the storm sewer system at the sampling point makes sample collection or flow monitoring impracticable,

b. Geometry of the structure at the sampling location makes installation of sampling or flow monitoring equipment impracticable,

c. Repeated vandalism or theft of monitoring equipment at a sampling location,

d. The City identifies an alternative monitoring location.

Task 4.4: The ENGINEER shall install, maintain, relocate, collect, and remove the City's monitoring equipment in all locations shown in Exhibit E. The following requirements apply to all 20 of the monitoring locations included in this project:

a. The City has or shall provide all flow monitoring equipment for the ENGINEER's use.

b. The ENGINEER shall do all preliminary investigations, data acquisition, access work, permit acquisition, and installation to relocate monitors if required. The rationale for such relocation is the same as that listed in Task 4.3, above.

c. The ENGINEER shall do all data gathering, maintenance, and repair of the City's monitoring equipment during the life of this project.

d. The ENGINEER shall remove any or all of the City's monitoring equipment if requested by the City.

The Engineer shall provide written justification to relocate a sampling or monitoring location in instances where the Engineer feels that an alternative sampling or monitoring location is required. The written justification shall include an explanation for why the current sampling location is unfeasible, provide a recommended alternative sampling or monitoring location, and provide justification for why the recommended sampling location was selected.

In addition to removing, transporting, and reinstalling monitoring equipment at an alternative location, work under this task shall also include the field screening and constituent characterization for dry weather flows (where present) as described in Task 3.

All elements of the work under this task shall only be performed "if authorized" in writing by the City prior to any execution of work. Such work would be performed only upon the approval of a cost estimate for sampling and/or monitoring relocation services prepared by the Engineer (under the rates and costs established by the agreement) and subsequent written authorization by the City. For budgeting purposes, the Engineer shall assume that each of the six (6) selected sampling/monitoring locations shall each be relocated once within the time frame of this project.

The Engineer shall also assume that the performance of dry weather characterization tasks prescribed under Task 3 along with flow monitoring, and hydrologic and hydraulic analysis prescribed under Task 4.1 will be required for each new sample location. Costs associated with Task 3 and Task 4.1 on sampling relocation sites, including revisions to the dry weather characterization findings based on the new sampling/monitoring sites, shall be included under this subtask.

Task 5 – Laboratory Analysis

The following tasks shall be performed to determine the amount of constituents that are present in the water quality samples collected in Task 4.

Task 5.1: Table 5.1 lists the constituents and minimum detection limits for which the Engineer shall deliver samples to the City's Surveillance Laboratory for analysis.

Table 5.1 – Constituents for City Surveillance Lab Analysis

Constituent Name	Detectible Limit
Alkalinity	1.2 mg/l
Hardness (as $CaCO_3$)	1.7 mg/l
Total Phosphorus	0.05 mg/l
Total suspended solids	1.0 mg/l
NH_3	0.02 mg/l
Oil and grease	1.0 mg/l
pH	0.1
Temperature (°C)	N/A
Dissolved Oxygen	1.0 mg/l
Copper	0.00075 mg/l
Chromium	0.005 mg/l
Cadmium	0.00011 mg/l
Lead	0.00034 mg/l
Nickel	0.00055 mg/l
Zinc	0.001 mg/l
Total cyanide	0.002 mg/l

Samples shall be prepared for analysis of the constituents listed in Table 5.1 and delivered to the following address by the Engineer:

City of Columbus
Surveillance Laboratory
1250 Fairwood Avenue
Columbus, Ohio 43206

Drop-off times for the City's Surveillance Laboratory shall be between 7:00 a.m. and 4:00 p.m., Monday through Friday.

Task 5.2: Table 5.2 lists the constituents and minimum detection limits for which the Engineer shall deliver samples to the Engineer's laboratory for analysis.

Table 5.2 - Constituents for Engineer's Lab Analysis

Constituent Name	Detectible Limit
Dissolved Phosphorus (dissolved ortho-phosphate, lab filtered)	0.05 mg/l
Nitrite	0.05 mg/l
Fecal Coli form*	1.0 (#/100 ml)
E. coli*	1.0 (#/100ml)
5-day CBOD	2.0 mg/l
5-day BOD	1.0 mg/l
COD	1.0 mg/l

***The City requires that flow-weighted composite samples be estimated for bacteria parameters under this contract. Costs associated with generating flow-weighted composite results for bacteria parameters shall be included under this task.**

No additional compensation will be considered beyond the negotiated cost of services for after-hours laboratory analysis.

The Engineer shall supply the City of Columbus with the sampling results that were generated by the Engineer's laboratory for inclusion into the City LIMS system.

Task 6 – Project Management

The Engineer shall provide the necessary project management to schedule, coordinate, and manage the necessary equipment and personnel to perform the services required by the Scope of Services. Project management services shall include, but are not limited to, scheduling, invoicing, and participating in quarterly progress meetings with the City. Within fourteen (14) days of contract award, the Engineer shall prepare and submit a schedule that includes all meeting and deliverable dates associated with this project. The Engineer shall participate in one kick-off meeting at the beginning of the project.

Task 7 – If Authorized Additional Services

If Authorized, the Engineer shall perform additional tasks associated with this project that are not included in the scope of services. Due to the uncertain nature of various work elements in this contract, it may be necessary to authorize additional work beyond the scope as written. Such work would be performed only upon the approval of a cost estimate for such services prepared by the Engineer (under the rates and costs established by the agreement) and subsequent written authorization by the City.