Agenda Item: 8.

Memo to the Programs, Projects and Operations Subcommittee

Subject: 240th Street (Sarpy County) Elkhorn River

Date: August 2, 2012

From: Gerry Bowen

The June 2010 Elkhorn River flood resulted in streambank erosion that threatened 240th Street in Sarpy County. In response to this, the District, in cooperation with Sarpy County, hired Tetra Tech to devise a long term solution to the erosion problem. This firm was hired due its past performance on stabilizing the banks on large, complicated river systems, such as the Elkhorn River.

Several long term solutions (see attached) were analyzed and the preferred option for protecting 240th Street was to provide as much physical separation between the river and 240th Street through a realignment of the river channel (estimated construction cost - $1.5 million). The existing channel would remain open to flows thus providing aquatic habitat benefits to the project. A second option incorporated tree root wads and logs along with additional rock along the current riverbank alignment to increase energy dissipation and improve aquatic habitat (estimated cost - $623,000). It was believed that either of these solutions would require an individual 404 permit from the Corps of Engineers that would require a lengthy time to obtain. It was also recommended that Nebraska Environmental Trust (NETF) funds be sought to offset a portion of the costs for these environmentally beneficial projects.

Since the threat to 240th Street was more immediate, an interim project was undertaken by the District and Sarpy County to stabilize the streambank at its current location through the use of windrowed revetment (riprap). This interim project was completed in January, 2012 (see attached photo) at a cost of $178,638. The engineering costs totaled $149,852 covering both the identification of alternatives and the design and construction of the interim project. Sarpy County and the District equally shared in these costs.

The contract with Tetra Tech did not include services needed to permit, design and construct the long term solution. It was intended that a separate professional services contract would be negotiated for the long term solution.

The local Tetra Tech personnel that worked on the analysis and interim project have since formed a new engineering firm, FYRA Engineering and were asked to prepare a proposal to complete the work of designing and implementing the long term solution. In addition, FYRA was asked to include Tetra Tech as a sub-consultant to maintain project continuity and expertise.

The attached proposal from FYRA Engineering is presented for your consideration. The scope of services calls for design, permitting, and right-of-way acquisition services for the project, with an estimated completion date of July, 2013. The total amount of the fees is estimated at $259,642.

Also attached is a proposed interlocal agreement with Sarpy County which provides for equally sharing the cost of the professional services contract with FYRA Engineering. The agreement does provide that the county's first payment will not be until July, 2013 due to the fact that their FY 13 budget has already been set.

- **Management recommends that the Subcommittee recommend to the Board that the District's consultant selection procedures be waived and that the General Manager be authorized to execute a professional services contract with FYRA Engineering, Inc. for the maximum not to exceed amount of $259,642; that Management be authorized to submit an application to the Nebraska Environmental Trust for financial assistance on the project; and, that the General Manager be authorized to execute an amendment to the interlocal agreement with Sarpy County for 50/50 cost share on the professional services contract, all subject to approval by Sarpy County and subject to changes deemed necessary by the General Manager and approval as to form by District Legal Counsel.**

Long Term Option 1- Rock, Root Wad, Locked Log Combo

Incorporate root wads and logs into a rock bench to increase the energy dissipation from standard rock stabilization and improve aquatic habitat. The rock bench is necessary to anchor the woody features in place. The root wads would be incorporated into the rock at the upstream end of the project where flow intersects the bank around the bend, then transition to locked logs anchored at a 30 degree angle downstream where flow is parallel to the bankline.

Transitioning from the Interim Solution

This alternative would be placed over the material placed on the bank for the interim solution.

Construction Cost Estimate: $995,300 (stand-alone)

If Interim Option 1 was implemented, the cost of the rock material and labor can be subtracted from the above cost as a stand-alone project. = $623,000

If Interim Option 2 was implemented, only the material cost can be subtracted from the stand-alone cost (assuming no rock had been placed during an emergency), and the labor will still be included. = $699,500

Time Constraints

Design and Individual Permit process through USACE.

Long Term Option 2- River Realignment

Excavate a pilot channel through the inner bend to create the new channel alignment. The pilot channel does not have to be exact dimensions of the future channel; once the river takes the new path it will erode the remaining material necessary to reach a stable depth, width and slope. A series of rock diversion structures would redirect flow through the pilot channel, and subsequent rows of cabled trees and rock would add additional roughness, causing the pilot channel to be the path of least resistance.. This diversion structure series would still allow base flow to pass through the existing channel; thus the installation would not completely cut off the existing alignment. The existing channel would also receive backwater from downstream at times, as well as additional flow at elevated water surface elevations during storm events. As a result, it is possible that the permitting agencies would not consider the new installation to be an impact to the original channel alignment.

The pilot channel must be in an orientation that encourages upstream flow to access the new path, and caution must be taken that the upstream river alignment does not shift in a manner that would prevent flow from entering the pilot channel. Preliminary analysis of historical aerial photos indicates that the majority of the upstream bankline is stable, except for a 500 ft segment directly upstream of the pilot channel. For planning purposes, it is assumed that this segment would be stabilized if this alternative was implemented. The bankline in the wooded area that extends about 1,500 feet upstream from the proposed bank protection has not migrated significantly since at least the mid- to late-1990s, and rock protection has been installed along part of this reach. The existing bankline, is however, steep and unvegetated, and is showing signs of erosion. This portion of the bankline should be carefully inspected prior to final design and additional protection measure installed if appropriate. The currently wooded area bankline that extends over the next approximately 1,700 feet upstream was about 300 feet farther to the west as recently as 2003. Although this portion of the bank is not actively eroding and is at least partially stabilized by the overbank vegetation, there is potential for re-erosion of this area. This should be assessed in final design and at the very least, frequent monitoring should be conducted to insure that the downstream bank protection is not flanked. Riprap has been installed from the upstream end of the reach through the abandoned railroad crossing that is located about 750 feet upstream. This area, including the railroad crossing have not changed during the period of available photography; thus, is assumed to be stable for the forseeable future.

The pilot channel would be cut 50 ft wide, and over time the river will erode the remaining material to reach its desired width. The pilot channel will be aligned so that it joins approximately parallel with the existing river to avoid the potential for erosion on the left bank downstream from the junction. Additional assessment would be needed to determine any potential impacts downstream of the pilot channel as a result of the new alignment and the localized increase in bed slope.

Transitioning from the Interim Solution

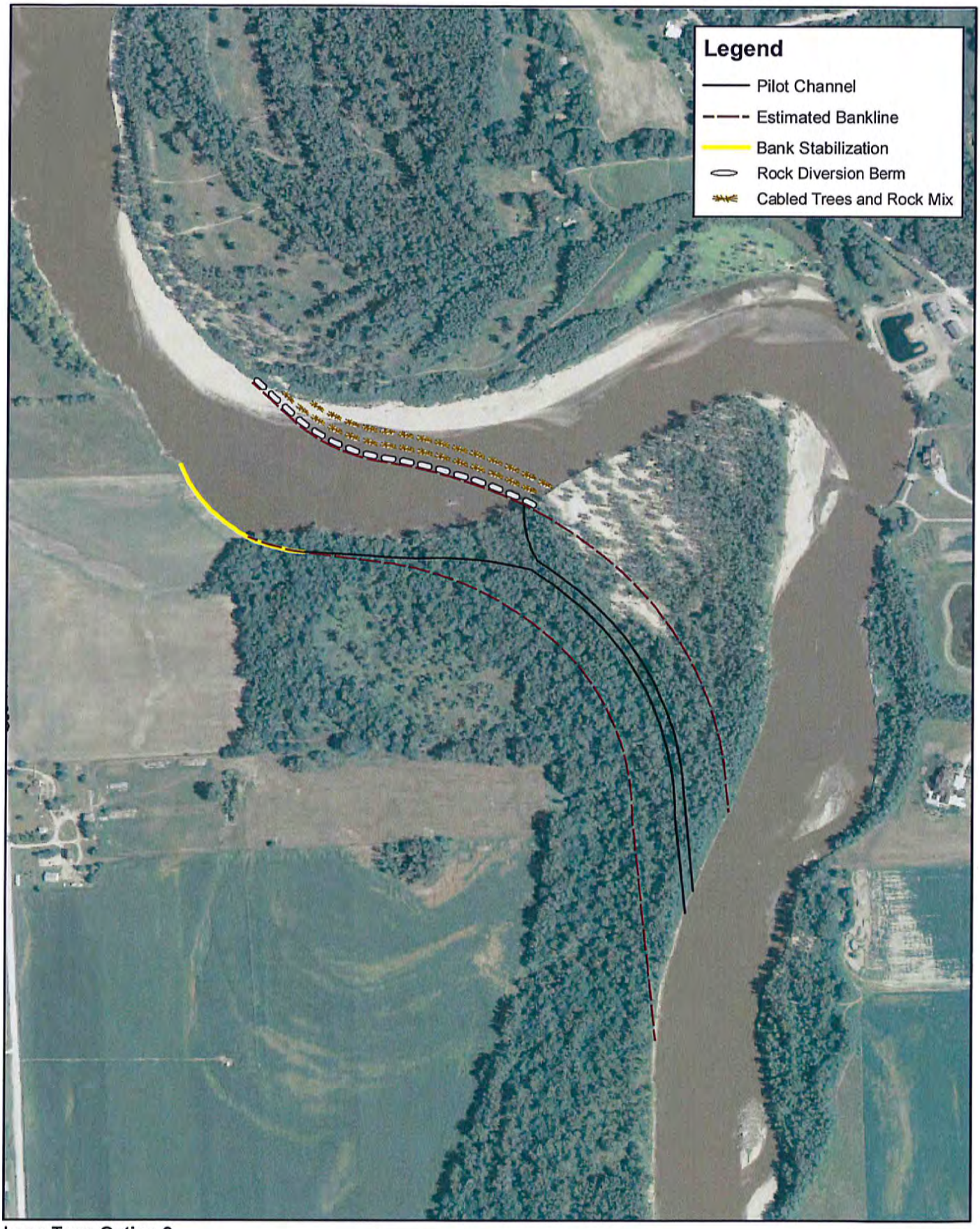
Either interim solution implemented would stay in place as bank protection for when flow over the diversion structure occurs. The rock would remain in place and would not be reused for construction of this long term solution.

Construction Cost Estimate: $1,500,000

Above is the cost to construct the pilot channel, diversion structure and bank stabilization on the right bank upstream of the pilot channel. There would be no use of material from the interim project to build off of that would provide cost savings for this project. It was assumed the land would need to be purchased and the cost included in estimate based off of Sarpy County assessor's website.

Time Constraints

Design and Individual Permit process through USACE.

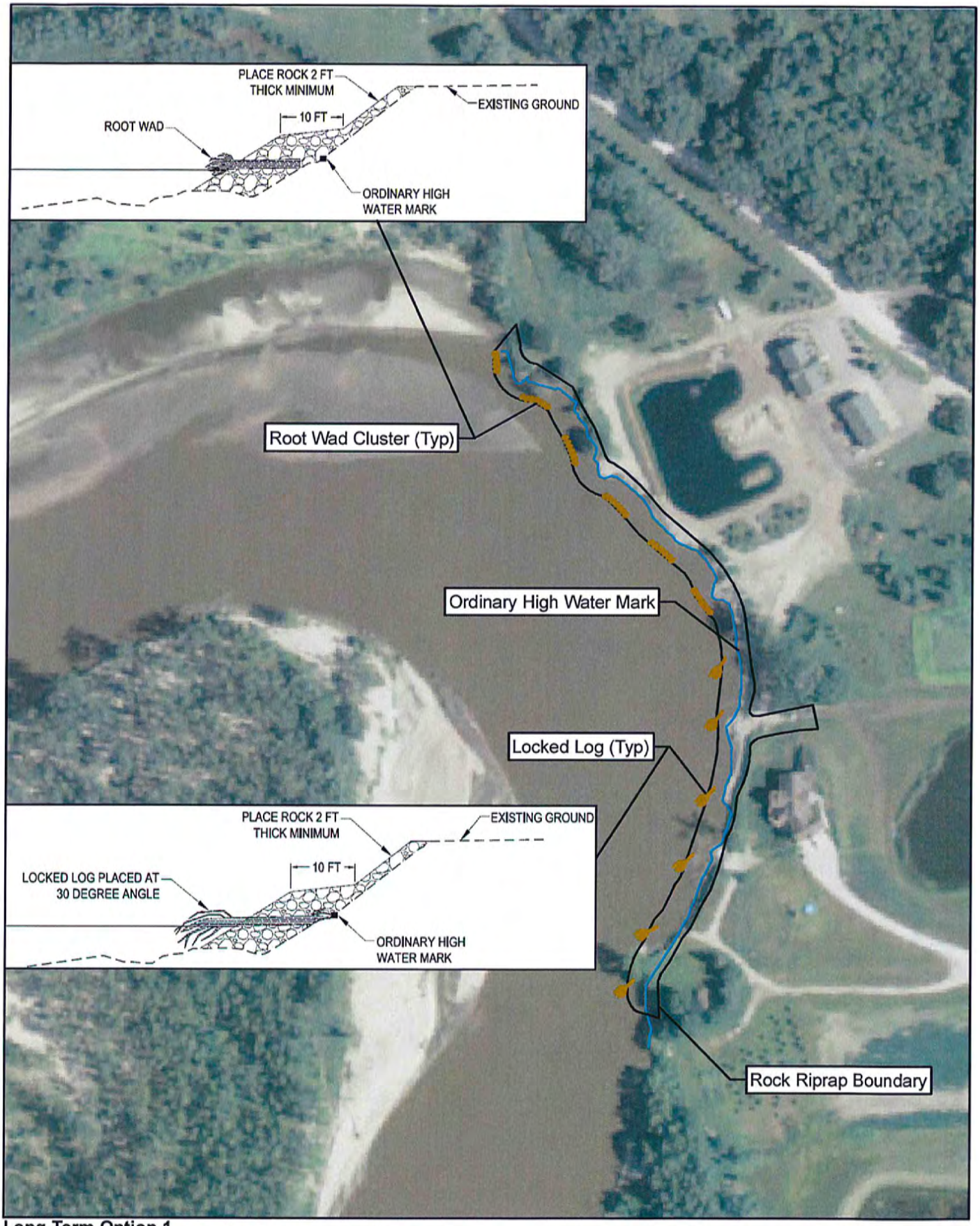


Long Term Option 2
Channel Realignment
Elkhorn 240th St Bank Stablilzation
Papio-Missouri River NRD

N

0 300 600 1,200
Feet

TETRA TECH



Long Term Option 1
Rock with Root Wads and Locked Logs

Elkhorn 240th St Bank Stablilzation
Papio-Missouri River NRD

N

0 100 200 400
Feet

TETRA TECH

1-27-12

P-MRNRD Elkhorn River 240th Street Bank Stabilization
Task Descriptions – Final Design of Long Term Solution

Project Management

Project Management – Monthly Client Meetings – Monthly meetings between consultant team project manager and client representative(s) to review progress and work ahead for the coming weeks.

Project Management – Monthly Invoice/Schedule Update – Monthly preparation of consultant invoice including incorporation of internal and subconsultant invoices, description of services rendered and update of Project schedule.

Prepare Nebraska Environmental Trust (NET) Application – Prepare NET application in accordance with Trust fund guidelines for the proposed Long Term Solution for the fall 2012 submittal. This task also includes assistance on any other grant applications to be named later.

Stakeholder Meetings – Prepare for and attend three (3) meetings with project stakeholders, the public or landowners, as defined by NRD and consultant team to relay the intended project path and identify any input needed from stakeholder agencies. The NRD may also choose to receive input from stakeholder groups.

USACE 404 Permit

Pre-Application Meeting with Corps. Submit request for pre-application meeting with Corps. Prepare Purpose and Need Statement. Attend meeting with goal of determining Corps requirements for permit and supporting documentation. Explore possible use of:

- Regional General Permit 11-02 for flood protection, reconstruction and repair work for flood damaged areas
- Nationwide Permit 27 for stream and wetland restoration activities; aquatic habitat restoration, establishment, and enhancement.
- Other NWPs

Prepare and distribute minutes.

Site Visit with Corps/Resource Agencies. If needed, organize site visit for Corps (and possibly USFWS and NGPC) to tour project area, inspect completed Phase, and review alternatives considered for next Phase.

Conduct Wetland Delineation/Stream Assessment. It is assumed that the Corps will request a wetland delineation and stream assessment for the Area of Potential Effect to document existing conditions (to serve as baseline). Conduct field studies and prepare reports. Provide senior technical review.

Impact Assessment. Assist Project Engineer in developing habitat restoration measures, and determining likely future conditions. Compare existing conditions with future scenario, and prepare quantitative and qualitative evaluation of impacts to wetlands and waters. Design objectives should attempt to create greater habitat benefits than existing condition. Provide senior technical review.

Prepare Alternatives Analysis/404(b)(1) Analysis. If the project cannot be handled under a Nationwide or Regional General Permit, it will require an Individual Permit (IP). IPs require an analysis of alternatives. These could include:

- In-place bank stabilization (sheet pile, spurs)
- Create new channel and retain old channel as chute
- Construct bridge on 240th Street
- Embankment protection
- Relocate 240th Street on bluff

Prepare document, provide senior technical review.

Prepare 404 Permit Application. Prepare 404 permit application package and provide senior technical review. Package to include application form, and supporting documents. It is assumed that the project will be self-mitigating and will not need a separate mitigation plan, above the project design itself. If an IP is required, request review letters from FWS, NGPC and SHPO.

Coordination Meetings. Attend 6 progress meetings with project team, and 2 follow-up meetings with the Corps.

Permit Response / Final Documentation – Respond to any comments received during public notice/comment period for permit and include them in the permit written record.

Plan Review for Permit Compliance – Review final design plans and specifications for compliance with approved permit.

Preliminary Design – Long Term Solution

Basemap Preparation – Prepare base maps for construction documents using available LiDAR information, field surveys and hydraulic survey information.

Topographic / Hydraulic Survey – Conduct spot field surveys at select locations to be identified during design to supplement available LiDAR and hydraulic survey information.

2-D Model Preparation – Incorporate hydraulic survey information and prepare mesh for Two-Dimensional (2-D) SMS model to be used in hydraulic analysis.

Hydraulic Analysis – Using 2-D SMS and 1-D HEC-RAS models, conduct hydraulic analyses of proposed modification to river course proposed as part of the Long Term Solution.

Conceptual Channel Alignment Design – Determine conceptual course (for 404 alternatives analysis) of proposed river channel alignment through project area that provides long term stability while protecting 240th Street corridor and related infrastructure.

Conceptual Channel Diversion Design – Conceptual design (for 404 alternatives analysis) of riprap/debris structures proposed for diversion of proposed river channel alignment from existing river channel at upstream end of project area that provides the desired separation of flows.

Conceptual Channel Grade Check Design(s) – Conceptual design (for 404 alternatives analysis) of up to two grade stabilization structures for proposed long term solution to hold grade of existing or proposed channel. Design includes geotechnical sampling and testing of up to two boreholes for two different sites (four holes total.)

Conceptual Downstream Confluence Stabilization Design – Analysis and conceptual design (for 404 alternatives analysis) of bank stabilization measures at the downstream confluence of the proposed and existing river channels likely to be necessary after the project is completed.

Final Design – Long Term Solution

Channel Alignment Design – Determine course for proposed river channel alignment through project area that provides long term stability while protecting 240th Street corridor and related infrastructure.

Channel Diversion Design – Design of riprap/debris structures proposed for diversion of proposed river channel alignment from existing river channel at upstream end of project area that provides the desired separation of flows.

Channel Grade Check Design(s) – Design of up to two grade stabilization structures for proposed long term solution to hold grade of existing or proposed channel. Design includes geotechnical sampling and testing of up to two boreholes for two different sites (four holes total.)

Downstream Confluence Stabilization Design – Analysis and design of bank stabilization measures at the downstream confluence of the proposed and existing river channels likely to be necessary after the project is completed.

Plan Preparation – Prepare plan and profile drawings for modifications to project area to be included in final construction documents package.

Seeding/Vegetation Plan – Preparation of temporary and final seeding/planting plans of disturbed and other critical areas in accordance with NPDES requirements and best management practices.

Prepare Project Specifications and Bid Documents – Prepare technical specifications and all front-end bid information in accordance with EJCDC requirements in EJCDC format.

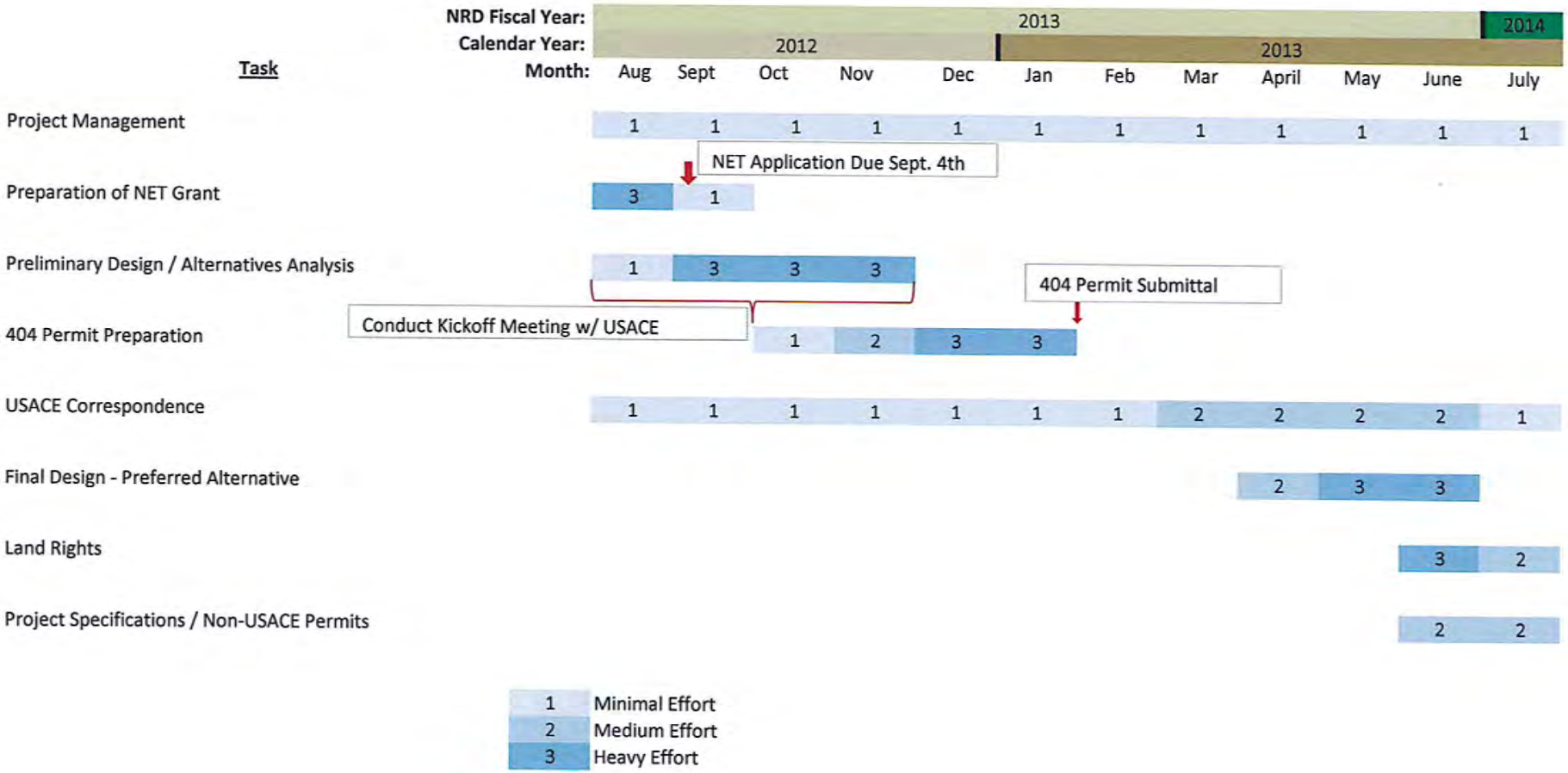
SWPPP Plan Preparation – Assembly and submittal of application and SWPPP to meet NPDES requirements for project.

Floodplain Development Permit - Assembly and submittal of application to meet Sarpy County floodplain development requirements for project.

Land Rights Survey – Field survey of property boundaries of parcels affected by project and requiring easement/acquisition of any portion of the land parcel.

Land Rights Document Preparations – Work with P-MRNRD to prepare temporary/permanent easements or fee title acquisition (or combination thereof) required to complete construction modifications to the river system and provide long term real estate (access/ownership) to operate and maintain the project.

Attachment 1 to Exhibit A



Attachment 1 to Exhibit C

P-MRNRD Elkhorn River 240th Street Bank Stabilization - Final Design of Long Term Solution

		FYRA Engineering						Tetra Tech			E&A Consulting Group			FHU Engineering				
	Title:	Proj Mgr	Sr. Scientist	H/H Engr	Project Engr	CADD Tech	Clerical	Mussetter	Trabant	Geot Engr	R.L.S.	CAD Tech	2-Man Crew	Sr. Scientist	Proj Scientist			
	Name(s):	Sotak	Holz	Gregalunas	Mechtenberg	Klein	Van Ackeren	Geomorphology	2-D Modeling	Chapel	Headley	Elder	Survey	Zlotsky	Tews	Expenses		
	Rate:	$180	$180	$105	$105	$70	$65	$235	$150	$210	$100	$67	$128	$160	$90			
TASKS																		
Project Management																		
Project Management - Client Mtg (12)		24			24									12			$8,760	
Project Management - Monthly Invoice/Schedule Update (12)		12					18	12						12		$100	$8,170	
Prepare NET Application		2	30				12									$200	$6,740	
Stakeholder Meetings (3)		18			18											$300	$5,430	**$29,100**
	Subtotal Hours	56	30	0	42	0	30	12	0	0	0	0	0	24	0			
USACE 404 Permit																		
Pre-Application Meeting w/ USACE					3									8	4	$400	$2,355	
Site Visit w/ USACE & Resource Agencies					8									8	8	$200	$3,040	
Conduct Wetland Delineation / Stream Assessment														80	80	$600	$20,600	
Impact Assessment			8		8									24	16		$7,560	
Prepare Alternatives Analysis / 404(b)(1) Analysis			16		24									24	16	$200	$10,880	
Prepare 404 Permit Application			12		4									8	24	$800	$6,820	
Coordination Meetings			20											40	40	$400	$14,000	
Permit Response / Final Documentation			12		4									12	24		$6,660	
Plan Review for Permit Compliance														4	8		$1,360	**$73,275**
	Subtotal Hours	0	68	0	51	0	0	0	0	0	0	0	0	208	220			
Preliminary Design - Long Term Solution																		
Basemap Preparation				20		40										$200	$5,100	
Topographic / Hydraulic Survey				24	16	16											$5,320	
2-D Model Preparation				60		24		8	24								$13,460	
Hydraulic Analysis				60				8	24								$11,780	
Conceptual Channel Alignment Design		4			8			6									$2,970	
Conceptual Channel Diversion Design		4		4	8			6									$3,390	
Conceptual Channel Grade Check Design(s)		4		4	8			2								$10,000	$12,450	
Conceptual Downstream Confluence Stabilization Design		2			8	8		4									$2,700	**$57,170**
	Subtotal Hours	14	0	172	48	88	0	34	48	0	0	0	0	0	0			
Final Design - Long Term Solution																		
Channel Alignment Design		8			22			18									$7,980	
Channel Diversion Design		12			32			18									$9,750	
Channel Grade Check Design(s)		12			24			6		80							$22,890	
Downstream Confluence Stabilization Design		6			16	32		12									$7,820	
Plan Preparation		12			40	80		8								$1,500	$15,340	
Seeding / Vegetation Plan		1			4									4	8		$1,960	
Prepare Project Specifications and Bid Documents		20			24		30									$200	$8,270	
SWPPP Plan Preparation				16	12		12									$200	$3,920	
Floodplain Development Permit				24			4									$100	$2,880	
Land Rights Survey (9)		9									27	72	36				$13,752	
Land Rights Document Preparations (9)		9									9	45					$5,535	**$100,097**
	Subtotal Hours	117	0	384	270	288	46	130	96	80	36	117	36	4	8			
	Total Hours	**187**	**98**	**556**	**411**	**376**	**76**	**176**	**144**	**80**	**36**	**117**	**36**	**236**	**228**			**$259,642**

"draft"

INTERLOCAL COOPERATION ACT AGREEMENT III

COUNTY OF SARPY, NEBRASKA,

And

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

For

240th STREET EROSION PROTECTION

THIS AGREEMENT ("**THIS AGREEMENT**") is entered into by and between the **COUNTY OF SARPY, NEBRASKA** ("the **COUNTY**") and the **PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT** ("the **DISTRICT**").

The COUNTY and the DISTRICT are referred to collectively hereinafter as "the **PARTIES**" and individually as a "**PARTY**".

RECITAL:

WHEREAS, pursuant to authority provided in the Nebraska Interlocal Cooperation Act (§§13-801, R.R.S., 1943, et seq.), the PARTIES desire to cooperatively commission engineers to perform design work ("the **DESIGN WORK**") necessary to determine the most cost-effective design for a long term project ("the **PROJECT**") to prevent 240th Street in Sarpy County from being lost to foreseeable and continued Elkhorn River bank erosion.

NOW, THEREFORE, for and in consideration of the foregoing recital and the mutual covenants of the parties hereinafter expressed, the PARTIES agree as follows:

1. **BENEFITS.** The PARTIES do hereby find, determine and agree that the DESIGN WORK and the PROJECT will be of general benefit to the DISTRICT, with only incidental special benefits.

2. **PARTICIPANTS.** The DESIGN WORK shall be undertaken by a consulting engineering firm retained on behalf of the PARTIES, as provided herein, without any separate entity being created, and the duties and responsibilities of the PARTIES with respect to the DESIGN WORK shall be as defined by THIS AGREEMENT.

3. **THE ENGINEERS.** The DISTRICT, with prior approval by the COUNTY, shall retain the ENGINEERS to perform the DESIGN WORK.

4. **DESIGN CRITERIA.** Written criteria for the DESIGN WORK shall be specified by the DISTRICT in accordance with the DISTRICT'S usual engineering practices, subject to the written approval by the COUNTY, which approval shall not be withheld or delayed unreasonably.

5. **STUDY AREA.** The area studied in the DESIGN WORK shall consist of the NE ¼ and the N ½ of the SE ¼ of Section 16, Township 14 North, Range 10 East of the 6th P.M., Sarpy County, Nebraska, unless, on the recommendation of the ENGINEERS and the approval of the PARTIES, the study area is expanded.

6. **RIGHTS-OF-ENTRY.** Rights-of-entry that the ENGINEERS and the DISTRICT determine are necessary for performance of the DESIGN WORK shall be obtained by the DISTRICT at its sole cost or expense, to which rights-of-entry the DISTRICT shall hold title.

7. **PERMITS.** The DESIGN WORK shall include preparation of applications for state and federal permits that the ENGINEERS and the DISTRICT determine are necessary for performance of the PROJECT.

8. **DEADLINE FOR COMPLETION.** The DESIGN WORK provided for in THIS AGREEMENT shall be completed prior to December 31, 2013, and shall be subject to acceptance by both the NRD and the COUNTY.

9. **COST-SHARING.** Each PARTY shall pay one-half of the contract fees due to the ENGINEERS for the DESIGN WORK; provided, however, the COUNTY'S share of the ENGINEERS' fees shall not exceed one-half of the ENGINEERS' original fee estimate of $259,642 without prior approval by the Sarpy County Board. The NRD shall pay such ENGINEERS' fees as they become due. Subject to the aforesaid limitation, on July 15, 2013, and on the 15th day of each month thereafter, the NRD shall invoice the COUNTY for the COUNTY'S share of the ENGINEERS' fees accrued as of such invoice date, all of which invoiced amounts shall be paid by the COUNTY to the NRD within 45 days after invoice date.

10. **INVOICES.** Invoices referred to herein shall set out the following information with respect to each cost being invoiced for partial reimbursement, to-wit:

a) amount of such cost,

b) date such cost was incurred,

c) person to whom such amount was paid, and,

d) purpose(s) for such cost.

11. **AUTHORITY FOR APPROVALS.**

a) Approvals by the COUNTY, and other COUNTY discretionary actions contemplated by THIS AGREEMENT, are authorized to be provided by the Public Works Director of the COUNTY; and,

b) Approvals by the DISTRICT, and other DISTRICT discretionary actions contemplated by THIS AGREEMENT, are authorized to be provided by the General Manager of the DISTRICT.

12. EFFECTIVE DATE AND DURATION. THIS AGREEMENT shall be in force and effect from and after its execution by the PARTIES and shall have permanent duration.

13. NON-DISCRIMINATION. The PARTIES shall not, in the performance of THIS AGREEMENT, discriminate or permit discrimination in violation of federal or state laws or local ordinances because of race, disability, color, sex, age, political or religious opinions, affiliations or national origin.

14. APPLICABLE LAW. The PARTIES shall follow all applicable federal and state statutes and regulations in carrying out the faithful performance and terms of THIS AGREEMENT.

15. SEVERABILITY. In the event any portion of THIS AGREEMENT is held invalid or unenforceable for any reason, it is agreed that any such invalidity or unenforceability shall not affect the remainder of THIS AGREEMENT and the remaining provisions shall remain in full force and effect, and any court of competent jurisdiction may so modify any objectionable provision of THIS AGREEMENT so as to render it valid, reasonable, and enforceable.

16. CAPTIONS. Captions used in THIS AGREEMENT are for convenience and not for use in the construction of THIS AGREEMENT.

IN WITNESS WHEREOF

The COUNTY has executed THIS AGREEMENT on _____, 2011, pursuant to resolution duly adopted by its Board of Commissioners.

THE COUNTY OF SARPY, NEBRASKA

By _____
Chairperson, Board of County Commissioners

Attest:

_____
County Clerk

The DISTRICT has executed THIS AGREEMENT on _____, 2011, pursuant to resolution duly adopted by its Board of Directors.

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

By _____
General Manager