

5.2 Park Flood Protection Evaluation

The Park flood protection evaluation was based on regulatory considerations, desired level of protection, berm structure analysis, and pre-and post- flood protection activity related cost analysis.

5.2.1 Regulatory Considerations

According to the effective FEMA Flood Study 290294V000 (FEMA Study) and FIRM 2902940001B both dated May 15, 1978, the entire English Landing Park is located within the regulated floodway as shown on Figure 5-2. This conclusion was reached as the 100-year floodplain boundary is located north of the entire Park and the FIRM for this area does not delineate the floodway. Per the FEMA Study, Pages 7 through 10, whenever the floodway edge and the 100-year floodplain boundary coincide only the floodway boundary is shown. The preliminary D-FIRM and profile does not remove the Park from the floodway (refer to Figure 3-2).

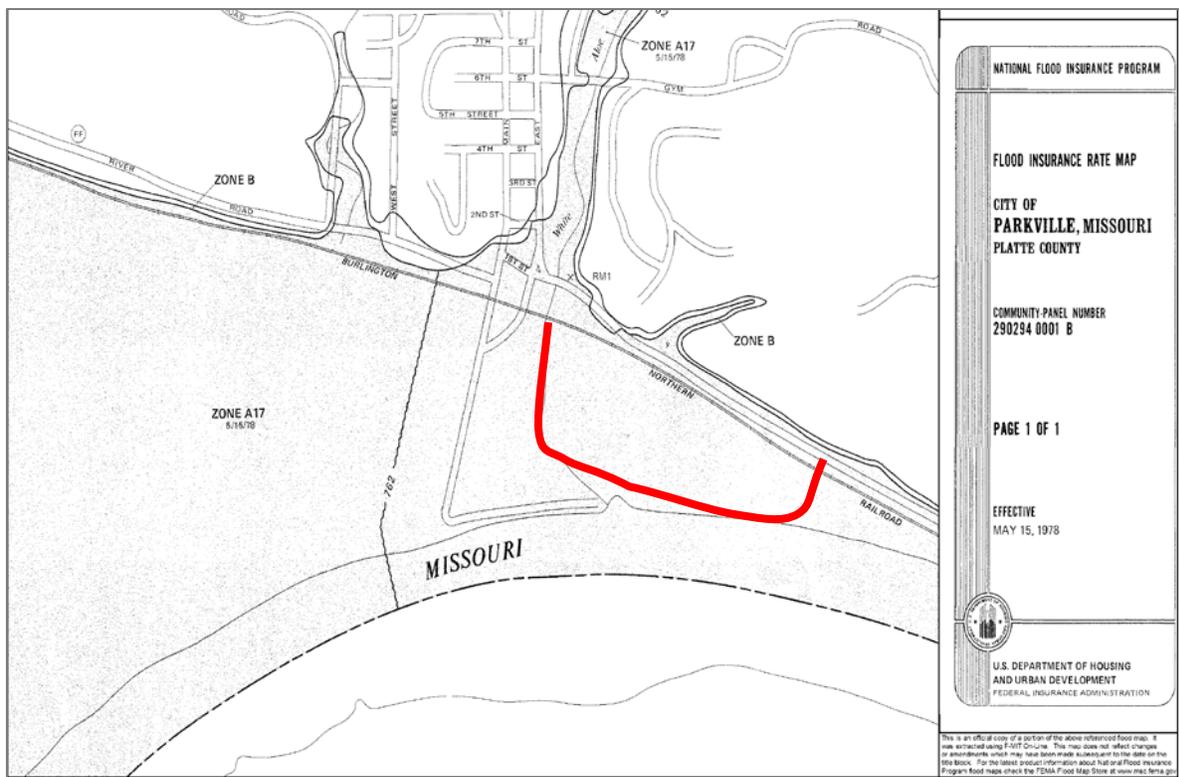


Figure 5-2 English Landing Park Study Area and FEMA Floodway

Per 44 CFR 60.3 (d) (3) communities should prohibit encroachment (including fill) in floodways unless a hydrologic and hydraulic analysis, performed in accordance with standard engineering practice, demonstrates that the proposed encroachment will not result in any increase in the flood levels within the community during the occurrence of the base flood discharge.

5.2.2 Level of Protection

Flood protection for the 10-Percent Annual Chance Flood (commonly referred to as the 10-year) event was chosen in order to meet the goal of a providing between a 5-year to 25-year level of flood protection for the Park. The reason for utilizing this flood event is that this is the only event within the 5-year to 25-year event range in the effective and preliminary FEMA model and profile. Per the preliminary profiles for the Missouri River as shown on Figure 3-2 in Section 3, the 10-Percent Annual

Chance Flood event WSE (dashed blue line) for the Missouri River at the Park is 752 feet. Per the City provided 2-foot contours and the survey performed in November 2012, the average ground surface elevation of the Park along the Missouri River is 746 feet.

It should be noted that the HDR 1999 report stated the elevation of the toe of the berm as 750 feet versus the average of 746 feet along the trail demonstrated by the November 2012 survey. The berm height needed to achieve a 10-Percent Annual Flood Chance protection was determined to be 6 feet. This was calculated based on the difference between the average ground elevation of 746 feet and the 10-Percent Annual Chance Flood WSE of 752 feet.

5.2.3 Berm Structure Analysis

The 2012 American Association of State Highway and Transportation Officials' (AASHTO) Guide for the Development of Bicycle Facilities provides design criteria for a shared use path, such as the Riverfront Trail. Should the Riverfront Trail be reconstructed as part of the flood protection, it is recommended to follow these design criteria. The design criteria are defined in Table 5-1.

Table 5-1 Shared Use Path Design Criteria per AASHTO

Description	Design Criteria
Two-directional shared path	10-foot minimum 11-foot minimum to allow for passing with steep side slopes
Berm Slope	1V:3H
Shoulder width	2-foot minimum 5-foot recommended when path is adjacent to bodies of water or downward slopes of 1V:3H or steeper*
Obstacle clearance	2-foot minimum from edge of path to edge of obstacle

* If the width is less than 5-foot AASHTO recommends that a physical barrier be placed if slopes of 1V:3H or greater are used next to a parallel body of water. The physical barrier can consist of dense shrubbery, railing, or fencing.

The current trail is approximately 6 feet lower than the 10-Percent Annual Chance Flood event WSE. Since the scope of work for this project states that overtopping of the flood protection system is considered acceptable, no freeboard was included in this estimation (44 CFR recommends no less than 2 feet of freeboard). Taking into consideration the proximity and multi-purpose function of the trail to the river in conjunction with the steepness of the slope of the sides of the berm it is recommended that the top of the berm be no narrower than 21 feet using AASHTO design criteria. The dimensions of the berm to provide flood protection for a 10-Percent Annual Chance Flood event are shown on Figure 5-3 and listed in Table 5-2.

Table 5-2 Park Berm Dimensions

Description	Dimension
Berm Height	6 feet
Berm Top Width	21 feet
Shoulder width	4 feet on land side (to allow for benches and lights along trail) 5 feet adjacent to the Missouri River
Trail Width	12 feet
Total Berm Width	57 feet (accounts for both sides maintaining a 1V:3H slope)
Berm Length	2,700 feet

This Park is renowned for its many festivals (Arts, Blues, Jazz, and RiverJam, Parkville Days, Turkey Trot, and Christmas on the River) and is frequented by many people who currently enjoy its “scenic walking trails” which provide a unique connectivity to the Missouri River (City of Parkville English Landing Webpage, 2012). The height of the berm at 6 feet obstructs the view of the Missouri River from within the Park as shown on Figure 5-4. An additional negative impact would be the loss of over 50 mature trees, as shown on Figure 5-5, which currently run along the length of the Riverfront Trail.



Figure 5-4 Superimposed 6-foot High Berm along West Side of Park



5.2.4 Cost Analysis of Flood Protection Options

The cost analysis of the flood protection options for the Park was performed utilizing a historical flood analysis of the Park, conceptual costs of building and maintaining a berm, and the historical flood repair costs from the City.

5.2.4.1 Background to Recommendation Analysis Approach: Historical Flood Analysis at Park

Using historical U.S. Geological Survey (USGS) gauge data, the number of days that the WSE has exceeded the average ground elevation in the Park was estimated (Table 5-3). Two USGS gauges were used, one upstream of the Park (Gauge 06820475) and one downstream of the Park (Gauge 06893000), to interpolate the daily WSE at the Park. This WSE was then compared to the average ground elevation in the Park. Figure 5-6 provides a visual representation of this analysis.

Table 5-3 Gauge Analysis of Historical Record of Flooding at English Landing Park

Period of Record	Days of Record/Year	Number of Days WSE Greater than 746 feet	Percentage of Year
Days in 1990	91	0	0.00%
Days in 1991	364	0	0.00%
Days in 1992	365	4	1.10%
Days in 1993	364	57	15.66%
Days in 1994	364	0	0.00%
Days in 1995	364	37	10.16%
Days in 1996	365	11	3.01%
Days in 1997	364	2	0.55%
Days in 1998	364	7	1.92%
Days in 1999	364	12	3.30%
Days in 2000	365	0	0.00%
Days in 2001	364	2	0.55%
Days in 2002	364	0	0.00%
Days in 2003	364	0	0.00%
Days in 2004	365	0	0.00%
Days in 2005	364	0	0.00%
Days in 2006	364	0	0.00%
Days in 2007	364	7	1.92%
Days in 2008	365	9	2.47%
Days in 2009	364	0	0.00%
Days in 2010	333	15	4.50%
Days in 2011	364	76	20.88%
Days in 2012	226	0	0.00%
Total Historical Gauge	7935	239	3.01%
	<i>Number of days where Missouri River WSE calculated to exceed 746 feet.</i>		

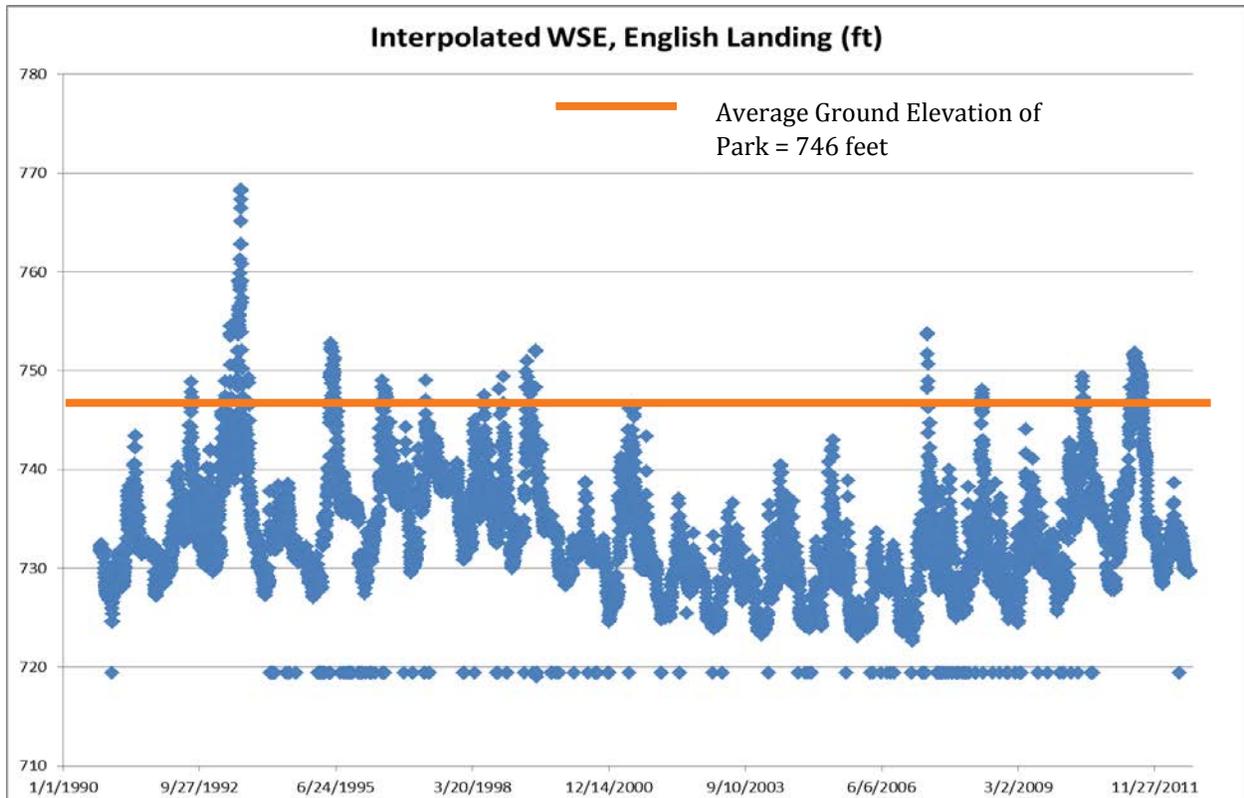


Figure 5-6 Visual Representation of Gauge Analysis of Historical Record of Flooding at English Landing Park

For the historical gauge record, it is estimated that the Park experiences Missouri River flooding approximately 3-percent of the time. This flooding has happened during 12 years of the total 22 year record of data.

An analysis was also completed comparing the historical gauge data to an approximate berm height of 6 feet for the Park. The goal of this analysis was to approximate the frequency at which the Park would still experience flooding from the Missouri River, even with the installation of a berm. With the installation of a berm, it is estimated that the number of days that the Park would have experienced flooding during the historical record would have been reduced by 198 days to 41 days of flooding. With the installation of a berm 6 feet in height, flooding would still occur in the Park approximately 1-percent of the time.

At the time of this study, flood repair costs incurred specifically for the Park were not available for the entire historical record or gauge data. However, City staff verbally quoted an average flood repair expense of the Park from 2007 through 2012 at \$416,667 per event. These expenses included general clean-up efforts, sediment removal, seeding, and landscaping.

Option #1 No Action: Budget for Park Clean Up

With flooding occurring at the Park less than 3-percent of the time based on the historical gauge data, one approach to addressing flood repair costs incurred is for the City to proactively budget for these anticipated costs using a pay-as-you-go sinking fund approach. This type of fund accumulates revenues until sufficient money is available for an identified project, or, in this case, a known cost incurred by the City on a regularly occurring basis. This would assist the City in building a fund to specifically address the flood recovery efforts in the Park when they are incurred.

To estimate the needed annual contribution to this type of fund in order to build an adequate safety-net, the average annual flood repair expense at the Park was extrapolated over the number of years in the historical record that the Park has experienced flooding based on the USGS gauge interpolation (Table 5-3).

$$\begin{aligned}
 & \text{(Total Historical Estimated Cost for Flood Repairs to Park)} \\
 = & \text{(Average Annual Flood Repair Expense, 2007 – 2012)} \\
 & \text{multiplied by} \\
 & \text{(Number of Years of Park Flooding)} \\
 \\
 & \$5,000,004 = \$416,667 \times 12 \text{ years}
 \end{aligned}$$

This total estimated historical cost incurred for flood repairs at the Park was then divided by the total number of years in the historical record to obtain an annual cost incurred for flood repairs.

$$\begin{aligned}
 & \text{(Historical Annual Cost of Flood Repairs to Park)} \\
 = & \frac{\text{(Total Historical Estimated Cost for Flood Repairs to Park)}}{\text{(Number of Years in Historical Record)}} \\
 \\
 & \$228,000 = \$5,000,004 \div 22
 \end{aligned}$$

Therefore, it is estimated that the City could contribute approximately \$230,000 annually to a sinking fund dedicated to Park flood repairs in order to anticipate the costs incurred from a flood event. Table 5-4 summarizes the estimated cost for this option.

Table 5-4 Option #1 No Action, Budget for Park Clean Up, Estimated Annual Cost

Total Annual Flood Repair Estimate Based on Historical Gauge Record	
Average Flood Repair Cost	\$416,667
Total Historical Estimated Flood Repair Cost	\$5,000,004
<i>Average Annual Flood Repair Cost</i>	<i>\$228,000</i>
<i>Recommended Annual Sinking Fund Budget, Park</i>	<i>\$230,000</i>
Total City Annual Costs	\$230,000

Option #2 Six-Foot Berm Construction: Raise Trail Elevation to 752 feet

The City has expressed a desire to construct a berm to provide flood protection of the Park as described previously. Table 5-5 provides a conceptual level estimated one-time construction cost of a berm 6 feet in height and Figure 5-1 shows an approximate alignment of this berm. This berm is estimated to provide the Park protection from a 10-year flood event.

Table 5-5 Option #2 Six-Foot Berm Construction, Estimated Conceptual Construction Cost to Raise the Trail Elevation to 752 feet

Estimated Conceptual Construction Cost of Berm		
Initial Construction Cost Description	Cost	Assumptions
Berm (6 feet) Estimated Construction Cost	\$1,184,349	Initial Cost, (27,543 Cubic Yards * \$43 ¹ /CY)
Utility Coordination/Relocation (8% of Construction Cost)	\$94,748	Benches and Electrical Relocation; Tree Removal
Local/State/Federal Permitting (5% of Construction Cost)	\$59,217	CLOMR/LOMR/MDNR Permitting
Engineering Design Fee (15% of Construction Cost)	\$177,652	Geotechnical Design Required
Contingency (25% of Construction Cost)	\$296,087	
Total Conceptual Construction Costs	\$1,812,054	

¹ Cost per cubic yard based on the HDR 1999 report converted to 2013 dollars using Engineering News Record multiplier.

Along the trail alignment, berm construction elevation should adhere to the “Shared Use Path Design Criteria” per AASHTO for trail design (Figure 5-3). For the purposes of this analysis, a 10- to 12-foot trail width was assumed. For the portions of the berm east of the Park road cul-de-sac, a 2-foot wide shoulder on the dry side of the berm and a 5-foot wide shoulder on the river side of the berm were assumed for fill calculations.

While the berm may initially seem a more permanent solution with less recurring costs, annual costs are still incurred with routine inspection and maintenance of a berm. Because a berm would only be constructed to provide a 10-year level of protection for the Park, flooding would still occur and, therefore, the City would still incur flood repair and clean-up costs to the Park. These costs are typically not reimbursable by Federal flood recovery assistance programs, and therefore should be addressed through budgeting endeavors. The estimation of Option #2 annual costs used the same approach for estimating costs as presented in Option #1. The average cost incurred for flood repair expenses at the Park between 2007 and 2012 was extrapolated over the number of years in the historical record that the Park has experienced flooding greater than the estimated 6-foot height of the berm (752 feet) based on the USGS gauge interpolation (Table 5-3).

$$\begin{aligned}
 & \text{(Total Historical Estimated Cost for Flood Repairs to Park)} \\
 & = \text{(Average Annual Flood Repair Expense, 2007 – 2012)} \\
 & \quad \text{multiplied by} \\
 & \quad \text{(Number of Years of Park Flooding With Berm)} \\
 & \\
 & \$1,666,668 = \$416,667 \times 4 \text{ years}
 \end{aligned}$$

This total estimated historical cost incurred for flood repairs at the Park was then divided by the total number of years in the historical record to obtain a conceptual annual cost that the City would still incur for flood repairs.

$$\begin{aligned}
 & \text{(Historical Annual Cost of Flood Repairs to Park)} \\
 & = \frac{\text{(Total Historical Estimated Cost for Flood Repairs to Park)}}{\text{(Number of Years in Historical Record)}} \\
 & \\
 & \$75,758 = \$1,666,668 \div 22
 \end{aligned}$$

Therefore, it is estimated that the City could contribute approximately \$76,000 annually to a sinking fund dedicated to Park flood repairs in order to anticipate the costs incurred from a flood event, with the berm installation.

It should be noted that with the construction of a berm in a defined floodway, significant damage could be incurred to a berm subjected to a prolonged flooding event that could entail complete reconstruction of the berm. Therefore, an annual sinking fund should also be considered to address these significant repairs. In the available historical record of 22 years, WSE exceeding the estimated berm height of 752 feet for a prolonged period of time has occurred once: 1993 (35 days). The estimated total construction cost of the berm (Table 5-5) was extrapolated over the historical record to estimate an additional annual sinking fund budget specifically for reconstruction of a berm. As part of this estimate, it was assumed that 50-percent of the original construction would be salvageable following a flood event.

(Estimated Annual Cost of Berm Construction)

$$= \frac{\left(\begin{array}{c} \text{Total Estimated Cost for Berm Construction} \\ \text{multiplied by} \\ \text{Number of Historical WSE Exceedance Events} \end{array} \right) \times 50\%}{\text{(Number of Years in Historical Record)}}$$

$$\$164,732 = \$(1,812,054 \times 4 \times 0.5) \div 22$$

In addition, an estimated annual maintenance cost of the berm was included at 3-percent of the estimated construction cost. Table 5-6 summarizes the estimated annual costs for this option.

Table 5-6 Option #2 Six-Foot Berm Construction, Estimated Conceptual Annual Costs Incurred to Raise the Trail Elevation to 752 feet

Total Annual Maintenance and Flood Repair Estimate for Berm Construction	
Average Flood Repair Cost	\$416,667
Total Historical Estimated Flood Repair Cost for Park	\$1,666,668
<i>Average Annual Flood Repair Cost</i>	<i>\$75,758</i>
Total Historical Estimated Berm Reconstruction Cost	\$3,624,108
<i>Average Annual Budget for Berm Reconstruction</i>	<i>\$164,732</i>
Recommended Annual Sinking Fund Budget, Berm Reconstruction	
<i>Recommended Annual Sinking Fund Budget, Berm Reconstruction</i>	<i>\$165,000</i>
<i>Recommended Annual Sinking Fund Budget, Park Repairs</i>	<i>\$76,000</i>
<i>Estimated Annual Maintenance of a Berm (3% of Construction Cost)</i>	<i>\$35,500</i>
Total City Annual Costs	\$276,500

The total annual costs associated with berm construction are estimated to be similar in cost of proactively planning for flood repairs (Option #1).

Option #3 Temporary Flood Protection: Water-Filled Tubes

In lieu of a permanent berm, the City could pursue a temporary flood protection option for the Park. Section 3 discussed advantages and disadvantages of three temporary flood protection options: fabric membrane, water-inflated tubes, and baffled bladders. Of these, water-filled tubes would allow the City the flexibility of choosing the best alignment to protect resources within the Park, while also allowing the City to purchase additional material as funds are available. This would allow the City to adjust flood

protection of the Park to a desired level for future flood events. However, this method of flood protection is dependent on a readily available source of water to fill the tubes at the point of installation.

Table 5-7 provides an estimated cost for temporary flood protection using water-filled tubes for a wall 3 feet in elevation and a wall 6 feet in height for the alignment shown in Figure 5-1.

Table 5-7 Option #3 Temporary Flood Protection, Estimated Material Cost for Water-Filled Tubes

Estimated Material Cost of Temporary Flood Protection, Water-Filled Tubes		
Estimated Material Cost	Height of Temporary Flood Protection	
	3-foot	6-foot
Estimated Material Cost per linear foot, (Dollars)	\$100	\$190
Alignment Length, (linear foot)	2700	2700
Total Estimated Material Costs	\$270,000	\$513,000

Similar to the permanent berm, annual costs are still incurred with temporary flood protection technologies (storage, etc.). Because the temporary flood protection would only provide flood protection to a defined level for the Park, flooding would still occur. Therefore, the City would still incur flood repair and clean-up costs to the Park. The estimated cost methodology to define this annual cost is the same as presented for Option #2. In addition, labor and inspection costs associated with installation can be estimated. An estimated labor cost per installation was extrapolated over the number of years in the historical record that the Park has experienced flooding greater than the average ground elevation of the Park (746 feet). Similarly, an estimated inspection cost per installation was extrapolated over the number of days in the historical record that the Park has experienced flooding greater than the average ground elevation of the Park (746 feet). All of these estimated costs could be anticipated through annual contributions to a sinking fund. Table 5-8 summarizes the estimated annual costs for this option.

Table 5-8 Option #3 Temporary Flood Protection, Estimated Annual Costs Incurred with Water-Filled Tubes

Total Annual Estimated Costs for Temporary Flood Protection		
Cost Description	Height of Temporary Flood Protection	
	3-foot	6-foot
Average Flood Repair Cost	\$416,667	\$416,667
Total Historical Estimated Flood Repair Cost for Park	\$5,000,004	\$5,000,004
<i>Average Annual Flood Repair Cost</i>	<i>\$227,273</i>	<i>\$227,273</i>
Total Labor Incurred over the Historical Record ¹	\$162,000	\$307,800
<i>Total Annual Labor Budget</i>	<i>\$7,364</i>	<i>\$13,991</i>
Total Inspection Incurred over the Historical Record ²	\$143,400	\$143,400
<i>Total Annual Inspection Budget</i>	<i>\$6,519</i>	<i>\$6,519</i>
<i>Estimated Annual Maintenance of Temporary Flood Protection (1% of Material Cost)</i>	<i>\$3,000</i>	<i>\$6,000</i>
<i>8Recommended Annual Sinking Fund Budget, Park Repairs</i>	<i>\$228,000</i>	<i>\$228,000</i>
<i>Recommended Annual Sinking Fund Budget, Temporary Flood Protection (labor/inspection)</i>	<i>\$14,000</i>	<i>\$21,000</i>
Total City Annual Costs	\$245,000	\$255,000

¹ Five-percent of material cost times 12 times in historical record.

² 239 days x 4 hours/day x 2-people x \$75/hour

Option #4 Three-Foot Berm Construction: Raise Trail Elevation to 749 feet

An additional alternative could include the City pursuing incremental flood protection of the Park by elevating the trail approximately 1 to 3 feet to an elevation of 749 feet. Appendix C includes conceptual plan and profile views of what this trail elevation could look like. Table 5-9 summarizes the estimated construction cost for this option.

Table 5-9 Option #4 Three-Foot Berm Construction, Estimated Construction Cost Incurred to Raise the Trail Elevation to 749 feet

Estimated Conceptual Construction Cost of Trail Elevation		
Initial Construction Cost Description	Cost	Assumptions
Trail Elevation Estimated Construction Cost	\$434,816	Initial Cost, (10,112 Cubic Yards * \$43 ¹ /CY)
Utility Coordination/Relocation (8% of Construction Cost)	\$34,785	Benches and Electrical Relocation; Tree Removal
Local/State/Federal Permitting (5% of Construction Cost)	\$21,741	CLOMR/LOMR/MDNR Permitting
Engineering Design Fee (15% of Construction Cost)	\$65,222	Geotechnical Design Required
Contingency (25% of Construction Cost)	\$108,704	
Total Conceptual Construction Costs	\$665,268	

¹ Cost per cubic yard based on the HDR 1999 report converted to 2013 dollars using Engineering News Record multiplier.

The City could potentially incur an estimated cost savings of up to 25-percent by using City resources or volunteer labor for trail elevation construction.

Along the trail alignment, trail elevation construction should adhere to the “Shared Use Path Design Criteria” per AASHTO for trail design (Figure 5-3). For the purposes of this analysis, a 10- to 12-foot trail width was assumed. For the portions of the trail east of the Park road cul-de-sac, a 2-foot wide shoulder on the dry side of the trail and a 5-foot wide shoulder on the river side of the trail was assumed for fill calculations.

Annual costs would still be incurred with routine inspection and maintenance of elevating the trail. Flooding of the Park would still occur at elevations greater than 749-feet, and therefore, the City would still incur flood repair and clean-up costs to the Park. These costs are typically not reimbursable by Federal flood recovery assistance programs, and therefore should be addressed through budgeting endeavors. The estimated annual costs for this option was derived similarly to Option #2, with the main difference being in the number of times in the historical record that the WSE has exceeded 749-feet (7 times). Table 5-10 summarizes the estimated annual costs for this option.

Table 5-10 Option #4 Three-Foot Berm Construction, Estimated Annual Costs Incurred to Raise the Trail Elevation to 749 feet

Total Annual Maintenance and Flood Repair Estimate for Trail Elevation	
Average Flood Repair Cost	\$416,667
Total Historical Estimated Flood Repair Cost for Park	\$2,916,669
<i>Average Annual Flood Repair Cost</i>	<i>\$132,576</i>
Total Historical Estimated Trail Elevation Reconstruction Cost	\$2,328,440
<i>Average Annual Budget for Trail Elevation Reconstruction</i>	<i>\$105,838</i>
Recommended Annual Sinking Fund Budget, Trail Elevation Reconstruction	
<i>Recommended Annual Sinking Fund Budget, Trail Elevation Reconstruction</i>	<i>\$106,000</i>
<i>Recommended Annual Sinking Fund Budget, Park Repairs</i>	<i>\$133,000</i>
<i>Estimated Annual Maintenance of a Berm (3% of Construction Cost)</i>	<i>\$13,100</i>
Total City Annual Costs	\$252,100

5.3 Considerations for Flood Protection of English Landing Park

Table 5-11 summarizes the estimated initial (construction and/or material acquisition) costs and estimated annual costs for the options presented in Section 5.2.

Table 5-11 Estimated Costs Summary for Flood Protection of English Landing Park

Option	Description	Estimated Cost (2012) ¹	
		Initial Cost	Annual Cost ²
Option #1 No Action	Budget for Park Clean Up	\$0	\$230,000
Option #2 Six-Foot Berm Construction	Raise Trail Elevation to 752 feet	\$1,820,000	\$280,000
Option #3 Temporary Flood Protection ³	3-Foot High Water Filled Tubes	-\$270,000	-\$250,000
	6-Foot High Water Filled Tubes	-\$520,000	-\$260,000
Option #4 Three-Foot Berm Construction	Raise Trail Elevation to 749 feet	\$670,000	\$260,000
	Raise Trail Elevation to 749 feet – City Self Perform Construction	\$510,000 ⁴	\$230,000 ⁵

¹ Estimated costs have been rounded up to the nearest \$10,000.

² Annual costs do not include intangible costs that cannot be quantified (i.e. loss of use)

³ Use of water-filled tubes is considered infeasible and is not recommended for further consideration.

⁴ Assumes City cost to construct is 75% of contracted cost.

⁵ Assumes City would self-perform annual maintenance and flood repair.

Under the “No Action” option, no initial cost would be incurred by the City. Instead, the City would proactively budget for anticipated future flood repairs in the Park.

The annual costs for Options #2 and #4 include building the berm, repairing the berm after minimal flood events, and annual maintenance of the berm. These costs do not include loss of use during flood events, the impact of any berm construction adjacent to established trees, modification to existing light poles and benches, and a reduction of the river view from the Park (particularly from the River

Stage Park Shelter). Raising the trail along the southern edge of the Park reduces accessibility to the trail and increased maintenance tasks. Currently the trail is accessible from any point in the Park for physically challenged people. Adding additional areas of accessibility to the trail would increase the financial costs associated with the berm. The additional maintenance tasks include inspecting for damage from burrowing animals, inspecting for scouring from high WSE events, and repairing noted damages.

Any fill placed for a berm or trail elevation should be compacted to meet USACE standards. This fill should be placed in 6 to 10 inch lifts. With the significant number of trees adjacent to the existing trail alignment, an arborist should be consulted to determine fill allowable near trees or design requirements for tree protection. Existing stormwater conveyance paths through the Park to the river are critical to retain. In addition, tie-in of a trail elevation or berm could pose challenges at the railroad tracks. Additional requirements may be required from BNSF to place any fill adjoining the railroad embankment. It should be noted that the entirety of the Park is within the FEMA regulated floodway of the Missouri River and will require a City floodplain permit for any land modifications.

Sandbag closures would be required at certain points where berm construction or trail elevation is not feasible. These locations include the Park road entrance, existing boat ramp, and Park road cul-de-sac, as well as potentially the connection adjacent to the railroad. A one to two day lead time would most likely be required to construct these measures prior to flooding. The Park would be closed leading up to and during any flood event. During the flood event, the berm and/or trail elevation area would require continuous monitoring to assess the structural integrity as well as the dewatering needs within the Park. Following any flood event, a full inspection of any berm and/or trail elevation should be completed with repairs completed as identified.

Due to the current lack of available water at the Park, the use of water-filled tubes (Option #3) as a temporary means of flood protection is considered infeasible. It is also uncertain how well the tubes would hold up under prolonged flooding conditions of the Missouri River as their placement would be in an area of higher flow velocity.

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Appendix A

Flood Technology Vendor Information

Architecture Metals Ltd. Co

Bowe, Pamela

From: Tom Osborne <tom@architecturemetals.com>
Sent: Monday, August 27, 2012 8:39 AM
To: Pugh, Terry
Cc: 'Larry Lopololo'; 'Tom Osborne'; 'Janet Tracy'
Subject: RE: Floodwall estimate
Attachments: 100 year level-8 ft ht-proposal_8.27.12.pdf; 1st significant damage-1 ft ht-proposal_8.27.12.pdf; 1st significant damage-3 ft ht-proposal_8.27.12.pdf; 100 year level-6 ft ht-proposal_8.27.12.pdf

Terry,

I re-ran the numbers for your quotes using mill runs rather than stock material numbers and came up with substantial savings.

Please find enclosed revised proposals assuming the use of mill runs for the materials. The mill is currently running 6 weeks for mill orders.

Best Regards,

Tom Osborne
President
Architecture Metals Ltd. Co.
5500 Military Trail
Ste 22-220
Jupiter, FL 33458
(O) 561.630.0020
(F) 561.744.2755
Tom@AM20.com
www.AM20.com



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From: Tom Osborne [mailto:tom@architecturemetals.com]
Sent: Monday, August 27, 2012 9:25 AM

To: PughTA@cdmsmith.com
Cc: 'Larry Lopololo'; 'Tom Osborne'; 'Janet Tracy'
Subject: RE: Floodwall estimate

Terry,

Thanks for your interest in our Flood mitigation products and our Flood Log system.

Per your request, please find enclosed proposals based on your level of protection scenario.

Please note that I have not included quotes for removable flood walls for the 270 yr and 500 yr floods.

From an engineering perspective it is not suggested that a removable design be used given the water heights projected. It would be more appropriate to use a removable system attached to the top of a concrete stem wall supported by a footer. We don't recommend a removable system to be over 8 feet in height. So the stem wall would have to be designed to meet that height requirement. The concrete wall would also be designed for the water height against the wall as well as the water pushing against the removable wall attached to the top of the support wall.

Please let me know if you need additional assistance.

Best Regards,

Tom Osborne
President
Architecture Metals Ltd. Co.
5500 Military Trail
Ste 22-220
Jupiter, FL 33458
(O) 561.630.0020
(F) 561.744.2755
Tom@AM20.com
www.AM20.com



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From: Larry Lopololo [mailto:larry@am20.com]
Sent: Friday, August 24, 2012 3:23 PM
To: 'Tom Osborne'
Subject: FW: Floodwall estimate

[Here you go.](#)

From: Pugh, Terry [mailto:PughTA@cdmsmith.com]
Sent: Friday, August 24, 2012 3:19 PM
To: larry@am20.com
Subject: Floodwall estimate

Larry,

Thank you for your time.

The project that we are seeking costs for includes a couple of road crossings. Additionally the method of achieving flood protection may be a blend of technologies which could reduce the length of removable floodwall required. Please provide estimates for the types of flood protection you would recommend based on height and length. Additionally there are areas along the length which have limited width available for placement of flood protection materials.

Below are four scenarios of protection levels that we are seeking cost estimates for, along with any support technology information. (For example: the footer required for a 1 foot flood wall should be less than for the 14 foot flood wall). Approximate flood wall lengths and heights:

Description of Level of Protection Scenario	Floodwall Height (feet)	Floodwall Length (feet)
First Significant damage	3	520
	1	1730
100- Year Level	8	520
	6	1730
270- Year Level (1993 Flood)	10.5	520
	8.5	1730
500- Year Level	14	520
	12	1730

Sincerely,

Terry Pugh, CFM | CDM Smith | 9200 Ward Parkway, Suite 500 Kansas City, MO 64114 | Main: (816) 444-8270 | Direct: (816) 412-3118 | pughta@cdmsmith.com | cdmsmith.com



Please consider the environment before printing this email.



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

FLOOD LOG™ PROPOSAL

Customer: CDM Smith
Project: Flood wall project

Date: 8/8/2012
Location: 9200 Ward Parkway
Suite 500
Kansas City, MO 64114

We are pleased to provide you with pricing for your project. This proposal is based upon the supply of custom Flood Log™ from Architecture Metals (AM). Flood Log™ are an exclusive design owned by Flood Panel LLC and Architecture Metals, Ltd. Any modifications to Flood Log™ that requires additional engineering or shop drawings will be at the expense of the owner.

Item	Door type	OPENING SIZE	MOUNT-WALL OR JAMB	MAXIMUM FLOOD SHIELD SIZE		Total SQ FT	Total linear feet	mid-span support	Spans
		WIDTH (in)	CONFIG.	WIDTH (in)	HEIGHT (in)				
1	1st sig. damage	6240	W/W	6240	36	1560.00	520.00	47	48
					Totals	1560.00	520.00	47.00	48.00

Materials and Fabrication	\$	97,474.29
Sales Tax 6%		None
Freight*		To be determined
Project Total	\$	97,474.29

For signed and sealed shop drawings and calc set with PE stamp ADD: \$1500.00

Notes: Installation not included in quote. The initial installation for this proposal will require a level concrete sill measuring 520 feet x 12" wide x 6" deep with concrete in-ground supports at the mid-span support locations (47 locations) measuring 24" x 24" x 18" deep.

Materials Proposal Includes: shop drawings, installation anchors, side walk bolts, flood logs, wall supports, mid-span supports and embeds.

Order Terms:

All domestic materials orders are by purchase order only.

All international materials orders are by purchase order only and are to be paid 100% by wire transfer with order. All international orders are FOB shipping forwarder in the state of Florida, USA.

Billing Terms:

For materials only orders:

- All orders under \$5,000.00 require 100% payment with purchase order
- All orders under \$10,000.00 require 50% payment with purchase order. 50% payment is due prior to shipment of product.
- All orders over \$10,000.00 require 25% with P.O.; 25% with submission drawings; 25% with approved drawings; 25% prior to shipping;

Payment Terms:

Checks made payable to:

Architecture Metals
5500 Military Trail, Suite #22-220
Jupiter, FL 33458
(o) #561-630-0020
(f) #561-744-2755
Sales@am20.com

Freight Terms: Prepaid

ORDER/SHIP BY: Quote subject to receipt of order within 30 days, due to fluctuations in the metals and fuel markets. Shipment of order being made 6 months from the date of this quotation and AM' s Terms & Conditions of Sale.



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

The seller and purchaser agree to the sale and installation and/or delivery of the above specified goods for the above specified price upon the terms and conditions hereinafter set forth on this sales agreement and attached "Conditions of Sale" agreement hereinafter referred to as the "contract". The terms and the terms and conditions set forth on this contract, including the descriptions and The terms and the terms and conditions set forth on this contract, limitations of all warranties and guarantees are incorporated into this contract as if fully set forth on this page, the terms and conditions may not be modified except in writing by sellers duly appointed forth on this page, the terms and conditions may not be modified except in writing by sellers duly appointed representative. Purchaser certifies by his signature that he fully understands and accepts all the terms and conditions of this contract and has received a copy of this contract .If installation or installation related services are included in this contract then: Installation is based on approved shop drawings. Installation does not include surface preparation, or demolition. Installation does not include obtaining or paying for permits.

NOTES

- 1) **BALANCE TO BE PAID IN FULL PRIOR TO RELEASE OF MATERIALS.**
- *2) **SHIPPING COST PRICED AT TIME OF ESTIMATE AND IS AN ESTIMATE ONLY. SHIPPING WILL BE RE-PRICED AT TIME OF SHIPPING. BALANCE WILL BE ADJUSTED PRIOR TO SHIPPING.**
- 3) **SHIPPING EXPENSE IS BASED ON AN ESTIMATED WEIGHT OF: 17055 Lbs**

Comments and Exclusions

Terms to be mutually agreed upon.

We will provide the Owner with a blank copy of FEMA's Form 81-65, Flood proofing Certificate. The Owner's design professional (Registered Professional Engineer or Architect) is responsible to certify the building's compliance with the specific provisions contained therein.

Field testing of Flood Panels (if required) is not included in the Scope of Work encompassed by this Proposal.

The Panel size (height) proposed herein is based on the information provided to Architecture Metals, by others. The appropriate panel height can only be ascertained by a thorough review of the floor elevations and base flood elevation data. This data is generally available in a site specific Elevation Certificate.

Our Flood Panels are gasketed items that require a smooth, continuous and unbroken surface upon which the gaskets can effectively form a seal. Also, some modifications to the existing plans may need to be made in order to accommodate the anchorage and edge distance requirements as determined by the Structural Engineer. We have not had the opportunity to review a full set of the building's plans and can not make any representation at this point in time as to the extent or need for any potential modifications to accommodate the use of our Panels.

EXCLUSIONS: Unless specifically listed above, AM excludes all Permits, sealants, structural supports, concrete work, concrete repair, installation, anchors and fasteners, field measurements and signed/sealed structural calculations.

SHOP DRAWINGS: The first submittal drawings will be made within two (2) weeks following receipt of a fully executed purchase order and all required technical data. Detailed coordination with other trades is not included. The customer is expected to be able to provide complete and accurate information for use in shop drawing preparation.

PRODUCTION LEAD TIME: The current production lead time is six (6) to seven (7) weeks following receipt of approved shop drawings and field verified sizes, unless otherwise arranged for premium delivery. Production lead time is highly seasonal and will vary over the course of any year. AM suggests that the hardware requirement date be announced by the customer as soon as it is known in order that the best delivery service can be arranged.

DESIGN LOADS & STRUCTURAL SUPPORTS: This design as quoted will withstand FEMA suggested design load without additional supports. It is presumed that the conditions, whether illustrated or not, are capable of adequately supporting the flood shields at the FEMA specified design load.

STRUCTURAL CALCULATIONS: When required by the specifications, AM will provide an analytical report to verify that the provided material meets a particular design load or building code. If a professional engineer's signature or stamp is required (engineering charges will be quoted upon request)

DOCUMENTS: This quotation is based on information provided to AM at the time of quotation. Any project technical information revealed after submittal of this quotation will be subsequently evaluated for contractual impact.

- 1. Quotation based upon manufacturers specification and accessories.
- 2. Manufacturers warranties all pass directly to customer or end user.

EXPIRATION: This quotation is valid for sixty (60) days with release to occur within ninety (90) days from the date of this quotation.

Accepted (Signature): _____

(Print Name): _____
Title: _____
Date: _____

By: Tom Osborne _____
Title: President _____
Date: 8/8/2012 _____



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

FLOOD LOG™ PROPOSAL

Customer: CDM Smith
Project: Flood wall project

Date: 8/8/2012
Location: 9200 Ward Parkway
Suite 500
Kansas City, MO 64114

We are pleased to provide you with pricing for your project. This proposal is based upon the supply of custom Flood Log™ from Architecture Metals (AM). Flood Log™ are an exclusive design owned by Flood Panel LLC and Architecture Metals, Ltd. Any modifications to Flood Log™ that requires additional engineering or shop drawings will be at the expense of the owner.

Item	Door type	OPENING SIZE	MOUNT-WALL OR JAMB	MAXIMUM FLOOD SHIELD SIZE		Total SQ FT	Total linear feet	mid-span support	Spans
		WIDTH (in)	CONFIG.	WIDTH (in)	HEIGHT (in)				
1	100 YR Level	6240	W/W	6240	96	4160.00	520.00	86	87
Totals						4160.00	520.00	86.00	87.00

Materials and Fabrication	\$	258,434.67
Sales Tax 6%		None
Freight*		To be determined
Project Total	\$	258,434.67

For signed and sealed shop drawings and calc set with PE stamp ADD: \$1500.00

Notes: Installation not included in quote. The initial installation for this proposal will require a level concrete sill measuring 520 feet x 12" wide x 6" deep with concrete in-ground supports at the mid-span support locations (86 locations) measuring 24" x 24" x 24" deep.

Materials Proposal Includes: shop drawings, installation anchors, side walk bolts, flood logs, wall supports, mid-span supports and embeds.

Order Terms:

All domestic materials orders are by purchase order only.

All international materials orders are by purchase order only and are to be paid 100% by wire transfer with order. All international orders are FOB shipping forwarder in the state of Florida, USA.

Billing Terms:

For materials only orders:

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- All orders under \$10,000.00 require 50% payment with purchase order. 50% payment is due prior to shipment of product.
- All orders over \$10,000.00 require 25% with P.O.; 25% with submission drawings; 25% with approved drawings; 25% prior to shipping;

Payment Terms:

Checks made payable to:

Architecture Metals
5500 Military Trail, Suite #22-220
Jupiter, FL 33458
(o) #561-630-0020
(f) #561-744-2755
Sales@am20.com

Freight Terms: Prepaid

ORDER/SHIP BY: Quote subject to receipt of order within 30 days, due to fluctuations in the metals and fuel markets. Shipment of order being made 6 months from the date of this quotation and AM' s Terms & Conditions of Sale.

Material Terms:

Materials Terms after receipt of approved executed Purchase Order:

1/3 payment with order, 1/3 with approved submittal, balance due at time of shipping. No Retainage.



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- 3) **SHIPPING EXPENSE IS BASED ON AN ESTIMATED WEIGHT OF: 51523 Lbs**

Comments and Exclusions

Terms to be mutually agreed upon.

We will provide the Owner with a blank copy of FEMA's Form 81-65, Flood proofing Certificate. The Owner's design professional (Registered Professional Engineer or Architect) is responsible to certify the building's compliance with the specific provisions contained therein.

Field testing of Flood Panels (if required) is not included in the Scope of Work encompassed by this Proposal.

The Panel size (height) proposed herein is based on the information provided to Architecture Metals, by others. The appropriate panel height can only be ascertained by a thorough review of the floor elevations and base flood elevation data. This data is generally available in a site specific Elevation Certificate.

Our Flood Panels are gasketed items that require a smooth, continuous and unbroken surface upon which the gaskets can effectively form a seal. Also, some modifications to the existing plans may need to be made in order to accommodate the anchorage and edge distance requirements as determined by the Structural Engineer. We have not had the opportunity to review a full set of the building's plans and can not make any representation at this point in time as to the extent or need for any potential modifications to accommodate the use of our Panels.

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DESIGN LOADS & STRUCTURAL SUPPORTS: This design as quoted will withstand FEMA suggested design load without additional supports. It is presumed that the conditions, whether illustrated or not, are capable of adequately supporting the flood shields at the FEMA specified design load.

STRUCTURAL CALCULATIONS: When required by the specifications, AM will provide an analytical report to verify that the provided material meets a particular design load or building code. If a professional engineer's signature or stamp is required (engineering charges will be quoted upon request)

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Accepted (Signature): _____

(Print Name): _____
Title: _____
Date: _____

By: Tom Osborne
Title: President
Date: 8/8/2012



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

FLOOD LOG™ PROPOSAL

Customer: CDM Smith
Project: Flood wall project

Date: 8/8/2012
Location: 9200 Ward Parkway
Suite 500
Kansas City, MO 64114

We are pleased to provide you with pricing for your project. This proposal is based upon the supply of custom Flood Log™ from Architecture Metals (AM). Flood Log™ are an exclusive design owned by Flood Panel LLC and Architecture Metals, Ltd. Any modifications to Flood Log™ that requires additional engineering or shop drawings will be at the expense of the owner.

Item	Door type	OPENING SIZE	MOUNT-WALL OR JAMB	MAXIMUM FLOOD SHIELD SIZE		Total SQ FT	Total linear feet	mid-span support	Spans
		WIDTH (in)	CONFIG.	WIDTH (in)	HEIGHT (in)				
1	1st sig. damage	20760	W/W	20760	12	1730.00	1730.00	143	144
Totals						1730.00	1730.00	143.00	144.00

Materials and Fabrication	\$	143,629.60
Sales Tax 6%		None
Freight*		To be determined
Project Total	\$	143,629.60

For signed and sealed shop drawings and calc set with PE stamp ADD: \$1500.00

Notes: Installation not included in quote. The initial installation for this proposal will require a level concrete sill measuring 520 feet x 12" wide x 6" deep with concrete in-ground supports at the mid-span support locations (47 locations) measuring 24" x 24" x 18" deep.

Materials Proposal Includes: shop drawings, installation anchors, side walk bolts, flood logs, wall supports, mid-span supports and embeds.

Order Terms:

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All international materials orders are by purchase order only and are to be paid 100% by wire transfer with order. All international orders are FOB shipping forwarder in the state of Florida, USA.

Billing Terms:

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Payment Terms:

Checks made payable to:

Architecture Metals
5500 Military Trail, Suite #22-220
Jupiter, FL 33458
(o) #561-630-0020
(f) #561-744-2755
Sales@am20.com

Freight Terms: Prepaid

ORDER/SHIP BY: Quote subject to receipt of order within 30 days, due to fluctuations in the metals and fuel markets. Shipment of order being made 6 months from the date of this quotation and AM' s Terms & Conditions of Sale.



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- 3) **SHIPPING EXPENSE IS BASED ON AN ESTIMATED WEIGHT OF: 21816 Lbs**

Comments and Exclusions

Terms to be mutually agreed upon.

We will provide the Owner with a blank copy of FEMA's Form 81-65, Flood proofing Certificate. The Owner's design professional (Registered Professional Engineer or Architect) is responsible to certify the building's compliance with the specific provisions contained therein.

Field testing of Flood Panels (if required) is not included in the Scope of Work encompassed by this Proposal.

The Panel size (height) proposed herein is based on the information provided to Architecture Metals, by others. The appropriate panel height can only be ascertained by a thorough review of the floor elevations and base flood elevation data. This data is generally available in a site specific Elevation Certificate.

Our Flood Panels are gasketed items that require a smooth, continuous and unbroken surface upon which the gaskets can effectively form a seal. Also, some modifications to the existing plans may need to be made in order to accommodate the anchorage and edge distance requirements as determined by the Structural Engineer. We have not had the opportunity to review a full set of the building's plans and can not make any representation at this point in time as to the extent or need for any potential modifications to accommodate the use of our Panels.

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DESIGN LOADS & STRUCTURAL SUPPORTS: This design as quoted will withstand FEMA suggested design load without additional supports. It is presumed that the conditions, whether illustrated or not, are capable of adequately supporting the flood shields at the FEMA specified design load.

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Accepted (Signature): _____

(Print Name): _____
Title: _____
Date: _____

By: Tom Osborne _____
Title: President _____
Date: 8/8/2012 _____



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

FLOOD LOG™ PROPOSAL

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Project: Flood wall project

Date: 8/8/2012
Location: 9200 Ward Parkway
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Item	Door type	OPENING SIZE	MOUNT-WALL OR JAMB	MAXIMUM FLOOD SHIELD SIZE		Total SQ FT	Total linear feet	mid-span support	Spans
		WIDTH (in)	CONFIG.	WIDTH (in)	HEIGHT (in)				
1	100 YR Level	20760	W/W	20760	72	10380.00	1730.00	143	144
Totals						10380.00	1730.00	143.00	144.00

Materials and Fabrication	\$	512,874.93
Sales Tax 6%		None
Freight*		To be determined
Project Total	\$	512,874.93

For signed and sealed shop drawings and calc set with PE stamp ADD: \$1500.00

Notes: Installation not included in quote. The initial installation for this proposal will require a level concrete sill measuring 520 feet x 12" wide x 6" deep with concrete in-ground supports at the mid-span support locations (47 locations) measuring 24" x 24" x 18" deep.

Materials Proposal Includes: shop drawings, installation anchors, side walk bolts, flood logs, wall supports, mid-span supports and embeds.

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Payment Terms:

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Jupiter, FL 33458
(o) #561-630-0020
(f) #561-744-2755
Sales@am20.com

Freight Terms: Prepaid

ORDER/SHIP BY: Quote subject to receipt of order within 30 days, due to fluctuations in the metals and fuel markets. Shipment of order being made 6 months from the date of this quotation and AM' s Terms & Conditions of Sale.

Material Terms:

Materials Terms after receipt of approved executed Purchase Order:

1/3 payment with order, 1/3 with approved submittal, balance due at time of shipping. No Retainage.

FLOOD PANEL

5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

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- 3) **SHIPPING EXPENSE IS BASED ON AN ESTIMATED WEIGHT OF: 104958 Lbs**

Comments and Exclusions

Terms to be mutually agreed upon.

We will provide the Owner with a blank copy of FEMA's Form 81-65, Flood proofing Certificate. The Owner's design professional (Registered Professional Engineer or Architect) is responsible to certify the building's compliance with the specific provisions contained therein.

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Accepted (Signature): _____

(Print Name): _____
Title: _____
Date: _____

By: Tom Osborne
Title: President
Date: 8/8/2012

Bowe, Pamela

From: Tom Osborne <tom@architecturemetals.com>
Sent: Monday, August 27, 2012 8:25 AM
To: Pugh, Terry
Cc: 'Larry Lopololo'; 'Tom Osborne'; 'Janet Tracy'
Subject: RE: Floodwall estimate
Attachments: 100 year level-8 ft ht-proposal_8.27.12.pdf; 1st significant damage-1 ft ht-proposal_8.27.12.pdf; 1st significant damage-3 ft ht-proposal_8.27.12.pdf; 100 year level-6 ft ht-proposal_8.27.12.pdf

Terry,

Thanks for your interest in our Flood mitigation products and our Flood Log system.

Per your request, please find enclosed proposals based on your level of protection scenario.

Please note that I have not included quotes for removable flood walls for the 270 yr and 500 yr floods.

From an engineering perspective it is not suggested that a removable design be used given the water heights projected. It would be more appropriate to use a removable system attached to the top of a concrete stem wall supported by a footer. We don't recommend a removable system to be over 8 feet in height. So the stem wall would have to be designed to meet that height requirement. The concrete wall would also be designed for the water height against the wall as well as the water pushing against the removable wall attached to the top of the support wall.

Please let me know if you need additional assistance.

Best Regards,

Tom Osborne
President
Architecture Metals Ltd. Co.
5500 Military Trail
Ste 22-220
Jupiter, FL 33458
(O) 561.630.0020
(F) 561.744.2755
Tom@AM20.com
www.AM20.com



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Architecture Metals (AM) does not guarantee that this email or the attachment(s) are unaffected by computer virus, corruption or other defects. AM may monitor incoming and outgoing emails for compliance with its Email Policy. Please note that our servers may not be located in your country."

From: Larry Lopololo [<mailto:larry@am20.com>]
Sent: Friday, August 24, 2012 3:23 PM
To: 'Tom Osborne'
Subject: FW: Floodwall estimate

Here you go.

From: Pugh, Terry [<mailto:PughTA@cdmsmith.com>]
Sent: Friday, August 24, 2012 3:19 PM
To: larry@am20.com
Subject: Floodwall estimate

Larry,

Thank you for your time.

The project that we are seeking costs for includes a couple of road crossings. Additionally the method of achieving flood protection may be a blend of technologies which could reduce the length of removable floodwall required. Please provide estimates for the types of flood protection you would recommend based on height and length. Additionally there are areas along the length which have limited width available for placement of flood protection materials.

Below are four scenarios of protection levels that we are seeking cost estimates for, along with any support technology information. (For example: the footer required for a 1 foot flood wall should be less than for the 14 foot flood wall). Approximate flood wall lengths and heights:

Description of Level of Protection Scenario	Floodwall Height (feet)	Floodwall Length (feet)
First Significant damage	3	520
	1	1730
100- Year Level	8	520
	6	1730
270- Year Level (1993 Flood)	10.5	520
	8.5	1730
500- Year Level	14	520
	12	1730

Sincerely,

Terry Pugh, CFM | CDM Smith | 9200 Ward Parkway, Suite 500 Kansas City, MO 64114 | Main: (816) 444-8270 | Direct: (816) 412-3118 | pughta@cdmsmith.com | cdmsmith.com

 Please consider the environment before printing this email.



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

FLOOD LOG™ PROPOSAL

Customer: CDM Smith
Project: Flood wall project

Date: 8/8/2012
Location: 9200 Ward Parkway
Suite 500
Kansas City, MO 64114

We are pleased to provide you with pricing for your project. This proposal is based upon the supply of custom Flood Log™ from Architecture Metals (AM). Flood Log™ are an exclusive design owned by Flood Panel LLC and Architecture Metals, Ltd. Any modifications to Flood Log™ that requires additional engineering or shop drawings will be at the expense of the owner.

Item	Door type	OPENING SIZE	MOUNT-WALL OR JAMB	MAXIMUM FLOOD SHIELD SIZE		Total SQ FT	Total linear feet	mid-span support	Spans
		WIDTH (in)	CONFIG.	WIDTH (in)	HEIGHT (in)				
1	1st sig. damage	6240	W/W	6240	36	1560.00	520.00	47	48
					Totals	1560.00	520.00	47.00	48.00

Materials and Fabrication	\$	136,464.00
Sales Tax 6%		None
Freight*		To be determined
Project Total	\$	136,464.00

For signed and sealed shop drawings and calc set with PE stamp ADD: \$1500.00

Notes: Installation not included in quote. The initial installation for this proposal will require a level concrete sill measuring 520 feet x 12" wide x 6" deep with concrete in-ground supports at the mid-span support locations (47 locations) measuring 24" x 24" x 18" deep.

Materials Proposal Includes: shop drawings, installation anchors, side walk bolts, flood logs, wall supports, mid-span supports and embeds.

Order Terms:

All domestic materials orders are by purchase order only.

All international materials orders are by purchase order only and are to be paid 100% by wire transfer with order. All international orders are FOB shipping forwarder in the state of Florida, USA.

Billing Terms:

For materials only orders:

- All orders under \$5,000.00 require 100% payment with purchase order
- All orders under \$10,000.00 require 50% payment with purchase order. 50% payment is due prior to shipment of product.
- All orders over \$10,000.00 require 25% with P.O.; 25% with submission drawings; 25% with approved drawings; 25% prior to shipping;

Payment Terms:

Checks made payable to:

Architecture Metals
5500 Military Trail, Suite #22-220
Jupiter, FL 33458
(o) #561-630-0020
(f) #561-744-2755
Sales@am20.com

Freight Terms: Prepaid

ORDER/SHIP BY: Quote subject to receipt of order within 30 days, due to fluctuations in the metals and fuel markets. Shipment of order being made 6 months from the date of this quotation and AM' s Terms & Conditions of Sale.



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

The seller and purchaser agree to the sale and installation and/or delivery of the above specified goods for the above specified price upon the terms and conditions hereinafter set forth on this sales agreement and attached "Conditions of Sale" agreement hereinafter referred to as the "contract". The terms and the terms and conditions set forth on this contract, including the descriptions and The terms and the terms and conditions set forth on this contract, limitations of all warranties and guarantees are incorporated into this contract as if fully set forth on this page, the terms and conditions may not be modified except in writing by sellers duly appointed forth on this page, the terms and conditions may not be modified except in writing by sellers duly appointed representative. Purchaser certifies by his signature that he fully understands and accepts all the terms and conditions of this contract and has received a copy of this contract .If installation or installation related services are included in this contract then: Installation is based on approved shop drawings. Installation does not include surface preparation, or demolition. Installation does not include obtaining or paying for permits.

NOTES

- 1) **BALANCE TO BE PAID IN FULL PRIOR TO RELEASE OF MATERIALS.**
- *2) **SHIPPING COST PRICED AT TIME OF ESTIMATE AND IS AN ESTIMATE ONLY. SHIPPING WILL BE RE-PRICED AT TIME OF SHIPPING. BALANCE WILL BE ADJUSTED PRIOR TO SHIPPING.**
- 3) **SHIPPING EXPENSE IS BASED ON AN ESTIMATED WEIGHT OF: 17055 Lbs**

Comments and Exclusions

Terms to be mutually agreed upon.

We will provide the Owner with a blank copy of FEMA's Form 81-65, Flood proofing Certificate. The Owner's design professional (Registered Professional Engineer or Architect) is responsible to certify the building's compliance with the specific provisions contained therein.

Field testing of Flood Panels (if required) is not included in the Scope of Work encompassed by this Proposal.

The Panel size (height) proposed herein is based on the information provided to Architecture Metals, by others. The appropriate panel height can only be ascertained by a thorough review of the floor elevations and base flood elevation data. This data is generally available in a site specific Elevation Certificate.

Our Flood Panels are gasketed items that require a smooth, continuous and unbroken surface upon which the gaskets can effectively form a seal. Also, some modifications to the existing plans may need to be made in order to accommodate the anchorage and edge distance requirements as determined by the Structural Engineer. We have not had the opportunity to review a full set of the building's plans and can not make any representation at this point in time as to the extent or need for any potential modifications to accommodate the use of our Panels.

EXCLUSIONS: Unless specifically listed above, AM excludes all Permits, sealants, structural supports, concrete work, concrete repair, installation, anchors and fasteners, field measurements and signed/sealed structural calculations.

SHOP DRAWINGS: The first submittal drawings will be made within two (2) weeks following receipt of a fully executed purchase order and all required technical data. Detailed coordination with other trades is not included. The customer is expected to be able to provide complete and accurate information for use in shop drawing preparation.

PRODUCTION LEAD TIME: The current production lead time is six (6) to seven (7) weeks following receipt of approved shop drawings and field verified sizes, unless otherwise arranged for premium delivery. Production lead time is highly seasonal and will vary over the course of any year. AM suggests that the hardware requirement date be announced by the customer as soon as it is known in order that the best delivery service can be arranged.

DESIGN LOADS & STRUCTURAL SUPPORTS: This design as quoted will withstand FEMA suggested design load without additional supports. It is presumed that the conditions, whether illustrated or not, are capable of adequately supporting the flood shields at the FEMA specified design load.

STRUCTURAL CALCULATIONS: When required by the specifications, AM will provide an analytical report to verify that the provided material meets a particular design load or building code. If a professional engineer's signature or stamp is required (engineering charges will be quoted upon request)

DOCUMENTS: This quotation is based on information provided to AM at the time of quotation. Any project technical information revealed after submittal of this quotation will be subsequently evaluated for contractual impact.

- 1. Quotation based upon manufacturers specification and accessories.
- 2. Manufacturers warranties all pass directly to customer or end user.

EXPIRATION: This quotation is valid for sixty (60) days with release to occur within ninety (90) days from the date of this quotation.

Accepted (Signature): _____

(Print Name): _____
Title: _____
Date: _____

By: Tom Osborne _____
Title: President _____
Date: 8/8/2012 _____



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

FLOOD LOG™ PROPOSAL

Customer: CDM Smith
Project: Flood wall project

Date: 8/8/2012
Location: 9200 Ward Parkway
Suite 500
Kansas City, MO 64114

We are pleased to provide you with pricing for your project. This proposal is based upon the supply of custom Flood Log™ from Architecture Metals (AM). Flood Log™ are an exclusive design owned by Flood Panel LLC and Architecture Metals, Ltd. Any modifications to Flood Log™ that requires additional engineering or shop drawings will be at the expense of the owner.

Item	Door type	OPENING SIZE	MOUNT-WALL OR JAMB	MAXIMUM FLOOD SHIELD SIZE		Total SQ FT	Total linear feet	mid-span support	Spans
		WIDTH (in)	CONFIG.	WIDTH (in)	HEIGHT (in)				
1	100 YR Level	6240	W/W	6240	96	4160.00	520.00	86	87
					Totals	4160.00	520.00	86.00	87.00

Materials and Fabrication	\$	387,652.00
Sales Tax 6%		None
Freight*		To be determined
Project Total	\$	387,652.00

For signed and sealed shop drawings and calc set with PE stamp ADD: \$1500.00

Notes: Installation not included in quote. The initial installation for this proposal will require a level concrete sill measuring 520 feet x 12" wide x 6" deep with concrete in-ground supports at the mid-span support locations (86 locations) measuring 24" x 24" x 24" deep.

Materials Proposal Includes: shop drawings, installation anchors, side walk bolts, flood logs, wall supports, mid-span supports and embeds.

Order Terms:

All domestic materials orders are by purchase order only.

All international materials orders are by purchase order only and are to be paid 100% by wire transfer with order. All international orders are FOB shipping forwarder in the state of Florida, USA.

Billing Terms:

For materials only orders:

- All orders under \$5,000.00 require 100% payment with purchase order
- All orders under \$10,000.00 require 50% payment with purchase order. 50% payment is due prior to shipment of product.
- All orders over \$10,000.00 require 25% with P.O.; 25% with submission drawings; 25% with approved drawings; 25% prior to shipping;

Payment Terms:

Checks made payable to:

Architecture Metals
5500 Military Trail, Suite #22-220
Jupiter, FL 33458
(o) #561-630-0020
(f) #561-744-2755
Sales@am20.com

Freight Terms: Prepaid

ORDER/SHIP BY: Quote subject to receipt of order within 30 days, due to fluctuations in the metals and fuel markets. Shipment of order being made 6 months from the date of this quotation and AM' s Terms & Conditions of Sale.

Material Terms:

Materials Terms after receipt of approved executed Purchase Order:

1/3 payment with order, 1/3 with approved submittal, balance due at time of shipping. No Retainage.



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The seller and purchaser agree to the sale and installation and/or delivery of the above specified goods for the above specified price upon the terms and conditions hereinafter set forth on this sales agreement and attached "Conditions of Sale" agreement hereinafter referred to as the "contract". The terms and the terms and conditions set forth on this contract, including the descriptions and The terms and the terms and conditions set forth on this contract, limitations of all warranties and guarantees are incorporated into this contract as if fully set forth on this page, the terms and conditions may not be modified except in writing by sellers duly appointed forth on this page, the terms and conditions may not be modified except in writing by sellers duly appointed representative. Purchaser certifies by his signature that he fully understands and accepts all the terms and conditions of this contract and has received a copy of this contract .If installation or installation related services are included in this contract then: Installation is based on approved shop drawings. Installation does not include surface preparation, or demolition. Installation does not include obtaining or paying for permits.

NOTES

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- 3) **SHIPPING EXPENSE IS BASED ON AN ESTIMATED WEIGHT OF: 51523 Lbs**

Comments and Exclusions

Terms to be mutually agreed upon.

We will provide the Owner with a blank copy of FEMA's Form 81-65, Flood proofing Certificate. The Owner's design professional (Registered Professional Engineer or Architect) is responsible to certify the building's compliance with the specific provisions contained therein.

Field testing of Flood Panels (if required) is not included in the Scope of Work encompassed by this Proposal.

The Panel size (height) proposed herein is based on the information provided to Architecture Metals, by others. The appropriate panel height can only be ascertained by a thorough review of the floor elevations and base flood elevation data. This data is generally available in a site specific Elevation Certificate.

Our Flood Panels are gasketed items that require a smooth, continuous and unbroken surface upon which the gaskets can effectively form a seal. Also, some modifications to the existing plans may need to be made in order to accommodate the anchorage and edge distance requirements as determined by the Structural Engineer. We have not had the opportunity to review a full set of the building's plans and can not make any representation at this point in time as to the extent or need for any potential modifications to accommodate the use of our Panels.

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DESIGN LOADS & STRUCTURAL SUPPORTS: This design as quoted will withstand FEMA suggested design load without additional supports. It is presumed that the conditions, whether illustrated or not, are capable of adequately supporting the flood shields at the FEMA specified design load.

STRUCTURAL CALCULATIONS: When required by the specifications, AM will provide an analytical report to verify that the provided material meets a particular design load or building code. If a professional engineer's signature or stamp is required (engineering charges will be quoted upon request)

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Accepted (Signature): _____

(Print Name): _____
Title: _____
Date: _____

By: Tom Osborne _____
Title: President _____
Date: 8/8/2012 _____



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

FLOOD LOG™ PROPOSAL

Customer: CDM Smith
Project: Flood wall project

Date: 8/8/2012
Location: 9200 Ward Parkway
Suite 500
Kansas City, MO 64114

We are pleased to provide you with pricing for your project. This proposal is based upon the supply of custom Flood Log™ from Architecture Metals (AM). Flood Log™ are an exclusive design owned by Flood Panel LLC and Architecture Metals, Ltd. Any modifications to Flood Log™ that requires additional engineering or shop drawings will be at the expense of the owner.

Item	Door type	OPENING SIZE	MOUNT-WALL OR JAMB	MAXIMUM FLOOD SHIELD SIZE		Total SQ FT	Total linear feet	mid-span support	Spans
		WIDTH (in)	CONFIG.	WIDTH (in)	HEIGHT (in)				
1	1st sig. damage	20760	W/W	20760	12	1730.00	1730.00	143	144
Totals						1730.00	1730.00	143.00	144.00

Materials and Fabrication	\$	215,444.40
Sales Tax 6%		None
Freight*		To be determined
Project Total	\$	215,444.40

For signed and sealed shop drawings and calc set with PE stamp ADD: \$1500.00

Notes: Installation not included in quote. The initial installation for this proposal will require a level concrete sill measuring 520 feet x 12" wide x 6" deep with concrete in-ground supports at the mid-span support locations (47 locations) measuring 24" x 24" x 18" deep.

Materials Proposal Includes: shop drawings, installation anchors, side walk bolts, flood logs, wall supports, mid-span supports and embeds.

Order Terms:

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All international materials orders are by purchase order only and are to be paid 100% by wire transfer with order. All international orders are FOB shipping forwarder in the state of Florida, USA.

Billing Terms:

For materials only orders:

- All orders under \$5,000.00 require 100% payment with purchase order
- All orders under \$10,000.00 require 50% payment with purchase order. 50% payment is due prior to shipment of product.
- All orders over \$10,000.00 require 25% with P.O.; 25% with submission drawings; 25% with approved drawings; 25% prior to shipping;

Payment Terms:

Checks made payable to:

Architecture Metals
5500 Military Trail, Suite #22-220
Jupiter, FL 33458
(o) #561-630-0020
(f) #561-744-2755
Sales@am20.com

Freight Terms: Prepaid

ORDER/SHIP BY: Quote subject to receipt of order within 30 days, due to fluctuations in the metals and fuel markets. Shipment of order being made 6 months from the date of this quotation and AM' s Terms & Conditions of Sale.



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

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NOTES

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- 3) **SHIPPING EXPENSE IS BASED ON AN ESTIMATED WEIGHT OF: 21816 Lbs**

Comments and Exclusions

Terms to be mutually agreed upon.

We will provide the Owner with a blank copy of FEMA's Form 81-65, Flood proofing Certificate. The Owner's design professional (Registered Professional Engineer or Architect) is responsible to certify the building's compliance with the specific provisions contained therein.

Field testing of Flood Panels (if required) is not included in the Scope of Work encompassed by this Proposal.

The Panel size (height) proposed herein is based on the information provided to Architecture Metals, by others. The appropriate panel height can only be ascertained by a thorough review of the floor elevations and base flood elevation data. This data is generally available in a site specific Elevation Certificate.

Our Flood Panels are gasketed items that require a smooth, continuous and unbroken surface upon which the gaskets can effectively form a seal. Also, some modifications to the existing plans may need to be made in order to accommodate the anchorage and edge distance requirements as determined by the Structural Engineer. We have not had the opportunity to review a full set of the building's plans and can not make any representation at this point in time as to the extent or need for any potential modifications to accommodate the use of our Panels.

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Accepted (Signature): _____

(Print Name): _____
Title: _____
Date: _____

By: Tom Osborne _____
Title: President _____
Date: 8/8/2012 _____



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

FLOOD LOG™ PROPOSAL

Customer: CDM Smith
Project: Flood wall project

Date: 8/8/2012
Location: 9200 Ward Parkway
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Item	Door type	OPENING SIZE	MOUNT-WALL OR JAMB	MAXIMUM FLOOD SHIELD SIZE		Total SQ FT	Total linear feet	mid-span support	Spans
		WIDTH (in)	CONFIG.	WIDTH (in)	HEIGHT (in)				
1	100 YR Level	20760	W/W	20760	72	10380.00	1730.00	143	144
					Totals	10380.00	1730.00	143.00	144.00

Materials and Fabrication	\$	769,312.40
Sales Tax 6%		None
Freight*		To be determined
Project Total	\$	769,312.40

For signed and sealed shop drawings and calc set with PE stamp ADD: \$1500.00

Notes: Installation not included in quote. The initial installation for this proposal will require a level concrete sill measuring 520 feet x 12" wide x 6" deep with concrete in-ground supports at the mid-span support locations (47 locations) measuring 24" x 24" x 18" deep.

Materials Proposal Includes: shop drawings, installation anchors, side walk bolts, flood logs, wall supports, mid-span supports and embeds.

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- All orders over \$10,000.00 require 25% with P.O.; 25% with submission drawings; 25% with approved drawings; 25% prior to shipping;

Payment Terms:

Checks made payable to:

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5500 Military Trail, Suite #22-220
Jupiter, FL 33458
(o) #561-630-0020
(f) #561-744-2755
Sales@am20.com

Freight Terms: Prepaid

ORDER/SHIP BY: Quote subject to receipt of order within 30 days, due to fluctuations in the metals and fuel markets. Shipment of order being made 6 months from the date of this quotation and AM' s Terms & Conditions of Sale.

Material Terms:

Materials Terms after receipt of approved executed Purchase Order:

1/3 payment with order, 1/3 with approved submittal, balance due at time of shipping. No Retainage.



5500 military Trail, Ste# 22-220, Jupiter, FL 33458 O (561) 630-0020 FAX (561) 744-2755 www.am20.com

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- 3) **SHIPPING EXPENSE IS BASED ON AN ESTIMATED WEIGHT OF: 104958 Lbs**

Comments and Exclusions

Terms to be mutually agreed upon.

We will provide the Owner with a blank copy of FEMA's Form 81-65, Flood proofing Certificate. The Owner's design professional (Registered Professional Engineer or Architect) is responsible to certify the building's compliance with the specific provisions contained therein.

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Our Flood Panels are gasketed items that require a smooth, continuous and unbroken surface upon which the gaskets can effectively form a seal. Also, some modifications to the existing plans may need to be made in order to accommodate the anchorage and edge distance requirements as determined by the Structural Engineer. We have not had the opportunity to review a full set of the building's plans and can not make any representation at this point in time as to the extent or need for any potential modifications to accommodate the use of our Panels.

EXCLUSIONS: Unless specifically listed above, AM excludes all Permits, sealants, structural supports, concrete work, concrete repair, installation, anchors and fasteners, field measurements and signed/sealed structural calculations.

SHOP DRAWINGS: The first submittal drawings will be made within two (2) weeks following receipt of a fully executed purchase order and all required technical data. Detailed coordination with other trades is not included. The customer is expected to be able to provide complete and accurate information for use in shop drawing preparation.

PRODUCTION LEAD TIME: The current production lead time is six (6) to seven (7) weeks following receipt of approved shop drawings and field verified sizes, unless otherwise arranged for premium delivery. Production lead time is highly seasonal and will vary over the course of any year. AM suggests that the hardware requirement date be announced by the customer as soon as it is known in order that the best delivery service can be arranged.

DESIGN LOADS & STRUCTURAL SUPPORTS: This design as quoted will withstand FEMA suggested design load without additional supports. It is presumed that the conditions, whether illustrated or not, are capable of adequately supporting the flood shields at the FEMA specified design load.

STRUCTURAL CALCULATIONS: When required by the specifications, AM will provide an analytical report to verify that the provided material meets a particular design load or building code. If a professional engineer's signature or stamp is required (engineering charges will be quoted upon request)

DOCUMENTS: This quotation is based on information provided to AM at the time of quotation. Any project technical information revealed after submittal of this quotation will be subsequently evaluated for contractual impact.

- 1. Quotation based upon manufacturers specification and accessories.
- 2. Manufacturers warranties all pass directly to customer or end user.

EXPIRATION: This quotation is valid for sixty (60) days with release to occur within ninety (90) days from the date of this quotation.

Accepted (Signature): _____

(Print Name): _____
Title: _____
Date: _____

By: Tom Osborne _____
Title: President _____
Date: 8/8/2012 _____

Eko Flood Systems USA, LLC

Bowe, Pamela

From: Wayne Flittner <wayne@ekofloodusa.com>
Sent: Thursday, September 06, 2012 1:45 PM
To: Pugh, Terry
Subject: EKO info for Terry Pugh at CDM Smith Kansas City Mo

To ; Terry Pugh CFM
CDM Smith
Kansas City Missouri

Hello Terry;

We have done some digging in our current project records to develop estimates for the foundation work for a typical EKO knee wall topped by a removable barrier. Now these estimates should be understood as “estimates only” as they do not include the engineering work nor any dry side drainage collection and pump station work.

Here are some examples close to your indicated needs:

Knee Wall and Foundation to be topped by 5 foot EKO removable barrier—total height 8 feet per lineal foot	\$ 225
Knee Wall and Foundation to topped by 7.5 foot EKO removable barrier—total height 10.5 feet per lineal foot	\$ 285
Knee Wall and Foundation to be topped by 11 foot EKO removable barrier—total height 14 feet per lineal foot	\$ 420
Knee Wall and Foundation to be topped by 9 foot EKO removable barrier ---total height 12 feet per lineal foot	\$415

The EKO components are included in our per square foot estimates for the various wall heights which we supplied a few days ago.

While these are not exact matches to your table , they are close. And they would meet all FEMA, BUREC and CORPS standards as well as those of FM Global—the casualty insurance rating firm. Please call so we can discuss, let us help you on your project.

Heinz and Wayne

Wayne Flittner

Marketing Director, EKO Flood USA, LLC.

1155 Deer Creek Road, Jackson, Wyoming 83001

Mailing Address:

P.O. Box 7475, Jackson, Wyoming 83002

wayne@ekofloodusa.com

307-739-2538

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Bowe, Pamela

From: Heinz Munz <heinz@ekofloodusa.com>
Sent: Friday, August 24, 2012 2:01 PM
To: Pugh, Terry
Subject: Re: Floodwall estimate

Thanks Terry , we are working on it . Give me 1 hour .
Thanks Heinz

----- Original Message -----

From: Pugh, Terry
To: heinz@ekofloodusa.com
Sent: Friday, August 24, 2012 12:59 PM
Subject: Floodwall estimate

Heinz,

Thank you for your time. Below are four scenarios of protection levels that we are seeking cost estimates for, along with any support technology information. (For example: the footer required for a 1 foot flood wall should be less than for the 14 foot flood wall).

Description of Level of Protection Scenario	Floodwall Height	Floodwall Length (feet)
First Significant damage	3	520
	1	1730
100- Year Level	8	520
	6	1730
270- Year Level (1993 Flood)	10.5	520
	8.5	1730
500- Year Level	14	520
	12	1730

Sincerely,

Terry Pugh, CFM | CDM Smith | 9200 Ward Parkway, Suite 500 Kansas City, MO 64114 | Main: (816) 444-8270 | Direct: (816) 412-3118 | pugh@cdmsmith.com | cdmsmith.com



Please consider the environment before printing this email.

Bowe, Pamela

From: Heinz Munz <heinz@ekofloodusa.com>
Sent: Friday, October 05, 2012 1:02 PM
To: Pugh, Terry
Subject: Re: Floodwall estimate

Importance: High

Hello Terry , thanks for taking my phone call . Like I told you on the phone , we will fabricate our EKO Parts in the US and will be more competitive with our f2 price. We are talking in the \$120.00 range .

Thanks again and please let me know what else we can do to help you with the project.

Heinz

Heinz Munz

CEO, President, Eko Flood Systems USA, LLC.

1155 Deer Creek Road Jackson, Wyoming 83001

Mailing Address:

P.O. Box 7475, Jackson, Wyoming 83002

heinz@ekofloodusa.com

307-739-2538 Office

307-730-0010 Cell

----- Original Message -----

From: [Pugh, Terry](#)
To: [Heinz Munz](#)
Sent: Friday, August 24, 2012 1:12 PM
Subject: RE: Floodwall estimate

Heinz,

A few other details. This project does have a couple of roads that it crosses and may end up being a blend of technologies so the length may be less. One possible scenario includes making the taller wall (shorter section) a permanent flood wall, this reduces the length of the overall project for removable floodwall to around 1700 feet in length. The heights with the 1730 length below would remain the same.

Sincerely,

Terry Pugh

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Bowe, Pamela

From: Wayne Flittner <wayne@ekofloodusa.com>
Sent: Friday, August 24, 2012 2:47 PM
To: Pugh, Terry
Subject: Re: Floodwall estimate

Hello Terry:

While Heinz is assembling per square foot costs , he asked me to provide data on the foundations required. You already ' get it ' in that the footer for a one foot wall is less than for a fourteen foot wall.

Now,since we are "holding back water", as the height increases, the subsurface seepage issues become critical—and this depends on the soil conditions as you can imagine. So estimates here are dangerous unless we have soil test data.

We also consider blending removable barriers where they make sense with permanent but pleasing concrete walls as illustrated by the Grand Ol Opry photos. There we achieved a balance in appearance to match the brick character of Opryland buildings and walkways. Our openings were used to give all the required easy public access as well as the needed commercial and safety access. FM Global—the casualty insurance rating firm -- approved the installation, a key requirement of Gaylord Entertainment, the owners and funding source.

For your scenarios, you may want to consider our low knee wall (3-4' high) with removable barrier on top to achieve the protection height needed at a lower cost. The knee walls can include "pedestrian or road ground level openings" which can easily be closed with our stop log system. This gives you the first 3-4 feet of protection needed, then you can add the removable barrier on top to meet the rising flood crest. Now this can be done in stages, for example ,if you need 12 feet, the knee wall gives you the first 3-or 4 feet. Close the openings. If the crest rises, add your 8 foot posts but for speed just add 4 feet of logs. If the crest continues to rise, add the final four feet. It is a doable flexible system.

At Opryland they did a trial with untrained staff/management people and the barriers were up in less than half the calculated time. We can provide crew size and time elements for a wall of x feet high, assuming storage is not miles away from the wall site.

This information may help you in your analysis.

Wayne

Wayne Flittner

Marketing Director, EKO Flood USA, LLC.
1155 Deer Creek Road, Jackson, Wyoming 83001
Mailing Address:
P.O. Box 7475, Jackson, Wyoming 83002
wayne@ekofloodusa.com
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Sincerely,

Terry Pugh, CFM | CDM Smith | 9200 Ward Parkway, Suite 500 Kansas City, MO 64114 | Main: (816) 444-8270 | Direct: (816) 412-3118 | pugh@cdmsmith.com | cdmsmith.com



Please consider the environment before printing this email.

Bowe, Pamela

From: Heinz Munz <heinz@ekofloodusa.com>
Sent: Friday, August 24, 2012 2:54 PM
To: Pugh, Terry
Subject: Your request
Attachments: Installation Document and Manuel.docx

Importance: High

Hello Terry , Thanks for giving us the opportunity to provide you with prices for your project. You will get 2 e-mails , 1 with the price per square foot , and one with suggestions and ideas for your project .

Flood Wall Height :	3	price per F2 :	\$ 125.00
Flood Wall Height :	1	price per F2 :	\$ 105.00
Flood Wall Height :	8	price per F2 :	\$ 135.00
Flood Wall Height :	6	price per F2 :	\$ 130.00
Flood Wall Height :	10.50	price per F2 :	\$ 140.00
Flood Wall Height :	8.50	price per F2 :	\$ 135.00
Flood Wall Height :	14.00	price per F2 :	\$ 145.00
Flood Wall Height :	12.00	Price per F2 :	\$ 140.00

All prices include delivery to Kansas City jobsite and installation blueprints and installation training . We also can provide foundation engineering blueprints and storage containers.

Construction, on –site supervision , for the EKO related installation will be billed at \$850 per day plus travel costs.

I am attaching an installation manual . If you need any technical information please send me an e-mail.

Thank you for contacting EKO.

Regards Heinz

Heinz Munz

CEO, President, Eko Flood Systems USA, LLC.
1155 Deer Creek Road Jackson, Wyoming 83001

Mailing Address:

P.O. Box 7475, Jackson, Wyoming 83002

heinz@ekofloodusa.com

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Operation and Maintenance Manual



EKO Removable Barrier Installation

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Introduction:

The EKO Removable Barrier Floodwall will perform dependably and reliably in the future. Each component has been carefully engineered to be easy to work with, handle and install. All the special tools, rubber mallet, wrenches and, Allen wrenches for cover plates are supplied in a tool box... Since the EKO wall for your installation is less than 7 feet tall, the components are all light enough that what 'heavy lifting and transporting " is needed can be done with an average size forklift. The "spare parts"" needed are supplied and included in the Storage Container.

The Storage Container:

The storage container is a "customized" standard 20 foot cargo container with a large side opening for easy forklift access, is well ventilated to provide air circulation to reduce interior temperatures. Special racking for the posts and beams is included to make storing easy, to make inventory checks easy and accurate. Everything has a place, clearly marked. Secure exterior locking pads are provided for the installation of whatever security system you prefer.

Each Container is clearly marked on the outside indicating the wall sections where the components in the container go. If the storage site is remotely located from the wall alignment, the Container can easily be loaded onto a flatbed trailer and transported to the appropriate location along the wall alignment where it can be opened, the contents removed and positioned along the wall using a forklift.



Wall storage



Checking the Inventory in the Container.

A check of the components in the Container of posts , beams, bolts, tension hold downs for each section against the Recorded Inventory should be done to make sure when you get it all to the wall site for set up all parts are there.

This is a double check against the Inventory recorded after the prior event or after a scheduled routine Maintenance review. The Parts Inventory is also part of this recording process.



Site Preparations;

This is a routine check of making sure access gates are open, walking the alignment and removing any accumulated dirt or residue from the sealing strips and post anchor plates with a pressure washer or broom. The cover plates on the wall end brackets should be removed as well as the post anchor plate cover plates. This can be done with the appropriate size Allen wrench.



Transporting The Posts and Beams;

Generally, if possible it is advisable to transport the Storage Container to the site on a flatbed trailer. Or transport the posts to the alignment on a forklift. Take the posts first. Doing so will let you have two men immediately begin erecting the posts.



Putting the Posts up.

The posts are not too heavy for two men to tilt up into position on the post anchor plate assuming the final design uses a 6 foot post. If higher three men will be needed to position a post .When they have tilted it up, one man can kneel down and rotate the anchor bolt about 90 degrees until the anchor lugs lock into place, then tighten the nuts using the supplied crescent wrench .This team can then move on to the next post and repeat the steps.









Securing The Braces ,

On walls over 6 feet high , back braces are used to provide the needed support for the posts. Two or three men can easily position the brace, tilt it up, and one can then insert the connection pins and secure the pin locking retainers. The men can use a magnetic speed level as a guide while they adjust the screw adjustments assuring a vertical position for the post and assuring the proper loading of the brace support pads. The braces are color coded to the posts to make installation foolproof.

