**Removable Flood Wall Barrier**

**PART 1-GENERAL**

* 1. **SUMMARY**

A. Design, fabricate and manufacture a removable (demountable) flood wall system. The flood wall system shall include the following components: planks (stop logs), parting support posts, intermediate support posts, struts and tension rods (if necessary), hold down clamps and rods, gaskets, hardware or any other appurtenance necessary to provide a complete flood wall system.

**1.2 REFERENCES**

1. U.S. Army Corps of Engineers Engineering Design Manuals
2. American Welding Society (AWS):

 Structural Welding Code D1.1

C. American Society for Testing and Materials (ASTM)

D. American Society of Civil Engineers (ASCE):

 SEI/ASCE 7-10 ‘Minimum Design Loads for Buildings and Other Structures’.

E. AISC Manual of Steel Construction, 13th Edition

F. The Aluminum Association, Aluminum Design Manual (2010)

G. FEMA TB 3-21

**1.3 DESCRIPTION**

A. The removable flood wall system is a temporary flood defense system, which is to be deployed prior to an expected flood event and removed afterward leaving the site in its demounted state.

B. The use of the flood barrier in a flood event is the responsibility of the Owner. In preparation for use, the Owner is responsible for the following:

1. Providing a secure location for storage of the panels, posts, and hardware.
2. Assembling the barriers in accordance with manufacturer’s instruction.
3. Training personnel to be ready to erect the system as specified.
4. Performing a mock up of the system on an annual basis, at minimum, or whenever a turnover in personnel makes this necessary.

**1.4 SYSTEM DESIGN REQUIREMENTS**

A. Design, fabricate, and construct a removable flood wall system to the extent shown, complying with the following design requirements.

1. Hydrostatic Pressure: As determined by USACE Engineering Design Manuals.

2. Seepage/Leakage; Minimal leakage (0.05 gph/square foot) when subjected to hydrostatic and hydrodynamic pressure determined above.

3. Wind Loads: As determined by ASCE 7 Design loads.

4. All joints will have gaskets.

B. Removable floodwall system shall establish watertight infill at areas shown by means of a modular system requiring minimal labor force. After foundation, sidewalls, base plates, and other permanent features are installed, system shall be designed to permit complete installation of demountable components by hand labor, to the extent possible.

C. System component modular design shall permit use of each similar component at every similar location (accept as specifically noted on drawings).

D. Each section of removable floodwall, closures barrier, and dike system shall be independent of adjacent sections, allowing erectors to install demountable system components either continuously or in sections.

 E. System shall use 20’ stop logs supported by parting support posts and intermediate support posts to the extent possible.

 F. System shall be designed to work properly with a dry-side gasket installation, allowing the stop log planks to fill with water for additional strength and capacity.

**1.5 SUBMITTALS**

A. Samples: Samples of the following materials which the Contractor proposes for use shall be submitted to the Engineer for approval:

* 12” Sample of Aluminum Panel with installed gaskets

B. Shop Drawings: Submit complete shop drawings demonstrating compliance of floodwall system with Contract Documents. Drawings shall include shop and erection details, wall details, bulkheads, base, and end conditions, including system components.

 C. Operation and Maintenance Manual: Submit operation and maintenance manuals for flood control system.

**1.6 QUALIFICATIONS**

A. The work shall be performed by a U.S. based manufacturer, specializing in the specified flood control system, having experience designing and supplying the specified system under similar conditions for a minimum of fifteen (15) years in the United States.

 **1.7 QUALITY ASSURANCE**

1. Test Reports: Certified test reports may be submitted in lieu of performing project-specific tests.
2. The Contractor shall demonstrate installation procedure to interested parties upon completion.

 **1.8 DELIVERY, STORAGE, AND HANDLING**

1. Components shall be undamaged when delivered to site and shall be handled and stored so as to prevent damage, including attention to gaskets.
2. Protect from exposure to damaging liquids, oils and greases, and unnecessary exposure to weather.

 **1.9 WARRANTY**

1. Furnish the manufacturer’s warranty for system and for component repair or replacement. The warranty shall be issued directly to the Owners. The warranty period shall be for one (1) year from the date of Owners acceptance of work.

 **1.10 SPARE PARTS**

1. Furnish spare gaskets for maintenance and replacement in the amount of ten percent of each type of gasket.

**1.11 FABRICATION**

1. The metals used in fabrication shall be free from kinks, sharp bends and other conditions which would be detrimental to the finished product. Manufacturing processes shall be done neatly and accurately, make bends by control means to insure uniformity of size and shape. All manufacturing shall be done in the United States using only domestic materials.
2. Vertical hold down clamps and all fabricated steel shall be galvanized.
3. Anchor Assembly: Typical manufactured concrete anchor to include bolts for erection and “headless” bolts for protecting hole during period when wall is not in use.

 **1.12 MANUFACTURERS**

1. Basis of Design: Drawings and details are based on Flood Control America’s “Invisible Flood Control Wall” removable flood wall system.
2. The removable floodwall system shall be designed and manufactured by:
* Flood Control America, 3497 W Clyde Pl, Denver, CO 80211,
* Distributed by Floodproofing.com 19 Mantua Road Mount Royal, NJ 08061. Contact Info@Floodproofing.com 800-507-0865
* Approved equal: all substitute suppliers must apply in writing 30 days prior to bid and be accepted in writing and include similar assembly processes, similar hold down mechanisms, similar posts and channels, and planks (stop logs) that are interchangeable with Flood Control America’s planks.
1. All floodwall system components used shall meet the “BUY AMERICA ACT” AS PER far Sub-part 25.2 for construction materials.

**PART 2- PRODUCTS**

**MATERIALS**

* Aluminum Extrusions: ASTM B-221M (B221). Alloy 6063-T6. Extrude aluminum tubes for demountable flood control system, with profiles for receiving and locking replaceable gaskets. Tube profiles shall establish nesting of tubes for vertical interlocking.
* Angle Brace: ASTM A-36
* Plate and Bar: ASTM A-36
* Sole Plate Material: ASTM A-569 Commercial quality Hot rolled 36 KSI minimum yield.
* Bolts and Nuts: ASTM A-325
* Anchor Bolts: Meadow-Burke (or equivalent) CB- 2, 1” Diameter x 6” length; “Headless” 6” long.
* Anchors: Meadow - Burke (or equivalent) CX - 8, 1” diameter, stainless steel.
* Steel Plate, Shapes, and Bars at Steel Support Components: ASTM A-36M (A36). Hot dip galvanize per ASTM A-123.
* Fabricate galvanized steel support members with vertical gasket secured to post with high strength adhesive.
* Coil rod: high strength coil (material AISI 1035-1055 medium carbon steel)
* Structural steel: ASTM A992
* Structural bolts: ASTM A325 Galvanized
* Structural nuts: ASTM A563, Grade DH
* Galvanizing: ASTM A123 (Min. 3 mil thickness)
* Zinc Plating: ASTM B633 SC1 Type III
* Stainless steel spacers: Sch. 40 340 stainless steel
* HSS shapes: A500 Grade B
* Gaskets: Each portion of extrusion shall be configured to form seal between:
* Base gasket – 70 Durometer Pero. EPDM PRE-SET BULB.
* Standard gasket between planks - Closed Cell EPDM Custom Sponge Gasket
* Vertical for steel support posts – Closed Cell EPDM Sponge Gasket factory applied with high strength adhesive.
* Vertical for end channels – Closed Cell EPDM Sponge Gasket with 1” 3M 4987 Heat Activated Tape Applied.
* Gaskets shall be custom fabricated for flood control applications, easily replaceable in extrusions and at support channels, free from cracks, burns, warp, checks, chipped or blistered surfaces, and shall have a smooth surface.
* EPDM gasket material meets “Typical Performance Characteristics” as defined in the following ASTM specification:
	+ Compression/Deflection –D - 1056,
	+ Compression Set – D- 395 (Method B),
	+ Dimensional Stability – D- 1056 (Method D865),
	+ Ozone Resistance – D - 1149,
	+ Brittleness – D - 746,
	+ Water Absorption – D – 1056
	+ Flame Propagation – C – 509 (Option II)

**PART 3- EXECUTION**

* 1. **EXAMINATION**
1. Verify Site Conditions
	1. Finished concrete should be within a ¼” in 10’ with no dips and minimal bumps within this tolerance.
	2. Plates must be set flush. No low or high plates are acceptable.
	3. **PREPARATION**
2. Surfaces must be clear of dirt and debris prior to assembly to ensure proper sealing of gaskets.
	1. **INSTALLATION**
3. Adhere to manufacturer’s instructions in Operations and Maintenance Manual and follow approved shop drawings.

**Please feel free to copy and paste the below graphic to your plans.**

