

# Twin Bridges MLIA Grant Application 2014

## Applicant and Partner Information

**Primary Applicant:**

Name of principle individual: Tom Hyndman, Mayor

Name of agency/entity: Town of Twin Bridges

Street: PO Box 307

City: Twin Bridges

County: Madison

State: Montana

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Department: Public Works

**Date Submitted: February 14, 2014**

**Date Received by State:**

**Descriptive Title of Applicant's Project:**

**Building GIS capacity in Twin Bridges, MT by creating basic GIS layers, training Town staff on how to use GIS, and collecting survey data to improve the accuracy of the MSDI Cadastral Data**

## Relevance and Public Benefit

This project is to start building a Geographic Information System (GIS) for the Town of Twin Bridges by collecting survey points, creating basic GIS layers, creating a set of hard copy maps that can easily be updated, and training Town staff on how to use GIS. **The project meets the purpose of the Montana Land Information Act (MLIA) by setting up a standardized process for the Town to collect and maintain spatial data.** By working with the Montana State Library, GIS data will be created utilizing best practices and standards, giving the Town a solid foundation for the continuing development of GIS.

It is difficult to impossible for local surveyors to find monuments in Twin Bridges because many have been buried or removed during road construction. In 2013, the Town started a phased plan to locate monuments. They have already spent \$1,500 and plan to budget approximately \$2,000 annually to find as many monuments as possible. In the summer of 2014, a licensed surveyor from Great West Engineering, the Town's on-call consultant, will search for monuments, place more durable monuments, and collect Global Positioning System (GPS) coordinates for the found monuments. This survey data will be submitted to the Montana State Library to ultimately improve the Montana Spatial Data Infrastructure (MSDI) Cadastral Data in Twin Bridges. **This project meets Grant Category B1 (MSDI Data Partner Support) from the Montana Land Information Plan because it will improve MSDI data.**

GIS data layers that will be created through this project include town limits, water system infrastructure, wastewater system infrastructure, parks, and trails. Great West Engineering will work with Town staff to research town limits records and create an accurate boundary based on the MSDI Cadastral Data. This information will be submitted to the Montana State Library so the MSDI Administrative Boundaries Data can be updated. **This part of the project meets both the Grant Category B1 because it will improve MSDI data and Grant Category B2.2 because it is a local GIS solution to managing spatial data.**

**GIS will not only benefit the Town by helping them manage land within the town limits, but will also benefit Madison County, other government agencies, planners, developers, and local citizens.** Understanding the current town limits boundary helps communities determine how a town should grow based on the proximity to existing infrastructure, natural resources, and hazards. The Town can make sure that all the properties within the town limits are being accurately taxed. In a similar project for the Town of Ennis, Ennis officials found several parcels that had been annexed into the town, but were still being taxed under Madison County's jurisdiction. For small communities like Twin Bridges, having a set of letter-sized maps to attach to reports, ordinances, and grant applications is important. In addition, poster-sized maps are useful at town meetings for planning and discussing future projects. **Hard copy maps are a good way to show citizens the benefits of GIS because most people enjoy looking at maps and can understand why it is useful to have a map showing town limits and infrastructure.**

Like many small towns across Montana, Twin Bridges does not have an efficient way to record and organize their spatial data. Existing water and wastewater data for Twin Bridges is a mix of AutoCAD data, hard copy maps, and the knowledge of the Public Works Director. There is not one source for the locations of infrastructure, which could present a public health and safety issue if there is an emergency. Twin Bridges is in danger of losing critical information as employees retire, along with local knowledge of the locations of town limit boundaries and infrastructure. **There are no easy solutions to help smaller communities realistically use GIS, but MLIA funding will help Twin Bridges move towards the daunting task of using GIS to successfully record and organize their spatial data.**

## Scope of Work Narrative

Listed below are the goals and objectives to build a GIS for the Town of Twin Bridges. The goals and objectives are in chronological order and generally, each goal and objective depends on the previous goals and objectives being completed. Any goals and objectives dependent on an earlier goal or objective are noted below. Tasks and activities are listed under each objective.

### Goal 1: Improve control point data in the Town of Twin Bridges

Past road construction has made it difficult to locate survey monuments. If present, monuments are buried one to two feet in road intersections. Local surveyors struggle to survey property boundaries. Starting the summer of 2014, Great West Engineering will search for monuments, place more durable monuments, and collect GPS coordinates of the monuments. This is an ongoing, phased project that will take place over the next several years. It is anticipated that several monuments will be found each year. Based on research done in 2013, the monument search will start in a Town road known to have monuments. The coordinates will be submitted to the Montana State Library for inclusion in the State's Public Land Survey System (PLSS) database.

#### *Objective 1A: Find monuments and collect survey data*

Great West Engineering's licensed surveyor will spend 4 days in the field in July of 2014 finding monuments. When a monument is found, it will be referenced with other markers, if needed, and GPS coordinates collected.

#### *Objective 1B: Submit survey data to the Montana State Library*

Great West Engineering's licensed surveyor will submit survey point GPS coordinates to the Montana State Library in July of 2014.

### Goal 2: Create basic GIS layers for the Town of Twin Bridges

The GIS layers for the Town will be organized in a geodatabase format. The coordinate system will be the Montana State Plane NAD83 HARN Coordinate System, as outlined in the Montana Association of Geographic Information Professional's *Best Practices and Standards: Spatial Reference*, 2009. Metadata will be generated for each layer in compliance with the Montana Portal Metadata Standards. All data layers will be published on the Montana GIS Portal. Great West Engineering and the Town will work with the Montana State Library to ensure that the data layers created for the Town aligns with the MSDI Cadastral Data. This goal is dependent on completion of survey data collection and updates to the MSDI Cadastral Data.

#### *Objective 2A: Create a town limits GIS layer and metadata*

Great West Engineering will work with Town staff to compile records for town limits, including AutoCAD data, legal descriptions, annexation records, and how properties are being taxed. This information will be used to create a town limits boundary. Based on experience with other towns, this step can take several months because there may need to be meetings between Town officials and landowners or other agencies, such as the Montana Department of Revenue. This objective is slated to begin in July of 2014 with completion estimated in September of 2014.

#### *Objective 2B: Submit town limits layer to Montana State Library*

The updated town limits layer will be submitted to the Montana State Library for inclusion in the MSDI Administrative Boundaries Data in September of 2014.

#### *Objective 2C: Create water system GIS layers and metadata*

Great West Engineering will work with Town staff to compile AutoCAD data and hard copy maps. AutoCAD layers will be converted to GIS layers in the Montana State Plane NAD83 HARN

Coordinate System using the MSDI Cadastral Data so the water system infrastructure aligns with the parcel boundaries. Hard copy maps will be scanned and georeferenced, and the water infrastructure digitized into GIS layers (mains, valves, and hydrants).

With the conversions from local coordinate systems created by surveyors to Montana State Plane HARN NAD83, there will be errors. By using multiple sources (AutoCAD layers and hard copy maps), the errors may be great enough that adjustments may be needed by heads-up digitizing using the hard copy maps and AutoCAD layers as a guide.

The maps that result from this project will not be created from field surveys. The purpose is to provide maps that show the general locations of infrastructure for planning purposes, but field surveys or other methods will be needed to find the exact locations of infrastructure. In the future, the Town may use a GPS to improve the accuracy of the data. The Town might also consider requiring future subdivision or annexation applicants to provide digital files (GIS layers in the Montana State Plane HARN NAD83 Coordinate System) of plats, including water and sewer infrastructure. This would make it easier for Town staff to update the water and sewer GIS layers. This objective will start in September of 2014 and be completed in October of 2014.

*Objective 2D: Create wastewater system GIS layers and metadata*

See Objective 2C for methodology. GIS layers for wastewater will include sewer mains, manholes, and cleanouts. This objective will start in October of 2014 and be completed in November of 2014.

*Objective 2E: Create parks and trails GIS layers and metadata*

Working with Town staff, Great West Engineering will create GIS layers for parks and trails. This objective will be met in November of 2014.

**Goal 3: Generate set of hard copy report and poster-sized maps for Town staff**

Great West Engineering will create ArcGIS project files (.mxd) for each of the following maps, as well as one set of hard copy maps and .pdf files for making additional copies. Town staff will be trained on how to update maps in the future (See Goal 4). The following objectives will be met in December of 2014.

*Objective 3A: Create letter and poster-sized maps showing town limits*

*Objective 3B: Create poster-sized maps of water and wastewater infrastructure*

*Objective 3C: Create letter and poster-sized maps showing parks and trails*

**Goal 4: Train Public Works Director on how to use GIS**

Training will consist of a manual, installation of GIS software, and on-site training.

*Objective 4A: Consultant creates custom manual for updating GIS layers and maps*

Great West Engineering will write a custom manual on how to update the GIS layers and maps. The manual will include step by step directions in non-technical terms. The manual will be drafted throughout the project, but completed in January of 2015.

*Objective 4B: GIS software installed on Twin Bridges staff computer*

Great West Engineering will work with Town staff to purchase and install ArcGIS for Desktop (Basic) Software on the Public Works Director’s computer. The only way the Town will move towards maintaining GIS layers and maps is by having software. Software installation will take place in February of 2015.

*Objective 4C: Consultant provides on-site training with Twin Bridges staff on how to use manual, update GIS layers, and maps*

Great West Engineering will provide two half-day trainings in Twin Bridges on how to use the GIS. Based on Great West Engineering’s experience, the best way to learn GIS is to have the Public Works Director actually update the GIS layers and maps while Great West Engineering provides guidance. The trainings will be completed in February of 2015.

**Deliverables**

- Survey point GPS coordinates
- Town limits GIS layer
- Water system GIS layers (mains, valves, hydrants)
- Wastewater system GIS layers (mains, manholes, cleanouts)
- Parks and trails GIS layers
- .MXD files (ArcMap project files), one set of hard copy maps, and .pdf files for the following maps:
  - Letter-sized town limits map
  - Poster-sized town limits map
  - Poster-sized water and wastewater infrastructure map
  - Letter-sized parks and trails map
  - Poster-sized parks and trails map
- GIS software
- Custom manual on how to update GIS layers and maps

**Timeline**

This timeline is a conservative estimate, but allows for the additional time to meet with agencies or the public, as needed.

Task	July 2014	Aug. 2014	Sept. 2014	Oct. 2014	Nov. 2014	Dec. 2014	Jan. 2015	Feb. 2015
Goal 1: Improve control point data in the Town of Twin Bridges								
Objective 1A: Find monuments and collect survey data	X							
Objective 1B: Submit survey data to the Montana State Library	X							
Goal 2: Create basic GIS layers for the Town of Twin Bridges								
Objective 2A: Create a town limits GIS layer	X	X	X					
Objective 2B: Submit town limits layer to Montana State Library			X					
Objective 2C: Create water system GIS layers			X	X				
Objective 2D: Create wastewater system GIS layers				X	X			
Objective 2E: Create parks and trails GIS layers					X			
Goal 3: Generate set of hard copy report and poster-sized maps for Town staff								
Objective 3A: Create letter and poster-sized maps showing town limits						X		
Objective 3B: Create poster-sized maps of water and wastewater infrastructure						X		
Objective 3C: Create letter and poster-sized maps showing parks and trails						X		
Goal 4: Twin Bridges staff is introduced to GIS								
Objective 4A: Consultant creates custom manual for updating GIS layers and maps							X	
Objective 4B: GIS software installed on Twin Bridges staff computer								X
Objective 4C: Consultant provides on-site training								X

## Project Management and Organizational Capability Narrative

### Great West Engineering (Consultant)

The Town of Twin Bridges published a Request for Proposals in April of 2012 for on-call services. Great West Engineering was selected through an evaluation process. The contract between Twin Bridges and Great West Engineering is in Exhibit A.

#### *Project Manager*

Dan McCauley, PE, will serve as the Project Manager and be responsible for the overall coordination and direction of the project. Dan will be responsible for project budget, schedule, and quality control. Dan has a long history of working with the Town of Twin Bridges, has immense knowledge of the Town's infrastructure, and understands the challenges in organizing and maintaining the Town's spatial data. Dan oversaw the project manager on the recently completed wastewater improvements project. He was involved with the Town's Wastewater Preliminary Engineering Report, Capital Improvements Plan, and the construction grant applications for the wastewater project. Dan also served as the project manager in the early 1990's improvements to the water system including the water tank, transmission main replacement and collection system improvements. Dan has over 30 years of engineering experience, is a graduate of Montana State University, and is a licensed Professional Engineer in the states of Montana, Idaho, and Wyoming.

#### *GIS Technician*

Renee Lemon will be doing the majority of the work for this project. She has 14 years of experience with GIS; land use planning; and grant writing and administration. Renee graduated from Montana State University with a degree in Earth Sciences, Geography Option. She started her career working for DTM Consulting, Inc., a GIS consulting firm in Bozeman. While working on consulting projects for the City of Bozeman, Gallatin County, and Madison County, she developed an interest in using GIS for land use planning and other local government applications. Renee worked for Ada County in Idaho scanning plats and digitizing parcel boundaries. She also spent four years working for the Ravalli County Planning Department on land use planning and providing GIS support. Recently, Renee built a GIS for the Town of Ennis, which included creating basic GIS layers, generating maps, and training the Ennis Public Works Director on how to use GIS. Renee understands the challenges in helping smaller communities realistically use GIS to record and organize spatial data. Renee will also administer this grant by providing quarterly reports and the final project report.

#### *Surveyor*

Kelly R. Schmutz, PLS, is a licensed professional land surveyor with 20 years of experience and has performed numerous surveys, including American Land Title Association (ALTA) surveys, rights of way, boundary, and construction surveys. Kelly has advanced training utilizing GPS, GIS and other related disciplines. He has worked as a project team leader in the creation and mapping of various base maps for GIS projects, subdivision design and layout, and boundary surveys. Kelly will complete all the surveying-related work for this project.

### Town of Twin Bridges (Applicant)

#### *Mayor*

Tom Hyndman will be providing input on the project and will be consulted on decision-making, as appropriate.

*Public Works Director*

Sam Novich will assist Great West Engineering in compiling existing data on town limits and infrastructure. Sam is interested in learning how to use GIS. ArcGIS for Desktop will be installed on his computer and he will be trained on how to use GIS. Sam has over 26 years of experience and is registered with the State of Montana as both a certified water and wastewater operator.

*Town Clerk*

Cathy Grose will assist Great West Engineering in compiling existing data on town limits and infrastructure. Cathy will also be involved in planning any required meetings with agencies, as needed.

## Budget Justification Narrative and Tables

The total cost of this project is estimated at \$25,829.00. This application is requesting \$20,850.00 from MLIA grant funding. The Town of Twin Bridges will pay \$4,979.00, which includes personnel and fringe benefits plus \$2,000.00 of the cost to collect limited survey data. This amount is included in the Town's annual budget. The Town is committed to budgeting \$2,000.00 every year to continue to collect additional survey data to improve the cadastral layer and make it easier to find property boundaries.

Madison County has been contacted to determine if there is available funding from the County Land Information Account for this project. A meeting will be scheduled with the Madison County Commissioners. If there is MLIA funding available from Madison County, it will be used to expand the scope of survey data collection. Following is a description of each budget item:

### Personnel

The Town Bridges Public Works Director and Town Clerk will be involved in the following tasks:

- Finding survey monuments
- Researching town limits records
- Compiling hard copy maps, digital files, and local knowledge on the locations of water and wastewater systems
- Compiling existing information on parks and trails
- GIS training

Estimated hours for the Public Works Director are 80 hours. Personnel costs for the Public Works Director are estimated at \$1,615.20 and fringe benefits are estimated at \$645.60.

Estimated hours for the Town Clerk are 40 hours. Personnel costs for the Town Clerk are estimated at \$504.80 and fringe benefits are estimated at \$213.60.

### Travel

No travel is anticipated for Town staff. Great West Engineering's travel time is included under the contractual section.

### Equipment

ArcGIS for Desktop (Basic) software will be installed on the Public Works Director's computer. The Town would like the ability to create poster-sized maps and this functionality is not currently available in ArcGIS Online. For a small town where there will only be one user, ArcGIS for Desktop has the less expensive one-time cost of \$1,500 versus the \$2,500 per year subscription cost of ArcGIS Online. The Town will include the \$400 per year maintenance cost in their future budgets to keep the software up to date.

### Supplies

No major supplies will be needed.

### Contractual

The Town of Twin Bridges currently has an on-call contract with Great West Engineering to provide surveying and GIS services (See Exhibit A). Great West Engineering was selected through a procurement process that included a published Request for Proposals and evaluation process.



Great West Engineering's surveyor will spend 4 days in the field searching for monuments and collecting survey data. Another ½ day will be spent in the office preparing and submitting the data to the Town and Montana State Library. The total surveying cost is estimated at \$4,500.00. The Town has \$2,000 committed for 2 days of surveying. An additional \$2,500.00 from the MLIA grant will allow for an additional 2 days of surveying plus time to prepare and submit the data to the Town and Montana State Library.

Great West Engineering's GIS Technician will spend 150 hours working with Town staff to compile existing data, create GIS layers, create .mxd files, generate hard copy maps, draft a training manual, and provide on-site training to Town staff. This estimate is based on a similar project Great West Engineering's GIS Technician completed for the Town of Ennis in 2012. Total cost, including labor and travel costs from Helena to Twin Bridges for training, is estimated at \$15,850.00.

Great West Engineering's Project Manager will provide 10 hours of review and oversight of the project at an estimated cost of \$1,000.00.

#### Other

No other costs are anticipated.

Category	MLIA Share	Applicant Share	Other Share	Total
a. Personnel		\$2,120.00		
a.1 Fringe		\$859.00		
b. Travel				
c. Equipment	\$1,500.00			
d. Supplies				
e. Contractual	\$19,350.00	\$2,000.00		
f. Other				
Totals	\$20,850.00	\$4,979.00		

This project is the first step towards building a GIS for the Town of Twin Bridges. In the future, the Town would like to have the ability to find infrastructure and property boundaries using GPS. They would also like to have an automated system for tracking infrastructure maintenance and improvements using software, such as PubWorks. Given the limited resources of Twin Bridges, this will be a long term project requiring a step by step approach. This first step is to get all of the spatial data organized into the GIS and have staff start to use the GIS software. Future steps will depend on the success of this first step.

**Statements of Support**

See Exhibit B for letter from Stewart Kirkpatrick, State GIS Coordinator, Montana State Library

**Renewable Grant Accountability Narrative**

NOT APPLICABLE

**Application Signature**

**Authorizing Statement**

I hereby certify that 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.

**Tom Hyndman**

Name (print or type)

**Mayor**

Title (print or type)

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

Date