Scope of Work: CITT Workplan for Water Measurement at Instream Flow, River Diversion Allowance, Natural Flow and Irrigation Return Flow Locations

Draft Version: April 18, 2016

Working Draft—Not Approved by the CITT

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List of Abbreviations

CSKT	Confederated Salish and Kootenai Tribes
CITT	Compact Implementation Technical Team
FIIP	Flathead Indian Irrigation Project
IIF	Interim Instream Flow
ISF	Instream Flow
MBMG	Montana Bureau of Mines and Geology
MEF	Minimum Enforceable Instream Flow
TIF	Target Instream Flow
RDA	River Diversion Allowance
USGS	United States Geological Survey

1.0 Executive Summary

The Confederated Salish and Kootenai Tribes (CSKT) – Montana Water Rights Compact (Compact) identifies stream and canal locations where water measurement will be needed to effectively allocate water between instream flow and irrigation demands. The Compact also sets forth the Compact Implementation Technical Team (CITT) and charges them, during the current pre-Effective Date period, with making technical recommendations for expanding the existing CSKT Water Measurement Program (Program) in a manner that instream flow (ISF) and river diversion allowance (RDA) measurement requirements are met. Recommendations in this proposal are prepared for the parties to the Compact to consider.

The body of this proposal provides background and detail, including the schedule and budget. Supplement One describes the existing CSKT Water Measurement Program, and Supplement Two describes the proposed expansion to the CSKT Water Measurement Program. The proposal assumes some familiarity with terminology found in the Compact. For readers needing clarification, the definitions section of the Compact found at http://dnrc.mt.gov/divisions/reserved-water-rights-compact-commission/confederated-salish-and-kootenai-tribes defines specific terms.

This proposal recommends flow measurement at locations where instream flows will be enforced, locations where natural flow will be monitored for predicting water availability, and flow measurement at RDA canal and irrigation return flow locations. Measurement locations are planned-for in Section 3.d. of Appendix 3.5 to the Compact. Specifically, the CITT recommends:

a. Installation of one new ISF station;
b. Installation of 17 new RDA stations;
c. Upgrades to six currently operated ISF stations;
d. Upgrades to four currently operated RDA stations;
e. Development of a monitoring protocol at 11 ISF sites and eight RDA stations;
f. Upgrades to two natural flow measurement locations;
g. New installations at three irrigation return flow locations; and
h. Placement of artificial control sections at sixteen canal locations.

With implementation of this proposal, the existing CSKT Water Measurement Program will be expanded to address all Compact-related measurement requirements at ISF and RDA locations. Additionally, the

CITT will work together with the CSKT Water Measurement Program to achieve implementation and ensure implementation effectiveness.

This recommendation is contingent upon the following principles:

1. The CSKT Water Measurement Program will continue to function as the principal entity with regards to water measurement at existing CSKT locations and locations added through this proposal;
2. Existing and future flow data will be processed and made accessible to the public via internet, and archived and managed by the CSKT;
3. Funding is available annually for the full ten-year period identified in the proposal;
4. As approved by the CITT, detailed site-assessments may justify modification of equipment and station placement outlined in this proposal; and
5. A cooperative status be maintained between the CSKT Water Measurement Program and the CITT.

The total cost for the ten-year proposal is $1,428,088, with $375,847 being allocated during the first year. A detailed annualized budget is included in Section 5.0, with an implementation schedule included in Section 6.0.

The CITT encourages the parties to the Compact to support and fund this proposal for expanding and enhancing the existing CSKT Water Measurement Program to include the locations set forth by the Compact. This action will improve the ability to implement operational improvements and simultaneously achieve ISF and irrigation demand (RDA) targets following the Effective Date and implementation of the Compact.

2.0 Water Measurement as it relates to the Compact

Water measurement, data management/dissemination, and planning for and allocation of water between instream and irrigation uses of water are explicitly called for in the Compact and Appendices 3.1 through 3.7 to the Compact. This occurs in part because:

- MEF, TIF and RDA levels are set to vary based on defined wet through dry water-year types;
- MEF and TIF levels are set to be incrementally met as operational improvements occur on the FIIP;

- Seasonal water supply planning and potential within-season adjustments to water allocations are keyed to water measurement information;
- Shared shortage conditions are identified based on water measurement information;
- Compliance for Interim Instream Flows (IIFs) have relied on measurement since the late 1980's, and will continue to for a period of time; and
- The FIIP water use right is satisfied and tracked through measurement at RDA locations.

Specifically, Articles IV. C., D., and E. of the Compact recognize the role of water measurement and Article IV. F. confirms this, explicitly identifying comprehensive water measurement as essential to the Compact. Appendices 3.1 through 3.7 call for water measurement, with Appendix 3.4 identifying water measurement in the operational improvements schedule, and Appendix 3.7 identifying indicator natural flow stream gages for determination of wet through dry years. In Appendix 3.5, the guidance document for CITT activities, water measurement is identified as a task in several locations, and Section 3.d.i. identifies that the Tribes shall manage data at instream flow, RDA, and irrigation return flow locations.

Water measurement has been, and will continue to be, critical on streams and canals associated with the FIIP due to the variability in seasonal runoff volumes, the complexity of the stream and canal network, and the very high level of utilization of available water supply for irrigation uses.

3.0 Background and Existing CSKT Water Management Program

This proposal builds on the CSKT Water Management Program (Program) gaging network and program capabilities. The CSKT Water Measurement Program has been active since 1982. The Program currently has four full-time hydro-technicians, a data management hydrologist, and a supervisory hydrologist. Currently the Tribes commit approximately 450,000 dollars annually toward the existing water measurement program, an effort that has served to provide substantial information used for purposes of FIIP operations, interim ISF management, and Compact negotiations. Most of the Compact-related ISF stations are part of the current Tribal measurement network, and a large number of Compact-related RDA stations are part of the current Tribal network or were historically part of the network.

Emphasis has historically been placed on surface water measurement; however the Program also maintains a groundwater monitoring network. The Program completes monitoring for the Tribes' Safety of Dams program, and the Program completes water quality monitoring and special projects work. Since

approximately 1990, the Program has participated in the NRCS snow survey program, and is currently one of the largest cooperators in the State, monitoring snowpack from Marias Pass south to the Rattlesnake Range.

Also since 1982, the Program has maintained cooperator status with the Montana US. Geological Survey office. Several activities have occurred through the cooperator arrangement, including larger water resource studies, extensive training and quality assurance for Program staff, and maintenance of a set of natural flow stream gages on the Reservation. Starting in 1992, as the Program transitioned to greater use of continuously recording equipment, the USGS completed site evaluations and installation recommendations for measurement stations, many of which are still operational. For a period of six years, the Program employed a retired USGS hydro-technician full-time to work with Tribal staff on field and data management techniques.

Field and office procedures rigorously adhere to standard operating procedures prepared by the Program and procedures found in various USGS publications (ex: USGS WSP 2175, 1982; USGS TM 3-A8, 2010; USGS TM 3-A22, 2013). Gaging station data and rating curves are compiled by field staff, reviewed and quality assured by the chief of field operations, and finally quality assured by a hydrologist. Data are currently maintained in an SQL database developed for the Program; this database houses all records dating back to 1982, including records for over 100 active or discontinued stream stations, over 70 active or discontinued canal stations, and 21 active or discontinued irrigation return flow stations. Hard copy data management files are also maintained and hold annual station analyses, level notes, rating curves and other station details.

In the last three years, the Program has completed the following upgrades.

- Field staff have discontinued use of mechanical stream gaging meters and use acoustic doppler velocimeters (ADV's) for wading discharge measurements.
- Field staff use an acoustic doppler current profiler (ADCV) for peak flow and large canal measurements.
- Electronics at forty five stations have been upgraded to support telemetry and real-time data acquisition using the GOES satellite network for data transmission. These data are reported to a dedicated website.
- The Program is currently transitioning from their SQL database to the Aquatic Informatics Aquarius Time Series database and Aquarius Web data portal. This data management software has been selected by the USGS and Water Resource Survey of Canada as their primary data management

platform, and will provide a robust data management solution for the Water Management Program. The database transition is ongoing with completion expected in mid to late 2016.

- The Program is scanning hard copy records prior to 2015 for electronic data storage and retrieval.

Currently, the Program maintains 66 active stations – 38 stream stations, 25 canal stations, and three irrigation return flow stations. Twenty of the stream stations are identified as ISF compliance locations in the Compact and twenty of the canal stations are identified as RDA stations in the Compact. Three return flow stations are monitored to assist FIIP comply with the biological opinion for project operations.

The cost savings that will accrue to CITT-related water measurement responsibilities from the existing Tribal investment in water measurement are significant and include:

- Numerous active stream and canal stations with greater than a 20-year period of quality-assured and fully documented record. This dataset provides insight into streamflow variability, streamflow trends, and ISF and FIIP operations under various water supply scenarios;
- Forty instream flow and RDA compliance locations, most of which are equipped for telemetry;
- Investment in a database and web-based reporting system;
- A fully operational and equipped program with expertise developed over 34 years; and
- A program that is able to incorporate new responsibilities and train new staff.

Supplement One includes: a) maps and tables showing the existing stream, canal, and return flow monitoring network; and b) a position description for the Water Management Program hydro-technician job.

4.0 Proposed Additions to the Water Measurement Program

Proposed additions to the measurement program to support CITT activities focus on ISF and RDA locations, but also include natural flow locations which are part of the definition of wet through dry water-year types, and additional irrigation return flows. Focus for ISF and RDA locations is to bring these stations forward to support telemetry and real-time data acquisition.

There are a number of instream flow and RDA stations where a monitoring protocol is recommended, instead of the investment in a continuously recording station and the associated long-term operations cost. These situations occur where the specified flow levels are low or the canal headworks water management does not require system-level coordination. The primary monitoring protocol will be to

identify a measurement section, install a staff gage, and complete check measurements and maintain a rating, as needed. Experience will indicate which stations require more diligence for measurement and rating work. The Flathead River pumping plant is a unique situation because the pump canal is a level canal supporting two-way flow. Pump volume records will be maintained by tracking electrical usage and on-off times for the pumps. This will require preparation of a standard operating procedure for information reporting.

Irrigation return flow stations are identified for measurement in the Compact. While there are well over 30 active return flow locations on the FIIP, the CITT recommends maintaining three currently operating return flow stations and adding three return flow locations which have been shown to carry higher flow volumes.

Natural streamflow information is needed for water supply forecasting and to define wet through dry water-year conditions. The proposal identifies upgrades to two existing CSKT stations which are applied for water-year definitions. USGS natural flow stations are maintained through the CSKT-USGS cooperative agreement. The Tribes and the CITT recognizes that this program is challenging to fund, and may need to look to alternative funding sources in future years.

Some premises for proposed additions to the measurement program follow:

- All continuous monitoring stations should support telemetry;
- All telemetered data should be available to the public via website access;
- Artificial controls (weirs or flumes, other) should be placed in canals to reduce long-term operational costs;
- A monitoring protocol should be applied where continuous monitoring may not be warranted; and

Access to data will occur through the Aquarius Web portal, which will be identified on the CITT website and accessible to the general public. The CITT is also exploring options to provide access to data through the Montana Bureau of Mines and Geology surface water web data portal. The CITT supports this concept, and is working with the MBMG to evaluate options. Costs that may be associated with MBMG data hosting are not reflected in this proposal.

Supplement Two contains equipment details and several tables that break-out measurement stations by proposed activities; these tables form the basis for the budget. Table 1.0 below sequentially summarizes measurement plans for MEF and TIF locations, as they are found in Appendix 3.1 to the Compact. Table 2.0 sequentially summarizes measurement plans for RDA locations, as they are found in Appendix 3.2 to

the Compact. Table 3.0 summarizes natural flow and irrigation return flow locations proposed for measurement activity. Table 4.0 identifies the initial priority list for installation of artificial controls in canal sections. Table S2.d (Supplement 2) contains the full list of canals identified for artificial controls.

Table 1.0: Measurement activities at MEF and TIF locations
Orange – existing CSKT telemetry station and equipment, count = 14;
Green – existing CSKT station with proposed upgrade to monitoring equipment, count = 6;
Yellow – new installation, count = 1;
Grey – monitoring protocol, count = 11

Station name	Station type	Measurement plan	Notes
Middle Fork Jocko River	IIF/MEF/TIF	Existing equipment	
North Fork Jocko River	IIF/ MEF/TIF	Existing equipment	
Falls Creek below Tabor Feeder	MEF/TIF	Monitoring protocol	Install staff gage or rate orifice gate planned for 2016 construction
S-14 Creek below Tabor Feeder	MEF/TIF	Monitoring protocol	Install staff gage after gate reconstructed in Tabor Feeder Canal
Jocko River below Upper S Canal	IIF/ MEF/TIF	Monitoring protocol	Maintain staff gage and rating, use downstream river gage at K Canal for primary water management
Cold Creek below Upper S Canal	MEF	Monitoring protocol	Install staff gage after gate reconstructed in Upper S Canal
Gold Creek below Upper S Canal	MEF	Monitoring protocol	Install staff gage after gate reconstructed in Upper S Canal
Big Knife Creek below Upper S Canal	IIF/MEF/TIF	Upgrade to telemetry	
Jocko River at K Canal	IIF/MEF/TIF	Existing equipment	
Agency Creek below Upper J Canal	IIF/MEF/TIF	Upgrade to telemetry	
East Fork Finley Creek below N	IIF/MEF/TIF	Upgrade to telemetry	
Schley Creek below Doney Ditch	MEF/TIF	Monitoring protocol	Install staff gage
Finley Creek near mouth	IIF/MEF/TIF	Existing equipment	
Jocko River below lower S Canal	IIF/MEF/TIF	Upgrade to telemetry	
Jocko River below lower J Canal	IIF/MEF/TIF	Existing equipment	
Revais Creek below Revais R	MEF/TIF	New installation	
Mission Creek below Pablo Feeder Canal	IIF/MEF/TIF	Existing equipment	
Post Creek above Pablo Feeder Canal	MEF/TIF	Existing equipment	
Middle Crow Creek below Pablo Feeder Canal	IIF/MEF/TIF	Upgrade to telemetry	
North Crow Creek below Pablo Feeder Canal	IIF/MEF/TIF	Existing equipment	
Mission Creek below 6C Canal	IIF/MEF/TIF	Existing equipment	Station moved to St. Ignatius due to poor measuring conditions around HW 93
Post Creek below F Canal	IIF/MEF/TIF	Existing equipment	
Marsh Creek below KH Feeder	IIF/MEF/TIF	Monitoring protocol	Use existing staff gage and measurement location
South Crow Creek below South Crow Feeder	IIF/MEF/TIF	Existing equipment	
Crow Creek below Crow Pump	IIF/MEF/TIF	Existing equipment	
Mud Creek below Ronan B Canal	IIF/MEF/TIF	Upgrade to telemetry	
Crow Creek below Moiese A Canal	IIF/MEF/TIF	Existing equipment	

Station name	Station type	Measurement plan	Notes
Hellroaring Creek below Twin Feeder Canal	MEF	Monitoring protocol	Install staff gage
Little Bitterroot River above Mill Creek	MEF	Monitoring protocol	Install staff gage
Mill Creek below Camas A Canal	MEF	Monitoring protocol	Install staff gage
Little Bitterroot River below Mill Creek	IIF/MEF/TIF	Existing equipment	
Hot Springs Creek below Camas C Canal	IIF / MEF	Monitoring protocol	Install staff gage
Little Bitterroot River below Hot Springs Creek			No action

Table 2.0: Measurement activities at RDA locations
Orange – existing CSKT station and equipment, count = 16;
Green – existing CSKT station with proposed upgrade to monitoring equipment, count = 4;
Yellow – new installation, count = 17;
Grey – monitoring protocol, count = 8

Station name	Station type	Measurement plan	Notes
Tabor Feeder Canal below MF Jocko River	RDA	Upgrade to telemetry	
Tabor Feeder Canal below NF Jocko River	RDA	Existing equipment	
Tabor Feeder Canal below Twin Lakes	RDA	Existing equipment	
Placid Canal above Black Lake	Incremental inflow	Existing equipment	
Upper Jocko S Canal at headworks at Jocko River	RDA	Existing equipment	
Upper Jocko S Canal at Big Knife Creek	RDA	New installation	
Jocko K Canal at headworks	RDA	Existing equipment	
Upper Jocko S Canal at Agency Creek	RDA	New installation	
Upper Jocko J Canal at Agency Creek	RDA	New installation	
Jocko E Canal at Agency Creek	RDA	New installation	
Jocko E Canal below Finley Creek	RDA	New installation	
Jocko N Canal at East Fork Finley Creek	RDA	New installation	
Doney Ditch at Schley Creek	RDA	Monitoring protocol	Install staff gage
Lower Jocko S Canal at Jocko River	RDA	New installation	
Lower Jocko J Canal at Jocko River	RDA	New installation	
Revais R Canal at Revais Creek	RDA	New installation	
Mission DA Canal at DC pool	RDA	Upgrade to telemetry	
Mission A Canal below Mission Creek	RDA	Existing equipment	
Pablo Feeder Canal below Post Creek	RDA	Existing equipment	
Pablo Feeder Canal below South Crow Creek	RDA	New installation	

Station name	Station type	Measurement plan	Notes
Pablo Feeder Canal below Middle Crow Creek	RDA	Monitoring protocol	Install staff gage
Pablo Feeder Canal below North Crow Creek	RDA	Existing equipment	
Pablo Feeder Canal at Pablo Drop	RDA	Existing equipment	
DC-2 Lateral at Dry Creek lining	RDA	Monitoring protocol	Install staff gage
Cold Creek Ditch at Cold Creek	RDA	Monitoring protocol	Install staff gage
Mission F Canal at headworks	RDA	Upgrade to telemetry	
Mission B Canal at Mission Creek	RDA	New installation	
Mission C Canal at Mission Creek	RDA	Existing equipment	
Mission 6C Canal at Mission Creek	RDA	New installation	
Kicking Horse Feeder at Post Creek	RDA	Existing equipment	
Post F Canal at Post Creek	RDA	Existing equipment	
Mission H Canal at Mission Creek	RDA	New installation	
South Crow Feeder at South Crow creek	RDA	Upgrade to telemetry	
Crow Pump Canal at Crow Creek	RDA	Monitoring protocol	Install staff gage
Ronan B Canal at Mud Creek	RDA	New installation	
Moiese A Canal at Crow Creek	RDA	Existing equipment	
Hillside Ditch	RDA	Existing equipment	
Twin Feeder Canal at Hellroaring Creek	RDA	Monitoring protocol	Install staff gage
Twin Feeder Canal at Centipede Creek	RDA	New installation	
Lower Twin Feeder Canal at Bisson Creek	RDA	Monitoring protocol	Install staff gage
Pablo A Canal below Pablo Reservoir	RDA	Existing equipment	
Flathead River Pumping Plant	RDA	Monitoring protocol	Derive flow from power usage
Camas A Canal at Mill Creek	RDA	Existing equipment	
McGinnis Diversion	RDA	New installation	
Alder Diversion	RDA	New installation	

Table 3.0: Measurement activities at Natural Flow and Irrigation Return Flow locations
Orange – existing CSKT/USGS station and equipment, count = 7;
Green – existing CSKT station with proposed upgrade to monitoring equipment, count = 2;
Yellow – new installation, count = 3

Station name	Station type	Measurement plan	Notes
South Fork Jocko River	Natural flow	Existing USGS coop	Part of definition for wet/dry/normal years
Agency Creek above Upper S Canal	Natural flow	Upgrade to telemetry	Part of definition for wet/dry/normal years
South Crow Creek	Natural flow	Existing USGS coop	Part of definition for wet/dry/normal years
North Crow Creek	Natural flow	Upgrade to telemetry	Part of definition for wet/dry/normal years
Hellroaring Creek	Natural flow	Existing CSKT station	Part of definition for wet/dry/normal years
Mill Creek	Natural flow	Existing USGS coop	Part of definition for wet/dry/normal years
Dublin Gulch	Return flow	Existing equipment	BIOP compliance
Coleman Coulee	Return flow	Existing equipment	BIOP compliance
Moiese MA Canal	Return flow	Existing equipment	BIOP compliance
West Miller Coulee	Return flow	New installation	Large return flow to Mud Creek from Pablo area
Hopkins Draw	Return flow	New installation	Large return flow to Flathead River from Round Butte
Westphal Coulee	Return flow	New installation	Large return flow to Flathead River from Valley View

Table 4.0: Initial priorities for artificial controls in canals. Further prioritization will be based on experience installing initial structures

Station	Priority ranking	Planned-for control structure
Hillside Ditch	1	Flume
Mission B Canal	2	Flume
Lower Jocko J Canal	3	Flume
Lower Jocko S Canal	4	Flume

5.0 Budget

The budget estimate for the proposed work is broken into one of four categories: CSKT staffing costs; equipment costs; database costs; and artificial control structure costs.

- CSKT staff costs are based on a ten year term. Planning for water measurement activities cannot effectively proceed on a one year term and CSKT staff costs are not provided on this basis. Staff costs include:
    - One full-time hydro-technician progressing from hydro-technician level 1 to level 2 after two years. This position is essential considering the increased number of measurement stations. Support costs, including vehicle and one-time purchase of field equipment are included.

    - Part-time FTE's (0.20 FTE) for the data management hydrologist and chief of field operations. These positions are intimately involved in all aspect of Water Management Program work, and are essential for effective implementation of proposed work.
- Equipment costs include costs for installation of new stations, upgrades to existing stations, and staff gage installations. Installation field service costs (equipment and operator, labor) are included. An electronics maintenance budget is based on Program experience that certain of the electronics equipment requires maintenance, repair or replacement during and after the warranty period.
- Database costs are directly attributable to costs to increase the number of stations reporting to Aquarius Web.
- Artificial control structure costs are based on installation of 16 structures. Costs for structures are included in the ten-year projections.

Table 5.0: Budget Compilation

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Totals
Labor											
1.0 fte hydro-tech	$46,678	$48,078	$50,000	$51,500	$53,045	$54,636	$56,275	$57,964	$59,703	$61,494	$539,373
0.2 fte data hydrologist	$14,056	$14,477	$14,912	$15,359	$15,820	$16,294	$16,783	$17,278	$17,805	$18,339	$161,132
0.2 fte chief of field operations	$15,547	$16,014	Responsibilities decrease after installation								$31,561
CSKT indirect	$16,019	$16,500	$13,631	$14,040	$14,462	$14,895	$15,342	$15,803	$16,277	$16,765	$153,734
										Labor Subtotal	**$885,799**
Hydro-tech field support											
Vehicle	$7,230	$7,375	$7,522	$7,673	$7,826	$7,983	$8,142	$8,305	$8,471	$8,641	$79,166
Equipment start-up	$15,000										$15,000
										Field Support Subtotal	**$94,166**
Database costs											
Increase # of web portal locations	$6,000										$6,000
Support and maintenance add-ons	$1,500	$1,200	$900	$900	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$13,500
										Database Subtotal	**$19,500**
Station Electronics											
Satlink V2	$2,516										$83,028
GOES antenna	$314										$10,362
lightning protector	$144										$4,752
SD1-12 Shaft Encoder	$738										$24,354
cable assembly 15ft.	$125										$4,125
float wheel	$224										$7,392
graduated float tape	$179										$5,907
counterweight and endhook	$64										$2,112
20 watt solar panel	$369										$12,177
4 amp solar panel charger	$89										$2,937
cable assembly 3ft.	$67										$2,211
12v deep cycle battery	$404										$13,332
float tape indicator	$120										$3,960

Site hardware	$400										$13,200
Per station total	**$5,753**									**Electronics subtotal (33 stations)**	**$ 189,849**
Electronics maintenance			$15,188				$ 15,188				$ 30,868
										Electronic maintenance subtotal	**$ 30,868**
Station housing											
Staff gage, channel iron	$340										$7,140
Steel equip. shelters	$775										$16,275
24", 16 gage 8' cmp	$198										$4,158
Cmp base plates, welding	$195										$4,095
Site hardware	$200										$4,200
										Station housing subtotal (21 stations)	**$35,868**
Installation –field services	$9,800										$ 9,800
										Installation subtotal	**$ 9,800**
					Total without Artificial Controls						
	357,547	**$103,643**	**$102,153**	**$89,472**	**$92,652**	**$95,309**	**$113,231**	**$100,858**	**$103,756**	**$106,739**	**$1,265,359**
Artificial Controls	**2 sites**	**2 sites**	**2 sites**	**2 sites**	**2 sites**	**2 sites**	**2 sites**	**2 sites**			
CIP concrete ($ 700.00 cuyard)	$16,800	$17,304	$17,823	$18,358	$18,909	$19,476	$20,060	$20,662			$149,391
bedding material	$1,000	$1,030	$1,061	$1,093	$1,126	$1,159	$1,194	$1,230			$8,892
misc.	$500	$515	$530	$546	$563	$580	$597	$615			$4,446
									Subtotal direct costs		**$162,730**
CSKT design, surveying [CSKT in kind]	$4,000	$4,120	$4,244	$4,371	$4,502	$4,637	$4,776	$4,920			$35,569
earthwork [FIIP in kind]	$5,000	$5,150	$5,304	$5,463	$5,627	$5,796	$5,970	$6,149			$44,462
										Subtotal in kind costs	**$80,031**
										Total artificial controls [direct and in kind]	**$242,761**
Total Direct Budget [excluded in kind]	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**	**Totals**
	$375,847	**$122,492**	**$121,568**	**$109,469**	**$113,249**	**$116,523**	**$135,082**	**$123,365**	**$103,756**	**$ 106,739**	**$1,428,088**

6.0 Schedule

The schedule for project implementation is contingent based on approval of the proposal and disbursement of funds to implement the proposal. Consequently, the schedule is defined in terms of time following funds disbursement. However, the schedule may need to be modified based on timing of funds disbursement, as it relates to irrigation activities and canal access and seasonal weather that may affect construction.

Hillside Ditch and Mission B Canal are identified for installation of a ratable, artificial control in fall, 2016. Lower Jocko J Canal and Lower Jocko S Canal are identified for installation of a ratable, artificial control in spring, 2017. These dates could change, pending project start-up.

Table 6.0: Schedule

Activity		Time following funds disbursement
1	Hire field hydrographer	3 months
2	Adapt workloads for Data Hydrologist and Chief of Field Operations	3 months
3	Purchase and receipt of gage station electronics	4 months
4	Purchase, fabrication, and receipt of gage station wet wells and gage houses	6 months
5	Upgrade gaging equipment at existing stations	6 months
6	Install wet wells, gage houses and gage station electronics at new stations	8 months
7	Install staff gages at monitoring protocol stations	12 months
8	Database activities, including new GOES assignments	4 months
9	Install control structures	2 – fall 2016, 2 – spring 2017