

## **ATTACHMENT B - COST ENGINEERING**

### **JORDAN CREEK FLOOD-RISK MANAGEMENT FEASIBILITY STUDY, SPRINGFIELD, MISSOURI**

#### **19.1.0 INTRODUCTION**

This appendix contains a summary of the detailed feasibility cost estimate prepared for the Springfield, Missouri Flood-Risk Management Feasibility Study. The study area lies entirely within the city limits of Springfield, Missouri. The streams studied, upstream from southwest to northeast, are the upper end of Wilsons Creek, Jordan Creek and its North Branch and South Branch tributaries. The streams start in the northeast portion of Springfield and flow southwestward to the central west part of Springfield. The total drainage area for the study is about 19.3 square miles. The total study area is 13.75 square miles. The total length of the streams studied is approximately 6.9 miles. The main land uses of the study area vary from sparsely developed industrial to highly congested commercial. The stream conditions range from natural configuration with wooded banks to a man-modified channel forced through concrete culverts with buildings built over the culvert or concrete lined with vertical sidewalls. The land terrain is gently rolling. The geology of the area is rich soil overlying limestone bedrock with the rock occasionally rising to protrude into the channel bottom.

Input for the cost estimates was obtained from the Project Delivery Team (PDT) consisting of the City of Springfield including the Storm Water Services Division of the Public Works Department and Design Branch, Planning, Environmental and Economics personnel of the Little Rock District of the U.S. Army Corps of Engineers. Guidance for preparation of these cost estimates was obtained from ER 1110-2-1150 Engineering and Design (E&D) for Civil Works Projects, ER 1110-1-1300 E&D Cost Engineering Policy and General Requirements, ER 1110-2-1302 Civil Works Cost Engineering, and ETL 1110-2-573 E&D Construction Cost Estimating Guide for Civil Works. The cost estimates were prepared using Micro-Computer Aided Cost Estimating System MII version 4, build.4. Supporting cost libraries or databases were MII 2010 cost library, 2011 Equipment expense library (EP 1110-1-8, dated November 30, 2011) and the 2012 R. S. Means labor rates library for Springfield, Missouri.

Cost estimates were prepared at two levels - Class 4, initially, and Class 3 for inclusion in this feasibility report. Preliminary or Class 4 cost estimates were prepared for nine channel and/or detention basin plans designated as Alternatives A through J with levels of protection (LOP) from rainfall events having a reoccurrence interval ranging from 500 years to 25 years. Alternative J, the National Economic Development Plan (NED), is the tentatively selected plan and consists of a LOP from the 500 year storm in reach E1 with the five detention ponds in the upper watershed. Two of the detention basins are located on the north branch tributary and three detention basins are located on the south branch tributary of Jordan Creek. See the main report for a description of the study reaches for this feasibility study.

The quantities used in these cost estimates were developed primarily by the Civil Designer and Structural Designer from over 500 surveyed field cross sections from the HEC models from which the economic analyses were conducted. Quantity calculations by the designers were aided by the combination of Excel, ArcMap, HEC RAS, AutoCAD, and Google Earth software.

The cost estimate presented in this cost appendix is for the design and construction of the tentatively selected plan, Plan J, which includes channel excavation of soil and rock, railroad bridges, automobile bridges and culverts, and water, sewer, natural gas, communications and electrical utilities relocations.

### **19.2.0 PRICE LEVEL**

Project costs are presented in December 2012 dollars and all project costs have been escalated to October 2014 price levels for inclusion in the 2015 budget. Labor rates for the estimates have been inflated over the construction period of this project. It is assumed that the metropolitan area of Springfield, Missouri, 2010 population of approximately 275,000, will have sufficient equipment operators, skilled craftsmen, and laborers to meet the needs of the contractors. The contractor is envisioned to only bring key personnel such as the project superintendent and one other key person to this job site. Only these persons will be provided living expenses in and above their salaries. Other sources of cost in these cost estimates are the 2010 MII Cost Library. Equipment costs are from the 2011 Region 5, which includes Springfield, Missouri, equipment rates from Engineering Pamphlet (EP) 1110-1-8 Construction Equipment Ownership and Operating Expense Schedule.

The costs of all alternative estimates, especially Alternative J, are considered fair and reasonable to a prudent and capable contractor.

### **19.3.0 COST ESTIMATE STRUCTURE**

The cost estimates for the alternatives presented in this feasibility study were prepared by cost engineers in the Cost Engineering Section of Little Rock District. The cost estimates were organized according to the Civil Works – Work Breakdown Structure (CWWBS) and designated by using a source tag that designated the plan ID, reach ID, two levels (Feature and Sub-feature) of the Civil Works Work Breakdown Structure and subsequent levels of the source tag were from the April 2012 Masterformat<sup>®</sup> 2012 Numbers and Titles. The cost estimate work breakdown format shown in the MII source tag was structured to reflect the alternative and reach as well as two levels of the CWBS for which the estimate is being prepared for example AA\_RR\_FFSS - AA being the alternative, RR the reach, FF CWBS feature designator, and SS is the sub-feature designator.

Project features in the total project cost summary (TPCS) are in accordance with the CWWBS:

01 Lands and Damages include the real estate acquisitions of project lands, easements and rights-of ways. Costs are real estate, non-Federal's sponsors cost for land surveys, title preparation, legal opinions and Federal costs of reviewing the non-Federal sponsor's documents for legal sufficiency.

02 Relocations – Automobile Roadway and Bridge relocations, Railroad track moving and utility relocations include the cost for moving automobile roads and bridges, railroad track and/or utilities to make room for the enlarged channel features of the project.

09 Channels and Canals include the estimated costs to excavate the proposed channel improvements and construct related features.

15 Floodway Control and Diversion Structures includes the cost of construction of the detention ponds. Construction measures are excavation of the pond storage area and modification of the outlet weir.

30 Planning, Engineering and Design (PED). Provides the estimated engineering design costs based on a percentage of the construction cost features.

31 Construction Management (CM) provide the estimated CM or Supervision and Administration costs based on a percentage of the construction cost features.

Contingencies are added to the cost estimates in the TPCS base on the results of the cost and schedule risk analysis performed on December 18, 2012. Results of the cost risk study yielded a 23 percent contingency which has been added to the construction costs of the relocations, channels, planning, engineering and design, and construction management.

Escalation factors to the Effective Price Level Date and the Fully Funded Project Estimate Amount through the end of construction have also been included as part of the TPCS. The inflation was based upon a schedule developed based on an assumed monthly construction production rate (dollars) which is typically \$500,000 to \$1,000,000 per month.

Key assumptions for estimating the construction costs of the proposed improved Jordan Creek channel are as follows:

- Work analyses were performed on the major cost items based on the feasibility level of design.
- All excavated material from enlargement of the channel must be hauled away for offsite disposal within ten miles of the work area as advised by the non-Federal sponsor.
- The working area associated with the channel excavation was sufficient for dump trucks to pull through even after the channel was enlarged.
- The dump truck pull through scenario permitted the hydraulic excavator to work in an efficient manner.
- For the final plans, the job office overhead was based upon a detailed calculated rate based upon typical labor, equipment and supplies, and applied as a running percentage on the direct cost.
- The latest Department of Defense Unit Cost data were used to cost the automobile and railway bridges in the cost estimates due to the time constraints.

## **19.4.0 DISCUSSIONS OF COSTS BY FEATURE**

### 19.4.1 01-Lands and Damages

The cost estimate for Lands and Damages is based on the estimated acres impacted by the project footprint as determined by the Civil and Structural Designer and estimated by Little Rock District Real Estate Division personnel. There are several types of real estate instruments required to obtain all land rights needed to construct this project. See the Real Estate Appendix for more detailed information regarding the development of the cost for Lands and Damages.

### 19.4.2 02 Relocations

This section summarizes cost estimate information related to relocating roadway paving and bridges, utilities, and building demolition.

#### 19.4.2.02.1 Road Bridges and Roads

Bridge costs were based upon the Department of Defense (DoD) Pricing Guide for FY 2011 utilizing the square feet of proposed bridge decks. These square foot costs were derived from bridges constructed at various locations across the country within the previous year.

#### 19.4.2.02.2 Utility Relocations

Many utilities will be impacted by the construction of the Jordan Creek channel improvements regardless of which plan is selected. In consultation with the City of Springfield and its utility departments and private utilities, i.e. telephone cables, the various utilities were located, designated by type, and size. The designers consulted this list during the design of the improved channel and it was noted what modifications were required to move the utility out of the way of the flow in the improved channel. Underground utilities which include water, sanitary sewer, communication cables, and natural gas, were designated to be lowered during the improvement of the channel. Overhead utilities, primarily electrical lines, were relocated after study by its respective designer often by the installation of new poles and possibly additional lengths of properly sized wire. Costs were added to the alternative's cost estimate based upon the action recommendation by the designers.

### 19.4.3 09-Channels and Canals

Results of the Hydrology and Hydraulic studies set the size and bottom elevation for the channel improvements to lessen Flood-Risks along Jordan Creek within Springfield, Missouri. The civil designer along with input from other PDT members added required features to make the channel functional. The other features along with the excavation quantities were provided to the cost estimators. The estimators assembled the necessary labor, equipment and materials to construct the project and yielded the project cost.

## **19.5.0 CONTRACTOR AND INDIRECT COST CONSIDERATIONS**

The cost estimator assumed the work is done by a prime contractor which performs the excavation work as well as project management functions. Specialty work such as bridge construction and utility relocations are to be done by subcontractors hired by the prime contractor. This arrangement makes for two levels of contracting and two levels of markup costs (job office overhead, home office overhead, profit, and bond).

### 19.5.1 Prime Contractor

The prime contractor's job office overhead (JOOH) was calculated based upon the typical number of supervisory people, temporary office, equipment, and office supplies and the construction time estimated for the project. The calculated JOOH was 39 percent for Plan J channel contractor and 33 percent for the detention basin contractor in Plan J.

The home office overhead (HOOH) expenses are those cost incurred by the contractor for its overall business management of their main office expenses. These main offices expenses include cost such as upper management, accounting, personnel, and legal. This cost estimator set the HOOH at 8 percent of the construction cost. Typically, HOOH ranges from 5 percent to 10 percent of the construction cost.

The profit for the prime contractor was calculated to be 9.38 percent of the running construction cost, which includes direct cost, JOOH and HOOH markups, as determined utilizing the profit weighted guidelines method in ETL 1110-2-573.

Performance and payment bond premium of 0.35 percent of the running construction cost, including the direct cost, JOOH, HOOH, and profit, as determined by the MII embedded bond premium table for Class B work.

### 19.5.2 Subcontractors

JOOH rates for the subcontractors were assumed to be a constant 13 percent on the job. Mobilization and demobilization were assumed to be included within this percentage. Including in the mobilization is the cost to move equipment, support equipment and supplies to the close proximity of the work area.

HOOH for the subcontractors is assumed to be a constant 8 percent to cover the subcontractors' permanent offices or home office expense.

Profit for the subcontractors was computed by the weighted guidelines methods to be 9.38 percent.

### **19.6.0 30-PLANNING, ENGINEERING AND DESIGN**

The Planning, Engineering and Design (PED) costs are the costs from authorization until the first construction contract is awarded. This work includes detailed surveys, soil investigations and preparation of the plans and specifications to guide the contractor to construct the project. Discussions with the PDT yielded a PED cost of 8.1 percent of the estimated construction cost.

### **19.7.0 31 CONSTRUCTION MANAGEMENT**

The Construction Management costs are determined as a percent of the estimated construction costs. For this feasibility level estimate, a percentage of 7.7 percent of the construction cost was used in consultation with Construction Branch personnel.

### **19.8.0 CONTINGENCY**

Current regulations require formal analyses of schedule and costs risks. See the Attachment C for the abbreviated Cost Risk Analysis Study documentation that was performed on December 18, 2012. The results of the cost risk study were that a 23 percent contingency was appropriate for construction costs, planning, engineering, and design, and construction management.

The purpose of contingencies is an added cost included in the cost estimate to cover unknowns. Unknowns could include:

- Quantity variation.
- Hidden features that will require modification or removal to construct the project as planned.
- Construction components not identified during conduct of the feasibility study. For example, is a temporary bypass required by railroad officials in order to replace the railroad bridge over Wilsons Creek.
- Additional costs to cover inflation while waiting for the project's authorization and appropriations.
- Additional costs to cover inflation while the non-Federal sponsors raises their cost share funds.
- Delays due to litigation.
- Previously unknown HTRW.

### **19.9.0 PROJECT SCHEDULE**

Project schedules for the NED alternative was developed by the Little Rock District PDT. The construction scenario is that the channel improvement of reach E1 and the detention basins are to be constructed concurrently. The detention basin work is to be performed on one basin at a time. The NED alternative has an estimate construction period of 3 years and has a required average annual funding need of \$ 4 million.

**19.10.0 OPERATIONS, MAINTENANCE, REPAIR, REHABILITATION AND REPLACEMENT (OMRR&R) COSTS**

A detailed OMRR&R cost estimate for this project has been prepared and is attached to this appendix. This estimate is to account for the net increase in project costs to operate and maintain the project features and to recognize costs for the repair, rehabilitation and replacement of primarily bridges and culverts. This cost will be required in the future to maintain the improved project for its expected life. The basis of the OMRR&R is a visual inspection of the project area via aerial photography which showed woody growth all along Jordan Creek outside of the business district between Main Street and Phelps Street indicating no regular maintenance. The difference in maintenance of bridges and culverts is due to the change in physical size of the structure.

**19.11.0 FINAL FEASIBILITY ESTIMATE**

The final feasibility cost estimate as presented in the following Total Project Cost Summary (TPCS) for the Jordan Creek Flood-Risk Management Feasibility Study is as follows:

Cost of NED Alternative (Plan J)  
Jordan Creek, Springfield, Missouri  
Flood-Risk Management Feasibility Study

Plan J National Economic Development Plan	
FY 2015 Price Level	\$ 21,051,000
Fully Funded Amount	\$ 21,873,000



# **WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE**

## **COST AGENCY TECHNICAL REVIEW**

### **CERTIFICATION STATEMENT**

For Project No. 354082

#### **Jordan Creek, Springfield, MO - Flood Risk Management Project**

The Jordan Creek, Springfield MO, Flood Risk Management Project, as presented by Little Rock District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of April 15, 2013, the Cost MCX certifies the estimated total project cost of:

FY 2015 Price Level: \$21,239,000

Fully Funded Amount: \$21,873,000

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management throughout the life of the project.



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of Engineers®**

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**Michael P. Jacobs, P.E.**  
**Chief, Cost Engineering MCX**  
**Walla Walla District**





\*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

\*\*\*\* CONTRACT COST SUMMARY \*\*\*\*

PROJECT: Plan J (NED Plan), Jordan Creek FRM Study, Springfield, Missouri 354082  
 LOCATION: Greene County, Missouri  
 This Estimate reflects the scope and schedule in report; Appendix C, Jordan Creek FRM Feasibility Study

DISTRICT: SWL Little Rock District  
 POC: CHIEF, COST ENGINEERING, Bruce Watson  
 PREPARED: 12/20/2012

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 3-Apr-13		Effective Price Level: 1-Oct-12		Program Year (Budget EC): 2015		Effective Price Level Date: 1 OCT 14						
		RISK BASED												
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	INFLATED (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
<b>PHASE 1 or CONTRACT 1 (Detention Ponds)</b>														
02	RELOCATIONS	\$1,233	\$271	22%	\$1,504	3.3%	\$1,274	\$280	\$1,554	2015Q4	1.4%	\$1,291	\$284	\$1,575
09	CHANNELS & CANALS FLOODWAY CONTROL & DIVERSION STRUCTURE	\$3,987	\$877	22%	\$4,864	3.3%	\$4,119	\$906	\$5,025	2016Q2	2.3%	\$4,212	\$927	\$5,139
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$5,219	\$1,148	22%	\$6,367		\$5,393	\$1,186	\$6,579			\$5,503	\$1,211	\$6,714
01	LANDS AND DAMAGES	\$3,219	\$644	20%	\$3,863	3.3%	\$3,326	\$665	\$3,992	2015Q1		\$3,326	\$665	\$3,992
<b>30 PLANNING, ENGINEERING &amp; DESIGN</b>														
0.5%	Project Management	\$26	\$6	23%	\$32	6.9%	\$28	\$6	\$34	2015Q1		\$28	\$6	\$34
1.0%	Planning & Environmental Compliance	\$52	\$12	23%	\$64	6.9%	\$56	\$13	\$68	2015Q1		\$56	\$13	\$68
4.8%	Engineering & Design	\$252	\$58	23%	\$310	6.9%	\$269	\$62	\$331	2015Q1		\$269	\$62	\$331
0.5%	Engineering Tech Review ITR & VE	\$26	\$6	23%	\$32	6.9%	\$28	\$6	\$34	2015Q1		\$28	\$6	\$34
0.5%	Contracting & Reprographics	\$26	\$6	23%	\$32	6.9%	\$28	\$6	\$34	2015Q1		\$28	\$6	\$34
0.5%	Engineering During Construction	\$26	\$6	23%	\$32	6.9%	\$28	\$6	\$34	2016Q2	4.9%	\$29	\$7	\$36
0.3%	Planning During Construction	\$13	\$3	23%	\$16	6.9%	\$14	\$3	\$17	2016Q2	4.9%	\$15	\$3	\$18
	Project Operations			23%										
<b>31 CONSTRUCTION MANAGEMENT</b>														
7.8%	Construction Management	\$407	\$94	23%	\$501	6.9%	\$435	\$100	\$535	2016Q2	4.9%	\$456	\$105	\$561
	Project Operation:			23%										
0.2%	Project Management	\$10	\$2	23%	\$12	6.9%	\$11	\$2	\$13	2016Q2	4.9%	\$11	\$3	\$14
<b>CONTRACT COST TOTALS:</b>		\$9,277	\$1,985		\$11,261		\$9,615	\$2,058	\$11,672			\$9,749	\$2,087	\$11,836

\*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

\*\*\*\* CONTRACT COST SUMMARY \*\*\*\*

PROJECT: Plan J (NED Plan), Jordan Creek FRM Study, Springfield, Missouri 354082  
 LOCATION: Greene County, Missouri  
 This Estimate reflects the scope and schedule in report; Appendix C, Jordan Creek FRM Feasibility Study

DISTRICT: SWL Little Rock District  
 POC: CHIEF, COST ENGINEERING, Bruce Watson  
 PREPARED: 12/20/2012

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 3-Apr-13				Program Year (Budget EC): 2015								
		Effective Price Level: 1-Oct-12				Effective Price Level Date: 1 OCT 14								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	INFLATED (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	<b>PHASE 2 or CONTRACT 2 (Reaches E1)</b>													
02	RELOCATIONS	\$292	\$64	22%	\$357	3.3%	\$302	\$66	\$368	2016Q3	2.7%	\$310	\$68	\$378
09	CHANNELS & CANALS	\$5,846	\$1,286	22%	\$7,133	3.3%	\$6,041	\$1,329	\$7,370	2017Q3	4.6%	\$6,317	\$1,390	\$7,707
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$6,139	\$1,351	22%	\$7,489		\$6,343	\$1,395	\$7,738			\$6,627	\$1,458	\$8,085
01	LANDS AND DAMAGES	\$448	\$90	20%	\$538	3.3%	\$463	\$93	\$555	2016Q3	2.7%	\$475	\$95	\$571
30	PLANNING, ENGINEERING & DESIGN													
0.5%	Project Management	\$31	\$7	23%	\$38	6.9%	\$33	\$8	\$41	2016Q3	5.9%	\$35	\$8	\$43
1.0%	Planning & Environmental Compliance	\$61	\$14	23%	\$75	6.9%	\$65	\$15	\$80	2016Q3	5.9%	\$69	\$16	\$85
4.8%	Engineering & Design	\$296	\$68	23%	\$364	6.9%	\$316	\$73	\$389	2016Q3	5.9%	\$335	\$77	\$412
0.5%	Engineering Tech Review ITR & VE	\$31	\$7	23%	\$38	6.9%	\$33	\$8	\$41	2016Q3	5.9%	\$35	\$8	\$43
0.5%	Contracting & Reprographics	\$31	\$7	23%	\$38	6.9%	\$33	\$8	\$41	2016Q3	5.9%	\$35	\$8	\$43
0.5%	Engineering During Construction	\$31	\$7	23%	\$38	6.9%	\$33	\$8	\$41	2017Q4	10.8%	\$37	\$8	\$45
0.3%	Planning During Construction	\$15	\$3	23%	\$18	6.9%	\$16	\$4	\$20	2017Q4	10.8%	\$18	\$4	\$22
	Project Operations			23%										
31	CONSTRUCTION MANAGEMENT													
7.5%	Construction Management	\$460	\$106	23%	\$566	6.9%	\$492	\$113	\$605	2017Q4	10.8%	\$545	\$125	\$670
	Project Operation:			23%										
0.2%	Project Management	\$12	\$3	23%	\$15	6.9%	\$13	\$3	\$16	2017Q4	10.8%	\$14	\$3	\$17
<b>CONTRACT COST TOTALS:</b>		\$7,555	\$1,663		\$9,217		\$7,840	\$1,726	\$9,566			\$8,225	\$1,811	\$10,037

OPERATION, MAINTENANCE, REPAIR, REHABILITATION AND REPLACEMENT

Date Prepared: April 9, 2013

Jordan Creek Flood Risk Management Feasibility Study, Springfield, Missouri

Life Cycle: 50 years  
Rate of Return: 3.75 percent

Plan J

Jordan Creek Flood Risk Management Feasibility Study, Springfield, Missouri									Equivalent Average Annual O&M/Major Replacement Value			
									Present Value			
Code	Item Description	Estimate O&M Cycle, years	Quantity Factor	Project Quantity	O&M Quantity	Unit	Project Unit Price	O&M Amount	O&M	Major Replacement	Annual Cost	Comments
									\$590,029	\$1,388,633	\$234,479	
<b>Reach E1 - Wilson's Creek and South Branch 0+00 to 37+92</b>												
00	Periodic Inspections	1	1	1	1	Job	\$281.00	\$281	\$6,304	0	\$281	
	Automobile Bridge Inspections	2	1	1	1	Job	\$271.00	\$271	\$4,348	0	\$271	Every 2 years
02	No added OMM&R											
09	Mowings	1	3	4.726	14.2	Acres	\$85.58	\$1,213	\$27,221	0	\$1,213	3 times per year
	Woody Vegetation Control	4	0.25	4.726	1.2	Acres	\$760.97	\$899	\$8,843	0	\$394	Every four years
	Sediment Removal	1	1		5	CY	\$63.68	\$318	\$7,143	0	\$318	Annually
	Trash/Debris Removal	1	1		1	Job	\$591.46	\$591	\$13,269	0	\$591	Annually
	Scour Repair	5	0.20		5	CY	\$774.72	\$592	\$4,805	0	\$214	Once every 5 years
	Riprap Repair	10	0.10		9	CY	\$229.24	\$593	\$5,837	0	\$260	Once every 10 years
	Railway Bridges - Wilson Crk Station 322+92	10	0.01	1	0.01	LS	\$648,544.00	\$6,485	\$29,076	\$559,714	\$26,245	
	Roadway Bridges - Scenic	10	0.01	1	0.01	LS	\$458,473.00	\$4,585	\$20,555	\$395,677	\$18,553	Monitor Foundation Shoring
	<i>Subtotal</i>										\$48,342	
<b>Reach E2 - Jordan Creek 37+93 to 109+99</b>												
	No Work											
	<i>Subtotal</i>											
<b>Reach E3 - Jordan Creek 110+00 to 166+70</b>												
	<i>Subtotal</i>										\$0	
<b>Reach E4 - Jordan Creek North Branch 0+00 to 24+75</b>												
	No Work											
	<i>Subtotal</i>											
<b>Reach E5 - Jordan Creek North Branch 24+76 to 81+21</b>												
	No Work											
	<i>Subtotal</i>											
<b>Reach E6 - Jordan Creek South Branch 0+00 to 91+78</b>												
00	Periodic Inspections	1	1	1	1	Job			\$0	\$0	\$0	
	Automobile Bridge Inspections	2	1	1	1	Job			\$0	\$0	\$0	Every 2 years
02	No added OMM&R											
09	Mowings	1	3	4.726	14.2	Acres			\$0	\$0	\$0	3 times per year

OPERATION, MAINTENANCE, REPAIR, REHABILITATION AND REPLACEMENT

Date Prepared: April 9, 2013

Jordan Creek Flood Risk Management Feasibility Study, Springfield, Missouri

Life Cycle: 50 years

Rate of Return: 3.75 percent

Plan J

Jordan Creek Flood Risk Management Feasibility Study, Springfield, Missouri			O&M and Major Replacement Costs						Equivalent Average Annual O&M/Major Replacement Value			
									Present Value			
Code	Item Description	Estimate O&M Cycle, years	Quantity Factor	Project Quantity	O&M Quantity	Unit	Project Unit Price	O&M Amount	O&M	Major Replacement	Annual Cost	Comments
	Woody Vegetation Control	4	0.25	4.726	1.2	Acres			\$0	\$0	\$0	Every four years
	Sediment Removal	1	1		5	CY			\$0	\$0	\$0	Annually
	Trash/Debris Removal	1	1		1	Job			\$0	\$0	\$0	Annually
	Scour Repair	5	0.2		5	CY			\$0	\$0	\$0	Once every 5 years
	Riprap Repair	10	0.1		9	CY			\$0	\$0	\$0	Once every 10 years
	National Culvert	10	0.01	1	0.1	LS			\$0	\$0	\$0	
	Railroad Near Sherman	10	0.01	1	0.1	LS			\$0	\$0	\$0	
	Sherman Street Culvert	10	0.01	1	0.1	LS			\$0	\$0	\$0	
	<i>Subtotal</i>								\$0	\$0	\$0	
											\$0	
<b>Reach EON - Detention Ponds on North Branch of Jordan Creek</b>												
00	Periodic Inspections	1	1	1	1	Job	\$914.00	\$914	\$20,505	\$0	\$914	
15	Mowings	1	3	10.7	32.1	Acres	\$85.58	\$2,747	\$61,630	\$0	\$2,747	3 times per year
	Woody Vegetation Control	4	0.25	10.7	2.7	Acres	\$760.97	\$2,036	\$20,021	\$0	\$892	Every four years
	Washout Repair	10	0.1		31	CY	\$56.50	\$1,752	\$7,852	\$0	\$350	Once every 10 years
	Outlet Structure Detention Basin 11	10	0.01	1	0.1	LS	\$70,729.29	\$7,073	\$31,710	\$61,042	\$24,734	
	Outlet Structure Detention Basin 11c	10	0.01	1	0.1	LS	\$95,461.84	\$9,546	\$42,798	\$82,387	\$33,383	
	<i>Subtotal</i>										\$63,020	
<b>Reach EOS - Detention Ponds on South Branch of Jordan Creek</b>												
00	Periodic Inspections	1	1	1	1	Job	\$914.00	\$914	\$20,505	\$0	\$914	
15	Mowings	1	3	13	39.0	Acres	\$85.58	\$3,338	\$74,878	\$0	\$3,338	3 times per year
	Woody Vegetation Control	4	0.25	13	3.3	Acres	\$760.97	\$2,473	\$24,324	\$0	\$1,084	Every four years
	Washout Repair	10	0.1		31	CY	\$56.50	\$1,752	\$7,852	\$0	\$350	Once every 10 years
	Outlet Structure Detention Basin 6	10	0.01	1	0.1	LS	\$133,988.00	\$13,399	\$60,070	\$115,636	\$46,855	
	Outlet Structure Detention Basin 7	10	0.01	1	0.1	LS	\$133,988.00	\$13,399	\$60,070	\$115,636	\$46,855	
	Outlet Structure Detention Basin 9B	10	0.01	1	0.1	LS	\$67,834.00	\$6,783	\$30,412	\$58,543	\$23,721	
	<i>Subtotal</i>										\$123,117	



## 20130405 Plan J NED Plan Construction Schedule, Jordan Creek, Springfield, MO FRM Feasibility Study 354082

ID	Task Name	Duration	Start	Finish	Predecessors	2013					2014				2015				2016				2017				2018			
						tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr
26	Final Design Reach 1	88 days	Fri 11/20/15	Mon 3/28/16	7																									
27	Relocations	5 mons	Tue 3/29/16	Wed 8/31/16	20,26																									
28	Reach 1 Project Construction	7 mons	Wed 1/11/17	Fri 8/18/17	9																									
29	Project Closeout	66 days	Mon 8/21/17	Fri 11/24/17	28																									
30	Final project accounting	66 days	Mon 11/27/17	Fri 3/2/18	29																									



Project: 20130405 Plan J NED Plan Co  
Date: Mon 4/8/13

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

