



Malas Engineering LLC

Integrated Innovative Solutions and Excellence in Engineering

August 15, 2017

Karl Stave, PE
Architecture, Engineering & Environmental Services
DAS - Facilities Management Division
633 W. Wisconsin Ave., Suite 1000
Milwaukee, WI 53203

DRAFT

Ref.: Alternative Replacement - Lyons Park Pedestrian Bridges over Lyons Park Creek.

Dear Mr. Stave,

Please find attached the alternative cost analysis to replace the subject Lyons Park Pedestrian Bridges. They are relatively similar in size and geometry. We will be discussing the replacement alternatives for one of these bridges, which is reasonably applicable to all three. Of course, the northerly and middle bridges or bridges number 3 and 2 respectively require your immediate consideration.

In evaluating alternatives, consideration was given to existing and proposed hydraulic of the Lyons Park Creek (a tributary to the KK River). The existing hydraulic model was provided by SEWRPC and the proposed model was provided by MMSD. The 100-Year flows and elevations were obtained from these models and summarized in Attachment "A". Accordingly, the 100-Year flow elevations varied between 731.65' and 735.82' from the north to the south, while respectively the creek bed elevation varied between 721' and 726.41'. Basically the 100-Year elevations are about 10 feet above the creek bed, while the bottom of the existing bridges are between 6.5' and 8.5' above the creek bed. The tops are approximately 8' to 10' feet above the creek bed.

In the evaluation of alternatives, we excluded the rigid frame and culvert options due to hydraulic concerns and MMSD reservation to having them flow under pressure (submerged) during the 100-Year event. Although freeboard is desirable on all bridge replacement alternatives, it requires raising the profile several feet. Some of the proposed alternatives provide slightly longer span to move the abutment further away from the natural creek banks and are raised slightly to reduce the frequency of potential high flow impediment.

The following alternatives were considered:

- **Alternative A – Replacement of Superstructure.** This alternative includes reutilizing existing abutment and replacing the steel framing and wood railing and decking.
- **Alternative B – Complete Replacement with Steel Framing and Wood Deck.** This includes the complete replacement of the existing bridge with new abutments, steel framing, wood deck, and wood railing. The new bridge will be slightly longer and higher.
- **Alternative C – Complete Replacement with Concrete Slab and Wood Railing.** This includes the complete replacement of the existing bridge with new abutments, concrete slab, and wood railing. The new bridge will be slightly longer and higher.
- **Alternative D – Complete Replacement with Prefabricated Truss.** This includes the complete replacement of the existing bridge with new abutments, prefabricated steel truss, and wood deck. The new bridge will be slightly longer and higher.
- **Alternative E – Complete Replacement with Prefabricated Wood Deck Steel Framing Bridge.** This includes the complete replacement of the existing bridge with new abutment, prefabricated superstructure of wood deck on steel framing. The new bridge will be slightly longer and higher.

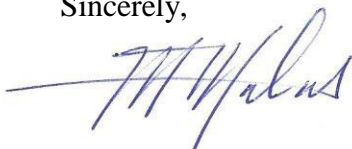
The following table shows the different alternatives with their associated cost:

Alternative	COST
A	\$96,382
B	\$154,362
C	\$127,010
D	\$138,710
E	\$154,310

Estimate based on bid work in 2018. All new steel is weathering steel. See breakdown of the estimates on Attachment “B”.

My recommendation is to proceed with alternative c or d. If you have any questions, please contact me. Thank you.

Sincerely,



Mahmoud (Mac) N. Malas, PE

Enclosed: Attachment “A” Hydraulic Information
Attachment “B” Cost Estimates

Attachment "A"

Lyons Park Creek / KK River Hydraulic Information through Lyons Park						
Creek Station	Existing Model/SEWRPC			Proposed Model/MMSD		
	100 YR Q	100 YR Elev.	Creekbed Elev.	100 YR Q	100 YR Elev.	Creekbed Elev.
North End of the Park	600 CFS	731.65	721.00	1450 CFS	729.98	721.00
Middle of the Park	600 CFS	733.89	724.04	1450 CFS	733.99	724.04
Southeast End of the Park	600 CFS	735.60	726.41	1450 CFS	735.82	726.41

RS 0.87

RS 1.00

RS 1.097



MILWAUKEE COUNTY
PARKS
N · A · T · I · O · N · A · L
GOLD MEDAL WINNER

RIVER STA.
0.898



RIVER STA.
0.964

S. 57TH ST.

S. 55TH ST.






RIVER STA.
1.068

W. HOLT AVE.

Lyons Park

3301 S. 55 St.
Milwaukee, WI 53219
Unit Office: (414) 672-5052

Park Legend

-  Park Land
-  Shrubs & Trees
-  Park Building
-  Tot Lot
-  Wading Pool

Parks Information
(414) 257-PARK (7275)
countyparks.com

0 20 40 80 120 160
Feet
PARK ACREAGE: 12.4

UPDATED JULY '12

File Options Help

Enter/Edit Number of Profiles (25000 max): Reach Boundary Conditions ...

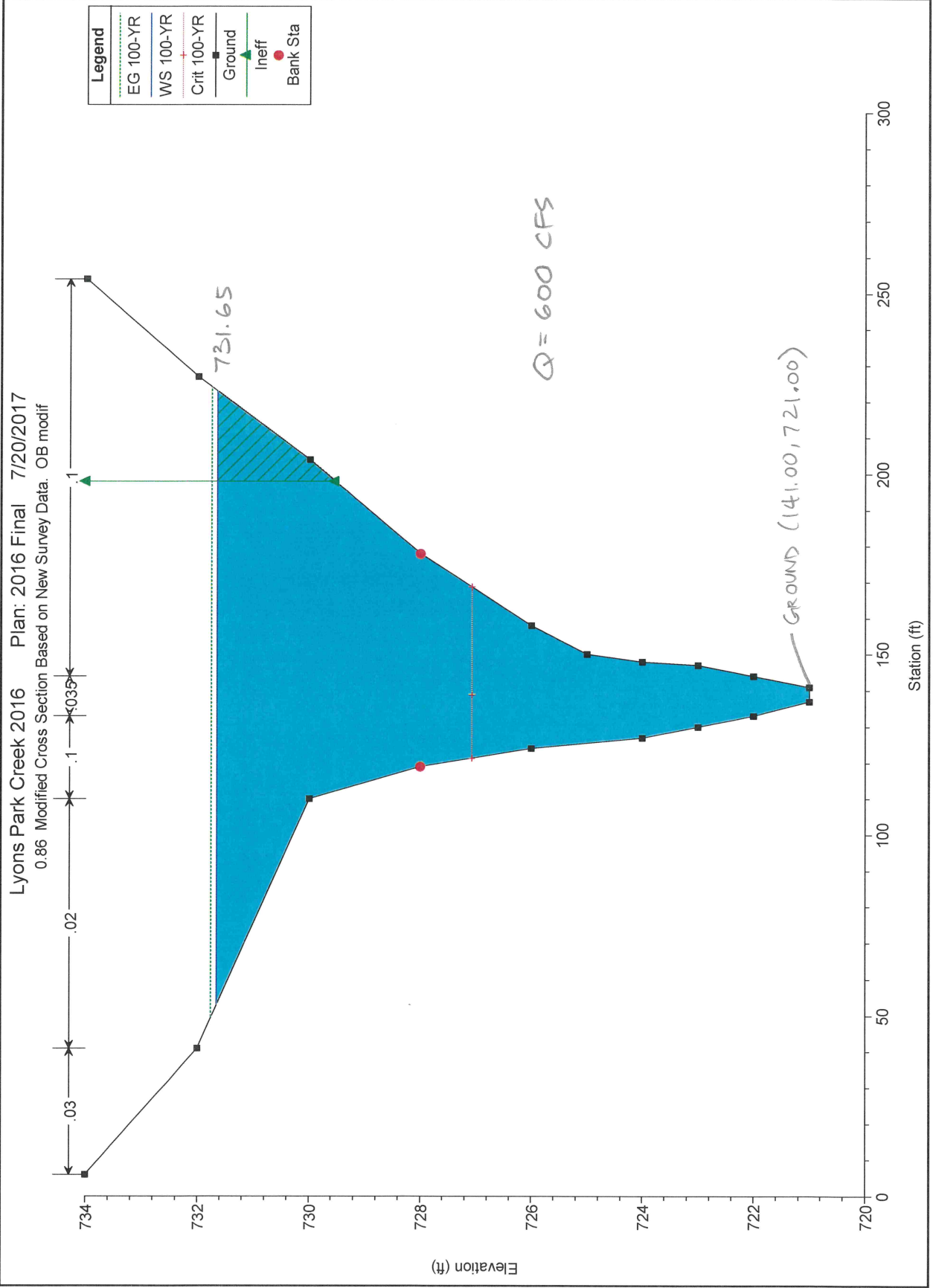
Locations of Flow Data Changes

River: Reach: River Sta.:

Flow Change Location				Profile Names and Flow Rates				
	River	Reach	RS	10-YR	25-YR	50-YR	100-YR	500-YR
1	Lyons Park Creek	Mainstem #1	1.31	453	614	751	903	1320
2	Lyons Park Creek	Mainstem #1	1.15	705	930	1110	1310	1830
3	Lyons Park Creek	57th St. Culvert	0.859	555	595	610	600	543
4	Lyons Park Creek	57th St. Overflo	0.04	150	335	500	710	1287
5	Lyons Park Creek	Mainstem #2	0.816	705	930	1110	1310	1830
6	Lyons Park Creek	Mainstem #3	0.687	705	820	840	855	890
7	Lyons Park Creek	Mainstem #3	0.53	955	1177	1284	1394	1680
8	Lyons Park Creek	Mainstem #3	0.45	955	1220	1377	1539	1871
9	Lyons Park Creek	Mainstem #3	0.41	955	1221	1383	1563	1932

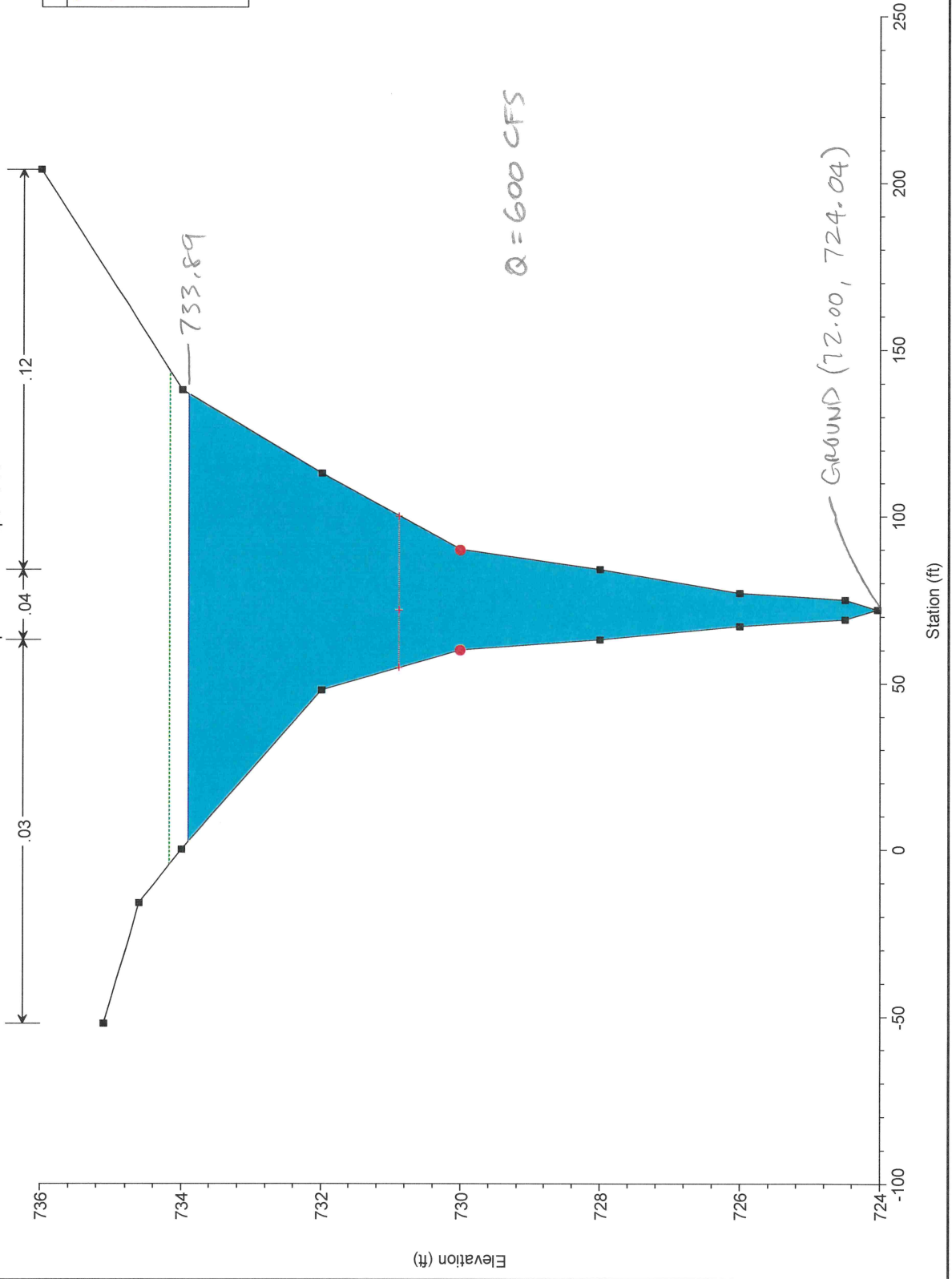
Edit Steady flow data for the profiles (cfs)

MAIN STEM #1
 RIVER STA. 0.87
 EXISTING



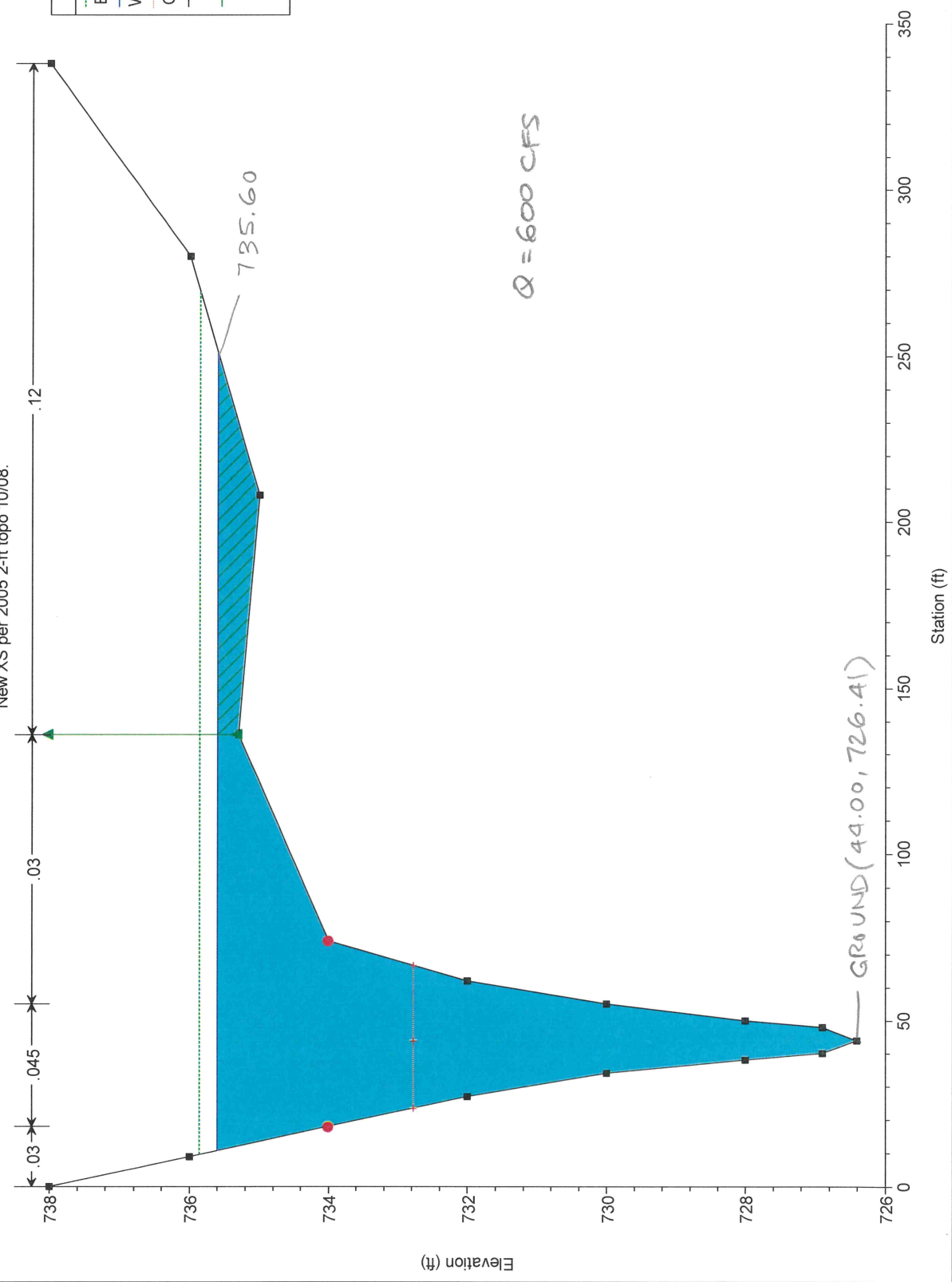
MAIN STEM #1
 RIVER STA. 1.00
 EXISTING

Lyons Park Creek 2016 Plan: 2016 Final 7/20/2017
 New XS per 2005 2-ft topo 10/08.



MAIN STEM #1
RIVER STA. 1.097
EXISTING

Lyons Park Creek 2016 Plan: 2016 Final 7/20/2017
New XS per 2005 2-ft topo 10/08.



Steady Flow Data - Proposed FFA 100yr

File Options Help

Enter/Edit Number of Profiles (25000 max): Reach Boundary Conditions ...

Locations of Flow Data Changes

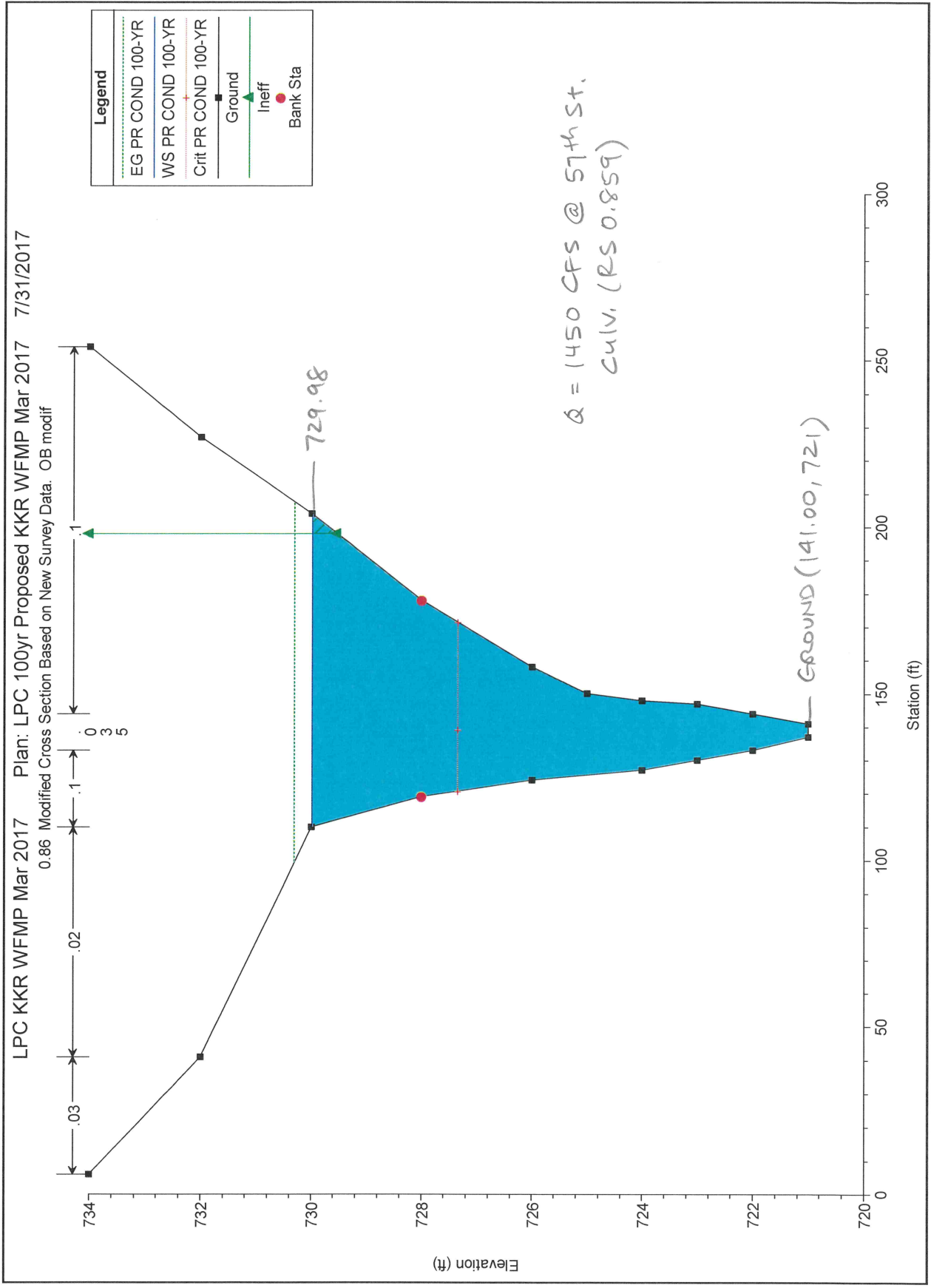
River:

Reach: River Sta.:

Flow Change Location		Profile Names and Flow Rates	
River	Reach	RS	PR COND 100-YR
1	Lyons Park Creek Mainstem #1	1.31	903
2	Lyons Park Creek Mainstem #1	1.15	1450
3	Lyons Park Creek 57th St. Culvert	0.859	1450
4	Lyons Park Creek 57th St. Overflo	0.04	0.0001
5	Lyons Park Creek Mainstem #2	0.816	1450
6	Lyons Park Creek Mainstem #3	0.687	1450
7	Lyons Park Creek Mainstem #3	0.53	1990
8	Lyons Park Creek Mainstem #3	0.45	1990
9	Lyons Park Creek Mainstem #3	0.41	1990

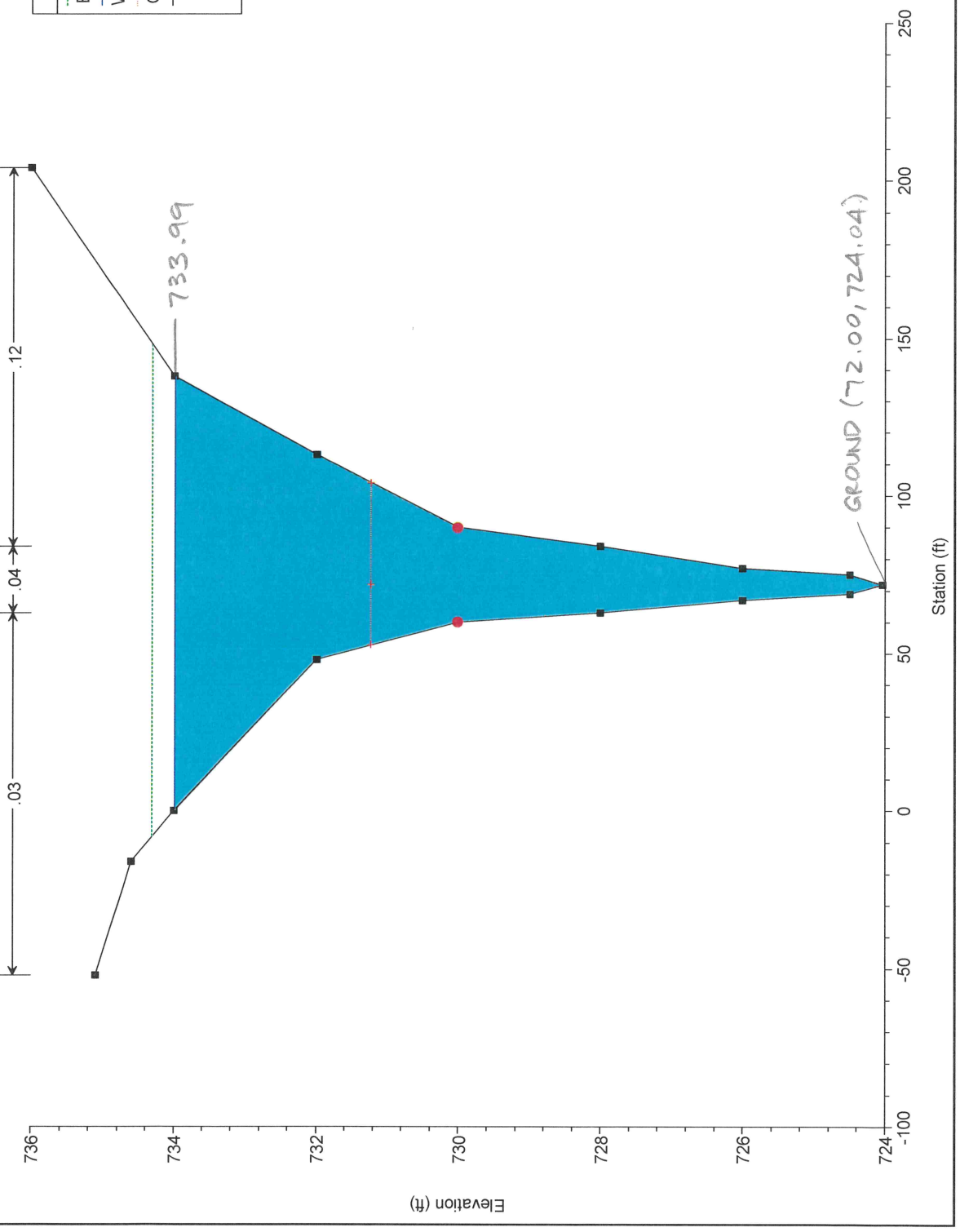
Edit Steady flow data for the profiles (cfs)

MAIN STEM #1
 RS 0.87
 PROPOSED



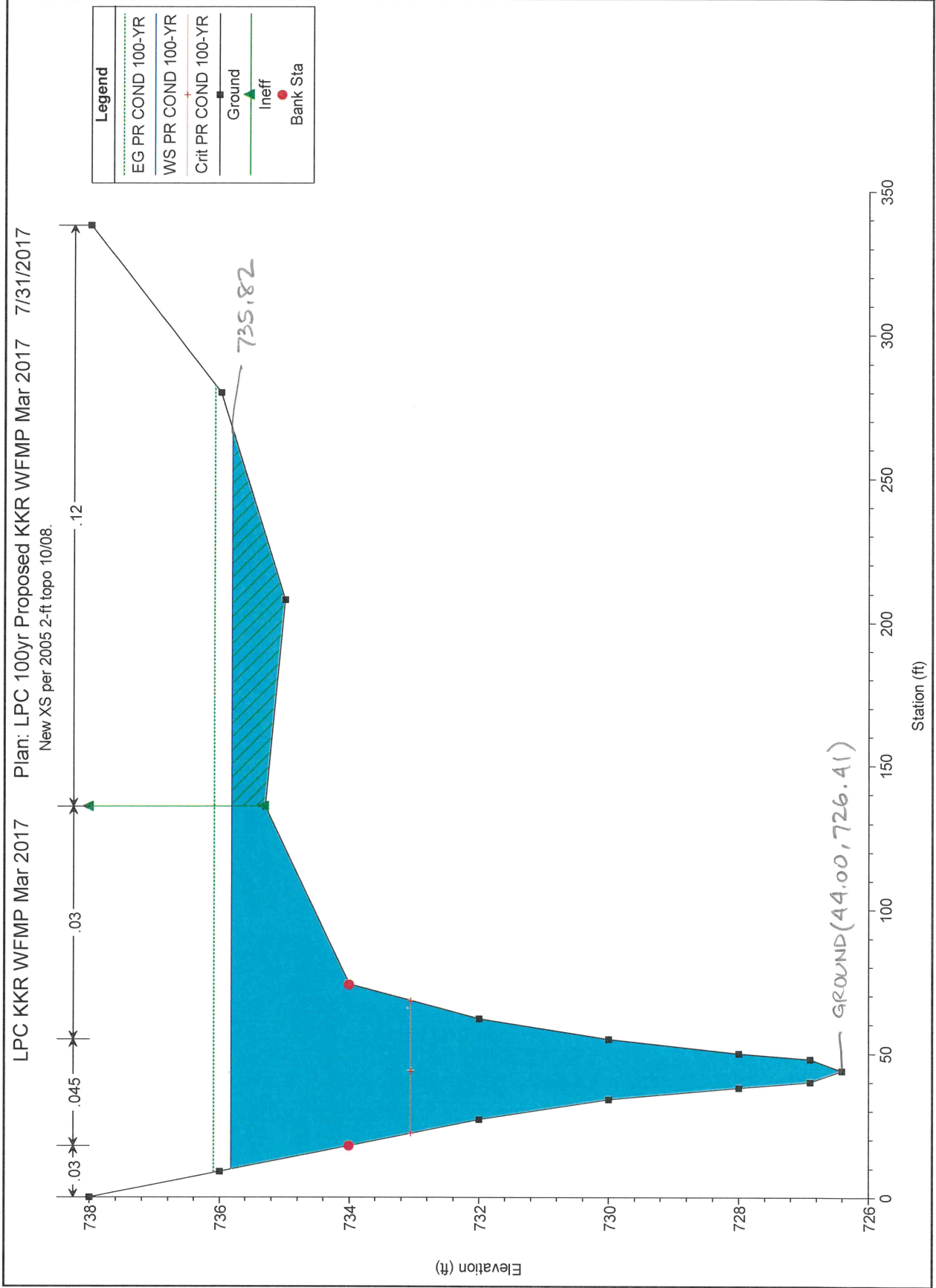
MAIN STEM # 1
RS 1.00
PROPOSED

LPC KKR WFMP Mar 2017 Plan: LPC 100yr Proposed KKR WFMP Mar 2017 7/31/2017
New XS per 2005 2-ft topo 10/08.



Legend	
EG PR COND 100-YR	(Dashed line)
WS PR COND 100-YR	(Solid line)
Crit PR COND 100-YR	(Red line)
Ground	(Black square)
Bank Sta	(Red circle)

MAINSTEM #1
 RS 1.097
 PROPOSED





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Project I.D.: 9120-16662

Date: 8/14/2017

Project Description: **Alternative B / Complete Replacement Steel** - Lyons Park
Pedestrian Bridge over the Lyons Park Creek / KK River

Client: Milw County

Computation By: MNM

Structure No.: 1, 2, or 3

BID ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
Bridge				\$102,740
Removal and Disposal of Existing Bridge	LS	1	\$10,000.00	\$10,000.00
New Weathering Structural Steel Framing	LB	8,000	\$5.00	\$40,000.00
Concrete Abutment	CY	22	\$600.00	\$13,200.00
New Wood Deck	SF	380	\$18.00	\$6,840.00
New Wood Railing	LF	120	\$35.00	\$4,200.00
Grading & Scour Protection Improvements	LS	2	\$7,500.00	\$15,000.00
Excavation & Filling for Structure	CY	100	\$35.00	\$3,500.00
Misc	LS	1	\$10,000.00	\$10,000.00
Trail				\$16,000
Approach Trail and Railing Removal (30 Feet)	LS	2	\$3,000.00	\$6,000.00
Trail Paving with Crushed Aggregate Base	SF	400	\$7.50	\$3,000.00
Approach Wood Railing w/foundation	LF	40	\$50.00	\$2,000.00
Misc	LS	1	\$5,000.00	\$5,000.00

Subtotal Construction Cost Estimate:	\$118,740
Total Estimated Design Services 15%	\$17,811
Construction Management/Oversight 5%	\$5,937
Owner Services 10%	\$11,874
Total Project Cost Estimate:	\$154,362



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Project I.D.: 9120-16662

Date: 8/14/2017

Project Description: **Alternative C / Complete Replacement Concrete** - Lyons Park
Pedestrian Bridge over the Lyons Park Creek / KK River

Client: Milw County

Computation By: MNM

Structure No.: 1, 2, or 3

BID ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
Bridge				\$71,700
Removal and Disposal of Existing Bridge	LS	1	\$10,000.00	\$10,000.00
New Reinforced Concrete Slab	CY	24	\$650.00	\$15,600.00
Concrete Abutment & Wing Walls	CY	22	\$600.00	\$13,200.00
New Wood Railing	LF	110	\$40.00	\$4,400.00
Grading & Scour Protection Improvements	LS	2	\$7,500.00	\$15,000.00
Excavation & Filling for Structure	CY	100	\$35.00	\$3,500.00
Misc	LS	1	\$10,000.00	\$10,000.00
Trail				\$26,000
Approach Trail and Railing Removal (30 Feet)	LS	2	\$3,000.00	\$6,000.00
Trail Paving with Crushed Aggregate Base	SF	400	\$7.50	\$3,000.00
Approach Wood Railing w/foundation	LF	40	\$50.00	\$2,000.00
Misc	LS	1	\$15,000.00	\$15,000.00

Subtotal Construction Cost Estimate:	\$97,700
Total Estimated Design Services 15%	\$14,655
Construction Management/Oversight 5%	\$4,885
Owner Services 10%	\$9,770
Total Project Cost Estimate:	\$127,010



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Project I.D.: 9120-16662

Date: 8/14/2017

Project Description: **Alternative D / Complete Replacement Prefab Truss - Lyons Park**
Pedestrian Bridge over the Lyons Park Creek / KK River

Client: Milw County

Computation By: MNM

Structure No.: 1, 2, or 3

BID ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
Bridge				\$90,700
Removal and Disposal of Existing Bridge	LS	1	\$10,000.00	\$10,000.00
Prefabed Bridge Installed	LF	60	\$650.00	\$39,000.00
Concrete Abutment	CY	22	\$600.00	\$13,200.00
Grading & Scour Protection Improvements	LS	2	\$7,500.00	\$15,000.00
Excavation & Filling for Structure	CY	100	\$35.00	\$3,500.00
Misc	LS	1	\$10,000.00	\$10,000.00
Trail				\$16,000
Approach Trail and Railing Removal (30 Feet)	LS	2	\$3,000.00	\$6,000.00
Trail Paving with Crushed Aggregate Base	SF	400	\$7.50	\$3,000.00
Approach Wood Railing w/foundation	LF	40	\$50.00	\$2,000.00
Misc	LS	1	\$5,000.00	\$5,000.00

Subtotal Construction Cost Estimate:	\$106,700
Total Estimated Design Services 15%	\$16,005
Construction Management/Oversight 5%	\$5,335
Owner Services 10%	\$10,670
Total Project Cost Estimate:	\$138,710



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Project I.D.: 9120-16662

Date: 8/14/2017

Project Description: **Alternative E / Complete Replacement Prefab Steel Stringer -**
Lyons Park Pedestrian Bridge over the Lyons Park Creek / KK River

Client: Milw County

Computation By: MNM

Structure No.: 1, 2 , or 3

BID ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
Bridge				\$102,700
Removal and Disposal of Existing Bridge	LS	1	\$10,000.00	\$10,000.00
Prefabed Bridge Installed	LF	60	\$850.00	\$51,000.00
Concrete Abutment	CY	22	\$600.00	\$13,200.00
Grading & Scour Protection Improvements	LS	2	\$7,500.00	\$15,000.00
Excavation & Filling for Structure	CY	100	\$35.00	\$3,500.00
Misc	LS	1	\$10,000.00	\$10,000.00
Trail				\$16,000
Approach Trail and Railing Removal (30 Feet)	LS	2	\$3,000.00	\$6,000.00
Trail Paving with Crushed Aggregate Base	SF	400	\$7.50	\$3,000.00
Approach Wood Railing w/foundation	LF	40	\$50.00	\$2,000.00
Misc	LS	1	\$5,000.00	\$5,000.00

Subtotal Construction Cost Estimate:	\$118,700
Total Estimated Design Services 15%	\$17,805
Construction Management/Oversight 5%	\$5,935
Owner Services 10%	\$11,870
Total Project Cost Estimate:	\$154,310