Attachment 6

Stormwater Flood Management Grant Proposal Littlerock Reservoir Sediment Removal Project Monitoring, Assessment, and Performance Measures

Attachment 6 consists of the following items:

- ✓ Monitoring, Assessment, and Performance Measures. The purpose of this attachment is to describe the monitoring, assessment, and performance measures that will be used to evaluate the proposed project. These measures will ensure that this proposal meets its intended goals, achieves measurable outcomes, and provides value to the Region and the State of California.

The purpose of this attachment is to provide a discussion of the monitoring system to be used to verify project performance with respect to the project benefits or objectives identified. This attachment will identify data collection and analysis to be used by the proposed Project.

This attachment will also discuss how monitoring data will be used to measure the performance in meeting the overall goals and objectives of the Antelope Valley IRWM Plan. The Project applicant has prepared a Project Performance Measures Table (included in this attachment) that includes the following:

- Project goals
- Desired outcomes
- Targets – measurable targets that are feasible to meet during the life of the Project(s)
- Performance indicators – measures to evaluate change that is a direct result of the Project being built
- Measurement tools and methods – to effectively track performance

The project performance measures will continue to be refined as the Project continues to be developed. Upon receipt of grant award funding, the Project Performance Measures Table (Table 6-1) will be utilized to develop a project monitoring plan. Project benefits are discussed in more detail in Attachments 7 and 8.

Project: Littlerock Reservoir Sediment Removal Project

The Littlerock Reservoir Sediment Removal Project (LRSR Project) will consist of a suite of activities designed to reduce dependence on imported water and improve water supply reliability, increase flood protection, protect environmental habitat, improve water quality, reduce energy consumption and reduce GHG emissions. These activities will be executed in order to meet the Project goals (listed below). Project goals will each have performance measures that will be used to quantify and verify project performance. The performance measures used to quantify and verify project performance are described in the Project Goals and Performance Measures section below and are summarized in Table 6-1.

Table 6-1: Performance Measures Table
Littlerock Reservoir Sediment Removal Project

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Water Supply - Increase capacity storage of local surface water supply in Littlerock Reservoir (Reservoir)	Increase water supply storage capacity of Reservoir	Removal of 900,000 net cubic yards of sediment to provide 560 AF of added storage capacity in the Reservoir	Quantification of increased surface water storage capacity at the Reservoir compared to baseline	Record of net cubic yards of sediment removed from Reservoir
Water Supply - Offset less reliable imported water supplies with more reliable local water supplies	Reduce dependence on less reliable imported water supplies	Increased use of local surface water supplies by 560 AFY and decreased use of SWP imported supplies by 560 AFY, on average	Quantification of local surface water and imported water use compared to baseline	Record of local surface water deliveries and imported water deliveries as measured by PWD influent flow meters for each source at the water treatment plant
Flood Protection - Provide debris control and peak flood attenuation at Littlerock Dam	Increase stormwater runoff storage capacity	Removal of 900,000 net cubic yards of sediment to provide 560 AF of added storage capacity in the Reservoir	Quantification of increased stormwater storage capacity at the Reservoir compared to baseline	Record of net cubic yards of sediment removed from Reservoir
Water Quality - Decrease the amount of TDS imported into the Antelope Valley	Reduce amount of TDS imported into the Antelope Valley Region	Avoid the import of 97 metric tons per year of TDS imported from outside the Region	Quantification of imported water use compared to baseline Quantification of the concentration of TDS in the imported water source	Record of local surface water deliveries and imported water deliveries as measured by PWD influent flow meters for each source at the water treatment plant Record of TDS concentrations in SWP imported water. PWD will collect, record, and report this data.
Water Quality - Decrease the amount of bromide imported into the Antelope Valley	Reduce import of bromide imported into the Antelope Valley Region	Avoid the import of 289 pounds per year of bromide imported from outside the Region	Quantification of imported water use compared to baseline Quantification of the concentration of bromide in the imported water source	Record of local surface water deliveries and imported water deliveries as measured by PWD influent flow meters for each source at the water treatment plant

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
				Record of bromide concentrations in SWP imported water. PWD will collect, record, and report this data.
Habitat Protection - Preserve habitat for federally endangered species	Protection of habitat for the arroyo toad	To be defined once the Littlerock Reservoir Sediment Removal Project Biological Resources Report is finalized (September 2013)	Quantification of acres of habitat protected compared to baseline	Botanical and wildlife surveys of actual acres of habitat protected
Energy Conservation - Reduce energy consumption	Reduce energy consumption from conveyance of imported water	Conserve 1,640,000 kWh per year of energy	Quantification of imported water use compared to baseline Quantification of the kWh per AF required to pump/convey SWP imported water to PWD	Record of local surface water deliveries and imported water deliveries as measured by PWD influent flow meters for each source at the water treatment plant Record of SWP energy demand requirements as reported by SWP
Greenhouse Gass Reduction - Reduce greenhouse gas (GHG) emissions	Reduce emissions of CO_2 equivalents from conveyance of imported water	Avoid 552 metric tons of CO_2 equivalents per year emitted	Quantification of kWh of energy conserved by the offset of SWP imported water Quantification of CO_2 equivalents per kWh of energy	Record of local surface water deliveries and imported water deliveries as measured by PWD influent flow meters for each source at the water treatment plant Climate Action Registry, General Reporting Protocol

Project Goals and Performance Measures

This section provides a discussion on the LRSR Project goals and how the monitoring systems used to verify each performance measure (summarized in Table 6-1) is consist with the Antelope Valley Integrated Regional Water Management (IRWM) Plan and project objectives (see Attachment 3 – Work Plan).

Water Supply – Increase capacity storage of local surface water supply in the Reservoir

The LRSR Project will remove 900,000 net cubic yards of accumulated sediment in the Reservoir to provide 560 AF of additional local water storage capacity. The increase of local surface water storage capacity will be recorded by measuring the net cubic yards of sediment removed behind Littlerock Dam during construction activities. This performance measure is consisted with the Antelope Valley IRWM Plan objective of *providing reliable water supply to meet the Antelope Valley Region's expected demand between now and 2035*. This performance measure additionally helps meet the LRSR Project objective of removing 900,000 net cubic yards (560 AFY) of accumulated sediment behind the Reservoir to restore the ability of PWD to store potable water supply starting in the year 2019.

Water Supply - Offset less reliable imported water supplies with more reliable local water supplies

The LRSR Project will reduce dependence on imported water by maximizing local surface water usage in the Antelope Valley IRWM Region that would be used in lieu of imported State Water Project (SWP) water. The LRSR Project will increase the use of local water supplies by 560 AFY and decrease the use of SWP imported supplies by 560 AFY, on average. The volume of imported water avoided as a result of the LRSR Project will be quantified by recording local surface water deliveries and imported water deliveries as measured by PWD influent flow meters for each source at the PWD water treatment plant. This performance measure is consistent with the Antelope Valley IRWM Plan objective of *providing reliable water supply to meet the Antelope Valley Region's expected demand between now and 2035*. This performance measure additionally helps meet the LRSR Project objective of offsetting imported water supplies by removing 900,000 net cubic yards (560 AFY) of accumulated sediment behind the Reservoir starting in the year 2019.

Flood Protection - Provide debris control and peak flood attenuation at Littlerock Dam

The LRSR Project will increase stormwater runoff storage capacity by removing 900,000 net cubic yards of sediment behind the Reservoir to provide 560 AFY of added storage capacity in the Reservoir. The increase of stormwater runoff capacity at the Reservoir will be recorded by measuring the net cubic yards of sediment removed from behind Littlerock Dam during construction activities. The performance measure identified for this project goal is consistent with the Antelope Valley IRWM Plan objective of *reducing negative impacts of stormwater, urban runoff, and nuisance water*. This performance measure will additionally help meet the LRSR Project objective of maintaining the level of debris control and flood peak attenuation provided by Littlerock Dam and Reservoir by removing 900,000 net cubic yards (560 AYF) of accumulated sediment starting in the year 2019.

Water Quality - Decrease the amount of TDS in the Antelope Valley

The LRSR Project will improve water quality by avoiding the import of 97 metric tons per year of Total Dissolved Solids (TDS), or salts, from outside the Antelope Valley Region. The reduction in TDS into the Antelope Valley as a result of the LRSR Project will be quantified by recording local surface water deliveries and SWP imported water deliveries as measured by PWD influent flow meters for each source at the PWD water treatment plant; TDS concentrations in SWP imported water will also be collected and recorded by PWD. This performance measure is consistent with the AV IRWM Plan objective of *providing drinking water that meets customer expectations*. This performance measure will additionally help meet the LRSR Project objective of decreasing the amount of imported TDS introduced into the Antelope Valley by offsetting 560 AFY of SWP imported water starting in the year 2019.

Water Quality – Decrease the amount of bromide imported into the Antelope Valley

The LRSR Project will improve water quality by contributing to the reduction of 289 pounds per year of bromide, a disinfection byproduct (DBP) precursor, imported into Antelope Valley Region. Reduction of imported bromide into the Antelope Valley Region as a result of the LRSR Project will be quantified by recording local surface water deliveries and imported water deliveries as measured by PWD influent flow meters for each source at the PWD water treatment plant; Bromide concentration data in SWP imported water will also be collected and recorded by PWD. This performance measure is consistent with the Antelope Valley IRWM Plan objective of *providing drinking water that meets customer expectations*. This performance measure will additionally help meet the LRSR Project objective of improving water quality for bromide (which contributes to the creation of DBPs) by replacing lower quality imported water with higher quality local surface water starting in the year 2019.

Habitat Protection - Preserve habitat for a federally endangered species

The LRSR Project will protect existing habitat for the federally endangered arroyo toad (*Bufo californicus*) during and after the construction of an in-stream grade control structure. The target for this project goal will be defined once the Littlerock Reservoir Sediment Removal Project Biological Resources Report is finalized in September 2013. The target is expected to consist of a quantification of acres of habitat protected compared to the baseline. Once the target is defined, the acres of habitat protected will be measured via botanical and wildlife surveys of actual acres of habitat protected. This performance measure is consistent with the Antelope Valley IRWM Plan objective of *preserving open space and natural habitats that protect and enhance water resources and species in the Antelope Valley Region*. This performance measure will additionally help meet the LRSR Project objective of preserving habitat for the federally endangered arroyo toad, and incidental "take" of the arroyo toad, by constructing a grade control structure to prevent sediment loss and headcutting of the stream channel upstream of Rocky Point starting in the year 2016.

Energy Conservation - Reduce energy consumption

The LRSR Project will reduce energy consumption from conveyance of SWP imported water by offsetting imported water with local water supplies. The LRSR Project will conserve 1,640,000 kWh per year of energy. Reduction of energy consumption as a result of the LRSR Project will be quantified by recording local surface water deliveries and SWP imported water deliveries as measured by PWD influent flow meters for each source at the PWD water treatment plant. Additionally, PWD will keep records of SWP

energy demand requirements by SWP to quantify energy conservation. This performance measure will help meet the newly drafted climate change objective of *mitigate against climate change* for the Antelope Valley Integrated Regional Water Management (IWRM) Plan 2013 Update. The 2013 Antelope Valley IRWM Plan is currently in the process of being updated, including Regional objectives, and is expected to be complete by September 2013[1]. This performance measure will additionally help meet the LRSR Project objective of reducing energy consumption by offsetting 560 AFY of SWP imported water.

Greenhouse Gas Reduction - Reduce greenhouse gas (GHG) emissions

The LRSR Project will offset imported water demands with local surface water supplies by avoiding 552 metric tons of CO_2 (a GHG) equivalents per year generated by transporting imported SWP water to the Antelope Valley Region. Reduction of CO_2 emissions as a result of the LRSR Project will be quantified by recording local surface water deliveries and SWP imported water deliveries as measured by PWD influent flow meters for each source at the PWD water treatment plant. PWD will also utilize the Climate Action Registry, General Reporting Protocol standards to document reduction of CO_2 emissions. This performance measure will help meet the newly drafted climate change objective of *mitigate against climate change* for the Antelope Valley Integrated Regional Water Management (IWRM) Plan Update. The Antelope Valley IRWM Plan is currently in the process of being updated, including Regional objectives, and is expected to be complete by September 2013.This performance measure will additionally help meet the LRSR Project objective of reducing GHG emissions by offsetting 560 AFY of SWP imported water.

[1] Revised objectives for the Antelope Valley IRWM Plan 2013 Update are currently in draft form and will not be finalized until September 2013. Some of these draft objectives do not appear in the 2007 Antelope Valley IRWM Plan.