

**FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION***All sections must be addressed, or the application will be considered invalid***I. APPLICANT INFORMATION**A. Applicant Name: Bitter Root Water ForumMailing Address: PO Box 1247City: Hamilton State: MT Zip: 59840Telephone: 406-375-2272 E-mail: _____B. Contact Person (if different than applicant): Andrea PriceAddress: PO Box 1247City: Hamilton State: MT Zip: 59840Telephone: 425-829-3846 E-mail: andrea@brwaterforum.orgC. Landowner and/or Lessee Name (if different than applicant): Paul Nelson

Mailing Address: _____

City: _____ State: _____ Zip: _____

Telephone: 208-220-0774 E-mail: pnelson@jrmiller.com**II. PROJECT INFORMATION**A. Project Name: East Fork Bitterroot River Habitat ImprovementRiver, stream, or lake: East Fork Bitterroot RiverLocation: Township: 01N Range: 19W Section: 16Latitude: 45.840905 Longitude: -113.968036 *within project (decimal degrees)*County: Ravalli

B. Purpose of Project: _____

This project will address poor habitat and water quality in the East Fork Bitterroot River, which provides important habitat for native ESA-listed Bull Trout and Westslope Cutthroat Trout, a Species of Concern. In the project area, in-stream habitat has been affected by grazing in riparian areas and road infrastructure near the stream. This reach has less than 25% vegetative cover due to previous agricultural practices (Riparian Evaluation, DEQ, 2019). Acute infrastructure concerns on Edwards Road, including new construction disturbance, high potential for flood damage, and insufficient buffer between the river and the road, are present on-site. According to the Bitterroot Headwaters Planning Area TMDL (2005), poor water quality caused by high sediment loads, high water temperatures, and alterations in streamside vegetative cover impairs aquatic life in the East Fork. This project will address issues identified in the TMDL assessment by expanding on the Water Forum’s previous riparian improvement activities in the area while developing a partnership with the Ravalli County Roads Department and building our rapport with the Sula community.

C. Brief Project Description (attach additional information to end of application):

Task 1. Riparian Revegetation Plots (400+ plants)
 We will work with the Shining Mountain—Sula Peak Ranch management and our team of local volunteers on ranch properties to plant and protect riparian plants and willow cuttings in dispersed clusters along 1.6 miles of the East Fork upstream and downstream of Edwards Road. This will lower sediment loads, provide shade, and promote groundwater infiltration. Fish will benefit from both the associated on-site habitat and water quality improvements; downstream reaches will also benefit from shading and water quality improvements.

Task 2. Bank Treatments (700’)
 Because of the above-mentioned infrastructure concerns on Edwards Road, two rapidly eroding banks on this property require intervention. We are working with the County to promote ecologically-friendly methods. In the past, the County has used rock to stabilize areas of concern. This time, soil lifts, woody debris, and vegetation will be used. This will better filter runoff from the road and provide more aquatic habitat than other bank stabilization methods. It will also reduce sediment loads from the banks by acting as a filter strip and reestablish woody riparian vegetation. To ensure the success of these treatments, the ranch managers will construct and repair riparian fencing and implement grazing BMPs on the roughly 7 acres surrounding the bank work, and we will also develop a grazing management plan for this area.

Task 3. Education, Outreach, and Partnership Building
 BRWF will conduct education, outreach, and coordination activities to communicate about this project and the importance of native fish habitat to the community and natural resources stakeholders. This project will establish a partnership between BRWF and the Ravalli County Roads Department. There are ample opportunities for this partnership to lead to conservation projects throughout the watershed. Further, Edwards Road provides key access for many East Fork residents; protecting this road will garner goodwill among the community and help us connect with other streamside landowners. At a minimum, there should be future opportunities to expand the fencing, revegetation, and grazing BMPs on this property following the successful completion of this project.

D. Length of stream or size of lake that will be treated (project extent): 700’ bank treatments, 0.6 miles grazing management, up to 1.6 miles of revegetation

Length/size of impact, if larger than project extent (e.g. stream miles opened): _____

E. Project Budget:

Grant Request (Dollars):	\$	9,000.00
Matching Dollars:	\$	<u>59,310.30</u>

Matching In-Kind Services:*	\$	6,597.10
<i>*salaries of government employees are not considered matching contributions</i>		
Other Contributions (not part of this app)	\$	692,477.00
Total Project Cost:	\$	767,384.40

F. **Attach** itemized (line item) budget – see *budget template*

G. **Insert** or **attach** a project location map showing the project area in relation to a major landmark or town. Please indicate if the project location is on public or private property.

Private property

H. **Attach** specific project plans (e.g. detailed sketches, plan views [showing location and type of channel modifications], example photographs), current condition photographs, and maps. **If project involves water leasing or water salvage complete and attach a supplemental questionnaire (fwp.mt.gov/habitat/futurefisheries/supplement2.doc).*

I. **Attach** letters or statements of support. This includes landowner consent, community or public support, and fish biologist support.

J. The project agreement includes a 20-year maintenance commitment. Please indicate (yes or no) that you will ensure project protection for 20 years. Discuss your ability to meet this commitment.

Yes No

BRWF will enter into an agreement with the landowner detailing maintenance responsibilities. BRWF has completed fencing, revegetation, and bank work projects on this property before and the ranch managers have demonstrated their ability to adhere to these expectations. BRWF’s volunteer team will assist with maintenance for the first 3 years after implementation and will follow up the 3-year maintenance period with biannual visits until the site is deemed stable and goals are met. We fulfill these minimum maintenance responsibilities for each project we complete.

BRWF will enter into a maintenance agreement with the Ravalli County Roads Department regarding the bank work adjacent to road infrastructure to ensure these treatments will be maintained for their projected lifespans. The Roads Department is accustomed to taking on long-term maintenance responsibilities and will have the ongoing capacity to meet requirements shared with BRWF.

K. **Describe** or **attach** land management & maintenance plans, including changing to grazing regimes, that will ensure protection of the restored area.

BRWF will develop a grazing management plan with the landowner that will, at a minimum, ensure complete exclusion of cattle from the bank treatment area for 5 years. We will strive to develop a plan that will exclude cattle permanently or require adaptive management practices in years following (i.e. amount of grazing in the riparian area will be determined by monitoring the vegetation community). The riparian area surrounding the bank work will be protected with livestock fencing, and added vegetation will be protected from livestock and wildlife browse with browse protector cages that comply with the fencing guidelines.

III. PROJECT BENEFITS (attach additional information to end of application):

A. What species of fish will benefit from this project?

Bull Trout, Westslope Cutthroat Trout, Rainbow Trout, Brown Trout, Mountain Whitefish

B. How will the project protect or enhance wild fish habitat?

On average, this stretch of river has less than 25% vegetative cover, and the vegetation added through this project will add physical habitat features and improve water quality. The area where the bank work is proposed suffers from particularly rapid bank erosion and sediment inputs from road runoff. Habitat is shallow and homogenous, offering little protection for fish. Both banks are at risk of being ripped because of road-management concerns. The soil lifts will address these concerns and improve habitat with the presence of root wads and riparian vegetation. The dispersed planting plots throughout the riparian area on the property will promote groundwater infiltration and shade the stream as well as increasing physical habitat complexity for fish and certain life-stages of aquatic invertebrates.

C. Will the project improve fish populations and/or fishing? To what extent?

The proposed project is within important habitat for native ESA-listed Bull Trout and Westslope Cutthroat Trout. The reach currently provides poor habitat and cover, and aquatic life is impaired due to poor water quality. These native fish populations as well as nonnative rainbow trout and brown trout, also present in the reach, will benefit from improved habitat. Anglers will enjoy increased fish presence at this popular publicly-accessible fishing site.

D. Will the project increase public fishing opportunity for wild fish and, if so, how?

The East Fork at Edwards Bridge is a popular fishing access, even though the immediate area offers poor, homogeneous habitat. This project will attract sport fish including native Westslope Cutthroat Trout a favorite of local and visiting anglers, by creating habitat complexity and cover with root wads, vegetation, and protection from grazing.

E. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?

Historical land management practices, including grazing in riparian areas, removal of riparian vegetation, channelization, and streambank modifications have degraded habitat on this property and throughout the East Fork. To address this, we will manage livestock access to the stream and install and protect native riparian plants.

Road infrastructure (road design, road placement near the river, and bridge placement misaligned with flow path) has further impacted in-stream habitat and water quality and is poised to have more devastating impacts in the future*. We will address this problem and reduce the need for further intervention by stabilizing the banks using ecologically friendly methods and maintaining a buffer between the road and the stream. Vegetation will provide habitat complexity and enhance filtration capacity. The County has agreed to shift the footprint of the bridge to better accommodate the present and future flow paths of the East Fork.

*The area immediately under the bridge will continue to be stabilized with rock by the county for safety purposes.

F. What public benefits will be realized from this project?

This project is the best way to provide simultaneous benefits to anglers (improved habitat and fishing around the Edwards access point) and road users (helping ensure the longevity of the bridge and preventing road washouts).

Because this work will be associated with the protection of Edwards Road and Bridge, which provide key access for many Sula residents, it will likely draw attention from community members that our previous restoration efforts in the area have not. This will help us engage a larger segment of the community in conservation.

G. Will the project interfere with water or property rights of adjacent landowners? (explain):

No, the proposed work occurs entirely on the Shining Mountain-Sula Peak Ranch property.

H. Will the project result in the development of commercial recreational use on the site? (explain):

No.

I. Is this project associated with the reclamation of past mining activity?

No.

Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.

IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature: _____



Date: 30 NOV 2020

Sponsor (if applicable): Bitter Root Water Forum

Submittal: **Applications must be signed and received before December 1 and June 1 of each year to be considered for the subsequent funding period.** Late or incomplete applications will be rejected.

Mail to: FWP Future Fisheries Fish Management Bureau PO Box 200701 Helena, MT 59620-0701	Email: Future Fisheries Coordinator FFIPFWP@mt.gov (electronic submissions must be signed) For files over 10MB, use https://transfer.mt.gov
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Applications may be rejected if this form is modified.

East Fork Bitterroot riparian revegetation
BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

002-2021

Both tables must be completed or the application will be returned

PROJECT COSTS					CONTRIBUTIONS			
WORK ITEMS (Itemize by Category)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	FUTURE FISHERIES REQUEST	MATCH (Cash or Services)**	OTHER (Not part of this application)	TOTAL
Personnel***								
Survey	8	HR	\$60.00	\$ 480.00		480.00		\$ 480.00
Design	40	HR	\$80.00	\$ 3,200.00		3,200.00		\$ 3,200.00
Engineering	12	HR	\$120.00	\$ 1,440.00		1,440.00		\$ 1,440.00
Permitting	12	HR	\$80.00	\$ 960.00		960.00		\$ 960.00
Oversight	120	HR	\$43.00	\$ 5,160.00		5,160.00		\$ 5,160.00
			Sub-Total	\$ 11,240.00	\$ -	\$ 11,240.00	\$ -	\$ 11,240.00
Travel								
Mileage	600	MILE	\$0.58	\$ 345.00		345.00		\$ 345.00
Per diem				\$ -				\$ -
			Sub-Total	\$ 345.00	\$ -	\$ 345.00	\$ -	\$ 345.00
Construction Materials****								
Bank treatment	700	FOOT	\$30.00	\$ 21,000.00	6,000.00	15,000.00		\$ 21,000.00
Plants for dispersed plots	400	EA	\$5.00	\$ 2,000.00	1,000.00	1,000.00		\$ 2,000.00
Browse protectors	400	EA	\$23.86	\$ 9,544.00	2,000.00	7,544.00		\$ 9,544.00
Livestock Fence	200	FOOT	\$1.50	\$ 300.00		300.00		\$ 300.00
			Sub-Total	\$ 32,844.00	\$ 9,000.00	\$ 23,844.00	\$ -	\$ 32,844.00
Equipment, Labor, and Mobilization								
Livestock Fence	200	FOOT	\$1.50	\$ 300.00		300.00		\$ 300.00
Plant and browse protector installation	240	HR	\$23.66	\$ 5,678.40		5,678.40		\$ 5,678.40
Bank treatment	700	FOOT	\$35.00	\$ 24,500.00		24,500.00		\$ 24,500.00
			Sub-Total	\$ 30,478.40	\$ -	\$ 30,478.40	\$ -	\$ 30,478.40
Other								
New bridge (design, permitting, construction, materials, etc)	1	LS	\$692,477.00	\$ 692,477.00			\$ 692,477.00	\$ 692,477.00
			Sub-Total	\$ 692,477.00	\$ -	\$ -	\$ 692,477.00	\$ 692,477.00
TOTALS					\$ 9,000.00	\$ 65,907.40	\$ 692,477.00	\$ 767,384.40

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Additional details: The Independent Sector estimates the value of volunteer time in Montana at \$23.66/hour. Volunteers will install and protect plantings. BRWF charges \$43/hour for staff time. Survey, design, engineering, and permitting will be completed by WGM and PCI. Rates are estimated based on quotes from past projects. The rancher's contribution includes fence material and construction as well as 10 hours (estimated) spent on project coordination. DEQ estimates the value of a rancher's time at \$31.87/hour. MWCC's contribution is not yet secured. Ravalli County Road Department's contribution of \$55,000 towards the bank treatment design, construction, and materials is secured.

APPLICATION MATCHING CONTRIBUTIONS

(do not include requested funds or contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL
Ravalli County Roads Department (secured)	\$ -	\$ 55,000.00	\$ 55,000.00
Volunteers	\$ 5,678.40	\$ -	\$ 5,678.40
Montana Watershed Coordination Council (not secured)		\$ 4,310.30	\$ 4,310.30
Rancher	\$ 918.70	\$ -	\$ 918.70
TOTALS	\$ 6,597.10	\$ 59,310.30	\$ 65,907.40

OTHER CONTRIBUTIONS

(contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL
Ravalli County Roads Department (from Department of Commerce Contract # MT-DLA-CG-21-949 for construction of new channel-spanning bridge) (secured)	\$ -	\$ 692,477.00	\$ 692,477.00
TOTALS	\$ -	\$ 692,477.00	\$ 692,477.00

1. Provide a narrative description of the present baseline conditions of the stream and riparian area. Provide a map showing the location of the proposed project. Identify stream type (ephemeral, intermittent, perennial) and stream classification (Rosgen or Montgomery-Buffington methodologies). Provide existing bank-full channel dimensions (width and depth; slope on larger scale projects). Provide photographic documentation of the existing channel, including a photograph of the existing typical channel substrate with an associated ruler for scale.

Bankfull Width: 60' (varies from 25'-125'. Variability due to rapid erosion; narrowest area constricted by former bridge)

Bankfull Depth: 3'

Slope: 0.5%

Stream type: Perennial

Stream Classification: Pool-riffle / C-3

Baseline conditions of the stream and riparian area: This reach has less than 25% vegetative cover due to previous agricultural practices (Riparian Evaluation, DEQ, 2019); some woody riparian plants, such as willows and dogwood, are present, particularly on the inner banks of the meanders, but pasture grasses are the predominant vegetation type. Acute road infrastructure concerns, including new construction, flooding, and insufficient buffer between the river and the road, are present on-site. The outer banks on the two meanders upstream of Edwards Bridge are actively eroding and pose a threat to the road and bridge, respectively. There is little woody debris in the stream. Previously, a 3-culvert bridge crossed the channel, but recently failed and was removed in 2019. The channel is constricted and riprapped at the site of this bridge.

Map: (courtesy Jeff Standaert, Professional Consultants Inc)



Photos of existing channel:



Downstream (right) bank



Upstream (left) bank



Downstream (right) bank, 150' upstream of bridge

Photo of substrate with ruler:

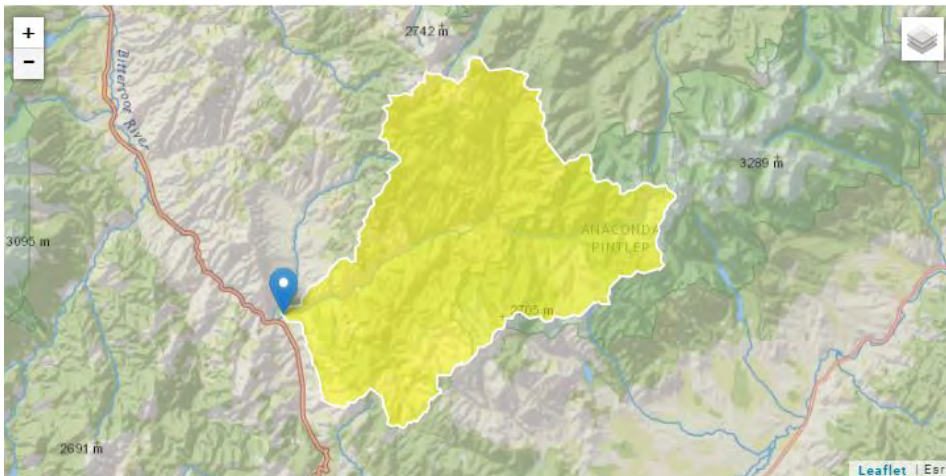


2. Identify the cause(s) of existing impairments on the proposed project reach and describe how the project would restore appropriate conditions.

Historical land management practices, including grazing in riparian areas, removal of riparian vegetation, channelization, and streambank modifications have degraded in-stream and riparian habitats both on this property and elsewhere on the East Fork. Poor water quality caused by high sediment loads, high water temperatures, and alterations in streamside vegetative cover impairs aquatic life in the East Fork. Beyond this, road infrastructure (road design, road placement near the river, and bridge placement misaligned with flow path) has further impacted in-stream habitat and water quality and is poised to have more devastating impacts in the future: the County Roads Department has identified flooding on the road and river migration to be threats to transportation infrastructure. We will address this problem and reduce the need for further intervention by stabilizing the banks using ecologically-friendly methods and maintaining a buffer between the road and the stream. This treatment will provide habitat complexity, woody debris, shade, and enhance filtration capacity. The previous bridge constricted the river and was misaligned with the present path of the river; its culvert design also interfered with stream function, leading to its failure. The County has agreed to shift the footprint of the new, channel-spanning bridge (to be built in 2021) and lengthen it to better accommodate the present and future flow paths of the East Fork. We will work with the landowner to manage livestock access to the stream surrounding the bank treatments. Installing and protecting plots of native riparian plants will expand the habitat benefits elsewhere on the property.

3. Provide an estimate of design discharge and note the method(s) of estimation. If the proposed design is based on a reference reach, provide specific descriptive information (channel type, bank-full width, and bank-full depth; slope on larger scale projects) and explain applicability to the proposed project reach. Identify the location of any or all reference reaches on a map. Provide photographic documentation of the reference channel.

To comply with FEMA floodplain regulations, the in-channel work should be designed to withstand the 100-year flood (2840 cfs based on Streamstats modeling below). Channel dimensions associated with the design will be based on the bankfull flood (1.5-year recurrence interval, 741 cfs based on Streamstats modeling below).



Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CONDA	Contributing Drainage Area	223.6	square miles	0.6	2470
PRECIP	Mean Annual Precipitation	28.76	inches	14.6	62.1
FOREST	Percent Forest	74.5	percent	20.4	99.1

Peak-Flow Statistics Flow Report [W Region Basin© 2019 5019F]

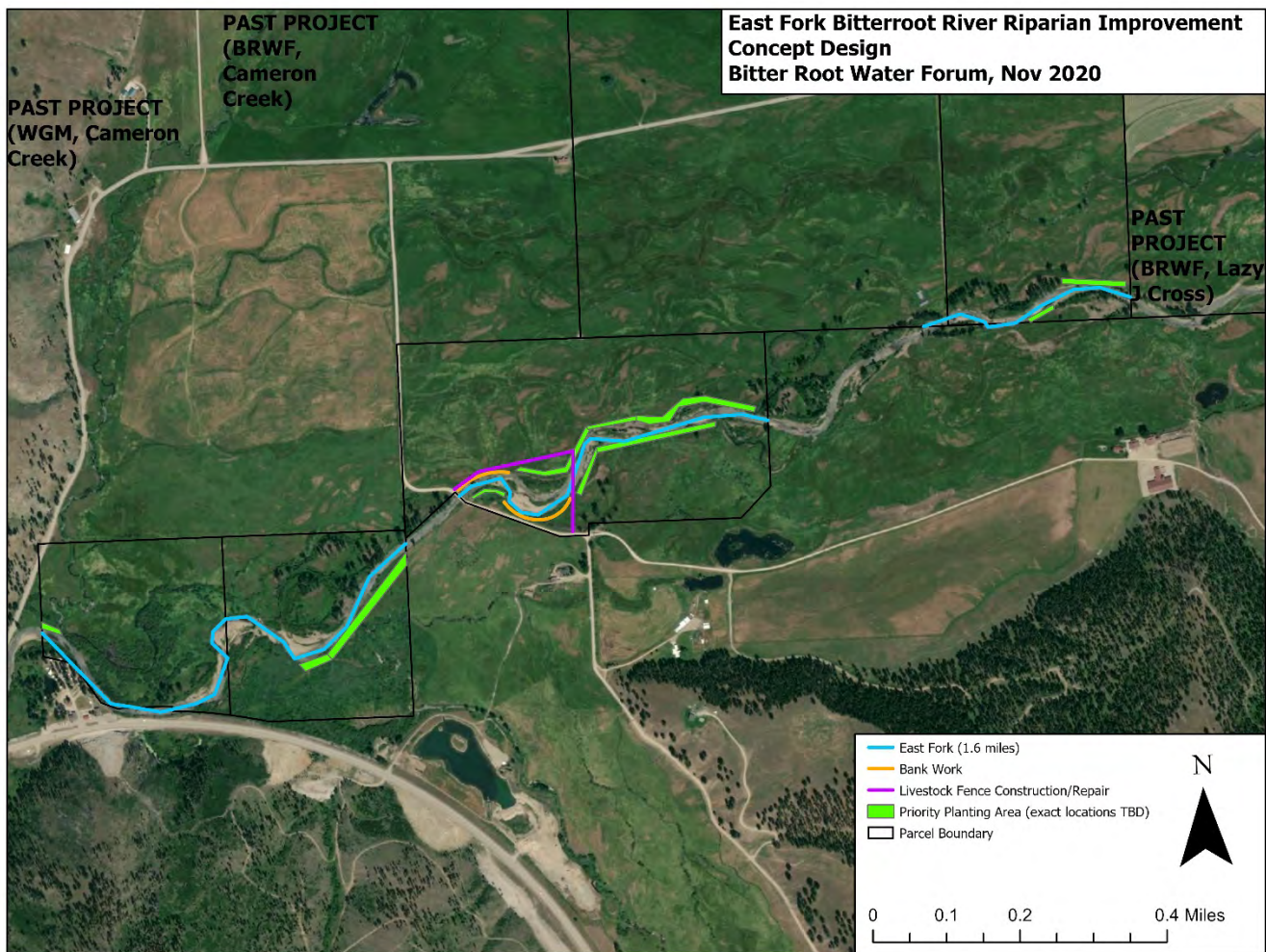
PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

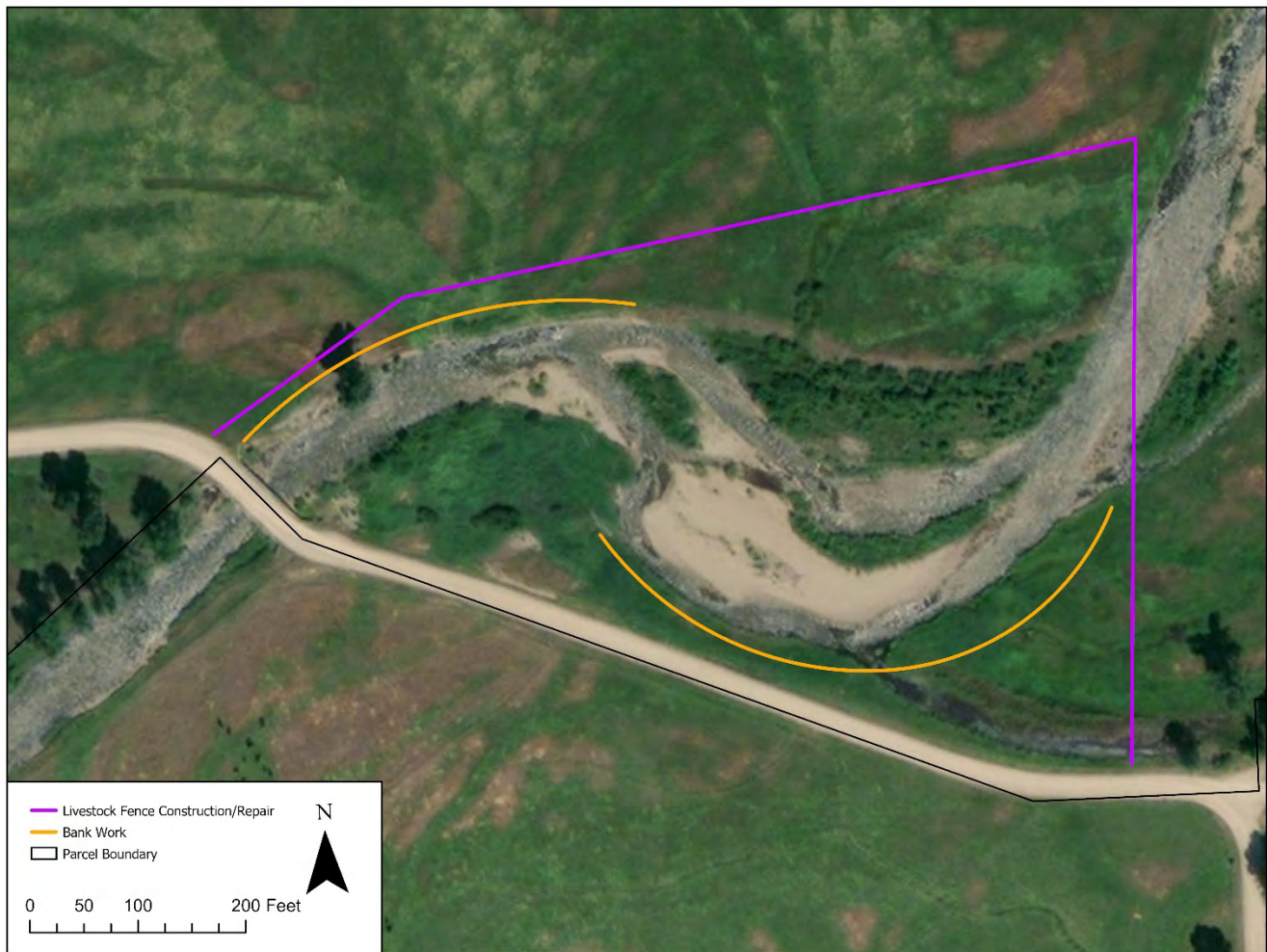
Statistic	Value	Unit	PIl	PIu	SEp
1.5 Year Peak Flood	741	ft ³ /s	302	1820	59.4
2 Year Peak Flood	911	ft ³ /s	384	2160	56.5
2 33 Year Peak Flood	994	ft ³ /s	423	2340	55.7
5 Year Peak Flood	1370	ft ³ /s	603	3110	53.4
10 Year Peak Flood	1750	ft ³ /s	777	3940	52.8
25 Year Peak Flood	2150	ft ³ /s	954	4840	53.2
50 Year Peak Flood	2490	ft ³ /s	1080	5720	54.2
100 Year Peak Flood	2840	ft ³ /s	1210	6640	56
200 Year Peak Flood	3200	ft ³ /s	1330	7680	58
500 Year Peak Flood	3610	ft ³ /s	1440	9040	61.4

Peak-Flow Statistics Citations

Sando, Roy, Sando, S.K., McCarthy, P.M., and Dutton, D.M., 2016, Methods for estimating peak-flow frequencies at ungaged sites in Montana based on data through water year 2011: U.S. Geological Survey Scientific Investigations Report 2015-5019-F, 30 p.

4. Provide a plan view drawing for the entire reach, showing placement of all structures and proposed treatments (including fencing).



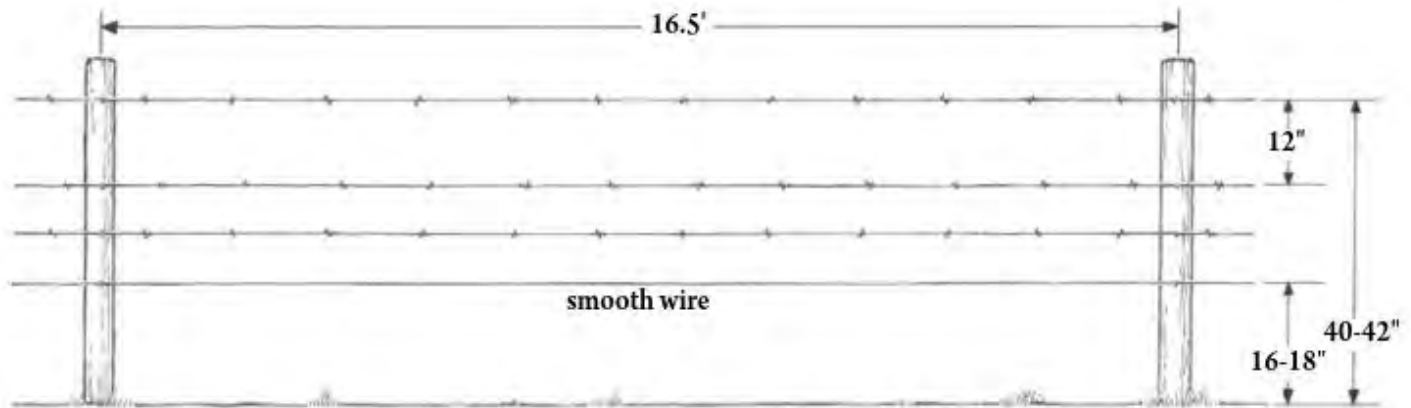


Note that the fence layout is a preliminary design and will be refined. The ranchers have committed to building fence to the extent that it will ensure grazing control to the bank work area.

5. Provide typical drawings for all proposed structures.

See planset for typical drawings of the bank treatments. Note that the drawing provided is preliminary and will be refined. The drawing shows a full woody debris toe, which will be necessary for the downstream, right-bank treatment adjacent to the bridge. However, the upstream, left-bank treatment can be done with a less robust woody debris toe, for example, using fewer root wads and/or incorporating brush.

Typical drawing of fence from "A Landowner's Guide to Wildlife Friendly Fences" (FWP, 2012):

**6. Describe proposed and future land use activities within adjacent riparian areas.**

Agricultural activities, mainly cattle grazing, are intended to continue on the property. Livestock will be excluded from the riparian areas adjacent to the bank work for a minimum of 5 years. BRWF, the landowner, and WGM will work together to determine if any grazing can or should be allowed in the riparian areas after vegetation is established. BRWF will develop a grazing management plan with the landowner detailing adaptive management requirements.



PRELIMINARY
 PLOTTED: 9/16/20
 SAVED: 9/16/20

AERIAL PHOTOGRAPH MAP
EDWARDS ROAD BRIDGE
RAVALLI COUNTY, MONTANA

REVISIONS:	NO.	DESCRIPTION	DATE

PROJECT: 20-07-33
 LAYOUT: Layout1
 SURVEYED: ---
 DESIGN: ---
 DRAFT: CEG
 APPROVE: BA
 DATE:

SEPTEMBER 2020

FILE: W:\Projects\200733\CAD_Data\Exhibits\200733_map.dwg



WGM GROUP
WWW.WGMGROUP.COM

PRELIMINARY

PLOTTED: 9/16/20
SAVED: 9/16/20

AERIAL PHOTOGRAPH MAP
EDWARDS ROAD BRIDGE
RAVALLI COUNTY, MONTANA

REVISIONS:
NO. DESCRIPTION DATE

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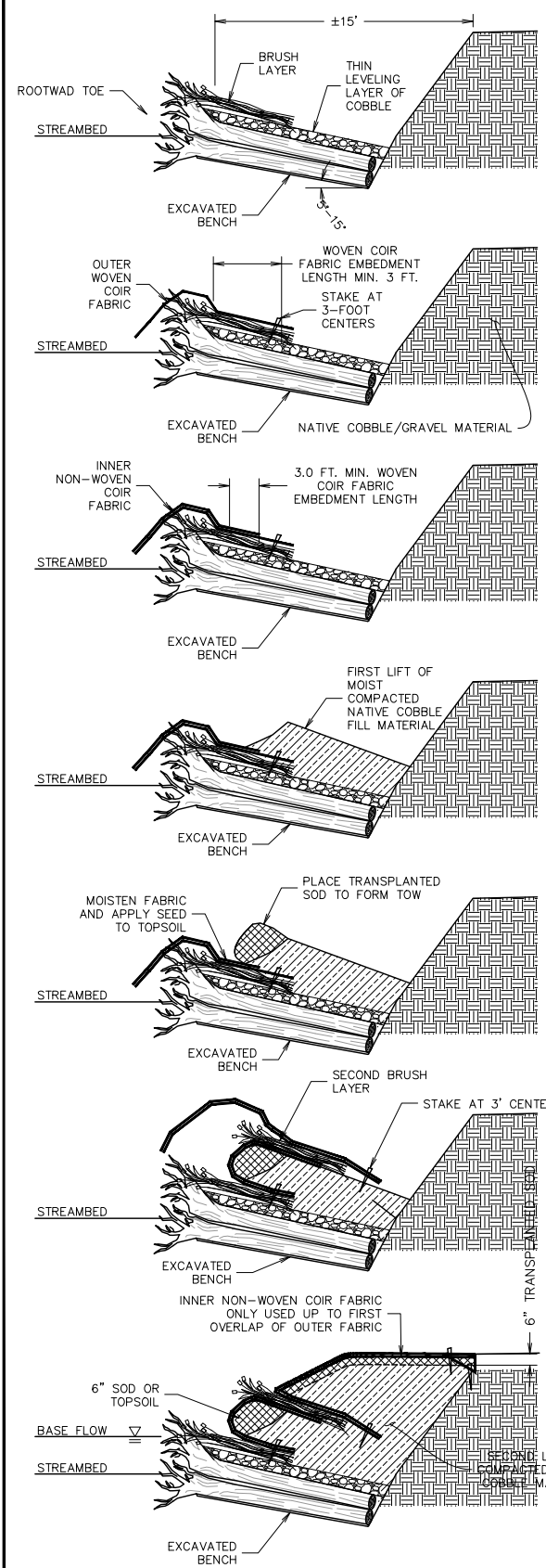
WGM GROUP
WWW.WGMGROUP.COM

PRELIMINARY

PLOTTED: 9/16/20
SAVED: 9/16/20

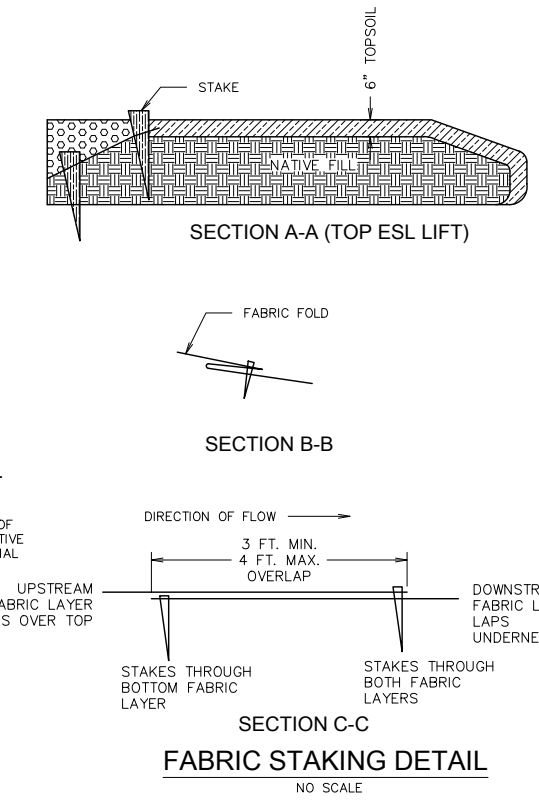
DETAILS AND NOTES
EDWARDS ROAD BRIDGE
RAVALLI COUNTY, MONTANA

FABRIC ENCAPSULATED SOIL CONSTRUCTION SEQUENCE



GENERAL NOTES FOR CONSTRUCTING FABRIC ENCAPSULATED SOIL LIFTS:

- BANKS MAY BE CONSTRUCTED IN EITHER AN UPSTREAM OR DOWNSTREAM DIRECTION, AS LONG AS THE FABRIC IS OVERLAPPED IN THE PROPER DIRECTION. SEE FABRIC STAKING DETAILS.
- INSTALL ROCK OR ROOTWAD TOE AS SHOWN ON PLANS AND DETAILS TO THE TOE DOWN DEPTH INDICATED.
- EXCAVATE BENCH ABOVE ROCK OR ROOTWAD TOE. FIG A. LEVEL ROOTWADS WITH THIN LAYER OF NATIVE COBBLE TO PREPARE FOR BRUSH LAYER.
- UNROLL THE OUTER WOVEN COIR FABRIC, PERPENDICULAR TO THE CHANNEL AND POSITION IT SO THAT AT LEAST 3 FT. EXTENDS FOR EMBEDMENT ON THE BANK (FIG B). DRAPE THE REMAINDER OF THE FABRIC OVER THE TOP OF THE ROCK OR ROOTWADS ON THE STREAM SIDE. DO NOT UNROLL AND INSTALL FABRIC IN PARALLEL DIRECTION TO CHANNEL.
- UNROLL THE INNER NON-WOVEN COIR FABRIC, OVER THE TOP OF THE OUTER FABRIC AND POSITION IT SO THAT AT LEAST 1 FT. OF THE INNER FABRIC EXTENDS AS AN EMBEDMENT LENGTH ON THE BANK (FIG C). DRAPE THE REMAINDER OF THE FABRIC OVER THE TOP OF THE ROCK TOE ON THE STREAM SIDE AND ALIGN THE LONG EDGES OF THE INNER AND OUTER FABRICS. STRETCH AND PULL THE FABRIC LAYERS TO REMOVE WRINKLES.
- PLACE A 18-INCH LIFT OF MOIST NATIVE COBBLE MATERIAL OVER THE BRUSH LAYER (FIG D). POUR WATER ON BACKFILL MATERIAL WITH EXCAVATOR BUCKET DIPPED IN STREAM TO MOISTEN SOIL AND ENCOURAGE FINES TO MIGRATE INTO BRUSH LAYER. COMPACT TO 85% STANDARD PROCTOR DRY DENSITY (SPDD). CAP STREAM SIDE OF COBBLE LIFT WITH 6-INCHES OF SOD (FIG E). MOISTEN INSIDE OF FABRIC AND SPRINKLE SEED ON TOPSOIL.
- FOLD THE LOOSE ENDS OF THE TWO FABRIC LAYERS BACK OVER THE COMPACTED TOPSOIL MATERIAL AND STRETCH TIGHTLY TO REMOVE WRINKLES AND ACHIEVE CONSTANT CONTACT WITH UNDERLYING SOIL (FIG F). SECURE WITH WOODEN STAKES AT A SPACING OF 3 FT. FOLLOW ALL STAKING DETAILS ON THIS SHEET.
- REPEAT STEPS 1 THROUGH 6 FOR SECOND LIFT. PRIOR TO WRAPPING WITH FABRIC LAYERS, ADD 6-INCHES OF SOD OR TOPSOIL (MIN) AND APPLY SEED. DO NOT INSTALL SEED ON TOP OF FABRIC.
- CUT FABRIC TO ACCOMMODATE LIVE PLANTINGS PER PLANTING SCHEDULE.



REVEGETATION SPECIFICATIONS

A: SEED MIX:

SCIENTIFIC NAME	COMMON NAME	SEEDS/SF	PERCENT SEEDS
CALAMAGROSTIS CANADENSIS	BLUEJOINT REEDGRASS	5	5%
ELYMUS TRACHYCAULUS	SLENDER WILDRY	19	17.5%
STREAMBANK WHEAT GRASS		14	12.5%
PSEUDOROEGNERIA SPICATA	BLUEBUNCH WHEATGRASS	16	15%
LDIUM MULTIFLORUM	ANNUAL RYEGRASS	78	50%
TOTAL		132	100%

BROADCAST SEED RATE = 30 LBS PLS./ACRE
TARGET SEED RATE = 132 SEEDS/SF

- ALL DISTURBED AREA SHALL BE SEEDED AS WELL AS SOIL LIFTS. PERFORM SEEDING DURING AN APPROPRIATE GROWING SEASON.
- INSTALL 4" MINIMUM SUITABLE TOPSOIL OR SALVAGED SOD PRIOR TO SEEDING. TOPSOIL/SOD MAY BE SALVAGED FROM LOCATION ON-SITE. CONTACT ENGINEER TO DETERMINE SALVAGE LOCATION.
- ALL SEEDING AREAS SHALL BE RAKED OR HARROWED TO PREPARE PLANTING BED SURFACE.

B: PLANTING SCHEDULE:

COMMON NAME	SCIENTIFIC NAME	SIZE	QUANTITY	SIZE	QUANTITY
CHOCHECHERRY	PRUNUS VIRGINIANA	10T	483	40D	108
SERVICEBERRY	AMELACHIER ALNFOLIA	10T	483	40D	108
RED-Osier DOGWOOD	CORNUS SERICEA	10T	483	40D	108
PONDEROSA PINE	PINUS PONDEROSA	10T	0	40D	108
DOUGLAS HAWTHORN	CRATAEGUS DOUGLAS	10T	483	40D	108
TOTAL			1932		540
					2472

- SHRUB/TREE SPECIES TO BE PLANTED IN LOCATION SHOWN ON REVEGETATION PLAN AT 3' STAGGERED CENTERS. SHRUBS SHALL COME FROM A REPUTABLE NURSERY SERVICE. CONSULT ENGINEER PRIOR TO SUBSTITUTION. TOTAL NUMBER OF SHRUBS TO BE PLANTED IS 2472.
- PLANTING TO OCCUR NO EARLIER THAN APRIL 1, 2016 AND NO LATER THAN MAY 1, 2016.
- APPLY PLANTSKYD BROWSE PROTECTION TO ALL SHRUB/TREE PLANTINGS.

C: COTTONWOOD, PINE, AND WILLOW LWD TOE:

- INSTALL WOOD DEBRIS TOE WHERE INDICATED ON PLAN. INSTALL LIVE WILLOW AT 20 STEMS PER LINEAR FOOT WHERE INDICATED ON PLANS.
- COTTONWOOD SHALL BE DIAMETERS RANGING FROM 1" TO 4" AND LENGTHS RANGING FROM 5' TO 7'. WILLOW SHALL BE DIAMETERS RANGING FROM 3/4" TO 2" AND LENGTHS RANGING FROM 4' TO 7'.
- CUTTINGS SHALL BE FREE OF ROT, TRIMMED OF BRANCHES.
- INSTALL CUTTINGS IN HORIZONTAL ORIENTATION.
- HARVESTING AND STORAGE SHALL FOLLOW ALL SPECIFICATIONS FOR BRUSH LAYERS (BELOW).
- ALL LIVE BRUSH LAYER AND LIVE STAKE MATERIALS SHALL BE SPRAYED WITH A ROOTING HORMONE, SUCH AS NAA OR IBAP, PRIOR TO INSTALLATION. APPLICATION SHALL FOLLOW MANUFACTURER'S INSTRUCTIONS.

MATERIAL SPECIFICATIONS

A. ROCK MATERIALS:
ROCK SHALL BE HARD AND DURABLE STONE WITH A BULK DENSITY NOT LESS THAN 165 POUNDS PER DRY CUBIC FOOT. THE LEAST DIMENSION OF ANY PIECE SHALL NOT BE LESS THAN 1/3 THE GREATEST DIMENSION. BROKEN CONCRETE OR RECYCLED CONSTRUCTION PRODUCTS ARE NOT ALLOWED. EACH LOAD OF ROCK SHALL BE REASONABLY WELL-GRADED FROM SMALLEST TO LARGEST SIZE SPECIFIED. ALL ROCK SHALL MEET MDT CLASS 3 RANDOM RIPRAP SPECIFICATIONS OR HIGHER.

1. THE FOLLOWING GRADATION FOR THE LARGE ROCK SHALL BE USED ON THIS PROJECT

ROCK DIAMETER*	ROCK WEIGHT (LBS.)	% SMALLER BY WEIGHT
34-INCHES	2000	100
31-INCHES	1400	70-90
24-INCHES	700	40-60
9.5-INCHES	40	0-10

* EQUIVALENT SPHERICAL DIAMETER BASED ON 165 PCF.

B. FABRIC MATERIALS:
1. WOVEN COIR FABRIC: FOR USE AS THE OUTER FABRIC LAYER IN FES LIFTS. WOVEN COIR SHALL BE A HIGH-STRENGTH, WOVEN, COIR FABRIC MADE FROM 100% COCONUT FIBER. FABRIC ROLL WIDTHS SHALL BE 4 METERS, COMPRISED OF A CONTINUOUSLY WOVEN MAT. THE FOLLOWING ARE MINIMUM ROLL PROPERTIES:

PROPERTY	TEST METHOD	CRITERIA
THICKNESS:	ASTM D1777	0.40 IN.
TENSILE STRENGTH (DRY):	ASTM D4595	150 X 50 LB./IN.
MASS PER UNIT AREA:	ASTM D3776	26.6 OZ./SQ. YD.
OPEN AREA:	MEASURED	40% (MAXIMUM)
ROLL WIDTH:		4 METERS

WOVEN COIR SHALL BE GEOCOIR/DEKOWE 900, COIRMAT 900 OR ENGINEER APPROVED EQUAL.
2. NON-WOVEN COIR FABRIC: FOR USE AS THE INNER FABRIC LAYER IN FES LIFTS, OR AS A SOIL RETENTION BLANKET ON GRADED SLOPES OR OTHER FLOODPLAIN AREAS, AS SHOWN ON THE DRAWINGS. NON-WOVEN COIR SHALL BE MADE FROM 100% COCONUT FIBER, ENCLOSED IN A NETTING SEWN FROM ORGANIC THREAD ON 1.5-INCH CENTERS. FABRIC ROLL WIDTHS SHALL BE 2 METERS. NON-WOVEN COIR SHALL MEET THE FOLLOWING MINIMUM SPECIFICATIONS:

PROPERTY	TEST METHOD	CRITERIA
THICKNESS:	ASTM D1777	0.25 IN.
TENSILE STRENGTH (DRY):	ASTM D4595	200 X 100 LB./IN.
MASS PAR UNIT AREA:	ASTM D3776	10 OZ./SQ. YD.
ROLL WIDTH:	APPROX. 2 METERS	

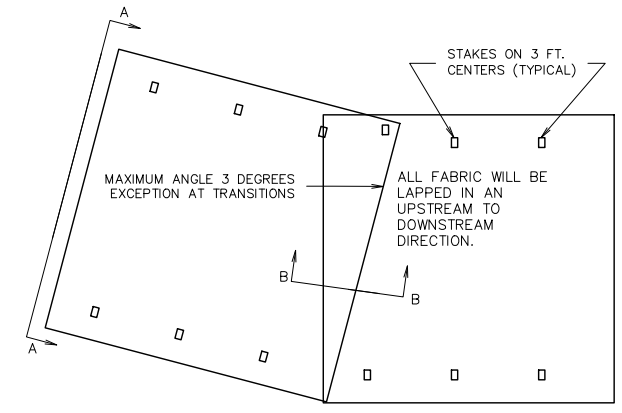
NON-WOVEN COIR FABRIC SHALL BE NORTH AMERICAN GREEN C125BN OR ENGINEER APPROVED EQUAL.

- C. WOODEN STAKES:**
- WOODEN STAKES FOR INSTALLATION OF FABRIC ENCAPSULATED SOIL LIFTS AT FABRIC EDGES AND OVERLAP AREAS SHALL BE 24-INCHES LONG, AND SHALL CONSIST OF A 2" X 4" PIECE OF LUMBER, RIPPED DIAGONALLY TO FORM A WEDGE-SHAPED STAKE.
 - USE OF SHARPENED 2"x2" OR CONSTRUCTION STAKES IS ACCEPTABLE TO ANCHOR. STAKE FABRIC ACCORDING TO DETAILS ON THIS SHEET.

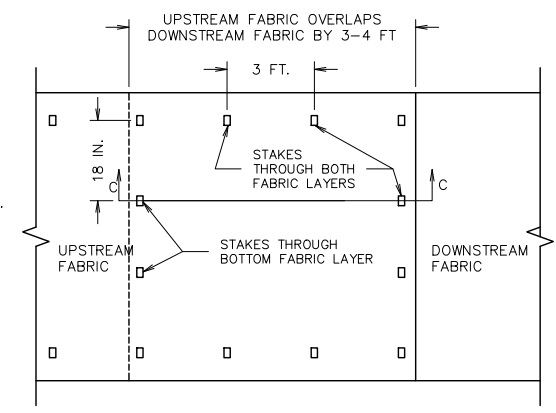
- D. BRUSH LAYER:**
- BRUSH LAYER MATERIALS SHALL CONSIST OF 4' TO 6' LONG CUTTINGS THAT ARE 1/4" TO 2" IN DIAMETER.
 - ACCEPTABLE SPECIES ARE THE FOLLOWING:

COMMON NAME	SCIENTIFIC NAME
SANDBAR WILLOW	SALIX EXIGUA
COTTONWOOD	POPULUS sp.
DRUMMOND'S WILLOW	SALIX DRUMMONDIANA
REDSIER DOGWOOD	CORNUS SERICEA
BEBB'S WILLOW	SALIX BEBBIANA
GEYER WILLOW	SALIX GEYERIANA

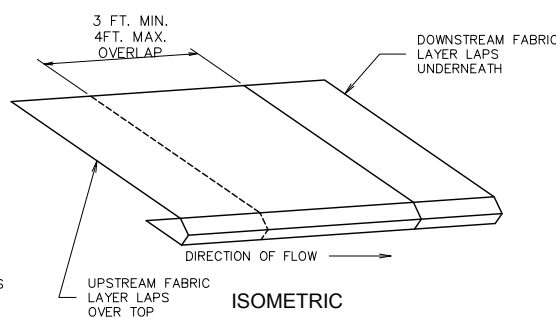
- BRUSH LAYER SHALL BE HARVESTED WHEN PLANTS ARE IN DORMANCY, UNLESS OTHERWISE APPROVED BY ENGINEER.
4. CUTTINGS NOT PLANTED WITHIN 5 DAYS OF HARVEST SHALL BE FULLY SOAKED IN WATER OR BURIED IN SNOW FOR STORAGE.
5. ENSURE THAT AT LEAST 2/3 OF CUTTINGS ARE BURIED WHEN INSTALLING IN BRUSH LAYER. CUTTINGS SHALL BE PLACED IN THE CORRECT GROWING ORIENTATION WITH TOP OF THE PLANT/CUTTING EXPOSED AND THE ROOTWAD END OF THE CUTTING BURIED.
6. BRUSH LAYER STEM MATERIALS SHALL BE 2/3 BURIED AND 1/3 EXPOSED TO SURFACE (BY LENGTH). STEMS SHALL BE TRIMMED AFTER INSTALLATION.
7. ALL LIVE BRUSH LAYER AND LIVE STAKE MATERIALS SHALL BE SPRAYED WITH A ROOTING HORMONE, SUCH AS NAA OR IBAP, PRIOR TO INSTALLATION. APPLICATION SHALL FOLLOW MANUFACTURER'S INSTRUCTIONS.



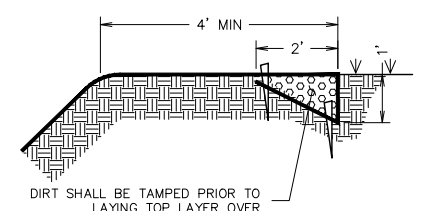
PLAN VIEW
FOLDING OF CONTINUOUS SHEET FABRIC FOR ANGLED BANK DETAIL
NO SCALE



PLAN VIEW
FABRIC JOINING DETAIL
NO SCALE



ISOMETRIC



FABRIC TERMINAL DETAIL
NO SCALE

REVISIONS:

NO.	DESCRIPTION	DATE

PROJECT: 20-07-33
LAYOUT: Layout1
SURVEYED: ---
DESIGN: ---
DRAFT: CEG
APPROVE: BA
DATE:

SEPTEMBER 2020

FILE: W:\Projects\200733\CAD Data\Exhibits\200733_mop.dwg

Dear Review Committee,

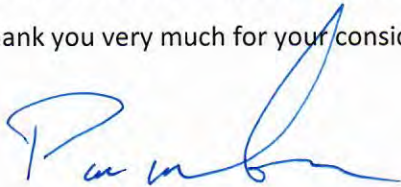
I would like to express my support for the Bitter Root Water Forum's restoration project on the East Fork of the Bitterroot River, as this project has a number of benefits.

Firstly, we are committed to taking good care of our land, and understand the importance of riparian vegetation for a healthy stream. This is why we worked with the Water Forum to complete successful restoration projects on Cameron Creek in 2014 and 2015. We are now looking forward to expanding the revegetation work onto the East Fork as well.

Secondly, we need Edwards Road to maintain our operations, and are concerned because of the frequent flooding that occurs in two places near the bridge. This access is also an important resource for the Sula community. But, we do not want rip-rap to be placed to protect it because this could have negative impacts on the stream. The County Roads Department and the Water Forum have come up with a much better solution: the roads and bridge that we and our community need will be maintained by the soil lifts, without damaging the river.

Thus, we are happy to participate in this project because it will help the river, our operations, and the community. We can contribute by modifying our ranching operations and building and moving fencing as needed in order to keep cattle out of the river in the project area. Once the project is established, we can adopt grazing management practices that will ensure the long-term success of the project.

Thank you very much for your consideration.



Paul Nelson

Ranch Manager



FWP.MT.GOV

THE **OUTSIDE** IS IN US ALL.

November 23, 2020

Montana Fish, Wildlife & Parks
Attn: Michelle McGree - Future Fisheries Coordinator
Fisheries Management Bureau
PO Box 200701
Helena, MT 59620

RE: Support for the Bitter Root Water Forum's Future Fisheries Proposal for the East Fork Bitterroot River

Dear Michelle,

I would like to express my support for the Bitter Root Water Forum's proposal to restore a short reach of the East Fork Bitterroot River upstream of Edwards Road near Sula. I have visited the site on several occasions and agree that past land use practices have led to a loss of habitat complexity throughout much of the project area. The absence of a healthy woody riparian community has reduced cover and shading, as well as exacerbated bank erosion upstream of the Edwards Road crossing. This has created a problem for the Ravalli County Road Department given the proximity of the river to the road and bridge opening. The Road Department has agreed to pursue a softer, bioengineered approach versus utilizing hardened riprap. Ravalli County will be providing a significant portion of the funding for this project making the Future Fisheries ask relatively modest. Successful completion of this project will help to restore overall stream function and riparian health. Together this will improve fish habitat for both native and non-native sport fish species. Bull trout and westslope cutthroat trout are present in this reach of the East Fork as are rainbow and brown trout. Because it is publicly accessible at the Edwards Road crossing, this section of the river is popular with anglers despite the poor habitat conditions. Improving habitat in this area will benefit both the fishery and the angling community.

Based on my experiences working with the Water Forum on other projects, I am confident that they will execute the proposed project on the East Fork in a manner that aligns closely with FWP's goals. If you have any questions, please feel free to contact me.

Sincerely,

Jason Lindstrom

Jason Lindstrom – Fisheries Biologist
Montana Fish, Wildlife & Parks
1801 N. First St.
Hamilton, MT 59840
Ph# (406) 363-7169



Ravalli County Road & Bridge Department
244 Fairgrounds Road
Hamilton, MT 59840
Phone 406-363-2733
Fax 363-6701

OG-20-11-32

November 4, 2020

To Whom It May Concern,

The Ravalli County Road and Bridge Department (Department) supports the Bitterroot Water Forum's proposed project to revegetate and conduct streambank bioengineering on the East Fork Bitterroot River upstream of the Edwards Road crossing. It is our understanding that conventional forms of bank stabilization are detrimental to our County's water resources.

As a part of the bridge replacement over the East Fork of the Bitterroot River, the Department is contributing \$55,000 towards the design, permitting and construction of the bioengineered erosion control immediately upstream of the bridge. This will reduce sediment loads to the stream and allow it to maintain natural function while maintaining the road and the bridge which is slated for construction in 2021.

Unfortunately, we do not have the financial resources to complete further streambank work upstream and integral to this area which would yield a more complete solution to the above cited issues.

We are looking forward to working with the Bitterroot Water Forum on this endeavor. We hope that this project will work towards the beginning of an ongoing partnership with the Bitterroot Water Forum.

Sincerely,

A handwritten signature in blue ink that reads "John C. Horat".

John Horat
Road Administrator