APPENDIX A

STATEMENT OF WORK

This scope of work includes a discussion of the activities, assumptions, deliverables, and a schedule associated with this project:

- Task 1.0 - Literature Review
- Task 2.0 - Experimental Design
- Task 3.0 - Quality Assurance Project Plan
- Task 4.0 - Steering Committee Coordination
- Task 5.0 - Project Management/Contract Administration

Work on these tasks will be performed by the City with assistance from King County and a consultant to be identified at a later date. The City, King County, and the consultant are hereafter referred to as the "Project Team".

Task 1.0 – Literature Review

Under this task, the Project Team will conduct a literature review to obtain information on past studies that have been implemented to achieve similar objectives. In connection with this review, the Project Team will conduct search engine queries of publically available studies on the internet, as well as searches on the following subscription based databases: Web of Science, ScienceDirect, and ProQuest. The specific objective of this literature review will be to identify measurement parameters from these studies that appear useful for quantifying long-term changes in stream health in response to increased watershed urbanization and/or the implementation of stormwater controls. Efforts will be made to identify parameters in all the following categories: biological, physical habitat, sediment quality, water quality, and hydrology. For each parameter identified, the duration and frequency of measurement, and the data analysis methodology will also be documented.

Results from this review will be summarized in a report that will contain the following information:

- Description of the methods used for the literature review
- Annotated bibliography for all studies that were identified
- Table summarizing parameters that were used in each study
- Recommended parameters for the City's study.

This report will be provided to the Steering Committee to inform the development of the experimental design and QAPP in Task 2.0 and Task 3.0, respectively.

Deliverables

- The Project Team will submit two electronic copies (PDF and Word) of the report for the literature review to the Steering Committee within two months of receiving notice of to proceed on the project.
  - Target Completion Date: December 31, 2014

Task 2.0 – Experimental Design

The Project Team will develop an experimental design for the study that will be incorporated into the QAPP to be prepared under Task 3.0. The experimental design will identify the following information:

- Specific targets for improved receiving water conditions following implementation of stormwater BMPs

- Parameters that should be used for measuring progress towards these targets in the following categories: biological, physical habitat, sediment quality, water quality, and hydrology
- Location, frequency and duration of measurement for each parameter.
- Method for analyzing the data for each parameter.

The experimental design identified in the City's original proposal to the RSMP for a "Regional Stormwater Monitoring Program Effectiveness Study" will provide the starting point for work under this task. This experimental design identified monitoring to quantify improvements in receiving water conditions based on routine and continuous measurements of various indicators of stream health. The study also utilized a "paired watershed" experimental design that will involve the collection of these measurements in seven watersheds categorized as follows:

- Three "Application" watersheds with the wadable lowland streams that are moderately impacted by urbanization and prioritized for rehabilitation efforts.
- Two "Reference" watersheds with relatively pristine wadable lowland streams that do not require rehabilitation.
- Two "Control" watersheds with significantly impacted wadable lowland streams (by urbanization) that are not currently targeted for rehabilitation pursuant to the WMP.

The City's original proposal to the RSMP also included monitoring at "roving" stations that would be used to quantify the effectiveness of stormwater BMPs to be constructed in Application watersheds. These roving stations were to be moved from one year to the next once the performance of a stormwater BMP is verified and a new BMP is constructed.

In order to guide the development of the experimental design, the power of trend tests to be performed for this study will also be investigated under this task using Monte Carlo simulations. These simulations will specifically investigate the power of Spearman's rho tests for detecting significant trends in time series data given: 1) the desired significance level, 2) magnitude of the trend, 3) sample size, and 4) amount of variation within existing datasets. It is anticipated that the simulations will be performed on synthetic time series data sets that will be developed for a subset of three to five parameters including: benthic index of biotic integrity (B-IBI) scores, total suspended solids, and total zinc.

In connection with the work identified in Task 4.0, the Project Team will coordinate with the Steering Committee to obtain their technical input during the development of the experimental design.

Assumptions

- A draft of the experimental design will be prepared for Steering Committee review. The steering committee review will be performed within 15 working days. Comments from the review will be provided using a standardized template to be developed by the Project Team.

Deliverables

- The Project Team will submit an two electronic copies (PDF and Word) of the draft experimental design to the Steering Committee for review within four months of receiving notice of to proceed on the project.
    - Target Completion Date: March 31, 2015

<u>Task 3.0 – QAPP Production</u>

Incorporating the experimental design developed under Task 2.0, the Project Team will prepare a QAPP in accordance with Ecology's Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (Ecology Publication No. 01-03-003) and Technical Guidance for Assessing the

Quality of Aquatic Environments (Ecology Publication No. 91-78). The QAPP will specifically include all of following information:

- **Background** – An explanation of why the project is needed.
- **Project Description** – Project goals and objectives, and the information required to meet the objectives.
- **Organization and Schedule** – Project roles and responsibilities, and the schedule for completing the work.
- **Quality Objectives** – Performance (or acceptance) thresholds for collected data.
- **Sampling Process Design** – The sampling process design for the study, including sample types, monitoring locations, and sampling frequency.
- **Sampling Procedures** – A detailed description of sampling procedures and associated equipment requirements.
- **Measurement Procedures** – Laboratory procedures that will be performed on collected samples.
- **Quality Control** – Quality control (QC) requirements for both laboratory and field measurements.
- **Data Management Procedures** – How data will be managed from field or laboratory recording to final use and archiving.
- **Audits and Reports** – The process that will be followed to ensure this QAPP is being implemented correctly and the quality of the data is acceptable.
- **Data Verification and Validation** – The data evaluation process, including the steps required for verification, validation, and data quality assessment.
- **Data Quality (Usability) Assessment** – The procedures that will be used to determine if collected data are of the right type, quality, and quantity to meet project objectives.

In connection with the work identified in Task 4.0, the Project Team will coordinate with the Steering Committee to obtain their technical input during the development of the QAPP.

Assumptions

- An initial draft of the QAPP will be prepared for Steering Committee review, a revised draft will then be prepared for Ecology review. All reviews will be performed within 15 working days. Comments from each review will be provided using a standardized template to be developed by the Project Team.

Deliverables

- The Project Team will submit two electronic copies (PDF and Word) of the initial draft of the QAPP to the Steering Committee for review within six months of receiving notice of to proceed on the project.
  - Target Completion Date: May 30, 2014

- The Project Team will submit two electronic copies (PDF and Word) of the revised draft of the QAPP to Ecology for review within eight months of receiving notice of to proceed on the project.
  - Target Completion Date:July 31, 2014

- The Project Team will submit two electronic copies (PDF and Word) of the finalized version of the QAPP to all reviewing parties within ten months of receiving notice of to proceed on the project.
  - Target Completion Date: September 30, 2014

<u>Task 4.0 – Steering Committee Coordination</u>

The Steering Committee for this study currently includes representation from the following agencies/individuals:

City of Seattle
Doug Hutchinson

King County
Jeff Burkey
Gino Lucchetti

Kitsap County
Chris May

U.S. Environmental Protection Agency
Dino Marshalonis

U.S. Geological Survey
Rich Dinicola
Chris Konrad
Rich Sheilbey

Washington State Department of Ecology
Brandi Lubliner
Ed O'Brien
Mindy Roberts

Under this task, the Project Team will coordinate the following activities to obtain input from the steering committee during the development of the experimental design and QAPP described in Tasks 2 and Task 3, respectively:

- Schedule and facilitate up to ten meetings with the Project Team and Steering Committee to discuss and refine the study design and monitoring procedures
- Schedule and facilitate a site visit with the Steering Committee to inspect monitoring stations that have been selected for the study.
- Coordinate the Steering Committee's review of the draft experimental design and QAPP.

Deliverables
- Meeting notes documenting discussion items and consensus decisions from the Steering Committee.
  - Target Completion Date:September 30, 2014

Task 5.0 – Project Management/Contract Administration
The City will be responsible for ongoing contract administration of this project, including preparing invoices and progress reports, as well as coordination of all work efforts with the designated Ecology point of contact and the Project Team. The City's project manager (Andy Rheaume) will have phone and e-mail contact with Ecology on an as-needed basis.