January 20, 2017

Ref: 57346.11

Mr. Thomas Benoit
Vermont Department of Environmental Conservation
Watershed Management Division, Stormwater Program
One National Life Drive
Montpelier, VT 05620-3522

Via Electronic Mail Only

and

Mr. Kevin Burke
Vermont Department of Environmental Conservation
Watershed Management Division, Stormwater Program
One National Life Drive
Montpelier, VT 05620-3522

Re: Green Mountain Power Corporation
Kingdom Community Wind
Lowell, Vermont
Stormwater Discharge Permit No. 6216-INDS
Level Spreader Monitoring Study - 2016 Monitoring Report

Dear Tom and Kevin:

As required by the approved monitoring plan, we have prepared the attached 2016 Monitoring Report for the Kingdom Community Wind Level Spreader Monitoring Study. The reported results represent the findings from Year 1 of the required three-year study. We appreciate the effort that the Department has made over the past year to review and comment on the study plan and to inspect the installation of monitoring equipment at the site. We look forward to installing the equipment this spring at the next level spreader to be instrumented per the study plan for Year 2 of the study and will plan to again review this installation in the field with you once it is complete.

Please review these results at your convenience and let us know if you have any questions or comments.

Sincerely,

Robert Wildey, CPESC
Project Manager

RAW/jkw
Enclosure

cc: Jason Lisai, Green Mountain Power Corporation
Preston Gregory, Green Mountain Power Corporation

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Level Spreader Monitoring Study

Kingdom Community Wind
Lowell, Vermont

PREPARED FOR

GREEN MOUNTAIN POWER

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January 20, 2017

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Executive Summary

As required by the Vermont Department of Environmental Conservation ("DEC") Individual Stormwater Permit 6216-INDS, a monitoring study of the Alternative Stormwater Treatment Practices ("Alternative STP") is underway at Kingdom Community Wind ("KCW"). This report presents the results obtained during the first year of the required three-year study. The sampling and analysis described in this report was conducted between May and December 2016 in accordance with the Revised Monitoring Plan that was approved by DEC on March 17, 2016.

During the 2016 field season, collected runoff samples met quality assurance/quality control criteria for four storm events. These samples will be used, in part, to fulfill Condition 14 of 6216-INDS which requires samples from a minimum of five events to be collected over the course of three years.

Flow-weighted composite samples were collected at four locations:

- At the inlet to the level spreader. This sample was used to evaluate pollutant concentrations in untreated flows entering the stormwater system.
- At a topographic low-point downgradient from the vegetated buffer. This location was used to evaluate pollutant concentrations following treatment by the vegetated buffer area.

- At an in-stream location upstream from the level spreader. This sample was used to represent pollutant concentrations in a nearby area unaffected by flows entering the stormwater system.
- At an in-stream location downstream from the level spreader. This sample was used to represent pollutant concentrations in an area that potentially received treated flows from the stormwater system.

Samples were analyzed for concentrations of total suspended solids ("TSS") and total phosphorous ("TP"). The removal efficiency of the level spreader for the pollutants of concern were measured by comparing the flow-weighted concentration of the pollutant at the inlet and the flow-weighted concentration of the pollutant at the downgradient location. For Total Suspended Solids the median effective removal efficiency was 99.8 percent. For Total Phosphorous, the median effective removal efficiency was 96.3 percent, but exhibited considerable variability, likely as a function of the sampling equipment design. The TSS and TP results at the upstream and downstream locations were also compared. Although the results were variable, the differences between in-stream samples collected at the upstream and downstream reaches do not show any significant changes in water quality.

Detailed photographic and video documentation was completed for the level spreader that was instrumented for sample collection during 2016 and additional photographic documentation was completed for the other two level spreaders that are included in the study.

The results from Year 1 indicate that the level spreaders are functioning as intended.

1

Introduction

As a requirement of the Operational Phase Individual Stormwater Permit issued by the Vermont Department of Environmental Conservation ("DEC") to Green Mountain Power Corporation ("GMP") for the Kingdom Community Wind Farm (the "Project" or "KCW"), a three-year study has been undertaken to evaluate the performance of alternative stormwater treatment practices ("Alternative STP") that are deployed at the Project site. VHB has prepared this report on behalf of GMP in order to provide the results from the first year of that study.

This study results presented herein follow the Revised Monitoring Plan dated March 2, 2016 that was approved by DEC on March 17, 2016. Section 2.5.2 for "New-Design Alternative Systems" of the Vermont Stormwater Management Manual ("VSMM") requires that a "plan of study" (or "monitoring plan") that addresses monitoring of the Alternative STP design be provided to DEC. The original monitoring plan dated December 9, 2010 was prepared and submitted as a component of the permit application materials for the Project, and initially approved through the issuance of Permit No. 6216-INDS (the "Permit"), by DEC on August 19, 2011. [1]

1. For more information on the permitted design, see "Final As-Builts" Sheets C-101 through C-135 prepared by Krebs and Lansing Consulting Engineers, Inc., dated September 6, 2013, which were most recently provided to DEC as an enclosure to the "Kingdom Community Wind Farm / 2015 Inspection, Reporting, and Maintenance Schedule" Memorandum, prepared by VHB and dated February 5, 2015.

In late 2014, DEC requested that the monitoring plan be revised to include a provision for sampling concentrated flows, if present, in the area downgradient from the vegetated buffer (or "disconnect area"). Because the level spreader treatment system is designed to convert concentrated stormwater flow into sheet flow that can be infiltrated, absorbed, or evaporated, concentrated flows that could be used to characterize the outflow from the system downgradient from the vegetated buffer are generally unavailable for sampling. Modifications to the proposed sampling system were incorporated into the revised monitoring plan in order to address DEC's request to attempt characterization of these flows.

1.1 Project Overview

Under existing and permitted conditions, the Alternative STP design that is currently in operation at KCW includes 31 level spreaders and associated vegetated/forested buffers, with 22 located along the access road (LS-A3, LS-A4, LS-A6 through LS-A25, and LS-AE) and nine located along the crane path (LS-C1, LS-C3 through LS-C5, LS-C7, LS-C16, LS-C19 through LS-C21). In addition to these level spreaders, accepted STPs pursuant to VSMM, including grass channels, stone-lined swales, dry ponds, wet ponds, and an infiltration basin, are in operation to meet the applicable criteria of VSMM.[2] An overall site location map is included on page 1 of Appendix 1.

The Project completed final earthwork stabilization and submitted the Initial Designer's Statement of Compliance on September 30, 2013. As required by the Permit, the stormwater management measures have been inspected at least annually and maintained as necessary since that time period. Required annual spring inspection reports and supplemental fall inspection reports have been submitted to DEC each year since that date. An application for renewal of 6216-INDS was submitted to DEC on May 19, 2016.

1.2 Permit Requirements

The approved monitoring plan for the level spreaders and vegetated buffers at KCW was prepared in compliance with Section 2.5.2 of the VSMM for New-Design Alternative Systems and pursuant to Condition 14 of the Permit. These monitoring activities are being conducted in addition to annual inspections and reporting that are required pursuant to Condition 12 of the Permit. Specific VSMM-required components of the monitoring plan involve the following:

1. Sampling is not to commence until the Alternative STP system has been in place for one full year from the date of construction completion.

2. For more information on the basis of design for the Alternative STP design, see the original permitted monitoring plan prepared by VHB, dated December 9, 2010

2. Sampling of at least five storm events over the course of three years from the time of construction completion.
3. Sampling of storm events under a varying and representative range of precipitation intensities and antecedent conditions.
4. Reporting of concentrations as flow-weighted.
5. Implementation of the monitoring plan in the field, as opposed to laboratory testing.
6. Independent verification of the monitoring plan by DEC.

1.3 Study Purpose

The purpose of the Level Spreader Monitoring Study is to demonstrate that the treatment practices are functioning in compliance with the performance requirements of the VSMM. The specific water quality criteria of the VSMM is designed to evaluate the capture and treatment of total suspended solids ("TSS") and total phosphorous ("TP"). Qualitative criteria include the non-erosive discharge of stormwater flows.

In accordance with the VSMM, the STP must be demonstrated to provide an 80 percent reduction in the quantity of TSS from the incoming load, a 40 percent reduction in the quantity of TP from the incoming load, and flows must be discharged from the STP in a non-erosive manner in order to protect downgradient areas and receiving waters.

1.4 Implementation

The Alternative STP study is required to provide analysis of a minimum of five events over the course of three years. The data presented in this report represents the results from Year 1 of the three-year study. As described in the monitoring plan, a single level spreader is to be instrumented for detailed analysis in each of the three years of the study. Level Spreader A9 ("LS-A9") was instrumented in May of 2016 for Year 1 of the study. Level Spreader A18 ("LS-A18") will be instrumented in the spring of 2017 for Year 2 of the study, and Level Spreader C7 ("LS-C7") will be instrumented in the spring of 2018 for Year 3 of the study. During years that each of these three level spreaders is not instrumented, photographic documentation and qualitative observations will be recorded to identify potential issues that may be occurring with the treatment practices.

2

Methodology

The Level Spreader Monitoring Study follows the monitoring plan dated March 2, 2016 that was approved by DEC on March 17, 2016. Key elements of the monitoring plan methodology are described below include the installation of a weather station, automated samplers at key locations with surface flow, a run-off sampling system ("ROSS") to capture overland flow, and the collection of photographs and video of the level spreaders during storm events.

2.1 Weather Station

An automated weather station was installed in an open area near the Operations and Maintenance Building at the site on April 26, 2016 and was maintained through the duration of the 2016 study period. The weather station featured a tipping bucket rain gage (Onset Model S-RGx-M002) connected to a remote monitoring data recorder (Onset RX3003 3G), a temperature/relative humidity sensor (Onset S-THB-M002), all of which was attached to a ground-mounted 2-meter tripod. The RX3003 unit is a battery-powered that was recharged by a 6W solar panel attached to the tripod. Data from each sensor was recorded at 5-minute intervals. The data recorded by the weather station is presented in Appendix 2.

2.2 Automated Samplers

Three automated samplers (Isco Model 6712 Portable Sampler) were installed at the site in the vicinity of LS-A9. The 6712 samplers were each powered with a 12-volt

deep cycle marine battery connected to a solar panel and inverter that maintained the batteries' charge. This configuration allowed the devices to be left turned on and to continually monitor stormwater or stream flows, whether or not a storm event was anticipated.

Each sampler was equipped with an area-velocity flow meter (Isco Model 750 Area Velocity Module) that was installed on the bottom of each channel. In the Inlet and Downstream open channel sections, the Area-Velocity meter was mounted to a board that was installed flush with the bottom of the channel. In the Upstream culverted section, the Area-Velocity meter was mounted directly to the floor of the corrugated metal pipe culvert. The intake hose for each Isco terminates with a stainless steel strainer that was also secured to the floor of the channel and positioned in small depressions of the channel in order to capture shallow flows.

The automated sampler incorporates a programmable computer that converts depth and velocity measurements recorded by the Area Velocity Module into a flow rate. The computer is programmed with estimates of the duration and volume of the storm event flows anticipated at each sampler. The automated sampler initiates sample collection when the flow in the channel exceeds a pre-set depth and collects aliquots based on the volume of flow that passes the Area Velocity Module. These aliquots are composited, resulting in a flow-weighted composite sample that can be delivered to the laboratory for analysis.

The "Inlet" sampler was positioned to measure and collect samples from the stone-lined swale that conveys stormwater runoff to LS-A9. See Photograph 1.

Photograph 1. Automated sampler at LS-A9 inlet. Flow enters LS-A9 in the stone-lined swale in the foreground of the photograph (VHB, 07/08/16).

The "Upstream" sampler was positioned to measure and collect samples from stream 2009-TB-C3 as it flows through the culvert beneath the Access Road north of LS-A9. See Photograph 2.

Photograph 2. Automated sampler at Access Road culvert inlet, upstream from LS-A9 vegetated buffer area (VHB, 07/08/16)

The "Downstream" sampler was positioned to measure and collect samples from a downstream reach of 2009-TB-C3 located west of LS-A9. See Photograph 3.

Photograph 3. Automated sampler adjacent to stream 2009-TB-C3, downstream from LS-A9 vegetated buffer area (VHB, 07/08/16)

2.3 ROSS Sampler

In an effort to capture representative samples of treated stormwater that overflows from the level spreader, a run-off sampling system ("ROSS") surface flow sampler was installed in the vegetated buffer west of LS-A9. This system follows the design presented in "Runoff Sampling System for Riparian Buffers" (Ngandu and Mankin, 2004)[3]. This system consists of two pieces of corrugated steel drip edge (each 6-inches wide by 5-feet long) that was partially driven into the ground and staked in place as "wing walls" to direct overland flow from the sampling area to a collection sump buried in the ground (a 5-gallon plastic bucket with a notch cut into the lip). A battery-powered sump pump with a float switch pumps collected water to a stainless-steel trough that is configured as a flow splitter. A fractional volume of the total flow is then collected in one or more 5-gallon sample collection jugs. Because the total volume of captured runoff is processed by the ROSS, the collected samples represent flow-weighted composites of the entire event. Flagging was installed in the sample collection area upgradient from the wing walls and sump in order to prevent ground disturbance by field technicians during sample collection and equipment maintenance. See Photograph 4.

3. Ngandu, D.M. and Mankin, K.R., 2004. Runoff Sampling System for Riparian Buffers, Applied Engineering in Agriculture, Vol. 20(5): 593-598, 2004.

Photograph 4. Overview of ROSS sampling system, downgradient from LS-A9 vegetated buffer area (VHB, 06/05/16)

Because no concentrated flow paths were evident downgradient from the LS-A9 vegetated buffer area, the ROSS was installed in an apparent topographic low point. The metal wing walls potentially assisted with converting sheet flow to shallow concentrated flow and directing it to the sampling sump.

2.4 Photographic and Video Documentation

A digital camera installed in a weather-proof housing attached to a post near LS-A9 automatically recorded photographs on a 5-minute interval. See Photograph 5.

Photograph 5. Time-lapse camera mounted adjacent to LS-A9. Shed roof was added to prevent rainwater from obscuring lens during storm events (VHB, 06/05/2016)

The camera compiled these photographs into a time-lapse video. Still frames excerpted from these videos are included in Appendix 3. The level spreader can be clearly seen to fill during storm events and to overtop along the length of the level lip during larger events or when still full after a previous storm event.

When samples were being collected from the automated samplers following a qualifying rainfall event, level spreaders LS-A18 and LS-C7 were also inspected and photographs taken with a hand-held digital camera. These photographs are presented in Appendix 3.

2.5 Quality Assurance / Quality Control Procedures

Samples collected from the automated samplers and ROSS were evaluated both at the time of collection and once the laboratory results were reported. Additional QA/QC measures were followed by the laboratory when processing the samples. Chain of custody forms and laboratory results are presented in Appendix 5.

Isco sampler composite jugs were thoroughly rinsed with distilled water between sample collection events. In the Inlet sampler, disposable 1-liter bags in the 24 sample carousel were replaced after each event.

The sump of the ROSS sampler was rinsed with distilled water between sample events. Leaf litter and other organisms (salamander, spiders, other invertebrates) were removed from the sampling sump during pre-storm preparations and sample collection. Because the ROSS is a whole-volume sampler (i.e., it collects all runoff

that reaches it from all runoff events), the sump must be emptied prior to the start of the storm event and any flows or foreign materials that reach the sump are captured by the sampler. Although these non-stormwater materials may bias the samples collected at the ROSS, it is an inherent limitation of the sampler design.

3

Results

The data collected during 2016 satisfy the permit requirements for Year 1 of the level spreader monitoring study. Data collected at LS-A9 included site-specific rainfall data, the collection of samples from multiple storm events of differing sizes and durations, evaluation of the removal efficiency for total suspended sediment and total phosphorous, and photographic and video documentation.

3.1 Rainfall Record

Stormwater monitoring efforts are, by definition, dependent on the weather during the sampling period. As reported by NOAA, 2016 was generally drier and warmer than normal throughout the Northeast U.S. and the site experienced periods of moderate to severe drought during the study period.[4] Drought conditions limit the amount of runoff generated by any given storm event due to increases in the initial abstraction (infiltration and interception). The resulting reduction in runoff volume decreases the sampling success in vegetated, open channel stormwater systems such as those at the Project site. Based on the observed runoff patterns at LS-A9, a minimum rainfall depth of 0.5 inches in a 24-hour period is needed to generate sufficient runoff for sampling by the automated samplers. Between May 1 and December 4, 2016, a total of 16 storm events were recorded at the site with 24-hour rainfall totals greater than 0.5 inches. The rainfall and temperature data collected by the weather station is included in Appendix 2.

4. NOAA National Centers for Environmental Information. Accessed 12/23/16 at: https://www.ncdc.noaa.gov/sotc/drought/201611

3.2 Storm Events Evaluated

Between May and December 2016, a total of 9 storm events were sampled in all or in part. Storms that were sampled in part means that one or more of the automated samplers did not correctly trigger during the storm event. The events ranged in total rainfall depth from 0.65 to 3.39 inches and in duration from approximately 2 to 51 hours. Table 1 provides summary data for the events that were sampled.

Table 1. Summary of Storm Events Sampled

Sampling Event	Start of Rain Event	End of Rain Event	Duration of Rainfall (hrs:min)	Depth of Rainfall (in)	5-minute Peak Intensity (in/hr)	72-hr Antecedent Rainfall (in)	QA/QC Criteria Met * (Y/N)
1	06/05/2016 11:30	06/05/2016 21:00	9:30	1.55	0.60	0.00	N
2	06/28/2016 16:15	06/29/2016 15:45	23:30	3.39	4.68	0.03	N
3	07/22/2016 04:10	07/23/2016 23:25	43:15	1.62	1.80	0.00	N
4	08/12/2016 08:15	08/13/2016 19:40	35:25	0.65	0.36	0.00	N
5	08/16/2016 14:55	08/17/2016 06:20	15:25	0.92	0.84	0.19	N
6	08/21/2016 18:05	08/22/2016 01:35	7:30	0.77	0.48	0.00	Y
7	08/28/2016 17:20	08/28/2016 20:00	2:40	1.48	3.00	0.00	Y
8	10/20/2016 16:15	10/22/2016 20:05	51:50	1.48	0.60	0.05	Y
9	11/03/2016 08:35	11/04/2016 09:20	24:45	0.77	0.36	0	N

* Reasons that sampling events did not meet QA/QC criteria are described in Section 3.4.

3.3 Hydrographs

Hydrographs from each storm event are presented in Appendix 4. In addition to rainfall depth, flow depth, and flow velocity, these graphs also illustrate the beginning and end of the sample collection period. As described in the study plan, the data used to produce these graphs was collected at 5 minute intervals by the automated samplers and the on-site weather station. It is possible to observe the rainfall-runoff response for each storm event in these hydrographs.

As would be anticipated from roadway runoff to a stormwater drainage system, the LS-A9 inlet hydrograph is relatively flashy, with short rising and receding limbs. The hydrograph for the LS-A9 upstream site exhibits a relatively minor rainfall-runoff response, which made it difficult for the automated sampler to identify the start of runoff and begin sample collection. The hydrograph for the LS-A9 downstream site exhibits a more gradual rainfall-runoff response that reflects the larger watershed draining to this site. No hydrograph is available for the ROSS sampler because the sampling apparatus does not collect flow data. Based on the configuration of the flow-splitter and the 5-gallon containers that were used to collect samples at the ROSS, this site did not receive more than 10 gallons of the runoff during any given storm event (i.e., the 5-gallon container that was configured to receive half of the flow was never filled to overflowing).

3.4 QA/QC Evaluation

When the laboratory results from the initial storm events (June and July) were reviewed, in particular from the LS-A9 inlet, it was observed that TSS concentrations appeared substantially lower than would be anticipated for runoff from a gravel road (less than 100 mg/L, whereas a more typical range might be from 150 mg/L to greater than 3,000 mg/L.)[5] Upon review of field methods being used, it was found that it was necessary to agitate the samples prior to removing aliquots from the collection container for transfer to the laboratory bottle ware. Without this agitation, artificially low TSS concentrations were reported because settling would have occurred between the time that the flow-weighted composite samples were collected and the removal of the aliquot from the device for laboratory processing. This issue affected samples collected during the 6/5, 6/28, and 7/22 sampling events. An agitation step was incorporated into the field methodology in subsequent events.

Two other sampling events (8/12 and 11/3) were also discarded due to the Inlet automated sampler failing to initiate sample collection or collecting an inadequate volume for the laboratory analysis to be performed. After these five events were discarded, four qualifying sampling events remain for evaluation of system performance.

5. Brown, K.R. et al., 2014. "The effect of increasing gravel cover on forest roads for reduced sediment delivery to stream crossings," in Hydrological Process, April 2014. Accessed 1/6/2017 via https://www.srs.fs.usda.gov/pubs/ja/2014/ja_2014_brown_001.pdf

3.5 Total Suspended Solids

Based on sample results from the four storm events that met QA/QC criteria, total suspended solids ("TSS") within the composite inlet samples ranged from 69 to 2,430 mg/L, with a median concentration of 363 mg/L. Composite samples collected at the ROSS sampler ranged from 9 to 29 mg/L. Table 2 provides the results of TSS concentrations and calculated removal efficiencies for these storms. Complete laboratory results are presented in Appendix 5.

Table 2. Summary of TSS Removal Efficiency Results

Sampling Event	Sampling Event Date	Inlet TSS Conc. (mg/L)	Vegetated Buffer Area TSS Conc. (mg/L)	Apparent Removal Efficiency (%)	Overflow from LS-A9 (Y/N)	Effective Removal Efficiency * (%)
5	08/16/16	594	17	97.1%	No	100%
6	08/21/16	132	29	78.0%	No	100%
7	08/28/16	2,430	9	99.6%	Yes	99.6%
8	10/20/16	69	10	85.5%	Yes	85.5%

* Effective Removal Efficiency is 100 percent for storm events where overflows from LS-A9 was not observed because the sample collected at the ROSS represents runoff originating within the vegetated buffer area rather than overland flow from LS-A9.

As shown in Table 2, the highest TSS concentration for all events was observed at the inlet sample collected during the intense event of August 28, 2016. This event had a total rainfall depth of 1.48 inches over a period of 2 hours and 40 minutes. Larger quantities of sediment can be liberated during intense storms due to the higher energy and increased flow velocities.

Removal efficiency for LS-A9 was calculated by dividing the TSS concentration at the ROSS by the TSS concentration at the inlet. For the four storms that met QA/QC criteria, apparent removal efficiency ranged from 78.0 to 99.6 percent. In addition, the time-lapse results demonstrate that LS-A9 was not overtopped during the 8/16 and 8/21 events and did not discharge surface flows (see Appendix 3). The effective removal efficiency for these events is therefore 100 percent and the median effective TSS removal efficiency for the four qualifying events is 99.8 percent.

3.6 Total Phosphorous

Within samples from the four storm events that met QA/QC criteria, total phosphorous ("TP") within the composite inlet samples ranged from 0.010 to 1.3 mg/L, with a median concentration of 0.19 mg/L. Composite samples collected at the ROSS sampler ranged from 0.09 to 0.26 mg/L, with a median concentration of 0.17 mg/L. Table 3 provides the results of TP concentrations and calculated removal efficiencies for these storms. Complete laboratory results are presented in Appendix 5.

Table 3. Summary of TP Removal Efficiency Results

Sampling Event	Sampling Event Date	Inlet TP Conc. (mg/L)	Vegetated Buffer Area TP Conc. (mg/L)	Apparent Removal Efficiency (%)	Overflow from LS-A9 (Y/N)	Effective Removal Efficiency * (%)
5	08/16/16	0.25	0.091	63.6%	No	100%
6	08/21/16	0.13	0.26	-100.0%	No	100%
7	08/28/16	1.3	0.097	92.5%	Yes	92.5%
8	10/20/16	0.010	0.24	-2300%	Yes	-2,300%

* Effective Removal Efficiency is 100 percent for storm events where overflows from LS-A9 was not observed because the sample collected at the ROSS represents runoff originating within the vegetated buffer area rather than overland flow from LS-A9.

As was observed with the TSS results, the highest concentration of TP for all events was observed at the inlet sample collected during the intense event of August 28, 2016. Phosphorous is frequently bound to particulate matter and can be mobilized during intense rainfall/runoff events in conjunction with that sediment.

As with TSS, the TP removal efficiency for LS-A9 was calculated by dividing the TP concentration at the ROSS by the TP concentration at the inlet. For the four storms that met QA/QC criteria, apparent removal efficiency ranged from -2,300 to 92.5 percent. Two of the four sampling events resulted in positive removal efficiency (63.6 percent on 8/16 and 92.5 percent on 8/28), which the other two sampling events resulted in negative removal efficiency (-100 percent on 8/21 and -2,300 percent on 10/20). However, as described above for TSS, LS-A9 was not overtopped during the 8/16 and 8/21 events and thus did not discharge surface flows (see Appendix 3). The effective removal efficiency for these two events is

therefore 100 percent and the median effective TP removal efficiency for the four qualifying events is therefore 96.3 percent.

Events with negative removal efficiency are not necessarily indicative of flows from LS-A9 contributing additional phosphorous to the vegetated buffer area. For example, LS-A9 was found not to have overtopped during Event 6, meaning that the flows captured at the ROSS must have originated elsewhere in the watershed rather than from discharges by LS-A9. This finding introduces the possibility that additional sources of phosphorous in the watershed might be inadvertently captured by the ROSS.

3.7 Upstream / Downstream Analysis

In addition to the samples collected at the Inlet and Downgradient sampling locations, samples were also collected within Stream 2009-TB-C3 at two locations. The Upstream location samples were collected at the culvert that conveys the stream under the Access Road and the Downstream location samples were collected downgradient from the LS-A9 Downgradient sampling location.

The character of Stream 2009-TB-C3 is different at these two locations, and configuring the samplers to trigger correctly at the beginning of the storm event and to collect sufficient sample volumes proved challenging. The Upstream reach consisted of a steep cobble-boulder A- or B-type channel leading to a corrugated metal pipe culvert. Although flow in this channel is perennial, it was occasionally no more than a trickle during the 2016 sampling season. Furthermore, flows did not always increase appreciably in response to storm events due to the generally dry conditions during the season. In contrast, the downstream sampling location on Stream 2009-TB-C3 is within a sand and silt bottom, E-type channel with a wider valley bottom. This reach maintained a more consistent depth of flow that allowed the automated sampler to better identify the changes in flow that constituted a runoff event.

Manual grab samples were collected in the field when automated samplers were found to have not triggered correctly in order to help provide context for the measurements collected at other sites. However, an accurate comparison of upstream and downstream conditions is possible only when composite samples were collected in both locations. Table 4 provides the results of TSS concentrations for storm events where composite samples were successfully collected at both the Upstream and Downstream locations. Complete laboratory results are presented in Appendix 5.

Table 4. Summary of TSS Concentrations at Upstream and Downstream Locations

Sampling Event	Sampling Event Date	Sample Type	Upstream TSS Conc. (mg/L)	Sample Type	Downstream TSS Conc. (mg/L)
4	08/12/16	Composite	6	Composite	9
5	08/16/16	Composite	3	Composite	55
7	08/28/16	Composite	161	Composite	153

Table 5 provides the results of TP concentrations for storm events where composite samples were successfully collected at both the Upstream and Downstream locations. Complete laboratory results are presented in Appendix 5.

Table 5. Summary of TP Concentrations at Upstream and Downstream Locations

Sampling Event	Sampling Event Date	Sample Type	Upstream TP Conc. (mg/L)	Sample Type	Downstream TP Conc. (mg/L)
4	08/12/16	Composite	0.024	Composite	0.018
5	08/16/16	Composite	0.015	Composite	0.079
7	08/28/16	Composite	0.28	Composite	0.22

Although there is some variability in both the TSS and TP concentrations at the upstream and downstream locations, no clear trend is evident in the available data that would suggest that the receiving water is receiving excess sediment or phosphorous from the level spreader vegetated buffer.

3.8 Vegetated Buffer Areas

The vegetated buffer areas downgradient of each level spreader in the monitoring study were inspected and photographed throughout the course of the study period. As can be seen in the photographs included in Appendix 3, these have good growth of understory vegetation and there is no evidence of erosion or concentrated flow paths extending beyond the 150-foot limit of the vegetated buffer.

3.9 Lessons Learned

Over the course of the 2016 sampling season, observations, adjustments, and refinements were made to the sampling methodology by field personnel to improve the success of the monitoring program. The sections below describe modifications that will be made to the equipment installations and sampling methodologies in subsequent years of the study.

Composite sample agitation

As described in Section 3.4, it is necessary to ensure that samples collected from the automated samplers are adequately agitated in order to entrain sediment that may have settled during the course of the storm event.

Flow metering configuration

In order to obtain the best accuracy from the area-velocity meters, it was found that it is necessary to create small in-stream impoundments that results in flow depths of 1-inch or greater above the probe. At the same time, the strainer of the intake hose to the automated sampler must be maintained in an area of the stream that does not experience tailwater effects, in order to prevent biasing the TSS concentration through settling.

Photographic documentation

During the first months that the time-lapse camera was installed, several storm events were not well-documented when the images were blurred due to water on the lens. A canopy was mounted above the camera to keep this from occurring during future events.

Visual aid for level lip overtopping

The installation of a staff gauge within level spreader that is visible in the time-lapse camera would have aided in documenting whether or not the level lip was overtopped during each storm event. A staff gage will be installed as part of the detailed instrumentation during subsequent years of the study.

Level Lip Vegetation Management

Vegetation management is a key component of the operations and maintenance of the level spreaders. Although woody vegetation was adequately controlled, dense growth of herbaceous vegetation on the level lip made it periodically difficult to document evidence of overtopping. This vegetation will be more actively controlled during subsequent years of the study.

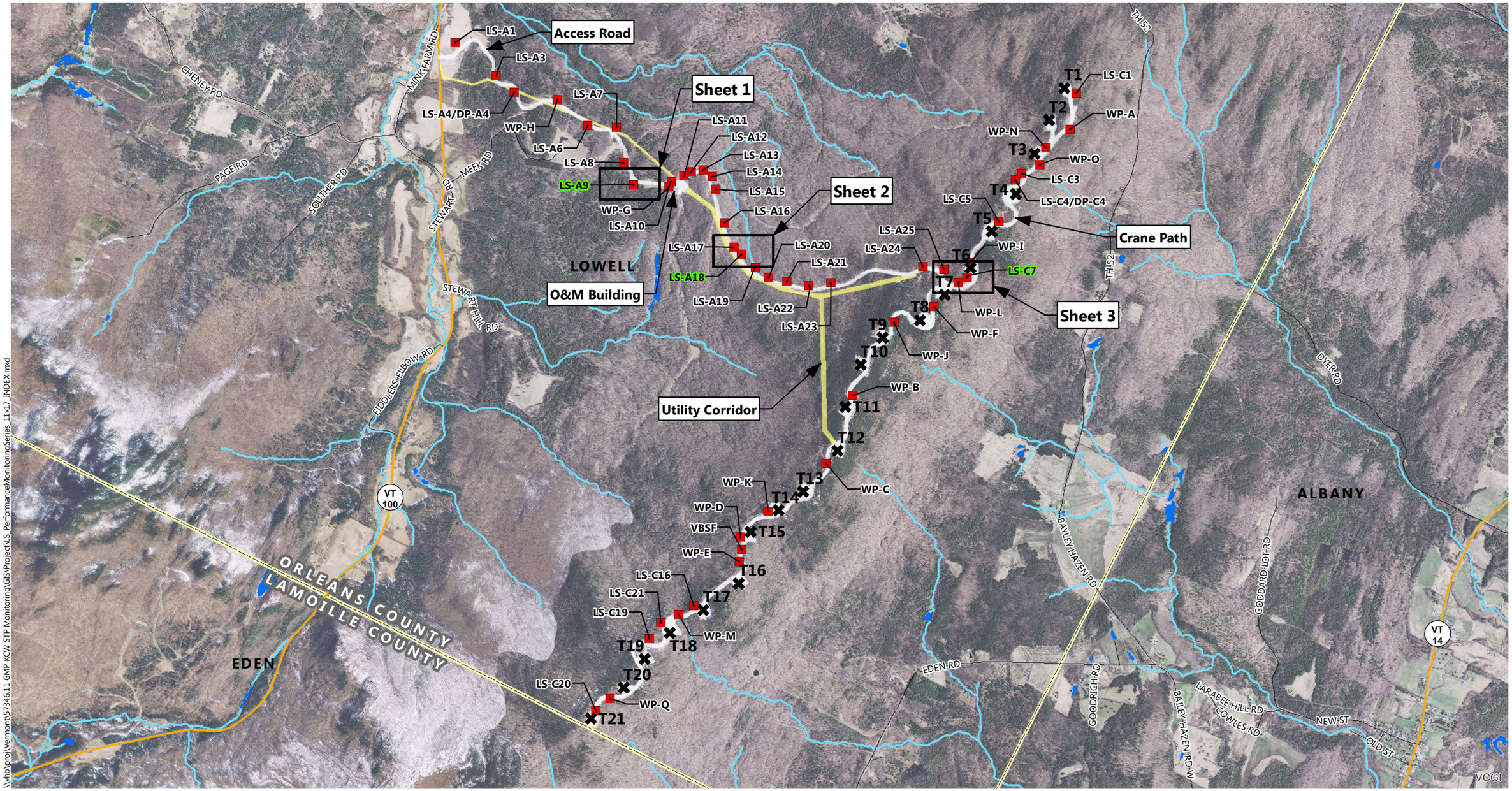
Appendix 1

- Level Spreader Monitoring Site Index Map
- Level Spreader Monitoring Site Maps

GREEN MOUNTAIN POWER

vhb

January 04, 2017



\\vhb\proj\Vermont\57346.11 GMP KCW STP Monitoring\GIS\Project\LS_PerformanceMonitoringSeries_11x17_INDEX.mxd

0 1000 2000 4000 Feet

- Turbine Location (K&L)
- STP Locations (VHB)
- VHD Stream (VCGI)
- VHD Waterbody (VCGI)
- Town Boundary (VCGI)

Road (VTrans)
- Interstate
- US Highway
- State Highway
- Town Road

Kingdom Community Wind Project | Lowell, Vermont

Sources:
Background Imagery from VCGI (2014)
VCGI (vermont Center for Geographic Information - 2010)
K&L (Krebs & Lansing - Design elements from 2010-2011)
VHB - 2009-2011

Alternative Design STP Performance Monitoring Study Level Spreader Monitoring Sites Index

GREEN MOUNTAIN POWER

vhb

January 04, 2017

LS-A9 Upstream

2009-TB-C3

LS-A9 Downgradient

LS-A9 Inflow

LS-A9

Access Road

LS-A9 Downstream

1430 1440 1450 1460 1470 1480 1490 1500 1510 1520 1530 1540 1550 1560 1570 1580 1590

NOTE: DETAILED INSTRUMENTATION/INVESTIGATION OF LS-A9 OCCURRED IN 2016

VCGI

\\vtnfdata\projects\57346.00\GIS\project\Site\Stormwater\Monitoring 57346.11\LS_PerformanceMonitoringSeries_11x17_update.mxd

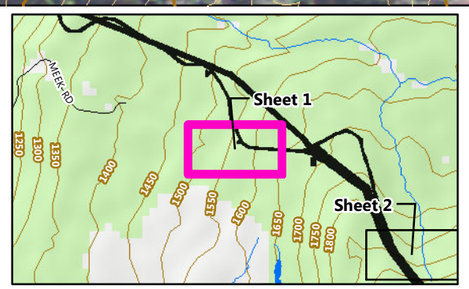
0 40 80 160 Feet

- Level Spreader Monitoring Sites (VHB)
- Turbine Location (K&L)
- STP Locations (VHB)
- Project/EPSC Clearing (K&L)
- Vegetated Buffer Area (VHB)
- Wetland (VHB)
- Recon Wetland (VHB)

Stream (VHB)

- Ephemeral
- Intermittent
- Perennial
- Recon Stream

- 10 ft Contour
- 2 ft Contour



Kingdom Community Wind Project | Lowell, Vermont

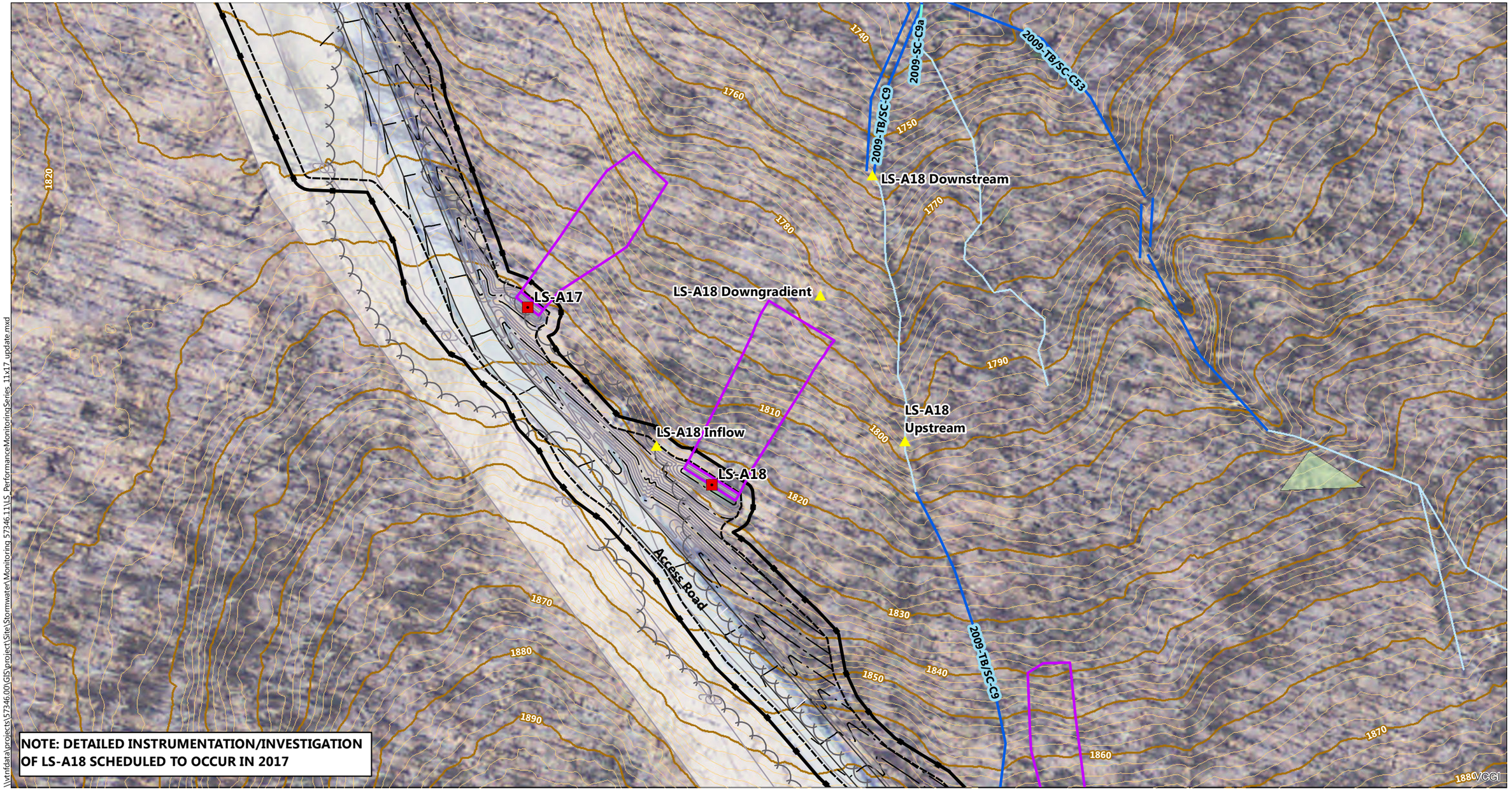
Sources:
Background Imagery from VCGI (2014)
K&L (Krebs & Lansing - Design elements from 2010-2011)
VHB - 2009-2011

Alternative Design STP
Performance Monitoring Study
Level Spreader Monitoring Sites
Sheet 1 of 3

GREEN MOUNTAIN POWER

vhb

January 04, 2017



\\vtnfdata\projects\57346.00\GIS\project\Site\Stormwater\Monitoring_57346.11\LS_PerformanceMonitoringSeries_11x17_update.mxd

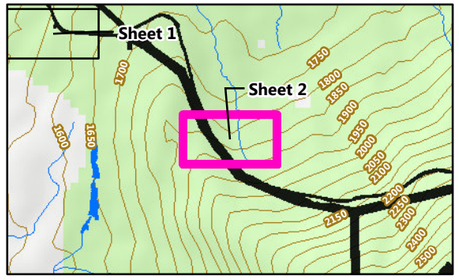
0 40 80 160 Feet

- Level Spreader Monitoring Sites (VHB)
- Turbine Location (K&L)
- STP Locations (VHB)
- Project/EPSC Clearing (K&L)
- Vegetated Buffer Area (VHB)
- Wetland (VHB)
- Recon Wetland (VHB)

Stream (VHB)

- Ephemeral
- Intermittent
- Perennial
- Recon Stream

- 10 ft Contour
- 2 ft Contour



Kingdom Community Wind Project | Lowell, Vermont

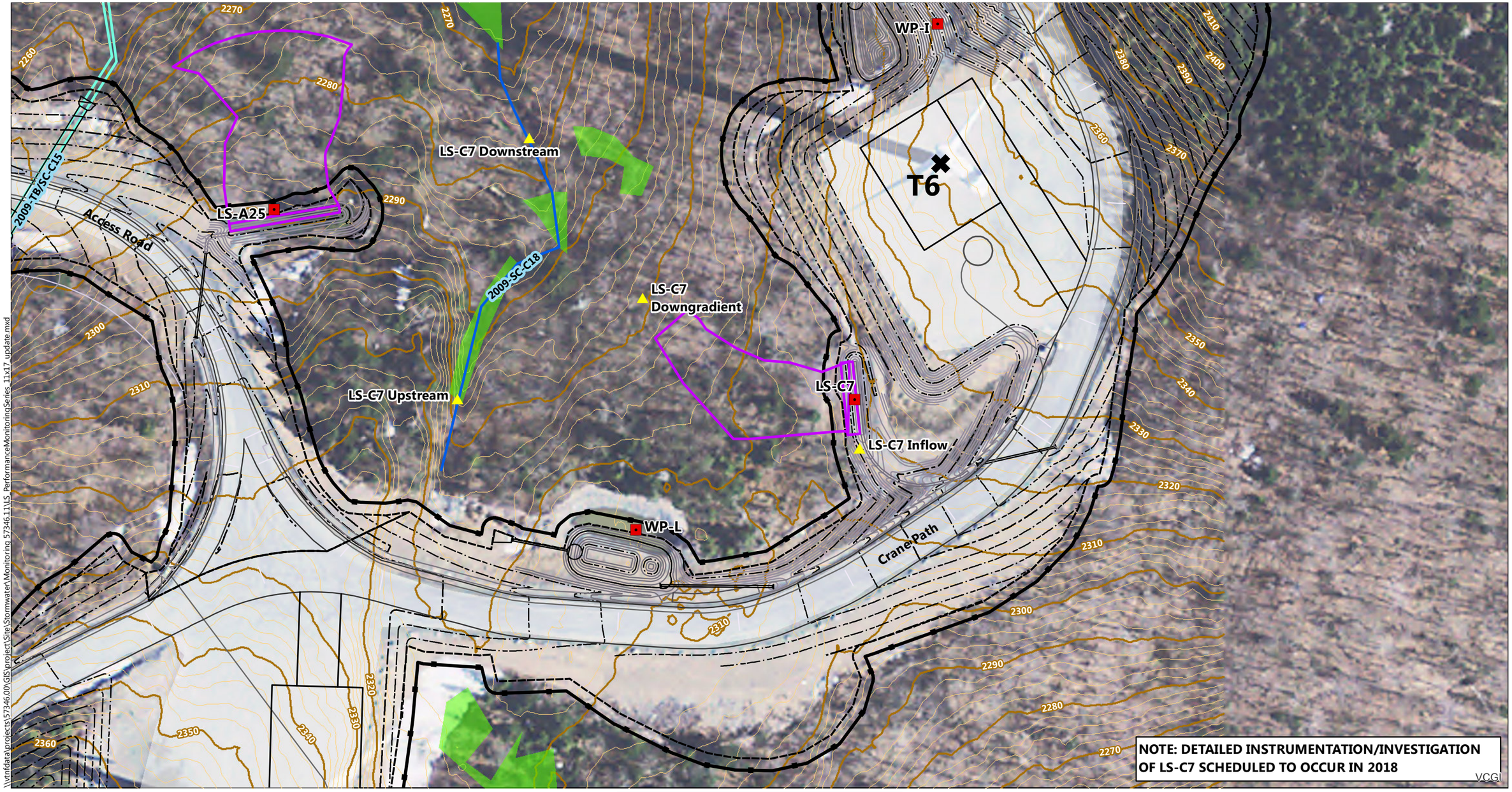
Sources:
Background Imagery from VCGI (2014)
K&L (Krebs & Lansing - Design elements from 2010-2011)
VHB - 2009-2011

Alternative Design STP Performance Monitoring Study
Level Spreader Monitoring Sites
Sheet 2 of 3

GREEN MOUNTAIN POWER

vhb

January 04, 2017



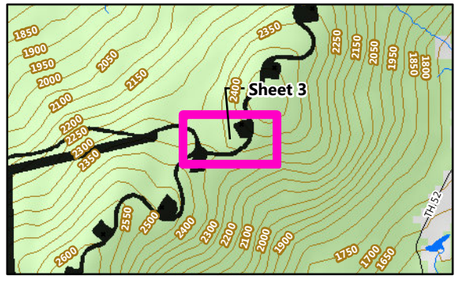
\\vtnfdata\projects\57346.00\GIS\project\Site\Stormwater Monitoring_57346.11\LS_PerformanceMonitoringSeries_11x17_update.mxd

0 40 80 160 Feet

- Level Spreader Monitoring Sites (VHB)
- Turbine Location (K&L)
- STP Locations (VHB)
- Project/EPSC Clearing (K&L)
- Vegetated Buffer Area (VHB)
- Wetland (VHB)
- Recon Wetland (VHB)
- 10 ft Contour
- 2 ft Contour

Stream (VHB)

- Ephemeral
- Intermittent
- Perennial
- Recon Stream



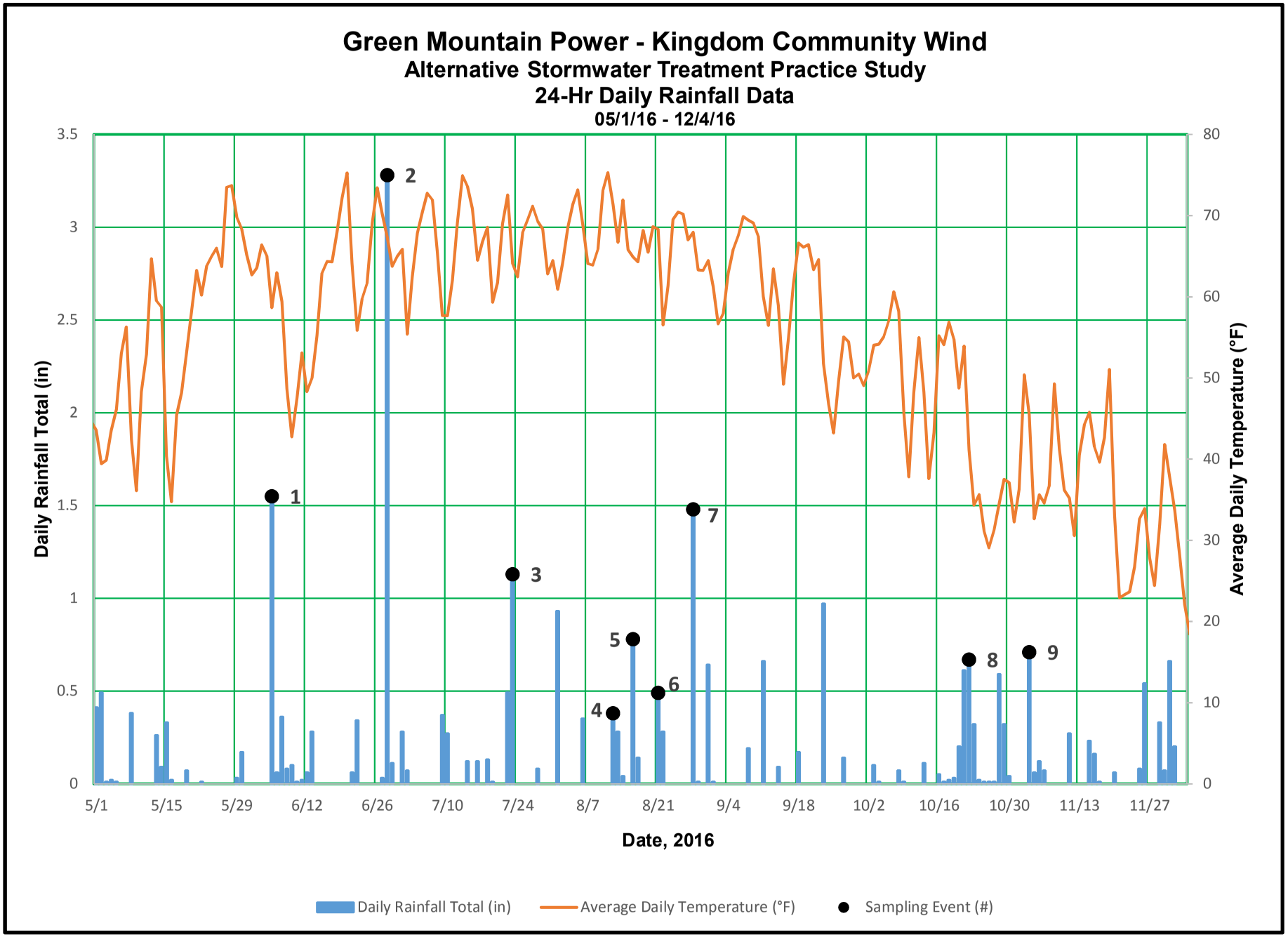
Kingdom Community Wind Project | Lowell, Vermont

Sources:
Background Imagery from VCGI (2014)
K&L (Krebs & Lansing - Design elements from 2010-2011)
VHB - 2009-2011

Alternative Design STP Performance Monitoring Study
Level Spreader Monitoring Sites
Sheet 3 of 3

Appendix 2

- Daily Rainfall Total and Average Daily Temperature Graph
- Daily Rainfall Total and Average Daily Temperature Table



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Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
Summary Table of Rainfall and Temperature Data
Prepared by VHB on: January 3, 2016

Date	Daily Rainfall Total (in)	Average Daily Temperature (°F)	Sampling Event (#) *
5/1/2016	0.41	43.6	
5/2/2016	0.49	39.4	
5/3/2016	0.01	39.9	
5/4/2016	0.02	43.5	
5/5/2016	0.01	46.1	
5/6/2016		53.0	
5/7/2016		56.3	
5/8/2016	0.38	42.4	
5/9/2016		36.1	
5/10/2016		48.3	
5/11/2016		52.9	
5/12/2016		64.7	
5/13/2016	0.26	59.5	
5/14/2016	0.09	58.7	
5/15/2016	0.33	40.4	
5/16/2016	0.02	34.8	
5/17/2016		45.4	
5/18/2016		48.2	
5/19/2016	0.07	53.0	
5/20/2016		58.3	
5/21/2016		63.3	
5/22/2016	0.01	60.2	
5/23/2016		63.8	
5/24/2016		65.0	
5/25/2016		66.0	
5/26/2016		63.7	
5/27/2016		73.5	
5/28/2016		73.7	
5/29/2016	0.03	69.8	
5/30/2016	0.17	68.4	
5/31/2016		65.2	
6/1/2016		62.7	
6/2/2016		63.6	
6/3/2016		66.4	
6/4/2016		65.0	
6/5/2016	**1.55**	**58.7**	**1**
6/6/2016	0.06	63.0	
6/7/2016	0.36	59.4	

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
Summary Table of Rainfall and Temperature Data
Prepared by VHB on: January 3, 2016

Date	Daily Rainfall Total (in)	Average Daily Temperature (°F)	Sampling Event (#) *
6/8/2016	0.08	48.7	
6/9/2016	0.10	42.8	
6/10/2016	0.01	47.5	
6/11/2016	0.02	53.1	
6/12/2016	0.06	48.3	
6/13/2016	0.28	50.0	
6/14/2016		55.2	
6/15/2016		62.9	
6/16/2016		64.3	
6/17/2016		64.3	
6/18/2016		67.9	
6/19/2016		72.2	
6/20/2016		75.3	
6/21/2016	0.06	64.1	
6/22/2016	0.34	55.9	
6/23/2016		59.8	
6/24/2016		61.7	
6/25/2016		69.1	
6/26/2016		73.4	
6/27/2016	0.03	70.3	
6/28/2016	**3.28**	**67.3**	**2**
6/29/2016	**0.11**	**63.8**	
6/30/2016		65.0	
7/1/2016	0.28	65.8	
7/2/2016	0.07	55.4	
7/3/2016		62.4	
7/4/2016		67.8	
7/5/2016		70.4	
7/6/2016		72.8	
7/7/2016		71.9	
7/8/2016		65.5	
7/9/2016	0.37	57.7	
7/10/2016	0.27	57.7	
7/11/2016		62.0	
7/12/2016		69.1	
7/13/2016		74.9	
7/14/2016	0.12	73.6	
7/15/2016		70.8	

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
Summary Table of Rainfall and Temperature Data
Prepared by VHB on: January 3, 2016

Date	Daily Rainfall Total (in)	Average Daily Temperature (°F)	Sampling Event (#) *
7/16/2016	0.12	64.5	
7/17/2016		66.8	
7/18/2016	0.13	68.6	
7/19/2016	0.01	59.3	
7/20/2016		61.8	
7/21/2016		69.0	
7/22/2016	**0.49**	**72.5**	**3**
7/23/2016	**1.13**	**64.1**	
7/24/2016		62.5	
7/25/2016		67.9	
7/26/2016		69.5	
7/27/2016		71.2	
7/28/2016	0.08	69.3	
7/29/2016		68.4	
7/30/2016		62.8	
7/31/2016		64.5	
8/1/2016	0.93	60.9	
8/2/2016		64.2	
8/3/2016		68.6	
8/4/2016		71.4	
8/5/2016		73.2	
8/6/2016	0.35	68.7	
8/7/2016		64.1	
8/8/2016		63.9	
8/9/2016		65.9	
8/10/2016		73.1	
8/11/2016		75.3	
8/12/2016	**0.38**	**71.4**	**4**
8/13/2016	**0.28**	**66.7**	
8/14/2016	**0.04**	**71.9**	
8/15/2016		65.8	
8/16/2016	**0.78**	**64.9**	**5**
8/17/2016	**0.14**	**64.3**	
8/18/2016		68.2	
8/19/2016		65.5	
8/20/2016		68.7	
8/21/2016	**0.49**	**68.3**	**6**
8/22/2016	**0.28**	**56.5**	

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
Summary Table of Rainfall and Temperature Data
Prepared by VHB on: January 3, 2016

Date	Daily Rainfall Total (in)	Average Daily Temperature (°F)	Sampling Event (#) *
8/23/2016		61.4	
8/24/2016		69.5	
8/25/2016		70.4	
8/26/2016		70.2	
8/27/2016		67.0	
8/28/2016	**1.48**	**67.9**	**7**
8/29/2016	0.01	63.3	
8/30/2016		63.3	
8/31/2016	0.64	64.5	
9/1/2016	0.01	61.3	
9/2/2016		56.7	
9/3/2016		58.0	
9/4/2016		62.9	
9/5/2016		65.8	
9/6/2016		67.6	
9/7/2016		69.9	
9/8/2016	0.19	69.4	
9/9/2016		69.1	
9/10/2016		67.4	
9/11/2016	0.66	60.1	
9/12/2016		56.5	
9/13/2016		63.4	
9/14/2016	0.09	58.9	
9/15/2016		49.2	
9/16/2016		54.9	
9/17/2016		61.6	
9/18/2016	0.17	66.6	
9/19/2016		66.1	
9/20/2016		66.4	
9/21/2016		63.3	
9/22/2016		64.6	
9/23/2016	0.97	51.8	
9/24/2016		46.8	
9/25/2016		43.2	
9/26/2016		49.5	
9/27/2016	0.14	55.1	
9/28/2016		54.5	
9/29/2016		50.0	

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
Summary Table of Rainfall and Temperature Data
Prepared by VHB on: January 3, 2016

Date	Daily Rainfall Total (in)	Average Daily Temperature (°F)	Sampling Event (#) *
9/30/2016		50.5	
10/1/2016		49.0	
10/2/2016		50.9	
10/3/2016	0.10	54.0	
10/4/2016	0.01	54.2	
10/5/2016		55.1	
10/6/2016		57.1	
10/7/2016		60.6	
10/8/2016	0.07	58.2	
10/9/2016	0.01	45.7	
10/10/2016		37.8	
10/11/2016		48.2	
10/12/2016		55.0	
10/13/2016	0.11	48.3	
10/14/2016		37.6	
10/15/2016		43.3	
10/16/2016	0.05	55.2	
10/17/2016	0.01	54.1	
10/18/2016	0.02	56.9	
10/19/2016	0.03	54.8	
10/20/2016	**0.20**	**48.8**	**8**
10/21/2016	**0.61**	**53.9**	
10/22/2016	**0.67**	**41.1**	
10/23/2016	0.32	34.3	
10/24/2016	0.02	35.6	
10/25/2016	0.01	31.2	
10/26/2016	0.01	29.1	
10/27/2016	0.01	31.3	
10/28/2016	0.59	34.5	
10/29/2016	0.32	37.5	
10/30/2016	0.04	37.1	
10/31/2016		32.3	
11/1/2016		36.3	
11/2/2016		50.4	
11/3/2016	**0.71**	**45.5**	**9**
11/4/2016	**0.06**	**32.7**	
11/5/2016	0.12	35.6	
11/6/2016	0.07	34.6	

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
Summary Table of Rainfall and Temperature Data
Prepared by VHB on: January 3, 2016

Date	Daily Rainfall Total (in)	Average Daily Temperature (°F)	Sampling Event (#) *
11/7/2016		36.7	
11/8/2016		49.3	
11/9/2016		41.3	
11/10/2016		36.2	
11/11/2016	0.27	35.2	
11/12/2016		30.6	
11/13/2016		40.5	
11/14/2016		44.3	
11/15/2016	0.23	45.8	
11/16/2016	0.16	41.5	
11/17/2016	0.01	39.6	
11/18/2016		42.7	
11/19/2016		51.0	
11/20/2016	0.06	33.1	
11/21/2016		22.9	
11/22/2016		23.3	
11/23/2016		23.7	
11/24/2016		26.7	
11/25/2016	0.08	32.7	
11/26/2016	0.54	33.9	
11/27/2016		27.9	
11/28/2016		24.4	
11/29/2016	0.33	32.0	
11/30/2016	0.07	41.8	
12/1/2016	0.66	37.8	
12/2/2016	0.20	33.7	
12/3/2016		28.1	
12/4/2016		22.1	

* Merged cells indicate that sampling event spanned more than one calendar day

Appendix 3

- Excerpts from time-lapse videos at LS-A9 Inlet
- Still photographs of LS-A9
- Still photographs of LS-A18
- Still photographs of LS-C7

Kingdom Community Wind, Lowell, Vermont
2016 Level Spreader Study
Time Lapse Documentation – Level Spreader A9

Image 1. Initial Conditions 6/05/2016 12:04	
Image 2. Rising Limb 6/05/2016 18:39	
Image 3. Apparent Peak Water Level 6/05/2016 20:19	

Image 4. Falling Limb 6/06/2016 08:00	
Image 5. Post-storm Conditions 6/06/2016 20:30	
	This rain event is believed to have filled the level spreader enough to overtop the level lip and discharge water to the downgradient disconnect area, although it is not visible due to the peak water level occurring after dark when the camera could not capture an image. • 5 Minute Peak Intensity = 0.6 in/hr • Total Depth of Rainfall = 1.55 in • Duration of Event = 9 hrs 30 mins • 72-Hour Antecedent Rainfall = 0 in

Image 1. Initial Conditions 8/16/2016 14:36	
Image 2. Rising Limb 8/17/2016 6:28	
Image 3. Apparent Peak Water Level 8/17/2016 9:38	

Image 4. Falling Limb 8/17/2016 12:03	
Image 5. Post-storm Conditions 8/17/2016 14:43	
	This rain event did not fill the level spreader enough to overtop the level lip. • 5 Minute Peak Intensity = 0.84 in/hr • Total Depth of Rainfall = 0.92 in • Duration of Event = 15 hrs 25 mins • 72-Hour Antecedent Rainfall = 0.19 in

Image 1. Initial Conditions 8/21/2016 17:35	
Image 2. Rising Limb 8/21/2016 19:30	
Image 3. Apparent Peak Water Level 8/22/2016 6:17	

Image 4. Falling Limb 8/22/2016 10:27	
Image 5. Post-storm Conditions 8/22/2016 13:02	
	This rain event did not fill the level spreader enough to overtop the level lip. • 5 Minute Peak Intensity = 0.48 in/hr • Total Depth of Rainfall =0.77 in • Duration of Event = 7 hrs 30 mins • 72-Hour Antecedent Rainfall = 0 in

Image 1. Initial Conditions 8/28/16 17:00	
Image 2. Rising Limb 8/28/16 17:35	
Image 3. Apparent Peak Water Level 8/28/16 18:20	

Image 4. Falling Limb 8/29/16 06:57	
Image 5. Post-storm Conditions 8/29/16 10:32	
	This rain event filled the level spreader enough to overtop the level lip and discharge water to the downgradient disconnect area. • 5 Minute Peak Intensity = 3 in/hr • Total Depth of Rainfall = 1.48 in • Duration of Event = 2 hrs 40 mins • 72-Hour Antecedent Rainfall = 0 in

Image 1. Initial Conditions 10/21/2016 14:04	
Image 2. Rising Limb 10/22/2016 14:11	
Image 3. Apparent Peak Water Level 10/23/2016 11:24	

Image 4. Falling Limb 10/23/2016 15:19	
Image 5. Post-storm Conditions 10/23/2016 16:54	
	This rain event filled the level spreader enough to overtop the level lip and discharge water to the downgradient disconnect area. • 5 Minute Peak Intensity = 0.6 in/hr • Total Depth of Rainfall = 1.48 in • Duration of Event = 51 hrs 50 mins • 72-Hour Antecedent Rainfall = 0.05 in

Image 1. Initial Conditions 11/03/2016 7:42	
Image 2. Rising Limb 11/03/2016 9:37	
Image 3. Apparent Peak Water Level 11/03/2016 13:22	

Image 4. Falling Limb 11/04/2016 9:09	
Image 5. Post-storm Conditions 11/04/2016 11:39	
	This rain event filled the level spreader enough to overtop the level lip and discharge water to the downgradient disconnect area. • 5 Minute Peak Intensity = 0.36 in/hr • Total Depth of Rainfall = 0.77 in • Duration of Event = 24 hrs 45 mins • 72-Hour Antecedent Rainfall = 0 in

Photograph 1. Overview of LS-A9 following August 16, 2016 storm event. (VHB, August 19, 2016)

Photograph 2. Overview of LS-A9 following August 28, 2016 storm event. (VHB, August 29, 2016)

Photograph 3. Overview of LS-A9 following October 22, 2016 storm event. (VHB, October 23, 2016)

Photograph 4. Level Lip of LS-A9 following August 16, 2016 storm event. (VHB, August 19, 2016)

Photograph 5. Level Lip of LS-A9 following August 28, 2016 storm event. (VHB, August 29, 2016))

Photograph 6. Level lip of LS-A9 following October 22, 2016 storm event. (VHB, October 23, 2016)

Photograph 7. Disconnect area of LS-A9 following August 16, 2016 storm event. (VHB, August 19, 2016)

Photograph 8. Disconnect area of LS-A9 following August 28, 2016 storm event. (VHB, August 29, 2016))

Photograph 9. Disconnect area of LS-A9 following October 22, 2016 storm event. (VHB, October 23, 2016)

Photograph 1. Overview of LS-A18 following August 16, 2016 storm event. (VHB, August 19, 2016)

Photograph 2. Overview of LS-A18 following August 28, 2016 storm event. (VHB, August 29, 2016)

Photograph 3. Overview of LS-A18 following November 3, 2016 storm event. (VHB, November 4, 2016)

Photograph 4. Level Lip of LS-A18 following August 16, 2016 storm event. (VHB, August 19, 2016)

Photograph 5. Level Lip of LS-A18 following August 28, 2016 storm event. (VHB, August 29, 2016))

Photograph 6. Level lip of LS-A18 following November 3, 2016 storm event. (VHB, November 4, 2016)

Photograph 7. Disconnect area of LS-A18 following August 16, 2016 storm event. (VHB, August 19, 2016)

Photograph 8. Disconnect area of LS-A18 following August 28, 2016 storm event. (VHB, August 29, 2016))

Photograph 9. Disconnect area of LS-A18 following November 3, 2016 storm event. (VHB, November 4, 2016)

Photograph 1. Overview of LS-C7 following July 22, 2016 storm event. (VHB, July 24, 2016)

Photograph 2. Overview of LS-C7 following August 28, 2016 storm event. (VHB, August 29, 2016)

Photograph 3. Overview of LS-C7 following November 3, 2016 storm event. (VHB, November 4, 2016)

Photograph 4. Level Lip of LS-C7 following July 22, 2016 storm event. (VHB, July 24, 2016)

Photograph 5. Level Lip of LS-C7 following August 28, 2016 storm event. (VHB, August 29, 2016))

Photograph 6. Level lip of LS-C7 following November 3, 2016 storm event. (VHB, November 4, 2016)

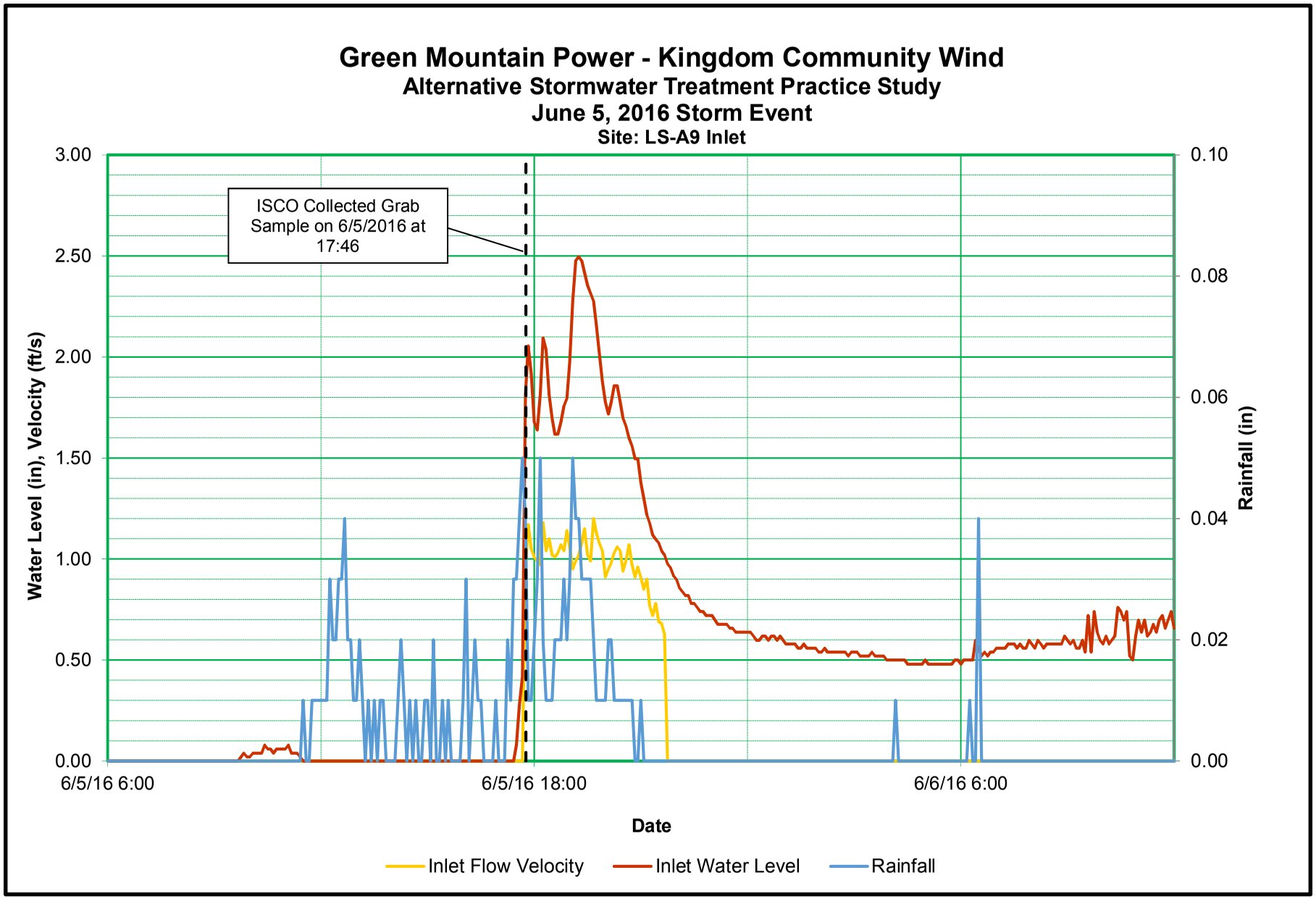
Photograph 7. Disconnect area of LS-C7 following July 22, 2016 storm event. (VHB, July 24, 2016)

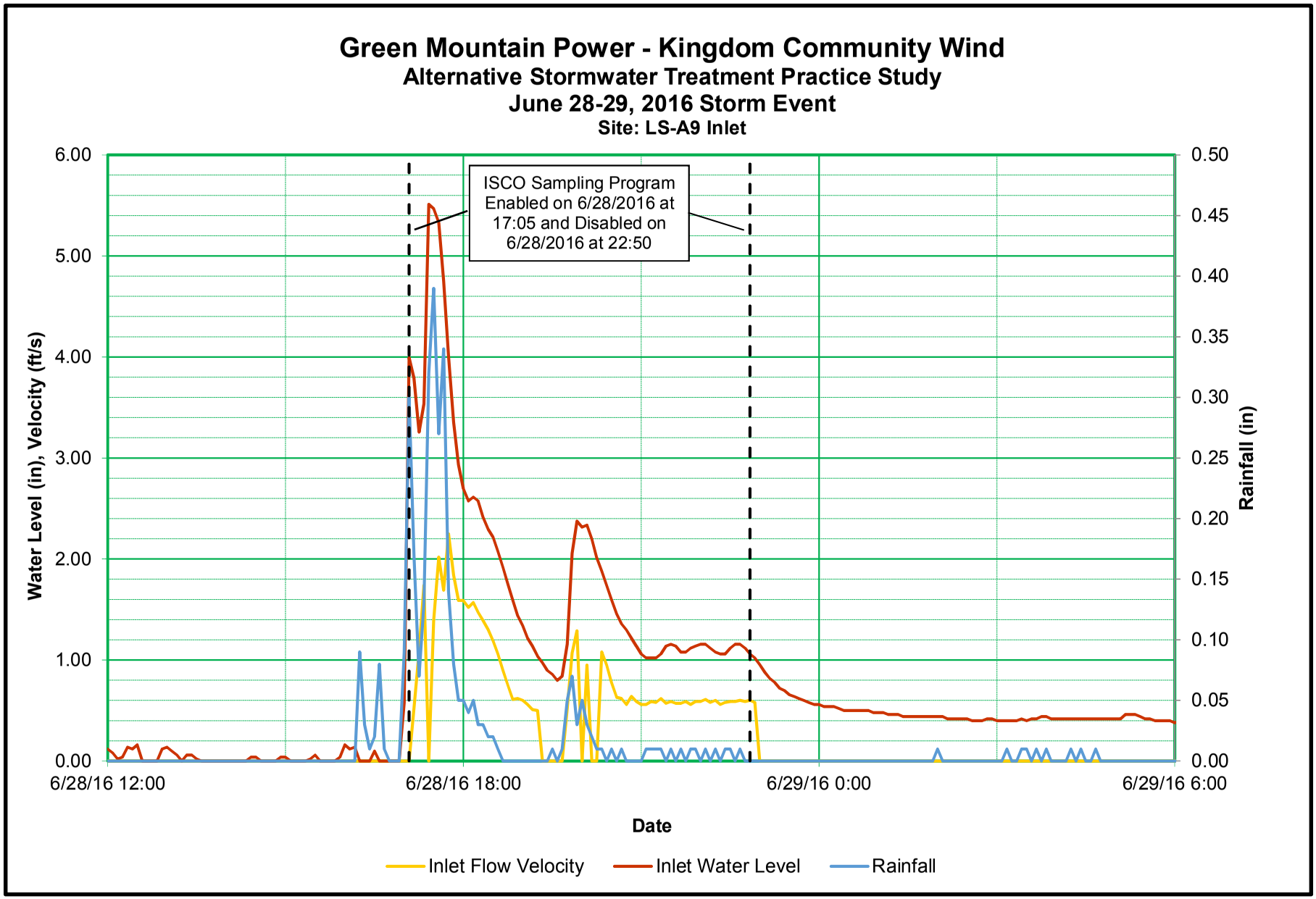
Photograph 8. Disconnect area of LS-C7 following August 28, 2016 storm event. (VHB, August 29, 2016))

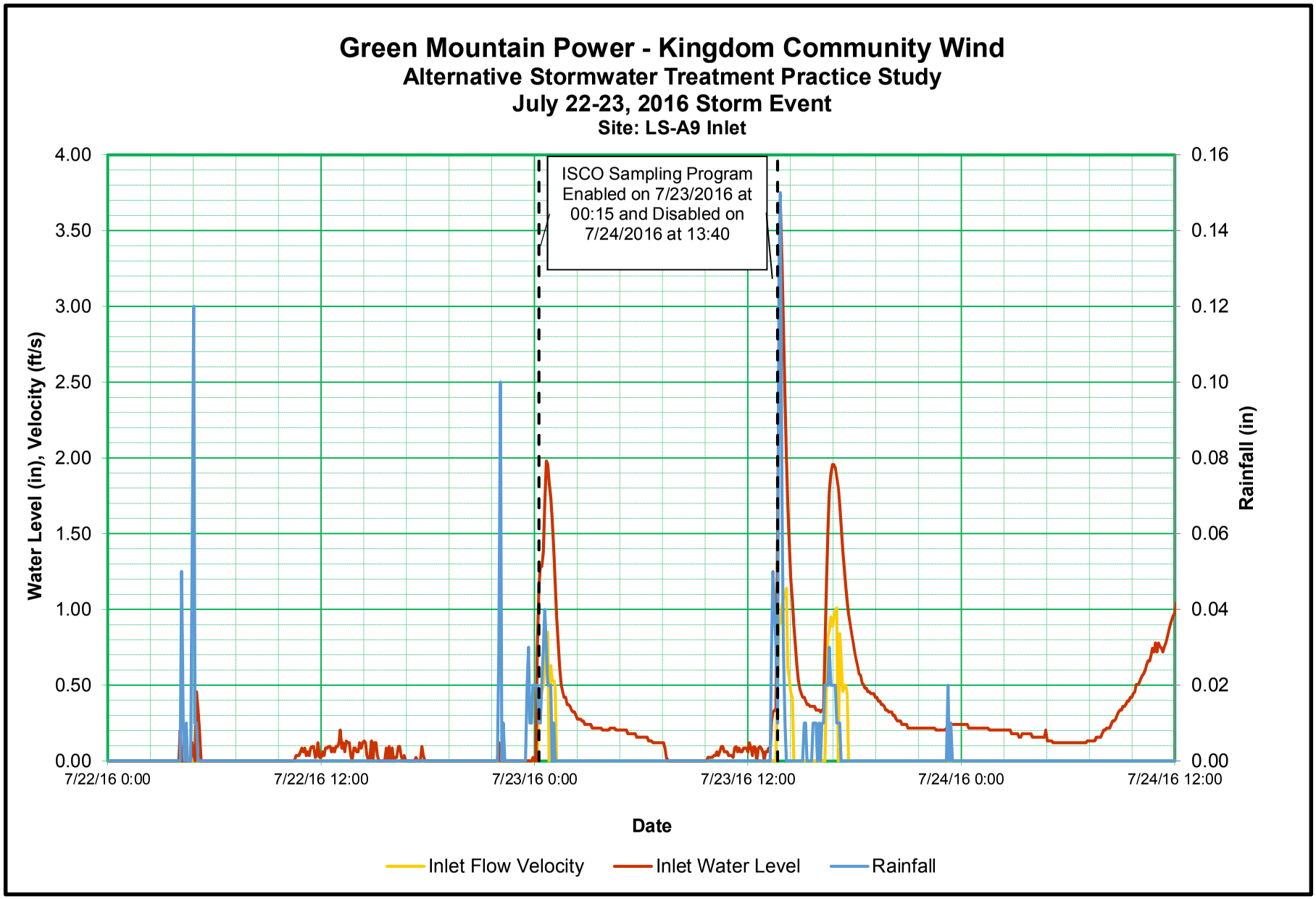
Photograph 9. Disconnect area of LS-C7 following November 3, 2016 storm event. (VHB, November 4, 2016)

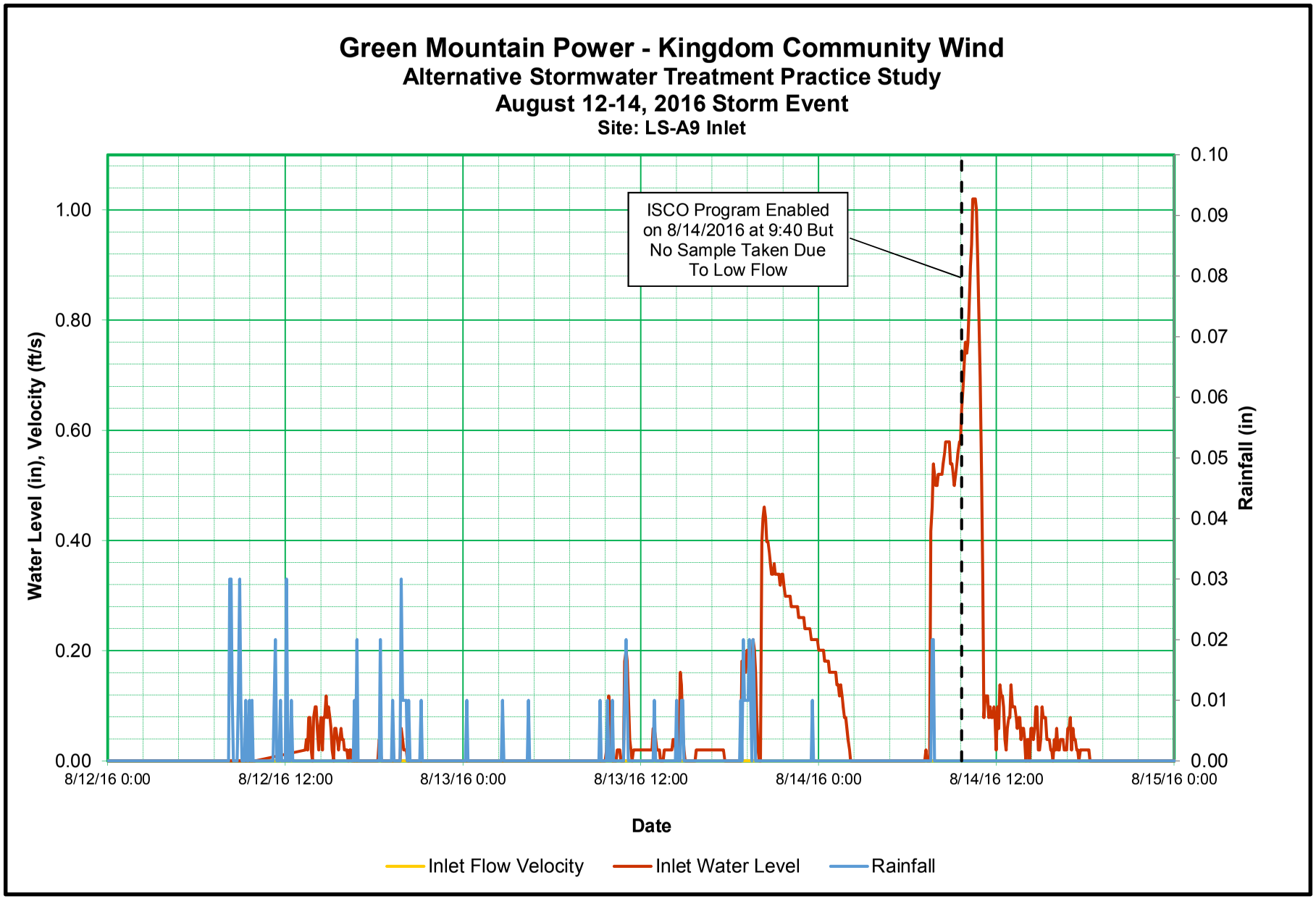
Appendix 4

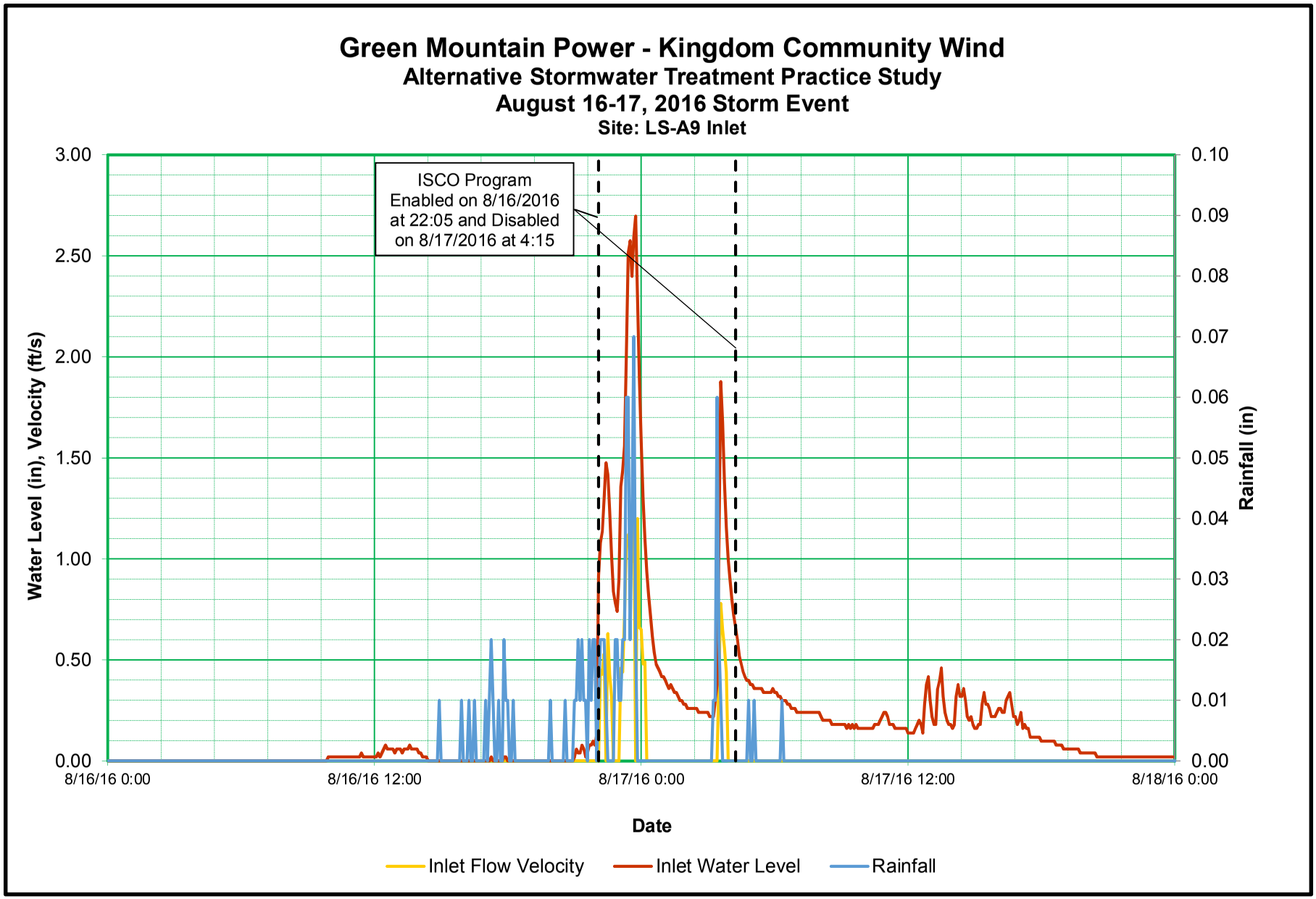
- Storm Event Hydrographs – LS-A9 Inlet
- Storm Event Hydrographs – LS-A9 Upstream
- Storm Event Hydrographs – LS-A9 Downstream

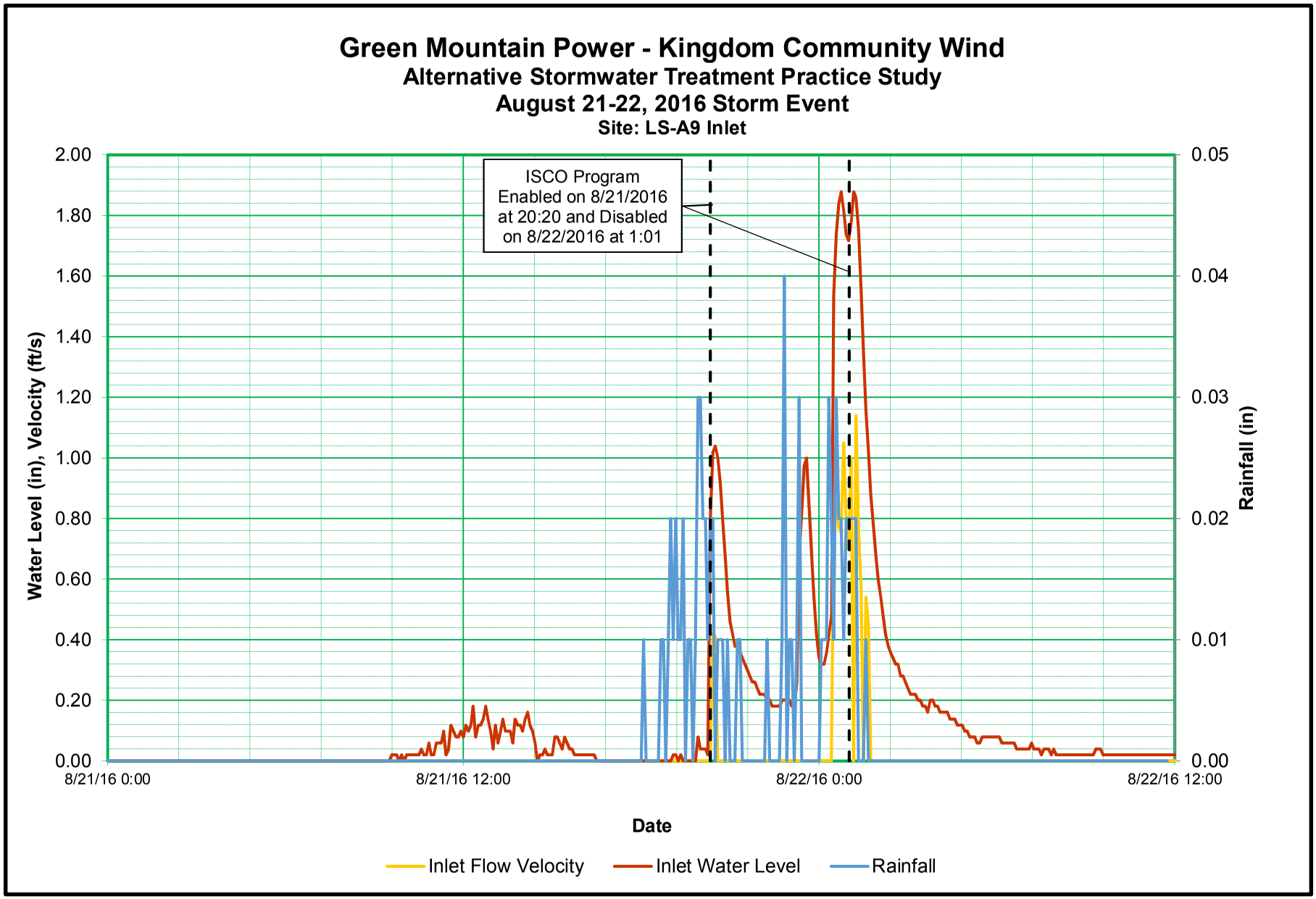

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
June 5, 2016 Storm Event
Site: LS-A9 Inlet
ISCO Collected Grab Sample on 6/5/2016 at 17:46
Water Level (in), Velocity (ft/s)
Rainfall (in)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.10
0.08
0.06
0.04
0.02
0.00
6/5/16 6:00
6/5/16 18:00
6/6/16 6:00
Date
Inlet Flow Velocity
Inlet Water Level
Rainfall

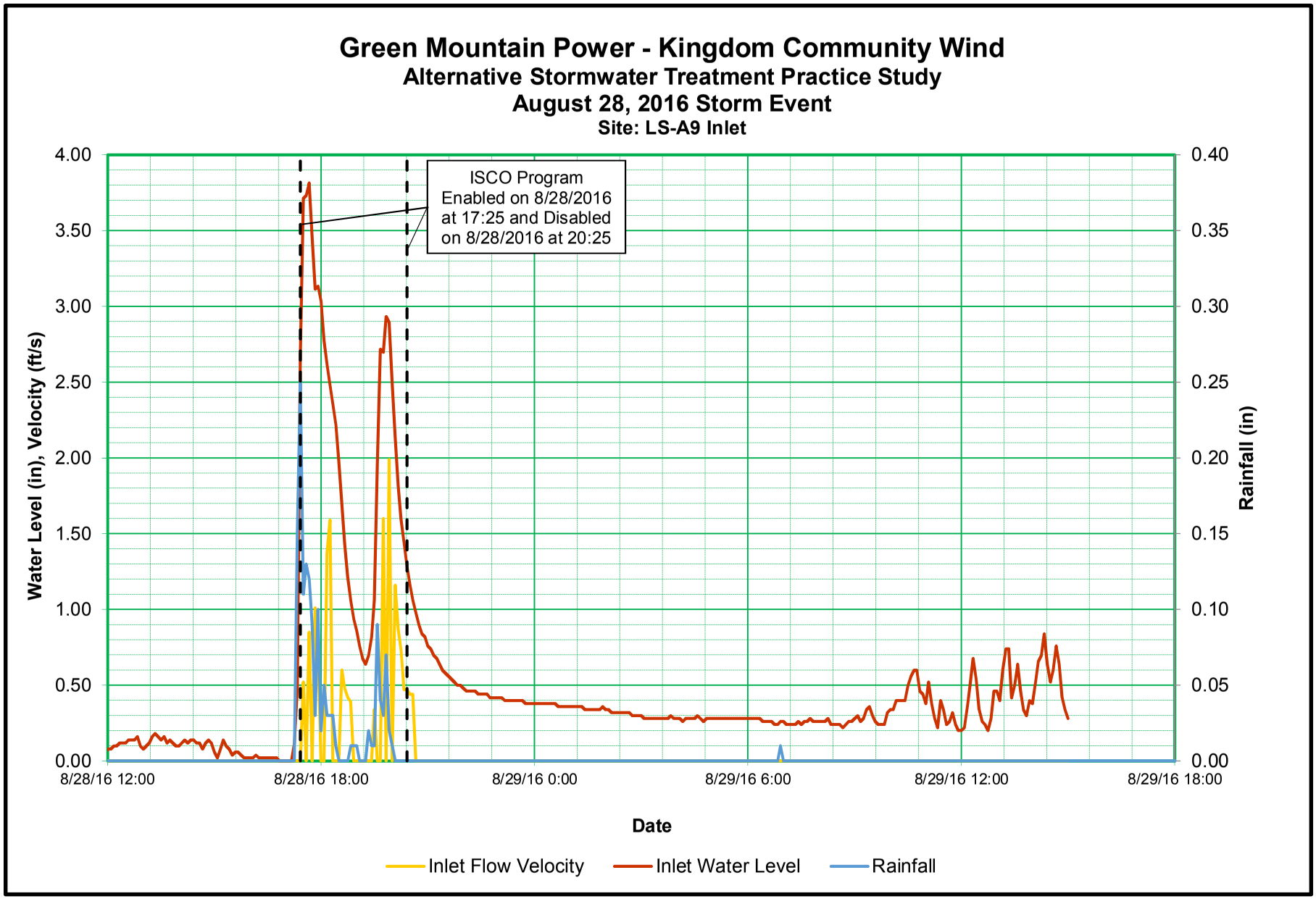

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
June 28-29, 2016 Storm Event
Site: LS-A9 Inlet
ISCO Sampling Program Enabled on 6/28/2016 at 17:05 and Disabled on 6/28/2016 at 22:50
Water Level (in), Velocity (ft/s)
Rainfall (in)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6/28/16 12:00
6/28/16 18:00
6/29/16 0:00
6/29/16 6:00
Date
Inlet Flow Velocity
Inlet Water Level
Rainfall

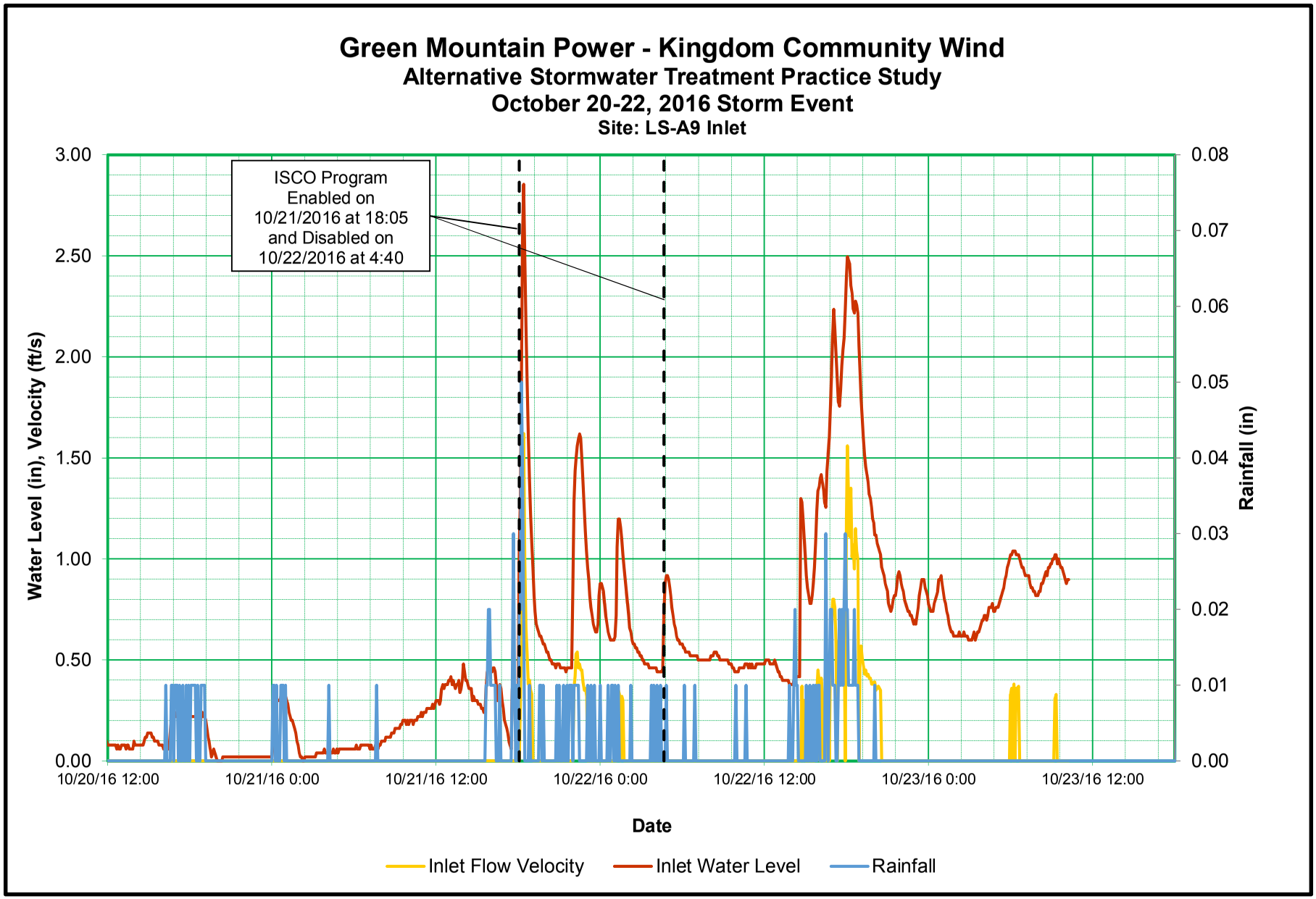

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
July 22-23, 2016 Storm Event
Site: LS-A9 Inlet
ISCO Sampling Program Enabled on 7/23/2016 at 00:15 and Disabled on 7/24/2016 at 13:40
Water Level (in), Velocity (ft/s)
Rainfall (in)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
7/22/16 0:00
7/22/16 12:00
7/23/16 0:00
7/23/16 12:00
7/24/16 0:00
7/24/16 12:00
Date
Inlet Flow Velocity
Inlet Water Level
Rainfall

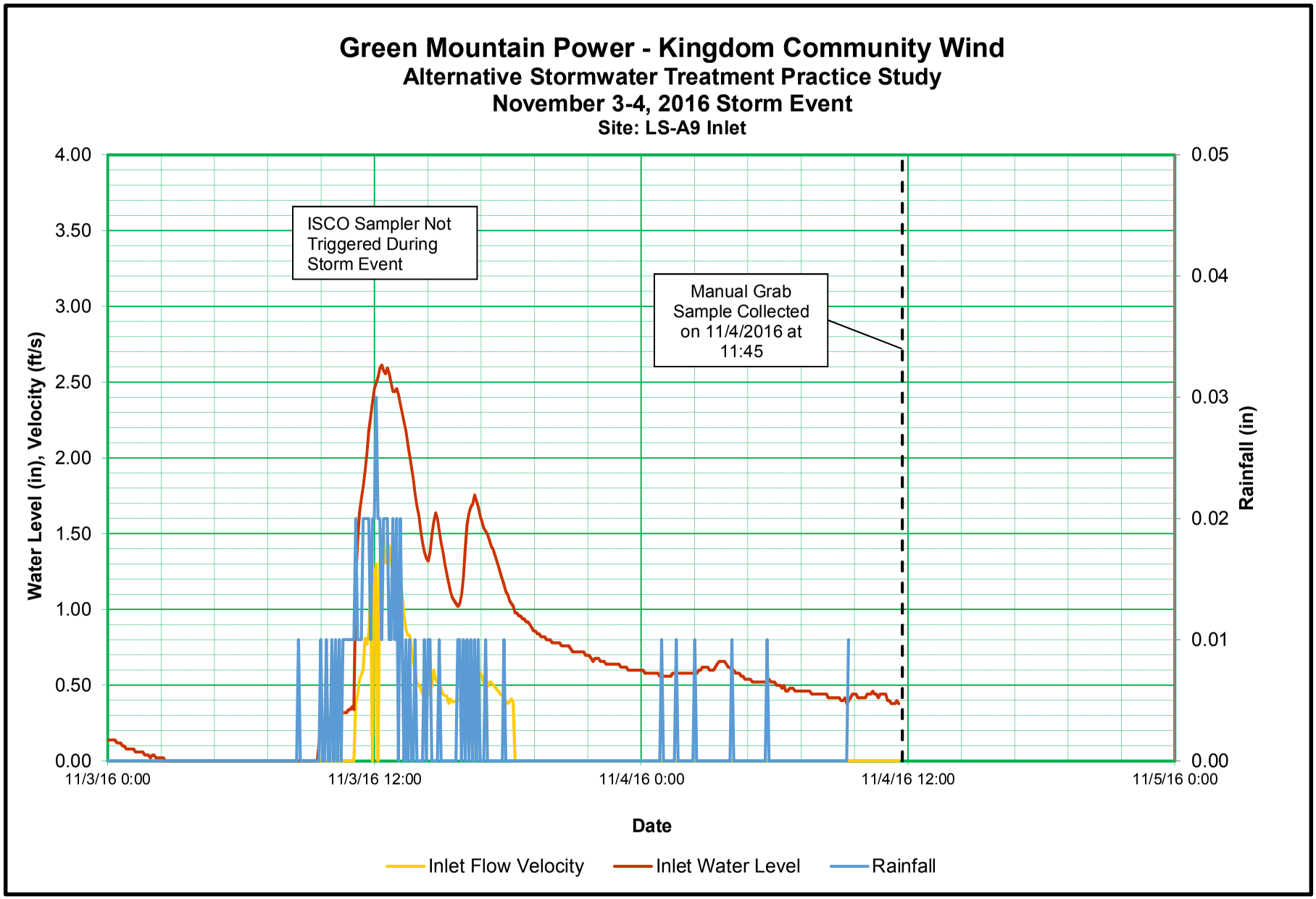

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 12-14, 2016 Storm Event
Site: LS-A9 Inlet
ISCO Program Enabled on 8/14/2016 at 9:40 But No Sample Taken Due To Low Flow
Water Level (in), Velocity (ft/s)
Rainfall (in)
1.00
0.80
0.60
0.40
0.20
0.00
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
8/12/16 0:00
8/12/16 12:00
8/13/16 0:00
8/13/16 12:00
8/14/16 0:00
8/14/16 12:00
8/15/16 0:00
Date
Inlet Flow Velocity
Inlet Water Level
Rainfall

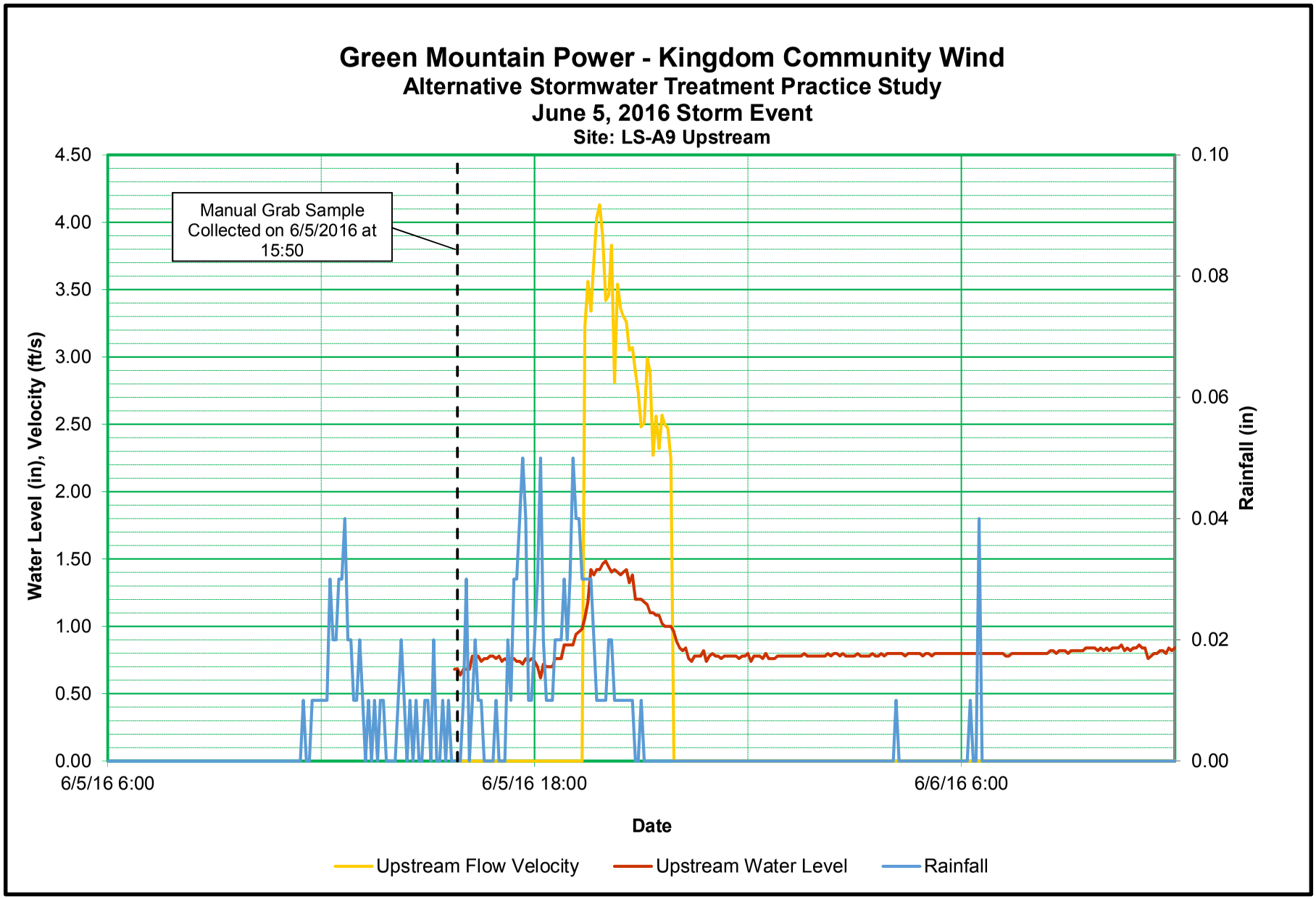

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 16-17, 2016 Storm Event
Site: LS-A9 Inlet
ISCO Program Enabled on 8/16/2016 at 22:05 and Disabled on 8/17/2016 at 4:15
Water Level (in), Velocity (ft/s)
Rainfall (in)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
8/16/16 0:00
8/16/16 12:00
8/17/16 0:00
8/17/16 12:00
8/18/16 0:00
Date
Inlet Flow Velocity
Inlet Water Level
Rainfall

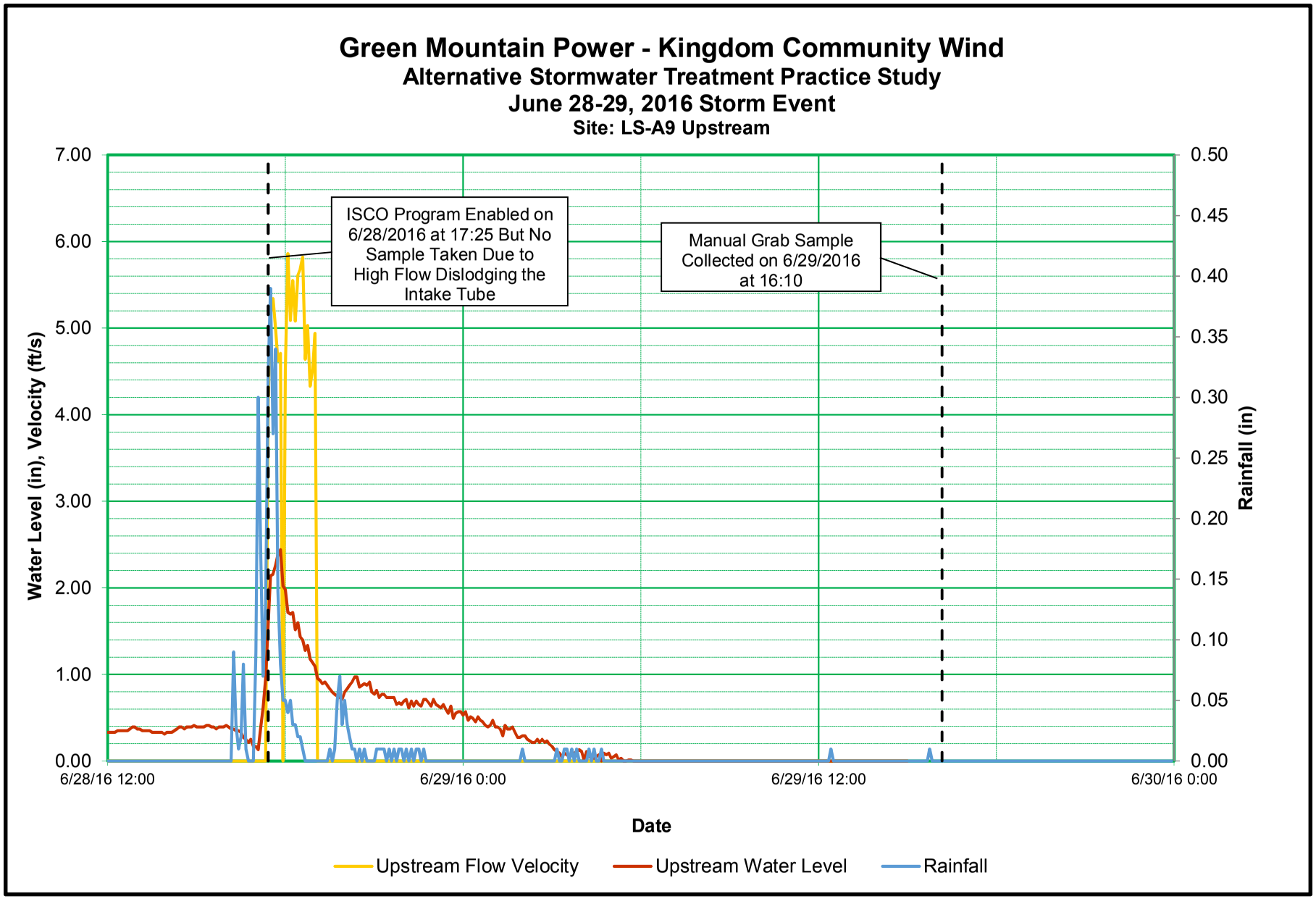

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 21-22, 2016 Storm Event
Site: LS-A9 Inlet
ISCO Program Enabled on 8/21/2016 at 20:20 and Disabled on 8/22/2016 at 1:01
Water Level (in), Velocity (ft/s)
Rainfall (in)
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.05
0.04
0.03
0.02
0.01
0.00
8/21/16 0:00
8/21/16 12:00
8/22/16 0:00
8/22/16 12:00
Date
Inlet Flow Velocity
Inlet Water Level
Rainfall

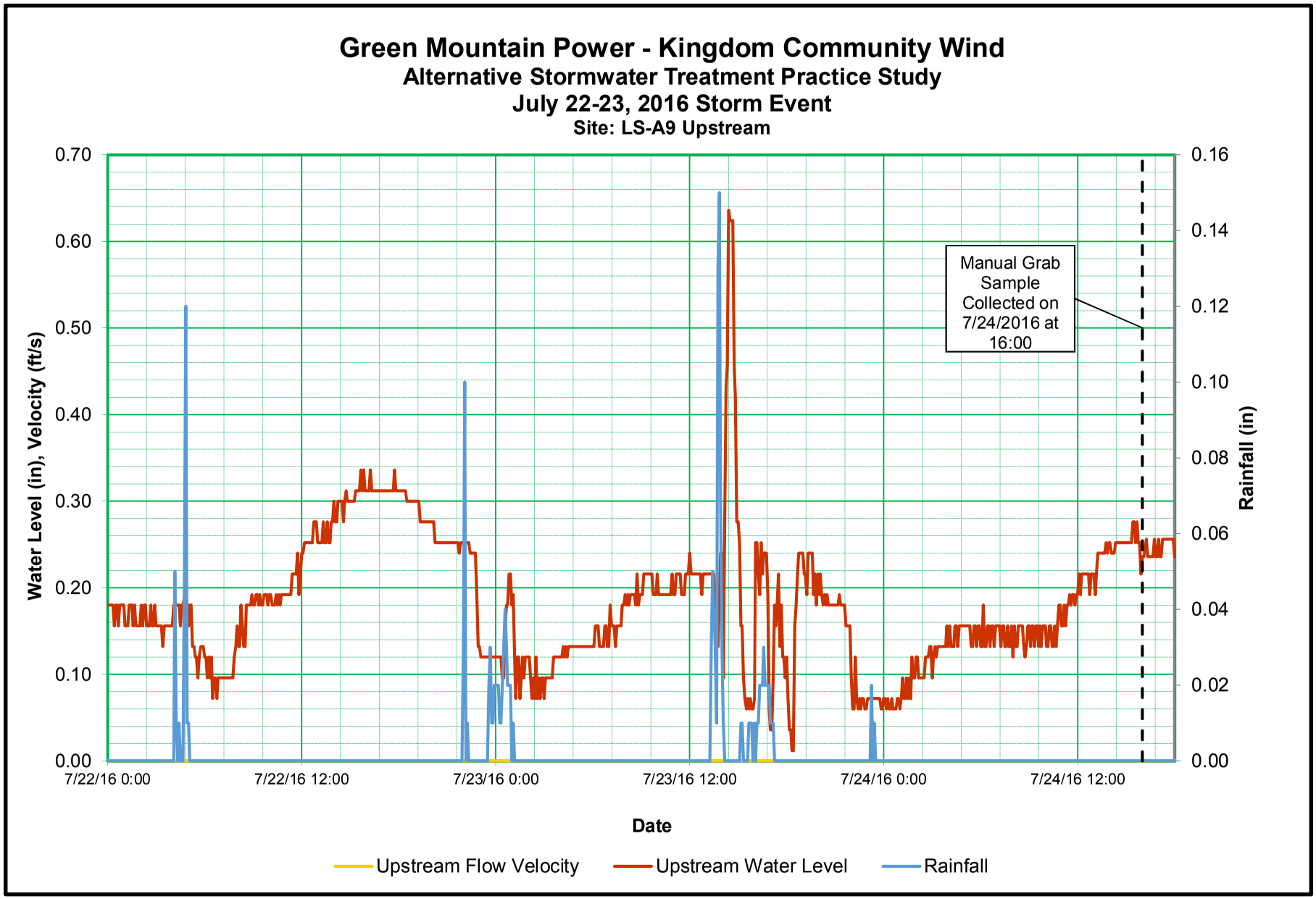

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 28, 2016 Storm Event
Site: LS-A9 Inlet
ISCO Program Enabled on 8/28/2016 at 17:25 and Disabled on 8/28/2016 at 20:25
Water Level (in), Velocity (ft/s)
Rainfall (in)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
8/28/16 12:00
8/28/16 18:00
8/29/16 0:00
8/29/16 6:00
8/29/16 12:00
8/29/16 18:00
Date
Inlet Flow Velocity
Inlet Water Level
Rainfall

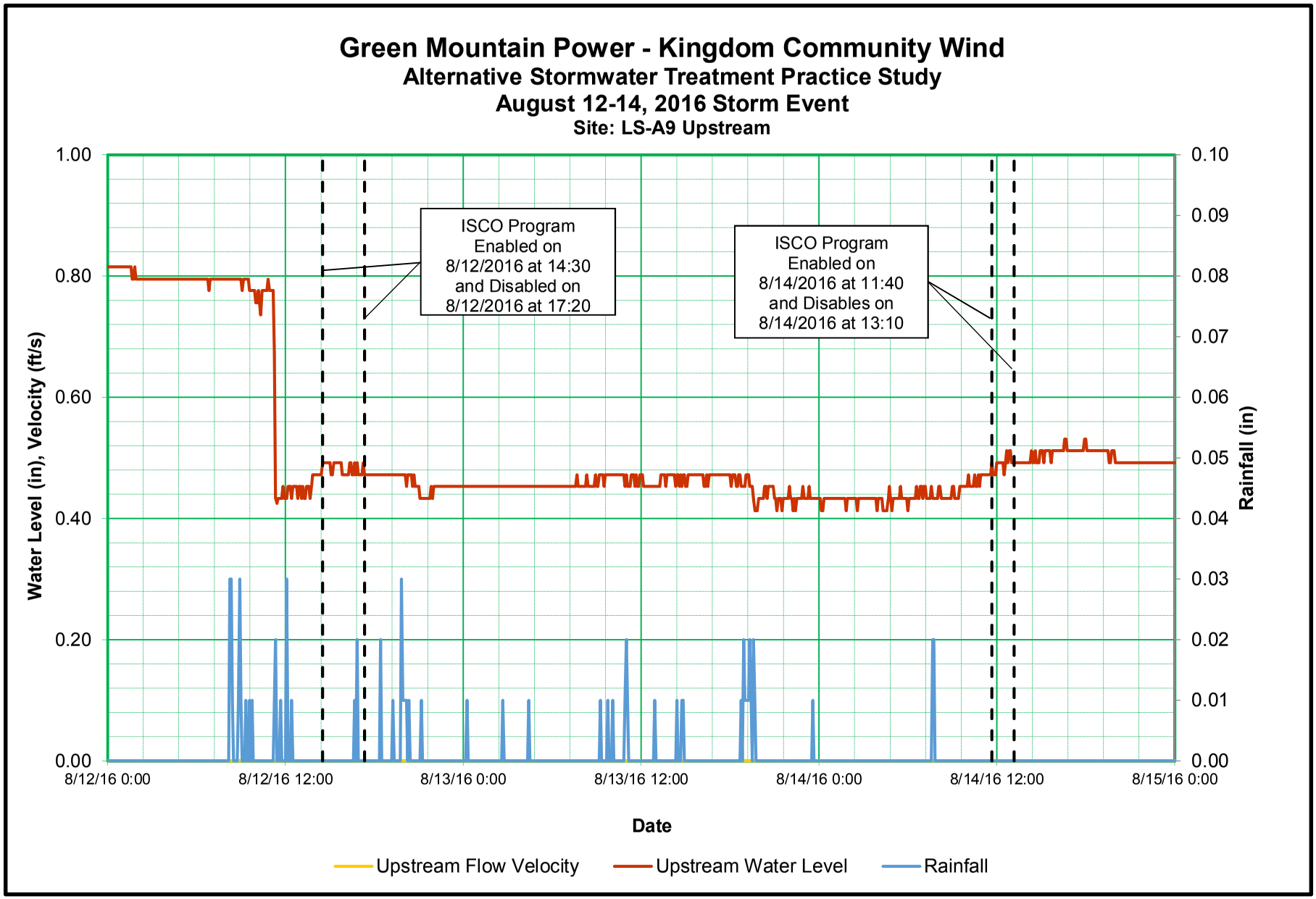

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
October 20-22, 2016 Storm Event
Site: LS-A9 Inlet
ISCO Program Enabled on 10/21/2016 at 18:05 and Disabled on 10/22/2016 at 4:40
Water Level (in), Velocity (ft/s)
Rainfall (in)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
10/20/16 12:00
10/21/16 0:00
10/21/16 12:00
10/22/16 0:00
10/22/16 12:00
10/23/16 0:00
10/23/16 12:00
Date
Inlet Flow Velocity
Inlet Water Level
Rainfall

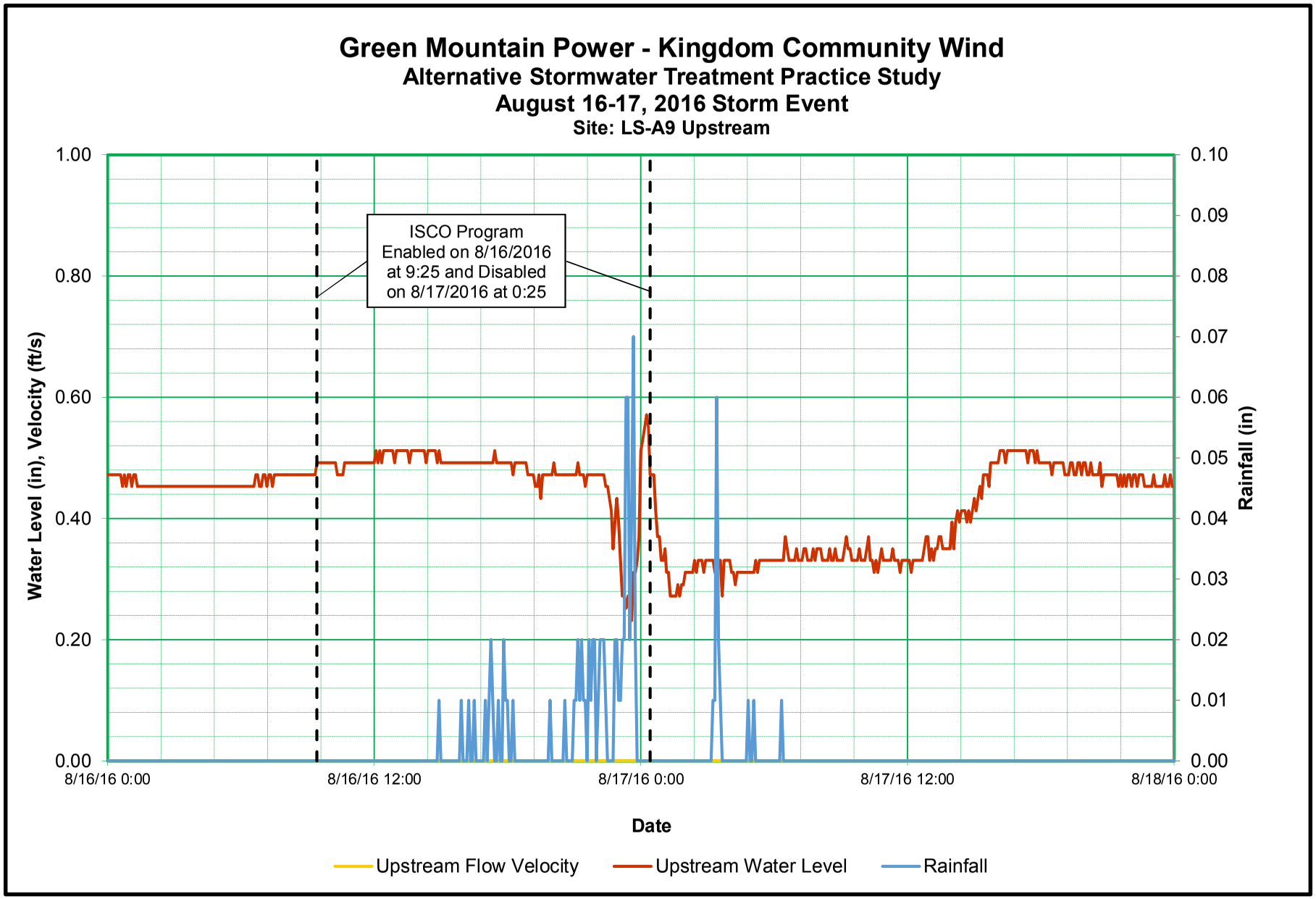

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
November 3-4, 2016 Storm Event
Site: LS-A9 Inlet
ISCO Sampler Not Triggered During Storm Event
Manual Grab Sample Collected on 11/4/2016 at 11:45
Water Level (in), Velocity (ft/s)
Rainfall (in)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.05
0.04
0.03
0.02
0.01
0.00
11/3/16 0:00
11/3/16 12:00
11/4/16 0:00
11/4/16 12:00
11/5/16 0:00
Date
Inlet Flow Velocity
Inlet Water Level
Rainfall

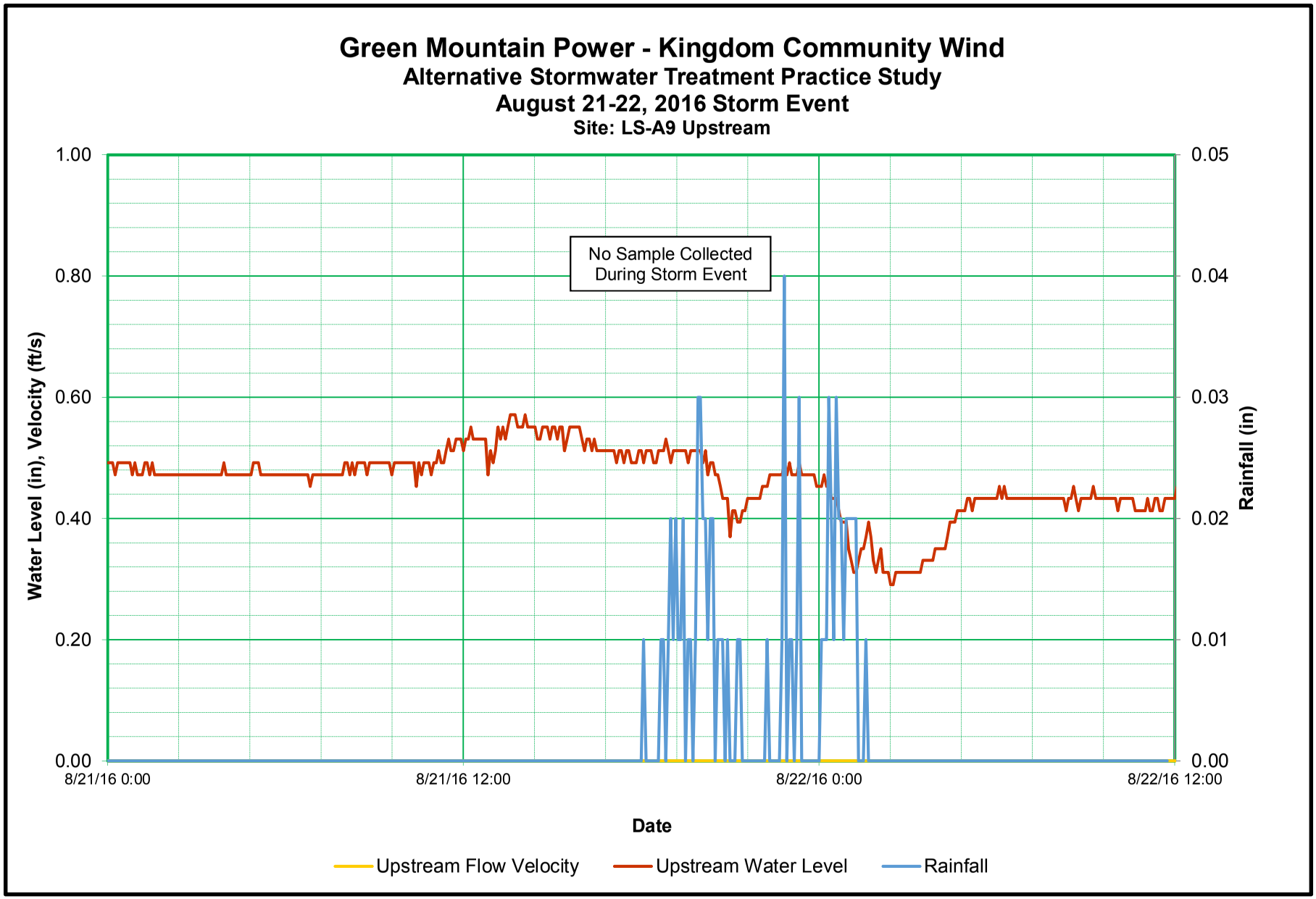

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
June 5, 2016 Storm Event
Site: LS-A9 Upstream
Manual Grab Sample Collected on 6/5/2016 at 15:50
Water Level (in), Velocity (ft/s)
Rainfall (in)
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.10
0.08
0.06
0.04
0.02
0.00
6/5/16 6:00
6/5/16 18:00
6/6/16 6:00
Date
Upstream Flow Velocity
Upstream Water Level
Rainfall

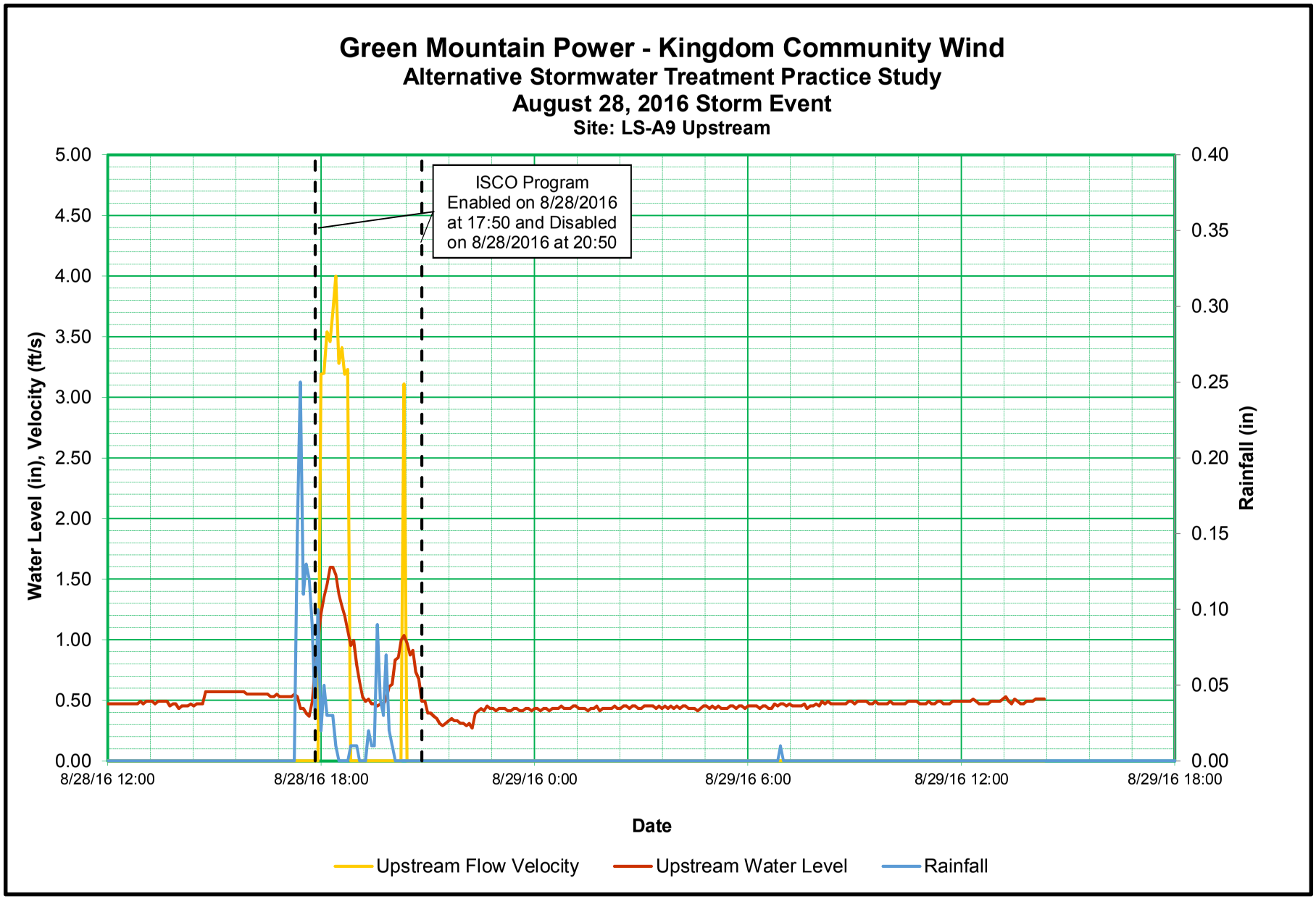

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
June 28-29, 2016 Storm Event
Site: LS-A9 Upstream
ISCO Program Enabled on 6/28/2016 at 17:25 But No Sample Taken Due to High Flow Dislodging the Intake Tube
Manual Grab Sample Collected on 6/29/2016 at 16:10
Water Level (in), Velocity (ft/s)
Rainfall (in)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6/28/16 12:00
6/29/16 0:00
6/29/16 12:00
6/30/16 0:00
Date
Upstream Flow Velocity
Upstream Water Level
Rainfall

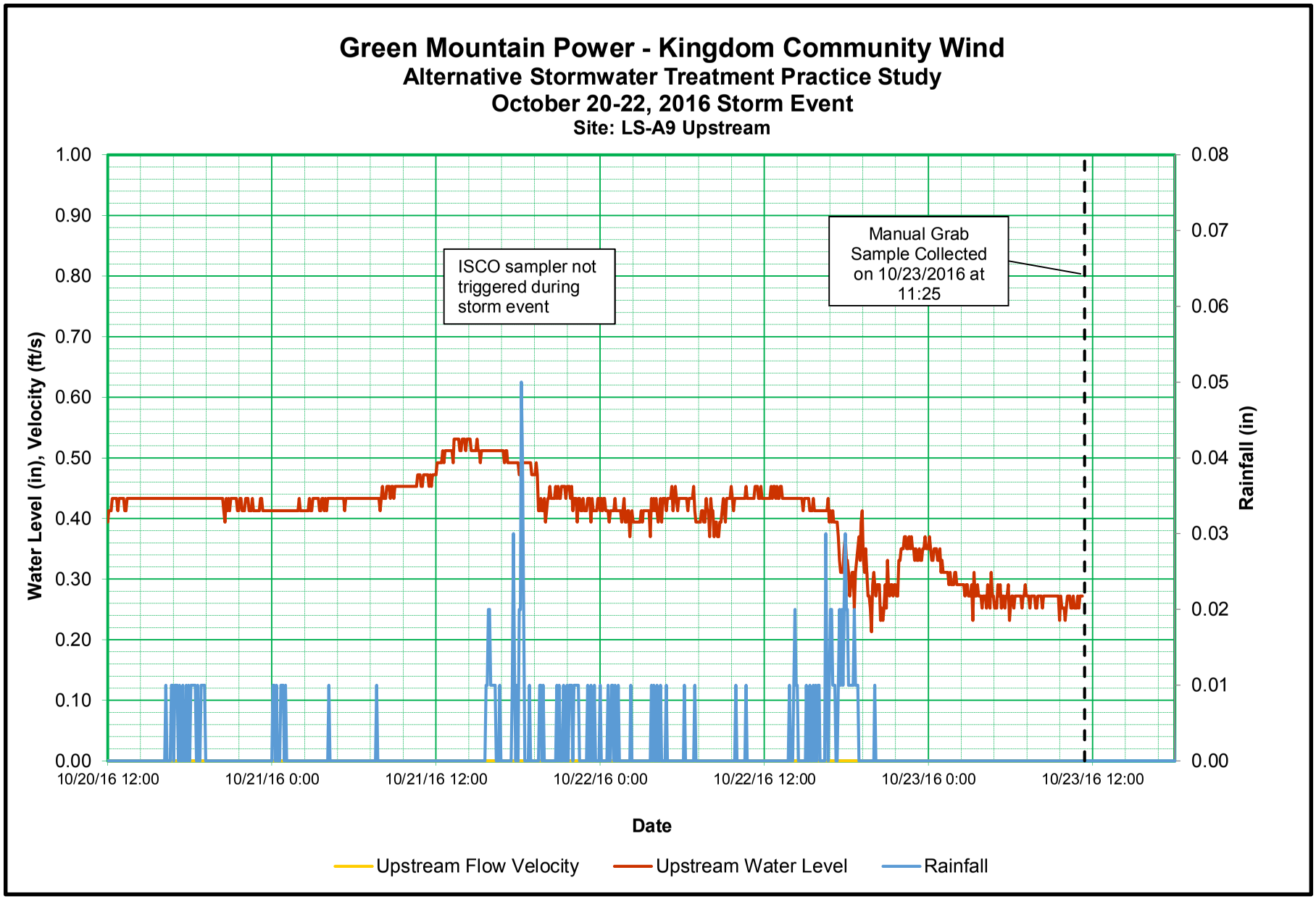

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
July 22-23, 2016 Storm Event
Site: LS-A9 Upstream
Water Level (in), Velocity (ft/s)
Rainfall (in)
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
7/22/16 0:00
7/22/16 12:00
7/23/16 0:00
7/23/16 12:00
7/24/16 0:00
7/24/16 12:00
Manual Grab Sample Collected on 7/24/2016 at 16:00
Date
Upstream Flow Velocity
Upstream Water Level
Rainfall

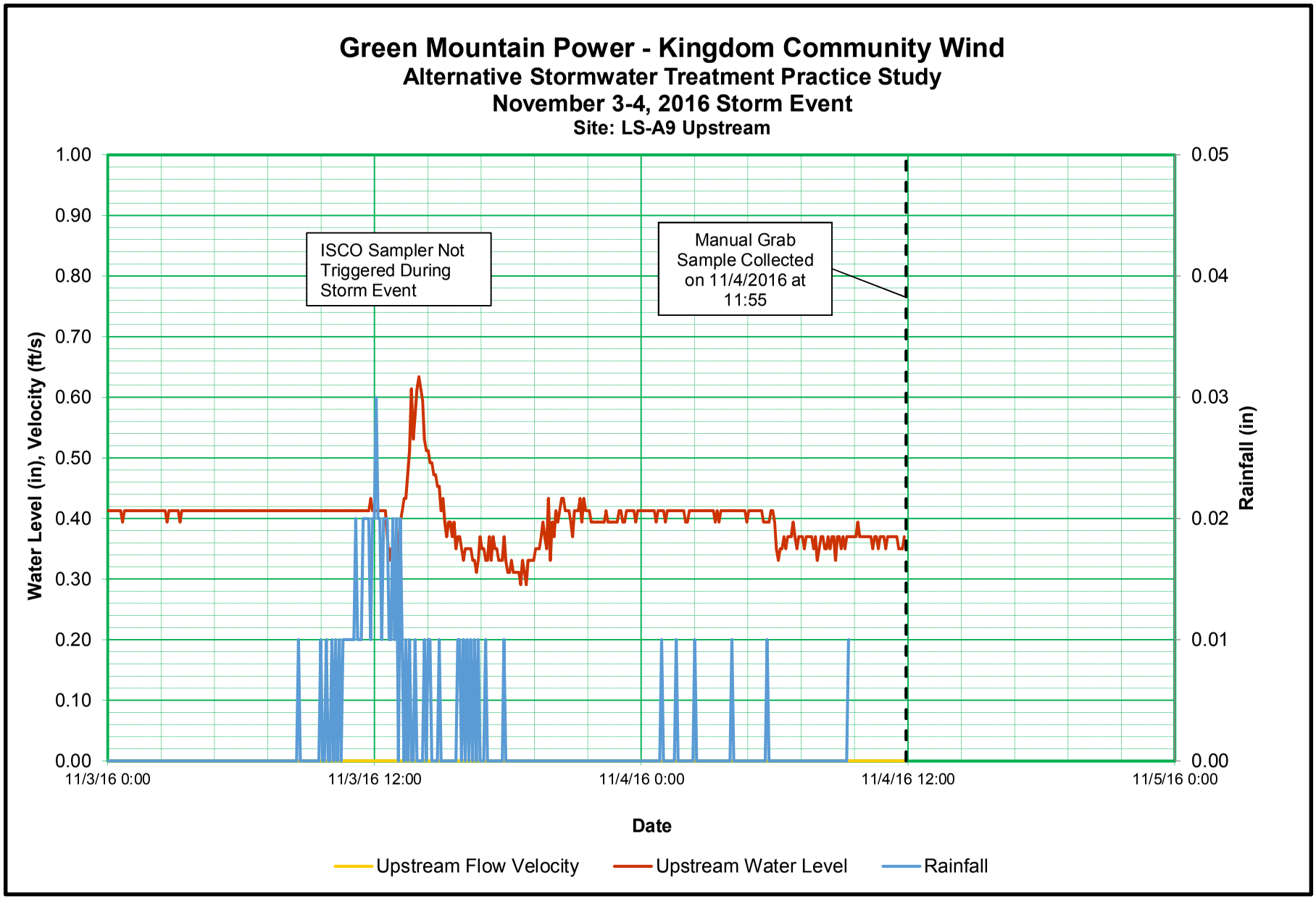

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 12-14, 2016 Storm Event
Site: LS-A9 Upstream
ISCO Program Enabled on 8/12/2016 at 14:30 and Disabled on 8/12/2016 at 17:20
ISCO Program Enabled on 8/14/2016 at 11:40 and Disables on 8/14/2016 at 13:10
Water Level (in), Velocity (ft/s)
Rainfall (in)
1.00
0.80
0.60
0.40
0.20
0.00
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
8/12/16 0:00
8/12/16 12:00
8/13/16 0:00
8/13/16 12:00
8/14/16 0:00
8/14/16 12:00
8/15/16 0:00
Date
Upstream Flow Velocity
Upstream Water Level
Rainfall

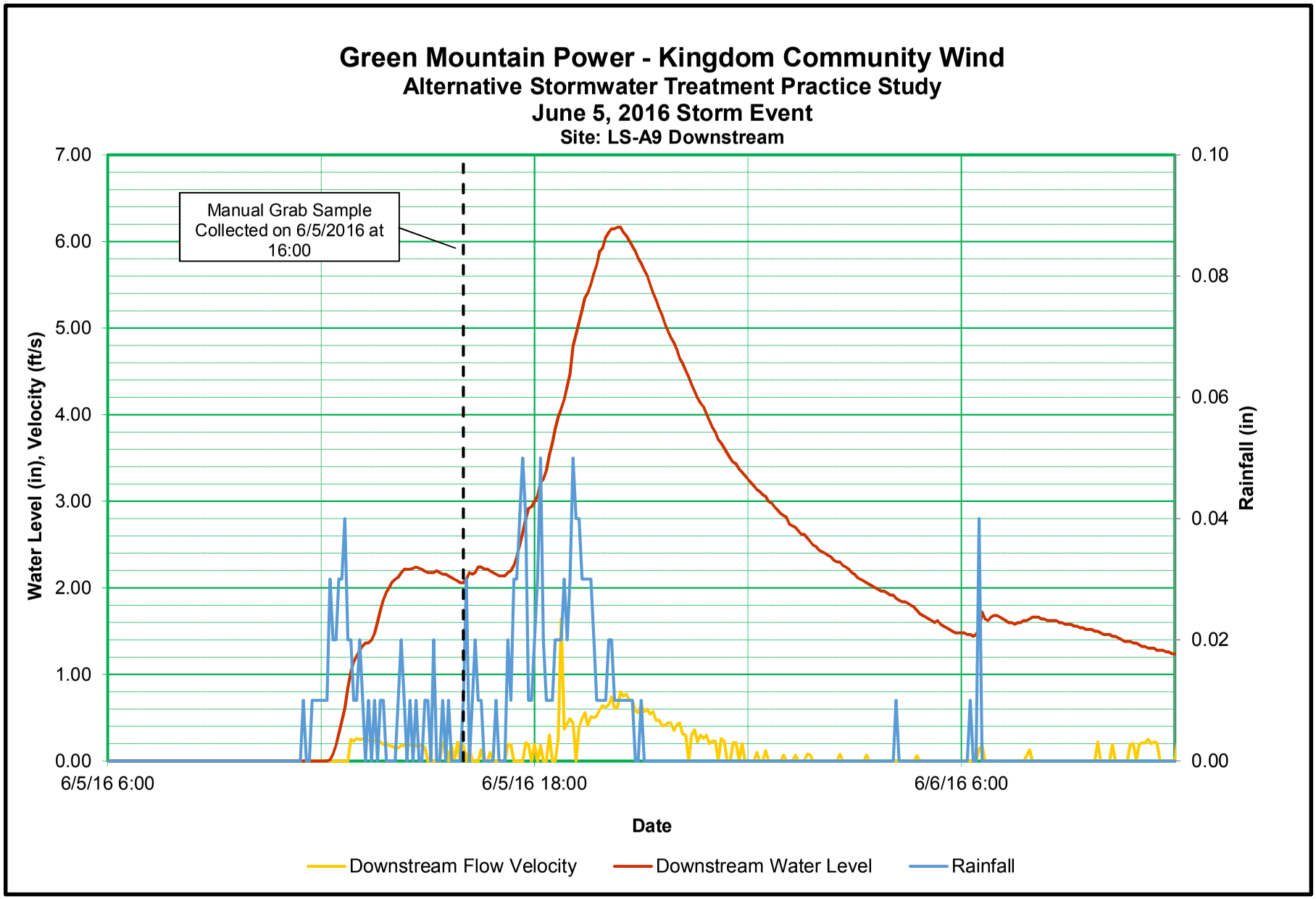

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 16-17, 2016 Storm Event
Site: LS-A9 Upstream
ISCO Program Enabled on 8/16/2016 at 9:25 and Disabled on 8/17/2016 at 0:25
Water Level (in), Velocity (ft/s)
Rainfall (in)
1.00
0.80
0.60
0.40
0.20
0.00
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
8/16/16 0:00
8/16/16 12:00
8/17/16 0:00
8/17/16 12:00
8/18/16 0:00
Date
Upstream Flow Velocity
Upstream Water Level
Rainfall

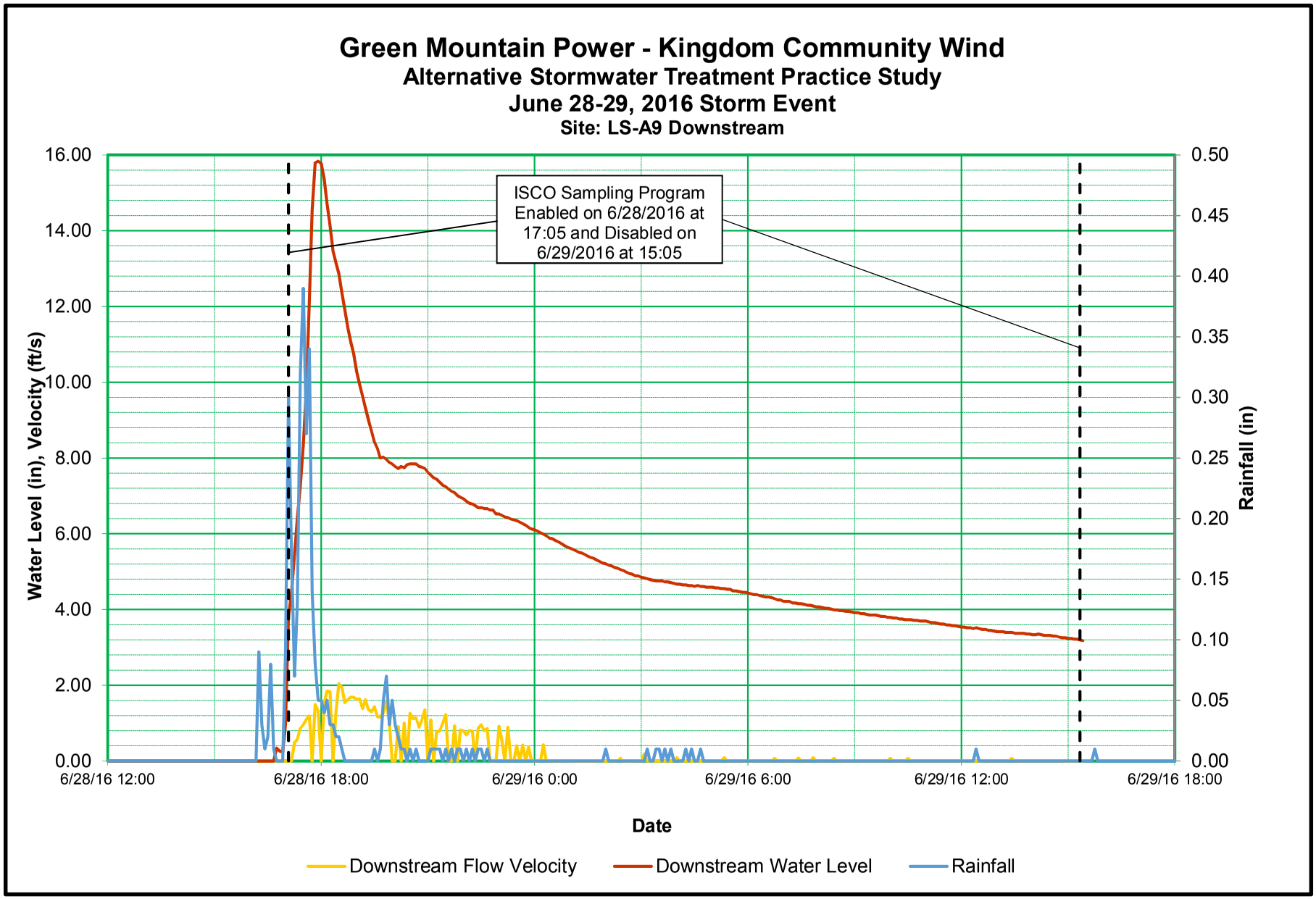

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 21-22, 2016 Storm Event
Site: LS-A9 Upstream
No Sample Collected During Storm Event
Water Level (in), Velocity (ft/s)
Rainfall (in)
1.00
0.80
0.60
0.40
0.20
0.00
0.05
0.04
0.03
0.02
0.01
0.00
8/21/16 0:00
8/21/16 12:00
8/22/16 0:00
8/22/16 12:00
Date
Upstream Flow Velocity
Upstream Water Level
Rainfall

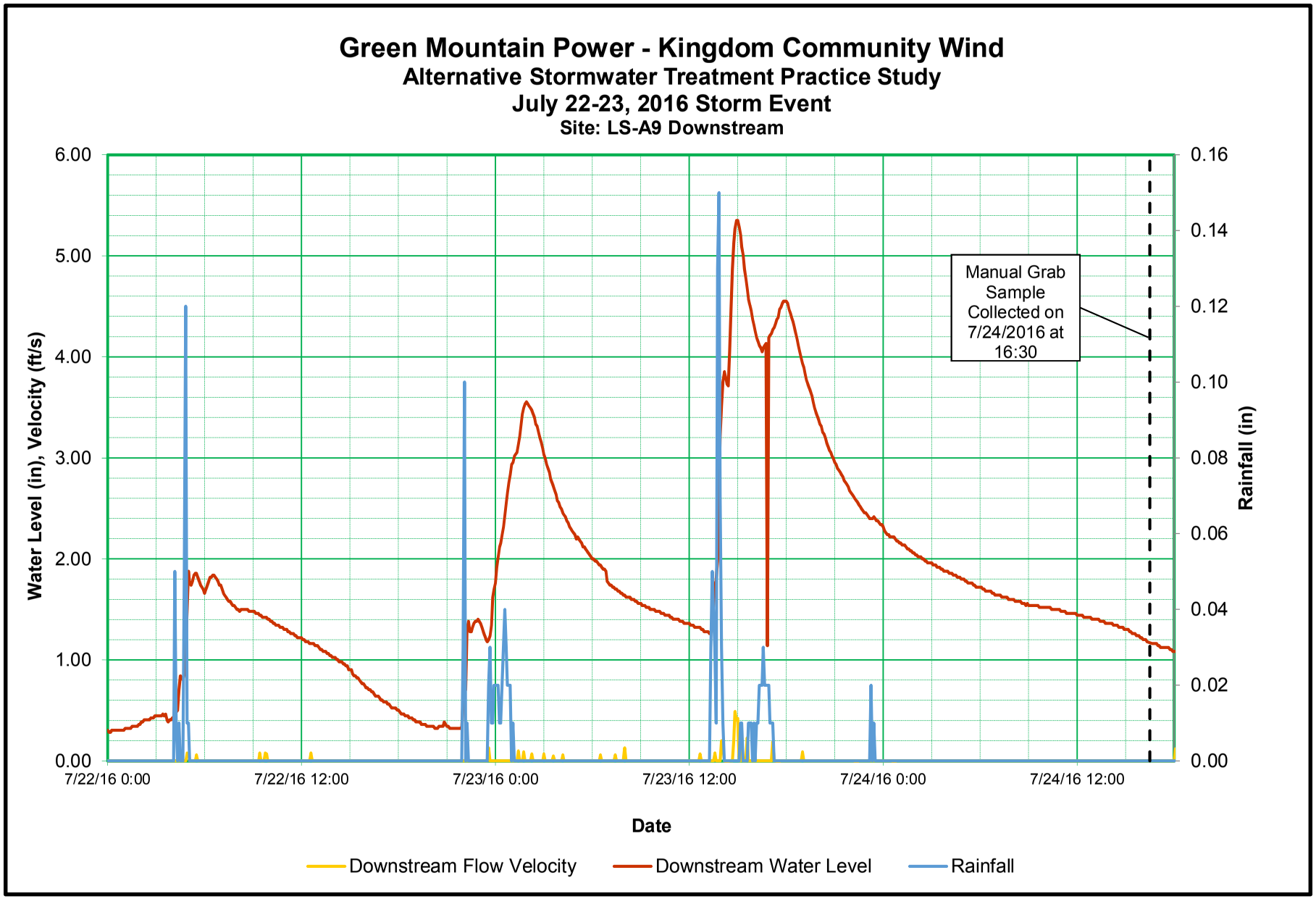

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 28, 2016 Storm Event
Site: LS-A9 Upstream
ISCO Program Enabled on 8/28/2016 at 17:50 and Disabled on 8/28/2016 at 20:50
Water Level (in), Velocity (ft/s)
Rainfall (in)
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
8/28/16 12:00
8/28/16 18:00
8/29/16 0:00
8/29/16 6:00
8/29/16 12:00
8/29/16 18:00
Date
Upstream Flow Velocity
Upstream Water Level
Rainfall

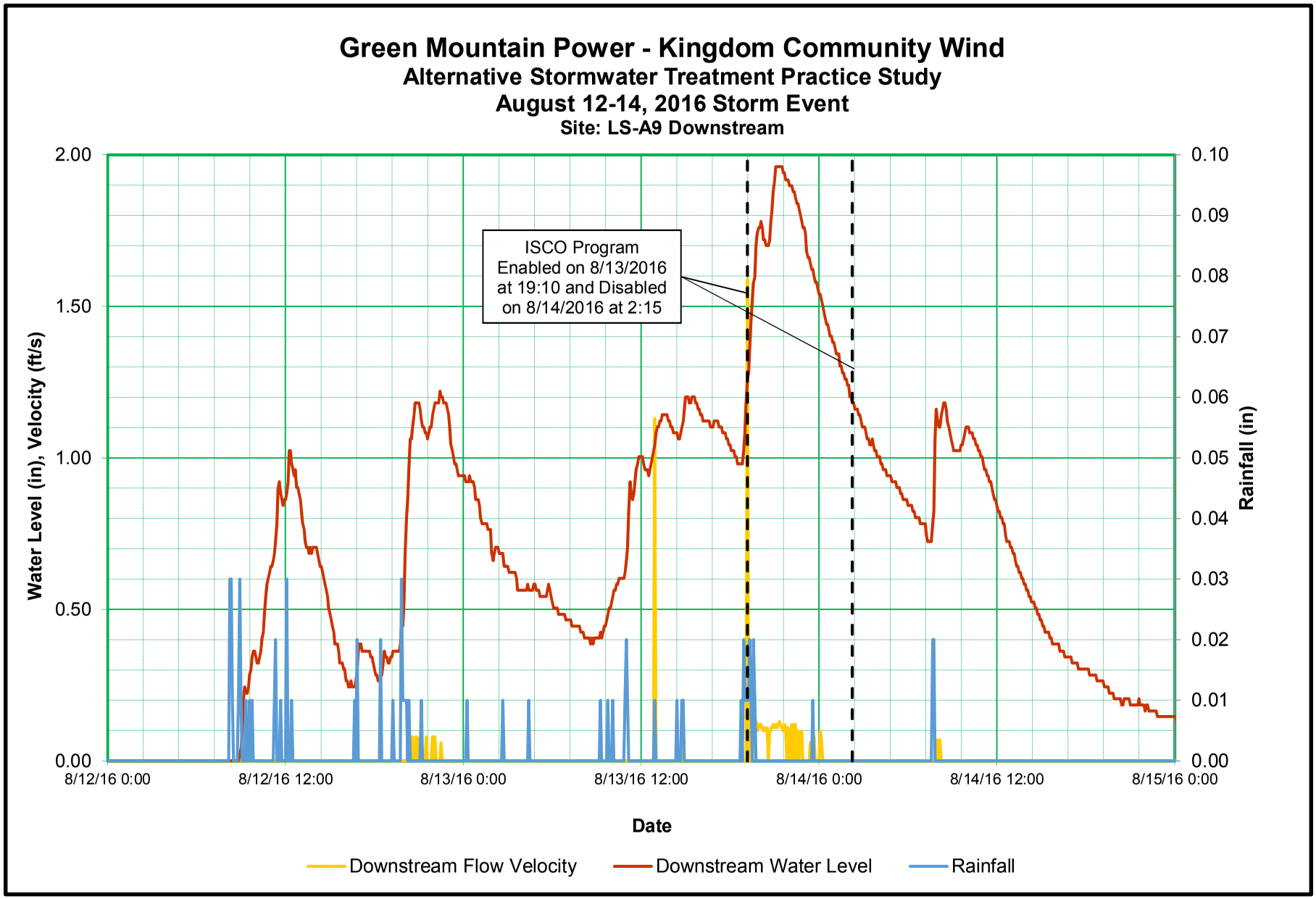

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
October 20-22, 2016 Storm Event
Site: LS-A9 Upstream
ISCO sampler not triggered during storm event
Manual Grab Sample Collected on 10/23/2016 at 11:25
Water Level (in), Velocity (ft/s)
Rainfall (in)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
10/20/16 12:00
10/21/16 0:00
10/21/16 12:00
10/22/16 0:00
10/22/16 12:00
10/23/16 0:00
10/23/16 12:00
Date
Upstream Flow Velocity
Upstream Water Level
Rainfall

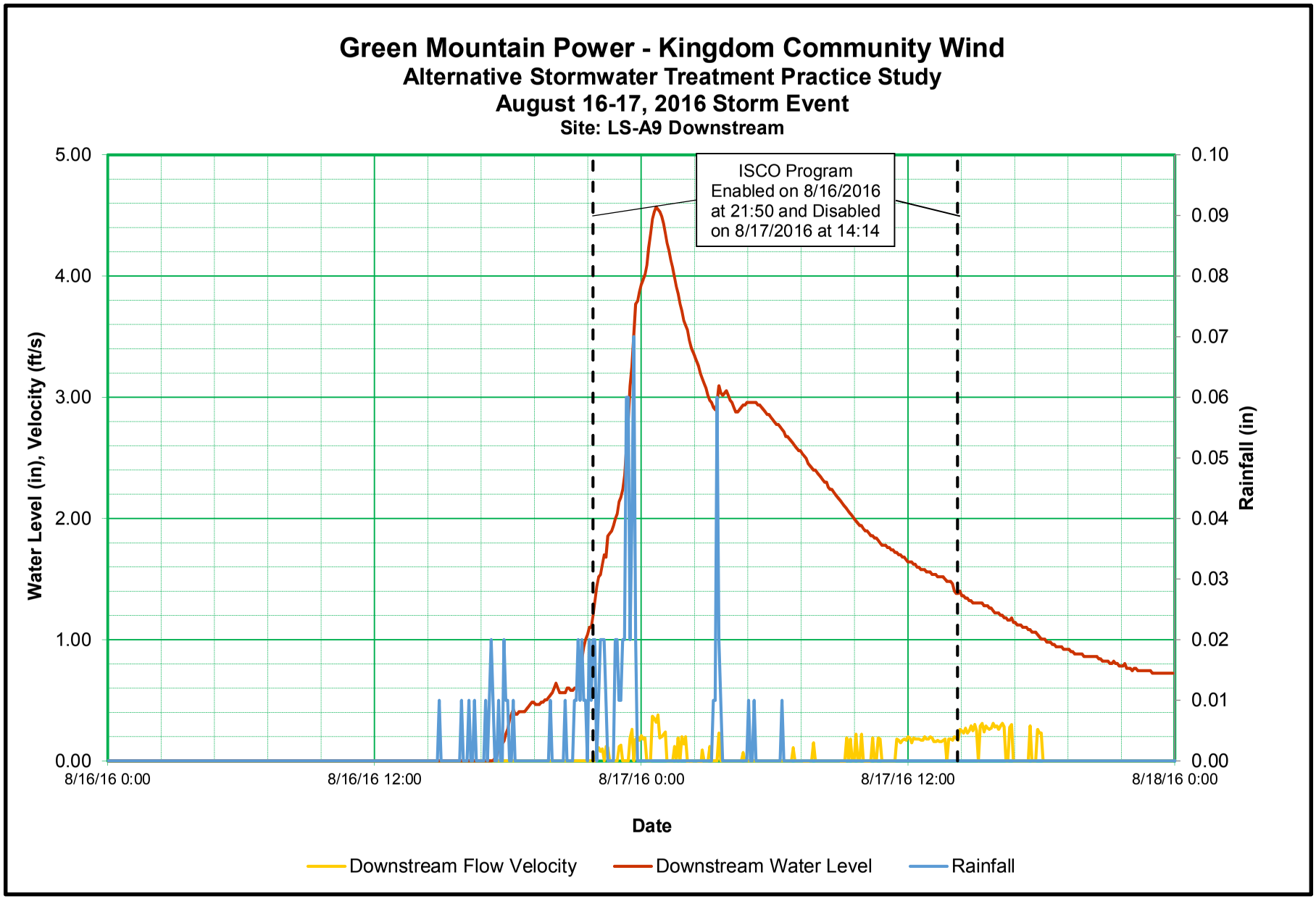

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
November 3-4, 2016 Storm Event
Site: LS-A9 Upstream
ISCO Sampler Not Triggered During Storm Event
Manual Grab Sample Collected on 11/4/2016 at 11:55
Water Level (in), Velocity (ft/s)
Rainfall (in)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.05
0.04
0.03
0.02
0.01
0.00
11/3/16 0:00
11/3/16 12:00
11/4/16 0:00
11/4/16 12:00
11/5/16 0:00
Date
Upstream Flow Velocity
Upstream Water Level
Rainfall

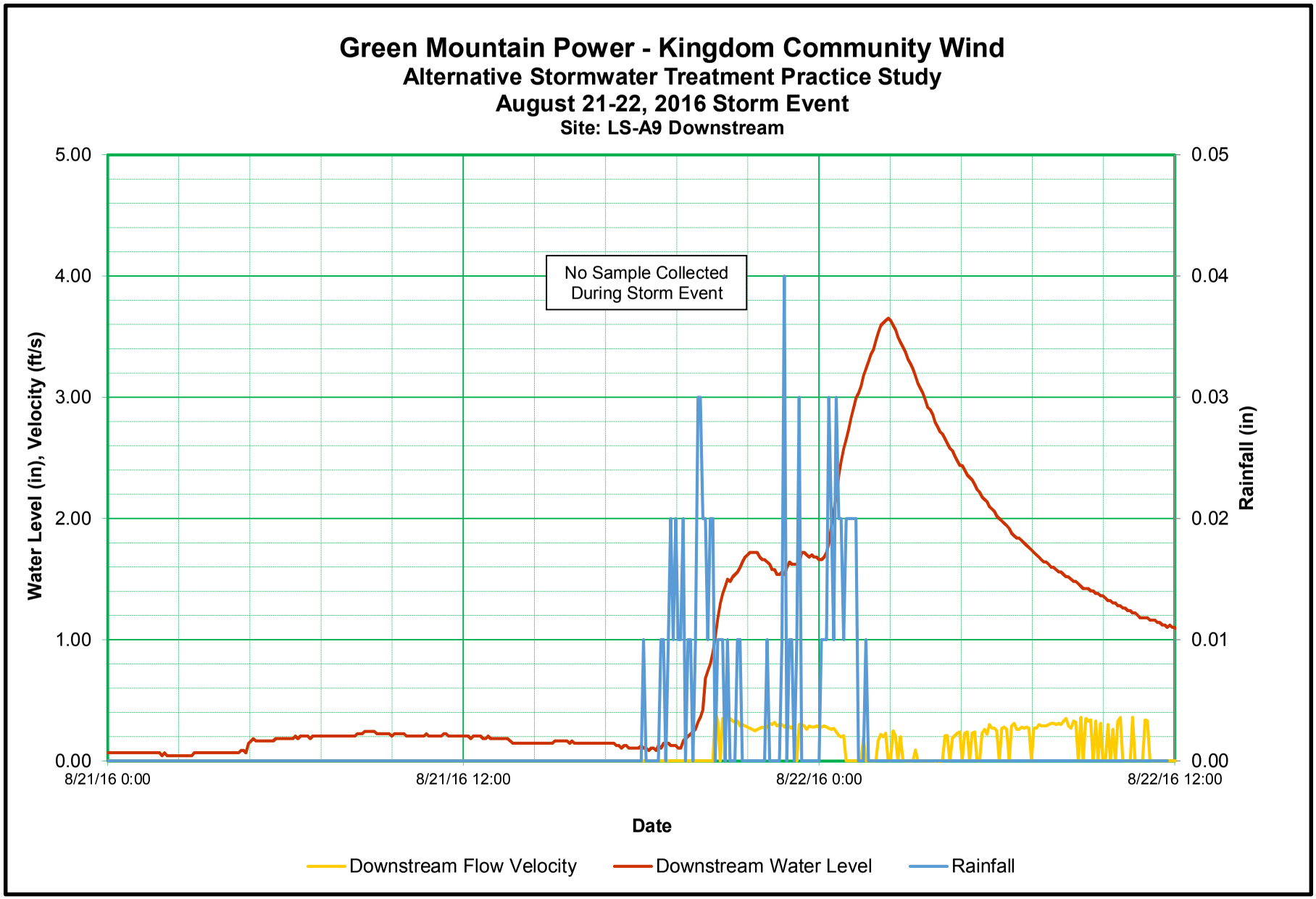

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
June 5, 2016 Storm Event
Site: LS-A9 Downstream
Manual Grab Sample Collected on 6/5/2016 at 16:00
Water Level (in), Velocity (ft/s)
Rainfall (in)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.10
0.08
0.06
0.04
0.02
0.00
6/5/16 6:00
6/5/16 18:00
6/6/16 6:00
Date
Downstream Flow Velocity
Downstream Water Level
Rainfall

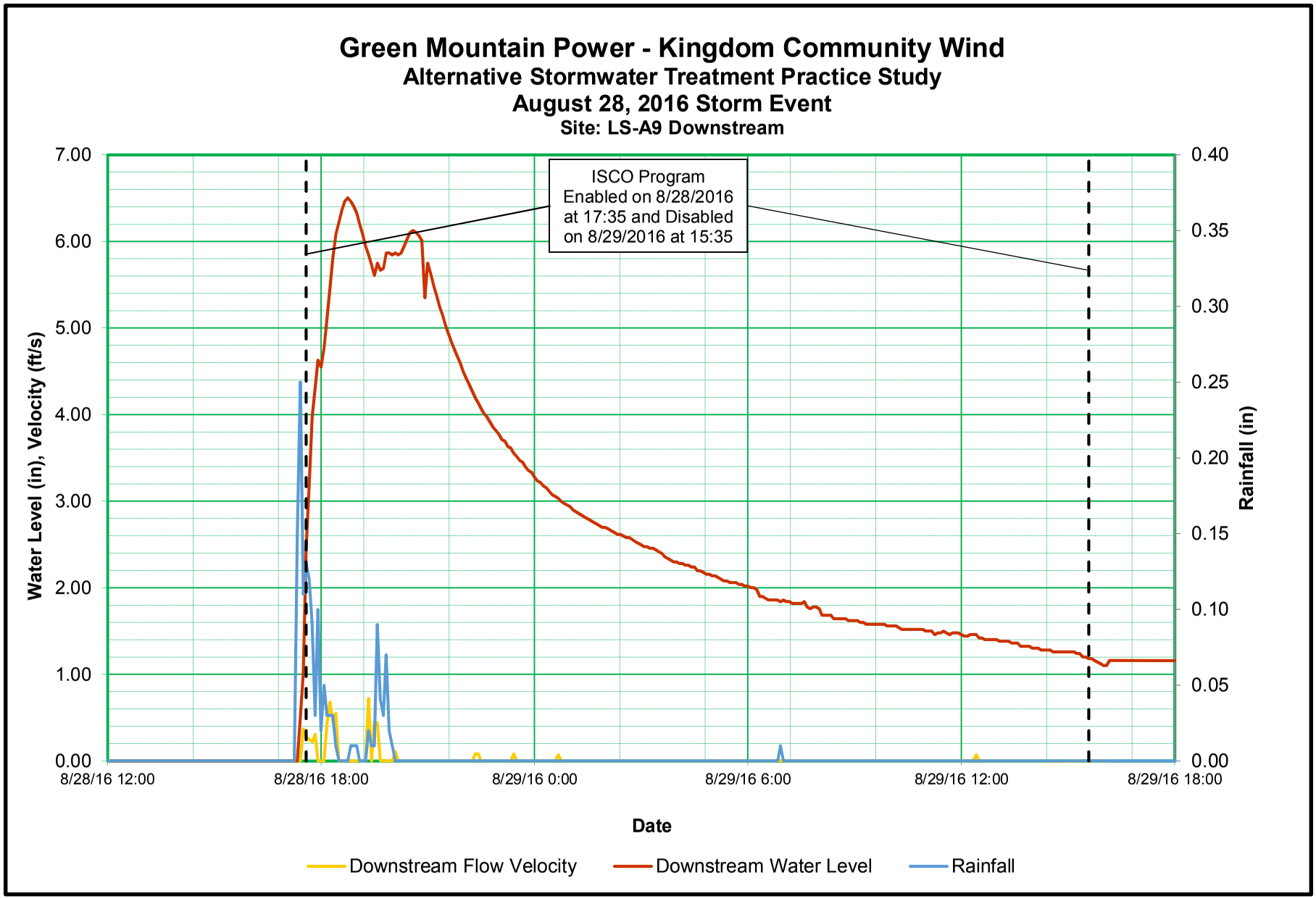

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
June 28-29, 2016 Storm Event
Site: LS-A9 Downstream
ISCO Sampling Program Enabled on 6/28/2016 at 17:05 and Disabled on 6/29/2016 at 15:05
Water Level (in), Velocity (ft/s)
Rainfall (in)
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6/28/16 12:00
6/28/16 18:00
6/29/16 0:00
6/29/16 6:00
6/29/16 12:00
6/29/16 18:00
Date
Downstream Flow Velocity
Downstream Water Level
Rainfall

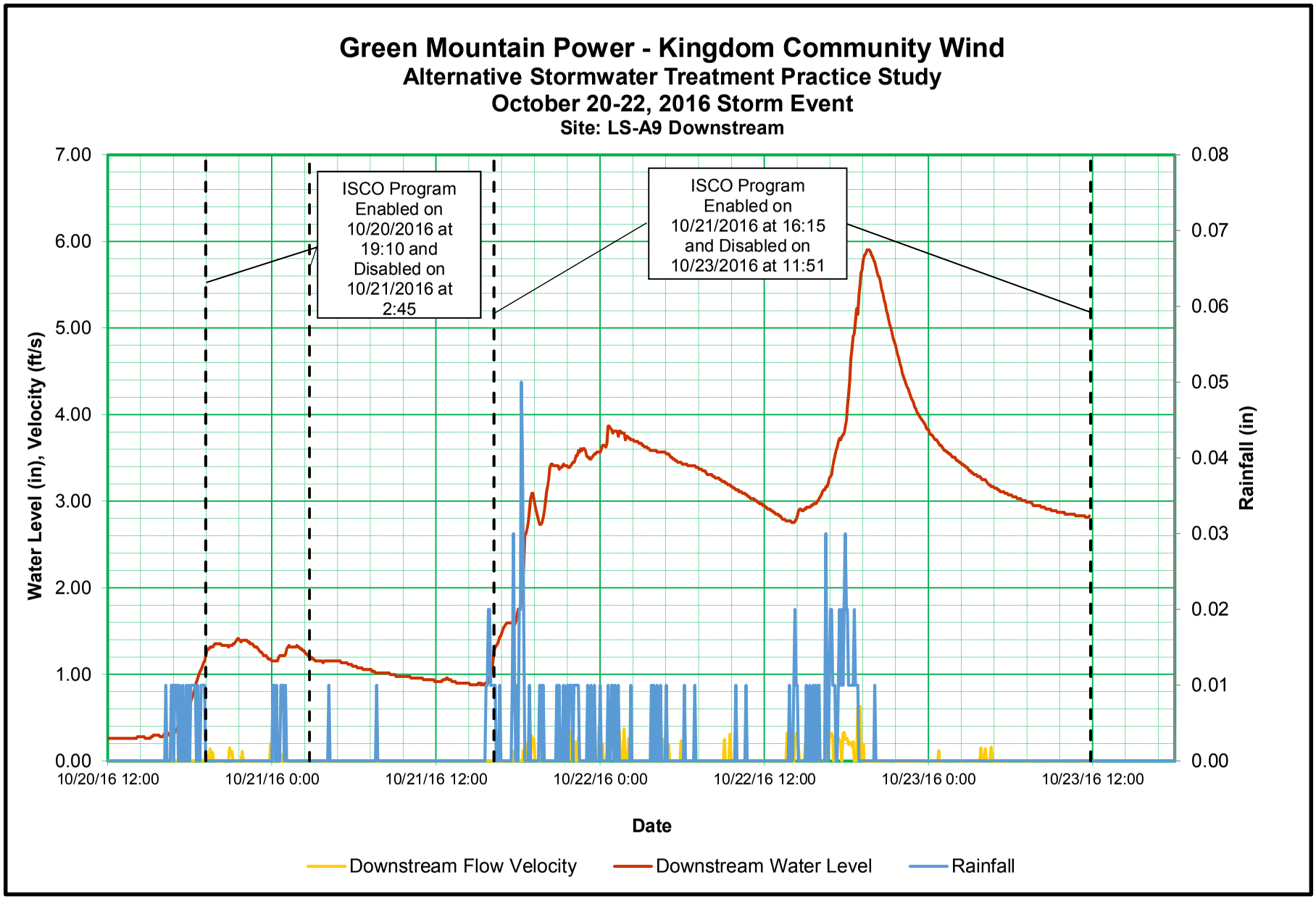

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
July 22-23, 2016 Storm Event
Site: LS-A9 Downstream
Water Level (in), Velocity (ft/s)
Rainfall (in)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Manual Grab Sample Collected on 7/24/2016 at 16:30
7/22/16 0:00
7/22/16 12:00
7/23/16 0:00
7/23/16 12:00
7/24/16 0:00
7/24/16 12:00
Date
Downstream Flow Velocity
Downstream Water Level
Rainfall

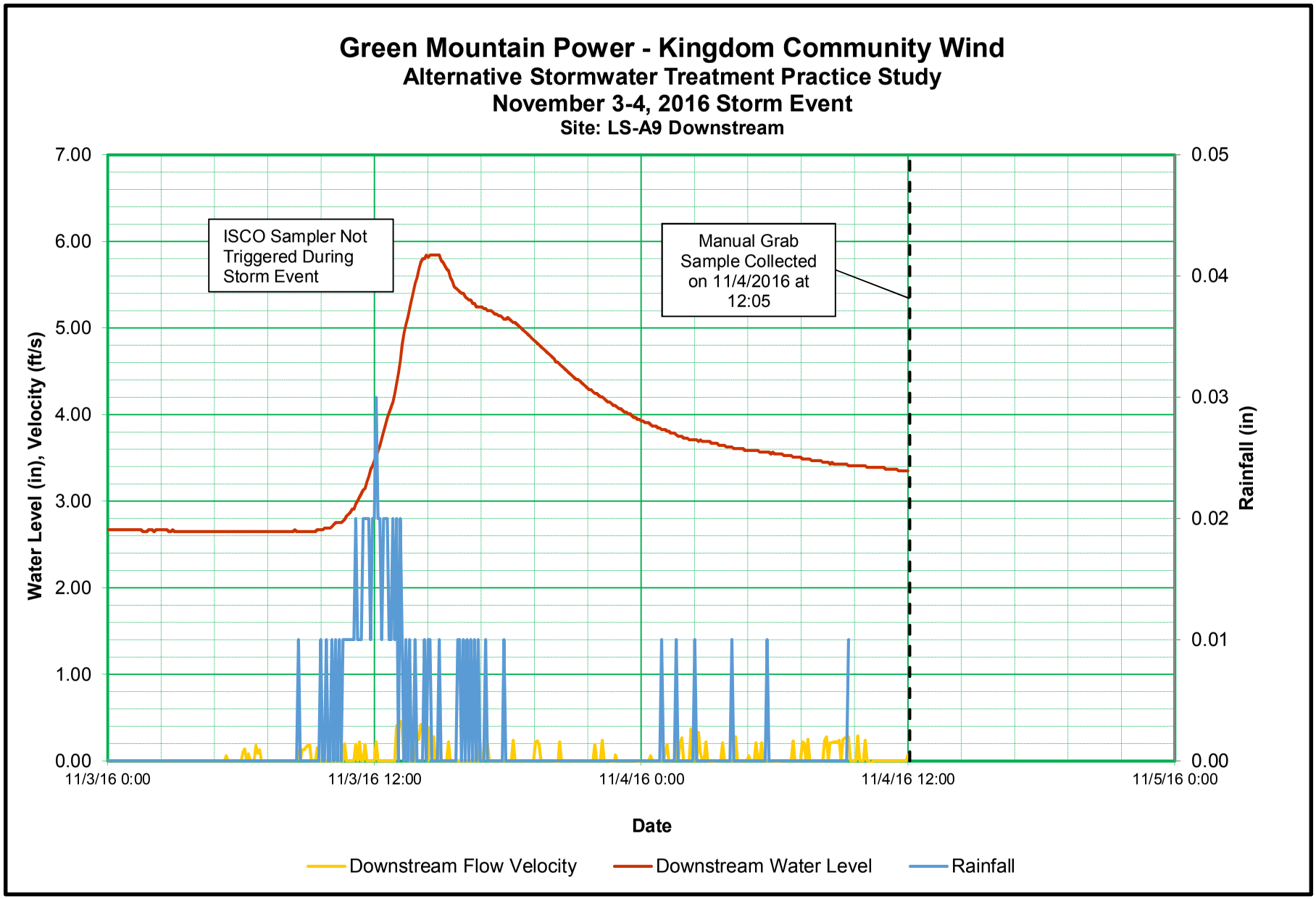

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 12-14, 2016 Storm Event
Site: LS-A9 Downstream
ISCO Program Enabled on 8/13/2016 at 19:10 and Disabled on 8/14/2016 at 2:15
Water Level (in), Velocity (ft/s)
Rainfall (in)
2.00
1.50
1.00
0.50
0.00
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
8/12/16 0:00
8/12/16 12:00
8/13/16 0:00
8/13/16 12:00
8/14/16 0:00
8/14/16 12:00
8/15/16 0:00
Date
Downstream Flow Velocity
Downstream Water Level
Rainfall


Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 16-17, 2016 Storm Event
Site: LS-A9 Downstream
ISCO Program Enabled on 8/16/2016 at 21:50 and Disabled on 8/17/2016 at 14:14
Water Level (in), Velocity (ft/s)
Rainfall (in)
5.00
4.00
3.00
2.00
1.00
0.00
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
8/16/16 0:00
8/16/16 12:00
8/17/16 0:00
8/17/16 12:00
8/18/16 0:00
Date
Downstream Flow Velocity
Downstream Water Level
Rainfall


Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 21-22, 2016 Storm Event
Site: LS-A9 Downstream
No Sample Collected During Storm Event
Water Level (in), Velocity (ft/s)
Rainfall (in)
5.00
4.00
3.00
2.00
1.00
0.00
0.05
0.04
0.03
0.02
0.01
0.00
8/21/16 0:00
8/21/16 12:00
8/22/16 0:00
8/22/16 12:00
Date
Downstream Flow Velocity
Downstream Water Level
Rainfall


Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
August 28, 2016 Storm Event
Site: LS-A9 Downstream
ISCO Program Enabled on 8/28/2016 at 17:35 and Disabled on 8/29/2016 at 15:35
Water Level (in), Velocity (ft/s)
Rainfall (in)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
8/28/16 12:00
8/28/16 18:00
8/29/16 0:00
8/29/16 6:00
8/29/16 12:00
8/29/16 18:00
Date
Downstream Flow Velocity
Downstream Water Level
Rainfall


Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
October 20-22, 2016 Storm Event
Site: LS-A9 Downstream
ISCO Program Enabled on 10/20/2016 at 19:10 and Disabled on 10/21/2016 at 2:45
ISCO Program Enabled on 10/21/2016 at 16:15 and Disabled on 10/23/2016 at 11:51
Water Level (in), Velocity (ft/s)
Rainfall (in)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
10/20/16 12:00
10/21/16 0:00
10/21/16 12:00
10/22/16 0:00
10/22/16 12:00
10/23/16 0:00
10/23/16 12:00
Date
Downstream Flow Velocity
Downstream Water Level
Rainfall


Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
November 3-4, 2016 Storm Event
Site: LS-A9 Downstream
ISCO Sampler Not Triggered During Storm Event
Manual Grab Sample Collected on 11/4/2016 at 12:05
Water Level (in), Velocity (ft/s)
Rainfall (in)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.05
0.04
0.03
0.02
0.01
0.00
11/3/16 0:00
11/3/16 12:00
11/4/16 0:00
11/4/16 12:00
11/5/16 0:00
Date
Downstream Flow Velocity
Downstream Water Level
Rainfall

Appendix 5

- Event results for all sampled storm events
- Laboratory Reports and Chains of Custody

Green Mountain Power - Kingdom Community Wind
Alternative Stormwater Treatment Practice Study
Summary Table of 2016 Rainfall Events Sampled
Prepared by VHB on: January 4, 2017

Sampling Event	Start of Rain Event	End of Rain Event	Duration of Rainfall (hrs:min)	Depth of Rainfall (in)	5-minute Peak Intensity (in / hr)	72-hr Antecedent Rainfall	LS-A9 Inlet			LS-A9 Overland Flow			% Removal		LS-A9 U/S			LS-A9 D/S			Comments
							Type	TSS (mg/L)	TP (mg/L)	Type	TSS (mg/L)	TP (mg/L)	TSS	TP	Type	TSS (mg/L)	TP (mg/L)	Type	TSS (mg/L)	TP (mg/L)	
1	06/05/2016 11:30	06/05/2016 21:00	9:30	1.55	0.60	0.00	Grab	*42*	*0.098*	NA	--	--	--	--	Grab	14	0.048	Grab	11	0.032	Level lip overtopped. Inlet sampler collected single sample at start of storm. Upstream and downstream samplers did not trigger; manual grab samples collected (6/5/2016 - 15:50 and 16:00).
2	06/28/2016 16:15	06/29/2016 15:45	23:30	3.39	4.68	0.03	Composite	*85*	*0.12*	Composite	10	0.052	*88%*	*57%*	Grab	5	0.02	Composite	3	0.023	Level lip likely overtopped. Upstream sampler did not trigger; manual grab sample collected (6/29/2016 - 16:10); Inlet composite not flow weighted correctly.
3	07/22/2016 04:10	07/23/2016 23:25	43:15	1.62	1.80	0.00	Composite	*16*	*0.026*	Composite	19	0.092	*-19%*	*-254%*	Grab	7	0.014	Grab	35	0.026	Level lip likely overtopped. Upstream and downstream samplers did not trigger - grabs sample collected (7/24/2016 - 16:00 and 16:30). Inlet composite not flow weighted correctly.
4	08/12/2016 08:15	08/14/2016 07:45	47:30	0.7	0.36	0.00	NA	--	--	Composite	18	0.3	--	--	Composite	6	0.024	Composite	9	0.018	Level lip did not overtop. Low intensity storm, inlet triggered but couldn't get enough volume.
5	08/16/2016 14:55	08/17/2016 06:20	15:25	0.92	0.84	0.19	Composite	594	0.25	Composite	17	0.091	**97%**	**64%**	Composite	3	0.015	Composite	55	0.079	Level lip did not overtop. Samples at all stations; U/S sample triggered before peak of storm event, D/S matched receeding limb better. **QA/QC Qualifying Event.**
6	08/21/2016 18:05	08/22/2016 01:35	7:30	0.77	0.48	0.00	Composite	132	0.13	Composite	29	0.26	**78%**	**-100%**	NA	--	--	NA	--	--	Level lip did not overtop. Composite coverage at inlet; upstream and downstream samplers did not trigger. **QA/QC Qualifying Event.**
7	08/28/2016 17:20	08/28/2016 20:00	2:40	1.48	3.00	0.00	Composite	2430	1.3	Composite	9	0.097	100%	93%	Composite	161	0.28	Composite	153	0.22	Level lip overtopped. Short, intense event, good composite coverage at all samplers. **QA/QC Qualifying Event**.
8	10/20/2016 16:15	10/22/2016 20:05	51:50	1.48	0.60	0.05	Composite	69	0.01	Composite	10	0.24	86%	-2300%	Grab	*3*	*0.019*	Composite	21	0.037	Level lip overtopped. Long, low intensity storm; U/S sampler not triggered. Snow over night. **QA/QC Qualifying Event.**
9	11/03/2016 08:35	11/04/2016 09:20	24:45	0.77	0.36	0	Grab	*23*	*0.028*	Composite	9	0.082	*61%*	*-193%*	Grab	*1*	*0.012*	Grab	*8*	*0.019*	Level lip overtopped. Samplers were not triggered, grab samples were taken after event (11/4/2016 - 11:45 to 12:15)

Note: Sample results in *italics* indicate that data does not meet QA/QC criteria. Sample results in **bold** indicate that theoretical removal efficiency is 100 % because level lip did not overtop.

ENDYNE Inc.
Environmental Laboratories

Vanasse Hangen Brustlin, Inc.	
40 IDX Drive	090395
Building 200, Suite 200	
South Burlington, VT 05403	
Atten: Robert Athen	

PROJECT: GMP KCW
WORK ORDER: **1606-11403**
DATE RECEIVED: June 06, 2016
DATE REPORTED: June 16, 2016
SAMPLER: Robert Athen

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 06/16/2016

CLIENT: Vanasse Hangen Brustlin, Inc. WORK ORDER: **1606-11403**
PROJECT: GMP KCW DATE RECEIVED 06/06/2016

001 Site: KCW LS-A9 Up Date Sampled: 6/5/16 Time: 15:50

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.048	mg/L	SM20 4500 P-F	6/13/16 12:20	R AJR	A	
Solids, Total Suspended	14	mg/L	SM 2540 D-97	6/8/16	W JSS	A	

002 Site: KCW LS-A9 Dn Date Sampled: 6/5/16 Time: 16:00

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.032	mg/L	SM20 4500 P-F	6/13/16 12:21	R AJR	A	
Solids, Total Suspended	11	mg/L	SM 2540 D-97	6/8/16	W JSS	A	

003 Site: KCW LS-A9 Inlet Date Sampled: 6/6/16 Time: 14:20

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.098	mg/L	SM20 4500 P-F	6/13/16 12:23	R AJR	A	
Solids, Total Suspended	42	mg/L	SM 2540 D-97	6/8/16	W JSS	A	

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: 57346.11

77281

Project Name: GMP KCW	Client/Contact Name: Robert Wildey	Sampler Name: Robert Athen
State of Origin: VT ✓ NY __ NH __ Other __	Phone #: 802-497-6164	Phone #: 802-497-6141
Endyne WO #	Mailing Address: VHB	Billing Address: VHB

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	FieldResults/Remarks	Due Date
KCW LS-A9 UP	Water	X		6/5/16 1550	1 1	160z 60mL	None H2SO4	33, 37		2 wk
KCW LS-A9 DN	↓	↓		6/5/16 1600	↓	↓	↓	↓		
KCW LS-A9 Inlet	↓	↓		6/6/16 1420	↓	↓	↓	↓		↓

1606-11403
1606-11403
Vanasse Hangen Brustlin, Inc.
GMP KCW

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
				Glen Lomey	6/6/16 @ 1630

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					(33)	Other TSS				
34	Corrosivity	35	Ignitability	36	Reactivity	(37)	Other TP				
38	Other										

LAB USE ONLY
Delivery: Client
Temp: 1.2
Comment:

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Page ____ of ____

4

ENDYNE Inc.
Environmental Laboratories

Vanasse Hangen Brustlin, Inc.	
40 IDX Drive	090395
Building 200, Suite 200	
South Burlington, VT 05403	
Atten: Robert Wildey	

PROJECT: KCW GMP
WORK ORDER: **1606-13698**
DATE RECEIVED: June 30, 2016
DATE REPORTED: July 07, 2016
SAMPLER: Robert

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 07/07/2016

CLIENT: Vanasse Hangen Brustlin, Inc. WORK ORDER: **1606-13698**
PROJECT: KCW GMP DATE RECEIVED 06/30/2016

001 Site: LS-A9 Inlet Date Sampled: 6/29/16 Time: 14:40

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.12	mg/L	SM20 4500 P-F	7/5/16 13:33	R SMY	A	
Solids, Total Suspended	85	mg/L	SM 2540 D-97	7/5/16	W JSS	A	

002 Site: LS-A9 USTR Date Sampled: 6/29/16 Time: 16:10

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.020	mg/L	SM20 4500 P-F	7/5/16 13:35	R SMY	A	
Solids, Total Suspended	5	mg/L	SM 2540 D-97	7/5/16	W JSS	A	

003 Site: LS-A9 DSTR Date Sampled: 6/29/16 Time: 15:35

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.023	mg/L	SM20 4500 P-F	7/5/16 13:37	R SMY	A	
Solids, Total Suspended	3	mg/L	SM 2540 D-97	7/5/16	W JSS	A	

004 Site: LS-A9 ROSS Date Sampled: 6/29/16 Time: 15:55

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.052	mg/L	SM20 4500 P-F	7/5/16 13:38	R SMY	A	
Solids, Total Suspended	10	mg/L	SM 2540 D-97	7/5/16	W JSS	A	

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

76072

Special Reporting Instructions/PO#: 57346.11

Project Name: KCW GMP	Client/Contact Name: Robert Wildey	Sampler Name: Robert Athan
State of Origin: VT X NY __ NH __ Other __	Phone #: 802-497-6164	Phone #: 802-497-6141
Endyne WO #	Mailing Address: VHB	Billing Address: VHB

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	FieldResults/Remarks	Due Date
LS-A9 INLET	water		X	6/29/16 1440	1	16 oz 60 mL	None H2SO4	33,37		2 wk
LS-A9 USTR	↓	X		1610	↓	↓	↓	↓		↓
LS-A9 DSTR	↓		X	1535	↓	↓	↓	↓		↓
LS-A9 ROSS	↓		X	1555	↓	↓	↓	↓		↓

1606-13698
1606-13698
Vanasse Hangen Brustlin, Inc.
KCW GMP

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
Robert Athan	6/30/16 8:35			Eileen Toomey	6/30/16 8:35

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					(33)	Other TSS				
34	Corrosivity	35	Ignitability	36	Reactivity	(37)	Other TP				
38	Other										

LAB USE ONLY
Delivery: Client
Temp: 2.0
Comment:

(White - Laboratory / Yellow - Client)

Page ____ of ____

ENDYNE Inc.
Environmental Laboratories

Vanasse Hangen Brustlin, Inc.	
40 IDX Drive	090395
Building 200, Suite 200	
South Burlington, VT 05403	
Atten: Robert Wildey	

PROJECT: LS-A9
WORK ORDER: **1607-16038**
DATE RECEIVED: July 26, 2016
DATE REPORTED: August 03, 2016
SAMPLER: Robert Wildey

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 08/03/2016

CLIENT: Vanasse Hangen Brustlin, Inc. WORK ORDER: **1607-16038**
PROJECT: LS-A9 DATE RECEIVED 07/26/2016

001 Site: LS-A9 Inlet Date Sampled: 7/24/16 Time: 15:20

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.026	mg/L	SM20 4500 P-F	8/1/16 12:38	R LS	A	
Solids, Total Suspended	16	mg/L	SM 2540 D-97	7/27/16	W JSS	A	

002 Site: LS-A9 USTR Date Sampled: 7/24/16 Time: 16:00

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.026	mg/L	SM20 4500 P-F	8/1/16 12:40	R LS	A	
Solids, Total Suspended	35	mg/L	SM 2540 D-97	7/27/16	W JSS	A	

003 Site: LS-A9 DSTR Date Sampled: 7/24/16 Time: 16:30

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.014	mg/L	SM20 4500 P-F	8/1/16 12:42	R LS	A	
Solids, Total Suspended	7	mg/L	SM 2540 D-97	7/27/16	W JSS	A	

004 Site: LS-A9 DGN Date Sampled: 7/24/16 Time: 17:00

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.092	mg/L	SM20 4500 P-F	8/1/16 12:43	R LS	A	
Solids, Total Suspended	19	mg/L	SM 2540 D-97	7/27/16	W JSS	A	

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: 57346.11

76213

Project Name:	Client/Contact Name: RVHB ROBERT WILDEY	Sampler Name: SAME
State of Origin: VT __ NY __ NH __ Other __	Phone #: (802) 497-6164	Phone #: RWILDEY@VHB.COM
Endyne WO #	Mailing Address: 40 IDX DR S.BURLINGTON 05403	Billing Address: SAME

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	FieldResults/Remarks	Due Date
LS-A9 INLET	SW		X	7/24/16 15:20	1	160z 60mL	NO H_2SO_4	7, 12		
LS-A9 USTR	SW	X		7/24/16 16:00	1	1	1	7, 12		
LS-A9 DSTR	SW	X		7/24/16 16:30	1	1	1	7, 12		
LS-A9 DGN	SW		X	7/24/16 17:00	1	1	1	7, 12		

1607-16038

1607-16038

Vanasse Hangen Brustlin, Inc.
LS-A9

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
Robert Wildey	7/26/16 805			Eileen Toomey	7/26/16 @ 7:58

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY
Delivery: Client
Temp: 3.6
Comment:

(White - Laboratory / Yellow - Client)

Page ____ of ____

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ENDYNE Inc.
Environmental Laboratories

Vanasse Hangen Brustlin, Inc.	
40 IDX Drive	090395
Building 100, Suite 200	
South Burlington, VT 05403	

PROJECT: KCW Stormwater Rev
WORK ORDER: **1608-18590**
DATE RECEIVED: August 19, 2016
DATE REPORTED: September 07, 2016
SAMPLER: Robert Wildey

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 09/07/2016

CLIENT: Vanasse Hangen Brustlin, Inc. WORK ORDER: **1608-18590**
PROJECT: KCW Stormwater Rev DATE RECEIVED 08/19/2016

001 Site: LS-A9 INLET Date Sampled: 8/17/16 Time: 14:00

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.25	mg/L	SM20 4500 P-F	8/29/16 12:58	R AJR	A	
Solids, Total Suspended	594	mg/L	SM 2540 D-97	8/24/16	W JSS	A	

002 Site: LS-A9 USTR Date Sampled: 8/17/16 Time: 14:00

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.015	mg/L	SM20 4500 P-F	8/29/16 12:56	R AJR	A	B
Solids, Total Suspended	3	mg/L	SM 2540 D-97	8/24/16	W JSS	A	

003 Site: LS-A9 DSTR Date Sampled: 8/17/16 Time: 14:15

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.079	mg/L	SM20 4500 P-F	8/29/16 13:00	R AJR	A	
Solids, Total Suspended	55	mg/L	SM 2540 D-97	8/24/16	W JSS	A	

004 Site: LS-A9 DGN Date Sampled: 8/17/16 Time: 14:10

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.091	mg/L	SM20 4500 P-F	8/29/16 13:01	R AJR	A	
Solids, Total Suspended	17	mg/L	SM 2540 D-97	8/24/16	W JSS	A	

005 Site: LS-A9 USTR Date Sampled: 8/14/16 Time: 13:30

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.024	mg/L	SM20 4500 P-F	8/29/16 13:03	R AJR	A	B
Solids, Total Suspended	6	mg/L	SM 2540 D-97	8/24/16	W JSS	A	

006 Site: LS-A9 DSTR Date Sampled: 8/14/16 Time: 14:45

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.018	mg/L	SM20 4500 P-F	8/29/16 13:16	R AJR	A	
Solids, Total Suspended	9	mg/L	SM 2540 D-97	8/24/16	W JSS	A	

007 Site: LS-A9 DGN Date Sampled: 8/14/16 Time: 14:20

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.30	mg/L	SM20 4500 P-F	8/29/16 13:22	R AJR	A	
Solids, Total Suspended	18	mg/L	SM 2540 D-97	8/24/16	W JSS	A	

Report Summary of Qualifiers and Notes

B: Blank contamination was observed at levels that could affect analytical results.

9-7-16 This Report has been revised to correct the date of collection on the last three samples.

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

74483

Special Reporting Instructions/PO#: 57346.11 RWILDEY@VHB.COM

Project Name: KCW STORMWATER	Client/Contact Name: VHB - ROBERT WILDEY	Sampler Name: ROBERT WILDEY
State of Origin: VT X NY __ NH __ Other __	Phone #: 802 497-6164	Phone #: 802-497-6164
Endyne WO #	Mailing Address: 40 IDX DR BLDG 100 SUITE 200	Billing Address: SOUTH BURLINGTON VT 05445

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	FieldResults/Remarks	Due Date
LS-A9-INLET	SW		X	8/17/16 14:00	2	VIAL/PLASTIC	H_2SO_4/ICE	7, 12		
LS-A9-USTR	SW		X	8/17/16 14:00	2	VIAL/PLASTIC	H_2SO_4/ICE	7, 12		
LS-A9-DSTR	SW		X	8/17/16 14:15	2	VIAL/PLASTIC	H_2SO_4/ICE	7, 12		
LS-A9-DGN	SW		X	8/17/16 14:40	2	VIAL/PLASTIC	H_2SO_4/ICE	7, 12	LIMITED VOL. AVAIL	
LS-A9-USTR	SW		X	8/14/16 13:30	2	VIAL/PLASTIC	H_2SO_4/ICE	7, 12		
LS-A9-DSTR	SW		X	8/14/16 14:45	2	VIAL/PLASTIC	H_2SO_4/ICE	7, 12		
LS-A9-DGN	SW		X	8/14/16 14:20	2	VIAL/PLASTIC	H_2SO_4/ICE	7, 12		

Relinquished by:	Date/Time	Received by:	Date/Time
[signature]	8/19/16 1:25		
		[signature]	8/19/16 1325

1	pH	6	TKN	11	Total Solids	16	Sulfa
2	Chloride	7	Total P	12	TSS	17	Colif
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD
4	Nitrite N	9	BOD	14	Turbidity	19	VT P
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg,						
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other
38	Other						

PH/FOG	26	8270 PAH Only	LAB USE ONLY
RO	27	8081 Pest	Delivery: Client
RO	28	8082 PCB	Temp: 4.7°C
	29	PP13 Metals	Comment:
N or Acid	30	Total RCRA8	
Sn, Tl, U, V, Zn			

1608-18590
1608-18590
Vanasse Hangen Brustlin, Inc.
KCW Stormwater

(White - Laboratory / Yellow - Client)

Page ____ of ____

13

ENDYNE Inc.
Environmental Laboratories

Vanasse Hangen Brustlin, Inc.	
PO Box 120	090395
N. Ferrisburgh,	
Atten: Scott Manley	

PROJECT: KCW STP/57346.11
WORK ORDER: **1608-18668**
DATE RECEIVED: August 23, 2016
DATE REPORTED: September 01, 2016
SAMPLER: RW

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and “N” the Plattsburgh, NY lab under certification ELAP 11892. “Sub” indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. “A” indicates the referenced laboratory is NELAC accredited for the parameter reported. “N” indicates the laboratory is not accredited. “U” indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an “A” meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 09/01/2016

CLIENT: Vanasse Hangen Brustlin, Inc. WORK ORDER: **1608-18668**
PROJECT: KCW STP/57346.11 DATE RECEIVED 08/23/2016

001 Site: LS-A9-INLET Date Sampled: 8/22/16 Time: 13:45

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.13	mg/L	SM20 4500 P-F	8/29/16 13:23	R AJR	A	
Solids, Total Suspended	132	mg/L	SM 2540 D-97	8/24/16	W JSS	A	

002 Site: LS-A9-DGN Date Sampled: 8/22/16 Time: 14:24

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.26	mg/L	SM20 4500 P-F	8/29/16 13:25	R AJR	A	
Solids, Total Suspended	29	mg/L	SM 2540 D-97	8/24/16	W JSS	A	

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: 57346.11

77064

Project Name: KCW STP	Client/Contact Name: ~~RG~~ VHB	Sampler Name: ROBERT WILDEY
State of Origin: VT X NY __ NH __ Other __	Phone #: 802 497 6164	Phone #:
Endyne WO #	Mailing Address: 40 IDX DR BLDG 100 STE 200	Billing Address: S. BURLINGTON VT 05403

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	FieldResults/Remarks	Due Date
LS-A9-INLET	SW		X	8/22 13:45	2	P/VIAL	ICE/H_2SO_4	TSS/TP		
LS-A9-DGN	SW		X	8/22 14:24	2	P/VIAL	ICE/H_2SO_4	TSS/TP	TP preserved on arrival	

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
Robert Wildey	8/22/16 8:50			BBugbee	8/23/16 8:45

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	(7)	Total P	(12)	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF				
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbon				
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, N										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

1608-18668

1608-18668

Vanasse Hangen Brustlin, Inc.
KCW STP/57346.11

LAB USE ONLY
Delivery: Client
Temp: 0.2
Comment:

(White - Laboratory / Yellow - Client)

16

ENDYNE Inc.
Environmental Laboratories

Vanasse Hangen Brustlin, Inc.	
PO Box 120	090395
N. Ferrisburgh,	
Atten: Scott Manley	

PROJECT: KCW 57346.11
WORK ORDER: **1608-19407**
DATE RECEIVED: August 30, 2016
DATE REPORTED: September 08, 2016
SAMPLER: JMD, RAW

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 09/08/2016

CLIENT: Vanasse Hangen Brustlin, Inc. WORK ORDER: **1608-19407**
PROJECT: KCW 57346.11 DATE RECEIVED 08/30/2016

001 Site: LS-A9-USTR Date Sampled: 8/29/16 Time: 14:35

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.28	mg/L	SM20 4500 P-F	9/6/16 15:56	R AJR	A	
Solids, Total Suspended	161	mg/L	SM 2540 D-97	9/1/16	W JSS	A	

002 Site: LS-A9-DSTR Date Sampled: 8/29/16 Time: 16:13

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.22	mg/L	SM20 4500 P-F	9/6/16 11:28	R AJR	A	
Solids, Total Suspended	153	mg/L	SM 2540 D-97	9/1/16	W JSS	A	

003 Site: LS-A9-Inlet Date Sampled: 8/29/16 Time: 15:09

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	1.3	mg/L	SM20 4500 P-F	9/6/16 11:30	R AJR	A	
Solids, Total Suspended	2,430	mg/L	SM 2540 D-97	9/1/16	W JSS	A	

004 Site: LS-A9-DGN Date Sampled: 8/29/16 Time: 15:57

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.097	mg/L	SM20 4500 P-F	9/6/16 11:39	R AJR	A	
Solids, Total Suspended	9	mg/L	SM 2540 D-97	9/1/16	W JSS	A	

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

74489

Special Reporting Instructions/PO#: 57346.11

Project Name: KCW 57346.11 State of Origin: VT ✓ NY __ NH __ Other __ Endyne WO #	Client/Contact Name: VHB Jordan Duffy Phone #: 802-497-8352 Mailing Address: 40 IDX Dr. Building 100, Suite 200 South Burlington VT 05403	Sampler Name: JMD / RAW Phone #: 802-447-8352 Billing Address:

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	FieldResults/Remarks	Due Date
				8/29/16						
LS-A9-USTR	SW		X	14:35	1	.95L	—	12		
LS-A9-USTR				"	1	60 mL	H_2SO_4	7		
LS-A9-DSTR				16:13	1	.95L	—	12		
LS-A9-DSTR				"	1	60 mL	H_2SO_4	7		
LS-A9-INLET				15:09	1	.95L	—	12	TP labels fell off in cooler. ET & JD	
LS-A9-INLET				"	1	60 mL	H_2SO_4	7		
LS-A9-DGN				15:57	1	.95L	—	12	attached per visual of qt sample bottles. JD	
LS-A9-DGN				"	1	60mL	H_2SO_4	7		

Relinquished by:	Date/Time	Received by:	Received by:	Date/Time
	8/30/16 @ 17:00		Eileen Toomey	8/30/16 @ 17:00

1	pH	6	TKN	11	Total Solids	16	Sulfate	2	5	8270 PAH Only	LAB USE ONLY
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	2	7	8081 Pest	Delivery: Client
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	2	3	8082 PCB	Temp: 22
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	2	)	PP13 Metals	Comment: TP samples were decanted from plastic to have the correct sites. ET
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	2	)	Total RCRA8	
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

1608-19407
1608-19407
Vanasse Hangen Brustlin, Inc.
KCW 57346.11

(White - Laboratory / Yello... ...)

Page ____ of ____

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ENDYNE Inc.
Environmental Laboratories

Vanasse Hangen Brustlin, Inc.	
PO Box 120	090395
N. Ferrisburgh,	
Atten: Scott Manley	

PROJECT: KCW 401 WQM
WORK ORDER: **1610-24409**
DATE RECEIVED: October 24, 2016
DATE REPORTED: November 02, 2016
SAMPLER: Robert Athan

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

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Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 11/02/2016

CLIENT: Vanasse Hangen Brustlin, Inc. WORK ORDER: **1610-24409**
PROJECT: KCW 401 WQM DATE RECEIVED 10/24/2016

001 Site: LS-A9 Inlet Date Sampled: 10/23/16 Time: 11:00

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.010	mg/L	SM20 4500 P-F	10/31/16 11:14	R LS	A	
Solids, Total Suspended	69	mg/L	SM 2540 D-97	10/28/16	W JSS	A	

002 Site: LS-A9 USTR Date Sampled: 10/23/16 Time: 11:25

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.019	mg/L	SM20 4500 P-F	10/31/16 11:15	R LS	A	
Solids, Total Suspended	3	mg/L	SM 2540 D-97	10/28/16	W JSS	A	

003 Site: LS-A9 DSTR Date Sampled: 10/23/16 Time: 11:57

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.037	mg/L	SM20 4500 P-F	10/31/16 11:17	R LS	A	
Solids, Total Suspended	21	mg/L	SM 2540 D-97	10/28/16	W JSS	A	

004 Site: LS-A9 Ross Date Sampled: 10/23/16 Time: 11:40

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.24	mg/L	SM20 4500 P-F	10/31/16 11:19	R LS	A	
Solids, Total Suspended	10	mg/L	SM 2540 D-97	10/28/16	W JSS	A	

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: 57346.11

78256

Project Name: KCW	Client/Contact Name: Robert Athey	Sampler Name: Robert Athey
State of Origin: VT X NY __ NH __ Other __	Phone #: 802-497-6164	Phone #: 802-497-6141
Endyne WO #	Mailing Address: VHB	Billing Address: VHB

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	Due Date
LS-A9 INLET	Water		X	10/23/16 1100	1 1	32 oz 60 mL	None H_2SO_4	7, 12	2 wk
LS-A9 USTR	↓	X		1125	↓	↓	↓	↓	
LS-A9 DSTR			X	1157					
LS-A9 ROSS	↓		X	↓ 1140	↓	↓	↓	↓	

1610-24409
1610-24409
Vanasse Hangen Brustlin, Inc.
KCU 401 WQM

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
Robert Athey	10/24/16 1523			Eileen Looney	10/24/16 @1523

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY
Delivery: Client
Temp: 0.8
Comment:

(White - Laboratory / Yellow - Client)

ENDYNE Inc.
Environmental Laboratories

Vanasse Hangen Brustlin, Inc.	
PO Box 120	090395
N. Ferrisburgh,	
Atten: Jordan Duffy	

PROJECT: KCW 57346.11 GMP
WORK ORDER: **1611-25491**
DATE RECEIVED: November 07, 2016
DATE REPORTED: November 16, 2016
SAMPLER: Robert & Jordan

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 11/16/2016

CLIENT: Vanasse Hangen Brustlin, Inc. WORK ORDER: **1611-25491**
PROJECT: KCW 57346.11 GMP DATE RECEIVED 11/07/2016

001 Site: LS - A9 - Inlet Date Sampled: 11/4/16 Time: 11:45

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.028	mg/L	SM20 4500 P-F	11/14/16 11:34	R AJR	A	
Solids, Total Suspended	23	mg/L	SM 2540 D-97	11/9/16	W JSS	A	

002 Site: LS - A9 - Upstream Date Sampled: 11/4/16 Time: 11:55

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.012	mg/L	SM20 4500 P-F	11/14/16 11:36	R AJR	A	
Solids, Total Suspended	1	mg/L	SM 2540 D-97	11/9/16	W JSS	A	

003 Site: LS - A9 - Downstream Date Sampled: 11/4/16 Time: 12:05

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.019	mg/L	SM20 4500 P-F	11/14/16 11:38	R AJR	A	
Solids, Total Suspended	8	mg/L	SM 2540 D-97	11/10/16	W JSS	A	

004 Site: LS - A9 - DGN Date Sampled: 11/4/16 Time: 12:15

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.082	mg/L	SM20 4500 P-F	11/14/16 11:40	R AJR	A	
Solids, Total Suspended	9	mg/L	SM 2540 D-97	11/10/16	W JSS	A	

ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

74490

Special Reporting Instructions/PO#: _____

Project Name: KCW - 57346.11 GMP	Client/Contact Name: VHB Jordan Duffy	Sampler Name: RAW / JMD
State of Origin: VT ✓ NY __ NH __ Other __	Phone #: 802-497-6175	Phone #: 802-497-6175
Endyne WO #	Mailing Address: 40 IDX dr. Building 100 Suite 200 South Burlington VT 05403	Billing Address:

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	F	Due Date
LS-A9 - Inlet	Water	✓		11/4/16 11:45	1	40ml VOA	None H2SO4	7, 12		
LS-A9 - US		✓		11:55						
LS-A9 - DS		✓		12:05						
LS-A9 - DGN		✓		12:15						

1611-25491

1611-25491

Vanasse Hangen Brustlin, Inc.
KCW 57346.11 GMP

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
	11/7/16 1:18			Eileen Toomey	11/7/16 @ 1310

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY
Delivery: Client
Temp: 1.5
Comment:

(White - Laboratory / Yellow - Client)

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