Exhibit A
Phase II(a) WSBRT Risk Study

Statement of Work
Date:

WATER ACTIVITY NAME –Joint West Slope Roundtable Technical Study – Phase II

GRANT RECIPIENT –Colorado River Water Conservation District

FUNDING SOURCE – WSRA Basin Accounts, four West Slope Roundtables, Colorado River Water Conservation District, Southwest Water Conservation District.

INTRODUCTION AND BACKGROUND

Provide a brief description of the project. (Please limit to **no more than 200 words**; this will be used to inform reviewers and the public about your proposal)

At the December 18th 2014 meeting of the four West Slope Basin Roundtables, attendees cited the need for more technical data and modeling so that the four roundtables could better understand and discuss issues surrounding future Colorado River development, the risk to existing water users and implementation of the framework principles included in the Colorado Water Plan. Results from Phase I validated previous work (Contingency Planning, Basin Study, etc) that illustrate real risks to Lake Powell and quantify a range of possible deficit volumes that Colorado could be asked to supplement to maintain Powell elevations above critical thresholds

The intent of Phase II is to further quantify the risks to water users in Colorado, by evaluating a number of scenarios with a variety of assumptions regarding the timing, location, volume, and administrative requirements that could be imposed in order to make up a Powell deficit. Scenarios to be evaluated in Phase II are developed based on feedback from the west slope BRTs as well as input from front range entities.

Two different technical approaches will be used in Phase II. The first set of analyses will build upon the CRSS modeling from Phase I, and will include additional modeling runs with CRSS to evaluate alternative model assumptions (hydrology, demand, etc), as well as to quantify the sensitivity of risk to various drivers (demand, hydrology, CRSP operations, etc). The second piece of Phase II will investigate the utility of StateMod in addressing more detailed sets of questions that have been raised by the participants. These include demand management allocation schemes among the basins, modeling of compact calls, and a more realistic look at the effects of trans-basin diversions and the use of storage facilities, particularly in the upper mainstem. While the ultimate objective is to use StateMod in parallel with CRSS, this initial work will test the ability of StateMod to address these questions, and will allow budget to perform some exploratory model analysis to better understand the limitations of the tool in this application.

OBJECTIVES

List the objectives of the project

Phase II will address the following questions:

1. Refinement and further analysis of CRSS-specific scenarios:
    a. Water Banking scenarios that include various levels of preemptive demand management and storage in a non-equalized reservoir, together with different assumptions about future demand growth. (TNC/ Wigington)
    b. Perform additional model runs utilizing paleo-hydrology sequences to understand sensitivity to paleo-events and where those events fit within the spectrum of historical gaged data and climate change (predicted) hydrology. (UYWCD / McBride)
    c. Develop a "risk ranking" for the various drivers that may contribute to a Powell deficit. Evaluate how sensitive the risk profile is to each driver, and relative ranking of same (current demands, demand growth, hydrology, DCP in the LB, etc.) (Denver Water / Waage)
2. Evaluate the utility of StateMod in addressing in-basin questions related to compact calls, trans-basin storage and deliveries, demand management, etc. This first look at StateMod for these purposes will allow us to perform some test runs under different assumptions and understand the capabilities and limitations in the tool. Questions that we hope to eventually be able to ask of StateMod include (but are not limited to):
    a. How would different augmentation programs impact water users, reservoir storages, and sub-basins?
        i. If each sub-basin were required to reduce consumptive uses by a pro-rata amount.
        ii. If a state-wide call were made on all post-compact rights.
        iii. If all junior stored water was required to be released before any direct rights were called.
        iv. If each basin were required to produce a specific volume.
        v. If multi-year curtailments were an option in order to avoid drastic single-year curtailments
        vi. If a water banking mechanism were in place to preemptively conserve water as an offset for future calls.
    b. How do east-slope storage and water supply conditions impact CRB risk? Does the east-slope condition during drought always impact the west slope in the same manner?
3. Review results with the sponsoring roundtables and discuss implications and lessons for implementation of the seven point framework.
4. As budget allows, expand on or refine scenarios to address follow-on questions.

TASKS

Provide a detailed description of each task using the following format

TASK 1 – Ongoing CRSS Evaluation

<u>Description of Task</u>

Based on feedback from the BRTs and other stakeholders, a set of follow-on questions have been developed that leverage the initial set of runs from Phase I. These include investigation of system risks (and "costs") with different hydrologic sequences, with different pre-emptive demand management and water banking mechanisms, and with different demand and growth assumptions. A preliminary set of questions is provided in the introduction above, and we anticipate additional feedback and scenario requests from the participants that will be included in this task.

Method/Procedure

Continued use of CRSS for additional model runs, and extraction of additional data from scenarios that were already run as part of Phase I.

Deliverable

Model reports, memos, and presentations to stakeholders as needed.

TASK 2 – StateMod Evaluation and CRSS Integration Testing

Description of Task

Phase I of this work utilized CRSS to evaluate basin-wide risks. It is too coarse for use in evaluating specific water rights and non-CRSP reservoir operations. Ideally we could use STateMod to address the more specific in-state questions regarding curtailment, banking, trans-basin storage and deliveries, etc. However, StateMod itself may have limitations in its ability to accurately reflect these components. The first task therefore will be an evaluation of the capabilities and limitations of StateMod in addressing these questions. We will use this budget to perform initial model simulations for the Risk Study, to better understand any limitations, to identify and possibly implement model 3enhancements necessary for the study, and to test the StateMod/CRSS "coupling" that would be necessary to allow for feedback and data flow between the two models.

We will also evaluate different options for hydrologic traces. StateMod traditionally uses a single-trace historical period of record, whereas CRSS utilizes a hydrologic ensemble approach for simulating multiple possible events. It may be necessary to develop one or more hydrologic sequences that can be utilized by both models. As part of this task, we will also evaluate the usefulness of Paleo-hydrologic data and whether or not it adds information to the evaluation of risk.

The long-term objective (Phase IIb) in enhancing and coupling these tools is to be able to simulate water allocation and demand management across the sub-basins including:

1. Pro-rata reductions in consumptive use by sub-basin, based on deficit volume and historical consumptive use as a percent of state-wide use.
2. Administrative call to post-compact rights, or to some other specified level of seniority
3. Storage-first operations that would release water from post-compact storage reservoirs before implementing a call or pro-rata reductions
4. Single-year versus multi-year actions to fill a deficit

5. Water banking scenarios wherein the State and individual sub-basins may proactively create a water bank to mitigate against a call or other "mandatory" actions
6. Multi-year events that could be required or otherwise negotiated in order to reduce single-year impacts that could be catastrophic
7. Combinations of the above.

Method/Procedure

Network modifications and testing of CRSS and StateMod; development of simple data conversion tool for moving data between the models.

Deliverable

Model files and ancillary tools and memo describing integrated use of the two models.

TASK 3 – Final Report(s) and Meetings (Phase IIa)

Description of Task

One objective of this work is to provide a foundation of knowledge to BRT participants in order to foster informed discussions on management of risk in the Colorado Basin. Phase I included over a dozen webinar events, as well as numerous in-person meetings. We anticipate a similar level of effort in this next Phase as well, and include budget in this task for conducting these meetings.

Additionally, we anticipate numerous interim reports, presentations, and as a final deliverable two separate reports, one for each of the above tasks:

1. Write a report documenting model work, scenario results, and recommendations moving forward, based on items from Task 1.
2. Write a report or memorandum of findings related to the use of StateMod, presenting initial modeling results and making recommendations for incorporation of StateMod results into Phase IIb analyses (Task 2).

Method/Procedure

Draft reportsto be reviewed by participant committees. Meetings and workshops will be held to present findings and solicit input for additional studies.

Deliverable

Final Reports and associated model files, results, and other analyses.

REPORTING AND FINAL DELIVERABLE

Reporting: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of the executed contract. The progress report shall describe the completion or partial completion of the tasks identified in the statement of work including a description of any major issues that have occurred and any corrective action taken to address these issues.

Final Deliverable: At completion of the project, the applicant shall provide the CWCB a final report that summarizes the project and documents how the project was completed. This report may contain photographs, summaries of meetings and engineering reports/designs.

BUDGET

Provide a detailed budget by task including number of hours and rates for labor and unit costs for other direct costs (i.e. mileage, $/unit of material for construction, etc.). A detailed and perfectly balanced budget that shows all costs is required for the State's contracting and purchase order processes. Sample budget tables are provided below. Please note that these budget tables are examples and will need to be adapted to fit each individual application. Tasks should correspond to the tasks described above.

Total Costs				
	Labor	Other Direct Costs	Matching Funds (If Applicable)	Total Project Costs
Task 1 – Ongoing CRSS Scenario Evaluations	$34,760			$34,760
Task 2 – StateMod Evaluation and CRSS Integration Testing	$25,000			$25,000
Task 3 – Final Reports and Meetings	$25,660	$4,080		$29,740
In-Kind Contributions				
Total Costs:	$85,420	$4,080		$89,500

Example Titles

Example Project Personnel: Hourly Rate:	Project Manager 205	Project Engineer I 128	Project Engineer II 140			Total Costs
Task 1 – Ongoing CRSS Scenario Evaluations	40	120	80			$34,760
Task 2 - StateMod Evaluation and CRSS Integration Testing	40	50	130			$25,000
Task 3 - Final Reports and Meetings	100	20	20			$25,660
Total Hours:	180	190	230			
Cost:	36,900	24,320	32,200			85,4420

Other Direct Costs				
Item:	Travel Expenses	Mileage		Total
Units:		Miles		
Unit Cost:				
Task 3 - Meetings	$3,000	2,000		$4,080
Total Units:		$0.54/mi		
Total Cost:				

In-Kind Contributions (If Applicable)

Project Personnel: Hourly Rate:				Total
Task 1 -				
Task 2 -				
Total Hours:				
Total Cost:				

SCHEDULE

Provide a project schedule including key milestones for each task and the completion dates or time period from the Notice to Proceed (NTP). This dating method allows flexibility in the event of potential delays from the procurement process. Sample schedules are provided below. Please note that these schedules are examples and will need to be adapted to fit each individual application.

Example 1

Task	Start Date	Finish Date
1	Upon NTP	NTP + 90 days
2	Upon NTP	NTP + 180 days
3	Upon NTP	NTP + 180 days
4	Upon NTP	12/31/11
5	NTP + 60 days	12/31/11
6	NTP + 60 days	12/31/11
7	NTP + 60 days	12/31/11

NTP = Notice to Proceed

Example 2

Task	First 6 Months						Second 6 Months					
	1/10 – 3/10			4/10 – 6/10			7/10 – 9/10			10/10 - 12/10		
A – Economic Analysis												
B – Storage Analysis												
C – TA for Ditch Cos												
D – Injury Analysis												
Final Reports												

PAYMENT

Payment will be made based on actual expenditures and invoicing by the applicant. Invoices from any other entity (i.e. subcontractors) cannot be processed by the State. The request for payment must include a description of the work accomplished by major task, and estimate of the percent completion for individual tasks and the entire water activity in relation to the percentage of budget spent, identification of any major issues and proposed or implemented corrective actions. The last 5 percent of the entire water activity budget will be withheld until final project/water activity documentation is completed. All products, data and information developed as a result of this grant must be provided to the CWCB in hard copy and electronic format as part of the project documentation. This information will in turn be made widely available to Basin Roundtables and the general public and help promote the development of a common technical platform.

Appendix 1
Reference Information

The following information is available via the internet. The reference information provides additional detail and background information.

- Water Supply Reserve Account main webpage:
  - http://cwcb.state.co.us/LoansGrants/water-supply-reserve-account-grants/Pages/main.aspx
- Water Supply Reserve Account – Basin Fund Application Details:
  - http://cwcb.state.co.us/LoansGrants/water-supply-reserve-account-grants/Pages/BasinWaterSupplyReserveAccountGrants.aspx
- Water Supply Reserve Account – Statewide Fund Application Details:
  - http://cwcb.state.co.us/LoansGrants/water-supply-reserve-account-grants/Pages/StatewideWaterSupplyReserveAccountGrants.aspx
- Colorado Water Conservation Board main website:
  - http://cwcb.state.co.us/
- Interbasin Compact Committee and Basin Roundtables:
  - http://cwcb.state.co.us/about-us/about-the-ibcc-brts/Pages/main.aspx/Templates/BasinHome.aspx
- House Bill 05-1177 – (Also known as the Water for the 21st Century Act):
  - http://cwcbweblink.state.co.us/DocView.aspx?id=105662&searchhandle=28318
- House Bill 06-1400 – (Adopted the Interbasin Compact Committee Charter):
  - http://cwcbweblink.state.co.us/DocView.aspx?id=21291&searchhandle=12911
- Senate Bill 06-179 – (Created the Water Supply Reserve Account):
  - http://cwcbweblink.state.co.us/DocView.aspx?id=21379&searchhandle=12911
- Statewide Water Supply Initiative 2010:
  - http://cwcb.state.co.us/water-management/water-supply-planning/Pages/SWSI2010.aspx

Appendix 2
Insurance Requirements

NOTE: The following insurance requirements taken from the standard contract apply to WSRA projects that exceed $25,000 in accordance with the policies of the State Controller's Office. Proof of insurance as stated below is necessary prior to the execution of a contract.

13. INSURANCE

Grantee and its Sub-grantees shall obtain and maintain insurance as specified in this section at all times during the term of this Grant: All policies evidencing the insurance coverage required hereunder shall be issued by insurance companies satisfactory to Grantee and the State.

A. Grantee

i. Public Entities

If Grantee is a "public entity" within the meaning of the Colorado Governmental Immunity Act, CRS §24-10-101, et seq., as amended (the "GIA"), then Grantee shall maintain at all times during the term of this Grant such liability insurance, by commercial policy or self-insurance, as is necessary to meet its liabilities under the GIA. Grantee shall show proof of such insurance satisfactory to the State, if requested by the State. Grantee shall require each Grant with Sub-grantees that are public entities, providing Goods or Services hereunder, to include the insurance requirements necessary to meet Sub-grantee's liabilities under the GIA.

ii. Non-Public Entities

If Grantee is not a "public entity" within the meaning of the GIA, Grantee shall obtain and maintain during the term of this Grant insurance coverage and policies meeting the same requirements set forth in **§13(B)** with respect to sub-Grantees that are not "public entities".

B. Sub-Grantees

Grantee shall require each Grant with Sub-grantees, other than those that are public entities, providing Goods or Services in connection with this Grant, to include insurance requirements substantially similar to the following:

i. Worker's Compensation

Worker's Compensation Insurance as required by State statute, and Employer's Liability Insurance covering all of Grantee and Sub-grantee employees acting within the course and scope of their employment.

ii. General Liability

Commercial General Liability Insurance written on ISO occurrence form CG 00 01 10/93 or equivalent, covering premises operations, fire damage, independent Grantees, products and completed operations, blanket Grantual liability, personal injury, and advertising liability with minimum limits as follows: **(a)**$1,000,000 each occurrence; **(b)** $1,000,000 general aggregate; **(c)** $1,000,000 products and completed operations aggregate; and **(d)** $50,000 any one fire. If any aggregate limit is reduced below $1,000,000 because of claims made or paid, Sub-grantee shall immediately obtain additional insurance to restore the full aggregate limit and furnish to Grantee a certificate or other document satisfactory to Grantee showing compliance with this provision.

iii. Automobile Liability

Automobile Liability Insurance covering any auto (including owned, hired and non-owned autos) with a minimum limit of $1,000,000 each accident combined single limit.

iv. Additional Insured

Grantee and the State shall be named as additional insured on the Commercial General Liability and Automobile Liability Insurance policies (leases and construction Grants require additional insured coverage for completed operations on endorsements CG 2010 11/85, CG 2037, or equivalent).

v. Primacy of Coverage

Coverage required of Grantee and Sub-grantees shall be primary over any insurance or self-insurance program carried by Grantee or the State.

vi. Cancellation

The above insurance policies shall include provisions preventing cancellation or non-renewal without at least 45 days prior notice to the Grantee and the State by certified mail.

vii. Subrogation Waiver

All insurance policies in any way related to this Grant and secured and maintained by Grantee or its Sub-grantees as required herein shall include clauses stating that each carrier shall waive all rights of recovery, under subrogation or otherwise, against Grantee or the State, its agencies, institutions, organizations, officers, agents, employees, and volunteers.

C. Certificates

Grantee and all Sub-grantees shall provide certificates showing insurance coverage required hereunder to the State within seven business days of the Effective Date of this Grant. No later than 15 days prior to the expiration date of any such coverage, Grantee and each Sub-grantee shall deliver to the State or Grantee certificates of insurance evidencing renewals thereof. In addition, upon request by the State at any other time during the term of this Grant or any sub-grant, Grantee and each Sub-grantee shall, within 10 days of such request, supply to the State evidence satisfactory to the State of compliance with the provisions of this **§13**.

Appendix 3
Water Supply Reserve Account Standard Contract Information

NOTE: The standard contract is required for WSRA projects that exceed $100,000. (Projects under this amount will normally be funded through a purchase order process.) Applicants are encouraged to review the standard contract to understand the terms and conditions required by the State in the event a WSRA grant is awarded. Significant changes to the standard contract require approval of the State Controller's Office and often prolong the contracting process.

It should also be noted that grant funds to be used for the purchase of real property (e.g. water rights, land, conservation easements, etc.) will require additional review and approval. In such cases applicants should expect the grant contracting process to take approximately 3 to 6 months from the date of CWCB approval.

The standard contract is available here under the header "Additional Resources" on the right side: http://cwcb.state.co.us/LoansGrants/water-supply-reserve-account-grants/Pages/BasinWaterSupplyReserveAccountGrants.aspx

Appendix 4
W-9 Form

NOTE: A completed W-9 form is required for all WSRA projects prior execution of a contract or purchase order. Please submit this form with the completed application.