

## **Attachment A**

### **King County -Detailed Scope of Work**

#### **Project Summary: Puget Lowland Small Streams Monitoring for the RSMP**

The Stormwater Work Group (SWG) members recommended a specific NPDES municipal permittee-funded plan for monitoring the effects of stormwater under the permits in the Puget Sound region. The resulting program, a subset of the overall strategy, is called the Regional Stormwater Monitoring Program (RSMP). The RSMP has three main components; one of which is a status and trends monitoring in Puget ecoregion lowland streams and Puget Sound marine nearshore. For the Puget lowland streams the focus for monitoring is water quality and "watershed health" (physical habitat, sediment chemistry, and biological communities) of wadeable streams.

The RSMP Coordinator at Ecology has formed a small streams monitoring team made up of federal, state, and local government entities to conduct the small streams monitoring. These team members include; King County, Skagit County, San Juan Conservation District, and the United State Geological Survey (USGS) who will conduct the RSMP streams sampling. King County is one of these entities (referred to as RSMP Contractors) will conduct monitoring at RSMP small streams sites from January to December of 2015 in King County and Snohomish County.

#### **Project Activities, Tasks, and Deliverables**

Task A1: Planning: Confirm suitability, secure permission if necessary, and develop stage height/flow measurement plan for each site

Deliverable A1.1: Summary of site visit for suitability, permissions and stage measurement approach. (Target Date January 31, 2015)

Task A2: Project Management and Quarterly Reporting

Deliverable A2.1: Prepare and send via email, project management status updates (quarterly) and attend coordination meetings (typically by phone monthly). (Target Dates: March 31, 2015; June 30, 2015; September 30, 2015; and January 29, 2016).

Task A3: Conduct monthly water quality monitoring from January – December 2015

Deliverable A3.1: Monthly field measured data will be submitted quarterly with copies of field data sheets. (Target Dates: March 31, 2015; June 30, 2015; September 30, 2015; and January 29, 2016).

Deliverable A3.2: Final water quality field and laboratory data deliverable sent to RSMP Coordinator. (Target Date: February 29, 2016).

Task A4: Conduct Watershed Health Monitoring during the index period from July – September 2015.

Deliverable A4.1: Field data will be submitted using electronic field forms and field data sheets quarterly. Grab samples will be sent to designate laboratories. (Target Dates: September and December 2015).

Task B1: King County Environmental Laboratory will analyze water quality samples and sediment quality samples collected by USGS and King County staff in King and Snohomish County.

Deliverable B.1: Lab result narratives with quality assurance and finalized data for water and sediment samples analyzed by KCEL, sent quarterly for results that are available.

Deliverable B.2: Final laboratory data in an EIM compatible spreadsheets, sent to the RSMP Coordinator. Target Date: February 29, 2016.

**Project Schedule**

<b>Calendar Year</b>	2014	2015				2016
Task	4	1	2	3	4	1
1. Site Summary						
2. Project Management & Quarterly reports						
3. Water Quality monthly monitoring						
4. Laboratory Analysis						

## Detailed Descriptions of Tasks and Deliverables

King County staff will monitor suitable RSMP small stream sites located in King and Snohomish County.

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### **Task A1: Visit sites, secure permissions and develop winter flow monitoring plan for each site.**

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(Total Cost \$=6,300)

Most streams are expected to still be wadeable and sample timing can be planned to accommodate better sampling conditions within that month timeframe. However, some creeks may have unsafe high flow conditions for wading or such low flows measurement using meters is impossible. The RSMP Coordinator needs to understand the extent of streams that may exhibit these conditions during 2015. Using best professional judgment, RSMP Contractors shall conduct a site visit to visualize low flow conditions and estimate tenable high flow conditions.

**Deliverable A1.1: Summary of site visit for suitability, permissions and stage measurement approach.**  
**Due Date: January 31, 2015**

King County will email a letter to the RSMP Coordinator providing a summary of site conditions: 1) dry in late summer, 2) anticipated to be hazardous for wading in winter months, and 3) how stage and discharge is planned to be monitored near the site. This letter will also discuss any pertinent local knowledge about the sites and/ or any outstanding permission necessary for monitoring.

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### **Task A2: Project Management and Quarterly Reporting**

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(Total Cost \$ = \$3,400)

Colin Elliot will be the point of contact at King County. As a RSMP Contractor, King County will provide oversight of the field team monitoring in King County, lab analysis of water and sediment quality samples, and interface with the RSMP Coordinator (Brandi Lubliner) to ensure the goals and reporting requirements are met. Project management by RSMP Contractor will include attending the coordination calls hosted by the RSMP Coordinator, managing the field team, resolving any monitoring issues, and preparation of deliverables. Project management time and expenses will be tracked and an invoice for time should be sent with a general status report accompanying the quarterly data reports. The status summary of the project during the course of monitoring will be the billable item for project management. If the expenses associated with project management exceed the quarterly estimate (1/4 of the total deliverable), then timesheets and an expense report may be submitted as justification.

After the last monitoring event of the year, King County will send the RSMP Coordinator the final EIM data spreadsheet and a completeness report on samples taken for each parameter at each site.

**Deliverable A2.1: Send (email) quarterly project management status updates. Participate in coordination meetings (monthly calls) for sampling alignment and management.**

**Due Date: March 31, 2015; June 30, 2015; September 30, 2015, and January 29, 2016.  
(Approximately \$850 per quarter)**

King County will prepare and send a project management status update in the form of an emailed letter to the RSMP Coordinator. King County will participate on the RSMP Coordination conference calls. These emails are encouraged to accompany the data deliverables, however if communication about monitoring or site conditions is important, then the county is expected to send independent correspondence. This status update will be comprehensive but concise. The use of tables is encouraged. Project management for which attending the coordination meetings, and preparing quarterly reports throughout the project is the deliverable.

The status report will contain a summary of the status of monitoring efforts to date, any QA/QC concerns and resolutions. Project management status updates will include an invoice for the costs associated with project management and preparation of deliverables. The final deliverable in February 2016 will briefly summarize performance and completeness of sampling. This will include the number of monitoring events, including attempted monitoring trips where monitoring was not successful. The final report deliverable will also include the finalized data for the field gathered parameters, stage height, and flow measurements in the provided EIM spreadsheet.

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**Task A3: Conduct monthly water quality monitoring from January – December 2015**

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Monitoring will consist of both field measured parameters using a multi-meter and grab samples for laboratory measured parameters, listed in the table below and discussed in detail in the QAPP. Ecology's EIM data spreadsheet template will be provided by the RSMP Coordinator and populated with the field-measured data. This EIM spreadsheet and copies of the field data sheets will be sent to the RSMP Coordinator, who will verify and enter the data into EIM.

**Water quality and field parameters to be monitored.**

Parameter	Where measured
Ammonia	KCEL
Chloride	KCEL
Dissolved organic carbon	KCEL
Dissolved oxygen	Field Meter
Hardness	KCEL
Fecal coliform	KCEL
Metals (total and dissolved): arsenic, cadmium, chromium, copper, lead, silver, and zinc	KCEL
Nitrate-Nitrite-N	KCEL
Polycyclic aromatic hydrocarbons	KCEL
pH	Field Meter
Orthophosphate	KCEL
Specific Conductance	Field Meter
Temperature	Field Meter
Total nitrogen	KCEL
Total phosphorus	KCEL
Total suspended solids	KCEL
Turbidity	KCEL
Stream Flow	Field Meter
Staff Height	Field Observation

KCEL = King County Environmental Laboratory

**Sub-task A3(a): Monthly Water Quality Monitoring**

Total Cost \$ = \$66,000 for up to 19 RSMP small stream sites in King and Snohomish County. (Costs include monitoring labor, site repeat visits, equipment, and supplies)

Beginning January 2015, King County will conduct monthly water quality monitoring at **19** RSMP sites within King county and Snohomish county, unless any of these sites is deemed unsuitable according to the criteria in the monitoring plan for this study *Quality Assurance Project Plan for Status and Trends Monitoring of Small Streams in the Puget Lowlands Ecoregion for Monitoring Conducted using Pooled RSMP Funds contributed by Municipal Stormwater Permittees (QAPP)*. These **19** sites are further described:

12 RSMP stream sites in King County

- Outside UGA Site Order #s: (8, 24, 38, 45, and 47)
- Within UGA Site Order #s: (1, 2, 34, 36, 40, 42, and 55)

7 RSMP sites in Snohomish County

- Outside UGA Site Order #s: (11 and 39)
- Within UGA Site Order #s: (3, 9, 18, 48, and 50)

RSMP coordinator will notify the county in writing if a site becomes disqualified for sampling.

If site(s) identified in sub-task A3(a) fail suitability criteria at some point during the course of monitoring then, King County will notify the RSMP coordinator immediately. A re-sample in the same month will be attempted and if the site still fails suitability, then that site will not be sampled that month. King County should resume monitoring the following month if conditions improve, or discuss with the RSMP Coordinator for a full cessation of monitoring at that site.

Six sites will be sampled in duplicate twice (once each in a winter month and a summer month) for an inter-laboratory comparison study. One duplicate set will be sent to Manchester Environmental Laboratory (MEL) and the other set analyzed by King County Environmental Laboratory (KCEL), discussed more in Appendix B.

### **Optional Sub-task A3(b): Addition of Water Quality Sites**

(\$3,512 per site in King County and \$3,010 in Snohomish County)

Site suitability conditions may change at any point in the sampling program across all of the RSMP sites. These changes may be accommodated by this agreement by increasing (or decreasing) the number of sites monitored by King County staff. The costs for these changes per site are location dependent (King or Snohomish County). The anticipated change in the final number of sites is expected to be low and will be capped at 5 sites. These include sites that are currently considered “maybe” sites. All replacement sites will come in order on the master list and must meet suitability criteria.

The RSMP coordinator will be notified by the other RSMP contractors about sites suitability and disqualifications in other counties. The RSMP Coordinator will notify King County in writing to begin sampling the additional site(s). The timeline that replacement sites would begin monitoring is from January – July, otherwise a replacement site will not be sought after the summer watershed health monitoring.

### **Deliverables A3.1 Quarterly field measured data and copies of field data sheets.**

**Due Dates: March 31, 2015; June 30, 2015; September 30, 2015, and January, 29, 2016. Costs for quarterly data reporting are included in Task A2.**

King County will send field measured data in the EIM spreadsheet format to the RSMP Coordinator for sampling conducted at each RSMP monitoring site with each quarterly report. This will also include photocopies of field data sheets and notes taken in the field. This data package will be attached to an email to the RSMP Coordinator. The email will also provide a brief status update on the completeness of the grab samples for the laboratory parameters for each site. This deliverable will invoice the costs associated with monthly monitoring including labor, travel, equipment, and monitoring supplies.

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**Task A4: Conduct watershed health monitoring during July – September 2015**

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Total Cost = \$71,050 for up to 38 RSMP small stream sites in King and Snohomish County. (Costs include all labor, travel, training, equipment and supplies)

Watershed Health monitoring consists of benthic macroinvertebrate, periphyton, stream bed sediment and habitat monitoring, which are discussed in detail in the monitoring plan for this study entitled: *Quality Assurance Project Plan for Status and Trends Monitoring of Small Streams in the Puget Lowlands Ecoregion for Monitoring Conducted using Pooled RSMP Funds contributed by Municipal Stormwater Permittees*. King County will conduct Watershed health monitoring (WHM) at all retained WQ sites from Task A3 plus additional sites as listed below. Much of the data collected for habitat variables will be recorded in the field. King County will seek permit coverage from Washington Department of Fish and Wildlife for a scientific collection permit to collect macroinvertebrates at the sites monitored by King County staff. Benthic macroinvertebrates and periphyton samples will be stored by King County for delivery to the qualified laboratory. Sediment samples will be analyzed at the King County Environmental Laboratory (KCEL) or sent to Manchester Environmental Laboratory (MEL) as shown in the table below. Chlorophyll a from the periphyton sample and sediment samples for pesticides, and PCB congener analysis will be sent to MEL for analysis at a qualified contracted laboratory. King County will follow notification guidelines and chain-of-custody procedures discussed in their own lab manual and for correspondence with MEL the MEL Manual <http://aww.ecology/programs/eap/forms/labmanual.pdf>. Samples will be shipped via Fed Ex to MEL.

MEL = Manchester Environmental Laboratory  
WA State Department of Ecology  
Attn: Sample Receiving  
7411 Beach Dr E  
Port Orchard, WA 98366-8204  
Phone: 360-871-8800  
Fax: 360-871-8850.

Ten WHM sites will be sampled in duplicate for an inter-laboratory comparison study. One duplicate set will be sent to Manchester Environmental Laboratory (MEL) and the other set analyzed by King County Environmental Laboratory (KCEL), discussed more in Appendix B.

**Sub-task A4.1: Watershed Health Monitoring**

Total Cost \$ = 71,050 to monitor 38 RSMP small stream sites in King and Snohomish County following WHM protocols.

Once during the index period (July 1 – October 15th, 2015) King County will conduct watershed health monitoring at the following RSMP sites in King and Snohomish County.

#### 25 RSMP stream sites in King County

Outside UGA Site Order #: (8, 24, 38, 45, 47, 69, 72, 74, 86, 94, and 98)

Within UGA Site Order #: (1, 2, 34, 36, 40, 42, 55, 61, 67, 70, 74, 80, 82, and 84)

#### 13 RSMP sites in Snohomish County

Outside UGA Site Order #: (11, 39, and 79)

Within UGA Site Order #: (3, 9, 18, 48, 50, 65, 68, 77, 79, and 85)

If site(s) identified in Task A4 fail suitability criteria for watershed health monitoring, King County will notify the RSMP coordinator immediately. A re-sample will be attempted and if the site still fails suitability, then that site will not be further sampled. King County will notify the RSMP coordinator, who will notify the RSMP Pooled Resources Oversight Committee that the site is disqualified for sampling.

#### **Optional Sub-task A4.2: Addition or Deletion of Watershed Health Sites**

\$1,756 per site (King or Snohomish County) as needed from January to August 2015.

Site suitability conditions may change at any point in the sampling program across all of the RSMP sites. These changes may be accommodated by this agreement by increasing or decreasing the number of sites monitored by King County staff. The anticipated change in the final number of sites is expected to be low and is capped to 5 sites. All replacement sites will come in order on the master list and must meet suitability criteria.

The RSMP coordinator will be notified by the other RSMP contractors about sites suitability and disqualifications in other counties. The RSMP Coordinator will notify King County in writing to begin sampling the additional site(s). The timeline that replacement sites would begin monitoring is from January – August, otherwise a replacement site will not be sought after the summer watershed health monitoring.

#### **Deliverables A4.1 Quarterly field measured data and copies of field data sheets.**

**Due Dates: September 30, 2015 and December 30, 2015. (Quarterly report costs are included in task A2).**

King County will send field measured data in the provided electronic field forms and spreadsheets to the RSMP Coordinator for sampling conducted at each RSMP monitoring site. This will include sending photocopies of field data sheets and notes taken in the field. This data package will be attached to an email to the RSMP Coordinator. The email will also provide a brief status update on the completeness of the grab samples for the laboratory parameters for each site. This deliverable will invoice the costs associated with the summer monitoring including labor, travel, training, equipment, and monitoring supplies.

For habitat variables collected under WHM, the RSMP Coordinator will supply Ecology's watershed health electronic software and specialized field data spreadsheets for use by King County. This software will be used to populate habitat data into a format suitable for EIM, and those forms sent to the RSMP Coordinator along with copies of any other field notes. Ecology will review and upload the habitat data into EIM.

**King County - Budget Detail by Task**

	Task 1. Planning	Task 2. Project Management	Task 3. WQ Monthly for 19 routine site visits	Task 4. WHM for 38 sites	Total by Object
King County Salaries and Benefits	\$4,095	\$2,210	\$41,730	\$45,630	\$93,665
Supplies	0	0		\$850	\$850
Equipment	0	0	\$1,800		\$1800
Overhead for Project (Estimated at 35%)	\$2,205	\$1,190	\$22,470	\$24,570	\$50,435
King County Lab Analyses	0	0	\$196,150 (23 samples/mo)	\$31,800	\$227,950
<b>Total Task</b>	<b>\$6,300</b>	<b>\$3,400</b>	<b>\$262,150</b>	<b>\$102,850</b>	<b>\$374,700</b>

## Attachment B

### King County Environmental Laboratory Analysis of RSMP Samples

#### Detailed Scope of Work

##### **Project Summary: King County Environmental Laboratory analysis of samples collected for RSMP Lowland Small Streams**

The Regional Stormwater Monitoring Program (RSMP) small streams component will use multiple laboratories to accomplish sample analysis throughout the Puget Sound ecoregion. The small streams focus for monitoring is water quality and "watershed health" (physical habitat, sediment chemistry, and biological communities) of wadeable streams. King County is one of these entities (referred to as RSMP Contractors) who will conduct monitoring at RSMP small streams sites from January to December of 2015 in King County and Snohomish County. King County Environmental Laboratory (KCEL) will analyze water quality and sediment quality samples collected in King and Snohomish County, primarily by King County staff. Samples collected by the United States Geological Survey (USGS) staff will also be analyzed by KCEL when sampling prearranged by USGS.

##### **Project Activities, Tasks, and Deliverables**

Task B1: King County Environmental Laboratory will analyze water quality samples and sediment quality samples collected in King and Snohomish County.

Deliverable B.1: A summary of water and sediment samples analyzed, laboratory data, quality assurance results and finalized data sent to the RSMP Coordinator quarterly. (Target 2015 Dates: March 31, June 30, September 30, January 29, 2016).

Deliverable B.2: A final populated EIM spreadsheet of data results from the water and sediment samples analyzed at KCEL. (Target Date: February 28, 2016).

##### **Project Schedule**

Calendar Year	2015				2016
	1	2	3	4	1
Task					
B1. Water Quality					
B2. Sediment Quality					Optional extension
B3. EIM submittal					

## Detailed Descriptions of Tasks and Deliverables

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### **Task B1: Laboratory analysis of monthly water quality samples and annual sediment samples**

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(Total Cost \$ = 227,950)

King County's Environmental Laboratory (KCEL) will analyze water and sediment samples for RSMP samples collected by within King and Snohomish County. KCEL will maintain its accreditation with Ecology, follow standard laboratory quality control practices, and meet the measurement quality objectives stated in the study plan: *Quality Assurance Project Plan for Status and Trends Monitoring of Small Streams in the Puget Lowlands Ecoregion for Monitoring Conducted using Pooled RSMP Funds contributed by Municipal Stormwater Permittees*.

**Deliverable B.1: Quarterly laboratory analysis status and data results package.**

**Due Dates: March 31, 2015; June 30, 2015; September 30, 2015, and January 29, 2016. (Quarterly reporting costs are included in Task A2).**

King County will send final data analytical results and laboratory QC results to the RSMP Coordinator. These result narratives are in addition to the quarterly report deliverables. Laboratory results will also be entered into the EIM data spreadsheet template by King County. This EIM spreadsheet and copies of the field data sheets will be sent to the RSMP Coordinator, who will provide a quality review and enter the data into EIM.

**Deliverable B.2: Final laboratory data results formatted for EIM.**

**Due Dates: March 31, 2016 (Report costs are included in Task A2).**

Table B1 list the parameters to be analyzed from the monthly water quality samples. KCEL is anticipated to receive **19** routine water quality samples monthly from King County monitoring staff. On occasion, additional samples will be analyzed by KCEL. These will include samples for field replicates (~24 samples per year), field filtration blanks (2 per year for Orthophosphate, dissolved organic carbon and dissolved metals) and inter-laboratory comparison samples (~ 6 samples for 2 events per year). Depending upon future coordination with USGS field crews a maximum of 60 water quality samples per year (4 per month) may also be analyzed by KCEL monthly. In total the number of samples analyzed by KCEL will range from 23 most months up to a possible 35 samples on a given month. KCEL will be given ample notice by the RSMP coordinator, USGS or King County staff on the number of samples each month.

Table B2 lists the parameters to be analyzed for in the sediment samples collected in the summer of 2015. King County staff will coordinate with KCEL for sample deliver for the 38 + QC samples over the 3 month summer index period. KCEL will send jars of remaining sediment sample to MEL in appropriate jars following QC protocols established in the QAPP for this study.

# King County Environmental Laboratory - Budget Detail per Unit

Table B1

RSMP Small Streams water quality samples			KCEL Analytical Costs for samples from Pooled RMSP sites				
Cost by Analytical Method			23			Inter-lab comparison (6 samples each lab)	
Parameter	Method	Cost for KC Analysis	# Samples (monthly)	# QC Samples (10% of total)	KCEL Costs		
Chloride	EPA 300.0 or SM4110B	15	276	28	\$ 4,560		
Hardness	SM 2430B or EPA 200.8	-	276	28	\$ -		
Fecal coliform	SM 9222D	50	276	28	\$ 15,200		
Dissolved Organic Carbon	SM 5310	40	276	30	\$ 12,240		
Total suspended solids	SM 2540D	15	276	28	\$ 4,560		
Turbidity	SM 2130 or EPA 180.1	15	276	28	\$ 4,560	\$ 180	six sites * 2 months
Ammonia	SM 4500-NH3H or G	20	276	28	\$ 6,080	\$ 240	six sites * 2 months
Nitrate-Nitrite-N	SM 4500-NO3-I or F	20	276	28	\$ 6,080	\$ 240	six sites * 2 months
Orthophosphate	SM 4500 PG or PF	20	276	30	\$ 6,120		
Total nitrogen	SM 4500-N-B or N-C	35	276	28	\$ 10,640		
Total phosphorus	SM 4500-P H or PF	25	276	28	\$ 7,600		
Total Metals (Ag, As, Cu, Cd, Cr, Pb, Zn)	EPA 200.8	75	276	28	\$ 22,800		
Dissolved Metals (Ag, As, Cu, Cd, Cr, Pb, Zn)	EPA 200.8	125	276	30	\$ 38,250	\$ 1,500	six sites * 2 months
PAHs	8270D SIM std list	175	276	28	\$ 53,200	\$ 2,100	4 sites * 2 months
		subtotal		304	\$ 191,890	\$ 4,260	

**Table B2**

<b>RSMP Small Streams Sediment quality samples</b>			KCEL Analytical Costs for samples from Pooled RMSP sites				
	Cost by Analytical Method		<b>38</b>			Inter-lab comparison (10 samples each lab)	
Parameter	Method	Cost for KC Analysis	# samples summer 2015	# QC Samples (10% of total)	Cost		
Grain size**	PSEP 1986, seive and pipette	\$ 100	38	4	\$ 4,200		
Total organic carbon (TOC)	PSEP (1986, with 1997a,b updates), combustion/CO2	\$ 100	38	4	\$ 4,200		
Percent Solids x2	SM 2540 G	\$ 15	76	8	\$ 1,260	\$ 150	ten sites * once
Metals (arsenic, cadmium, chromium, copper, lead, silver, and zinc)	EPA 200.8 (ICP/MS)	\$ 120	38	4	\$ 5,040	\$ 1,200	ten sites * once
PAHs - standard list	8270D (GCMS)	\$ 175	38	4	\$ 7,350	\$ 1,050	six sites * once
Phthalates	8270D (GCMS)	\$ 175	38	4	\$ 7,350		
				<b>42</b>	<b>\$ 29,400</b>	<b>\$ 2,400</b>	