

Town of Twin Bridges, MT

Levee Accreditation Feasibility Study

January 2022

Brent Pilon, PE

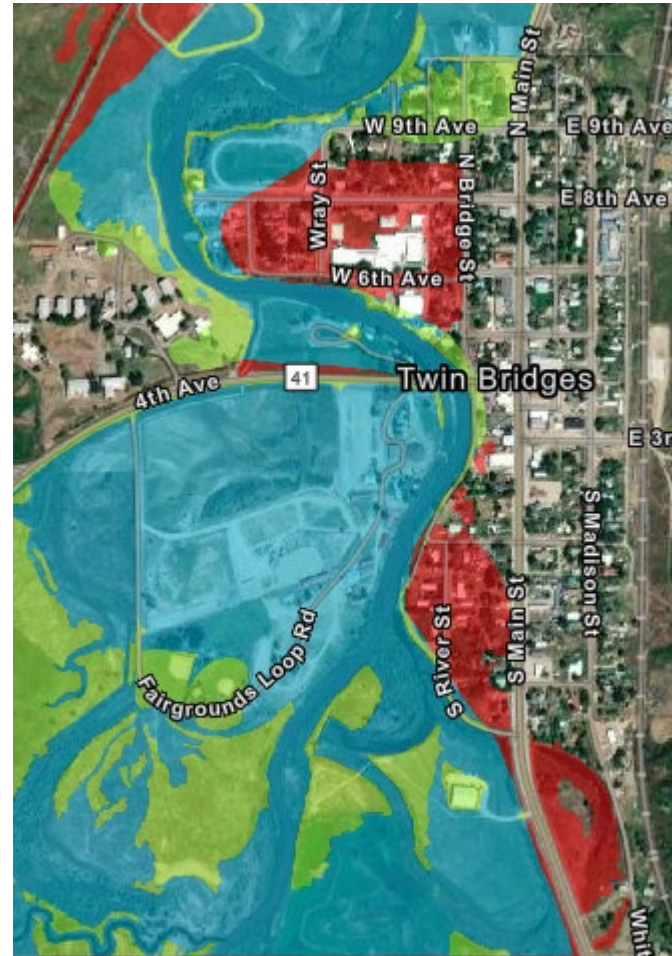
Jeremiah Theys, PE



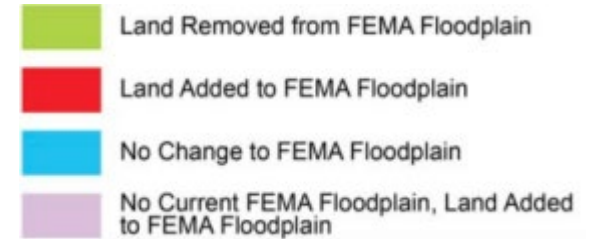
Introduction and Background

» Madison-Ruby-Jefferson River Watershed Flood Map Update

- » Existing floodplain maps are from the 1980's
- » Madison County, FEMA, and DNRC partnered to update floodplain maps
- » New floodplain maps are expected to be finalized and effective in 2022
- » New floodplain maps have approximately 61 properties and over 90 structures within the 100-year floodplain
- » Town of Twin Bridges and Madison County contracted with Great West Engineering to prepare a levee accreditation feasibility study



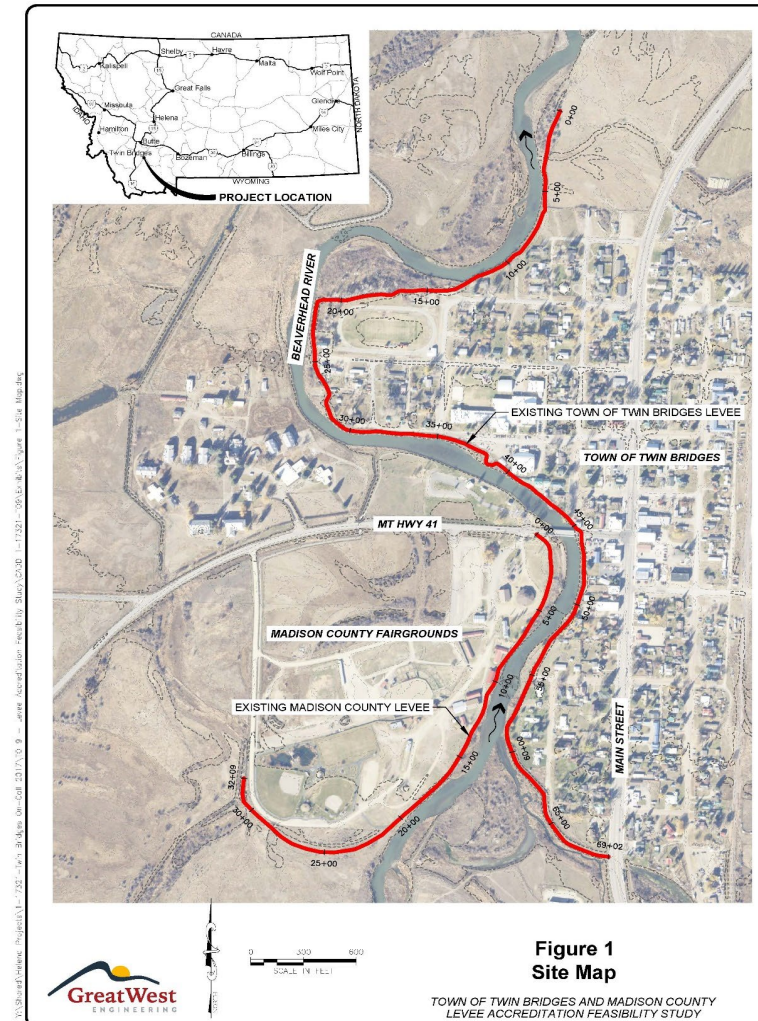
▲ Draft Floodplain Map



Existing Levee History

» Levee Section South of Highway 41 Bridge

- » **February 1956** - \$450 were allocated to build a river dike. Project deemed necessary due to flooding risks to residents.
- » **December 1956** – Flooding on the Beaverhead occurs due to ice jams.
- » **February 1957** – Dike and levee maintenance deemed necessary. An additional five mill levy is passed.
- » **March 1957** – Construction of a river dike on the east side of the Beaverhead River is agreed upon with the Montana Highway Commission. Unclear if easements were ever procured.

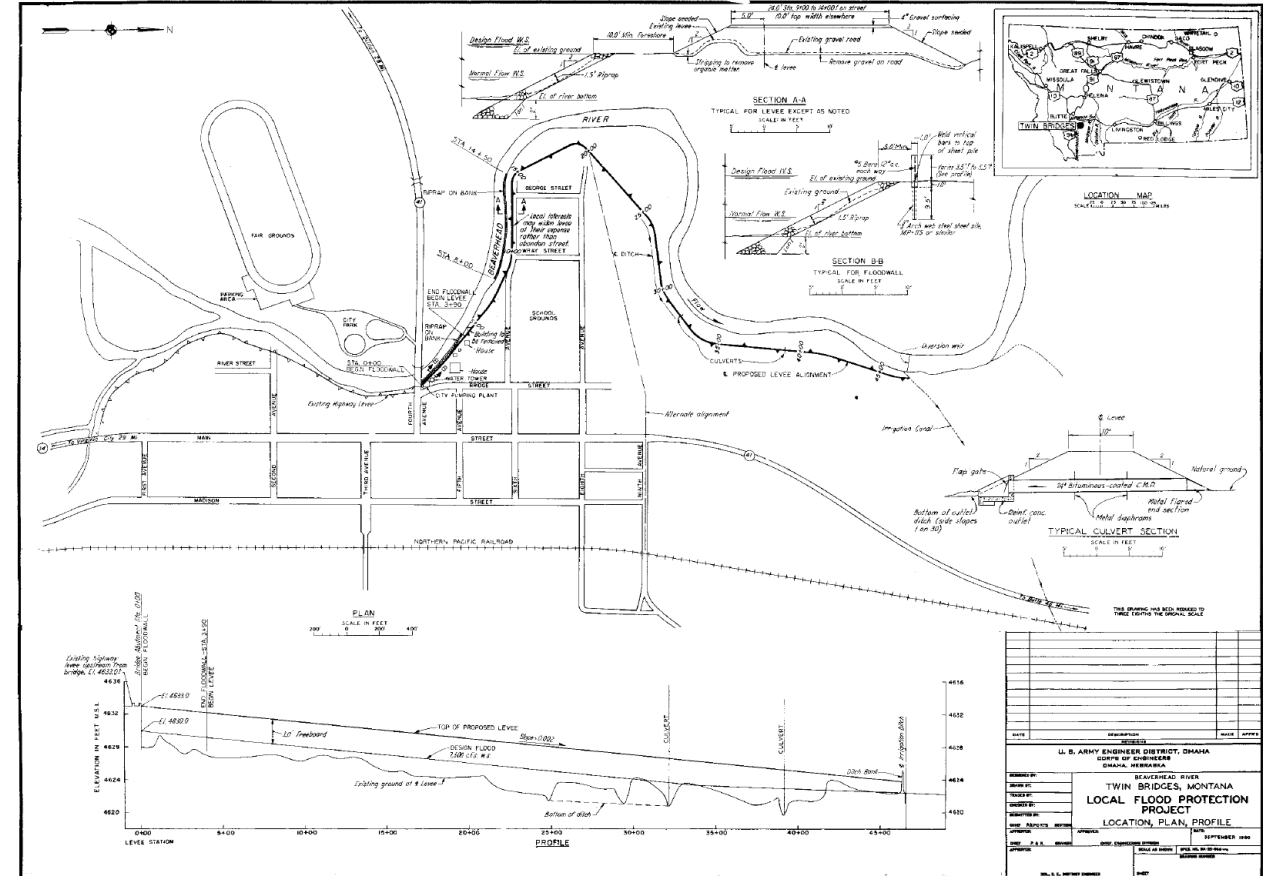


 Site Map

Existing Levee History

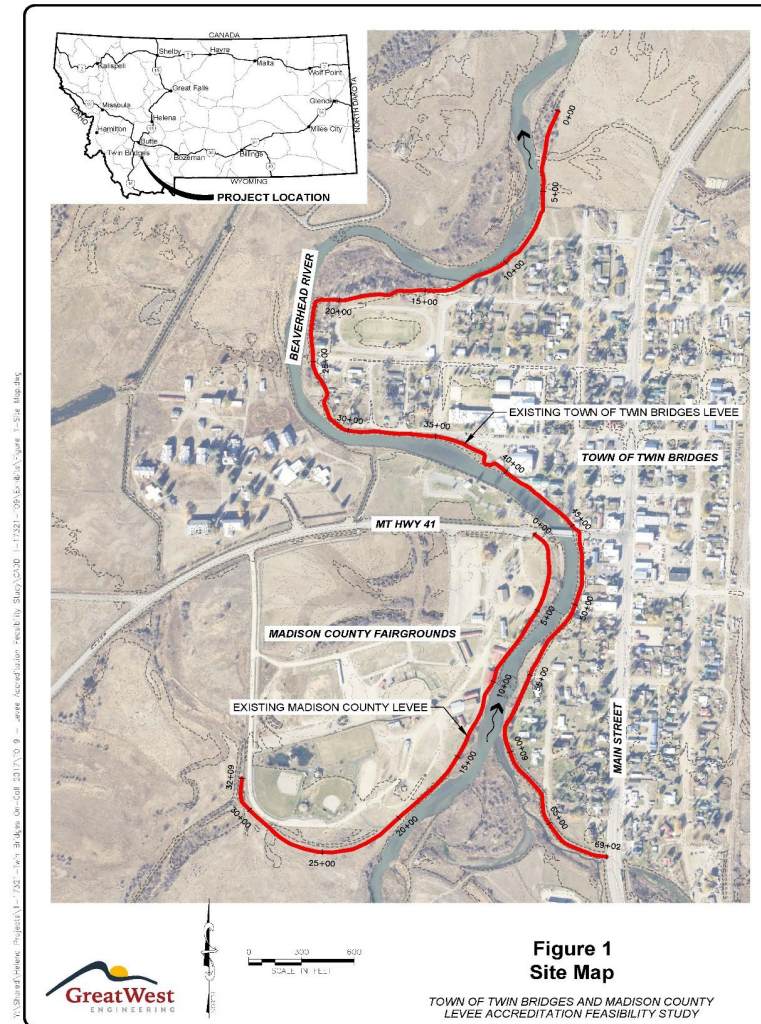
» Levee Section North of Highway 41 Bridge

- » **May 1957** – Town Council meets with USACE Engineer who proposes new river dike. USACE requires right-of-way for the levee with an attorney of legality of right-of-way, maintain the levee, provide evidence of financial responsibility, and hold USACE free from responsibility
- » **June 1961** – USACE District Engineer indicates a new river dike appears feasible and economically justified
- » **July 1961** – Town Council meets to discuss easements and right-of-way for the proposed levee. Property owners voted unanimously against granting easements or right-of-way. Town Council concurs.
- » Unknown when the levee was built but assumed to be built by the Town.



Existing Levee

- » Levee approximately 6,900 feet long
- » Levee is not accredited by FEMA and thus not recognized as providing flood protection
- » Reconstructing existing levee to FEMA criteria would reduce mandatory flood insurance requirement
- » Embankment needs to be raised an average of approximately 0.84' to meet FEMA Criteria



▲ Site Map

FEMA Accreditation Criteria



Design Criteria

- » **Freeboard** – The height difference between the top of the levee and the 1% annual-chance water surface elevation must be a minimum of 3 feet
- » **Closures** – A closure must be considered for any opening within the levee system elevated at or below the minimum freeboard elevation
- » **Embankment Protection** – Must demonstrate no appreciable erosion of the levee embankment during a 1% annual-chance flood
- » **Embankment and Foundation Stability** – Evaluate expected seepage during 1% annual-chance flood. Must prove seepage will not jeopardize levee stability
- » **Settlement** – Demonstrate that three feet of freeboard will be maintained after levee settlement
- » **Interior Drainage** – Identify source(s) of internal flooding, inundation area, and water-surface elevation(s) of the 1% annual-chance flood and structures to drain interior

FEMA Accreditation Criteria Continued



Operation Plan

- » **Flood Warning System** – Documentation of the flood warning system and proof that there is sufficient flood warning time is required
- » **Plan of Operation** – A formal plan of operation is required for closures and interior drainage systems
- » **Periodic Operations of Closures** – Terms for periodic operation of the closure structure(s) for testing and training is required within the Operation Plan

Emergency Preparedness Plan

- » FEMA requires a current emergency preparedness plan.

Maintenance Plan

- » Levee systems must be maintained in accordance with an officially adopted maintenance plan

\\Shared\Indiana Projects\1-17321-Twin Bridges On-Coll 2017\TOD 9 - Levee Accreditation Feasibility Study\000 1-17321-T09 Exhibits\Figure 15-Typical Levee Cross Sections.dwg

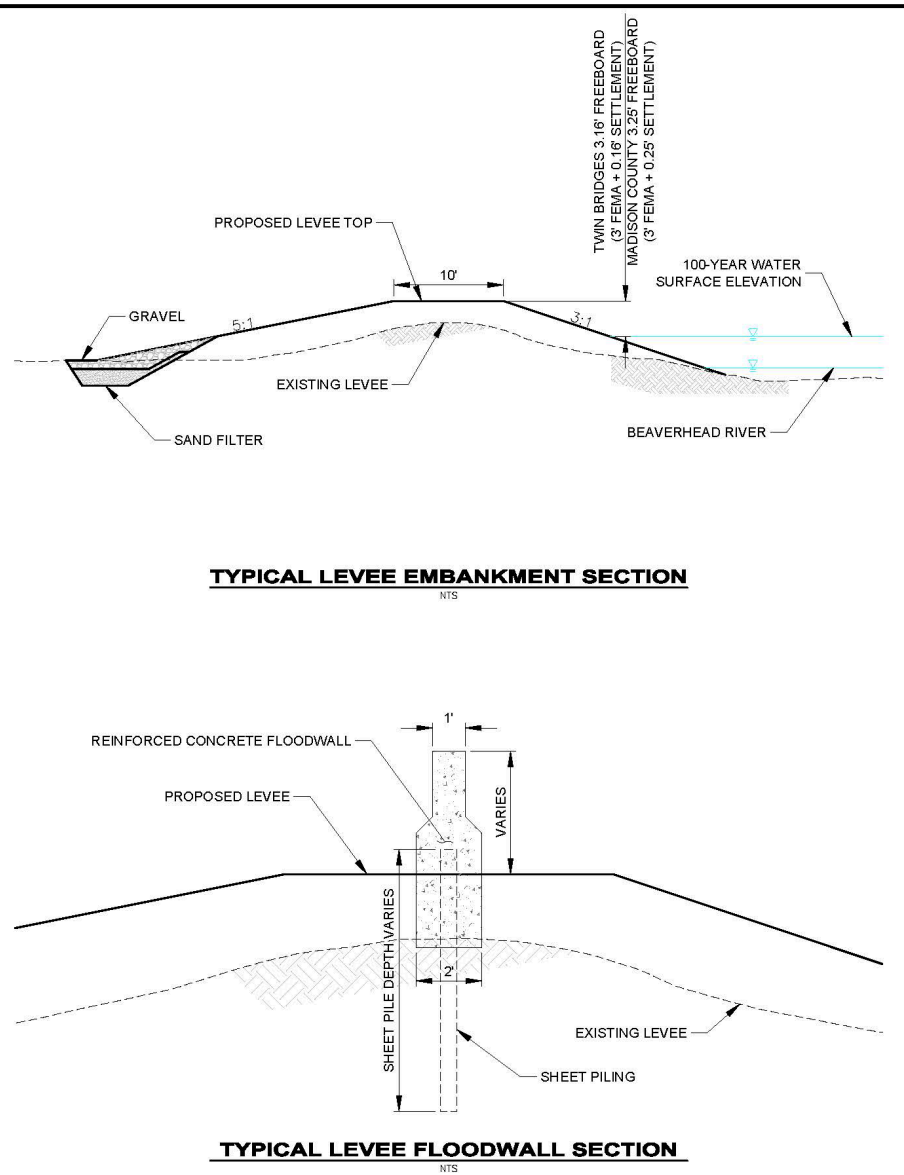
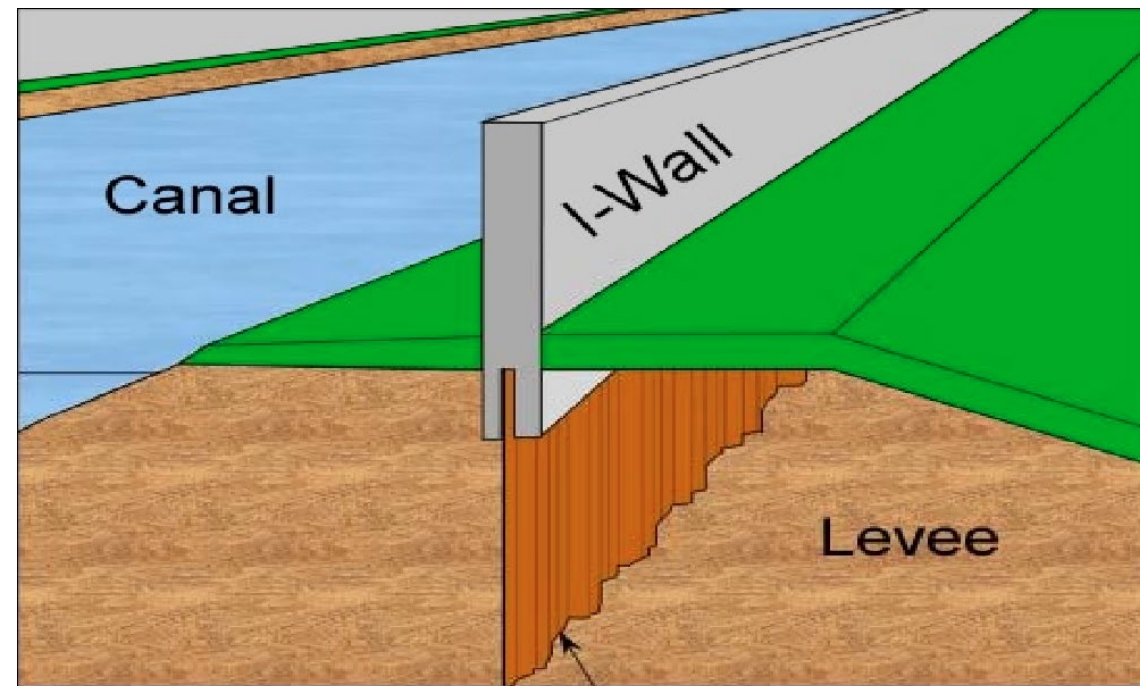


Figure 15
Typical Levee Cross Sections

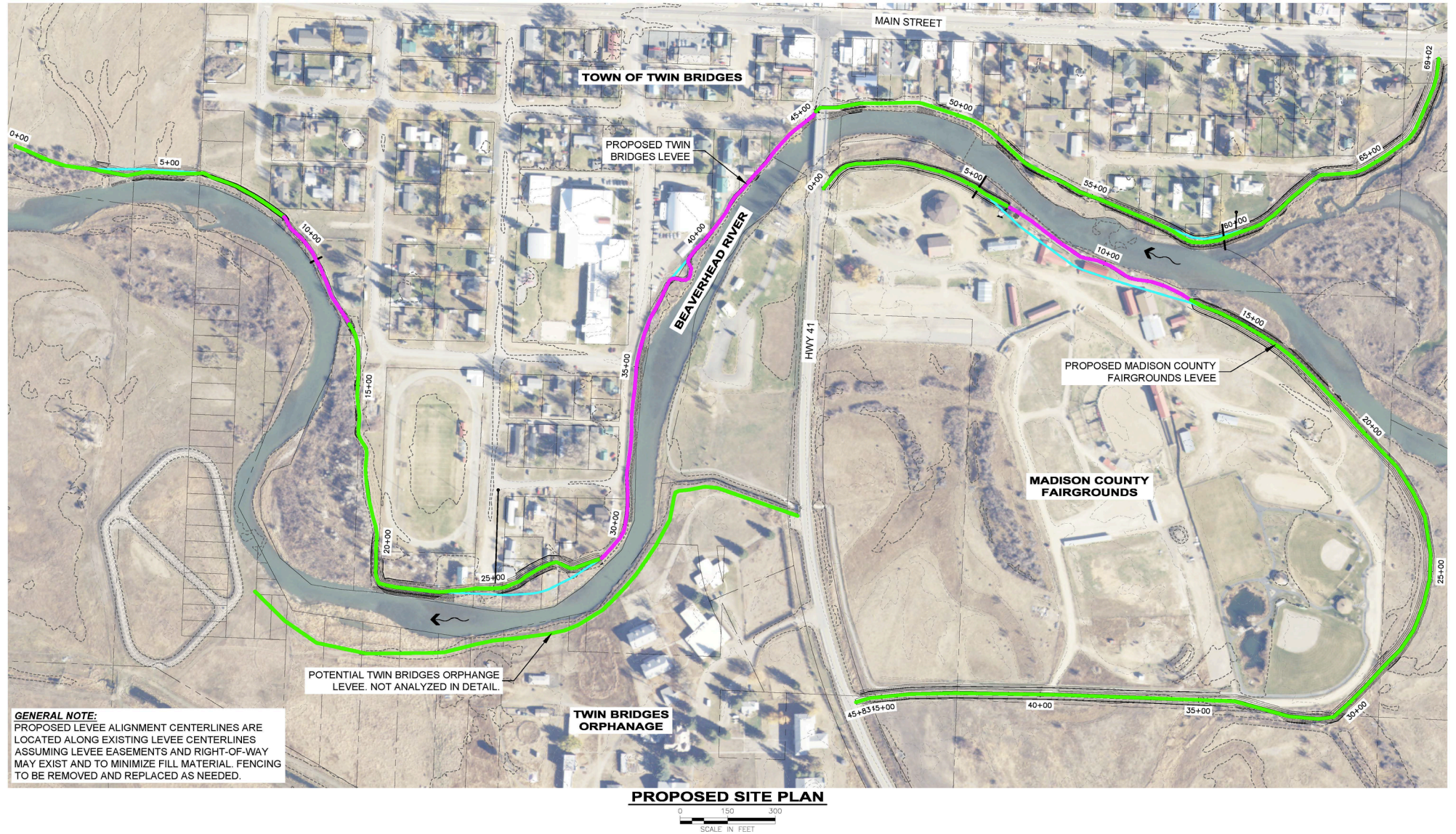
TOWN OF TWIN BRIDGES AND MADISON COUNTY
LEVEE ACCREDITATION FEASIBILITY STUDY



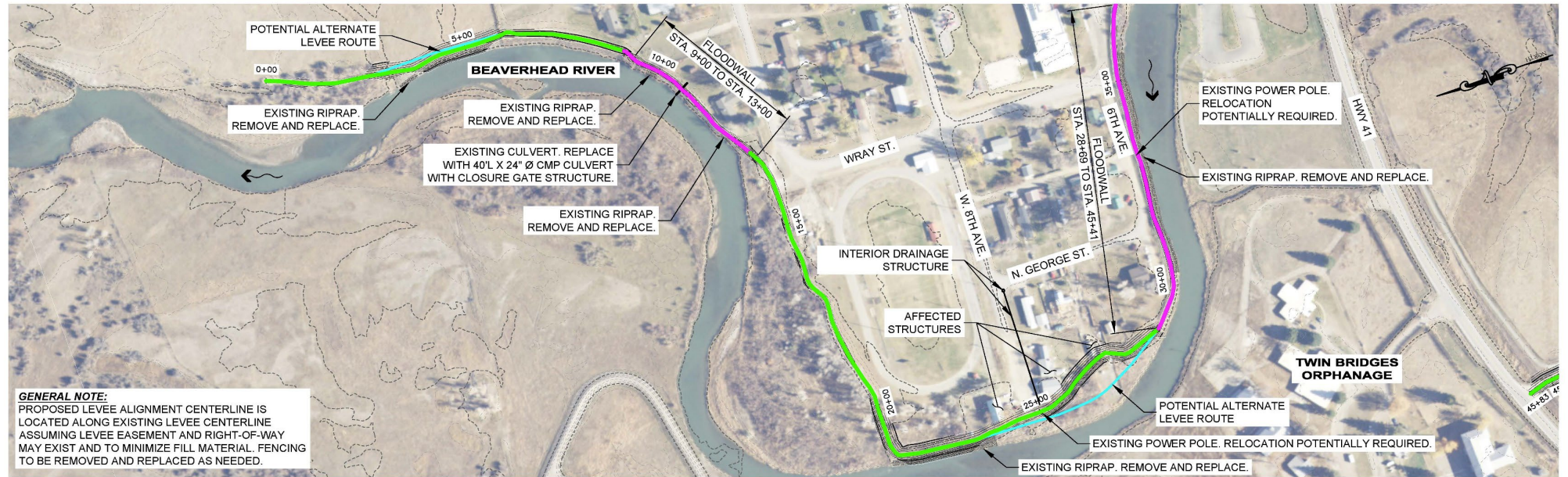
Sheet Piling



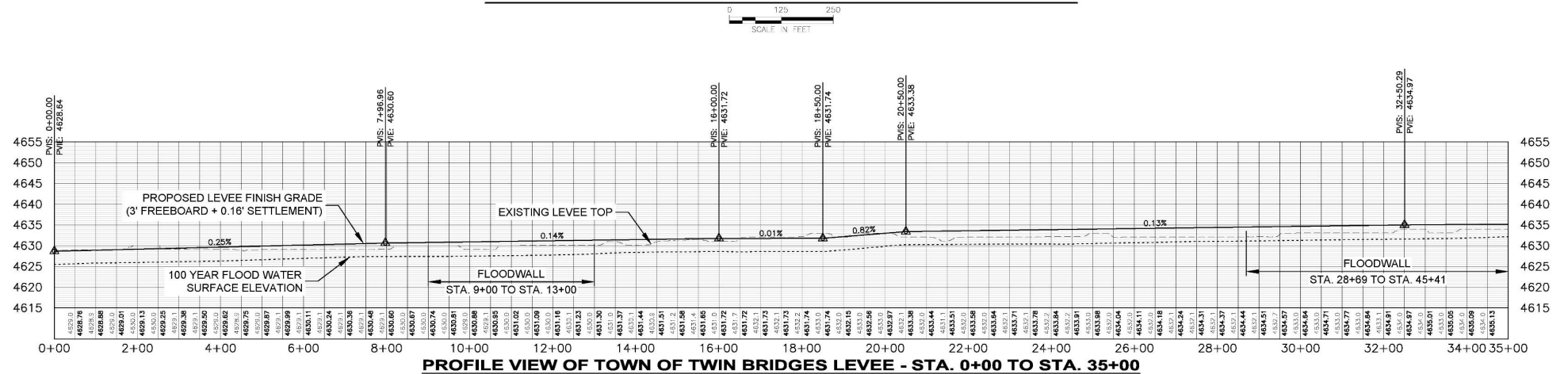
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PLAN VIEW OF TWIN BRIDGES LEVEE - STA. 0+00 TO STA. 35+00



LEGEND:

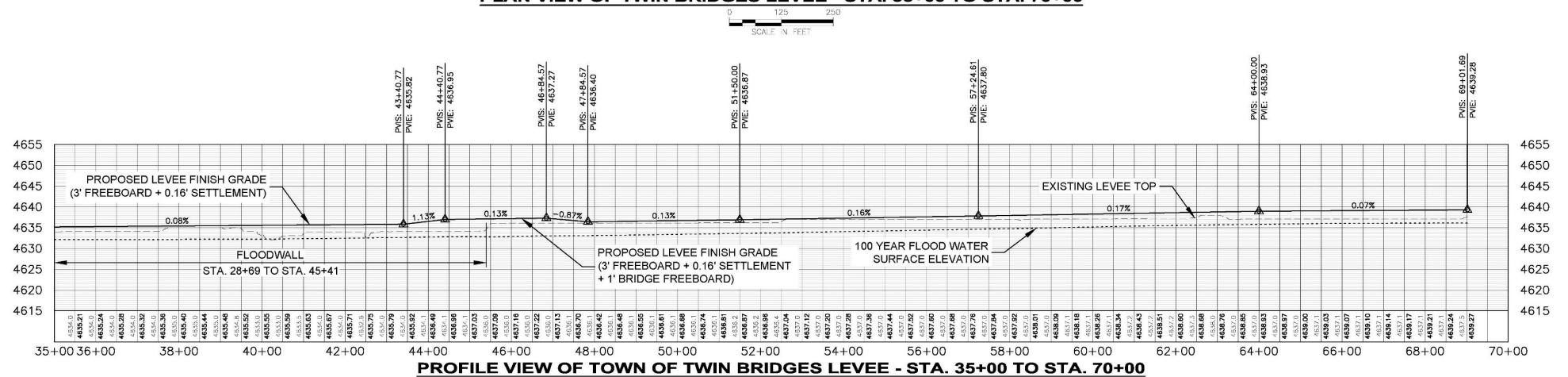
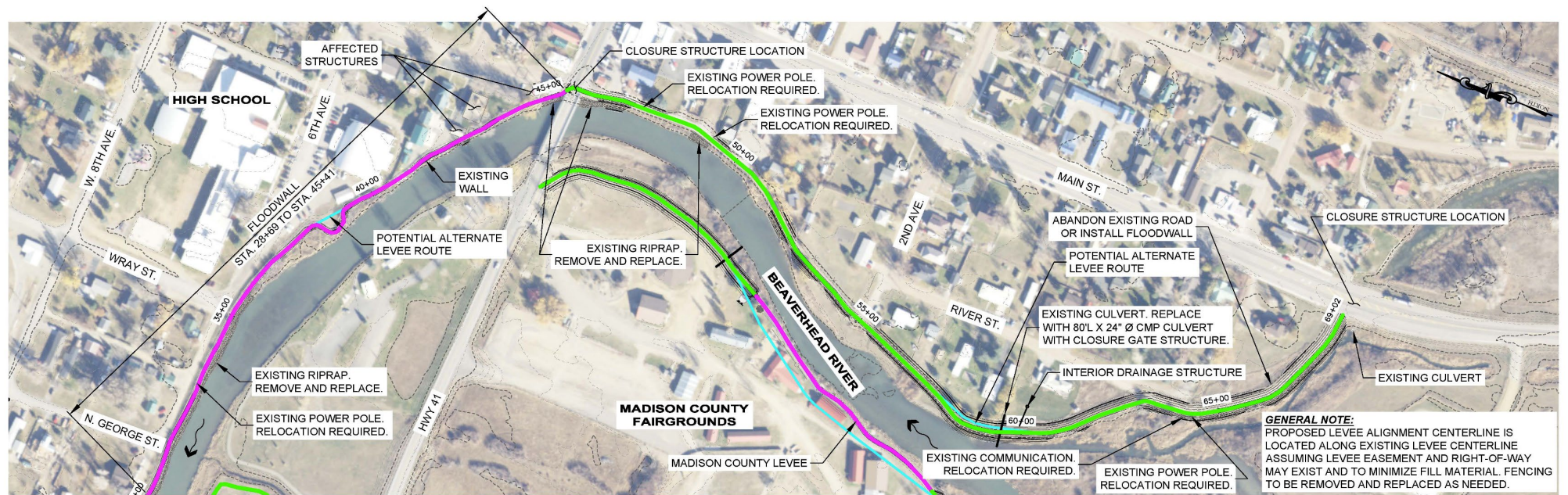
- EARTHEN EMBANKMENT
- CONCRETE/STEEL FLOODWALL
- ALTERNATIVE ROUTE



Figure 11
Proposed Twin Bridges Levee
Sta. 0+00 to Sta. 35+00

TOWN OF TWIN BRIDGES AND MADISON COUNTY
LEVEE ACCREDITATION FEASIBILITY STUDY

Y:\Shared\Inhouse Projects\11-17391-Twin Bridges On-Cali 2017\10 9 - Levee Accreditation Feasibility Study\000 1-17391-109 Exhibit\Figure 12-Twin Bridges Proposed Levee 2.dwg



LEGEND:

- EARTHEN EMBANKMENT
- CONCRETE/STEEL FLOODWALL
- ALTERNATIVE ROUTE



Figure 12
Proposed Twin Bridges Levee
Sta. 35+00 to Sta. 70+00

TOWN OF TWIN BRIDGES AND MADISON COUNTY
LEVEE ACCREDITATION FEASIBILITY STUDY

Estimated Project Costs

Project Costs	
Item	Cost
Construction Subtotal	\$3,399,800
Right-Of-Way/Easement Acquisition	\$45,000
Geotechnical Engineering	\$45,000
Legal Survey and Monumentation	\$60,000
Operation, Emergency Preparedness, and Maintenance Plan	\$20,000
Engineering Service (Design, Bidding, CM)	\$680,000
Resident Project Representative	\$120,000
Floodplain CLOMR and LOMR	\$100,000
Grant Administration	\$34,000
Legal and Administrative	\$34,000
Total Project Cost	\$4,536,272

Benefit-Cost Analysis

Benefit-Cost Analysis	
Flood Insurance Policies	61
Average Annual Policy Premium	\$1,500
Total Annual Premium Cost to Town	\$91,500
Expected Annual Flood Insurance Rate Increase	6.4%
Expected Annual Inflation Rate	3.0%
Period of Analysis	30 Years
Total Project Cost	\$4,536,272
Present Value Cost of “Doing Nothing”	\$4,438,573



Funding

- » Grant Funding could range from 20% to 90% of total project cost
- » FEMA – Building Resilient Infrastructure and Communities (BRIC) Grant
- » FEMA – Flood Mitigation Assistance (FMA) Grant
- » Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program Grant
- » Montana State Revolving Fund (SRF) Loan
- » Special Improvements/Maintenance District to service loan and operation costs



Questions?

**Water/Wastewater ▪ Transportation ▪ Grant Services ▪ Solid Waste ▪
Structural ▪ Bridges ▪ Natural Resources ▪ Planning**

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