MONTANA LAND INFORMATION GRANT APPLICATION

STATE FISCAL YEAR 2019

CROW RESERVATION, MT PRYOR CORS PROJECT

FEBRUARY 15, 2018

TRIBAL TRANSPORTATION
CROW AGENCY, MT 59022

APPLICATION FOR MLIA GRANT FUNDING

SECTION 1 – APPLICANT, PARTNER, AND PROPOSAL INFORMATION

Primary Applicant Contact Information	
(Please fill this section out in it entirety)	
Name of Agency/Entity:	Crow Tribe of Montana
Department:	Tribal Transportation Program
Division/Section:	Transportation
Street:	183 Forestry Lane (P.O. Box 610)
City:	Crow Agency
County:	Big Horn
State:	MT
Zip Code:	59022
Project Manager Contact Information:	
Name:	Sam Windy Boy
Title:	Transportation Director
Email Address:	Sam.WindyBoy@crow-nsn.gov
Phone Number:	406.633.3868
Fax Number:	
Secondary Contact Information:	
Name:	Leonard Little Light
Title:	
Email Address	Leonard.LittleLight@crow-nsn.gov
Phone Number:	
MLIA Grant Funding Request & Match:	
Total Requested MLIA Funds:	$18,066
Total Matched Funds:	$9,743

Proposal Information	
Date Submitted:	2-15-18
Identified Grant Priority:	Improve Land Records
Annual or Multi-Year Proposal:	Annual
Proposal Prepared By:	Crow Tribe of Montana
Short Title of Proposal:	Crow Tribe – Pryor CORS Purchase & Installation

Executive Summary (*required – 250 maximum word count*):

The Crow Tribe proposes to purchase and install a Continuously Operating Reference Station (CORS) in Pryor, Montana or near Pryor

Montana Real Time Network - Pilot Project
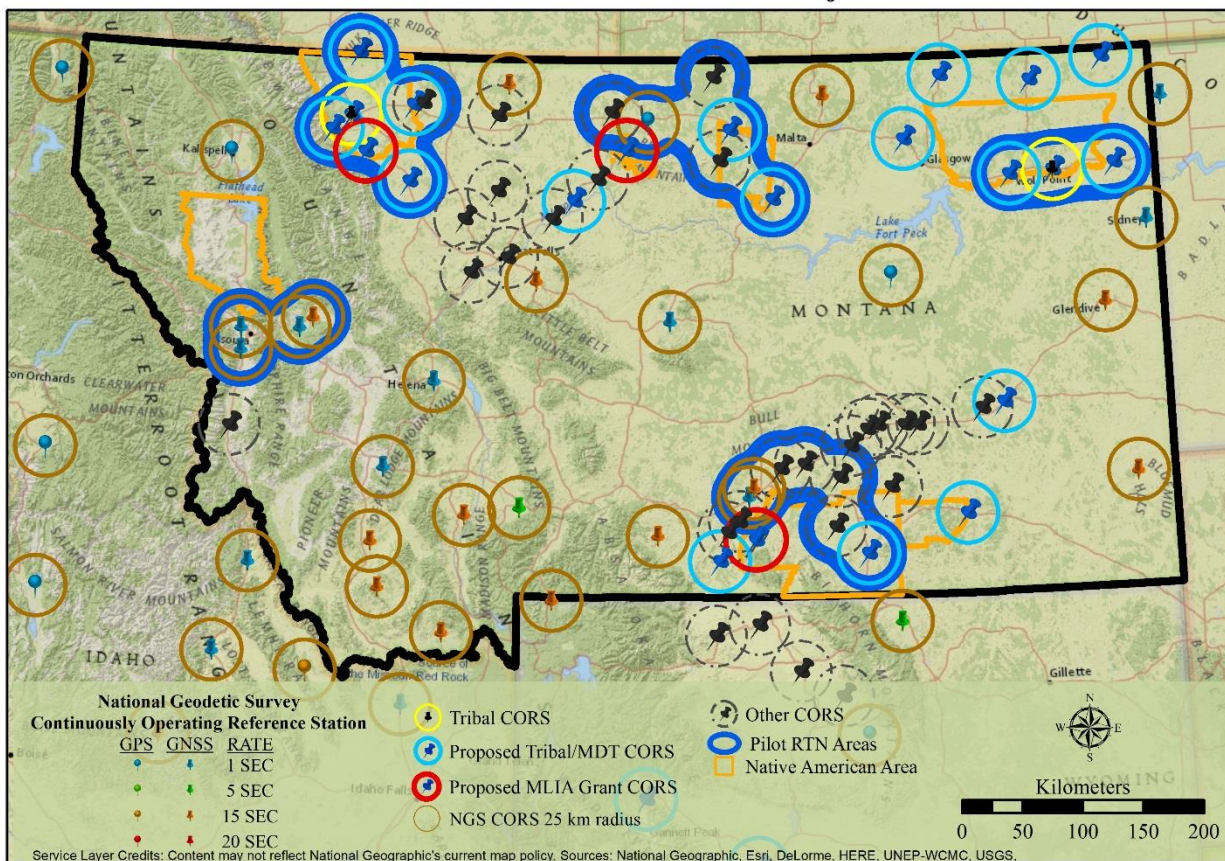
to serve as high accuracy georeferenced survey control to support mapping activities on the Crow Reservation. The National Geodetic Survey (NGS) no longer accepts passive survey control points; NGS now uses CORS. CORS establishment will improve the quality and production of survey grade GPS data.

The Tribe proposes that the CORS hardware be purchased with MLIAC funding, installed by the Crow Tribal Transportation Program, and internet, electricity, and site security provided via the Pryor Elementary School or other suitable facility.

The proposed Pryor CORS will serve as infill to the four NGS CORS to provide the densification needed to establish a Real Time Network (RTN). The proposed Pryor CORS station will provide survey control to collect and map sections corners, utilities, and other land attributes in a common, georeferenced coordinate system.

List All Past Awarded MLIA Grants:

None

Funding Partners:	
(required for each partner, copy box as needed)	
Name of Contact:	
Name of Agency:	
Street:	
City:	
County:	
State:	
Zip Code:	
Contact Email Address:	
Contact Phone Number:	

SECTION 2 – RELEVANCE

Improve Land Records

Installation of the Pryor CORS will provide control for 450 square miles near the western border of the Crow Reservation, eliminating surveys based on local control systems that do not georeference Montana's PLSS system. The permanent CORS will be publicly accessible and will serve as an invaluable tool to efficiently locate PLSS monumentation for incorporation into a Tribal GIS system and the MSDI.

The Crow Reservation has sparse mapping control availability, with some areas as large as 200 mi^2 with no Montana Spatial Data Infrastructure recognized mapping controls. The Montana Land Information Plan FY 2019 prioritizes the improvement of land records under "Improve Land Records: a. Improvements to digital representation of Public Land Survey System for improving accuracy of MSDI Cadastral and Administrative Boundaries Themes: i. Collecting new survey control data". Efficiently surveyed section corners will contribute value locally and statewide by improving the MSDI Mapping Control theme, aiding in the development of other Montana Land Plan priorities:

- Public Safety Answering Point boundaries
- Disaster and Emergency Management Planning
- Land Use Planning
- Infrastructure and Asset Management

The project will also compliment the GIS of Bighorn County, by improving the efficiency of surveying in the region.

SECTION 3 – PUBLIC BENEFIT

The Crow Tribe of the Crow Reservation is applying for funding to purchase and mount a Continuously Operating Reference System (CORS). The Tribe will utilize the CORS to collect mapping control as part of joint hands on training program with Little Bighorn College to collect new mapping control points to contribute to the MSDI. The National Geodetic Survey (NGS) no longer accepts passive survey control points. NGS now uses Continuously Operating References Systems (CORS). CORS establishment will improve the quality and production of survey grade GPS data for the following purposes:

- Geospatial Data Collaboration - Survey data collected referencing CORS can be uploaded to GIS systems to show spatial relationships and increase data accessibility. Efficiently surveyed section corners and parcel boundaries will contribute value statewide and locally by improving the MSDI Mapping Control theme, aiding in the development of
- Public Safety Answering Point boundaries
- Disaster and Emergency Management Planning
- Land Use Planning
- Infrastructure and Asset Management
- Quality GIS Foundation for the Crow Tribe
- Other Applications - Improved geodetic control and accessibility will assist all tribal spatial information users, as documented by the previously referenced publications.

  Additional applications include:

- Agriculture
- Precise grading
- Chemical application
- Irrigation
- Environmental
- Groundwater monitoring
- Wetland delineation and mapping
- Geophysical measurements

In addition to the improvements to land information, the project will serve as a valuable training opportunity for the students of Little Bighorn College, introducing the next generation of land information stewards to surveying, and data collection.

SECTION 4 – PROJECT MANAGEMENT AND ORGANIZATIONAL CAPABILITY

The Crow Tribe, through Project Manager Sam Windy Boy, has pioneered mapping and surveying technology projects on the Crow Reservation. The following demonstrates the Crow Tribal Transportation Program's project management experience and qualifications:

1. Mapping and Survey Technology – In 2008, the Crow Tribe, together with other Rocky Mountain tribes, began their eight phase Tribal Mapping endeavor, which included the following efforts:

    a. **Development of Low Distortion Projections** to reduce distortion associated with using the State Plane Coordinate System and reduction in resurveys/errors associated with using the Modified State Plane Coordinate System. Tribal projections, including the Crow projection, can be found in ESRI 10.4.1 and newer.

    b. **Publication of a Tribal Coordinate Reference System Handbook** to assist surveyors and GIS professionals in the implementation of the Low Distortion Projections.

    c. **CORS and RTN Establishment** – As described below and throughout this application, the Tribes have and are currently implementing this technology. The Tribe has begun partnering with Washington State to implement an RTN network.

    d. **Collect and Compile GIS Based PLSS and Infrastructure Data** – As a result of previous mapping project efforts, the Tribe will be able to efficiently collect survey-grade data to create GIS based data that can be accessed by all land users

In 2013, 2015, and 2017, the Tribe received the ACEC Engineering Excellence Honor Awards for its work on the development of Low Distortion Projections, publication of the Tribal Mapping Handbook and User Guide and implementation of CORS.

Specialized survey services, including on-the-ground CORS setup, calibration, and accuracy verification will be provided by the Tribe's engineering consultant, Northern Engineering and Consulting, Inc. (NECI). NECI has been providing engineering and survey services to the Tribe since 1999 and was selected through the Qualification Based Selection process. NECI provided the specialized survey services for the installation of several CORS in the Rocky Mountain region.
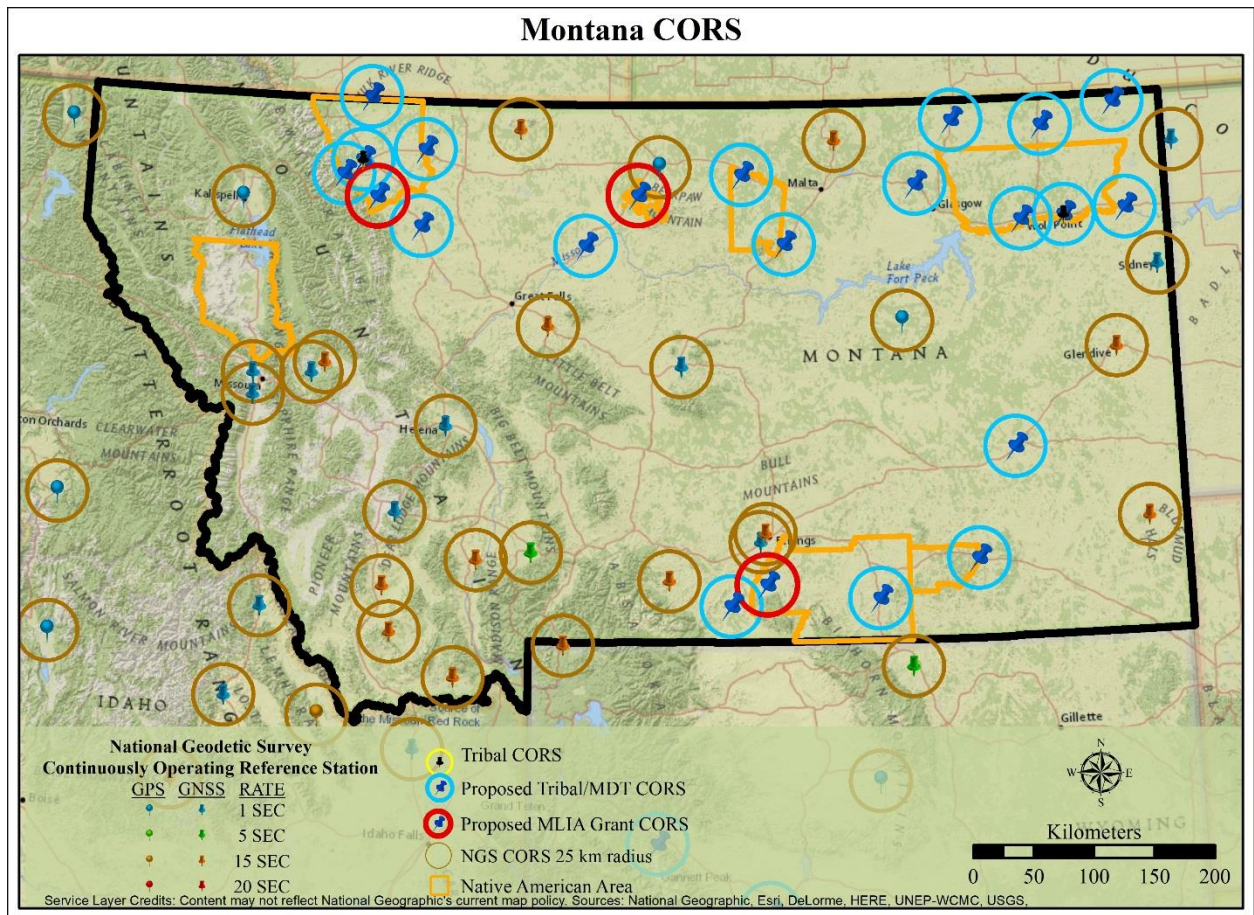
The Tribe supports the Montana Library's mission to support publicly accessible data and is establishing a GIS based mapping system accessible throughout the Tribe as a web-based mapping application. To further support the MLIA mission, the Tribe will provide the subsequent PLSS and infrastructure to the Montana State Library and agrees to comply with data submission requirements.

Since the CORS and Tribal mapping project is a part of the Crow Transportation Improvement Program, the Tribe already routinely prepares and submits quarterly financial and progress reports to comply with federal reporting requirements. The Tribe is prepared to modify the reports to fit State reporting requirements.

SECTION 5 – SCOPE OF WORK

1. _Goals and Objectives_ – The goal of the Pryor CORS Project is to establish permanent, georeferenced survey control for enhanced data collection on the Crow Reservation through the establishment of a Continuously Operating Reference Station. The goal of enhanced survey control will be accomplished through the purchase, installation, and initiation of a Continuously Operating Reference Station in Pryor, Montana on the Crow Indian Reservation. Further objectives include collection of PLSS data through a partnership with the Little Bighorn College or interns upon CORS station installation and establishment of a Real Time Network (RTN) for the Crow Reservation.

Montana CORS

2. _Tasks or Activities_ – The following activities constitute the tasks required to install the Pryor CORS upon developing the Statement of Work and receipt of funding on July 1, 2018:

    a. **Scoping and Planning with Vendor and Technical Experts –** The vendor and consulting technical experts will first be consulted to determine the feasibility, most suitable location, and mounting procedure of installing a CORS station on Pryor Elementary School. Following the initial planning efforts, the Vendor and Consultant will develop conceptual drawings showing mounting materials and methods, internet and electricity wiring and routing, hardware mounting requirements, and internet modifications. This task is estimated to take 9 weeks.

    b. **Procurement of CORS and Installation Materials –** Following project planning, the Tribe will purchase the CORS hardware and the mounting system from the Vendor. The Vendor will be selected through a formal proposal process in accordance with the Tribe's procurement policy. At this time the project manager will begin coordination with Pryor Elementary School to schedule mobilization and construction. It is estimated that materials can be purchased and delivered to the Tribe within 12 weeks of order placement.

    c. **CORS Installation –** Upon CORS delivery, Crow TTP will mobilize to Pryor to mount the system, install wall mount with antenna, grounding, and a polyphase box; setup the receiver, establish the IP address through X Square Technologies, complete all internet connections and wiring, and set-up broadcast signals. Tribal surveyors, through the support of the consultant will then conduct verification surveys at known reference points and conduct the calibration process. It is anticipated that this task will require three days, but three weeks has been provided in the project schedule in case additional mounting equipment is required.

    d. **Data Collection and RTN Establishment –** After the CORS is installed the Tribe can begin efficient georeferenced data collection in the Pryor area on the western part of the Crow reservation, including surveying of PLSS section corners for submission to the Montana State Library to improve MSDI parcel mapping. Infrastructure, including potable water, sanitary sewer, transportation, irrigation is also needed in the Pryor area. The Tribal Transportation Department will partner with the Little Bighorn College to enlist the help of classes and interns to increase tribal capacity and enhancement community education efforts. Although this CORS will not be an NGS accepted station due to spacing requirements, the CORS is still needed to densify CORS spacing to implement a Real Time Network (RTN), which will provide improved station accessibility and access to machine controlled construction equipment and GPS farm enabled equipment. Although not part of this project, the RTN is expected to be

implemented in 2019. To accomplish this, the Tribe expects to apply for another Accelerated Innovated Deployment Grant from FHWA. The Tribe, with MARLS and MDT are already working with the State of Washington, who is doing an RTN Pilot Project for Montana.

3. *Project Schedule* – The project tasks listed in the above section will be accomplished as follows:

Task	Start	End	Duration
1.0 Scoping and Planning w/Vendors & Technical Experts	**2-Jul-2018**	**31-Aug-2018**	**60**
1.01 Feasibility Level Planning	2-Jul-2018	11-Aug-2018	40
1.02 Develop Drawings	11-Aug-2018	31-Aug-2018	20
2.0 Procurement of CORS & Installation Materials	**26-Aug-2018**	**16-Dec-2018**	**112**
2.01 Select Vendor through RFP Process	26-Aug-2018	10-Oct-2018	45
2.02 Order CORS Station	11-Oct-2018	10-Dec-2018	60
2.03 Procure Installation Materials	16-Oct-2018	15-Nov-2018	30
2.04 Coordination with CORS Site Owners	2-Jul-2018	16-Dec-2018	167
3.0 Instal CORS	**11-Dec-2018**	**22-Dec-2018**	**11**
3.01 Install CORS	11-Dec-2018	16-Dec-2018	5
3.02 Check Surveys	16-Dec-2018	22-Dec-2018	6
4.0 Data Collection & RTN Establishment - Future	**2-Jan-2019**	**2-Jan-2020**	
4.01 PLSS & Infrastrue Data Collection	2-Jan-2019	Ongoing	
4.02 Establish RTN	2-Jan-2019	2-Jan-2020	
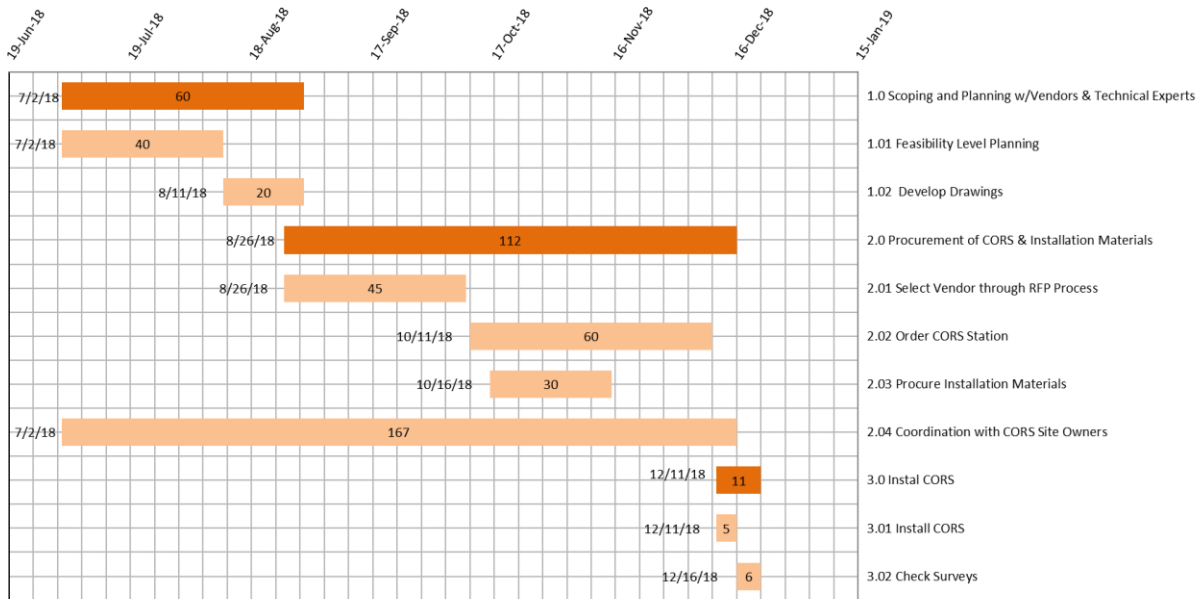
SECTION 6 – BUDGET JUSTIFICATION AND BUDGET TABLE

Project expenditures to install CORS were evaluated extensively to prepare costs to support the Montana Department of Transportation (MDT) in installing the NGS CORS, to prepare the 2015 Accelerated Innovation Deployment (AID) grant application, and to construction the Browning CORS. The project budget is as follows:

1. **Permanent Materials** – Material costs were determined through vendor quotes obtained in conjunction with the MDT CORS project. Necessary permanent materials to be funded by the MLIA grant are as follows:

CORS Hardware	$15,000.00
220' LMR600 cable	$660.00
Polyphaser - GPS (N connectors)	$170.00
N-connectors GPS x2	$38.50
#6 CU ground wire (10 feet)	$13.75
25' (1.5" conduit & 2 sweep 90's and misc.)	$11.00
Wall Mount	$1,650.00
Tech 200 (shipping)	$55.00
Seco 2072-33 tilt mount	$253.00
Ground Rod	$55.00
Anchor Bolts	$27.50
Misc. (shelf supports, epoxy, conduit, emt conduit, etc)	$132.00
Total	**$18,065.75**

2. **Labor and Equipment** – Labor and material costs were determined based on actual installation costs of the Browning CORS. Labor and equipment, to be contributed by Crow Housing and the Crow Tribal Transportation (in-kind), are as follows:

				Cost/Hour	Hours	Total Cost
Crow Tribal Transportation Program						
Man Lift				$28.13	24	$675.12
Man Lift Operator				$33.92	24	$814.08
Survey Crew				$165.00	24	$3,960.00
Professional Land Surveyor				$116.00	20	$2,320.00
Technician				$73.00	5	$365.00
Travel and Milage						$1,609.00
Total						9,743.30

3. **Operations & Maintenance** – Although CORS need no manual day-to-day operations, it is assumed that data management, periodic restarts, updates, and reprograming of the CORS will be needed. Maintenance will be performed by the Crow Tribal Transportation Program yearly funding shares with support as necessary from the Vendor. The following summarizes yearly costs to service, maintain, and provide internet and electricity to the CORS:

	Estimated Cost Per Year
Pryor Elementary or Equivalent	
Internet	$480.00
Electricity	$240.00
Crow Tribal Transportation Program	
Maintenance	$580.00
Total	$1,300.00

STATEMENTS OF SUPPORT (IF APPLICABLE)

MLIA GRANT BUDGET SUMMARY TABLE

MLIA GRANT BUDGET SUMMARY							
	MLIA Summary	Applicant Summary			Funding Partner Summary*		Total:
Category	MLIA Share	Applicant Cash	Applicant In-kind	Applicant Subtotal			MLIA Share, Applicant Subtotal, Partner Subtotal
a. Personnel			$2,794	$2,794			$2,794
a. 1. Fringe Benefits							
b. Travel			$531	$531			$531
c. Equipment	$15,000		$675	$675			$15,675
d. Supplies & Materials	$3,066						$3,066
e. Contractual			$5,743	$5,743			$5,743
f. Other							
Total	$18,066		$9,743	$9,743			$27,809

SECTION 7 – RENEWABLE GRANT ACCOUNTABILITY

SECTION 8 – AUTHORIZING STATEMENT

Authorizing Statement

I hereby certify that I have read the application and the information and all statements in this application are true, complete and accurate to the best of my knowledge and that the project or activity complies with all applicable state, local and federal laws and regulations.

I further certify that this project will comply with applicable statutory and regulatory standards.

I further certify that I am (by my signature) authorized to enter into a binding agreement with the Montana State Library to obtain a grant if this application receives approval.

_____

Name (print or type)

_____

Title (print or type

_____

Signature and Title of Authorized Representative(s) of Public Entity Applicant

_____

Date

SECTION 9 – CHECKLIST – SIGNATURES REQUIRED

Applicant's Project Manager, defined Section 1, must initial in ink or mark 'n/a' if a section is not applicable.

Initial or mark n/a	Completed Required Task
	Proposal Prepared by an outside party – I have read this document in its entirety. *(if applicable)*
	Section 1 – Applicant, Partner, and Proposal Information
	Primary Applicant Information
	Funding Partner *(if applicable)*
	Proposal Information
	List All Past Awarded MLIA Grants
	Section 2 – Relevance *(300 max word limit)*
	Section 3 – Public Benefit
	Section 4 – Project Management
	Section 5 – Scope of Work Narrative *(4-page limit)*
	Section 6 – Budget Justification Narrative and Table *(3-page limit)*
	Budget Justification Narrative
	Complete Budget Table
	Section 7 – Funding Partner Statements of Support *(if applicable)*
	Section 8 – Renewable Grant Accountability Narrative *(if applicable)*
	FY2018 Grantee Report *(if applicable)*
	Past MLIA Grant Project Narrative *(if applicable)*
	Section 9 – A Signed Authorizing Statement

APPENDIX A – GRANT ADMINISTRATIVE COST GUIDELINES

One MLIA grant evaluation criteria is how much of the MLIA dollar is spent directly accomplishing the proposed project goals/objectives vs. the amount of MLIA funds spent on organizational administrative cost. MLIA grant submissions may include reasonable administrative costs; the question arises as to what is "reasonable". Any definition of "reasonable administrative costs" is somewhat subjective, so the criteria is not intended to exclude any rational administrative costs; certainly none that use these costs as "matching" funds in support of the MLIA project goals.

Therefore, State Library and the Subcommittee will consider any administrative costs up to 5% of the total MLIA funds requested "reasonable" upon their face value. If the MLIA administrative costs funds requested exceed 5%, the grant requestor must detail and individually justify each administrative cost. When evaluating the "above 5%" submissions, the Subcommittee and the State Library will consider the:

- Ratio of the total MLIA funded administrative cost to the total MLIA grant funds requested; the higher the ratio, the lower the overall grant score.
- Justification for each administrative cost category, and their application to the goals and objectives of the MLIA Land Plan.
- The mix of current grant submissions and the relative value of this submission to the short and long term goals of the MLIA Council.

The State Library and the Subcommittee have the following options:

- Reject the grant;
- Ask the grant requestor to modify the administrative costs;
- Rate the grant lower in the MLIA grant funding priority list; and/or accept the administrative costs as submitted.

APPENDIX B – USING THE STATE FILE TRANSFER SERVICE

In order to submit grants digitally, applicants are required to use to the State of Montana File Transfer Service (MFTS) for submitting grants digitally: http://transfer.mt.gov/.

Steps for using the State of Montana File Transfer Service:

1. Navigate and login to the MFTS website.
    a. Choose to login with an existing ePass account or create a new ePass account.
        i. HINT:
            1. All state employees, by default, have an ePass account. Click login with existing ePass account and Login with State Employee Account.
            2. If you have an account to publish to the Montana Data List, you already have an ePass account. Click login with existing ePass account and use your existing account to login.
2. Send a file.
    a. Click the **+ Send a New File(s)** (blue) button.
    b. Drag and drop files into or click anywhere in the gray box on the page to select your files.
        i. Add more files by clicking in the gray area or dragging and dropping.
        ii. Click the "Remove File" button, to remove a file.
    c. Click the **Continue** button.
    d. Select the recipient(s) of the files:
    e. In the General section under Recipient Options > Click *State Employee or ePass Montana Customer* link.
        i. Search for and choose Erin Fashoway within the *find a state employee* tab.
    f. Review the files being sent.
    g. Compose a message.
    h. Click Send.
3. Review and print a copy of the sent receipt for your records.
4. Check the status of files at the home page in the MFTS.

APPENDIX C – STATEMENT OF WORK

The State Library will write the MLIA Grant Application Statement of Work for each awarded grant proposal. The SOW defines the contractual terms of the grant. The information about the project will be taken directly from the applicant's grant application. Funds cannot be distributed until the SOW has been signed by all parties.

SOW Reporting Requirements:

Transfer of all electronic documents/deliverables of the grant must be submitted using the State of Montana File Transfer Service, see Appendix D.

- Quarterly reports: Summary of the project, timeline, and budget.
- Financial Status Report: due by the project closeout the report includes:
    - summary of Project,
    - financial Status Report,
    - description of Methods for data creation/collection,
    - data and its associated metadata,
    - proof data has been published to Data List (if applicable),
    - map depicting the project,
    - media describing the grant, with a release state for use of the State of Montana for supporting the Montana Land Information Act: photos, video clips, sound bites, graphics/images.

APPENDIX D – REFERENCED DOCUMENTS OR WEBSITES

Montana Land Information Act:
http://msl.mt.gov/MLIAC

Montana Land Information Act Administrative Rule:
http://www.mtrules.org/gateway/Subchapterhome.asp?scn=10%2E102.91

Montana Land Information Plan:
http://msl.mt.gov/MLIAC/LandPlans

Montana Land Information Advisory Council:
http://msl.mt.gov/MLIAC

Montana Library Commission:
http://about.msl.mt.gov/commission_councils/commission.aspx

Montana Spatial Data Infrastructure Theme Stewards:
http://msl.mt.gov/GIS/msdi

MLIA Grant Information:
http://geoinfo.msl.mt.gov/mliagrant

Montana GIS Data List:
http://msl.mt.gov/GIS/DataList

Montana State File Transfer Service:
http://transfer.mt.gov/