SEPTEMBER 30, 2019

MAPLE CREEK WATERSHED IRRIGATION EFFICIENCIES IMPROVEMENT PROJECT

Applicant: Dixie Bench Ditch Lateral Association

Applicant address: 3144 South 3600 East Franklin ID 83237

Project Manager: Lyla Dettmer

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Technical Proposal

Executive Summary

Date: 10/1/2019

Applicant: Dixie Bench Ditch Lateral Association

City/County/State: Preston, Franklin, Idaho

Project Manager: Lyla Dettmer

Project Description:
This project will decommission 8,000 feet of earthen canal; bypassing it with 7,040 feet of pipe to reduce water losses an estimated 1 cfs or 250 Acre Feet (AF) seasonally.
The assessment, using flow measurements, identified a problematic reach of the canal where it traversed steep hillsides with clay composition that periodically resulted in large amounts of water loss by seepage and landslides destructive to the canal. The option to install a pipeline to bypass this reach was selected as a measure that would address multiple goals of the Dixie Bench. The Deep Creek Pooling Agreement with 4 users is no longer working. Conflicts between the subdivision and the other 3 agriculture users have arisen. Again the option to install a pipeline to deliver the water to agriculture users that have similar goals and methodology was selected.

The funding provided by this opportunity will help the water users with the costs of pipe material, contractual construction and administrative tasks needed to implement the project.

Timeline: 2 Years from award, estimated completion date June 30, 2022

Federal Facility: Project is not located on a Federal Facility

Background Data

When the settlers first came to this area in the late 1800's the first projects they begun were irrigation. They knew that our arid climate would not generate productive farmland without irrigation. Irrigation companies continue what the settlers began. Their goals have always been to effectively use the water available without waste or abuse to promote the desired crop response. This is vital to the continuation of the agricultural community during drought periods that are becoming more common in our arid west.

All of the water in the intended project is used for agriculture. Major crops grown are small grains, pasture, alfalfa, field corn, and safflower. Specifics associated with the crops irrigated along the Bear River are: Potatoes 2%, Alfalfa 35%, Meadow hay 4%, Pasture 18%, Spring wheat 6%, Winter wheat 15%, Spring barley 12%, Sugar beets 1%, Field corn 6%, Other 1%. (Hill, 1989)

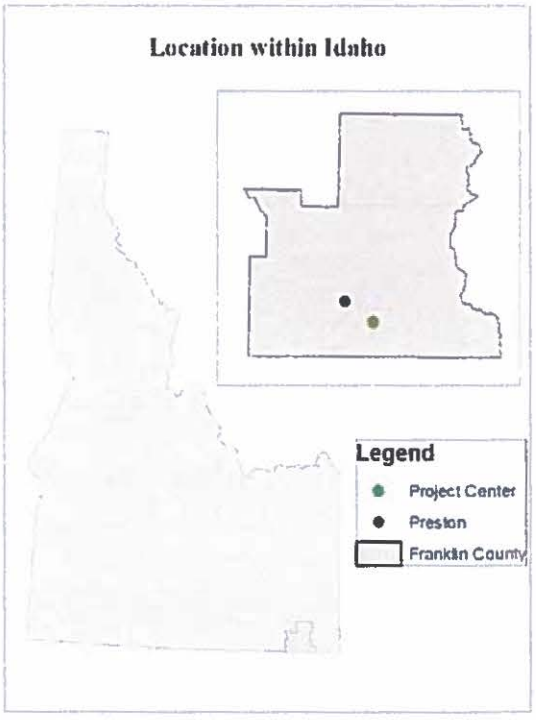
During the average growing season, May-September, limited precipitation is available for crop production. Direct use of ground water by the crops is an integral part of the present consumptive use. Within this service area, the Soil Conservation Service (SCS) estimated that 25-50 percent of the crop's needs come from precipitation and ground water. (Taylor, 1980) Thus irrigation and irrigation water storage is necessary for the crops in this system.

The applicant's water delivery system includes canals, ditches and pipelines. The main conveyance system travels 1 miles through open canal, resulting in major losses due to seepage, evaporation, and canal breaks. The system does not have any water storage capabilities. This project focuses on a 2,700 feet open ditch known as the Dixie Bench and a 4,340 feet ditch known as Deep Creek Lateral. Deep Creek also includes a gravity sprinkler system that supplies irrigation water to a subdivision.

The Dixie Bench has six users and they divide the water as follows 127 hours to Mike Porter, 5 hours to Val Castillo (leases to Porter), 5 hours Larry Young (leases to Porter, 20 hours to Barry Hawkes, 20 hours to Doug Wright, and 40 hours to RiteWood Inc. The Idaho State Water Right No. 13-47 issued with a priority date of April 1, 1862 has Stockwater and Domestic uses for 3.98 Cubic Feet per Second (CFS).[1] This water irrigates 360 acres.

Deep Creek has 3 users and they divide 11.4 CFS from Idaho State Water Rights 13-53A/B[2] with a priority date of April 1, 1883 as follows: Chatterton 3/8, Rallison 2/8, and Jensen 1/8. The Subdivision lateral uses 2/8. The total acres is 185 acres, of which 35 acres is the subdivision.

None of the users have any past working relationship with Reclamation. Since 1999 the project manager Lyla Dettmer has been involved in multiple Reclamation, WaterSMART projects with Consolidated Irrigation Company (CIC), Water District #11, and Winder Lateral. These projects were all ditch to pipe conversion except a project with CIC that included a small 500 watt Hydro facility.



Project Location

The proposed project is located in Franklin County in Southeastern Idaho. The Maple Creek Watershed is a tributary to the HUC 10 Cub River Watershed, which is a tributary to the HUC 8 Middle Bear River Watershed. This watershed is one of six watersheds within the Bear River Basin which covers Utah, Wyoming and Idaho. The largest nearby city is Preston, Idaho located to the north west of the watershed.

The project latitude is 42°1'52.92"N) and longitude is (111°46'44.03"W)

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[1] Idaho Department of Water Resources. *Water Right and Adjudication Search.* n.d. Web. 5 September 2019

[2] Idaho Department of Water Resources. *Water Right and Adjudication Search.* n.d. Web. 5 September 2019

Technical Project Description

Evaluation Criteria

A. Quantifiable Water Savings

By implementing this project the Maple Creek Watershed water users will eliminate water losses by the 2 laterals that have been observed to be as much as 1 CFS, 250 AF seasonally, as well as high maintenance costs required by frequent landslides and canal breaks. As a result, the water users will be taking a large step as to following a plan for better conservation and management of water.

To estimate our pre-project benefits we utilized proven accepted methods. We interviewed the knowledgeable people associated with the systems. The users have notebooks that measure flow in and out of the laterals.

We then contacted the local representatives from the Natural Resources Conservation Service (NRCS). They provided any previous studies ie pooling agreements done by their organization. The technical staff associated with the conservation districts used available technology such as GIS, Soil Surveys, IDWR water rights, and water accounting models.

A site inspection of the Dixie Bench was completed on July 23, 2019. Flow measurements using a Marshall- Water Current Meter were taken. This equipment measures velocity in shallow streams, irrigation ditches, canals, water supply conduits, and sewers. Suspended on a 1.2 m or 4′ wading rod, the bucket wheel revolves in flowing water. Readings at the ditch head were 1.29 cfs, readings at the weir were 1.13 cfs and readings at the last pump on the system were 1.04 cfs. This documented a .25 cfs loss or .50 Acre feet per day at this time of the irrigation season. Estimated season loss is 90 Acre feet (.50*180 days). July is not the optimum time to measure water loss. More water and more absorbent soils are in the spring. Our intent is to repeat this water measuring in the spring of 2020 to get a better picture of the before situation

The deep creek system was analyzed by NRCS using climate area III and assuming soils are cobbly silt loam with water holding capacity estimated at 6 inches in profile. The following on-farm calculations were completed:

$Up_{(m/day)}=0.034\ Um^{1.09}\ I^{-0.09}$ For alfalfa Um = 6.51 inches in July. 3/16" nozzles @ 45psi on 40'x60' spacing will apply 1.95 inches net in 11 hours at 65% efficiency. Up=0.247/2 +0.187/2=0.217 inches/ day [3]

Preliminary engineering was obtained by working through the pipeline hydraulics based on Hazen-Williams formula. (ID-40) This provided estimated design outputs including pipe size and length, flow velocity, pressure rating, thrust blocks, and appurtenances.

Pre-project estimation is based on knowledge obtained from the water users and data collected by flow measurements obtained July 23, 2019. It is estimated that the losses are currently

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[3] Hasfurther K., USDA-Natural Resources Conservation Service, *Wallace Chatterton- Pooling Agreement #3* Preston ID

seeping into the ground due to the soil type and being spilled at the end of the ditch due to the management of the open ditch.

To verify and document that the proposed water conservation project achieves the estimated water savings we will finalize and execute a monitoring plan that clearly defines the goal, encourages the use of appropriate analysis, takes into consideration cost-benefit, and increases the efficient use of management resources.

We propose that in order to quantify the actual benefits of this project the following methods will be used:

1. The pipeline will be installed using applicable standards, completed, and inspected.
2. As required by Idaho order a measuring device and lockable headgate will be installed at the diversion points.
3. Using installed and existing measuring devices at the on-farm locations, stream flows, and water transfers will be recorded and documented.

This information will be presented to the Cub River Water District, providing them with the information so that they can continue to make effective water management decisions watershed wide and assist in a future adjudication of the Bear River.

B. Supply Reliability

The applicant's water supply delivery system is approximately 2 miles of unlined canal. The canal has offered a relatively low cost delivery system with the exception of continuous maintenance. The water right of 11.4 cfs has never been available in the Deep Creek source. Actually shortages due to the drought have become more common. By implementing the proposed project overall system efficiency will by increased by decreasing canal maintenance costs and water losses.

Supply reliability is dependent on the canal's ability to convey water over long distances until taken by water users. Canal breaks during the irrigation season impacts shareholders by reducing crop yields when irrigation demands are not being met and have a detrimental effect on the landowners that have placed homes in relatively close proximity (one case 15 feet) from the open ditch. The proposed project will improve reliability of the conveyance system that frequently experiences breaks and seepage losses.

The current Deep Creek project scope involves a system (Pooling Agreement) that when created involved 4 agriculture users. In recent years one landowner changed to a subdivision. The resulting differences in irrigation methodology and equipment has produced community animosity. This municipal system, even though it is still irrigation water, does not use the water in the same manner or understand the agricultural needs and mind-set.

Positive impacts to local agriculture economies will be expected as the project will increase water reliability to farmers served by the proposed pipelines, helping maintain better crop yields and economic stability. An overall community benefit in well-being of the residents will happen in this rural or economically disadvantaged community.

Currently the open ditch has inputs along it from seeps and springs. This unappropriated water has actually been reducing the water losses. After piping this water will continue down watershed and enter the Maple Creek as it should. The stream flow for wildlife and the Bonneville Cutthroat trout, a federally recognized candidate species will be improved.

This project promotes and encourages collaboration in the Maple Creek Watershed, the Cub River Watershed, and the Middle Bear River Watershed. No known conflicts have been mediated by Idaho Department of Water Resources (IDWR) or the water district. The landowners along the Dixie ditch have verbalized discontent with the current conditions. Annual management of the diversion, loss of stream water for horses, wildlife and fish, worry of the safety associated with close proximity of the open ditch have all been voiced to the project manager.

This project will alleviate the future need for intervention by IDWR and will address the ongoing conflict between agriculture and the subdivision on the Deep Creek while still protecting the agriculture customs and water rights.

C. Implementing Hydropower

No Hydropower is proposed in this project.

D. Complementing on-Farm Irrigation Improvements

This proposal has complementing on-farm irrigation improvements. The Dixie Ditch delivers water to the Merri-Canna Farm LLC. Contract #740211911190PV under ISDA-NRCS EQIP 2019 was signed in the spring of 2019. This contract is a 4 year contract. Irrigation Practices in this contract that complement this BoR proposal include: 2 Irrigation pivots systems, 1 irrigation wheel-line system, 2 Irrigation Pumping plants, 1 Variable Frequency Drive, and 1 Telemetric Meter. Irrigation management practices included Irrigation water Managed (IWM).

The proposed pressurized pipeline will determine the pump sizing and specification and will actually reduce the pump size and reduce the energy consumption. Jared Campbell, NRCS Soil Conservationist completed an Application Ranking Summary dated 5-3-2019. National Priority Water conservation: 3b states "Yes implementing irrigation practices that reduce on-farm water use". 3d states "Yes implementing practices that reduce on-farm water use as a result of changing to crops with lower consumptive use, the rotation of crops, or the modification of cultural resources" National Priority Energy Conservation: 8a states "Yes Reducing on-farm energy consumption".
State Issues Irrigated Land "Yes a basic irrigation water management scenario will be contracted. "Yes an estimated reduction in gross water applied more than 21%."

Estimated on-farm savings with FIRI: NRCS worksheet comparing present condition to planned condition worksheet demonstrates present condition has 49.1 estimated gross inches of 49.1 and net irrigation requirement of 24.6 inches. Planned on-farm condition has 35.4 estimated gross inches and net irrigation of 24.6 inches. The estimated reduction in Gross Water applied is 13.7 inches per acre or 28%. (appendix:)

Estimated on-farm energy savings: Variable Speed Drive –Economic comparison worksheet reviewed and approved Darin Murdock, NRCS Engineer 4-15-19 with savings of 66,890 KWH or 15.5% and power savings $1,107.19 ([4]appendix:)

E. Department of Interior Priorities

1. *Creating a conservation stewardship legacy*: The Maple Creek Watershed in located at the top of the Cache Valley. This is an area approximately 1,387 square miles and includes the valley floor, the benches, and the flanks of the Wasatch Mountains. The Cache Valley is experiencing rapid suburban and second-home development. With this urbanization several problems have emerged. Suburban sprawl being the most concerning. This low-density, non-contiguous development consumes relatively large amounts of farmland and natural areas. Cache Valley 2030-The Future Explored study included the Maple Creek Watershed. The conclusion drawn was that alternative futures need to be pursued so that "the region will become strong enough to determine its own destiny rather than being subject to external forces" [5] The Maple Creek Watershed is in the upper part of the Cub River watershed. The Cub River is a tributary of the Bear River that ends in the Great Salt Lake. Any benefits and savings to water travels down river. The heavily populated Wasatch Front is below us. Water savings from here have an ultimate impact of the water quantity and quality.
2. *Utilizing our natural resources:* This project will benefit agricultural land.
3. *Restoring trust with local communities:* The ongoing conflicts of the Deep Creek agricultural water users and the subdivision will be eliminated by this pipe project improving the trust in this local community.
4. *Striking a regulatory balance:* We are hopeful that improvements to the stream diversions and allowing springs and seeps to continue on to the Maple Creek will have a benefit to the Bonneville Cutthroat trout thus helping keep this candidate species off the endangered list which would add regulatory burdens to our landusers.
5. *Modernize our infrastructure:* This project is an infrastructure project. Replacing open ditches with buried pipelines definitely modernizes these systems. The NRCS projects a life span of buried PVC pipe to be 25 years. So the maintenance involving ditch cleaning etc will be eliminated. As urbanization occurs the ability to access easements is substantially reduced. This time in history is a good time to pipe as the regulations and community acceptance just continue to grow on the side of not implementing pipe project.

F. Implementation and Results

1. *Project Planning:* The Franklin Soil & Water Conservation District Five Year Resource Conservation Plan is a plan that covers all of Franklin County Idaho. It is issued under Idaho state Law, Title 22, Chapter27. Conservation District are charged with facilitation cooperation and agreements between agencies, landowners, and others. The 5 year plan identifies local conservation objectives; develops plans with clear measurable goals; establishes actions to ensure implementation; and monitors programs and projects

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[4] USDA-NRCS, EQIP 2018 Application Ranking Summary with Irrigation FIRI and pump VFD worksheets. Preston ID

[5] Toth, R.E., Braddy, K., Guth, J.D., Leydsman, E.I., Price, J.T., Slade, L.M., and Taro, B.S. (2006) Cache Valley 2030-The Future Explored. Final Project Report No. 2006-1, College of Natural Resources, Utah State University, Logan Utah 84322-5200

effectiveness. On page 17 water resources surface supply and demand are addressed. The flow of streams which produce the supply of water that was stored as snow does not coincide with the total irrigation season. This pattern creates problems with irrigated agriculture such as over irrigation and inefficient delivery.[6]

This project involves surface water delivery without a reservoir facility. It will have a direct positive impact on inefficient delivery of irrigation water. On September 4, 2019 this project was given strong support when presented to the board of supervisors.

2. *Performance Measures:* We plan to quantify project benefits to determine the relative effectiveness of our efforts as well as the overall effectiveness of WaterSMART grants. In July 2019 we took flow measurements of the Dixie Bench Ditch. We measured at the diversion from Maple Creek, at the weir to calibrate the readings, and at the last pump before going into the on-farm systems. We plan to repeat these reading in the spring 2020 to get an early season reading. We also plan to take a spring reading for the Deep Creek water users to verify the on farm calculation of loss by NRCS.

   Idaho Department of Water Resources completed a comprehensive study of the reliability of meters. This compared various types and manufacturers. They have endorsed magnetic meters as the best method of measuring in a pipeline. Magnetic meters will be installed at water users turnouts. The meters are vital to getting a quantifiable use of Maple Creek and Deep Creek water.

   During installation of the pipe we will install measuring device. and lockable head gates per the Idaho Department Water Resources order for the Bear River. Our schedule allows for time during the 2022 irrigation season to obtain this data. We will proceed under the assumption that all seepage loss and evaporation will be eliminated by the underground pipes.

   Reclamation WaterSMART grants have produced many irrigation efficiency improvements in Franklin County. We are proceeding in a way that this project can add to those success stories and demonstrate the overall effectiveness of WaterSMART grants.

   This project will be highlighted when possible with the state legislators, county commissioners, county fair, water districts meetings, and other agriculture attended events.

   3. Readiness to Proceed: The implementation of the proposed project will include five major tasks that include: Project Management, Environmental Compliance, Engineering, Construction, and Finalization. These major tasks will begin June 2020 and be completed by June 30, 2022.

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[6] Franklin Soil & Water Conservation District (March 2019) *Annual Plan: Five-Year Resource Conservation Plan.* Preston ID

Preliminary Hydraulic Engineering: The report from this study provided a comprehensive framework from which final design and construction budgets can be completed. Included are the following: -preliminary GPS survey, -hydraulic analysis and sign, -delineation of all users and locations, -establishment of alignments, -establishment of final design criteria, -construction planning, -institutional issues, -construction cost estimates, and -life-cycle cost analysis.

Final Design & Survey: The final design package will contain the construction drawings, specification, and operations manual. This report will be provided to reclamation for input

Construction: The Dixie Bench and Deep Creek water users are committed to constructing underground PVC pipelines with inlet structures.

The Deep Creek pipeline will begin with an inlet structure with weir plate and wedge wire screen. It will involve 160 feet of 10" HDPE, 1,660 feet of 10" 100 psi PVC pipe then reduce to 1,320 feet of 8" 160 psi PVC pipe and 1,200 feet of 8" 200 psi PVC pipe using the technology associated with pressure reducing/ sustaining station that will take in 111 psi and outlet 45 psi. This would better manage the water by removing the need for constant adjustments.

The Dixie Bench pipeline begin with an inlet cement structure and 2,700 feet of 18" 80 psi PVC pipe, 16 elbows are planned to accommodate the need to stay in the existing easement. 2,700 feet of exceptional hard to install construction installation. This ditch is located alongside a steep hill. All installation will need to be driven down the existing easement access road. A cement truck will be able to access the inlet structure.

The pipelines will be installed in the existing easement as much as possible. Trench excavation will avoid wetlands and be performed outside the irrigation season while the canal is not in operation. Care will be taken to ensure minimal utilities and road crossings with additional caution at these locations during construction. During this construction interim reports will be provided to Reclamation for review and input.

Construction Inspection: The construction will include construction engineering for unforeseen conditions, inspection, and quality control. The technician will do the on-site construction inspection. A field superintendent will be assigned by the water users. This position will be on-site the majority of the time. The duties associated with this position include: Coordinate and supervise all subcontractors, construction and scheduling of work. Oversee all ordering and receiving of construction materials. Function as coordinator and liaison to property owners and stockholders regarding all construction activities and services to be provided by the irrigation company. Review and approve all invoices; assist with monitoring of project budget and bookkeeping. A report of these activities will be provided to reclamation for review and input.

Operation and Maintenance: A properly operated and maintained irrigation pipeline is an asset. This irrigation pipeline is designed and installed to transmit water to place of use. The estimated life span of this project is at least 25-50 years. The life of this pipeline can be assured and usually increased by developing and carrying out a good operation and maintenance program.

Project Management and reporting: Franklin Soil & Water Conservation District (FSWCD) has administered all of the previous BoR grants. Lyla Dettmer, Project Manager was the FSWCD staff assigned to these Reclamation projects and is familiar with the federal forms and the ASAP financial reimbursement process. Lyla Dettmer will do the Program Performance Reports and the Fiscal reporting. Regular meeting with the water users will be held. During the annual meeting a report will be provided to the stockholders and waterusers.

Permits for accessing the diversion point in the way of Notice of Intent to modify or Improve an existing diversion will be acquired by submitting a Joint Application to IDWR and Army Corp

Previously there has been surveying and preliminary pipe sizing calculations performed in support of this project.

No new policies will be required to implement the proposed project. An administrative action where the group of water users will officially become a Lateral Association. Lateral associations are organized under Idaho state statues. Title 42 Chapter13 defines and authorizes these entities. The organization of these entities is "where 3 or more parties take water from the same canal or reservoir at the same point to be conveyed to their respective premises".

The environmental compliance estimate of 3% was developed using our knowledge of past WaterSMART projects. We have allowed time in our schedule so that upon request the Provo field office will be able to help with the environmental compliance. On September 17, 2019 we received an email from Scott Blake, BoR. He states "3%should be fine for your estimating. Most budgets come in at 1-2% unless there are circumstances that warrant going higher like cultural or environmental concerns"

Table 1-Schedule

Major Tasks	Milestones	Responsibility	Date
Project Management	Financial Assistance Review	BOR, water users,	1-3 months after award
	CIC Budget Adjustment	Water users	Fall 2020
	Agreements w/ Partners	Water users	Summer 2020
	Verbal Easements Formalized	Water Users	Fall 2020
	Reporting & Coordination	Project Manager	As required
Environmental Compliance	Category exclusion probably or /FONSI/ROD	BOR, water users, Project Manager	Prior to Construction
Engineering	Preliminary Screening	FSWCD	Winter 2019/ Spring 2020
	Survey	Surveyor	Spring 2020 if needed
	Design	Engineer	Spring 2020
	Permits	Water users, Project Manager	Summer 2020
	Construction Inspections	Project Superintendent	During Installation
Construction	Procurement	Water users, Project Manager	Summer 2021
	Installation	Water Users	Fall 2021

	Testing	Water Users	Upon Completion
Finalization	Performance Measures	Water users, FSWCD	Spring 2020/fall 2021/Spring 2022
	Project acceptance	Water users	Winter 2021
	Final Report	Water users, Project manager	90 days after grant end

G. Nexus to Reclamation Project Activities

The Reclamation Project known as the Preston Bench Project contract no IIr-1520 dated August 31, 1948 and contract NO 4-07-40-R0070 dated September 27, 1994 is located in Franklin County. This is within the planning area. This Reclamation project was for the Preston Mink Creek Irrigation Company who combined with the Preston Whitney Irrigation Company and is now known as Consolidated Irrigation Company.

Preston Whitney's water source is the Cub River. The combined company Consolidated is a large shareholder in the Water District 13a-Cub River. This project's location on the Maple Creek, and its tributaries, has a direct impact on the water available in the Cub River. Maple Creek is a tributary to Cub River.

In recent months the Upper Colorado Office, located in Provo Utah, has provided increased technical staff assistance to CIC. This interest, support, and commitment of resources both technical and financial demonstrates to us the desire to continue a relationship beneficial to both parties that began in 1948.

H. Additional Non-Federal Funding

Additional Non-Federal Funding include water users for construction, environmental, engineering, and administration, and Franklin SWCD for information and education. If engineering assistance is provided at a later date we will update. The Idaho Soil & Water Conservation Commission as an elaborate planning methods for technical assistance. Thus they cannot commit this far in advance.

Non-Federal Funding $ 142,643.57
Total Project cost $285,000.14

Project Budget

Funding Plan

Cost-effectiveness in conserving water and the economic impacts solutions will have on the farmer required to make the change are important considerations because they affect the acceptability of the project. Various methods benefit the water resource and society, but often do not provide an economic benefit to the landowner who installs and maintains them. This is why cost sharing financial incentives are critical for promoting implementation of water conservation and management improvements.

As presented in the budget section of this proposal the estimate total project cost is $285,000.14. We have considered several factors such as ensuring the expenses are allowable, allocable, and reasonable. We propose to fund the non-Reclamation project costs by using a combination of

cash reserves, future assessment on capital stock, loans, and other appropriate sources. The Project manager has experienced the specific matching requirements associated with federal funds. This past involvement will ensure that a cost-effective, environmentally sound product is provided

We are confident in our financial strength and stability. The water users have owned and operated agricultural operations for decades. Our users include various cooperation's such as Ritewood Inc. and the owners of business entities in Franklin County.

Additional financial and technical assistance will be provided by nonfederal entities. The Natural Resources Conservation Service will provide technical assistance in an oversight role ensuring compliance to NRCS standards & specifications. They will provide guidance on addressing the environmental and regulatory compliance. This is a federal agency thus no time, materials, etc have been included in the construction project budget. This interagency involvement will guarantee an overall quality product is generated.

Non-Federal share of project costs will be the responsibility of the Maple Creek watershed water users. The individual upon organizing into a Lateral Association will appoint a water manager and will acquire funding by raising the assessment based on water use.
Idaho Soil & Water Conservation Commission has the ability to contribute in-kind funding with engineering staff for project design. Engineering staff time is allocated on an annual basis and cannot commit staff time at this moment. Historically requests for engineering staff time have been approved.

If the in-kind contribution from ISWCC is not available or the water users choose a different contract engineer, the Maple Creek watershed water users will cover the associated costs by shareholder assessment.

Please see attached official resolution for Dixie Bench's commitment to funding. Non-Federal share of project costs will be the responsibility of water users.

Letters of Commitment

On September 4, 2019, in a regular meeting, the Franklin SWCD board of supervisors made an official motion that they would assist the Maple Creek Watershed Water Users to pursue a funding request to the Bureau of Reclamation and contribute $287.00 in office supplies and travel cost. Upon approval of funds, they will execute a cooperative agreement with the water users to detail their commitment in the information and education components where state legislators and, county commissioners are notified of this successful project.

Budget Proposal

Table 2---Total Project Cost Table

SOURCE	AMOUNT
Costs to be Reimbursed with the requested Federal funding	$ 142,356.57
Costs to be paid by the Applicant-dixie	$ 83,342.86

Costs to be paid by the Applicant- Deep Creek	$ 59,013.71
Value of Third party Contributions	$ 287.00
TOTAL PROJECT COST	$ 285,000.14

Table 3---Budget Proposal

BUDGET ITEM DESCRIPTION		COMPUTATION		QUANTITY TYPE	TOTAL COST
		$/Unit	Quantity		
Salaries & Wages					
	Project Manager	35.56	110	hours	$ 3,911.60
	Technician	24.44	50	hours	$ 1,222.00
	Field Superintendent	20.87	80	hours	$ 1,669.60
Fringe Benefits					
	included above				
Travel					
3rd	Vehicle Mileage	0.58	150	miles	$ 87.00
Equipment					
	18" 80 psi pipe	14.5	2700	feet	$ 39,150.00
	18" gasket 90 elbows	560	1	each	$ 560.00
	18"gasket 45 elbow	375	5	each	$ 1,875.00
	18" gasket 22 elbow	355	5	each	$ 1,775.00
	18" gasket 11 elbow	355	5	each	$ 1,775.00
	Cement Structure	28000	1	each	$ 28,000.00
	10" HDPE sdr17 pipe	12.91	160	feet	$ 2,065.60
	10" valve assembly	1100	2	each	$ 2,200.00
	10" 100 psi PVC pipe	4.7	1660	feet	$ 7,802.00
	8" 160psi PVC pipe	5.29	1320	feet	$ 6,982.80
	8" 200psi PVC pipe	6.43	1200	feet	$ 7,716.00
	Pressure station	6500	1	each	$ 6,500.00
	8"x10"x6" tee	280	1	each	$ 280.00
	8"x8"x8" tee/ valve assembly	750	1	each	$ 750.00
	8"x8"x6" tee/ valve assembly	750	1	each	$ 750.00
	inlet weir & screen	20776	1	each	$ 20,776.00
	Seametric magnetic meter 12"	3434	1	each	$ 3,434.00
	Seametric magnetic 8"	2471	4	each	$ 9,884.00
	Seamettic magnetic 10"	2887	1	each	$ 2,887.00
	6" valve assembly	580	1	each	$ 580.00

Supplies & Materials					
3rd	Postage	0.44	100	roll	$ 44.00
3rd	Office Supplies				$ 156.00
	Grass seed	100	1	acre	$ 100.00
Contractual/ Construction					
	Deep Creek Installation	4320	4.9	feet	$ 21,168.00
	Dixie Connection	2800	1	each	$ 2,800.00
	Dixie Ditch Installation*	2700	15	feet	$ 40,500.00
	Dixie Fittings & Thrust blocks	750	16	each	$ 12,000.00
	Digging & crossing water lines	4140	1	each	$ 4,140.00
	Install pressure station	800	1	each	$ 800.00
	Engineering	7%	$ 227,450.40		$ 15,921.53
Other					
	Financial Review-2yrs	1.00%	$250,262.13		$ 2,502.62
	Legal	0.50%	$250,262.13		$ 1,251.31
	Environmental costs	3%	$250,262.13		$ 7,507.86
Total Direct Costs					**$ 261,523.92**
Indirect Costs					
	De minimis MTDC	10%	$234,762.13		$ 23,476.21
Total Estimated Project Costs					**$285,000.14**
Third-Party Contributions					$ (287.00)

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Budget Narrative

Salaries and Wages

Lyla Dettmer, Project manager or staff she directs, with confirmation of the Maple Creek Watershed Water Users will complete fiscal reporting responsibilities and Program Performance Reports. Project dedicated salaries including rates and hours are included for Lyla Dettmer, Project Manager. Lyla has worked for the Franklin SWCD since 1998. She has attended formal trainings and is certified in various natural resources. She has created the administration and financial procedures and policies that help ensure these federal grants meet all the requirements and simplifies the auditing process. The use of these policies substantially reduces the engineering cost because the engineer firm is not paying his administration employees and marking this wage up before billing us.

Unnamed, technician will provide construction inspection . Using the ASCE guideline we estimated construction engineering at 50% of the design fee or 5% of construction. He will work closely with the engineer and project superintendent to ensure adherence to engineering practices.

Unnamed, field superintendent will oversee the field operations on a daily basis and will be compensated for the portion of his activities that are above and beyond his normal duties or specific to this project. .
Please see the following wage calculations showing the wage and how it is calculated.

lyla FTE 2080 hrs				rate
hourly rate				$ 25.00
FICA	0.062			$ 1.55
Med	0.0145			$ 0.36
unemployr	0.01275			$ 0.32
workers cc	0.0025			$ 0.06
liability	0.0057			$ 0.14
annual lea	120 hrs an	$ 250.00	$ 3,000.00	$ 1.45
sick leave	72 hrs ann	$ 150.00	$ 1,800.00	$ 0.87
health insu	month	$ 250.00		$ 1.45
retirement		$ 250.00		$ 1.45
holiday	10 @ 8 hrs	$ 166.67	$ 2,000.00	$ 0.96
rent	380 month	$ 190.00		$ 1.19
cell/phone	123 month	$ 123.00		$ 0.77
indirect				
				$ 35.56

Luke FTE 2080 hrs			rate
hourly rate			$ 15.00
FICA	0.062		$ 0.93
Med	0.0145		$ 0.01
unemployr	0.01275		$ 0.01
workers cc	0.0144		$ 0.01
liability	0.0057		$ 0.01
annual lea	40 hrs ann	1.54	$ 0.29
sick leave	72 hrs ann	1.54	$ 0.29
health insu	month	250	$ 1.56
holiday	10 @ 8 hrs	3.08	$ 0.58
retirement		250	$ 1.56
rent	380 month	190	$ 1.19
vehicle	5040 annu	420	$ 2.63
phone	75 month	75	$ 0.47
			$ 24.54

Lyle				rate	monthly
hourly rate				$ 20.00	$2,700.00
FICA	0.062			$ 0.29	$ 167.40
Med	0.0145			$ 0.26	$ 39.15
unemployr	0.01275			$ 0.10	$ 34.43
workers cc	0.0050			$ 0.11	$ 13.50
liability	0.0057			$ 0.11	$ 34.48
retirement				$ -	
	0.5	50		$ 20.87	$ 2,988.96

Fringe Benefits

Fringe Benefits are included in our burdened or billable hourly rate. This is detailed on the above breakdown of wages and how they are calculated

Travel

Travel cost associated with construction inspection includes IRS approved mileage rate at 58 cents/mile.

Equipment

All purchases such as pipe, fittings, and measuring will be procured using a competitive bid process. The installation using public works contractors will also be selected using sealed completive bids.

To estimate our application budget we based these prices on previous projects similar in size that have been completed in the last 3-5 years. Because pipe cost change a lot we placed calls to the local dealers (Valley Implement and Circle B Irrigation) and ask for an estimate. Our experience has been that when placed in a competitive bid situation the final accepted price is a little lower. Internet accessed Instrumart provided the cost of the magnetic meter. A 12" and a 8" will

provide measurements at the take out connection 1 for Merri Canna farm and 1 for the others. The 4 users on Deep creek will have either an 8" or 10" depending on their location on the pipe.

Pipe Installation costs were obtained by comparing a recent competitive bid to the project conditions and elbow, fitting, air vac, and thrust block installation was estimated as a percentage of the associated expense. This again was based on our prior knowledge of similar sized construction projects.

Supplies and Materials

This category includes project specific supplies necessary for implementation of this project. These may be but are not limited to office expenses, postage etc. The majority of these supplies will be utilized for reporting and education. Seeding after the pipe installation total area will be 1 acre at 100.00/acre. This is using the current price at Intermountain Farmers Association (IFA)

Contractual and Construction

Construction will be accomplished with the water users as the general contractor and specific tasks allocated to job specific contractors such as cement installers. If the water users do the installation as cost share, it must meet applicable standards per the construction inspections. All design engineering will be on a contractual basis using a ASCE guidelines for an average complexity rate of 7% the construction budget.

Third-Party Contributions

Franklin SWCD will provide $200.00 for office supplies and $87.00 for 150 miles @.58 travel to project site

Other

Legal fees and accounting fees based on our experience with similar projects were calculated as 1.5 % of construction. Agreements and review of easements will be completed and the legal advice obtained will prevent any errors with water right transfers to separate the deep creek water users from the subdivision.

3% of construction was included for environmental review. As directed in the Funding opportunity we contacted Reclamation staff and received an email dated September 17, 2019 from Scott Blake, Provo Area office stating that "3% should work for your estimating. Most budgets come in at 1-2% unless there are circumstances that would warrant going higher like cultural or environmental concerns."

Indirect

Dixie Bench Ditch does not have a negotiated in direct cost. The budget includes a *de minimis* rate of 10 percent. The Modified Total Direct Rates(MTDC) is proposed. MTDC consists of salaries and wages, fringe benefits, materials and supplies, services, travel, and subgrants and subcontracts up to the first $25,000.00 of each. We understand this rate will apply for the life of the award and cannot be changed even if we do establish an approved rate.

Environmental and Cultural Resources Compliance

The following questions have been answered to the best of our knowledge.

• *Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.*

During construction soil and vegetation will be disturbed. Care will be taken to ensure that disturbance is minimized and no sediment is transported from the construction site into waterways using such methods as silt fences etc. The construction will take place in predominately agricultural land that will be reseeded into annual or perennial vegetation in the next crop cycle. If it is not agricultural land, it will be reseeded into perennial vegetation.

• *Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? Would they be affected by any activities associated with the proposed project?*
Using NRCS Threatened and Endangered Species GIS data sets No species of concern were found within the project area, and will not be affected by this project.

• *Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States?" If so, please describe and estimate any impacts the proposed project may have.*
Using NRCS wetland data There are no known wetlands or surface waters within the project area that fall under CWA jurisdiction. Maple Creek and Deep Creek are a perennial stream that will be categorized as a Waters of the United States. No negative impacts are anticipated. Necessary precautions will be taken to comply with all permits and reduce any impacts of project construction.

• *When was the water delivery system constructed?*
The Dixie Bench Ditch had a court order dated June 11th, 1980 where the judge ordered the ditch easement of 15 feet on each side and grants the right to replace the present ditch with a buried pipeline. The Deep Creek water users were created in a USDA-NRCS pooling agreement #3 dated April 9, 1981

• *Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.*
The proposed project will not be modifying any individual irrigation system features.

• *Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.*

No buildings, structures, or features in the irrigation district are known to be listed by the National Register of Historic Places. (National Park Services, U.S. Department of the Interior, 2016)

•*Are there any known archeological sites in the proposed project area?*
There are no known archeological sites in the proposed project area. Final determination of this will be made by Idaho State Historical Preservation Office (SHPO) prior to construction. Please see a Cultural Resource Assistance requested by USDA-NRCS for Merri-Canna Farms on June 6, 2019. This is adjacent to the Dixie Ditch at the end of the proposed piping project. Confirmation received June 21, 2019 from Darin Vrem, Archaeologist states that it does not require a cultural resource survey. (appendix)[7]

• *Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?*
The proposed project will not have a disproportionately high or adverse effect on low income or minority populations. We project a benefit to these populations.

• *Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?*
The proposed project will have no impact on tribal lands. No lands are located near the project site.

• *Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?*
This project is not anticipated to contribute to the introduction, continued existence, or spread of noxious weeds or invasive species in the area. We project a benefit as we remove the transportation vehicle that is open ditches. All excavated and disturbed areas will be revegetated so that the area will be less susceptible to weed invasion.

Required Permits or Approvals

Based on the court case (Talent Irrigation) irrigation ditches and canals are being considered waters of the U.S. and subject to regulations by the U.S. Corp of Engineers. Diversion points have been given the ability to maintain without a permit This project has an impact on waters of the U.S. at the diversion points. We will make an application and fulfill all necessary requirements associated with this permitting process. All available exemptions have been investigated and based on recommendation from our local U.S. Corp of Engineer representative this project will proceed as an activity with minor impacts.

IDWR stream alteration permit or notice of intent may be needed. This permit is the joint §404 permit with the U. S. Corp of Engineers.

During the preliminary planning/final engineering process all permits, easements, or approvals will be identified. It is the responsibility of the irrigation companies to negotiate and obtain the necessary easements and agreements with Water District 13a-Cub River. These are only necessary when an existing historical right of way is not available. Additional easements for the

[7] USDA-NRCS, *NRCS Project Request for Cultural Resources Assistance*, Boise ID June 6,2019

deep creek pipe and will be needed and the landowners have been approached and are either shareholders or will give easement. No funds will be used to purchase easements.

Letters of Project Support

NRCS submits the attached letter in support of this application.
Cub River Water District submits the attached letter in support of this application.

Official Resolution

On September 30, 2019, the Dixie Bench Ditch Water Users in a special meeting met authorized Michael Porter to write and sign the resolution. They reviewed the funding plan and voted to submit the required resolution (attached)

References

Franklin Soil & Water Conservation District (March 2019) *Annual Plan: Five-Year Resource Conservation Plan.* Preston ID

Hasfurther K.(April 9, 1981), USDA-Natural Resources Conservation Service, *Wallace Chatterton- Pooling Agreement #3* Preston ID

Hill, R. W. (1989). *Duty of Water Under the Bear River Compact: Field Verification of Empirical Methods for Estimating Depletion.* Research Report 125.

Idaho Department of Water Resources.(Sept. 2019) *Water Right and Adjudication Search.* n.d. Web. 5

Taylor, L. P. (1980). *Feasibility Study North Cache Water Development Project,* Preston Idaho. CH2M Hill, Boise Idaho.

Toth, R.E., Braddy, K., Guth, J.D., Leydsman, E.I., Price, J.T., Slade, L.M., and Taro, B.S. (2006) *Cache Valley 2030- The Future Explored. Final Project Report No. 2006-1*, College of Natural Resources, Utah State University, Logan Utah 84322-5200

USDA-NRCS, (May 2019). *EQIP 2018 Application Ranking Summary* with Irrigation FIRI and pump VFD worksheets.

USDA-NRCS, (June 2019). *NRCS Project Request for Cultural Resources Assistance* and determination email

IN THE DISTRICT COURT OF THE SIXTH JUDICIAL DISTRICT OF
THE STATE OF IDAHO, IN AND FOR THE COUNTY OF FRANKLIN

WILLIAM WRIGHT, JERRY HAWKES
ALAN D. HAMPTON, and
ROBERT HAWARTH,

Plaintiffs,

vs.

JOSEPH DILWORTH MORRISON,

Defendant.

CASE NO. 4121

JUDGMENT

The above-entitled matter came on for hearing on an Order to Show Cause before the above-entitled Court this 11th day of June, 1980, at Preston, Idaho.

The plaintiffs were represented by J. D. WILLIAMS of WILLIAMS & CASTLETON of Preston, Idaho, and the defendant was represented by TOM HOLME of RACINE, HUNTLEY & OLSON of Pocatello, Idaho. Whereupon counsel for both parties informed the Court that they had previously met with all parties to this action and had agreed by stipulation to a compromise and settlement of all dispute, rights, and allegations pending in this action and the Court having examined each of the parties as to their Agreement to the said settlement, and the Court having approved the same,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED as follows:

1. The plaintiffs have a ditch easement known as the Dixie Bench Ditch to carry water from Maple Creek to their farm lands located in Franklin County, Idaho, accross

the following described real property which defendant is purchasing from the State of Idaho:

Township 16 South, Range 40 East of the Boise Meridian
Section 15: That part of the South Half of the Southwest Quarter of Section 15 described as follows: Commencing at a point 180 feet South of the Northwest Corner of the said South Half of the Southwest Quarter, running thence East 172 feet; thence South 395 feet; thence East 60 feet; thence South 48 degrees 27 minutes East 493.05 feet; thence East 2039 feet; thence South 418 feet; thence West 2640 feet; thence North 1140 feet to the point of beginning

EXCEPTING THEREFROM: A part of Sections 15 and 22, Township 16 South, Range 40 East of the Boise Meridian, described as follows: Beginning at a point 141.88 feet North of the Southwest corner of Section 15, and running thence South 24 degree 34 minutes East 156 feet, thence South 42 degrees 2 minutes 30 seconds West, 64 feet, to a point 47.53 feet South of the Southwest Corner of Section 15, thence North 189.41 feet to the point of beginning.
ALSO EXCEPT: Commencing at a point 470 feet West of the Southeast corner of the Southwest Quarter of Section 15 and running thence North 232 feet; thence West 229.6 feet; thence South 232 feet; thence East 229.6 feet to the point of beginning.

2. The said ditch easement is to carry 3.98 CFS of water from Maple Creek during the regular irrigation season and additional water to the present capacity of the ditch during the early runoff period when additional water is available from Maple Creek.

3. The said ditch easement shall include the actual width of the ditch and fifteen feet on each side thereof for access thereto for repair, cleaning and maintenance purposes. Provided, however, that except in emergency situations the plaintiffs will only use the eastern and

4. The said easement shall include the right for plaintiffs to remove dirt for repair and maintenance purposes within 15 feet on each side of the ditch and the plaintiff shall, in so far as practical, smooth over any area where dirt is removed.

5. The plaintiffs shall pay defendant the sum of SEVEN HUNDRED FIFTY and NO/100 ($750.00) DOLLARS for any and all dirt which may now or ever have to be removed within the said boundaries of the right-of-way for repair and maintenance purposes.

6. The plaintiffs shall have the right to replace the present ditch with a pipeline along the present course of the easement and cover the same with dirt within the boundaries of the easement.

7. Defendant shall not interfere with plaintiffs, their agents and employees in the cleaning and maintenance of the said easement.

8. The easement shall run with the land and shall be binding upon and shall inure to the benefit of the parties hereto, their heirs, successors and assigns.

9. Each party shall pay their respective costs and attorney fees incurred herein.

DATED this 11 day of June, 1980.

FRANCES J. RASMUSSEN
District Judge

[illegible] certificate is [illegible] full, true and correct copy [illegible] on file and of record in my [illegible] been filed 6-11-80
June 11 1980
[illegible] Clerk of the District [illegible] Judicial District in [illegible] Franklin County, Idaho
[illegible] Deputy

JUDGMENT

Certified Copy Sent to State Engineer June 22nd, 1906.

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT
OF THE STATE OF IDAHO, IN AND FOR ONEIDA COUNTY.

J.J.FLACK,.....Plaintiff

vs.

Franklin, Maple Creek Pioneer Irrigation Company, a corporation,

Defendant

and

James G. Lowe, Levi Oliverson, W.B. Gibson, E.M. Chatterton, A. Stalker, John Gayman, Joseph Chatterton, John C. Whitehead, William Woodward, Samuel Morgan, James Howarth, Maria Wickham and Margaret Whitehead,

Interveners.

JUDGMENT AND DECREE

This cause came on regularly for hearing on the 2nd day of November 1903 before the Court sitting without a jury, jury having been expressly waived by the respective parties, upon the plaintiff's complaint herein, and the answer and cross complaint of the defendants and the petition of the intervenors, and the answers of the petition of the intervenors, Messrs Standrod and Terrell and Geo. E. Gray, Esq., appearing as counsel for the Plaintiff, and for the Intervenors William Stockdale, and W.W. Maughan, F.K. Nebeker and Arthur Hart Esqs., appearing as counsel for the Franklin-Maple Creek Pioneer Irrigation Company, a corporation; and D.C. McDougall, Esq., appearing as counsel for the intervenors Samuel Morgan, John C. Whitehead W.B. Gibson, and Levi Oliverson, and F.K. Nebeker and Arthur Hart, Esq appearing as counsel for intervenors James G. Lowe, Elizabeth M. Chatterton and Joseph Chatterton; and James C. Walters, Esq., appearing as counsel for intervenors, William Woodward, John Gayman, Maria Wickham, Margaret Whitehead, James Howarth, and Alexander Stalker.

When Witnesses on behalf of the plaintiff were introduced and their testimony taken, and the record testimony on behalf of the Plaintiff also having been taken; and witnesses for and on behalf of the defendant and intervenors having been taken, and the documentary evidence on their behalf also having been received and filed therein, and the cause having been argued by the counsel for the respective parties and having been finally submitted to the court for its decision, and the court having duly considered the same, and being now fully advised in the law and the premises and findings of fact and conclusions of law having been duly waived by stipulation of the counsel for all the respective parties, filed herein.

Wherefore, by reason of the law and the premises, it is ordered,

adjudged and decreed that the Plaintiff John J. Flack, and the Intervenors, William Stockdale and Alexander Stalker Sr., are entitled to use 5.45 cubic feet per second of time of the waters of Maple Creek, a tributary of Cub River, situated near the town of Franklin, in Oneida County, State of Idaho, their right to the use of said waters to date from the year (1876), the water herein decreed to be conveyed through what is known as the Flack Ditch, taken from the said stream a short distance below the dam of the defendant, to be appurtenant to and a part of the following described lands to be used for irrigation, domestic and stock purposes thereon, to-wit:

The North half of the S W quarter and the E half of the N W quarter and the N W quarter of the N W quarter of section 15, township 16 S. of Range 40 E. of Boise Meridian.

Also the W half of the S W quarter, and the S W quarter of Section 10, Township 16, S. of Range 40 E. of Boise Meridian; the same being the lands owned by the Plaintiff J.J. Flack; also forty acres of lands situated in the S. half of the S.W. quarter of Section 15, in Township 16 S. of Range 40 E. of Boise Meridian, belonging to Alexander Stalker; also the E. half of the S.W. quarter of the S W quarter of section 10 in Township 16 S. of Range 40 E. of Boise Meridian belonging to William Stockdale all of said lands being situated in Oneida County, State of Idaho.

That the Intervenors, William Woodward, is entitled to the use at all times of .8 cubic feet per second of time of the waters of said Maple Creek, his right to the use of said water to date from the year (1881) to be appurtenant to and become a part of the following described lands, to be used for irrigation, domestic and stock purposes thereon, to-wit:

The S W quarter of the N W quarter of Sec. 15 Township 16 S. of Range 40 E. Boise Meridian, in Oneida County, State of Idaho, said water to be conveyed through what is known as the Woodward Private Ditch.

That the Franklin Maple Creek Pioneer Irrigation Company a corporation, organized and existing under the laws of the State of Idaho, for the purposes of distributing the waters of said Maple Creek to its several stock holders is entitled at all times, for the use and benefit of such stock holders, to 6.8 cubic feet per second of time of the waters of said Maple Creek, its rights to the use thereof to date from the year (1860). And also to two cubic feet per second of time of the waters of said Maple Creek for the purposes aforesaid, its rights to same to date from the year (1877).

And also to the use of the waters of Maple Creek aforesaid for the purposes aforesaid of four cubic feet per second of time, its right to the same to date from the year (1887).

That intervenor John Gayman is entitled at all times to the use of one fifth of a cubic foot per second of time to the waters of said Maple Creek, his right to the same to date from the year (1872) to be appurtenant to and a part of the following described lands, for the irrigation thereof and for domestic and stock purposes thereon, to-wit:

Five acres of land planted to orchard, situated in section 16, Township 16 South of Range E of Boise Meridian, in said Oneida County, to be diverted and conveyed through what is known as the Flack Ditch.

That the Intervenors William Woodward, John Gayman, Maria Wickham, Margaret Whitehead, James Howarth and Alexander Stalker are the joint owners of what is known as the Dixie Bench Ditch, said ditch being below the headgate of the defendants, the Franklin Maple Creek Pioneer Irrigation Company, on said Maple Creek, and are entitled to 3.98 cubic feet per second of time of the waters of said Maple Creek, to be conveyed through said Dixie Bench Ditch, their right to the use of the same to date from the year 1862, to be appurtenant to and become a part of the respective tracts of land owned by said intervenors lying under said ditch, and heretofore irrigated by the waters of said Maple Creek, in Oneida County, State of Idaho, provided, that in so far as the waters arising below the head gate of the defendant, the Franklin Maple Creek Pioneer Irrigation Company, may become necessary to furnish the amount of water herein described to the said last named intervenors. Said intervenors shall have the exclusive right to use said waters arising below the head gate of the defendant aforesaid to the extent and for the purpose of making up the amount of water herein decreed to them through the said Dixie Bench Ditch.

That the intervenors, Joseph Chatterton, E.M. Chatterton, James G. Lowe and W.B. Gibson, are entitled to the use of 11.4 cubic feet per second of time of the waters of Deep Canyon Creek, a tributary of said Maple Creek, to be equally divided among them, share and share alike, their right to the use of the same to date from the year 1883, the same to be appurtenant to and become a part of their respective tracts of land described as follows, to-wit:

Lands of Joseph Chatterton: S. half of the S W quarter of section 13, Township 16 S. of Range 40 E. of Boise Meridian.

Lands of Elizabeth Chatterton: The W. half of the S E quarter of section 14, Township 16 S. of range 40 E of Boise Meridian.

Lands of James G. Lowe; The S W quarter of the N E quarter of section 14, Township 16 S. of Range 40 E. of Boise Meridian.

Lands of W.B. Gibson: Two hundred and forty acres of land situated in Section 11, 12, 13 and 14, Township 16 S. of Range 40 E. of Boise Meridian.

That the Intervenors Levi Oliverson is entitled at all times to .6 of a cubic foot per second of time to the waters of said Maple Creek, his right to the use of the same to date from the year 1882, to be appurtenant to and become a part of the following described lands, to-wit:

The S W quarter of the N W quarter of section 13, township 16 S. of Range 40 E. of Boise Meridian.

That the Intervenor John C. Whitehead is entitled at all times to 2.5 cubic feet per second of time to the waters of said Maple

Creek, his right to the use of the same to date from the year 1885, and to be appurtenant to and become a part of the following described lands, to-wit:

One hundred and sixty acres of land lying in Section..... Township 16 S. of Range 40 E. of Boise Meridian, upon which said water has heretofore been used.

That the Intervenor Samuel Morgan is entitled at all times to the use of four cubic feet per second of time to the waters of said Maple Creek, his right to the use thereof to date from the year (1894) and to be appurtenant to and become a part of the following described lands, to-wit: W. half S W quarter of Section 31, Township 15 S. and W half of the N.W. quarter of section six (6) Township 16 S. of Range 41, E. of Boise Meridian.

It is further ordered, adjudged and decreed that the said plaintiff, the said defendant, and each and every of the intervenors, their agents, servants or employees and successors in interest, be and they and each of them are hereby perpetually enjoined and restrained from in any manner interfering with the free flow of said waters of Maple Creek, and its several tributaries, except as herein adjudged and decreed to the said respective parties, and in the order of their several priorities.

It is further ordered, adjudged and decreed that as the costs in this action, consisting of the clerk's fees, in the sum of $18.40; the sheriff's fees in the amount of $9.50; bill of S.P. Morgan, Surveyor, $9.00; of George Swendsen, $25.00; of the court stenographer $368.00, making a total of $420.00, the same shall be distributed as follows, to-wit:

John J. Flack to pay $20.00; William Stockdale, to pay $10.00; Alexander Stalker, to pay $10.00; that William Woodward, John Gayman, Maria Wickham, Margaret Whitehead, James Howarth and Alexander Stalker the owners of the rights in the Dixie Bench Ditch, pay the sum of $104.00, to be contributed by them in equal amounts; the defendant, The Franklin Maple Creek Pioneer Irrigation Company, shall pay the sum of $206.00; that Joseph Chatterton, E.M. Chatterton, James G. Lowe and W.B. Gibson, pay the sum of $10.00 each; that Intervenor Levi Oliverson, pay the sum of $10.00; that Intervenor John C. Whitehead pay the sum of $10.00; that Intervenor Samuel Morgan pay the sum of $10.00, for which execution may issue against the ~~ex~~ respective partie against whom the above amount of costs is adjudged.

Done in open court this the 16th day of October, 1905.

Alfred Budge, District Judge.

Reference: Book B of Judgments, page 323, Original Oneida Co. Records

Recorded in book "2" of Judgments, page 83, records of Franklin County Idaho.

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Appendix

Letters of support: NRCS, Cub River Water District

Letters of commitment: Franklin SWCD

Merri-Canna NRCS Cultural Resources Review

NRCS Application Ranking Summary , FIRI, variable speed drive comparison

Wallace Chatterton Pooling Agreement #3Summary of Planning Data

Construction Estimates: Valley Implement, Circle B Irrigation

Steve & Joe Chatterton Summary of System Planning.

Dixie Ditch Water Measurements dated 7-23-2019 George Hitz.

USDA-NRCS pipeline hydraulics worksheet.

Resolution Dixie Ditch

Appendix

Letters of support: NRCS, Cub River Water District

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Merri-Canna NRCS Cultural Resources Review

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USDA-NRCS pipeline hydraulics worksheet.

Resolution Dixie Ditch

United States Department of Agriculture

NRCS
Natural Resources Conservation Service
98 East 800 North, Suite # 3
Preston, Idaho 83263

September 30, 2019

Maple Creek Water Users
Dixie Bench Ditch
Preston, ID 83263

Dear Maple Creek Water Users,

The Preston Field Office of the Natural Resources Conservation Service (NRCS) supports your proposed project because it furthers the mission of NRCS in Franklin County. The mission of the NRCS is to provide leadership in a partnership effort to help people conserve, maintain and improve our natural resources and environment. This is done primarily on private lands. This project would address Insufficient Water: Inefficient Use of Irrigation Water. This resource concern has been identified as high priority resource concern for Franklin County by NRCS and the Franklin Soil and Water Conservation District.

Your proposed project will reduce current water losses in the delivery of water to farms operated by Maple Creek Water Users. During the past year the Preston NRCS office has worked with land owners to improve or plan on-farm improvements within Maple Creek Water Users. On-farm improvements to irrigation systems are under contract on 254 acres and scheduled to be completed by the end of 2020.

Sincerely,

Boyd A. Bradford
District Conservationist

Franklin Soil & Water Conservation District
98 East 800 North Suite #5
Preston ID 83263
(208) 852-0562 Ext. 5 email: Lyla.Dettmer@franklinSWCD.net

September 30, 2019

Maple Creek Water Users
Dixie Bench Ditch
Deep Creek Lateral

Preston ID 83263

Dear Mr. Porter,

On September 4, 2019, the board of supervisors met and discussed your proposed Reclamation Project. The Franklin SWCD is in full support of the grant opportunities with the Bureau of Reclamation Water and Energy Efficiency Grant. The function of the conservation district is to take available technical, financial, and educational resources whatever their source, and focus or coordinate them so that they meet the needs of the local landuser for conservation of soil, water, and related resources. We feel that this grant will help us in reaching that goal.

The Franklin Soil & Water Conservation District will provide $200.00 in office supplies and we calculate 150 miles @.58 a mile is $87.00 for a total of $287.00 towards the implementation of this grant.

Sincerely

Lyla Dettmer

Lyla Dettmer
District Manager

Campbell, Jared - NRCS, Preston, ID

From: Vrem, Darin - NRCS, Boise, ID
Sent: Friday, June 21, 2019 10:49 AM
To: Campbell, Jared - NRCS, Preston, ID
Cc: Bradford, Boyd - NRCS, Preston, ID
Subject: Cultural Resources Review -- Merri-Canna Farms EQIP

The following project has been reviewed and it was determined that **it does not require a cultural resource survey.** Place a copy of this email in the project folder and complete the "Cultural Resources" section of the CPA-52. This concludes the Section 106 process requirements and the project can proceed as proposed.

FIELD OFFICE	PROJECT NAME	PROJECT NUMBER
PRESTON	MERRI-CANNA FARMS EQIP	NRCS-19-10209

Please contact me at the phone number or email address below if you have any questions.

Darin Vrem
Cultural Resources Specialist/Archaeologist
Idaho Natural Resources Conservation Service
9173 W. Barnes Drive, Suite C
Boise, ID 83709-1574
(208) 685-6995
Darin.Vrem@id.usda.gov

U.S. Department of Agriculture
Natural Resources Conservation Service

ID-420-005
03/2006

NRCS Project Request for Cultural Resource Assistance

Project Name: Merri-Canna Farms	Quad Name: Franklin	Date of Request: 6/6/2019

Legal Description

¼ Sec.	Sec. #	Township	Range
NE, SE, SW	S 9,	R 40, T 16 and NW, SW	S 10, R 40, T 16 and NE, NW S 16, R 40, T 16 and SW S 20, R 40, T 16

NRCS Unit: Preston Program: EQIP	County: Franklin	NRCS Contact Person & Phone #: Jared Campbell 208-244-3932

Project Description: Install 7485' of 12" down to 4" diameter pipe at 30" depth to operate a series of pivots, wheel lines and pods. Replace an existing 1550' stock water line at a depth of 48" and install a 30"x20' Culvert for stream crossing of Spring Creek (excavation will be ~36-42" depth from ground level). 2500' of Barb wire fence will also be installed.

Previous or Current Land Use: Cultivated for 100+ years, on all ground where irrigation pipe is being installed, Associated Ag land where the livestock pipeline will be installed (from well to different barns and corrals), Associated Ag Land between cultivated fields where the culvert will be installed. The fence will be installed in pasture land.

Acres of undertaking: Disturbance will be 10' wide on all pipelines and fence locations and 25' wide where the culvert will be installed. Total disturbance is 90,750 sq ft (2.1 acres)

Is the project within the external boundaries of an Indian Reservation and/or on tribally owned lands? [ ] No [ ] Yes (which?)

[ ] Duck Valley (Shoshone-Piaute)	[ ] Nez Perce	[ ] Kootenai
[ ] Ft. Hall (Shoshone-Bannock)	[ ] Coeur d'Alene	[ ] Other:_____

CULTURAL RESOURCE SPECIALIST PRELIMINARY REVIEW

Date Received:	Project Number: NRCS

Sources of information checked:

Are there known sites in the Project Area? ( ) Yes ( ) No If Yes, list site number, name and relationship to project: (key to map)

Is the NRCS Project Area sensitive? ( ) Yes ( ) No If Yes, provide a brief description of where Cultural Resources are expected with respect to cultural themes, landforms, water, slope, etc.

Is an archaeological field review recommended? ( ) Yes ( ) No

Additional comments\recommendations:

Cultural Resource Specialist_____ Date:_____

Attachments: ( ) Maps ( ) Site Forms ( ) Other Attachments (List)

INSTRUCTIONS: 02/27/06

Project Name: List landowner and type of project e.g.

John Smith Irrigation Pipeline

Quad Name: List 7.5′ topographic map name.

Date of Request: List date that the request was mailed to the Cultural Resources Specialist.

Legal Description: List Township, Range, Section to ¼ section.

NRCS Unit: List the office that is providing technical assistance for the project.

County: List the Idaho County where the project will be applied.

Program: List any program that is associated with the project (EQIP, CRP, RCRDP etc.)

NRCS Contact Person and Phone #: Specify who to contact about the project.

Project Description: Provide a brief but complete description of the project and history for the land involved. For example: in pipeline projects - the extent of the excavation involved; length, width and depth of the trench, or other activities associated with the project that may affect cultural resources. Include total acres of the undertaking.

Describe the previous and current land use. For example: if cropland - how long has it been cultivated?

Enclose a high quality copy of the project area shown on a 7.5′ topographic map at a 1:24,0000 scale. Indicate the project area boundary clearly on the map.

The map should be labeled in the lower right corner with the following information:

Project Name
7.5′ Topographic Map Name
North Arrow

Forward this form and map to:

Darin Vrem
NRCS Archaeologist
9173 West Barnes Drive, Suite C
Boise, ID 83709-1574
Phone: 208-685-6995

Send a copy of the form and map to your Division Cultural Resource Coordinator .

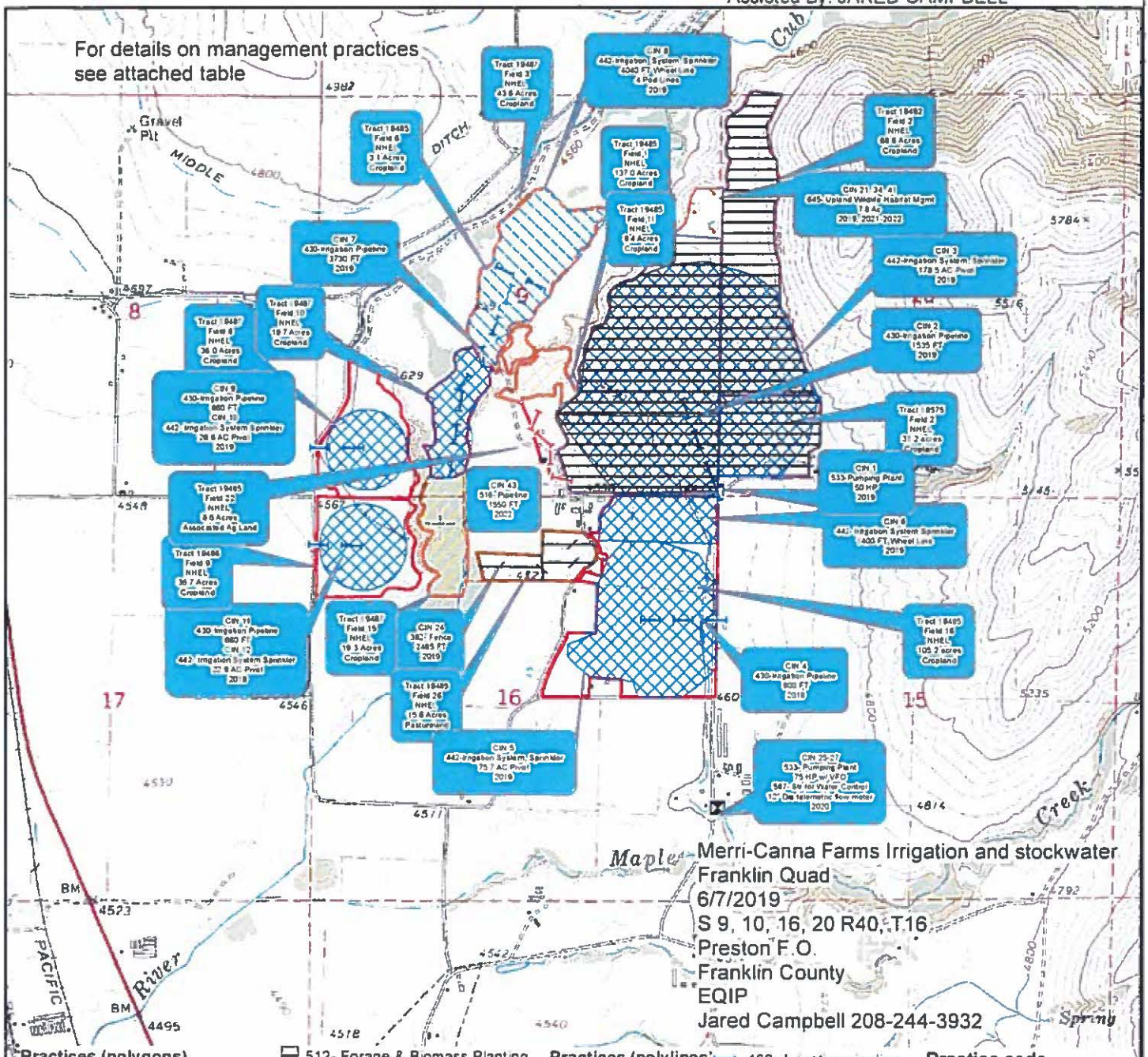
Requests may also be sent via email: Attach the request as a word document (.doc) and the map as a [.pdf]. Title each file the same in this format: "field office" "one word project name." Example – the John Dough Pipeline project from the Emmett

F.O. would be labeled "Emmett Dough.doc" for the request and "Emmett Dough.pdf" for the map. Mail to darin.vrem@id.usda.gov and Div. Coordinator

CULTURAL RESOURCES MAP #1

Customer(s): MERRI-CANNA FARM LLC
Approximate Acres: 694.9

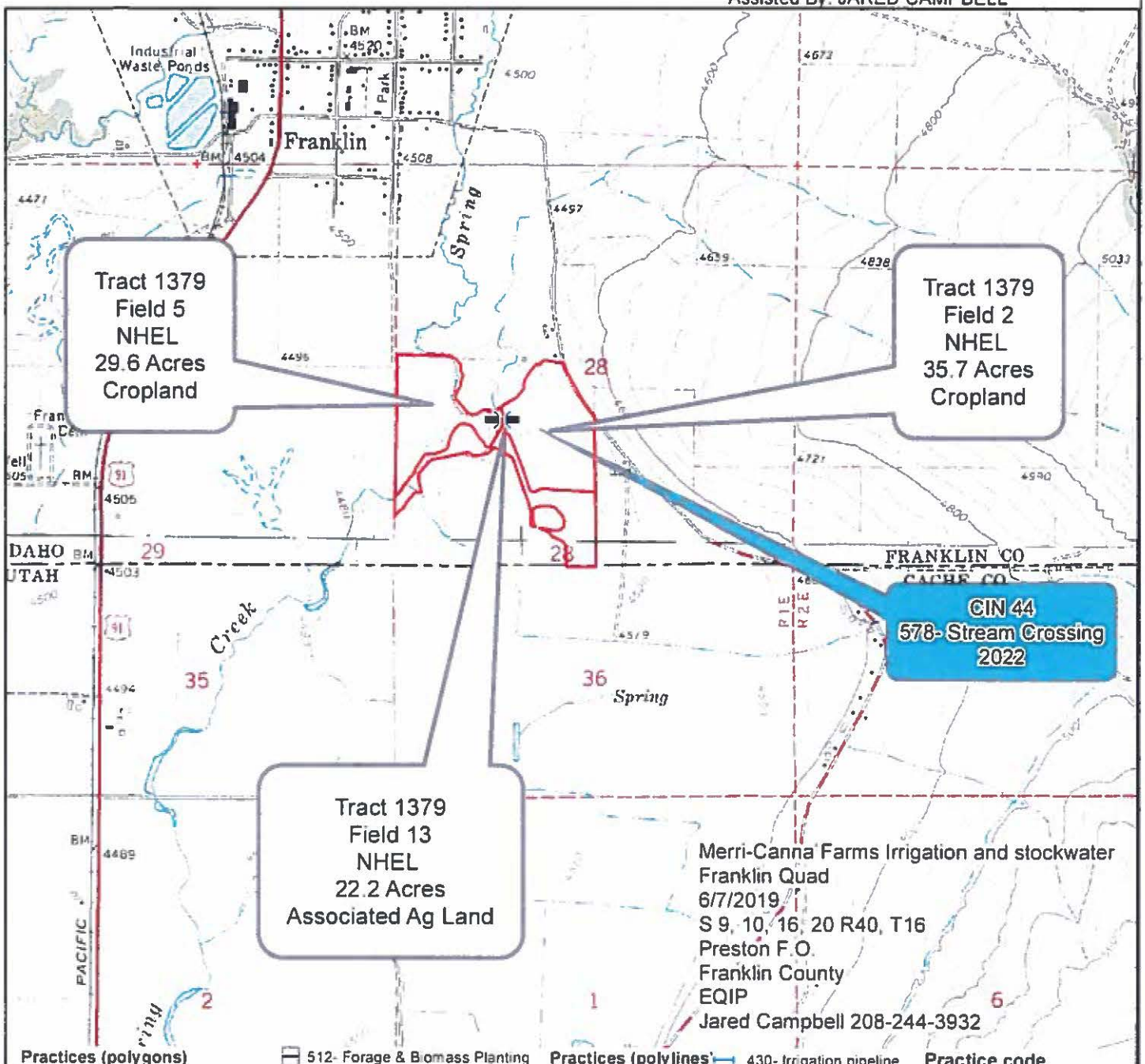
Date: 5/31/2019
Field Office: PRESTON SERVICE CENTER
Agency: NRCS
Assisted By: JARED CAMPBELL



CULTURAL RESOURCES MAP #2

Customer(s): MERRI-CANNA FARM LLC
Approximate Acres: 694.9

Date: 5/31/2019
Field Office: PRESTON SERVICE CENTER
Agency: NRCS
Assisted By: JARED CAMPBELL



Practices (polygons)
Practice code
- 340- Cover Crop
- 345- Residue Mgmt, Reduced Till
- 442- Irrigation System, Sprinkler
- 449- Irrigation Water Mgmt
- 512- Forage & Biomass Planting
- 528- Prescribd Grazing
- 590- Nutrient Mgmt
- 595- Integrated pest Mgmt
- 645- Upland Wildlife Habitat mgmt

Practices (polylines)
Practice code
- 382- Fence
- 430- Irrigation pipeline
- 516- Pipeline

Practices (points)
Practice code
- 533- Pumping Plant
- 578- Stream Crossing
- 587- Str for Water Control

EQIP 2019
drg_id041.sid
RGB
- Red: Band_1
- Green: Band_2
- Blue: Band_3

Prepared with assistance from USDA-Natural Resources Conservation Service

1,100 0 1,100 2,200 3,300 4,400 Feet

N

Natural Resources Conservation Service
PRESTON SERVICE CENTER
98 E 800 N
PRESTON , ID 83263-5388
Phone: (208)852 - 0562 Fax:(855)504 - 3537

Application Ranking Summary

EQIP Div V Irrigated Cropland - Irrigated Hay

Program: EQIP 2018	**Ranking Date:** 5/3/2019	**Application Number:** 740211190PV
Ranking Tool: EQIP Div V Irrigated Cropland - Irrigated Hay		**Applicant:** MERRI-CANNA FARM LLC
Final Ranking Score: 255.16		**Address:** 3144 S 3600 E FRANKLIN, ID 83237
Planner: JARED CAMPBELL		**Telephone:** (208)757 - 1770
Farm Location: Farm Number: 2013; 3230; 3231; 4212; 4213; 4225; Tract Number: 1379; 18575; 18577; 18576; 19487; 19485; 19455; 19492;		

National Priorities Addressed

Issue Questions	Responses
If the application is for development of a Conservation Activity Plan (CAP), the agency will assign significant ranking priority and conservation benefit by answering "Yes" to the following question. Answering "Yes" to question 1a will result in the application being awarded the maximum amount of points that can be earned for the national priority category.	
1. a. Is the program application to support the development of a Conservation Activity Plan (CAP)? If answer is "Yes", do not answer any other national level questions. If answer is "No", proceed with evaluation to address the remaining questions in this section.	No
Water Quality Degradation – Will the proposed project improve water quality by: (select all that apply)	
2. a. Implementing the practices in a Comprehensive Nutrient Management Plan (CNMP)?	No
2. b. Implementing the practices in a Nutrient Management Plan (NMP)?	Yes
2. c. Reducing impacts from sediment, nutrients, salinity, or pesticides on land adjoining a designated "impaired water body" (TMDL, 303d listed waterbody, or other State designation)?	Yes
2. d. Reducing the impacts from sediment, nutrients, salinity, or pesticides in a "non-impaired water body"?	No
2. e. Implementing practices that improve water quality through animal mortality and carcass management?	No
Water Conservation – Will the proposed project conserve water by: (select all that apply)	
3. a. Implementing irrigation practices that reduce aquifer overdraft.	No
3. b. Implementing irrigation practices that reduce on-farm water use?	Yes
3. c. Implementing practices in an area where the applicant participates in a geographically established or watershed-wide project?	No
3. d. Implementing practices that reduce on-farm water use as a result of changing to crops with lower water consumptive use, the rotation of crops, or the modification of cultural operations?	Yes
Air Quality - Will the proposed project improve air quality by: (select all that apply)	
4. a. Meeting on-farm regulatory requirements relating to air quality or proactively avoid the need for regulatory measures?	No
4. b. Implementing practices that reduce on-farm emissions of particulate matter (PM2.5, PM10)?	Yes
4. c. Implementing practices that reduce on-farm generated greenhouse gases such as carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O)?	No
4. d. Implementing practices that increase on-farm carbon sequestration?	Yes
Soil Health :– Will the proposed project improve soil health by: (select all that apply)	
5. a. Reduce erosion to tolerable limits (Soil "T")?	No
5. b. Increasing organic matter and carbon content, and improving soil tilth and structure?	Yes

being met OR exceeded? (5 points)	
Answer one of the next two questions if contracted practices will result in planning criteria for 'Soil Erosion - Sheet, rill, and wind erosion' being met OR exceeded. Use the appropriate NRCS tool for the erosion type being addressed. If multiple erosion types occur, use the most predominant.	
13. a. Is average soil loss reduced by 5 or more tons/acre? (10 points)	No
13. b. Is average soil loss reduced by less than 5 tons/acre? (5 points)	No
Answer one of the next two questions, if applicable.	
14. a. Will Residue and Tillage Management - Reduced Till be scheduled in the contract for 3 years? (15 points)	Yes
14. b. Will Residue and Tillage Management - No Till be scheduled in the contract for 3 years? (20 pts)	No
IRRIGATED LAND (Answer in addition to Cropland and/or Grazing land questions if land is irrigated).	
15. Will the contracted practice(s) result in planning criteria for 'Soil Erosion - Sheet, rill, and wind' being met where it was not met in benchmark conditions? (This includes irrigation-induced erosion) (5 points)	No
16. Will the contracted practice(s) convert the existing irrigation system to a sprinkler or drip irrigation system? (10 points)	No
Answer one of the next three questions if the indicated Irrigation Water Management scenario will be contracted.	
17. a. Basic IWM (5 points)	Yes
17. b. Intermediate IWM (10 points)	No
17. c. Advanced IWM (25 points)	No
Answer one of the next three questions if there will be a reduction in gross water applied according to FIRI. Average results for all contracted irrigation systems.	
18. a. Is estimated reduction in gross water applied more than 21%? (15 points)	Yes
18. b. Is estimated reduction in gross water applied 12-21%? (10 pts)	No
18. c. Is estimated reduction in gross water applied less than 12%? (5 pts)	No
Answer one of the next two questions if a gravity pressurized sprinkler system is included in this application. This can either be through improvement to an existing system or the result of a new system installation.	
19. a. Will the contracted practice(s) include the installation of a 50 to 99% gravity pressurized sprinkler irrigation system? (5 points)	No
19. b. Will the contracted practice(s) include the installation of a 100% gravity pressurized sprinkler irrigation system? (10 points)	No
GRAZING LAND	
20. Will the contracted practice(s) result in planning criteria for 'Livestock Production Limitation - Inadequate water' being met where it was not met in benchmark conditions? (10 points)	No
21. Will Prescribed Grazing be scheduled in the contract for 3 years? (25 points)	Yes
22. Will the contracted Prescribed Grazing plan include multiple grazing units with rest periods during the growing season? (15 points)	Yes
23. Will Brush Management be scheduled in the contract to treat invasive species and result in planning criteria for 'Degraded Plant Condition' being met where it was not met in benchmark conditions? (15 points)	No
24. Will Range Planting be scheduled in the contract and result in improved range health according to the ID-CPA-01 Range Health Assessment? (5 points)	No
FOREST LAND (Timber production is primary land use)	
25. Will the contracted practice(s) promote tree species that are most adapted and suited to the site and result in planning criteria for 'Degraded Plant Condition - Undesirable productivity and health' being met where it was not met in benchmark conditions? (15 points)	No
26. Will the contracted practice(s) be applied within an Idaho Forest Action Plan Priority Landscape Area and within the boundaries of a cooperatively developed project? (5 points)	No
27. Will the contracted practice(s) manage to proper stocking levels on an existing forest site and result	No

17. Answer 17 OR 18: Will the planned practices improve habitat for T&E species, species of concern such as Sage Grouse/Cutthroat Trout (listed in FOTG)? (30 points)	No
18. Answer 17 OR 18: Will the planned practices in this application improve habitat for terrestrial or aquatic wildlife (non-T&E). (20 points)	No
19. Answer 19 OR 20: Do the planned practices control or remove livestock access to riparian and other live water areas by the installation of fencing and offsite watering facilities? (30 points)	No
20. Answer 19 OR 20: Do the planned practices reduce livestock access to riparian and other live water areas by installation of offsite watering facilities without fencing? (20 points)	No

Land Use:
Associated Agriculture Land;

Crop;

Farmstead;

Pasture;

Resource Concerns	Practices
Air Quality Impacts: Emissions of Greenhouse Gases (GHGs)	Residue Mgmt, Reduced Till
Air Quality Impacts: Emissions of Particulate Matter (PM) and PM Precursors	Residue Mgmt, Reduced Till
Degraded Plant Condition: Excessive Plant Pest Pressure	Cover Crop
Degraded Plant Condition: Excessive Plant Pest Pressure	Forage and Biomass Planting
Degraded Plant Condition: Excessive Plant Pest Pressure	Pest Management Conservation System
Degraded Plant Condition: Undesirable Plant Productivity and Health	Cover Crop
Degraded Plant Condition: Undesirable Plant Productivity and Health	Fence
Degraded Plant Condition: Undesirable Plant Productivity and Health	Forage and Biomass Planting
Degraded Plant Condition: Undesirable Plant Productivity and Health	Irrigation Pipeline
Degraded Plant Condition: Undesirable Plant Productivity and Health	Irrigation Water Management
Degraded Plant Condition: Undesirable Plant Productivity and Health	Prescribed Grazing
Degraded Plant Condition: Undesirable Plant Productivity and Health	Pumping Plant
Degraded Plant Condition: Undesirable Plant Productivity and Health	Residue Mgmt, Reduced Till
Degraded Plant Condition: Undesirable Plant Productivity and Health	Sprinkler System
Degraded Plant Condition: Undesirable Plant Productivity and Health	Structure for Water Control
Excess Water: Runoff, Flooding, or Ponding	Stream Crossing
Excess Water: Seasonal High Water Table	Stream Crossing
Fish and Wildlife - Inadequate Habitat: Inadequate Habitat - Cover/Shelter	Upland Wildlife Habitat Management
Fish and Wildlife - Inadequate Habitat: Inadequate Habitat - Food	Upland Wildlife Habitat Management
Inefficient Energy Use: Equipment and Facilities	Livestock Pipeline
Inefficient Energy Use: Equipment and Facilities	Pumping Plant

resource concerns that have been determined to be a national priority. **Final Ranking Score: 255.16**

This ranking report is for your information. It does not in any way guarantee funding. When funding becomes available, you will be notified if your application is selected for funding. Some changes to the application may be required before a final contract is awarded.

Notes:

NRCS Representative: JARED CAMPBELL USDA electronic signature; manual signature not required. **Signature Date: 5/3/2019**	**Applicant Signature Not Required on this report for Contract Development unless required by State policy:** **Signature Date:**

NRCS

Natural Resources Conservation Service (NRCS)

Client:	Merri-Canna Farms	Planner:	J Campbell	Location:	Fairview	Date:	4/17/19
Tract No.		Farm No.		Field No.		Field Name/description:	Alfalfa/grass- Wheat

Irrigation Type	Present Condition: Sprinkler - Hand Line or Wheel Line	70	Planned Condition: Center Pivot	80

		Present Condition		Planned Condition	
Measurement	Md	No flow measuring devices	0.90	Flow measurement - whole farm-automatic recorded	0.95
Scheduling	S	None	0.90	Soil moisture by NRCS feel method	0.95
Skill	I	Good-Lack of full attention	0.92	Following IWM plan	1.00
Maintenance	M	Poor	0.90	Excellent	1.00
Delivery	D	Rotation -- Modified amount	0.88	Arranged -- Fixed duration	0.90
Soil	Sc	Soil Condition Index from SCI = 1.0 or more	1.00	Soil Condition Index from SCI = 1.0 or more	1.00
Water Distribution Control	Wc	Flow rates to each field are adequately controlled. Flow rates to each set are difficult to control.	0.98	Flow rates to each field are adequately controlled. Flow rates to each set are difficult to control.	0.98
		Material: Closed conduit pipeline; Length(ft): 5000		Material: Closed conduit pipeline; Length(ft): 2000	
Conveyance	Ce		1.00		1.00
Land Leveling	L	A sprinkler or drip system utilized	1.00	A sprinkler or drip system utilized	1.00
Tailwater reuse	R	0%	1.00	0%	1.00
Climate	C	Warm -- peak avg et 0.30	1.00	Warm -- peak avg et 0.30	1.00
Wind	W	Fine spray wind speed 4 -10 MPH	0.90	Coarse spray wind speed 4 -10 MPH	0.96
Sprinkler	Sd	Pressure variation > 40%, Uniformity <70%, Application rate > soil intake	0.86	Pressure variation <= 20%, Uniformity >80%, Application rate <= soil intake	1.00
Emitter	E	Surface or Sprinkler System N/A		Surface or Sprinkler System N/A	
Drip-Micro	T	Surface or Sprinkler System N/A		Surface or Sprinkler System N/A	

	Rating Value	Percent of maximum potential rating	Meets Quality Criteria	Rating Value	Percent of maximum potential rating	Meets Quality Criteria
	50.1	71.6%		69.6	87.0%	YES

Soil description	Soil intake Characteristic	Annual Net Irrigation Requirement (inches)	Limited Water Supply
Silty Clay Loam	Low Intake Fine Textured Soils	24.60	

Estimated Gross Irrigation Required (in)	Net Irrigation Requirement (in)	Estimated Gross Irrigation Required (in)	Net Irrigation Requirement (in)	Estimated Reduction in Gross Water Applied (ac-in/ac)	Estimated Reduction in Gross Water Applied Percent (%)
49.1	24.6	35.4	24.6	13.7	28%

Excess water applied going to	Default percentages: Runoff (%)	Default percentages: Deep percolation /leaching (%)	Change	Estimated fraction of excess water going to (ac-in/ac): Runoff	Estimated fraction of excess water going to (ac-in/ac): Deep Percolation

Default percentages: Runoff (%)	Default percentages: Deep percolation /leaching (%)	Change	Estimated fraction of excess water going to (ac-in/ac): Runoff	Estimated fraction of excess water going to (ac-in/ac): Deep Percolation

Variable Speed Drive - Economic comparison

Cooperators name	Location
Merri-Canna Farms_Turbine	Franklin, ID

Management inputs			
Field size (ac)	System flow rate (gpm)	Gross irrigation requirement (in/yr)	Total seasonal Operating Hours
260.7	1450	21.83	1,776

Motor assumptions		Costs	
Motor Efficiency (%)	VFD Efficiency (%)	Average Cost per kWh ($)	Installed Cost VFD ($)
91	95	$0.09	

Selected or Existing Pump			
Manufacturer	Type	Model	Pump RPM
berkley	Turbine	12HHC	1,200

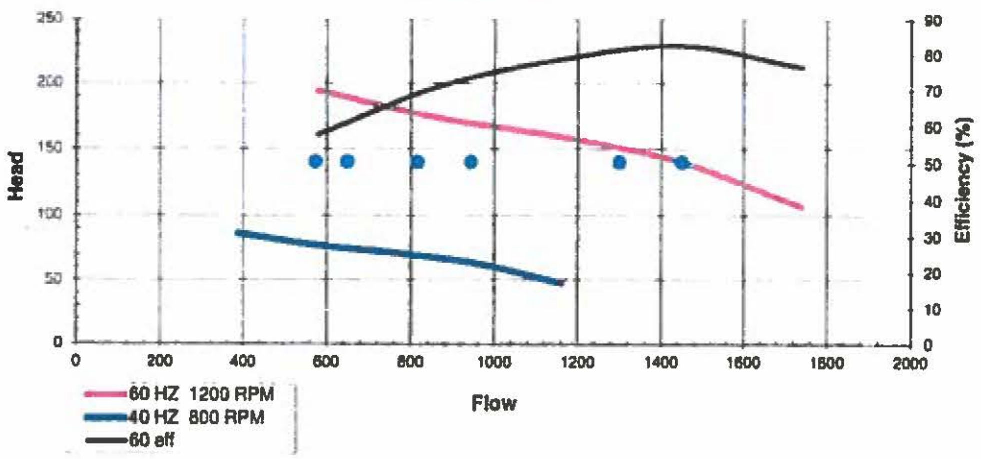
Base pump curve (60 Hz)			
Point	Flow (gpm)	Head (ft)	Efficiency (%)
1	1740	107	76.5
2	1450	140	83
3	1160	159	79
4	870	173	71
5	580	194	58
6			
7			
8			
9			
10			
11			

Operating points/ system curve without VFD				Operating points/System curve with VFD			
Point	Flow (gpm)	Head (ft)	Pump Efficiency (%)	Flow (gpm)	Head (ft)	VFD freq (Hz)	Pump Efficiency (%)
1	1,450	140	82	1450	140	60.0	82
2	1,300	151	82	1300	140	58.3	82
3	943	169	73	943	140	55.2	76
4	650	188	61	650	140	52.8	65
5	575	195	58	575	140	52.0	62
6	816	176	69	816	140	54.2	72

	Operating points/ system curve without VFD				Operating points/System curve with VFD			
	Point	%Hrs	Input-HP	KWh	VFD freq (Hz)	Input-HP	%Hrs	KWh
221.125	1	15%	69	13,883	60.0	72	15%	14596
87.23	2	7%	67	5,938	58.3	65	7%	5770
132.345	3	14%	60	11,231	55.2	51	14%	9436
95.16	4	15%	55	10,711	52.8	41	15%	7895
59.6275	5	10%	54	7,394	52.0	38	10%	5219
318.24	6	39%	58	30,035	54.2	46	39%	23975
913.727								

VFD analysis Reviewed + Approved [signature] 4/18/19

Base pump curve - 60 Hertz



Without VFD		With VFD		Power savings	Payback period (yrs)
Annual Power use (KWH)	Cost/season ($)	Annual Power use (KWH)	Cost/season ($)	($/yr)	(yrs)
79,192	$7,127.32	66890	$6,020.12	$1,107.19	0.0
		15.5%	energy savings		

Idaho — Wallace Chatterton - Pooling Agreement #:
K. Hasfurther 4-9-81 — Preston F.O.
Summary of System Planning Data — 1 — 4

Gravity Sprinkler System

Total acres to be irrigated by the project ≈185 ac

There are 4 landowners involved:

C. Wallace Chatterton	40 acres	3/8 of stream
Douglas Oliverson	49 acres	2/8 of stream
William Jensen	23 acres	3/8 of stream
Willard Gibson	73 acres	

Crops — figure 50% Alfalfa, 50% Grain

Farmers desire 40' × 60' spacing

Find: 1) On Farm water requirement
2) Mainline sizing & pressure ratings

Solution:
Use Climatic Area III
Assume soils are cobbly silt loam with WHC = 6 inches in profile

$$Up_{(in/day)} = 0.034\, Um^{1.09}\, I^{-0.09}$$

For alfalfa $Um = 6.51$ inches in July
For grain $Um = 5.04$ inches in July

3/16" nozzles @ 45 psi on 40'x60' spacing will apply 1.95 inches net in 11 hrs at 65% eff.
Therefore $I = 1.95$

$$\text{July } Up_{(alf)} = (0.034)(6.51)^{1.09}(1.95)^{-0.09} = 0.247 \text{ in/day}$$

$$\text{July } Up_{(grain)} = (0.034)(5.04)^{1.09}(1.95)^{-0.09} = 0.187 \text{ in/day}$$

$$\text{Composite } Up = \frac{0.247}{2} + \frac{0.187}{2} = 0.217 \text{ in/day}$$

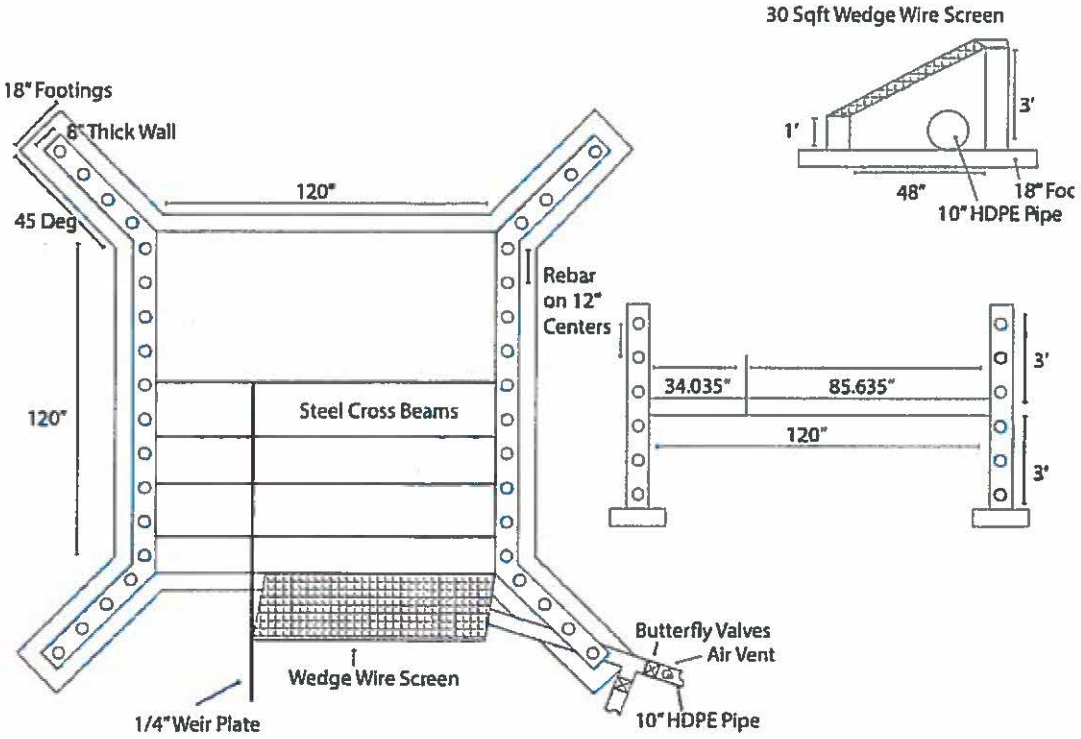
$$\text{Composite rotation period} = \frac{1.95}{0.217} = 8.99 \text{ days} - \text{use 9 days}$$

Length mainline covered per rotation period = (60)(2)(9) = 1080 ft

CIRCLE B IRRIGATION LLC

4075 N Hwy 91/ PO Box 549
Hyde Park, UT 84318

Office: (435) 787 -1988
Cell: (801) 879 - 9471



CIRCLE B IRRIGATION LLC

PURCHASE ORDER & SECURITY AGREEMENT

Customer Name:

#	QTY	SIZE	DESCRIPTION	UNIT PRICE	AMOUNT
1	160'	10"	SDR 17 HDPE PIPE	12.91	2065.92
2	2	10"	VAIVE ASSEMBLIES / AIR VENT	1100.00	2200.00
3	1660'	10"	100 PSI PVC	4.70	7802.92
4	1320	8"	160 PSI PVC	5.29	6982.80
5	1200'	8"	200 PSI PVC	6.43	7716.00
6	1	QUAL FLOW	PRESSURE STATION	1	6500.00
7	1	8"X10X6"	TEE		280.00
8	1	6"	VALVE ASSEMBLY AV PRV		580.00
9	1	8X8X6	TEE 6" VALVE ASSEMBLY AV PRV		750.00
10	1	8"X8X8	TEE 6" VALVE ASSEMBLY AV PRV		750.00
11	4320	'	INSTALL AND BED PIPE	4.90 /	21,168.00
12	1		INLET WIER & SCREEN AS PER DRAWING		20,726.00
13	1		INSTALL PRESSURE STATION	800.00	800.00
14					
15					
16			DOES NOT INCLUDE EASEMENTS ; PERMITS		
17					
18					
19					
20					

THIS IS TO CERTIFY THAT THE FARM MANCHINERY, EQUIPMENT OR SUPPLIES LISTED ON THIS INVOICE
ARE TO BE USED PRIMARILY AND DIRECTLY IN A COMMERCIAL FARMING OPERATION X _____

BILL OF SALE FOR PROPERTY TAKEN IN TRADE

FOR VALUE RECEIVED I/WE HEREBY BARGAIN AND SELL, GRANT AND DELIVER TO DEALER NAMED BELOW

SERIAL NO.	AMOUNT	DESCRIPTION
		NA
		NA
		NA
		NA

I/WE HEREBY CERTIFY THAT THERE IS NO LIEN, CLAIM, DEBT, MORTGAGE, OR ENCUMBRANCE OF ANY KIND, NATURE OR DESCRIPTION AGAINST THIS PROPERTY NO EXISTIN, OF RECORD OR OTHERWISE, AND THAT SAME IS FREE AND CLEAR AND IS MY/OUR SOLE ABSOLUTE PROPERTY.

X _____

1. TOTAL AMOUNT	$ 78,319
2. SALES TAX	$ N/A
3. CASH PRICE	$ 78,319
4. Down Payment	$
Trade In	$
Cash	$
Total Down Payment	$
Due on Product Arrival	$
Balance Due Upon completion	$
Total Project Cost	$
7. AMOUNT FINANCED	$
9. MONTHLY PAYMENT	$

DEALER CHECK — FARM/INDUSTRIAL EQUIPMENT SAFETY CHECK

YES	NO	
		ALL GUARDS IN PLACE AND POINTS OF DANGER PROTECTED
		EQUIPMENT MODIFIED OR ALTERED (GIVE DEAILS UNDER "SPECIAL NOTES" BELOW)
		INSTURCTION BOOKLET PROVIDED
		OPERATING INSTRUCTIONS GIVEN

DATE ___/___/___

CUSTOMER'S ACCEPTANCE

X _____

The terms and conditions set forth on the reverse side hereof are incorporated into this agreement. They provide for the rights of the seller and the purchaser pertaining to recision, cancellation, warranties, design changes, assignment, delays and other terms governing this transaction.

Buyer hereby grants to the seller a purchase money security interest in and to the property described herein, subject to the provisions of the Utah Uniform Commercial Code, until the purchase price together with interest, costs and fees are paid in full.

Buyer agrees to pay a FINANCE CHARGE of 18% ANNUAL PERCENTAGE RATE [1.5% PER MONTH] upon the unpaid balance of this account. In the event of collection, by suit or otherwise, the undersigned agrees to pay all costs of collection, including a reasonable attorney's fee and costs of court.

This order is not binding until accepted and signed by dealer or his authorized agent. This order, when accepted, shall be subject to conditions and applicable warranties printed on the reverse side and we the selling dealer hereby adopt the said warranties and agree to carry out the terms thereof with you as the original purchaser.

SALESMAN

X _____

SPECIAL NOTES _____

CIRCLE B IRRIGATION LLC.

3559 N Hwy 91/PO Box 549
Hyde Park, UT 84318

COMPANY AUTHORIZED SIGNATURE

X DAN J BOWDEN

TITLE OWNER MEMBER

Buyer Data

Name (print) _____

Date ___/___/___

Address _____

City _____ State UT

Phone _____

Name (signature)
Acceptance _____

CASE IH
Zimmatic

NEW HOLLAND AGRICULTURE

ValleyImplement

213 W 8th N
Preston, ID 83263
208-852-0430

515 W 2500 N
North Logan, UT
84341
435-787-1586

PO Box 305
Grace, ID 83241
208-425-3031

Date 8/9/2019 Quote Unit Number

Dixie Ditch Company PO#

Customer Name 208-757-1770

Address City State Zip Code

Qty	Size	Description		Unit Price	Amount
					-
					-
		Franklin Canal Project			-
					-
		Pipe Materials			-
2700	8cfs	18" 80# pipe		14.50	39,150.00
					-
					-
					-
1		18" Gasket 90 Degree Elbow	$560.00	560.00	560.00
5		18" Gasket 45 Degree Elbow	$375.00	375.00	1,875.00
5		18" Gasket 22 Degree Elbow	$355.00	355.00	1,775.00
5		18" Gasket 11 Degree Elbow	$355.00	355.00	1,775.00
					-
		Installation			-
1		Connection to existing structure		2,800.00	2,800.00
2700		Installation		15.00	40,500.00
16		Fittings with installation and cement thrust blocks		750.00	12,000.00
1		Digging and crossing existing water lines		4,140.00	4,140.00
					-
		New Cement Structure/Headwall/Inlet			-
1		New Cement Structure	(Estimate only, no drawings, just an educated guess based on other projects)	28,000.00	28,000.00
					-
					-
					-
					-
		***Price does not include permits			-
					-

Total Sales Price	132,575.00
Sales Tax	
Cash Price	132,575.00
Down Payment	
Trade In	-
Balance Due Dealer	132,575.00

Bill of Sale For Property Taken In Trade

For Value I/we Hereby bargain and sell, grant and deliver to DEALER named below

Description	Serial No	Amount
		-

Accepted By

X

Purchaser Signature

I certify that the property which I have here purchased will be used by me directly and primarily in the process of producing Tangible personal property by mining, manufacturing Processing, fabricating or farming or as a repair part of equipment used primarily as described above. This tax exemption statement qualifies if this statement is signed by the purchaser and the name, address, and nature of business of the purchaser is shown on the invoice. Any person who signs this certification with the intention of evading payment of tax is guilty of a misdemeanor.

STEVE & JOE CHATTERTON

SUMMARY OF SYSTEM PLANNING

TOTAL ACRES 185

4 LAND OWNERS

CHATTERSON 40 ACRES 3/8 STREAM

OLIVERSON 49 ACRES 3/8 STREAM

JENSON 23 ACRES } 3/8 STREAM

GIBSON 73 ACRES }

3/8 = .375

2/8 = .25

23+73 ACRES = 96 ACRES . 375/96 = .00390 PER ACRE

23 X .00390 = .0897

73 X .00390 = .2847

GIBSON = .2847 STREAM FLOW

Rest = .7147 STREAM FLOW

DESIGN FLOW - 4-30-81 1158 G.P.M

1158 X .2847 = 329.68 G.P.M

1158 X .7147 = 827.62 G.P.M NEW PIPE DESIGN FLOW

* WIER PLATE 120" WIDE INLET 120"

SEE DRAWING .2847 .7147

34.16" GIBSON 85.76" REST USE

.125 1/2 PLATE THICK - .125 1/2 PLATE THICKNESS

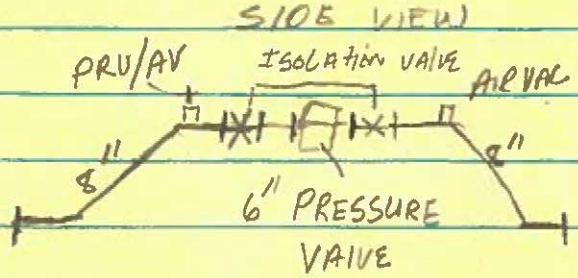
34.035 85.635

NEW PIPE LINE PROPOSAL

NODE	FLOW GPM	SIZE	DISTANCE'	Ft/100'	Hd Loss	Velocity	ELEVATION	STATIC HEAD	DYNAMIC Hd / PSI
001-002	828	10 SDR 17 HDPE 9.062 ID	160'	.54	.86	4.12	5470-5440	30'	29.14 - 12.7
002-003	828	10" 100 psi	1460'	.24	4	2.78	5440-5320	120'	116' 50.2
003-004	633	8" 160	1320	.58	7.71	3.34	5320-5200	120'	112.29 = 53
								257'	111 PSI
									45 PSI
				PRESSURE Reducing STATION at NODE 004					
					INPUT PSI				111 PSI
					OUTPUT PSI				45 PSI
004-005	514	8" 200	4182'	.477	5.64	3.49	5200-5124	76'	70' 30 PSI
									75 PSI
			4348				5124 (5010)	114	102' 44 PSI
							LOWEST ELEVATION		119 PSI
								200# = .72 =	144 PSI
							* EXISTING PSI PVC MAIN LINE		

PRESSURE REDUCING STATION

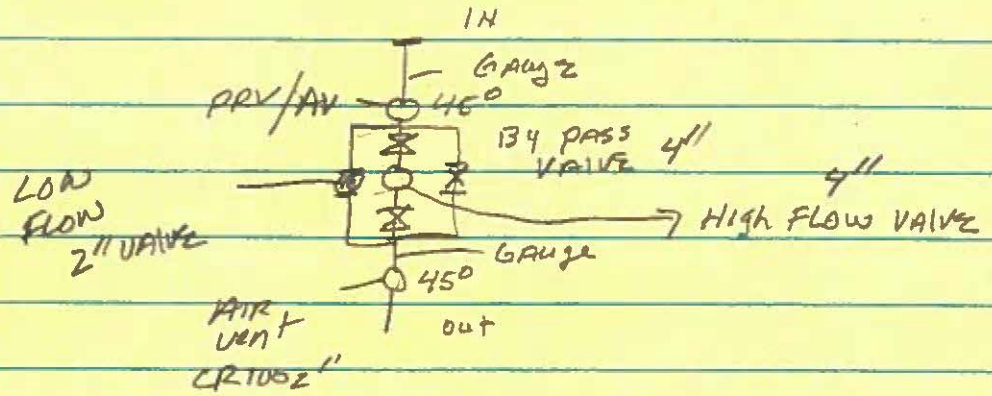
SIDE VIEW

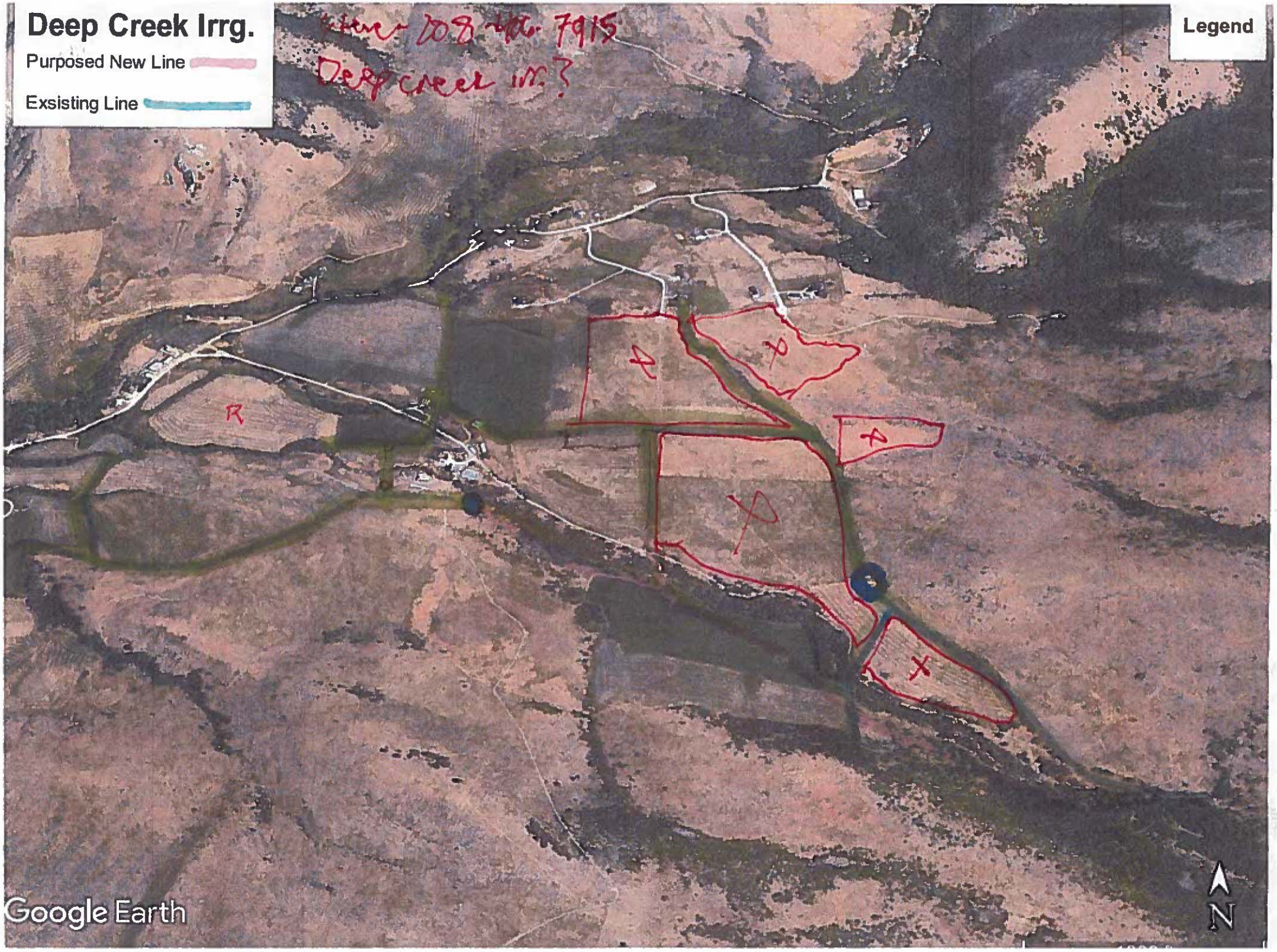


IN 111 PSI

out 45 PSI

PLAN VIEW




Deep Creek Irrg.
Purposed New Line
Exsisting Line
Legend
Deep creek irr.?
Google Earth
N

Lyla Dettmer

From: George Hitz <George.Hitz@swc.idaho.gov>
Sent: Monday, July 29, 2019 4:22 PM
To: Hatch, Chris - NRCS-CD, Preston, ID; Chris Hatch - Franklin SWCD (chris.hatch@franklinSWCD.net); Lyla Dettmer (lyla.dettmer@franklinSWCD.net)
Subject: Cub River, Dixie Ditch, Klause (sp?) Ditch flow measurements
Attachments: Cub_River_Dixie_Ditch_Klause_Ditch_flow meter data.xlsx

Flow measurements for 7/23/2019

Cub River - Bridge: 66.21 CFS

DixieDitch_Head_Wtr: 1.29 CFS
DixieDitch-@Weir: 1.13 CFS (Gauge reading 3.8) In Weir: don't have distance (width) measurements?
DixieDitch-@Pump: 1.04 CFS

BirchCrk-KlauseDitch-Diversion: 1.06 CFS (Gauge reading 10.25)
BirchCrk-KlauseDitch-Mid.Ditch: 2.53 CFS (Gauge reading 2.25)
BirchCrk-KlauseDitch-byCulinary: 1.2 CFS (Gauge reading 1.8)

George Hitz
Water Quality Resource Conservationist
Idaho Soil & Water Conservation Commission
725 Jensen Grove Drive, Suite 3
Blackfoot, ID 83221
(208) 690-3543 (office)
(208) 810-0760 (cell)
george.hitz@swc.idaho.gov
http://swc.idaho.gov/

notes	Distance (ft)	Depth (ft)	Velocity (ft/s)	velocity 2	velocity (mean)	cell width	Mean Depth (ft)	Q (cell)	Q total (ft3/s)	% of total
LWE	0	0.0	0.00		0.00	0.00	0.00	0.00	1.29	0.00
	0.8	0.2	-0.19		-0.19	0.80	0.14	-0.02		-1.61
	1.6	0.2	-0.23		-0.23	0.80	0.24	-0.04		-3.37
	2.4	0.3	-0.18		-0.18	0.80	0.31	-0.04		-3.42
	3.2	0.4	0.23		0.23	0.80	0.43	0.08		6.17
	4	0.6	1.09		1.09	0.80	0.57	0.49		38.26
	4.8	0.7	1.34		1.34	0.80	0.57	0.61		47.04
	5.6	0.4	0.56		0.56	0.80	0.48	0.22		16.77
	6.4	0.4	0.01		0.01	0.85	0.25	0.00		0.16
	7.3	0.0	0.00		0.00	-3.20	0.12	0.00		0.00
	0	0.0	0.00		0.00	-3.65	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
RWE	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00

Instructions:

1. Select a perpendicular cross-section of the stream to be measured that has laminar flow and is relatively free of large cobbles and vegetation.
2. Measure the width of the selected cross section from wetted edge to wetted edge, divide this width into equal sized cells. Ideally you should have a minimum of 10 cells no smaller than .5 foot.
3. Use the wading rod to measure and record the depth of the mid-point of each succesive cell (the wading rod is divided into 1/10 foot increments)
   for depths less than 2.5 ft measure the flow at 0.6 depth, for depths greater than 2.5 ft measure the flow at 0.2 and 0.8 ft depth.
4. Enter collected data into this spreadsheet. The distance recorded in column B is the distance to the center of the cell, or alternatively, the distance from the bank where the flow measurement is taken.
   If the depth is greater than 2.5 ft and 2 flow measurements are necessary (at 0.2 and 0.8 depth) the 0.2 depth velocity is recorded in column D and the 0.8 depth velocity is recorded in column E.
   Only enter data into the yellow shaded cells, the remainder of the cells are calculated automatically. The total discharge is calculated in the green cell.

notes	Distance (ft)	Depth (ft)	Velocity (ft/s)	velocity 2	velocity (mean)	cell width	Mean Depth (ft)	Q (cell)	Q total (ft3/s)	% of total
LWE	0	0.3	0.00		0.00	0.00	0.00	0.00	1.13	0.00
	0.5	0.4	0.67		0.67	0.50	0.37	0.12		10.85
	1	0.4	0.82		0.82	0.50	0.40	0.16		14.49
	1.5	0.4	1.08		1.08	0.50	0.40	0.22		19.08
	2	0.4	1.11		1.11	0.50	0.42	0.23		20.43
	2.5	0.5	0.98		0.98	0.50	0.45	0.22		19.48
	3	0.5	0.49		0.49	0.50	0.45	0.11		9.74
	3.5	0.4	0.31		0.31	0.50	0.43	0.07		5.93
	4	0.4	0.00		0.00	-1.75	0.27	0.00		0.00
	0	0.0	0.00		0.00	-2.00	0.13	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
RWE	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00

Instructions:

1. Select a perpendicular cross-section of the stream to be measured that has laminar flow and is relatively free of large cobbles and vegetation.

2. Measure the width of the selected cross section from wetted edge to wetted edge, divide this width into equal sized cells. Ideally you should have a
3. Use the wading rod to measure and record the depth of the mid-point of each succesive cell (the wading rod is divided into 1/10 foot increments) for depths less than 2.5 ft measure the flow at 0.6 depth, for depths greater than 2.5 ft measure the flow at 0.2 and 0.8 ft depth.
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D

minimum of 10 cells no smaller than .5 foot.

from the bank where the flow measurement is taken.
ınd the 0.8 depth velocity is recorded in column E.
ən cell.

D

notes	Distance (ft)	Depth (ft)	Velocity (ft/s)	velocity 2	velocity (mean)	cell width	Mean Depth (ft)	Q (cell)	Q total (ft3/s)	% of total
LWE	0	0.5	0.00		0.00	0.00	0.00	0.00	1.04	0.00
	0.4	0.5	0.71		0.71	0.40	0.50	0.14		13.60
	0.8	0.5	0.88		0.88	0.40	0.50	0.18		16.86
	1.2	0.5	1.14		1.14	0.40	0.50	0.23		21.84
	1.6	0.5	1.10		1.10	0.40	0.50	0.22		21.07
	2	0.5	0.85		0.85	0.40	0.50	0.17		16.28
	2.4	0.5	0.54		0.54	0.40	0.50	0.11		10.34
	2.8	0.5	0.00		0.00	-1.20	0.33	0.00		0.00
	0	0.0	0.00		0.00	-1.40	0.17	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00
RWE	0	0.0	0.00		0.00	0.00	0.00	0.00		0.00

Instructions:

1. Select a perpendicular cross-section of the stream to be measured that has laminar flow and is relatively free of large cobbles and vegetation.
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U. S. Department of Agriculture
Natural Resources Conservation Service
Pipeline Hydraulics
Hazen-Williams Formula

State: Idaho
By: JLC

Project: Dixie Ditch
Date: August 19, 2019
Checked By:

Notes:

Design Inputs						
Beginning Station	0	feet	Flow Rate	4	cfs =	1795.20 gpm
Ending Station	2700	feet	Total Available Head			21 feet

Pipe Alternatives	Pipe Description	Pressure Rating		Inside Diameter		H-W C Factor
Alt #1	PIP SDR 41	80	psi	12	inches	150
Alternative #2	PIP SDR 41	80	psi	15	inches	150
Alternative #3	PIP SDR 41	80	psi	18	inches	150

Minor Losses				Description
Entrance Conditions Loss	0.5	$K_{entrance}$	K_1 0.9	
Exit (Velocity Head) Loss	1	K_{exit}	K_2 10	
			K_3 0	
			K_4 0	

Design Outputs	Alternative Pipe #1 Design	Alternative Pipe #2 Design	Alternative Pipe #3 Design	
Pipe Size	12	15	18	inches
Length	2700	2700	2700	feet
Flow Area	0.785	1.227	1.767	square feet
Flow	4	4	4	cfs
Flow Velocity	5.1	3.3	2.3	feet per second
Friction Loss	0.0058	0.0019	0.0008	feet per foot length
$K_{entrance}$	0.5	0.5	0.5	---
K_{exit}	1	1	1	---
Sum of Minor K's	10.9	10.9	10.9	---
Velocity Head	0.40	0.16	0.08	feet
Entrance Loss	0.20	0.08	0.04	feet
Minor Losses	4.39	1.80	0.87	feet
Line Loss	15.53	5.24	2.16	feet
Exit Loss	0.40	0.16	0.08	feet
Total Loss	20.52	7.28	3.14	feet
Available Head	21	21	21	feet
Enough Head?	YES	YES	YES	
Air Vent Spacing	9.0	7.2	6.0	feet

I Michael Porter, majority shareholder of Dixie Bench Ditch Lateral Association. have reviewed the application submitted to the Bureau of Reclamation and Found it satisfactory.

If the application is accepted, the Dixie Bench Ditch company has the resources and is willing to pay our 50% share of the cost of the project.

We will work with the Bureau of Reclamation to meet the established deadlines and enter into an agreement.

Michael Porter
9-30-2019