



DEPARTMENT OF
ECOLOGY
State of Washington

AMENDMENT NO. 3

To

IAA No. C1500059

INTERAGENCY AGREEMENT (IAA) BETWEEN
THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY
AND
CITY OF REDMOND

PURPOSE: To amend the Agreement between the state of Washington, Department of Ecology, hereinafter referred to as “ECOLOGY” and CITY OF REDMOND, hereinafter referred to as “CITY,” or “CONTRACTOR”.

WHEREAS: This Agreement is undergoing an increase in scope and extension of the timeline to allow for completion of the work described in the new Appendix C.

IT IS MUTUALLY AGREED the agreement is amended as follows:

- 1) The project end date is changed from July 31st, 2019 to June 1st, 2020.
- 2) Compensation is increased for additional tasks added by this amendment. The total amount is changed from \$1,298,000 to \$1,775,755, an increase of \$477,755.
- 3) Appendix C - Statement of Work is a new appendix with two Tasks C1.0 & C2.0 to continue monitoring of the flow, water and sediment quality at the study sites for October 1 2018 to December 31, 2019.

APPENDIX C

STATEMENT OF WORK FOR WATER YEAR 2019 AND ONE QUARTER OF WATER YEAR 2020 (OCTOBER 1, 2018 THROUGH DECEMBER 31, 2019)

Background

The City of Redmond (REDMOND) has a Citywide Watershed Management Plan (WMP) to implement structural and nonstructural stormwater controls pursuant to the Phase II municipal stormwater permit. This Redmond Paired Watershed Study (RPWS) will study and quantify improvements in receiving water conditions based on implementing the WMP controls. This RPWS will measure various hydrologic, chemical, physical, and biological indicators of stream health. The RPWS was initiated in the fall of 2015 and will be implemented over an anticipated ten year timeframe. Funding comes from the Stormwater Action Monitoring (SAM) program, a coordinated monitoring program founded by Phase I and II municipal stormwater permittees and administered by Ecology.

This scope of work in Appendix C continues field measurement collection, data management and quality assurance review, data analysis, and reporting for this study over all of water year 2019 (a water year is defined as the 12-month period that extends from October 1 in any given year through September 30 of the following year) and the first quarter of water year 2020. Additional monitoring for the study in subsequent years would occur under a new contract or addendum to this contract. The monitoring will follow the already approved quality assurance project plan (QAPP) for this Paired Watershed study.

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

- Task C1.0 - Water Year 2019 Study Implementation
- Task C2.0 - Water Year 2020 First Quarter Study Implementation

Work on these tasks will be performed by REDMOND with assistance from Herrera Environmental Consultants (Herrera), and King County. REDMOND, Herrera, and King County are collectively referred to as the “Project Team” in this scope of work. Where applicable, specific roles for each member of the Project Team are called out under individual tasks. The cost by deliverable, and schedule by deliverable are included in the table at the end of this Scope of Work.

Task C1.0 – Water Year 2019 Study Implementation

Under this task, the Project Team will implement a series of startup activities for the Paired Watershed Study that will include field reconnaissance of monitoring stations, staff training on required monitoring procedures, and the development of data management systems. These activities are described in more detail under the following subtasks:

Subtask C1.1 - Hydrologic Monitoring

REDMOND has subcontracted with King County to continue the hydrologic monitoring component of the RPWS through Water Year 2019. This involves continuous flow monitoring at 14 stations in seven watersheds. Data from the continuous flow monitoring will be processed to calculate a suite of indicators for evaluating hydrologic impacts from urban development. King County will continue hydrologic monitoring which involves maintenance of the continuous flow monitoring equipment and replacement as needed, telemetry where cell phone coverage is available, maintenance of the automatic processing, and the King County's Hydrological Information Center (HIC) database on their public website. Herrera will generate summary statistics (e.g., antecedent dry period, flow at time of sample collection) from the flow record for storm and base flow events that were sampled for water quality under Subtask C1.2. King County will perform a quality assurance review on these data that will clearly identify any limitations to their use and interpretation by January each calendar year for the prior water year's data. These statistics will be stored in the data management system developed for this project and presented in the data report described under Subtask C1.6. These statistics will be used in analyses to detect trends in water quality that will be performed in later phases of the study. REDMOND will coordinate the project team members (Herrera and King County) to summarize the continuous flow monitoring data for each station for presentation in the data report described in Subtask C1.6.

Assumptions

- Telemetry, and database all continue to work without problems.
- Equipment will be replaced as it reaches maximum manufacturer's life expectancy.

Deliverables

- Posting of telemetered data on HIC (continual) and non-telemetered data on HIC will occur every 5 weeks.
- Table with flow summary statistics for sampled storm and base flow events from 14 stations.

Subtask C1.2- Water Quality Monitoring

REDMOND subcontracted with Herrera for water quality monitoring component of the RPWS which involves the collection of twelve grab samples over the water year during storm events (three each quarter) at 14 stations. In addition, four grab samples will be collected over the water year during base flow (one each quarter) at these stations. Each sample is analyzed for the following indicators for evaluating water quality impacts from urban development:

- Total suspended solids
- Turbidity
- Conductivity
- Hardness
- Dissolved organic carbon
- Fecal coliform bacteria
- Total phosphorus

- Total nitrogen
- Copper, total and dissolved
- Zinc, total and dissolved

In addition, the following indicators are continuously measured in-situ at each hydrology monitoring station using probes:

- Temperature
- Conductivity

This task is to collect grab samples during both storm and base flow events, including the following activities that will be performed in accordance with the QAPP for the study:

- Weather tracking and go/no go decision coordination
- Mobilization of field crews for sampling during the event
- Delivery of samples to the laboratory after the event
- Auditing of laboratory analytical results within seven days of their receipt
- Entry of the analytical results into the study's data management system
- Preparation of a data validation memorandum that will establish the usability of all the data
- Preparation of graphical and tabular summaries for the data report described in Subtask C1.6

REDMOND will ensure coordination between the project team members. King County will oversee the continuous in-situ monitoring at each station using the probes. Herrera will coordinate with King County to provide review continuous data and summarize them for presentation in the data report described in Subtask C1.6.

Assumptions

- Storm event sampling will be performed by two teams of two Herrera staff. Sampling for each event will be performed over an 8- hour period including travel but not including storm tracking and go/no go decision coordination. A 15 percent contingency is included to account for sampling event false starts and allow for make-up sampling.
- Nominally, all 14 stations will be sampled during each storm event. If specific stations are not sampled because a sampling event was terminated, they will be prioritized for sampling in subsequent events to ensure the annual sampling goals established for the study are met for every station.
- Base flow event sampling will be performed by one team of two Herrera staff. Sampling for each event will be performed over a 10- hour period including travel.
- King County will provide continuous water quality monitoring data in electronic format for review by Herrera. King County will perform a

quality assurance review on these data that will clearly identify any limitations to their use and interpretation.

- Obtaining storm event samples may not be possible during particularly dry summer months.

Deliverables

- Laboratory analytical results and documentation of audits for 14 stations from 16 sampling events (12 storm event+ 4 base flow events) uploaded to the Environmental Information Management (EIM) database.
- Data validation memorandum.

Subtask C1.3 - Sediment Quality Monitoring

The sediment quality monitoring component of the RPWS involves collecting sediment samples once during the water year at 19 monitoring stations. Each sample is analyzed for the following indicators for evaluating sediment quality impacts from urban development:

- Total organic carbon
- Copper
- Zinc
- Polycyclic aromatic hydrocarbons
- Phthalates

This task is to collect stream sediment samples. This includes the following activities that will be performed in accordance with the QAPP for the study:

- Mobilization of field crews for sampling
- Delivery of samples to the laboratory after the event
- Auditing of laboratory analytical results within seven days of their receipt
- Entry of the analytical results into study's data management system
- Preparation of a data validation memorandum that will establish the usability of all the data

Assumptions

- Sediment samples and the benthic macro invertebrate samples described in Task C1.5 will be collected during the same field visit to each station. This sample collection will be performed by one team having two Herrera staff. Collection of these samples from 3 stations will require approximately 8-hours of field time including travel.

Deliverables

- Laboratory analytical results and documentation of audits for 19 stations.
- Data validation memorandum.

Subtask C1.4 - Physical Habitat Monitoring

Under this subtask, REDMOND will ensure Herrera is trained and conducts physical habitat monitoring for the RPWS once during the water year at 19 monitoring stations. Herrera will coordinate directly with Ecology's Environmental Assessment Program (EAP) for training, data management, and quality control of habitat data. At each station, the characteristic bed-form type will be recorded as a whole, and physical habitat quality indicators will be measured at 11 cross sections and one longitudinal (thalweg) profile. Pursuant to the QAPP for the study, the following indicators will be measured at each cross-section:

- Bank-full width, wetted width, and cumulative bar width
- Bank-full depth, wetted depth, substrate class and embeddedness
- Fish cover
- Riparian shading
- Riparian vegetation structure

The following indicators will be measured along the thalweg profile:

- Thalweg depth and the presence of bars and/or edge pools
- Main channel slope and bearing
- Large woody debris tally, including notation of diameter, length, category, zone, and key-pieces

Upon completion of field work, physical habitat monitoring data will be uploaded to the EIM. Based on post processing of these data within this system, Ecology will provide a suite of indicators for assessing physical habitat quality that are consistent with those being used for the broader SAM program. A summary of these indicators will be presented in the data report described in Subtask C1.6.

Assumptions

- Two Herrera staff will participate in an Ecology sponsored 2-day training session on the physical habitat monitoring protocols developed for the SAM program. These staff will coordinate an additional 1-day training session for two additional Herrera staff that will be involved in the monitoring.
- Physical habitat monitoring will be performed by two teams having two Herrera staff. Physical habitat monitoring at each station will require approximately 8-hours of field time including travel.
- Data entry for physical habitat and biological monitoring will be performed using electronic field data collection software that has been developed by Ecology to ensure completeness in field data collection, and facilitate upload of these data to Ecology's Watershed Health database in the EIM. Ecology's EAP will perform quality assurance review of these data and calculate metrics for assessing physical habitat conditions using scripts that have been developed to work with the Watershed Health

database in the EIM. Costs for EAP's support for these activities are not included in this scope of work.

- A delay of approximately 5 months can be expected for obtaining processed metrics for assessing physical habitat conditions from EAP via the Watershed Health database in the EIM system.

Deliverables

- Results from physical habitat monitoring at 19 stations that are uploaded to Watershed Health database in the EIM.

Subtask C1.5 - Biological Monitoring

Under this subtask, Herrera will conduct biological monitoring for the RPWS once during the water year at 19 stations. Pursuant to the QAPP for the study, this entails the collection of a composite sample of benthic macro invertebrates from specific locations along the cross-sections for physical habitat monitoring that are described in Subtask C1.4. These samples will be submitted to an analytical laboratory where they will be processed to compute the following indicators for use in evaluating stream health:

- Benthic Index of Biotic Integrity
- Taxa Richness
- Ephemeroptera Richness
- Plecoptera Richness
- Trichoptera Richness Clinger Percent
- Long-Lived Richness
- Intolerant Richness
- Percent Dominant
- Predator Percent
- Tolerant Percent

Assumptions

- Benthic macro invertebrate samples and the sediment samples described in Task C1.3 will be collected during the same field visit to each station. This sample collection will be performed by one team having two Herrera staff. Collection of these samples from 3 stations will require approximately 8-hours of field time including travel.
- A delay of approximately 6 months can be expected for obtaining biological metrics from the contract lab.

Deliverables

- Laboratory results from macroinvertebrate sample analysis for 19 stations entered into the Puget Sound Stream Benthos database.

Subtask C1.6- Water Year Data Summary Report

A data summary report will contain tabular and/or graphical summaries of all data that were collected over the water year in connection with the following monitoring components of the RPWS: hydrologic, water quality, sediment quality, physical habitat, and biological. This report

will provide a detailed description of any quality assurance issues associated with these data based on results from audits and data validation memoranda. Any corrective actions that were undertaken to address quality assurance issues will also be described. Finally, this report will document all rehabilitation efforts that have occurred in the Application watersheds over the previous year. Included will be detailed information on the design and operational status of structural stormwater controls and the frequency and geographic extent of nonstructural stormwater control implementation.

REDMOND will ensure Herrera and King County collaborate to prepare a preliminary draft and review the data summary report. A revised draft will be sent to Ecology (SAM Coordinator) and the technical advisory committee that has been established for the study (see Task C1.7). Herrera will then finalize the water year report based on comments received. REDMOND will review and send to Ecology.

Deliverables

- Preliminary draft data summary report.
- Revised draft data summary report.
- Final Water Year 2019 data summary report.

Subtask C1.7 -Technical Advisory Committee Coordination

The technical advisory committee for this study includes representation from the following agencies: Ecology, King County, Kitsap County, City of Seattle, and the U.S. Geological Survey (USGS). This task is to coordinate and for the project team to participate in up to two meetings to obtain input from the steering committee on technical issues related to the study over water year 2019. It is anticipated that one of these meetings will occur after the release of the data report from Subtask C1.6 to review and discuss the monitoring results from the water year. Contingency budget is also provided for a second, optional meeting to address unforeseen issues that may arise during implementation of the RPWS over the water year.

Assumptions

- Technical advisory committee meetings will last 2-hours and be attended by up to 3 Herrera staff.

Deliverables

- Meeting notes documenting discussion items and consensus decisions from the technical advisory committee.

Subtask C1.8 - Project Management

REDMOND and Herrera will work continue shared responsibilities for ongoing contract administration of this project, including preparing invoices and progress reports, as well as coordination of all work efforts with Ecology (SAM Coordinator) and the Project Team.

Deliverables

- Monthly invoices and progress reports from the Project Team, compiled and sent on a semi-annual basis.

Task C2.0 – Water Year 2020 First Quarter Study Implementation

Under this task, REDMOND will ensure Herrera and King County implement required hydrologic and water quality monitoring activities identified in the QAPP for the Paired Watershed Study over the first quarter of water year 2020 (October 1, 2019 through December 31, 2019). The activities, assumptions, and deliverables for this monitoring are identical to those for Tasks C1.1 and C1.2.

Task/Deliverable	Quantity	Total by Deliverable	Target Dates
Redmond Paired Basin Retrofit Effectiveness monitoring Implementation - Water Year 2019			
Task 1.0 – Water Year 2019 Study Implementation			
<i>Subtask C1.1 – Hydrologic Monitoring</i>			
Table with flow summary statistics for sampled storm and base flow events from 14 stations	1	\$ 105,216	
<i>Subtask Total</i>		\$ 105,216	1/31/2020
<i>Subtask C1.2 – Water Quality Monitoring</i>			
Laboratory analytical results and documentation of Herrera audits for 14 stations x 16 sampling events	16	\$ 128,320	
Data validation memorandum	1	\$ 31,560	
<i>Subtask Total</i>		\$ 159,880	1/31/2020
<i>Subtask C1.3 – Sediment Quality Monitoring</i>			
Laboratory analytical results and documentation of Herrera audits for 19 stations	1	\$ 16,200	
Data validation memorandum	1	\$ 4,060	
<i>Subtask Total</i>		\$ 20,260	1/31/2020
<i>Subtask C1.4 – Physical Habitat Monitoring</i>			
Results from physical habitat monitoring at 19 stations that are uploaded to Ecology’s data management system	1	\$ 66,200	
<i>Subtask Total</i>		\$ 66,200	1/31/2020
<i>Subtask C1.5 – Biological Monitoring</i>			
Laboratory results from macroinvertebrate sample analysis for 19 stations	1	\$ 16,900	1/31/2020

SCOPE OF WORK

<i>Subtask Total</i>			\$ 16,900	
<i>Subtask C1.6 – Water year Data Summary Report</i>				
Draft data summary report	1		\$ 18,100	1/31/2020
Final data summary report	1		\$ 4,540	3/31/2020
<i>Subtask Total</i>			\$ 22,640	
<i>Subtask C1.7 – Technical Advisory Committee Coordination</i>				
Meeting notes documenting discussion items and consensus decisions from the technical advisory committee x 2 meetings	2		\$ 5,542	
<i>Subtask Total</i>			\$ 5,542	3/31/2020
<i>Subtask C1.8 – Project Management</i>				
Compiled progress reports from project team members (12 months)	12		\$ 21,109	
<i>Subtask Total</i>			\$ 21,109	3/31/2020
Task Total			\$ 417,747	
Task C2.0 – Water Year 2020 First Quarter Study Implementation				
<i>Subtask C2.1 – Hydrologic Monitoring</i>				
Table with flow summary statistics for sampled storm and base flow events from 14 stations	1		\$ 27,368	
<i>Subtask Total</i>			\$ 27,368	1/31/2020
<i>Subtask C1.2 – Water Quality Monitoring</i>				
Laboratory analytical results and documentation of Herrera audits for 14 stations x 16 sampling events	16		\$ 32,640	
<i>Subtask Total</i>			\$ 32,640	1/31/2020
Task Total			\$ 60,008	
Project Total			\$ 477,755	

