

Semi-Annual Progress Report

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**General Information**

*Contract / Grant Agreement Number:* IAA No. C1900143  
*Project Title:* **The effects of mulch on stormwater treatment and maintenance effort in bioretention systems**  
*Organization:* Washington State University  
*Project Manager:* Anand Jayakaran  
*Reporting Period:* July 1, 2020 to December 31, 2020  
*Date this Form was Completed* February 3, 2021

**Brief description of Tasks and Deliverable Achievements for current report period.**

**Task 1: Project Management**

Percent of Task Completed:	70%			
All deliverables to be completed:	Deliverables 1.1 to 1.4: Semi Annual reports #s 1 to 4			
Deliverables completed in <b>previous</b> reporting periods:	Deliverable 1.1, and 1.2			
Deliverables completed in <b>this</b> reporting period:	Deliverable 1.3 (this report)			
Description of Achievements:	1. A technical advisory committee (TAC) of 6 members was formed in September 2019. 2. The TAC received a draft version of the Quality Assurance Project Plan.			
Challenges faced:	none to report			

<b>Task 2: Quality Assurance and Project Protocol (QAPP) development</b>				
Percent of Task Completed:	100%			
All deliverables to be completed:	Deliverable 2.1 & 2.2: Draft and final QAPP			
Deliverables completed in <b>previous</b> reporting periods:	none			
Deliverables completed in <b>this</b> reporting period:	Deliverable 2.1: Draft QAPP			
Description of Achievements:	Project QAPP was completed, sent to the TAC for their approval, revised, and approved by SAM Coordinator			
Challenges faced:	none to report			

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<b>Task 3: Bioretention system preparation and instrumentation</b>					
Percent of Task Completed:	100%				
All deliverables to be completed:	Deliverable 3.1: Memo of completed instrumentation				
Deliverables completed in <b>previous</b> reporting periods:	none				
Deliverables completed in <b>this</b> reporting period:	Deliverable 3.1: Memo of completed instrumentation				
Description of Achievements:	<p>1. Flowmeters were installed to measure bioretention cell outflows were calibrated.</p> <p>2. Flowmeters were connected to dataloggers, and the wired into the lexisting data collection network at the LID facilities at WSU Puyallup.</p> <p>3. Soil moisture sensors were purchased.</p> <p>4. The three different types of mulch were purchased and installed in 12 bioretention cells. Previously installed mulch was first removed. Four cells were left unmulched as control.</p>				
Challenges faced:	Three of the 16 bioretention cells appeared to develop leaks. Those three cells were re-excavated and leaks in the underlying pond liner patched.				

<b>Task 4: Quantifying maintenance effort and plant survival</b>					
Percent of Task Completed:	70%				
All deliverables to be completed:	Deliverable 4.1: A memo that describes and compares the total effort associated with monitoring of maintenance at 16 bioretention cells at the study site				
Deliverables completed in <b>previous</b> reporting periods:	none				
Deliverables completed in <b>this</b> reporting period:	none to report				
Description of Achievements:	Measurements of maintenance and survival is ongoing				
Challenges faced:	Staff availability late last year impacted the rate of digitization of measured plant and weed survival field data, but steps to remedy are already taken. Raw data were collected, however, the final versions of monthly data in digital formats were delayed. Additionally, data collection only began in Q1 of 2020 once the plants were installed and the QAPP approved in mid December 2019. We therefore anticipate completion of the plant study in Q4 of 2021, and not Q2 of 2021 as stated in the QAPP.				

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<b>Task 5: Quantifying mulch effects on water quality and water quantity</b>					
Percent of Task Completed:	44%				
All deliverables to be completed:	<b>Deliverable 5.1:</b> Draft analysis and presentation shared with TAC meeting # 2 of all effort <b>Deliverable 5.2:</b> Revised analysis and revised report shared with TAC meeting # 3				
Deliverables completed in <b>previous</b> reporting periods:	none				
Deliverables completed in <b>this</b> reporting period:	none to report				
Description of Achievements:	Three storm events have been completed, analyses of data (hydrologic and water quality) is ongoing				
Challenges faced:	none to report				

<b>Task 6: Communication</b>					
Percent of Task Completed:	20%				
All deliverables to be completed:	<b>Deliverable 6.1:</b> Draft report of the whole study <b>Deliverable 6.2:</b> Final Report with complete appendices <b>Deliverable 6.3:</b> Two presentations – one for the Stormwater Work Group, and another for regional stormwater related conference <b>Deliverable 6.4:</b> Draft fact sheet per SAM format				
Deliverables completed in <b>previous</b> reporting periods:	none				
Deliverables completed in <b>this</b> reporting period:	none to report				
Description of Achievements:	none to report				
Challenges faced:	none to report				