

DNRC Floodplain Engineering 101 Workshop

Lessons Learned from the Legal Side of
Permitting

Jeremiah Theys | Great West Engineering



Case Studies

- ▶ Ravalli County
 - ▶ Bell Crossing Bridge over the Bitterroot River
- ▶ Flathead County
 - ▶ Church Slough fishing access and boat ramp



Ravalli County – Bell Crossing Bridge

- ▶ Loss of bank issues potentially due to MDT scour mitigation project
 - ▶ Significant channel migration over the life of the bridge
 - ▶ Up to 1800 ft of channel shift in areas
 - ▶ Significant braiding
 - ▶ High sedimentation
 - ▶ 1996 & 1997 floods significantly altered channel
 - ▶ Bridge developed significant scour at intermediate piers
 - ▶ River migration changed attack angle
 - ▶ Erosion along abutment and river bank

1995



2003



2005



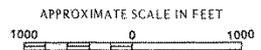
2011







ZONE



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

RAVALLI COUNTY,
MONTANA AND
INCORPORATED AREAS

PANEL 120 OF 850
(SEE MAP INDEX FOR OTHER PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RAVALLI COUNTY (UNINCORPORATED AREAS)	30001	0120	C

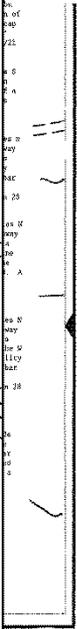
MAP NUMBER
30881C0120 C

EFFECTIVE DATE:
SEPTEMBER 7, 1998



Federal Emergency Management Agency

ZONE X

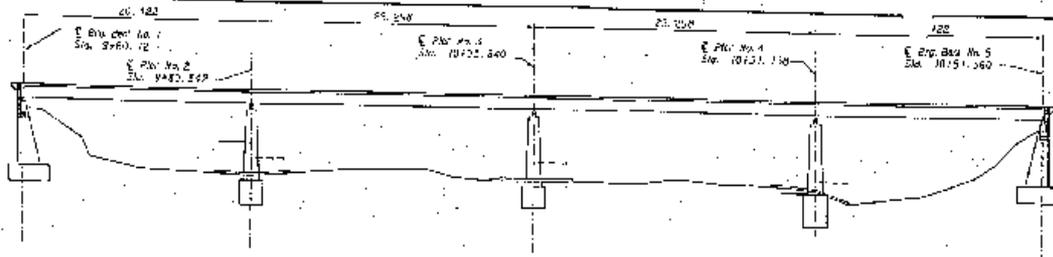


This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Ravalli County – Bell Crossing Bridge

- ▶ MDT completed scour mitigation project on bridge
 - ▶ Detailed design
 - ▶ Cable-tied blocks around piers
 - ▶ Riprap trench along roadway
 - ▶ Constructed in 2004





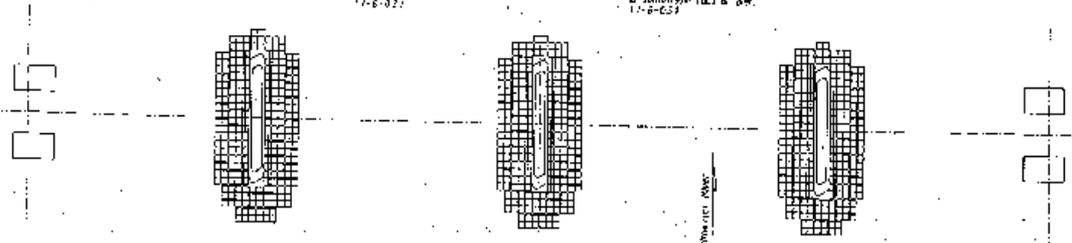
PROFILE ELEVATION

Scale = 1/200

NOTE: The maximum chord slope shown represents the grade shown on Stationing 11+00. The current grade may vary.

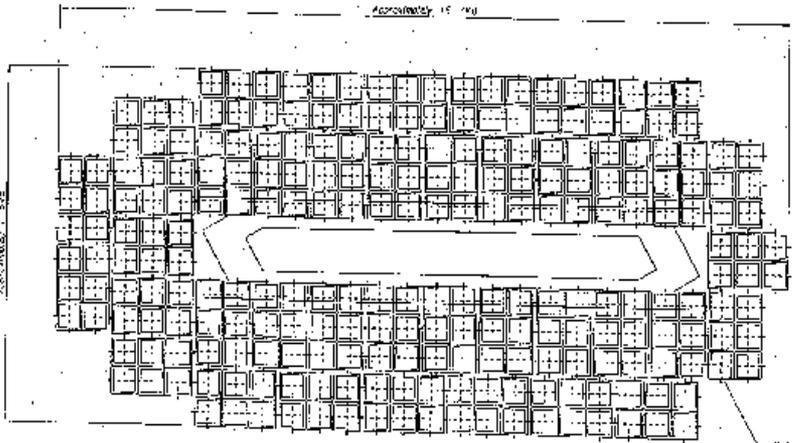
Approximate chord slope of maximum fall of pier 11+0-022

Approximate chord slope of maximum fall of pier 11+0-033



PLAN VIEW

Scale = 1/200



MAT LAYOUT FOR PIER NO. 2, NO. 3 AND NO. 4

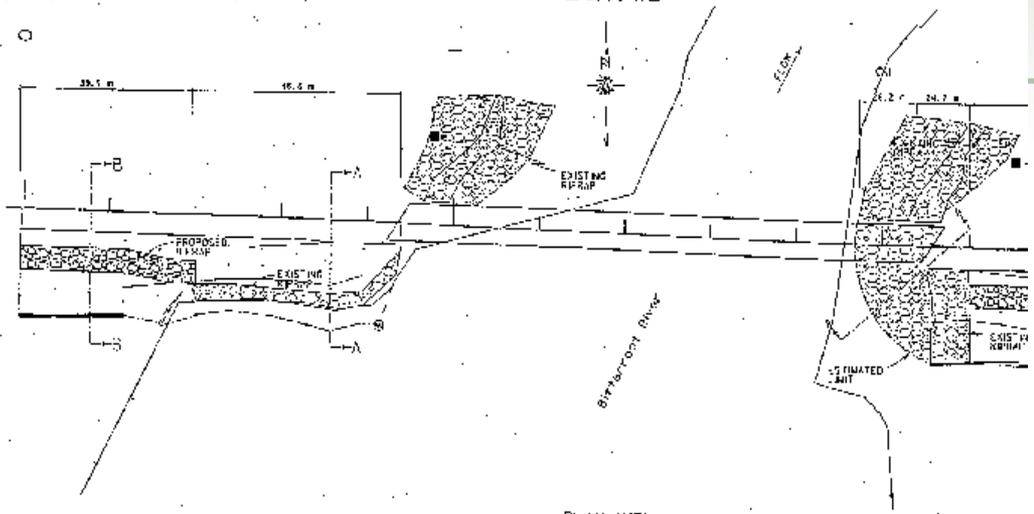
Scale = 1/80

NOTE: See Eng. No. 10543 for details concerning steel layout and steel detail.

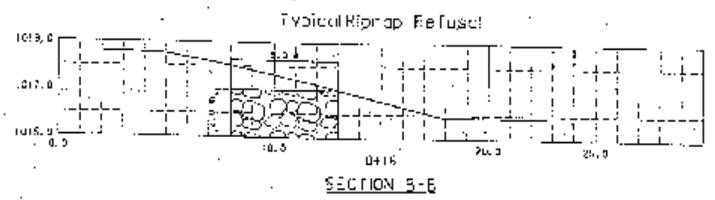
11-20-10-00000-1-000
 6/1/2013
 08:35:50 AM 30/225

SECTION
 NAME
 DATE
 DRAWN
 CHECKED
 IN CHARGE

DETAIL

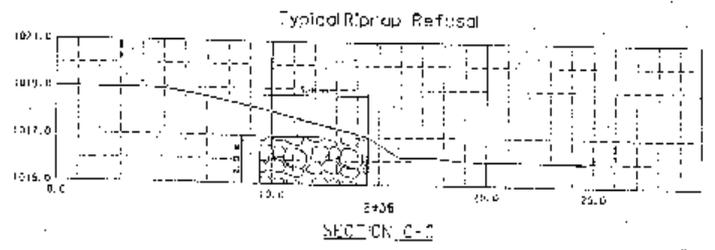


PLAN VIEW



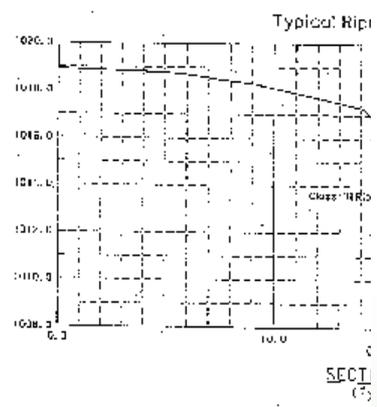
Typical Riprap Refusal

SECTION B-B



Typical Riprap Refusal

SECTION C-C



Typical Riprap

SECTION D-D

QUANTITIES	
	CLASS (SMPRIP, I.P.)
REFUSAL	225
RIPRAP REPAIR	122

* THE RIPRAP REPAIR OR MISSING RIPRAP QUANTITIES ARE DA

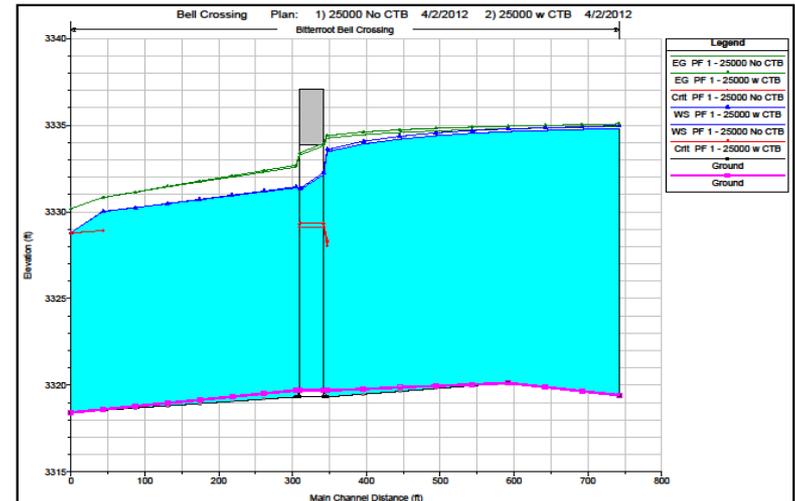
MINIPLAN OPERATIONS
OF INDEPENDENCE

DESIGNED BY: J. J. LINDSEY
CHECKED BY: J. J. LINDSEY
DATE: 10/15/55
PROJECT NO.: 10-155

4381 N. W. 4378th Ave. Ocala, Fla.

Ravalli County – Bell Crossing Bridge

- ▶ MDT completed a full HEC-RAS model
 - ▶ (3) 100-year flow rates calculated and modeled
 - ▶ 23100, 23300, 25000 cfs
 - ▶ Comparison of existing conditions (scour) and proposed improvements
- ▶ Permits applied for and received
 - ▶ 124 permit
 - ▶ 318 authorization
 - ▶ Nationwide 14
 - ▶ Floodplain permit
 - ▶ No significant finding
 - ▶ Project met County floodplain regulations



Ravalli County – Bell Crossing Bridge

- ▶ County floodplain regulations require no impact to

BFE

Bell Crossing Road HEC-RAS Model
Comparison of Proposed & Existing Conditions Mod
23100 cfs

River Sta	W.S. Elev (ft)	E.G. Elev (ft)	Vel Chnl (ft/s)	Top Width (ft)
200	0.14	0.13	-0.08	6.42
183.333	0.14	0.14	-0.09	2.78
166.666	0.15	0.14	-0.09	1.86
150	0.15	0.15	-0.08	1.56
140	0.16	0.15	-0.07	1.59
130	0.15	0.15	-0.05	1.61
120	0.15	0.15	-0.03	1.56
110	0.15	0.15	0.02	1.45
100	0.13	0.14	0.09	0.5
95	0	0	0	0
90	0.06	0.11	0.19	0.24
80	0.04	0.08	0.17	1.52
70	0.03	0.06	0.15	2.01
60	0.02	0.04	0.13	0.39
50	0	0.03	0.11	0.11
40	-0.01	0.01	0.08	-0.06
30	-0.01	0	0.06	-0.15
20	0	0	0	0

Bell Crossing Road HEC-RAS Model
Comparison of Proposed & Existing Conditions Mod
25000 cfs

River Sta	W.S. Elev (ft)	E.G. Elev (ft)	Vel Chnl (ft/s)	Top Width (ft)
200	0.14	0.15	-0.08	6.71
183.333	0.15	0.14	-0.08	2.82
166.666	0.15	0.15	-0.08	2.18
150	0.16	0.15	-0.08	1.61
140	0.16	0.16	-0.07	1.65
130	0.17	0.16	-0.05	1.66
120	0.16	0.16	-0.04	1.63
110	0.16	0.15	0.01	1.54
100	0.13	0.15	0.09	0.54
95	0	0	0	0
90	0.06	0.12	0.2	0.26
80	0.05	0.09	0.17	1.45
70	0.03	0.07	0.15	1.93
60	0.01	0.05	0.13	0.39
50	0	0.03	0.11	0.1
40	0	0.01	0.08	-0.07
30	-0.01	0	0.06	-0.16
20	0	0	0	0

Ravalli County – Bell Crossing Bridge

- ▶ Landowner filed lawsuit
 - ▶ Claimed scour project caused increased migration of channel resulting in loss of bank along subject property
 - ▶ Named MDT and County as liable parties
 - ▶ Hundreds of thousands in loss of land value
 - ▶ Concern with flooding of property and potential loss of buildings
- ▶ Outcome – Currently in settlement conference
 - ▶ MDT and County have some liability
- ▶ Lesson learned– REVIEW AND QUESTION ALL DATA

Flathead County – Church Slough

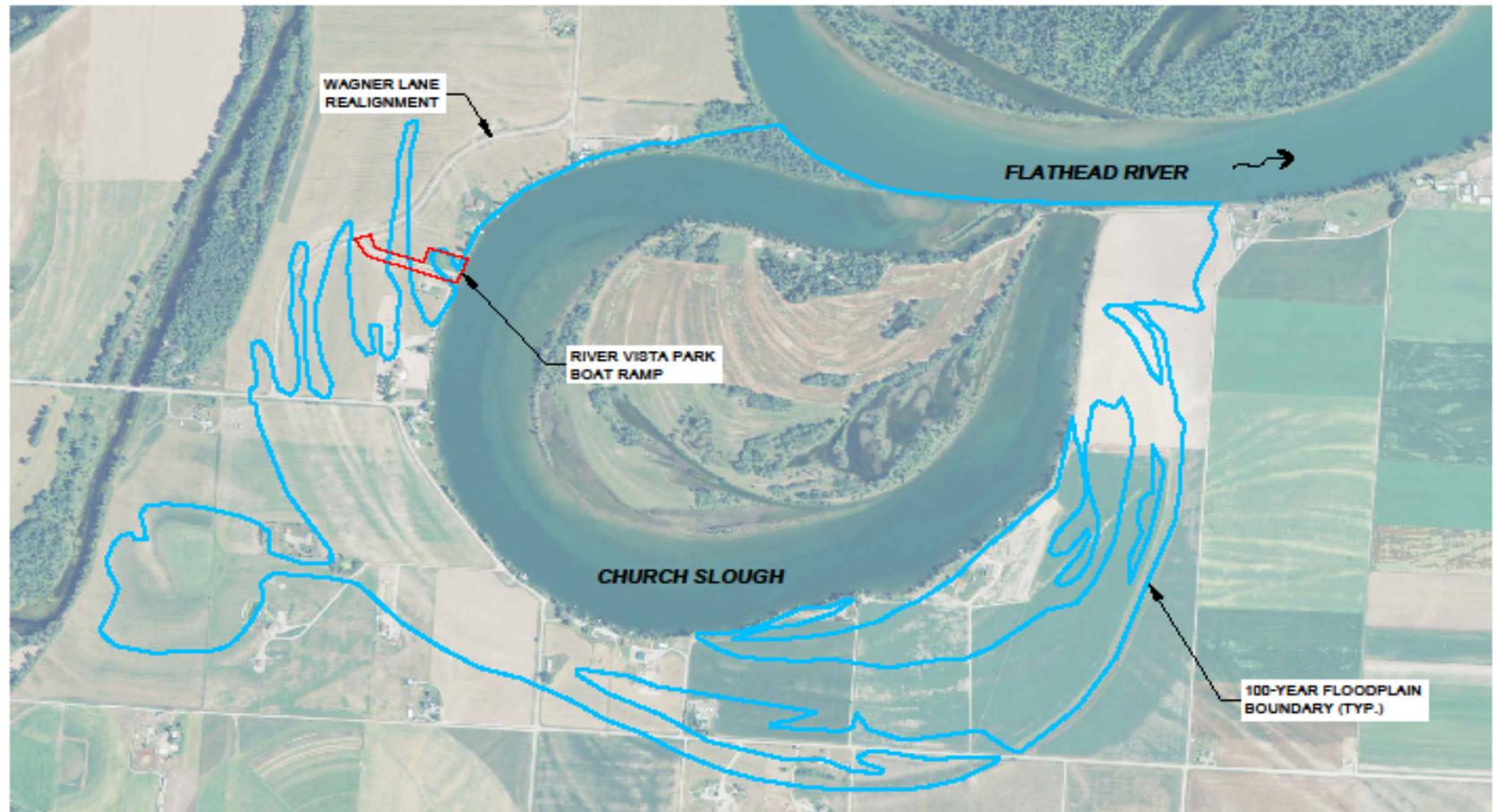
- ▶ County constructed fishing access and concrete boat ramp accessing Church Slough (River Vista Park Boat Ramp)
 - ▶ Project completed as part of a land swap with adjacent property owner
 - ▶ Landowner wanted to develop property
 - ▶ Wanted to move County road
 - ▶ Allow parcels developed adjacent to slough
 - ▶ Provide a dedicated fishing access and boat ramp
 - ▶ Backwater slough from the main channel of the Flathead River
 - ▶ Detailed floodplain in project area
 - ▶ County obtained all necessary permits
 - ▶ 124, 404 and Floodplain
 - ▶ 318 authorization and Navigable Water not required

2006

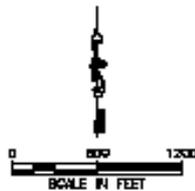


2011





AREA OF CHURCH SLOUGH 100-YEAR
FLOODPLAIN = 28,143,157 SQ. FT.



MAP DATA SOURCES:
AERIAL PHOTO BOUNDARY FROM 2008 COLOR AERIAL
PHOTOS OBTAINED FROM MONTANA NATIONAL
RESOURCE INFORMATION SYSTEM (DNIR).

EXHIBIT B AERIAL PHOTO SITE PLAN

RIVER VISTA PARK BOAT RAMP
FLATHEAD COUNTY, MONTANA

Flathead County – Church Slough

- ▶ Landowner files lawsuit claiming new boat ramp and increased traffic has devalued property
 - ▶ Names Montana Fish, Wildlife and Parks, and Flathead County as defendants
 - ▶ 124 permit
 - ▶ Floodplain permit
 - ▶ Lawsuit claims deficiencies in EA process
 - ▶ Not enough time for public comment (14 days – 15 days required)
 - ▶ Impacts from recreational traffic – vehicles and boats
 - ▶ Impact to floodplain elevation caused by construction of boat ramp

Flathead County – Church Slough

- ▶ Expert Report completed on project
 - ▶ Findings
 - ▶ Floodplain permit was deficient due to lack of supporting data
 - ▶ Unauthorized fill placed in floodplain (44 CY)
 - ▶ Flood flows entering floodplain quicker
 - ▶ Stability of channel banks and impacts from additional boat traffic
 - ▶ Deficient permit process





08/24/2011 08:29



08/24/2011 08:30



08/24/2011 08:32



08/24/2011 08:32

Flathead County – Church Slough

▶ Impacts to the Floodplain

- ▶ Church Slough is hydraulically linked to the Flathead River
- ▶ Impacts to floodplain in Church Slough effect the entire system
- ▶ River banks are stable and well protected with riparian vegetation – no noticeable erosion
- ▶ No permanent features placed in the floodplain
- ▶ Project (Boat ramp construction and fill placement for roadway) impacted the BFE 0.000507 inches
- ▶ Break in bank doesn't affect limits of floodplain

▶ Outcome – Currently going to trial

▶ Lesson learned– PROPER SUPPORTING DATA FOR ALL DECISIONS

Lessons Learned from the Legal Side of Permitting

Questions???

