Damariscotta Deployable flood barrier
Proposal
9/17/2024

System/Proposer	Product	Cost	Shipping	Total Cost	Delivery timeframe	Installation Instructions	Warrantee	Time to install	Process to store	number /volume crates	anchoring	material	functional narrative	examples	repairs
Flood Defense	Box Wall	$78,650.00		$78,650.00	14 days	included	included	30 min 2 people	Included	10	no	yes	yes	yes	
Tiger Dam	Tiger Dam	$97,803.00	$1,695.00	$99,498.00	7 days	included	included	2hrs-4 people	included	4	yes	yes	yes		
Geodesign Barriers	Industrial Flood Barrier P40	$124,684.00	5000	$129,684.00	3-4 Weeks	Included	Included	50 Min, 6 people	included	6	no	yes	yes	yes	yes
Megasecur	Water-Gate	$134,908.68	$1,200.00	$136,108.68	3-5 weeks	included	included	15 min 5 people	Included	4	no	yes	yes	yes	yes
Porta Dam	FloodDefender 48"	$192,000.00	$2,100.00	$194,100.00	up to 8 weeks	included	included	80 min, 4 people	included	7	no	yes	yes	yes	yes
Aqua Fence	Aqua Fence	$359,000.00		$359,000.00	10-14 Weeks	included	included	1.5 Hrs 5 people	included	15	Yes	yes	yes	yes	yes

Jan Wiegman

From:	Thomas Briedis <thomas.briedis@aquafence.com>
Sent:	Thursday, September 12, 2024 6:17 PM
To:	Jan Wiegman
Cc:	Jacob Guss; Zackary Tynan
Subject:	Re: Damariscotta Flood Barrier
Attachments:	ME 101_Town of Damariscotta v1.060924.pdf; AquaFence Addendum_Town of Damariscotta.pdf; DamariscottaFloodBarrierQuoteForm_AquaFence.pdf; AquaFence Warranty.pdf

Hi Jan,

We have reviewed the project and developed a design based on the layout you provided, which is attached to this email. In this design, we've combined our V1200 (4' high) and V750 (2.5' high) flood barriers to ensure a consistent protection height of 11 feet or greater as the elevation changes throughout the site. Please note that all sewage manholes (SMH) are positioned on the dry side of the AquaFence gaskets. It is important that these manholes do not experience backflow during a flood event for the system to function effectively.

The total cost of the AquaFence system is $359,000, which includes:

- The complete flood barrier system
- FOB delivery in weather-resistant storage crates
- Shop drawings and details
- PE-stamped calculations
- An on-site training session for your local deployment team

Attached you will find:

- The quote form
- The AquaFence layout drawing
- An addendum with the requested information from the quote form
- The AquaFence O&M Manual
- Our standard warranty

Since this is our first time working with Wright-Pierce, and this is quite a bit of information, we'd be happy to arrange a conference call to go over everything in detail if you think that would be helpful.

Thank you for the opportunity to submit a bid on this project, and have a great evening.

Best regards,
Thomas

Thomas H. Briedis
President

+1 (862) 290-7663

thomas.briedis@aquafence.com
www.aquafence.com

AquaFence Inc.
95 River Street, Ste 408
Hoboken, NJ

Town of Damariscotta
21 School Street
Damariscotta, Maine, 04543

Description: The Town of Damariscotta, Maine is seeking quotations to purchase a deployable flood barrier for use in a municipal parking lot along the Damariscotta River.

Barrier Length: 840 feet in length, 3' height min., barrier intent is to prevent flood water from adjacent tidal river from flooding parking lot and adjacent buildings. Barrier will be deployed on an asphalt paved surface and be deployed by the Town work force. Refer to attached plan for barrier length and arrangement. Barrier shall come with storage bins for handling and deployment. Parking lot elevation is approximately 8.0 and rises to 11.0 the base flood elevation is 10.0 and barrier must have 1' of freeboard. One 90 degree interior angle, One 90 degree exterior angle.

Delivery will be preferred by December 1, 2024.

Flood Barrier Bid Criteria:

Product name: AquaFence FloodWal, Models V750 (2.5' high) & V1200 (4' high)

Manufacturer: AquaFence

Distributor: AquaFence USA, Inc.

Location of Manufacture: Latvia

Product Cost: $359,000

Delivery to Damariscotta, Maine: Included

Total cost: $359,000

(Note: purchaser is the Town of Damariscotta, a municipality, and not subject to state sales tax)

Quotations are due September 17, 2024 by 5:00 PM EST.

Prices will be held for 60 days.

Submit quotations to :

Jan Wiegman, PE
Wright-Pierce
11 Bowdoin Mill Island, Suite 140
Topsham, ME 04086

Questions may be submitted to :

Jan Wiegman, PE,
Wright-Pierce
Tel: 207-319-1520
Email: Jan.wiegman@wright-pierce.com

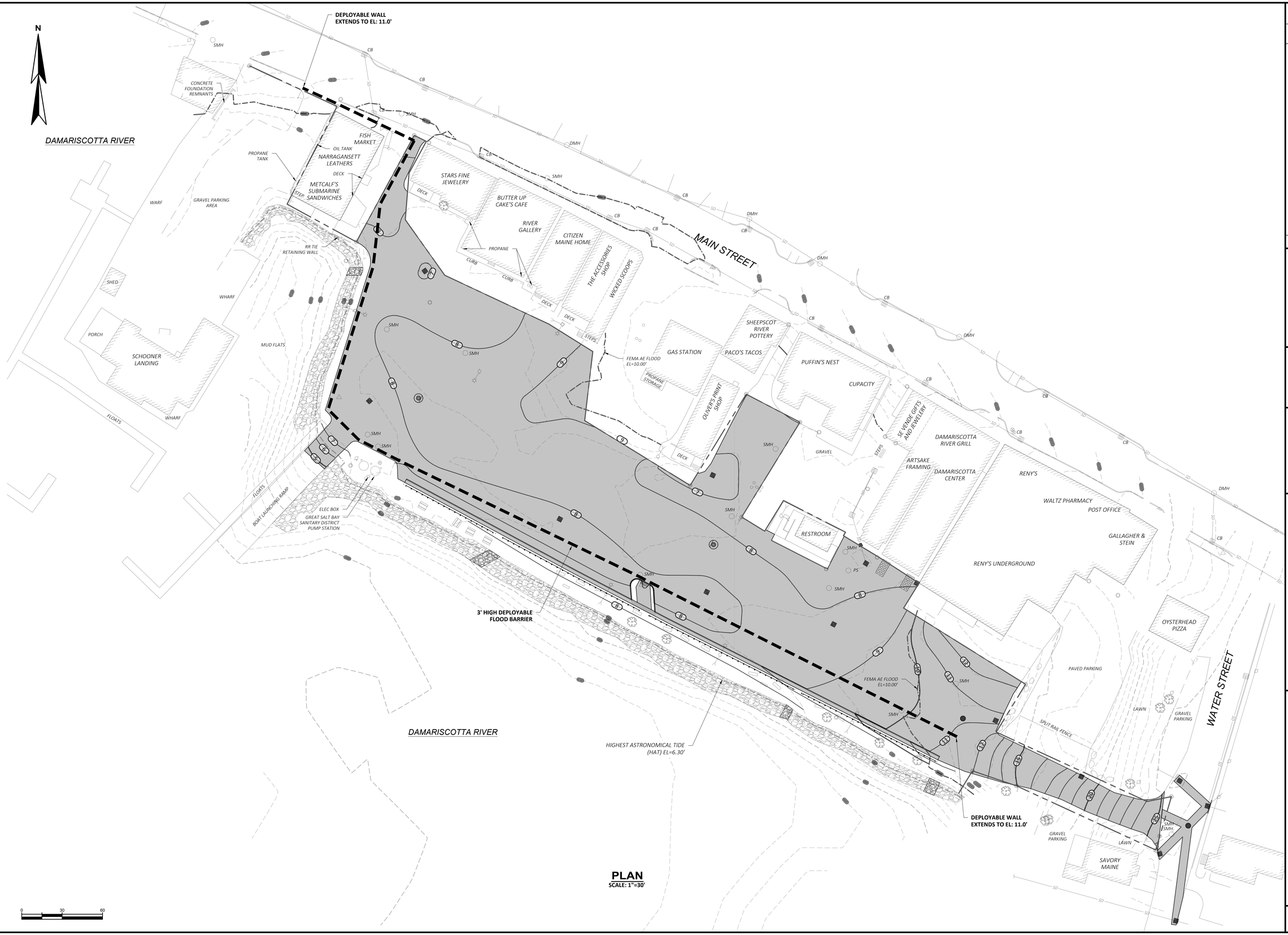
Delivery Time Frame from date of order 10-14 weeks

Product information to be provided with quotation:

- Installation/set-up Instructions: SEE: FloodWall 2024 Installation, Operation, & Maintenance Manual i2024-V2.6
- Product Warrantee: SEE: AquaFence Warranty
- Time to install 300 foot length of barrier and number of people necessary: SEE: Addendum
- Process to store after use: SEE: Addendum
- Number of crates and volume of storage crates: SEE: Addendum
- Anchoring requirements: SEE: Addendum
- Barrier material: SEE: Addendum
- Narrative of how product performs: SEE: Addendum
- Examples of where the product has been used within the USA: SEE: Addendum
- Can barrier be repaired and what is the process: SEE: Addendum

LAST SAVED BY: RYAN.BEISAW 8/19/2024 10:01 AM

I:\ENG\ME\DAMARISCOTTA\20459-DOWTOWNFLOODPROTECTION-MUNPARKINGLOTIMP\DRAWINGS\CIVL_FIGURES\20459-CS-TEMPFLOODWALLLAYOUT.DWG | 20459 Figure TempFloodWallLayout | 1:2,584 | ---- | 8/26/2024 2:54:20 PM | RYAN.BEISAW



PLAN
SCALE: 1"=30'

NO	REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			

PROJECT NO: 20459
DESIGNED: J.WIEGMAN
CAD COORD: R.BEISAW
CAD: R.BEISAW
CHECKED: J.WIEGMAN
DATE: 08-2024
APPROVED: J.WIEGMAN
DATE: 08-2024
SUBMISSION: ISSUED FOR QUOTATION

STATE OF MAINE
JAN B.S. WIEGMAN
No. 9852
REGISTERED PROFESSIONAL ENGINEER
8/26/2024

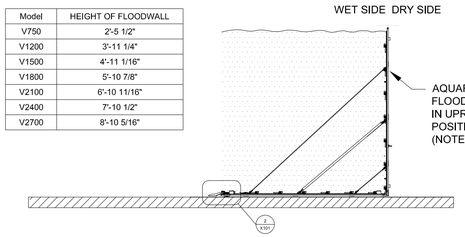
WRIGHT-PIERCE
(207) 725-8721 | www.wright-pierce.com
11 BOWDOIN MILL ISLAND, TOPSHAM, ME 04086

TOWN OF DAMARISCOTTA
DOWNTOWN PARKING LOT IMPROVEMENTS
DAMARISCOTTA, MAINE

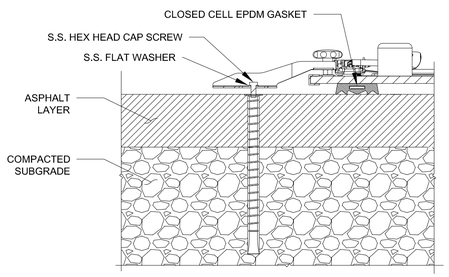
TEMPORARY FLOOD BARRIER PLAN

DRAWING
1

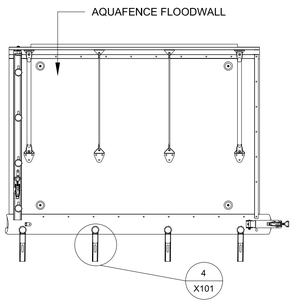
Model	HEIGHT OF FLOODWALL
V750	2'-5 1/2"
V1200	3'-11 1/4"
V1500	4'-11 1/16"
V1800	5'-10 7/8"
V2100	6'-10 11/16"
V2400	7'-10 1/2"
V2700	8'-10 5/16"



1 X101 SECTION DETAIL - AQUAFENCE FLOODWALL
SCALE: 1/4"=1'-0"

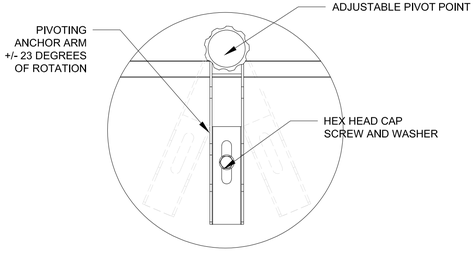


2 X101 SECTION DETAIL - ANCHORING IN ASPHALT
SCALE: 2"=1'-0"

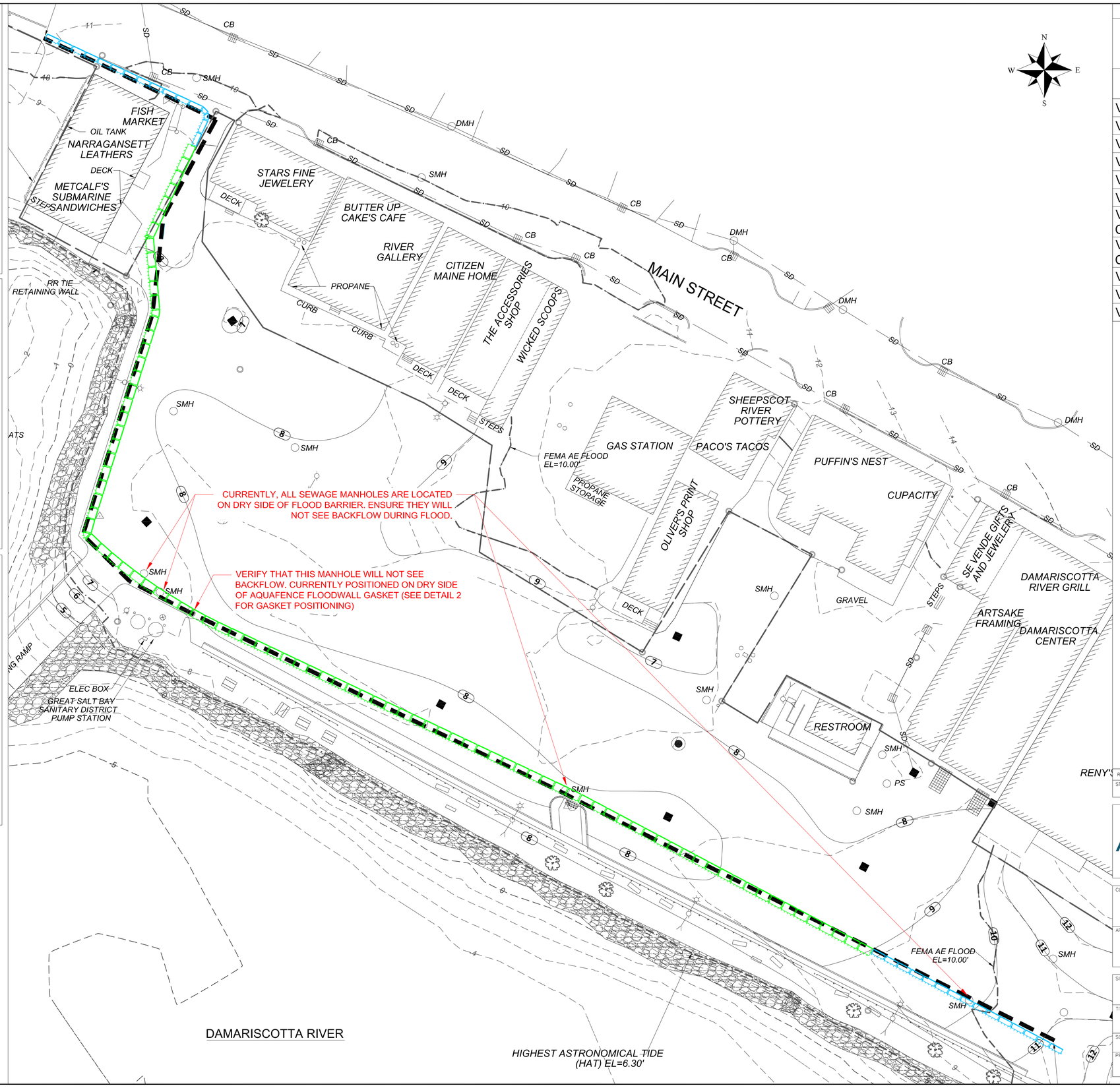


Anchor Spacing	
V750	1'-8 11/16"
V1200	1'-8 11/16"
V1500	1'-8 2/3"
V1800	1'-3 3/4"
V2100	1'-3 3/4"
V2400	1'-13/16"
V2700	1'-1 3/4"

3 X101 PLAN DETAIL - FLOODWALL ANCHOR SPACING
SCALE: 1/2"=1'-0"



1 X101 PLAN DETAIL - FLOODWALL ANCHOR ARM
SCALE: 3"=1'-0"



Notes:

V1 PANEL COUNT:

Item	Count
V1200 CW1200 IC22.5	1
V1200 CW1700	1
V1200 CW2100	81
V1200 CW2100 FBA	4
V1200 CW2100 OC30	1
V1200 CW2100 OC60	1
V1200 HL1200 HR750 CW2100	1
V1200 HL750 HR1200 CW2100	1
V750 CW1200 IC45	2
V750 CW2100	28
V750 CW2100 FBA	1

AQUAFENCE LEGEND:

- V750 (2.5' HIGH)
- V1200 (4' HIGH)

REV:	DESCRIPTION:	BY:	DATE:
STATUS:	AWAITING APPROVAL		

AquaFence®

CLIENT:

ARCHITECT:

SITE: TOWN OF DAMARISCOTTA MAINE

TITLE: AQUAFENCE Flood Barrier Solutions

SCALE AT 34x22":	DATE:	DRAWN:	CHECKED:
1/24"=1'0"	09/06/24	JG	TB
PROJECT NO:	DRAWING NO:		REVISION:
ME_001	X101		V1

AquaFence

AquaFence USA Inc.
95 River Street, Ste. 408
Hoboken, NJ, 07030
201 210-8658 • infousa@aquafence.com

Jan Wiegman, PE
Wright-Pierce
11 Bowdoin Mill Island, Suite 140
Topsham, ME 04086

Re: Deployable Flood Barrier for Town of Damariscotta September 12th, 2024

We appreciate the opportunity to submit this addendum to our proposal for the Town of Damariscotta deployable flood barrier. This document contains the additional product information requested on page 2 of the quote form.

If additional information is required, or if any of the involved parties would like AquaFence to give a presentation of the system, please do not hesitate to contact us.

Sincerely,

Thomas H. Briedis
President

1. Installation/set-up Instructions:

Step-by-step instructions on how to install the AquaFence FloodWall can be found in the attached document: FloodWall 2024 Installation, Operation, & Maintenance Manual i2024-V2.6

2. Product Warranty

The standard AquaFence warranty is included as an attachment. Extended warranties are available through the AquaFence Maintenance Program, a yearly subscription that offers on-site team training, a review of deployment plans, material inspections, and additional services.

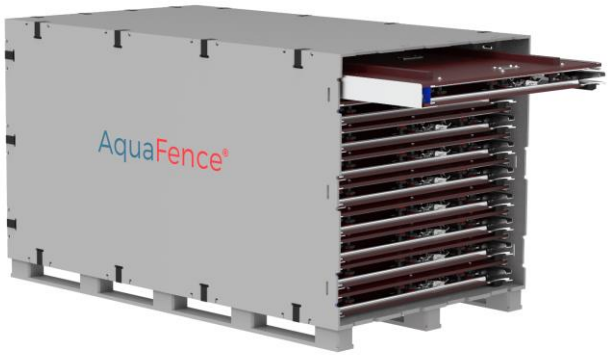
3. Time to install a 300-foot length of barrier and the number of people necessary:

A team of five laborers, each capable of repeatedly lifting 50 lbs., can deploy 200 linear feet of flood barrier per hour with ease. With a well-coordinated deployment plan and properly trained personnel, this rate can increase to as much as 400 linear feet per hour, as demonstrated in this video.

Deploying 300 feet of barrier would take a 5-person team less than 1.5 hours, allowing the entire system for the Town of Damariscotta to be set up in under 5 hours. Doubling the team to 10 people would cut the installation time in half.

4. Process to store after use

After use, the AquaFence FloodWall folds flat and is stored in custom, weather-resistant storage crates that can be stacked up to 4 high with a forklift. Each crate, whether for the V1200 (4' high) or V750 (2.5' high) systems, can hold up to 62 linear feet of flood barrier. The V1200 crates have dimensions of 4'4"x7'4"x4'4" (DxWxH), while the V750 crates measure 2'10"x7'4"x4'4" (DxWxH).



AquaFence FloodWall Folded Flat in Crates

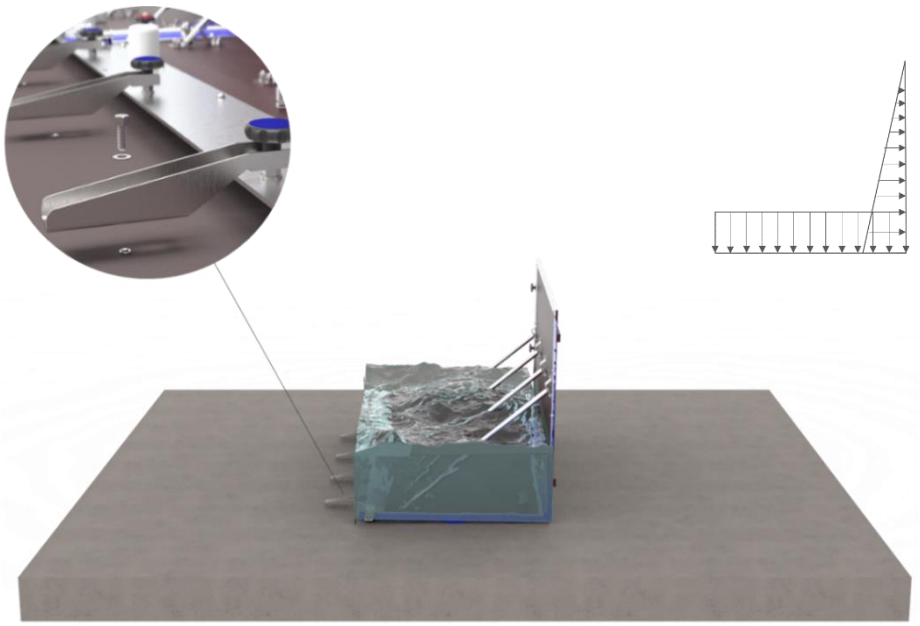
Stacked AquaFence Storage Crates

5. Number of crates and volume of storage crates:

For the Town of Damariscotta, a total of 15 storage crates would be required: 11x V1200 crates and 4x V750 crates. If the crates are stored without stacking, such as when forklift access is unavailable at the storage site, the entire system will occupy just under 450 square feet of space. However, when stacked up to 4 high, the storage space required would be reduced to just 150 square feet.

6. Anchoring requirements.

The FloodWall system is designed to harness the weight of the floodwaters to stabilize itself in a flood. This key feature makes the system highly resistant to a range of flood conditions, with its performance improving as the severity of flooding increases. Despite the self-stabilizing design of the flood barrier, it should always be securely anchored to the ground to resist sliding and shear forces caused by currents, debris impacts, and other dynamic loads frequently encountered during flooding. Unlike many other flood barrier systems, which often require significant structural reinforcements to resist dynamic loads, or lack this capability altogether, the simple anchoring method used with the AquaFence FloodWall enables it to perform effectively even in severe flood events. Specialized asphalt anchors are available for installation on asphalt. Due to the variability in asphalt conditions, AquaFence recommends conducting pull tests to determine the most suitable anchor for the specific site.



AquaFence FloodWall Self-Stabilization and Anchoring Method

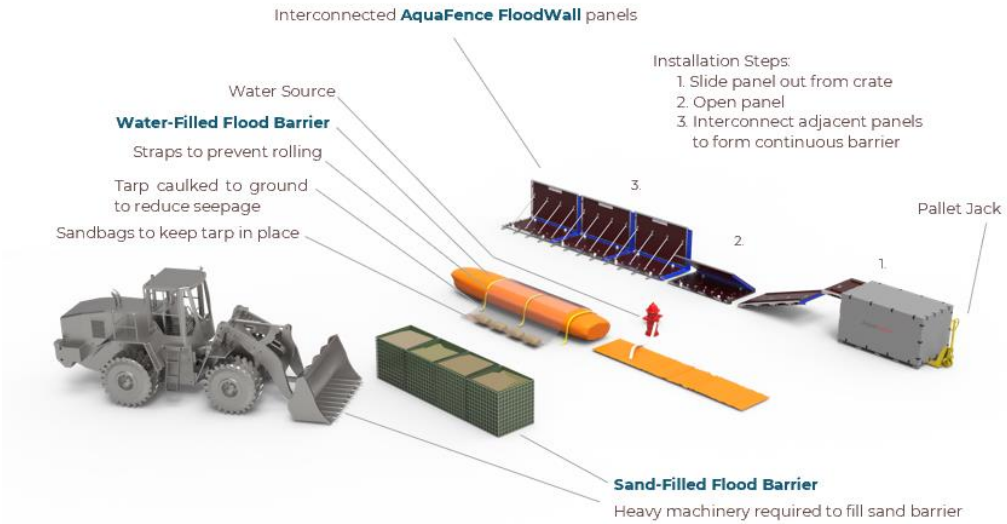
7. Barrier material

- Panel: Marine grade Baltic laminate (ISPM 15)
- Steel components: 316 Stainless Steel
- Struts: Aluminum 6060-T4
- Remaining aluminum components: 6063-T6 Aluminum
- Gasket: EPDM
- Canvas: Polyvinyl chloride (PVC)

All components of the AquaFence FloodWall are constructed from marine-grade, highly durable materials. Some customers have deployed their FloodWall systems continuously in water for up to 18 months. After use, AquaFence has tested the structural components of these barriers and found no observable deterioration or loss in performance.

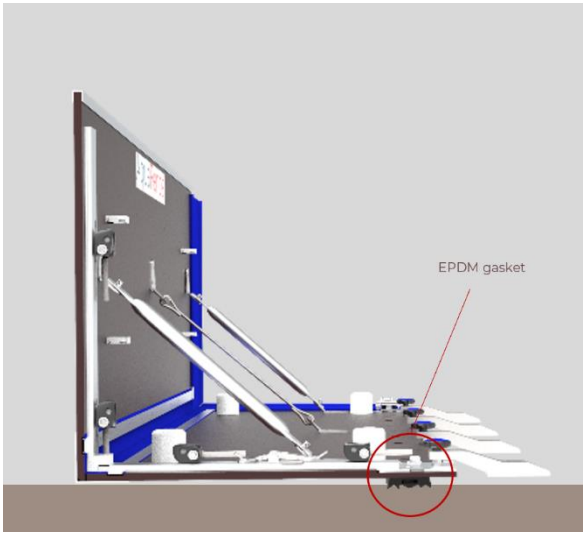
8. Narrative of how the product performs:

Installation Speed and Cost: The AquaFence FloodWall is a modular flood barrier consisting of multiple interconnected, standardized components. It requires no fill material or additional parts, removing the need to coordinate the delivery of large quantities of sand or water to fill bags, tubes, or plastic containers before a flood event. Unlike the majority of fillable barriers, it does not call for plastic tarps, caulk, tape, and sandbags for the system to meet seepage standards and operate as intended. All components are fully reusable and stored within the system itself, generating zero waste after use, and no heavy machinery is required to set it up. This results in industry-leading installation speeds and the lowest operating costs among comparable flood barriers. Certified for over 60 reuses and with an expected lifespan of over 25 years, the long-term cost benefits are significant.

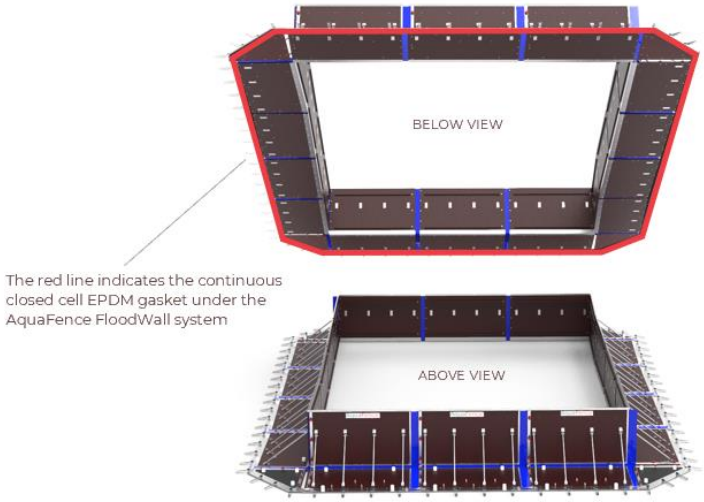


AquaFence FloodWall Installation Process

Seepage: At 4' of flooding, a small circular opening 2 inches in diameter can allow over 200 gallons of water to flow through it **every minute**. The table below illustrates the importance of minimizing gaps in the system. AquaFence FloodWall utilizes a durable EPDM rubber gasket at the front toe of the barrier, which is compressed by the flood loads to create a watertight seal between the system and its surroundings. Following the basic installation procedure, which can be learned in less than 15 minutes, these gaskets create a continuous seal at the joints when modules are interconnected. In contrast, other systems rely on caulking, tarps, sandbags, etc., to seal gaps, introducing complexity to the installation process and the risk of failure if any of these materials are not applied correctly or are inaccessible when needed.

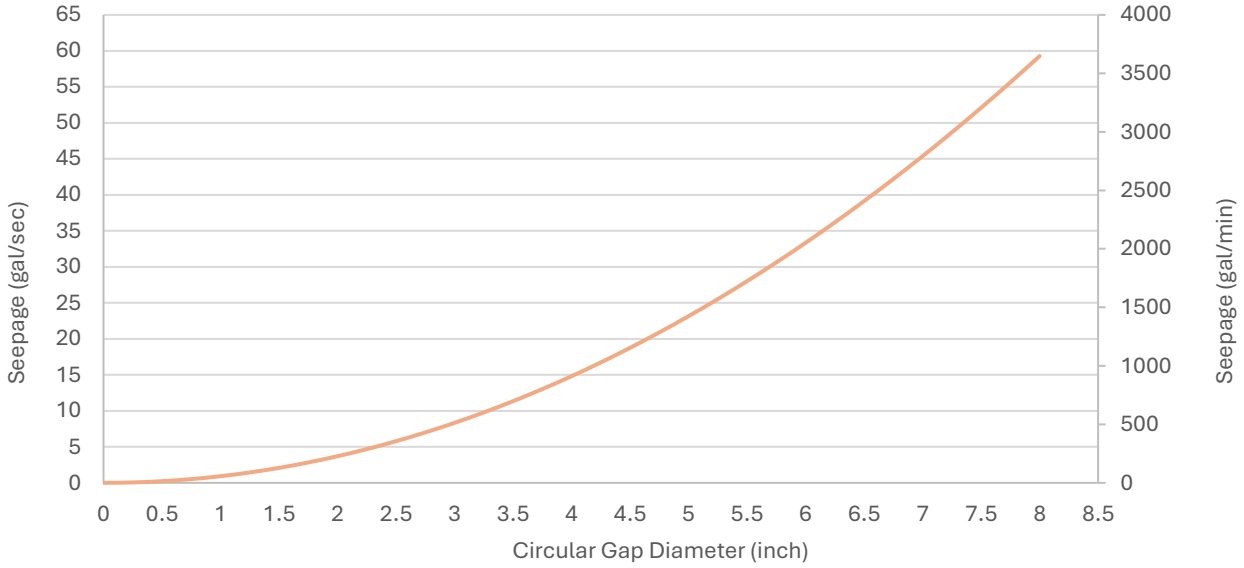


AquaFence FloodWall EPDM Gasket

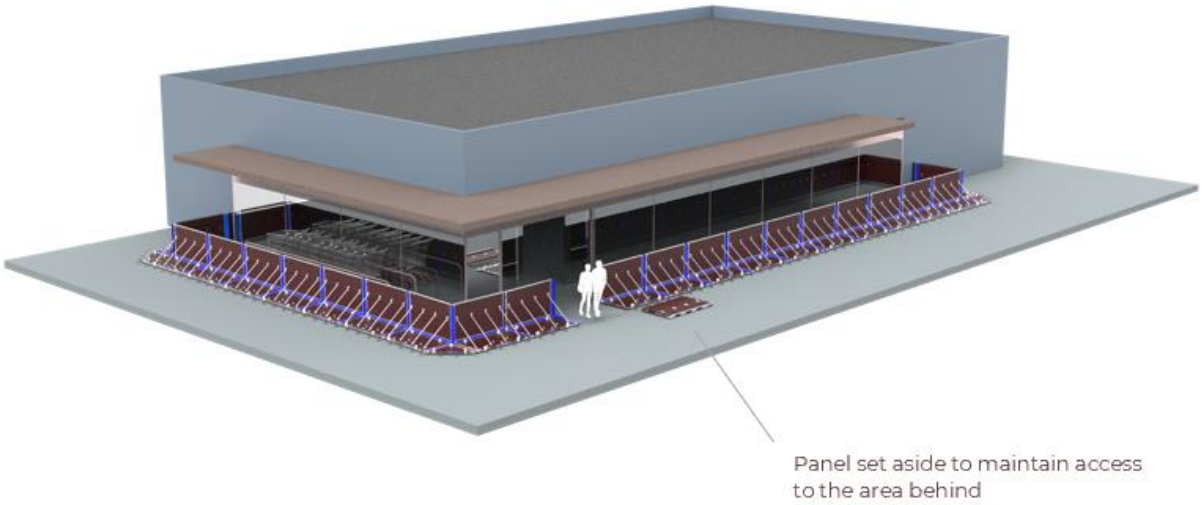


Interconnected Modules - Continuous Gasket

For the method used to calculate the values in the table below, see Appendix I.



Maintaining Egress: The modularity of the AquaFence FloodWall allows for uninterrupted access to the protected area until moments before a flood. With the majority of the system installed, certain panels can be left out at key entrance and exit points. When flooding is imminent, these remaining panels can be installed within minutes to complete the protection. After a flood event has subsided, access can be quickly restored using the same approach. In areas prone to seasonal flooding, this concept provides the opportunity to leave the majority of the barrier up during wet periods, minimizing response times and ensuring business continuity throughout. For the Town of Damariscotta, this feature ensures that access to key areas such as the boat ramp, the parking lot entrance near the fish market, and other critical locations can be maintained while the system is being installed.

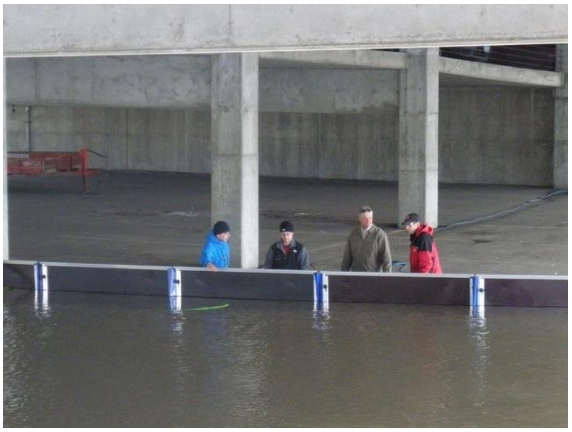


Engineering, Quality Control, and Maintenance: AquaFence is a team of engineers with over 20 years of global experience in solving flood mitigation challenges. Our barriers undergo rigorous testing by our in-house engineers and R&D team, as well as third parties, including the US Army Corps of Engineers. The FloodWall system is designed to comply with ASCE standards for dry floodproofing and is certified by FM Approvals. All components are engineered and tested to exceed industry standards. As mentioned under the warranty section, we offer service programs that include extended warranties and annual training for on-site installation personnel, ensuring high performance throughout the lifetime of the flood barrier.

9. Examples of where the product has been used within the USA

AquaFence has successfully completed hundreds of projects across the United States, providing flood protection for hospitals, airports, Fortune 100 companies, and other critical assets. Our flood barriers are deployed in more than 25 states. Notable projects include:

- Hospitals: Tampa General Hospital, Ohio Health, NY Presbyterian
- Tunnels: Holland Tunnel, Battery Park Tunnel, Queens Midtown Tunnel
- Airports: LaGuardia Airport, Boston Logan Airport, Teterboro Airport
- Financial Institutions: Citibank, J.P. Morgan, State Street Capital
- Universities: MIT, Ohio State University
- Telecommunications: AT&T, Comcast
- Municipalities: Fargo, North Dakota. Mt. Vernon, Washington
- Military: Pearl Harbor Air Force Base



AquaFence @ Fargo, ND

AquaFence @ Fargo, ND

AquaFence @ Ohio State University

AquaFence @ Tampa General Hospital

10. Can barrier be repaired and what is the process.

While the AquaFence system is highly durable and typically does not require repairs, on rare occasions when maintenance is needed, most repairs can be performed on-site with minimal effort. AquaFence barriers have been deployed hundreds of times by some customers, with only a few instances requiring attention. Potential repairs include:

- **Gasket replacement**: To replace a gasket, simply remove four screws, slide off the old gasket, position the new one, and re-attach the screws.
- **PVC canvas patching:** The PVC canvas is reinforced with a wire mesh to prevent tearing. While the canvas is highly durable, it could potentially puncture if struck by a sharp object with significant force, although this has never occurred during a flood that we are aware of. If the canvas did puncture, it could be easily repaired using a standard patch kit.
- **Lever cleaning/replacement:** If the levers are repeatedly exposed to floodwater and not rinsed prior to storage, they can become clogged with sediment. Should this occur, the levers can be removed by unscrewing a few screws, then either cleaned or replaced.

Appendix I

Bernoulli's Equation

$$\frac{\partial}{\partial s}\left(\frac{v^2}{2}+\frac{p}{\rho}+g\cdot h\right)=0 \tag{1.1}$$

$$g\cdot h_1+\frac{p_1}{\rho}+\frac{V_1^2}{2}=g\cdot h_2+\frac{p_2}{\rho}+\frac{V_2^2}{2} \tag{1.2}$$

Water Level Differential

$$h=h_1-h_2 \tag{1.3}$$

$$V_1=\left(\frac{A_2}{A_1}\right)\cdot V_2 \tag{1.4}$$

1.2, 1.3, and 1.4 combined

$$V_2=\sqrt{\frac{2}{\left(1-\frac{A_2^2}{A_1^2}\right)}\cdot\left(\frac{p_1-p_2}{\rho}+g\cdot h\right)} \tag{1.5}$$

Opening cross-section infinitely smaller than cross-section of flood area

$$A_1>>A_2 \tag{1.6}$$

$$V_2=\sqrt{2\cdot\left(\frac{\rho g h}{\rho}+g\cdot h\right)} \tag{1.7}$$

$$V_2=2\sqrt{gh} \tag{1.8}$$

$$V_2\cdot A_2=2\sqrt{gh}\cdot A_2=\ \textit{Flow rate} \tag{1.9}$$

Warranty for AquaFence Flood Mitigation Products

Vendor products are warranted to be free from defects in material and workmanship at the time of delivery. The Vendor undertakes to remedy any defect resulting from faulty materials or workmanship in the Product under normal intended use, except as otherwise set out in the P.O. or otherwise agreed between the Parties in writing; provided that Purchaser has provided proper storage, care and annual or more frequent if necessary service to the Product as set forth in Vendor's installation, operation and maintenance manuals provided upon delivery. In addition, Vendor shall, without cost to Purchaser, make any repairs necessary due to damage sustained to the Vendor Products during Purchaser's initial deployment of the product unless occurring due to Purchaser's negligent or willful acts. THIS WARRANTY IS LIMITED TO DEFECTS IN MATERIAL AND WORKMANSHIP WHICH APPEAR DURING THE PERIOD OF TWO YEARS FROM THE DATE OF DELIVERY (THE "WARRANTY PERIOD").

Vendor warrants that the Products supplied under these General Conditions conform to specifications set forth on the Order Form to which these General Conditions are attached (and incorporated by reference) and the specifications set forth herein, and are fit for the purpose for which such Products are ordinarily employed; provided however, the parties recognize that it is Purchaser's responsibility to design, engineer, and build the foundation for the Product elements and any below surface conditions as well as Purchaser's responsibility to choose the method of securing the foundation for the fence elements ("Purchaser's Groundwork"). The parties understand and agree that the warranty set forth in this Article 7 does not extend to any of Purchaser's design, installation, and operation of the Products in accordance with Purchaser's own design and engineering work; provided further that the parties agree that the design of the Product and debris should not guarantee nor intended to prevent floods but instead is a tool to mitigate flood and debris damage provided the flood is of no more than the height of the flood wall offered and then only when properly installed, used, and maintained. NO OTHER WARRANTY, WHETHER EXPRESSED OR IMPLIED (INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE), SHALL EXIST IN CONNECTION WITH THE SALE OR USE OF ANY VENDOR PRODUCTS.

In order for the warranties set forth in these General Conditions to continue to be valid, the Purchaser, without delay, shall notify the Vendor in writing of any defects that have appeared, and in no event shall such notification be later than 30 days from the date the defect was discovered or should have been discovered, and Purchaser shall give Vendor every opportunity to inspect and remedy any defects pursuant to the terms hereof.

Products claimed to be nonconforming or defective must promptly be returned to Vendor for inspection, unless the Vendor has given other instructions to the Purchaser in writing. Vendor will, at its option, either repair or replace nonconforming or defective products for which it is responsible or return the purchase price to Purchaser. The return of the purchase price to Purchaser or the delivery to the Purchaser of a repaired part or a part in replacement thereof, at Vendor's option, shall be deemed to be a fulfillment by the Vendor of Vendor's warranty obligations under these General Conditions with respect to such defective part. Claims not made as provided above and within the applicable time period will be barred. Vendor shall in no event be responsible if the products have not been stored or used in accordance with its specifications and recommended procedures. THE FOREGOING STATES PURCHASER'S EXCLUSIVE REMEDY FOR ANY BREACH OF VENDOR'S WARRANTY. Purchaser forever agrees to indemnify, defend, and hold harmless the Vendor from and against any and all losses, claims, obligations, demands, assessments, penalties, liabilities, costs, damages, reasonable attorneys' fees and expenses (collectively, "Damages"), asserted against or incurred by Purchaser by reason of or resulting from Purchaser's own wrongful and/or negligent acts or omissions or those of their officials, officers, agents, or employees to the fullest extent required by law including acts or omissions related to Purchaser's installation of the Product, site selection (including but not limited to soil, subsurface, and/or geological conditions), maintenance and storage, or operation of the Product. Furthermore, Vendor shall not be liable for the actions and/or inactions of any person, company, or governmental unit, agency, or quasi-governmental unit or agency in connection with the installation of the Product.

Defective parts returned to Vendor in accordance with this Section 7 shall become the exclusive property of the Vendor and Vendor shall be entitled to dispose of such parts in its discretion.

The Vendor Warrants only defects in materials and workmanship and that the Products conform to specifications herein and are fit for the purpose for which such Products are ordinarily employed as set forth herein. Vendor shall not be liable to Purchaser or any third party for defects due to causes arising after the risk has passed to the Purchaser.

AquaFence®

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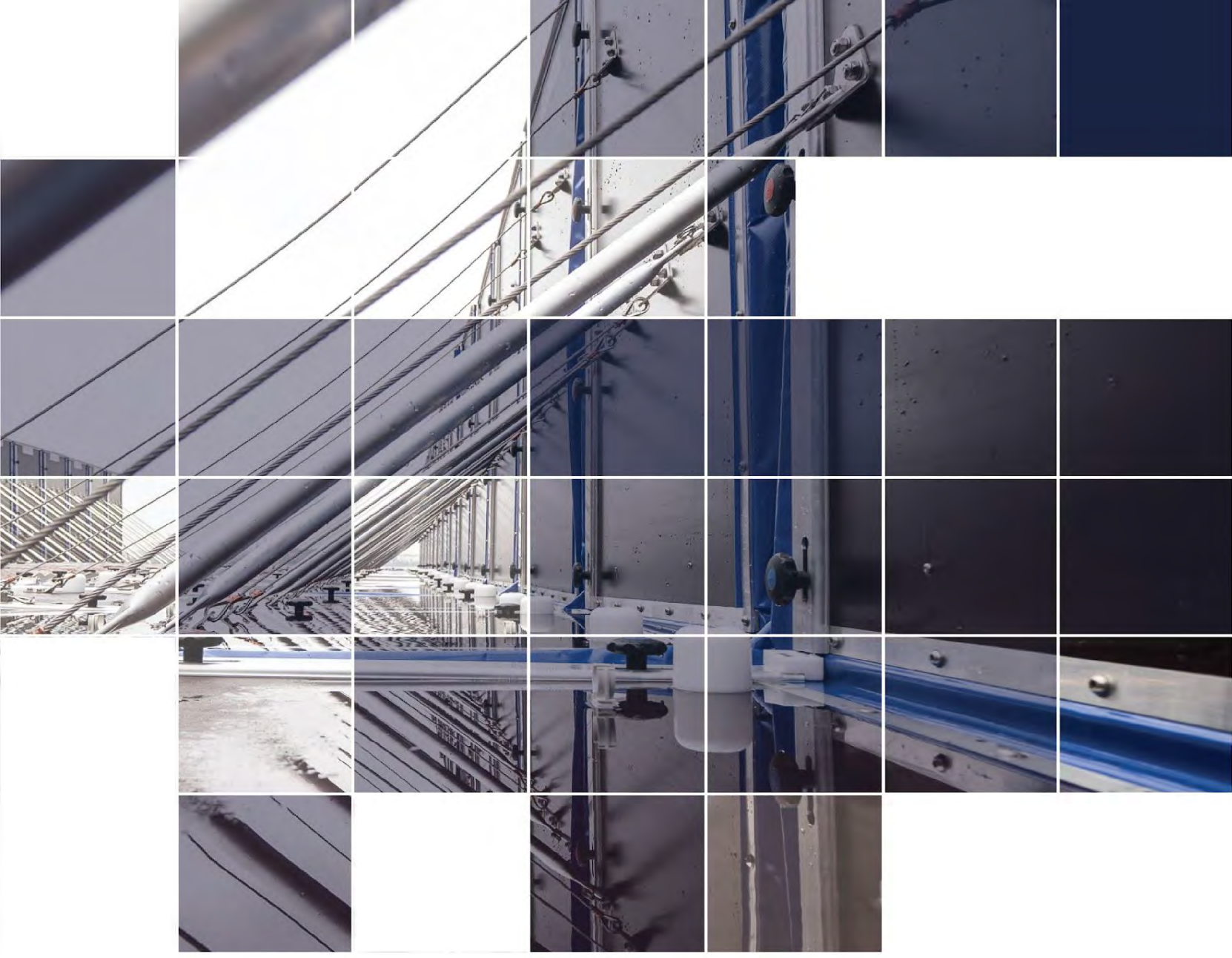

Installation, Operation & Maintenance Manual

i2024 - V2.7

AquaFence®

Flood Protection Technology

Version Number	Date	Changes Applied	Authors
2.0	July 2020	Creation of 2020 Operations & Maintenance Manual	Thomas Briedis & Erik Flood
2.1	Oct. 2020	Added Front Beak Anchor Section	Erik Flood
2.2	Sept 2021	Complete Manual overhaul with new drawings, and sections	Edijs Jumburg, Erik Flood, Thomas Briedis, Francesco Beckmann, Fred Dahl, Mikael Dahl
2.3	April 2022	Manual date; All visuals	Seweryn Wierdak, Herta Galina, Edijs Jumburgs
2.4	June 2022	Tools needed, Anchoring	Thomas Briedis, Fred Dahl, Edijs Jumburgs
2.5	Nov 2023	General update	Thomas Briedis, Erik Flood, Edijs Jumburgs
2.6	Apr 2024	Section Pumps	Thomas Briedis, Fred Dahl, Edijs Jumburgs
2.7	June 2024	General Updates, revisions, reformatting	Zackary Tynan, Thomas Briedis

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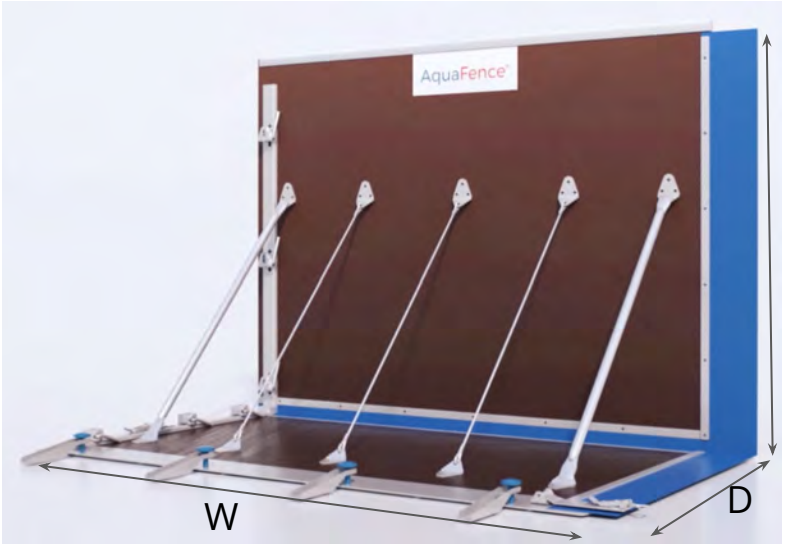
Disclaimer

The AquaFence FloodWall system must be installed, maintained, stored and used in accordance with the guidelines provided by Aquafence. Aquafence is not liable for unintended consequences of improper installation, maintenance, and/or storage.



TYPE	DIMENSIONS (Height x Depth x Width)
V750	29.75 x 29.75 x 82.7 inches 0.75 x 0.75 x 2.1 meters
V1200	47.2 x 47.2 x 82.7 inches 1.2 x 1.2 x 2.1 meters
V1500	59.1 x 59.1 x 82.7 inches 1.5 x 1.5 x 2.1 meters
V1800	70.9 x 70.9 x 47.2 inches 1.8 x 1.8 x 1.28 meters
V2100	82.7 x 82.7 x 47.2 inches 2.1 x 2.1 x 1.28 meters
V2400	94.5 x 94.5 x 41.3 inches 2.4 x 2.4 x 1.05 meters
V2700	106.3 x 106.3 x 41.3 inches 2.7 x 2.7 x 1.05 meters

INTRODUCTION AND KEY FEATURES

THE AQUAFENCE FLOOD BARRIER SYSTEM

Invented and patented in Norway in 1999, the mission at AquaFence has always been to offer state of the art flood barriers that are easy to install during emergency situations, yet out of sight at all other times. Originally developed in cooperation with multiple international flood protection programs as well as global insurance companies, AquaFence is now protecting hospitals, municipalities, transportation hubs, industrial buildings and significant real estate worldwide.

The AquaFence is a US Army Corps of Engineers tested flood protection barrier that can be:

- Deployed 100 times faster than sandbags without special training or heavy machinery
- Easily disassembled and stored for future floods
- 100% reused without any waste creation
- Delivered in protection heights ranging from 2.5’ to 9’ (0.75 to 2.7 meters)
- Used nationwide as FEMA-compliant dry floodproofing.

The AquaFence Flood Barrier is a modular system where multiple interconnected panels are used to form a flood wall around a structure or area. Each panel is individually self-stabilized by the weight of the water on the system, creating a barrier that is highly resistant to a variety of flood loads with minimal anchoring and preinstallation site work.

The AquaFence Flood Barrier is designed with safety factors above industry standards and has been extensively tested in AquaFence as well as third party test facilities. All parts are made of durable materials, with examples of the system being used, in some cases fully submerged in water, for several years at a time. It has also been tested to withstand extreme temperatures. The system is compliant with building codes such as ASCE 7-16, ASCE 24-14, IBC 2015, and more.

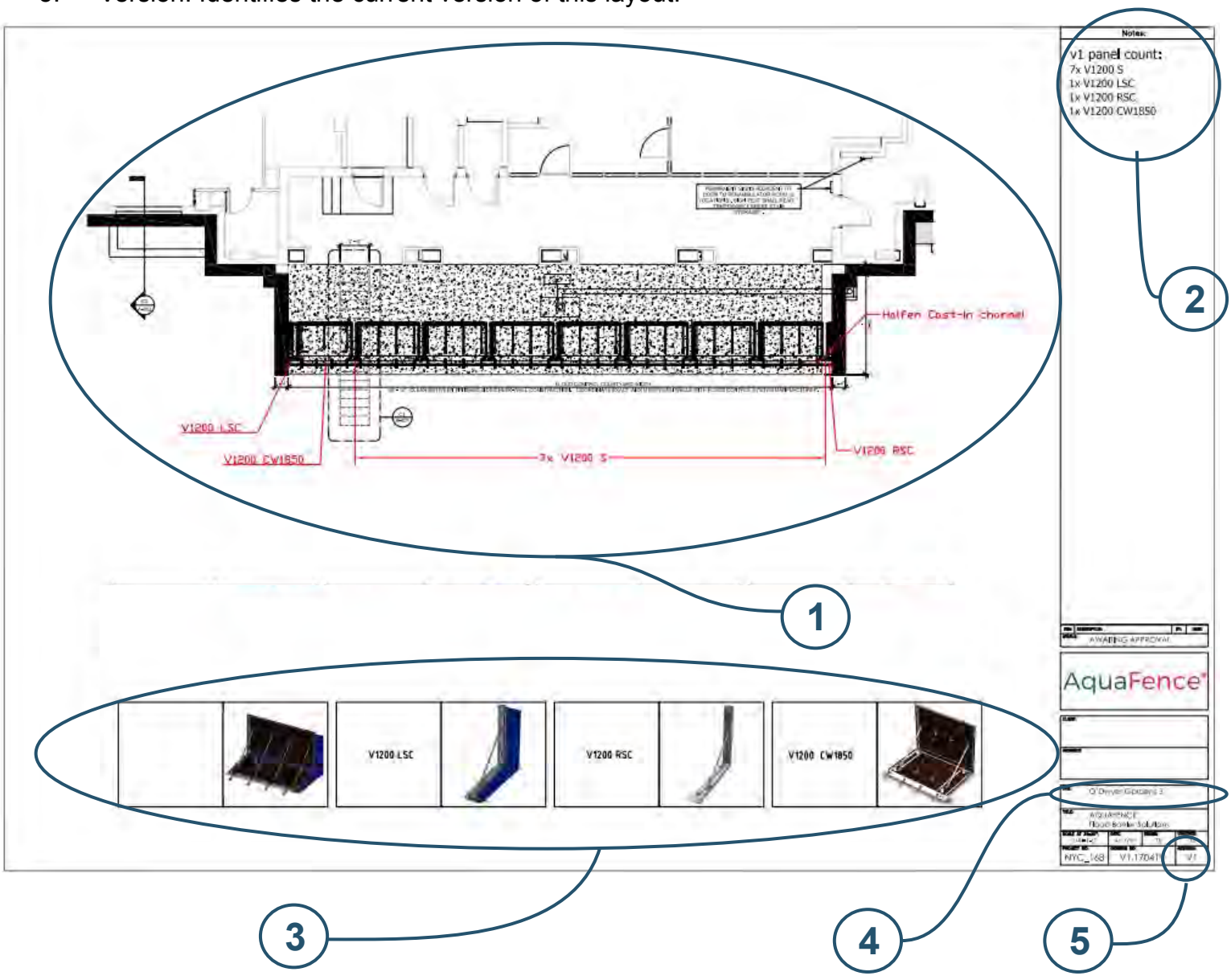
Due to the ease of installation, AquaFence Flood Barriers can be installed even when there is a low probability of flooding. The modularity of the system allows egress points to be created by leaving single modules out of the barrier. With egress in and out, the area at risk can stay open up until the last minute before flooding occurs, at which point the remaining modules are installed to complete the barrier.

The system can be reused dozens of times and only requires a fresh water rinse after each use. When the AquaFence system is not in use, the panels are stored in custom, space efficient crates, which can be stacked up to four high.

UNDERSTANDING THE LAYOUT PLAN

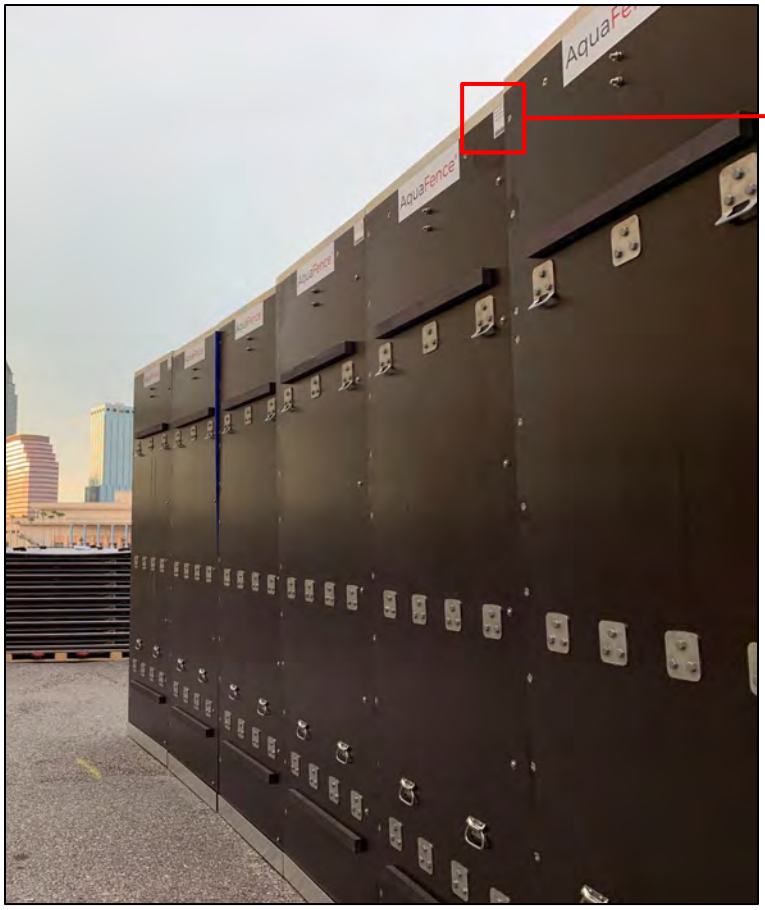
Review the Deployment Plan (or Layout Plan Drawings) prior to any deployment as it identifies the layout of the FloodWall system on site. There are several main features of the deployment plan, identified below:

1. Layout: The plan drawings the FloodWall system, usually incorporating the facility's Architectural & civil floorplans.
2. Panel Count: Identifies the specific items & components used, per Item ID.
3. 3D illustrations of the items being used or details of specific components
4. Site Name: Typically an address or name of the building.
5. Version: Identifies the current version of this layout.



PANEL IDENTIFICATION

The simplest way to identify the type of AquaFence FloodWall module is to review the Item specification and S/N label at the back of the panel, located in the top right corner.



TERMINOLOGY AND ITEM CODES

ITEM CODE	CODE MEANING	ITEM DESCRIPTION	EXAMPLE
FLOODWALL MODULES			
CW	Custom Width	Indicates the width of a module	V1500 CW1000
HL#### HR####	Transition	Transition module connects two different types of modules. HL denotes the depth of lefthand side in mm, HR denotes the depth of the righthand side in mm.	V1500 HL1200 HR1500 CW2100
H	Hybrid	Indicates a modules depth in mm, when it is not the same as the height.	V1500H1200 S
IC	Inside Corner	The inside corners are used for inside turns, and the degrees turned are stated after IC.	V1500 IC22.5
OC	Outside Corner	The outside corners are used for turns and the degrees turned are stated after OC.	V1500 OC90
S	Standard	Indicates the module is of standard width. See page 5 for the widths of each.	V1500 S
Shield	Debris Shield	An optional feature of the system.	V1500 Shield
V	FloodWall	The V indicates the height of the module, in mm.	V1500
VW	Variable Width	FloodWall modules whose width can be adjusted on-site.	V1500 VW
STRUCTURAL CONNECTION MODULES			
C Clamp	3” C Clamp	When an elevation rail is not used, c-clamps are used to attach two side closers together.	
ER	Elevation Rail	Custom fittings on a side closer, used to aid elevation changes.	V1500 LSCP ER
LSC RSC	Left Side Connector Right Side Connector	The Side Connector (Or Side Closer) is the module to connect the system to the permanent wall.	V1500 LSC
P	Adjustable Push Rod	Also known as adjustable tension rod.	V1500 LSCP

TERMINOLOGY AND ITEM CODES

CONTINUED

ITEM CODE	CODE MEANING	ITEM DESCRIPTION	EXAMPLE
SCA	Side Connection Adapter	The Side Connection Adapter allows for Side Connectors to connect to the wall at any angle.	V1500 SCA
WE	Wall Extender	Wall Extenders. Custom Panels used to aid in connection to the structure & to circumvent obstacles.	WE305
	Wall Filler	Closed cell foam which is used to fill spaces	
FB	Flood Barricade	AquaFence Opening barrier.	V2100 FloodBarricade 3.85' OS
OTHER BARRIERS (not FM Approved)			
FW	Flash Wall	AquaFence Opening Barrier	FW X3

TERMINOLOGY AND ITEM CODES

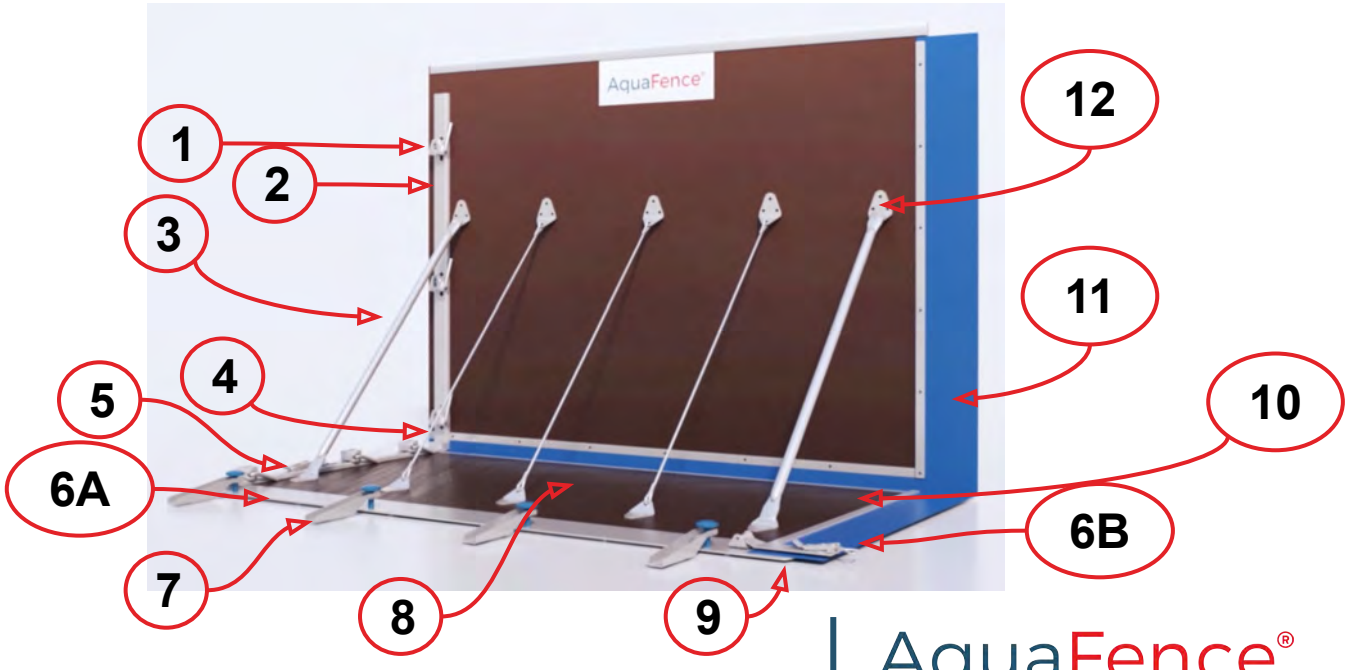
CONTINUED

GENERAL TERMINOLOGY	
Anchors	Ground anchors, concrete anchors, earth anchors, asphalt anchors
Fasteners	Screws, bolts, nuts, threaded rods, wheels, straps, and other hardware used to fasten the AquaFence system to the structure
Crate	The weather resistant storage box used for storing AquaFence systems
Deployment	The installation of the barriers on site
Egress Stairs	Custom 3rd party stairs for walking over the flood protection wall
Integrated Flood Shield	A complete AquaFence Flood system
AquaFence system	The entire configuration of FloodWall and FloodBarricade panels used to provide flood protection for a facility.
Module/Panel	Individual AquaFence FloodWall or FloodBarricade panels/units
Test Installation	The first installation, usually a dry-install, done to verify that the system fits as designed.
Wet Side	The side of the AquaFence system facing the water
Dry Side	The side of the AquaFence system protected from flood waters
Protection Line	Modules combined together creating the watertight seal

TERMINOLOGY AND ITEM CODES

CONTINUED

No.	NAME	DESCRIPTION
1	Lever	Tighten and release Canvas Clamp
2	Canvas Clamps	The Canvas Clamp connects and seals adjacent modules by securing the canvas' together
3	Strut	The struts are used to hold the vertical wall upright
4	Corner Block	The white corner block
5	Canvas Latch	Latch which pushes the Horizontal Canvas Clamp
6B	Front Beak Latch	Latch which connects two adjacent modules
6A	Front Beak Latch Receiver	Hook
7	Anchor Arm	Use for anchoring the module
8	Strut Clip	Grey C shape part to lock the strut
9	Gasket	The gasket which creates a seal to the ground
10	White Cyllinder	4 pcs per module
11	Canvas	Reinforced blue pvc canvas that connects modules
12	Strut Receiver	Strut Receivers they lock the strut into it's support



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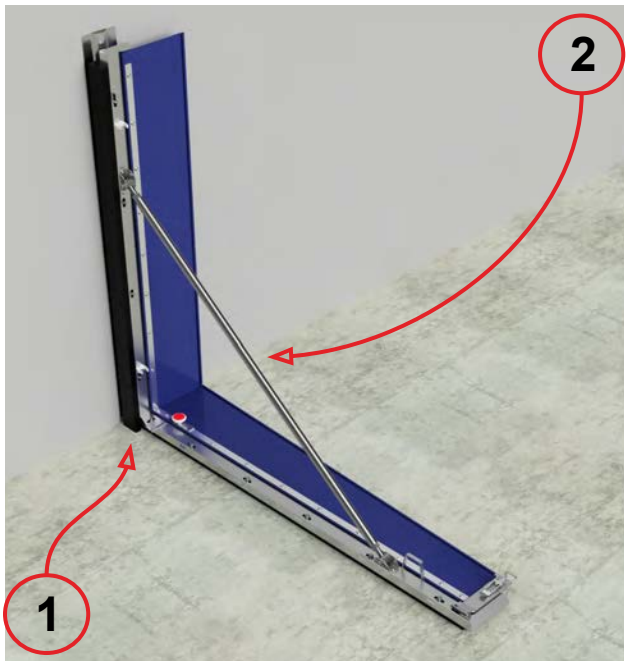
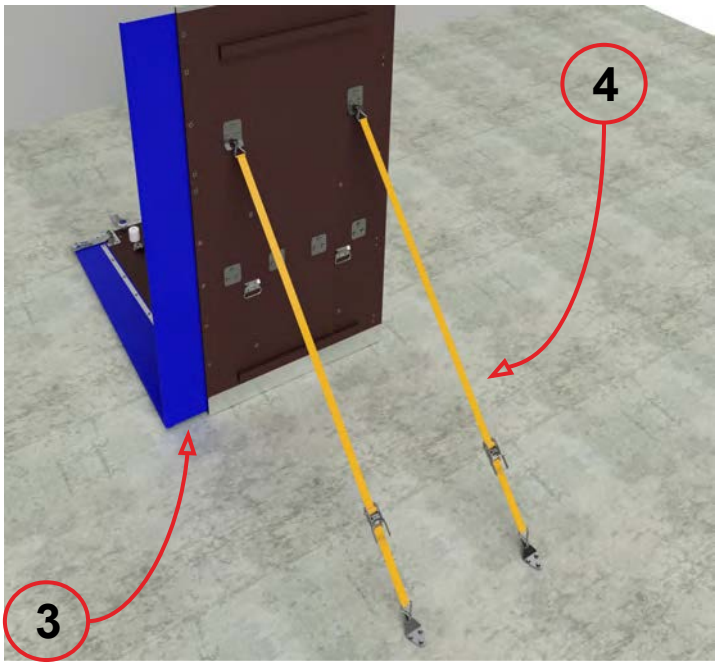
TERMINOLOGY AND ITEM CODES

CONTINUED

No.	NAME	DESCRIPTION
1	Gasket	The gasket which creates a seal to the ground or wall.
2	Adjustable Push Rod	Stainless steel tension rod used to reinforce connection between horizontal and vertical components of panels
3	Canvas	The blue reinforced pvc canvas
4	Wind Straps	Added for extra protection.

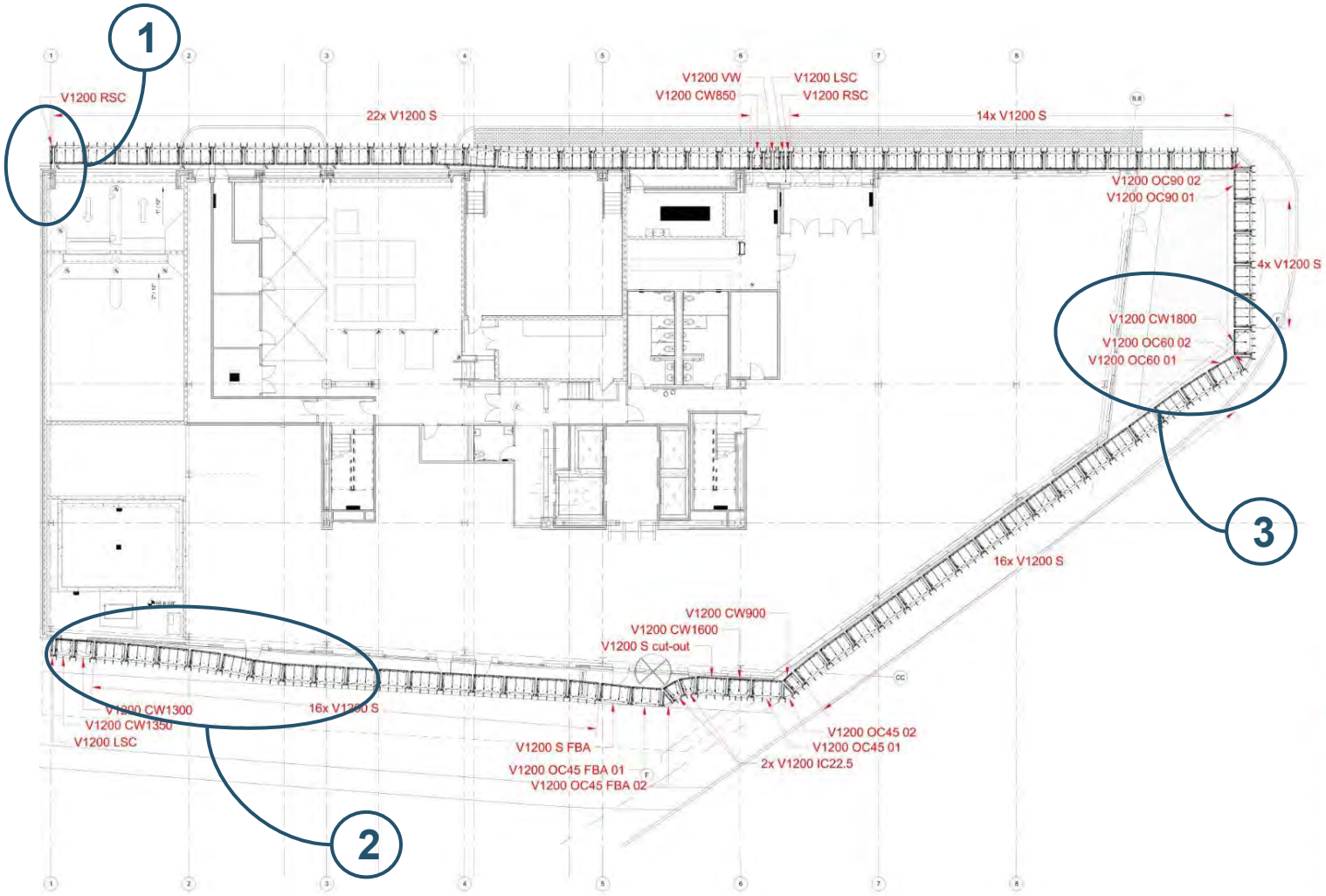




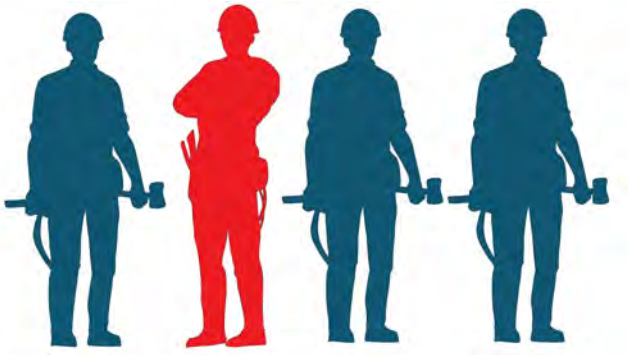
UNDERSTANDING THE DEPLOYMENT PLAN

Things to be aware of when reviewing a layout plan:

1. Look for the exact location where the Side Connectors attach to the walls.
2. Standard modules can be adjusted a few degrees at each connection point. In this layout you can see several locations where the modules angle away or towards the building. When deploying, pay particular attention to these points.
3. Note the location of special modules, i.e. CW (custom width) OC (outside corners) or other modules. (e.g. not V1200 S).

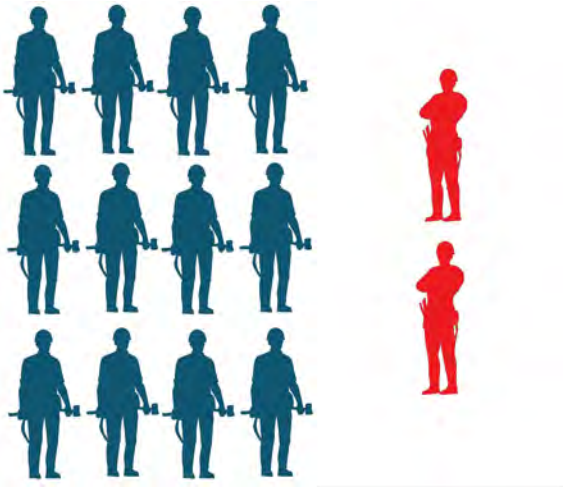


A minimum of 4 workers, where at least one of them is trained in the use, and installation methods of the FloodWall, are recommended for the deployment.



For larger projects, multiple teams are recommended to speed up the deployment time, by deploying multiple sections at the same time or from both ends.

The larger the workforce is the more focus on moving crates, anchoring, placing panels, or do connections between modules. In such cases, the trained workers can function as supervisors to manage the different teams, and/or individuals. Consult with AquaFence for recommendations on team numbers and sizes for your project specifically.



The below tasks should be delegated prior to deployments:

- Coordinating crate delivery and placement
- Module deployment
- Module connection
- Anchoring
- Quality control

LOGISTICS

TIMING

The following table shows estimated deployment times based on FloodWall height and team sizes.

DEPLOYMENT TEAMS				
TYPE	**2 Person Team**	**4 Person Team**	**8 Person Team**	**12 Person Team**
V750	100 ft./hr 30 m/hr.	200 ft./hr 60 m/hr.	400 ft./hr 120 m/hr.	560 ft./hr 170 m/hr.
V1200	n/a	100 ft./hr 30 m/hr.	200 ft./hr 60 m/hr.	275 ft./hr 85 m/hr.
V1500	n/a	100 ft./hr 30 m/hr.	200 ft./hr 60 m/hr.	275 ft./hr 85 m/hr.
V1800	n/a	60 ft./hr 18 m/hr.	120 ft./hr 36 m/hr.	165 ft./hr 50 m/hr.
V2100	n/a	60 ft./hr 18 m/hr.	120 ft./hr 36 m/hr.	165 ft./hr 50 m/hr.
V2400	n/a	40 ft./hr 12 m/hr.	80 ft./hr 24 m/hr.	110 ft./hr 34 m/hr.
V2700	n/a	40 ft./hr 12 m/hr.	80 ft./hr 24 m/hr.	110 ft./hr 34 m/hr.

A multitude of factors can affect deployment time:

- Climate
- Individual efficiancy
- Distance from storage to site
- Proper planning

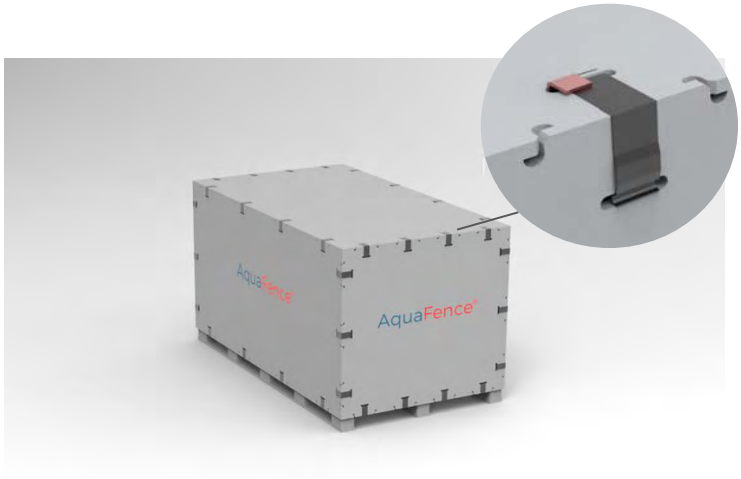
*The deployment speeds are based on straight runs of standard width FloodWalls prior to anchoring

LOGISTICS

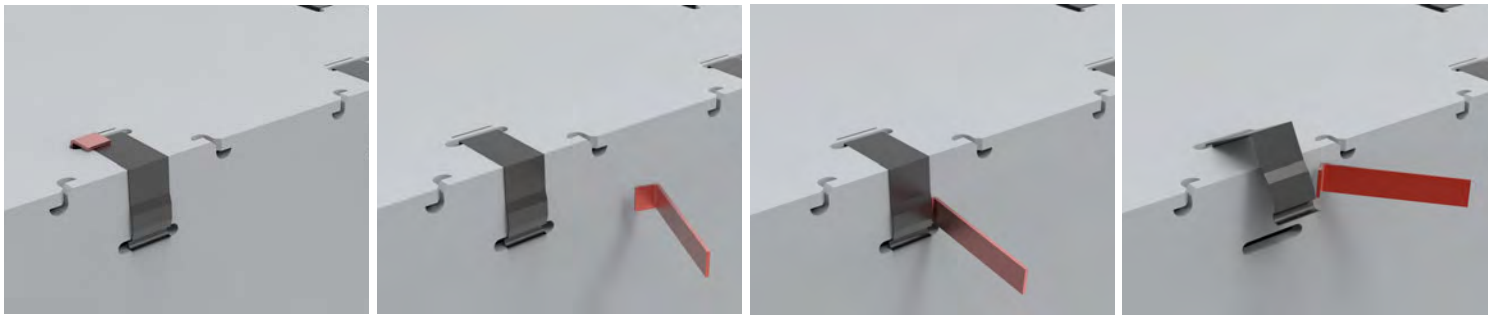
STORAGE CRATE OPENING

To simplify panel removal, crates containing V750, V1200, or V1500 panels should be opened from the short end (as shown below), while V1800, V2100, V2400, and V2700 crates should be opened from the long side. To open a crate and take out a panel, follow the following steps:

Step 1: Identify the clips you'd like to remove.



Step 2: Locate the metal crate opener positioned at one of the short ends of the crate.



Step 3: Using the crate opener, pry open the lock clips which releases them. You will always pry the clip from the vertical side of the crate.

Step 4: Once you've opened the crate, slide the panels out while being careful not to damage the gaskets underneath each panel. The spacer bars on the back of all panels help guide them in and out of the crates.

GENERAL INSTALLATION PROCESS

The process of installing a FloodWall system normally has four noteworthy phases:

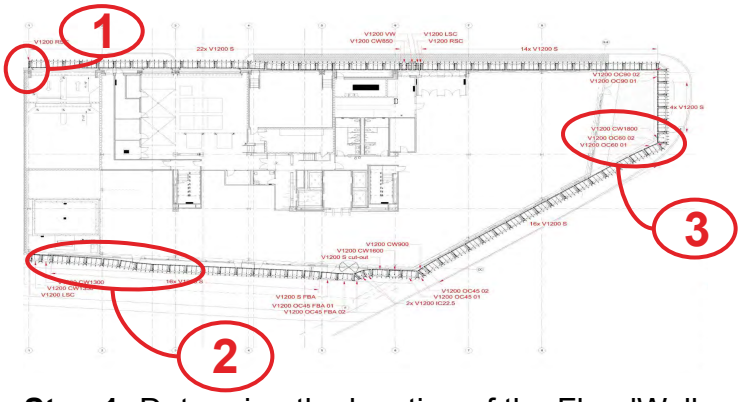
01	**Pre-installation**	• Ground work, if necessary (i.e. installing impermeable surface like concrete, pavement, etc. for system to be placed on) • Installing anchor rails/footings (if part of the project) • Identifying & Removing obstacles (planters, benches, signposts, etc.)
02	**First-time Deployment**	• Aquafence agent is physically present, provides training and supervision on how to install AquaFence system components to the necessary personnel • Execution of deployment plan and making necessary adjustments • Locating and installing anchors
03	**Regular Deployment**	• Execution of deployment plan to defend against flood threats or as part of training sessions • Verifying all components are correctly installed (Identifying & correcting installation errors, gaps in the protection line, etc.)
04	**After-service procedures**	• Cleaning FloodWalls of dirt after use, rinsing with water • Properly packing the modules back into the crates • If damages are observed, please contact AquaFence team for assistance

Recommended tools for the installation of an AquaFence flood barrier:

No.	Item	1st Time Deployment	Regular Deployment
1	Pallet Jack	Yes	Yes
2	Forklift (not required, but recommended for larger projects)	Yes	Yes
3	Masonry drill & drill bits for anchoring purposes*	Yes	No
4	Hand-held electric drills with torque control for anchor installation	Yes	Yes
5	Paint or chalk line used to mark anchor points and/or align panels' position	Yes	No
6	Markers/Labels for sequencing panel components & storage crates	Yes	No
7	Gloves	Yes	Yes
8	Steel Toe Boots	Yes	Yes

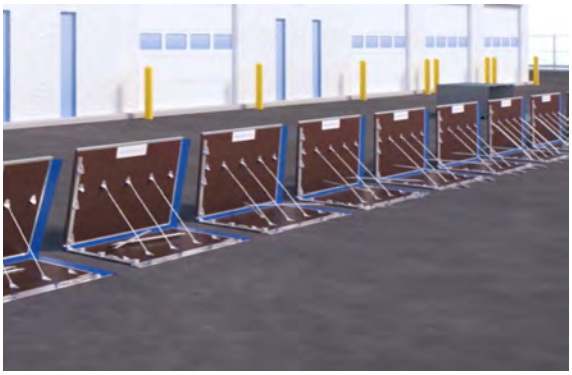
*Confirm size of drill bits prior to deployment

Examples of typical protective gear used during installation



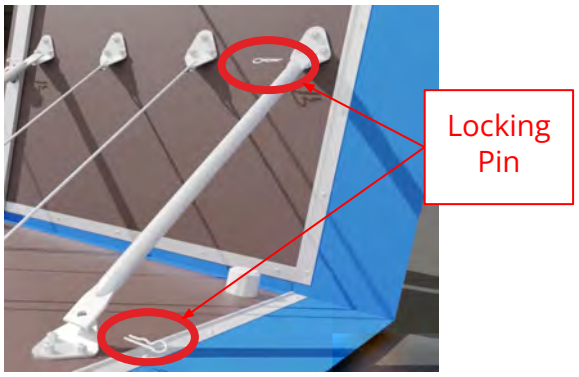
Step 1: Determine the location of the FloodWall modules based on the deployment plan.

Step 2: Lay each FloodWall module next to the previous module and align the front beaks.

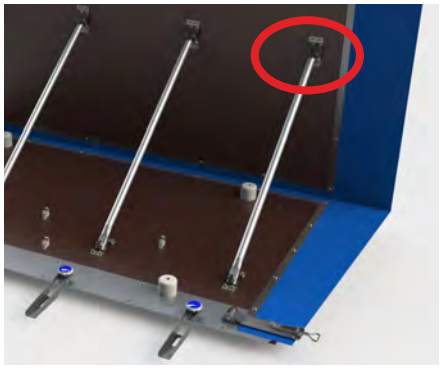


Step 3: Have one person hold the vertical panel open while the other attaches the support struts.

There are 2 types of support struts (Described in the following boxes).



Strut Receiver **version 1:**
Remove the pin, secure the support strut, then add the pin back on.

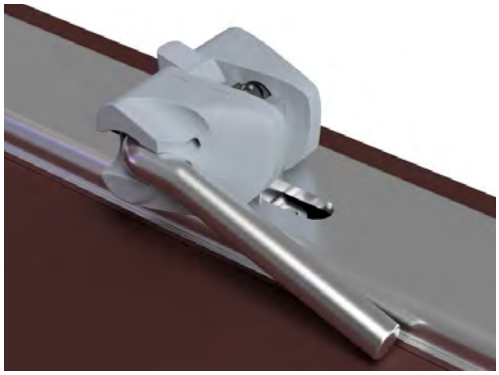


Strut Receiver **version 2:** Gear Shift Lock
Slide the support strut into the Gear Shift Lock. This version is used in older panel models. Newer 'Slimline' FloodWall panels wull use the version 1 strut receiver.

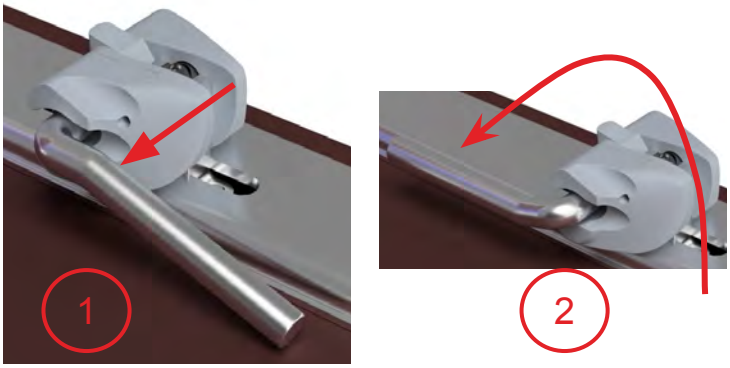
Step 4: Open Levers on Canvas Clamps

INSTALLATION

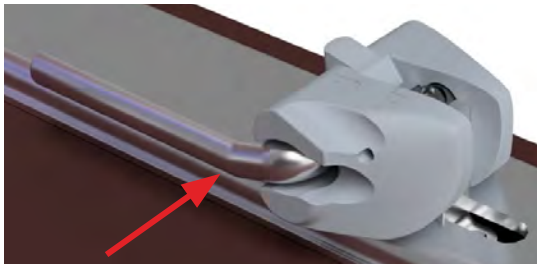
STANDARD FLOODWALL LEVER OPERATION



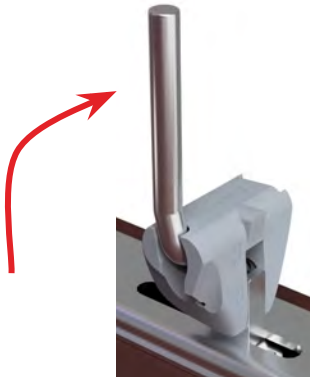
Start: This is closed and secured position of the lever.



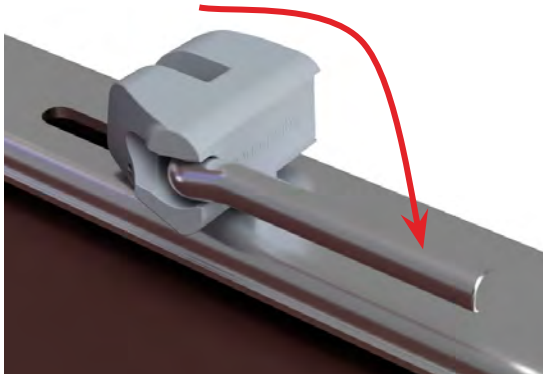
Step 1: Slide the handle out of its locking position (1) and tilt it (2).



Step 2: The handle will fixate itself in the working position.



Step 4: Move the handle up together with the plastic body. Photo shows the middle position.

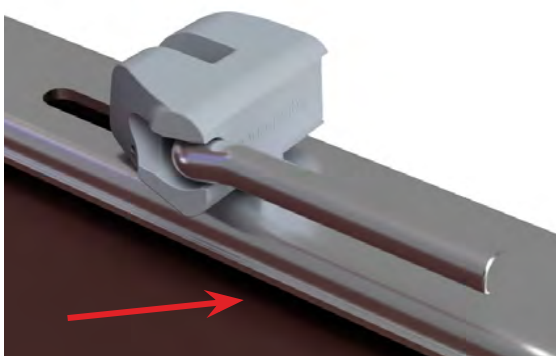


Step 5: Continue the move the lock until it will be in the open position. It releases canvas clamp fully.

Step 6: To lock the lever, please do the actions described above in a reverse sequence.

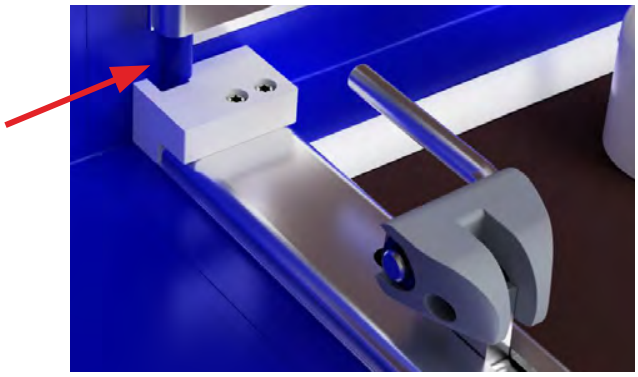
INSTALLATION

STANDARD FLOODWALL INSTALLATION CONTINUED

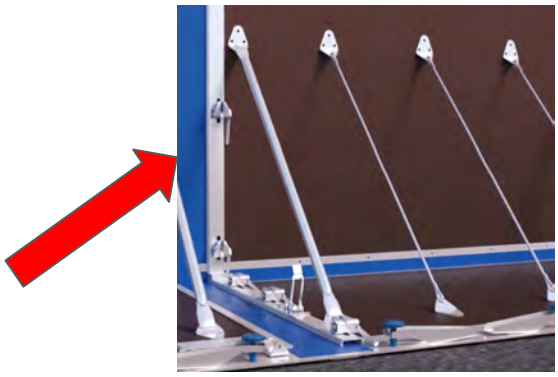


Step 1: Open the lever and release the canvas clamps. Once there is a gap underneath, canvas clamp is released.

Step 2: Starting at the front beak, tuck the canvas under the canvas clamp, working your way up. When you get to the White Corner Block, ensure the thick canvas end is centered in the notched cut out.

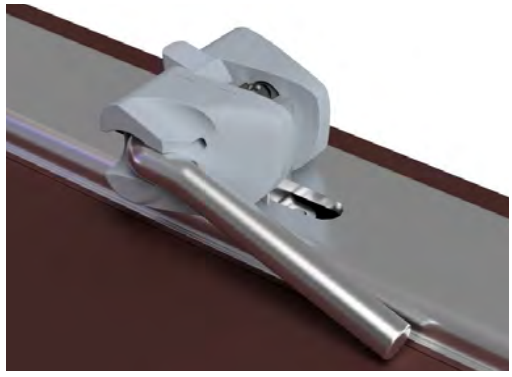


Step 3: Slide the horizontal Canvas Clamp into the vertical panel, so the thick roped canvas fits into the notched cutout.



Step 4: Tuck the rest of the canvas under the vertical canvas clamp.

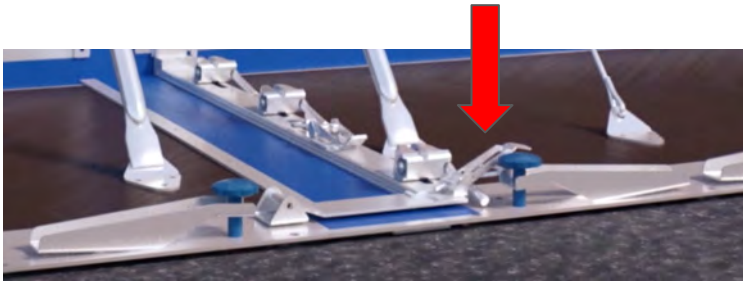
Step 5: Once canvas are in place, set the levers in the middle position and lock the latch on the horizontal canvas clamp.



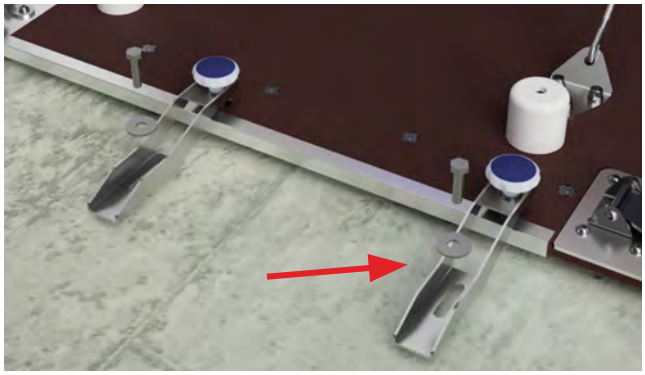
Step 6: Secure the levers in the closed position on the horizontal canvas clamp. Make sure the lever is in a locked position.

Step 7: Slide vertical Canvas Clamp down until it's touching the white corner block.

Step 8: Secure the levers in closed position on the vertical Canvas Clamp. Make sure the lever is in a locked position.



Step 9: Connect adjacent modules with the front beak latch.

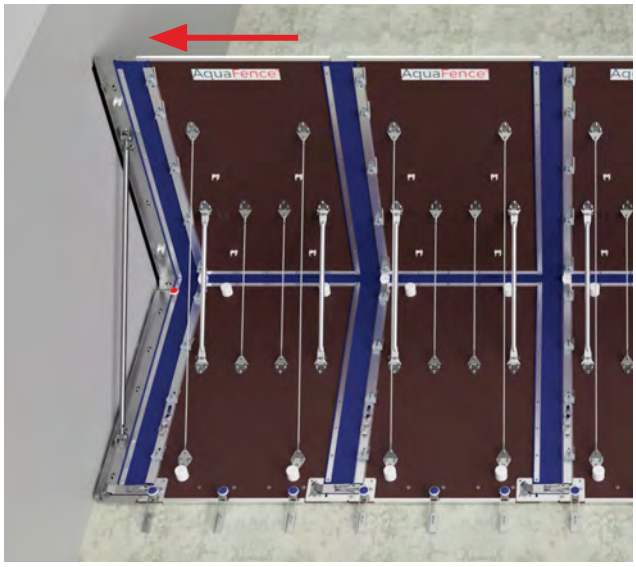


Step 10: Rotate anchor arms to align with ground anchors. Install fasteners.

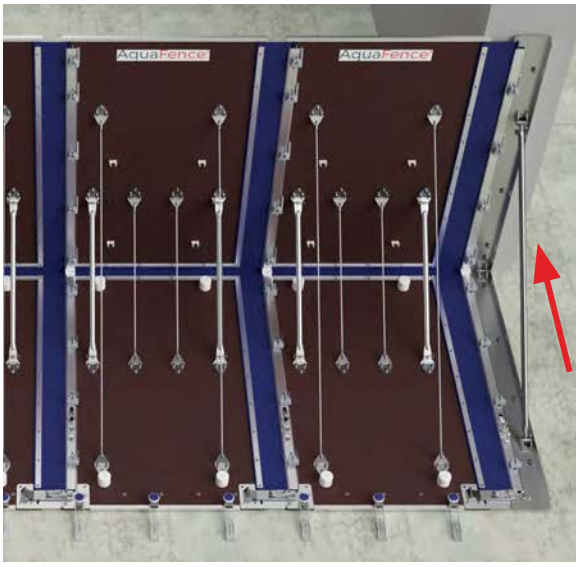
INSTALLATION

SIDE CONNECTOR INSTALLATION

If FloodWalls are protecting a section rather than a full perimeter, Side Connectors can be used to attach FloodWall modules to a structure, Wall Extender (WE), or Side Closer Adapter (SCA). Side Connectors can connect in two ways, an inside connection (flush) or an outside connection (Backward facing).



INSIDE CONNECTION (FLUSH)

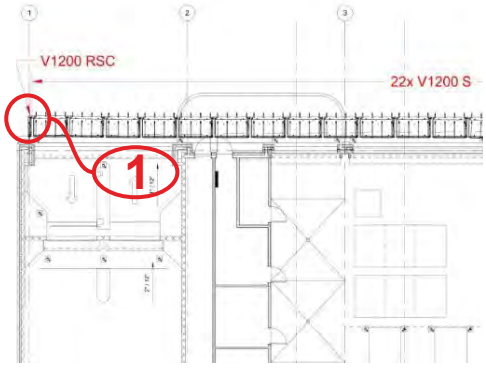


OUTSIDE CONNECTION
(BACKWARD FACING)

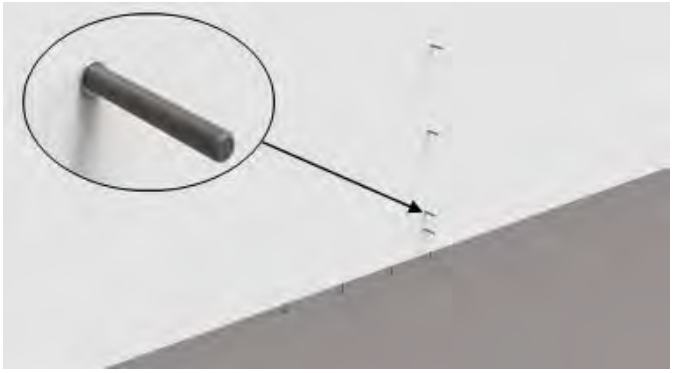
AquaFence Side Closers are installed as detailed below:

INSTALLATION

SIDE CONNECTOR INSTALLATION CONTINUED



Step 1: Identify the locations where the Side Connectors anchor to the building/structure. Locate the anchoring hardware.



Step 2: Remove the caps, and insert the threaded rods into the anchors.

Step 3: Fold open the Side Connector. Place the Side Connector with the threaded rods going through the anchor points on the ground.

Step 4: Take the Adjustable Push Rod, and remove the clips and bolts from both ends.

Step 5: Slide the bolt through the connection bracket and adjustable support rod.

Step 5: Insert the lock pin through the hole on the end of the bolt to secure it in place.

INSTALLATION

SIDE CONNECTOR INSTALLATION CONTINUED

Step 6: Place the washers and nuts onto the threaded rods then tighten.

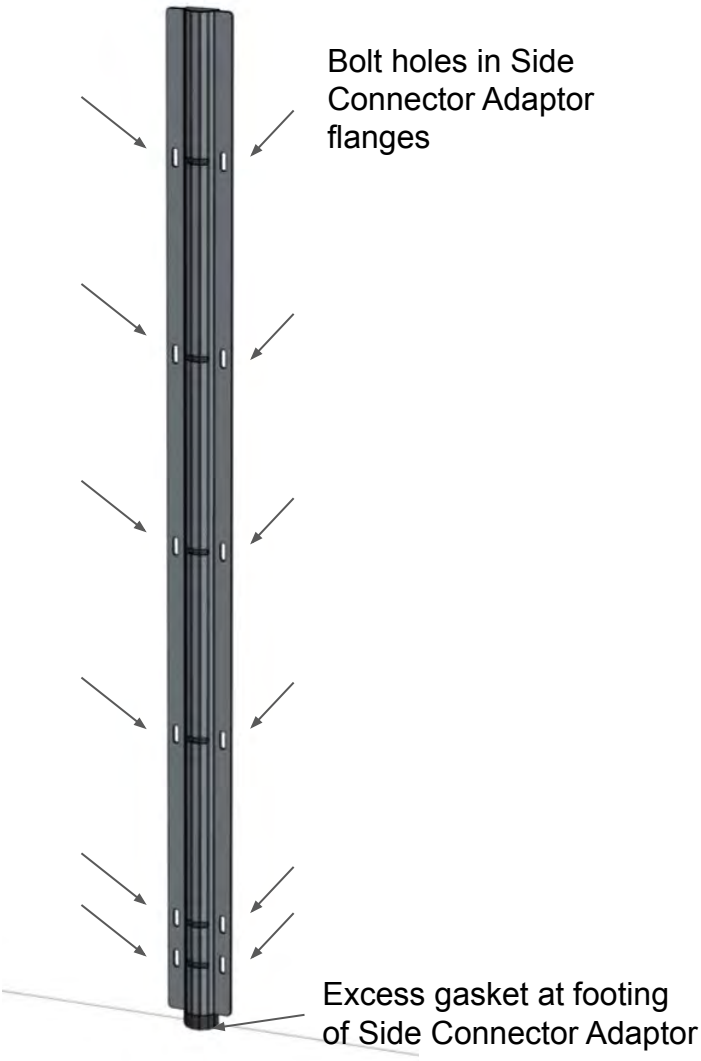
!

Step 7: Look for gaps between the foam gasket and structure. If there's a gap, and flooding is imminent, use expanding waterproof caulk to fill gaps.

INSTALLATION

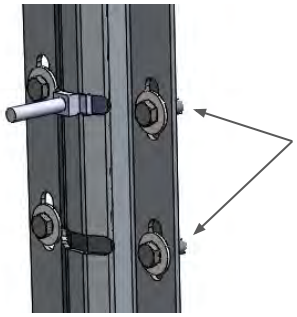
SIDE CONNECTOR ADAPTOR

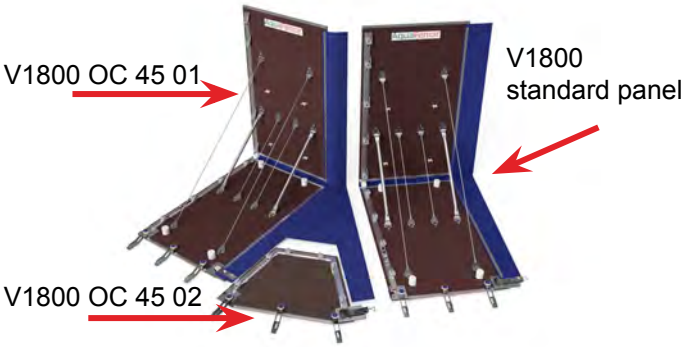
The Side Connector Adaptor is a specialized mounting bracket that allows for connections to buildings at angles sharper than what the standard Side Connectors can usually accommodate.



Installation Procedure:

1. Position The Side Connector Adapter (SCA) in the correct position, according to layout plans.
2. Hold SCA against the wall, and press downward on SCA to ensure gasket at bottom is compressed towards the ground.
3. Mark locations/drill pilot holes for the anchors.
4. Remove SCA to install anchors into the wall.
5. Align the SCA's bolt holes with the installed anchors in the wall.
6. Fix the SCA to the wall with the correct fasteners & hardware.





Step 1: Identify the correct Outside Corner modules. You can distinguish the correct OC panel by the forked blue pvc canvas component, as well as by the identification sticker located on the back. (Ex. V1800 OC45)

Step 2: Connect the corner components to the OC FloodWall module

NOTE: There are multiple components in an OC module. The component number is indicated on the part. The FloodWall section is component # 01, and the corner pieces are 02, and 03 if applicable.

Step 3: Align the front beaks of the adjacent panels.

Step 4: Connect the OC FloodWall module to the adjacent modules.

INSTALLATION

MAINTAINING EGRESS

The modular design allows for egress before floodwater arrives by removing modules at key locations either during or after deployment. To correctly and safely create egress, there must be a minimum of three modules installed on either side of the section before it is removed.

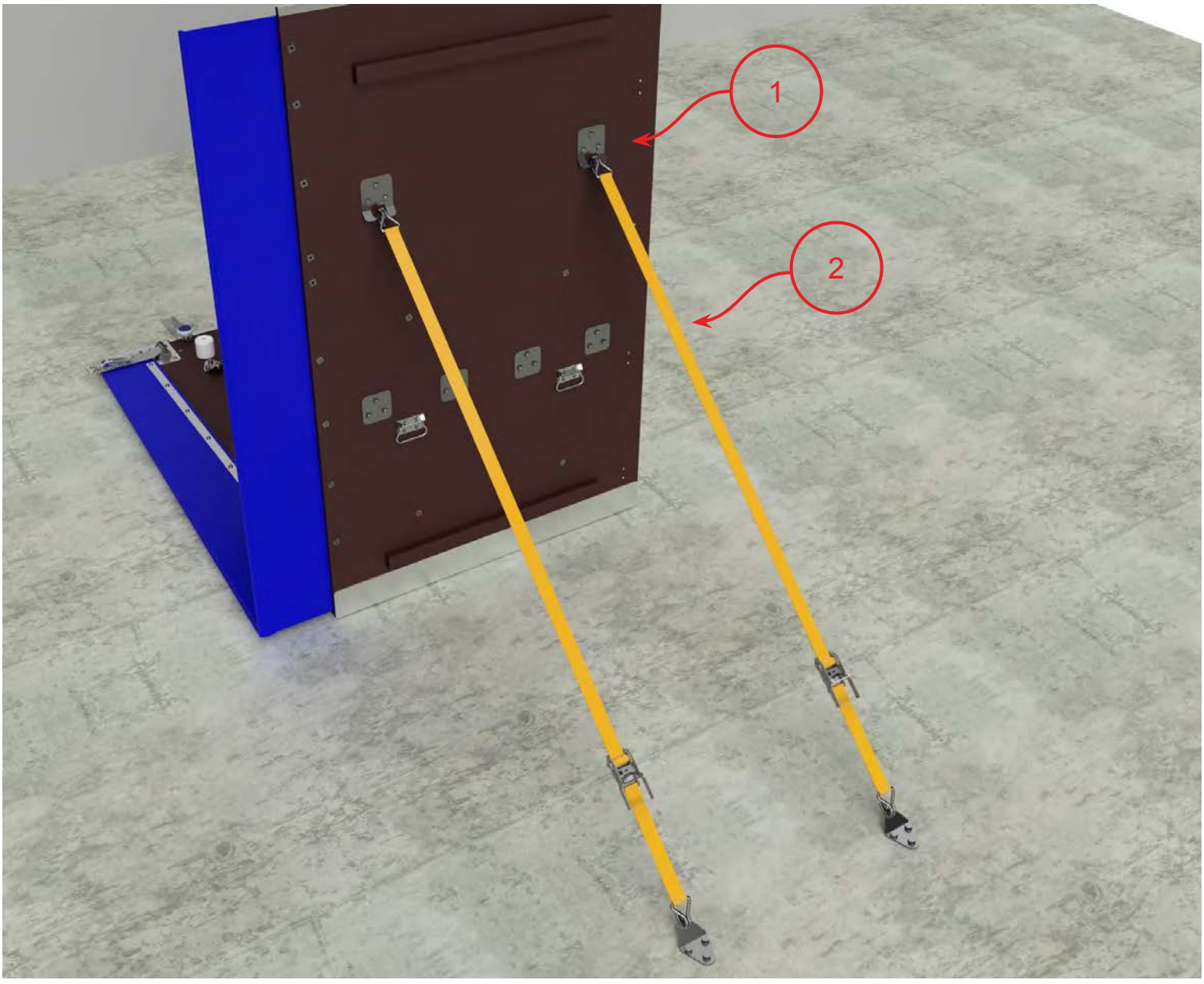
Following the FloodWall removal process, disconnect each module from the adjacent module. Fold the modules and place them in a safe location that's not a tripping hazard. Make sure the blue canvas is not squeezed under the folded support or other objects.

INSTALLATION

WIND STRAPS

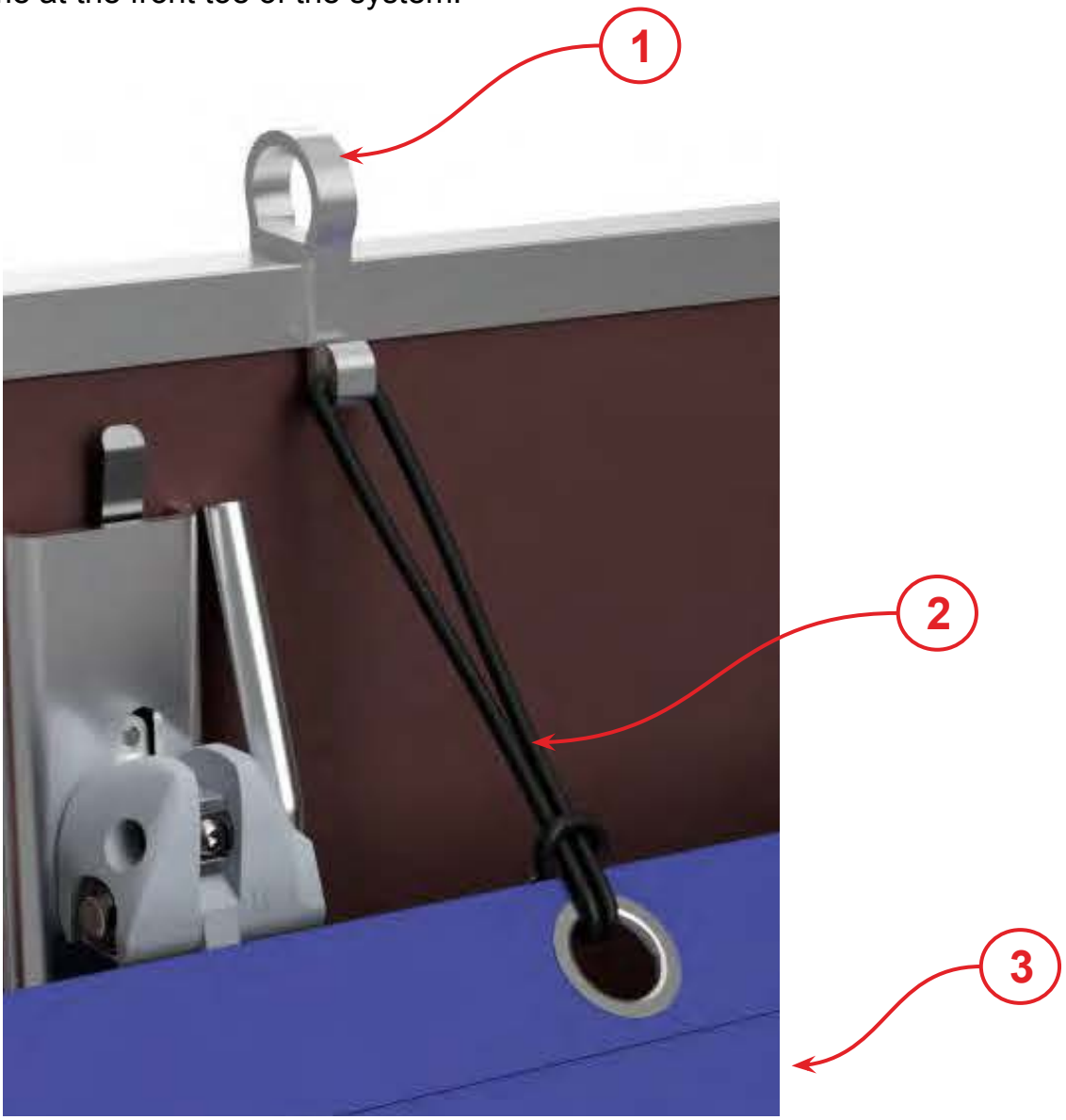
AquaFence FloodWalls are equipped with wind brackets from behind (1). Use the brackets to secure the panel in case of high winds.

We recommend (2) straps capable of withstanding up to 1100 lbs (500 kg). Use proper strap anchoring to the ground as per your conditions.



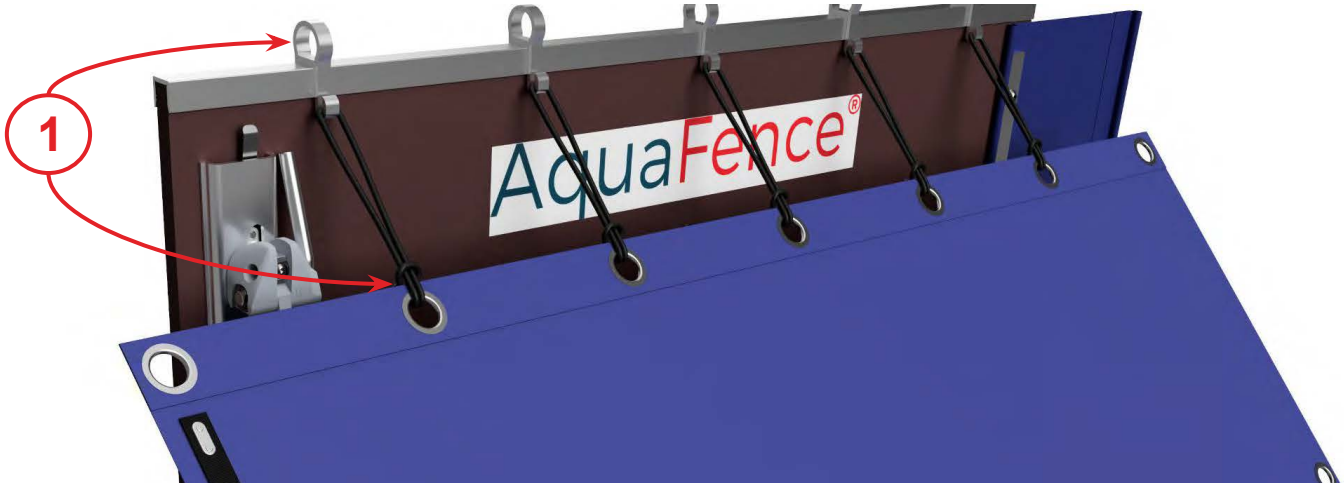
Installation Procedure:

1. Conect the elastic bands to the shield.
2. Connect the hooks to the band.
3. Connect the hook, band and shield assmbly to the upper edge.
4. Do the same at the front toe of the system.

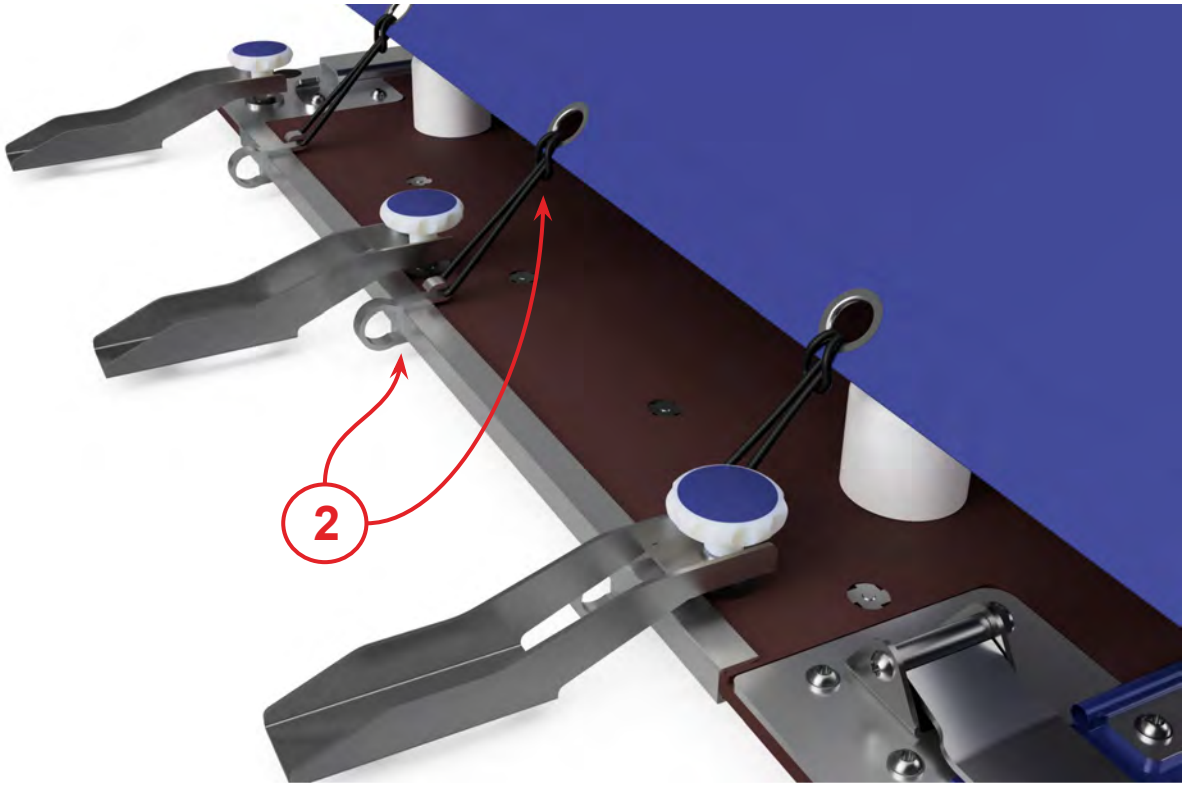


1 - Shield Hooks
2 - Rubber Bands
3 - Debris Shield (reinforced PVC canvas)

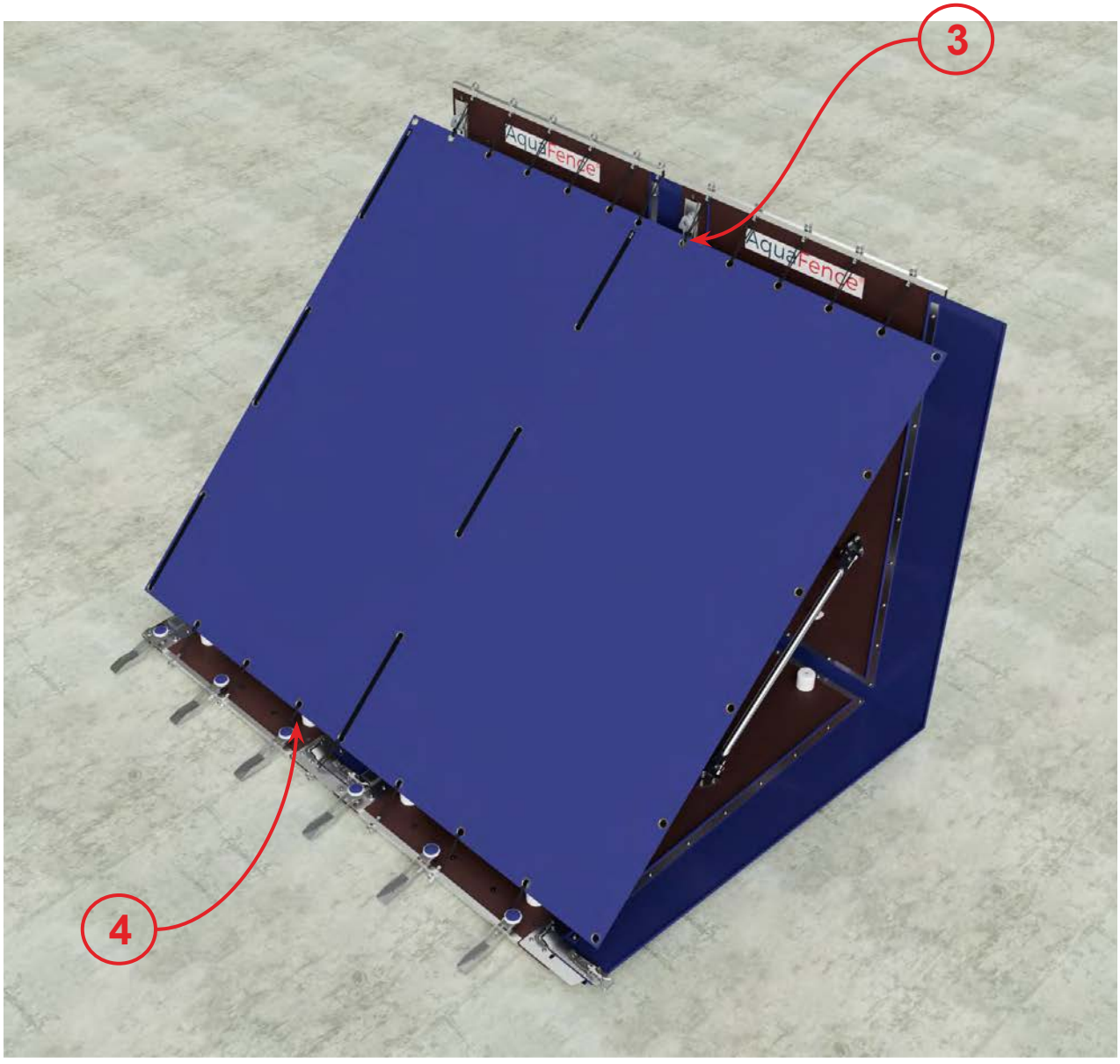
1. Conect the elastic bands to the shield. Connect the hooks to the band.



2. Connect the hook, band and shield assembly to the upper and lower edge.



3. Connect shields together with a strap. Use holes to connect.



4. Connect to the FloodWall module.

ANCHORING

ANCHOR LOAD REQUIREMENTS

Anchoring is required. The table below indicates anchor quantities and loads for the various system heights. Anchor pull tests are also required.

FM Approvals always require anchoring.

No.	Panel Type	No. Of Anchors Per Module	Recommended Anchor Pullout (kN)	Recommended Anchor Pullout (lbf)
1	V750	4	> 5 kN	> 1125 lbf
2	V1200	4	> 5 kN	> 1125 lbf
3	V1500	4	> 5 kN	> 1125 lbf
4	V1800	3	> 8 kN	> 1800 lbf
5	V2100	3	> 8 kN	> 1800 lbf
6	V2400	3	> 10 kN	> 2250 lbf
7	V2700	3	> 10 kN	> 2250 lbf

AquaFence systems require anchoring to the ground.

Anchoring adds pressure between the ground and the closed cell gasket under the horizontal panel. This provides an initial seal to the gasket during the initial stages of a flood before there is any substantial amount of water, and thereby weight, built up on the horizontal panel.

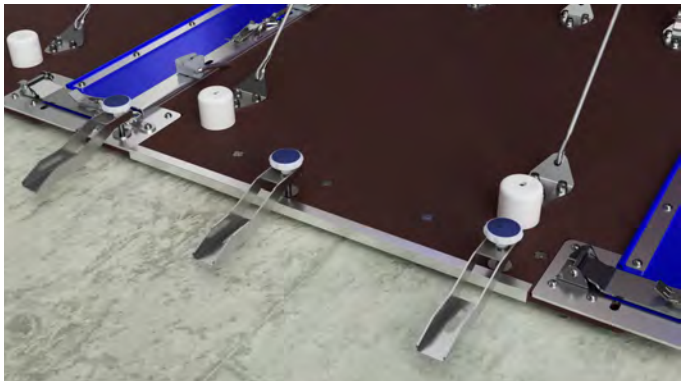
The AquaFence can be secured to the ground in multiple ways. A common alternative is to use permanent stainless steel drop-in anchors installed flush with the ground surface and capped when not in use. Other solutions include a pre-installed Halfen track system cast into the underlying concrete, or a just-in-time solution utilizing Tapcon screws for single use only. Consult with AquaFence and your structural engineers to determine the best type of anchoring.

ANCHORING

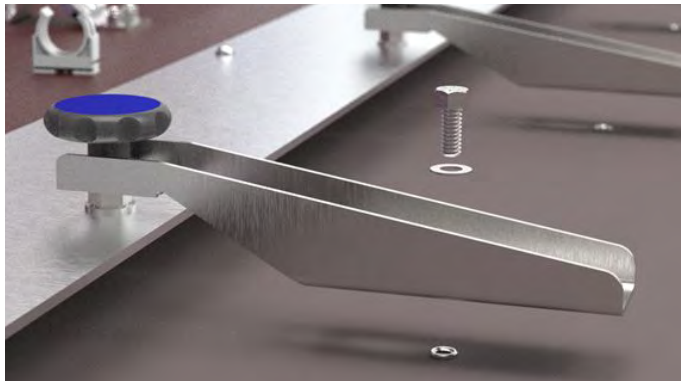
REPEATED INSTALLATION

Standard Anchoring Method (Anchor Arm):

Along the front edge of the AquaFence are anchor arms that serve as the anchoring points between the panels and the foundation. Each anchor arm can pivot axially when the tightening knob is loosened, and has a channel cut-out that runs about half of its length, providing flexibility when positioning the AquaFence panel in relation to pre-installed embedded anchors.

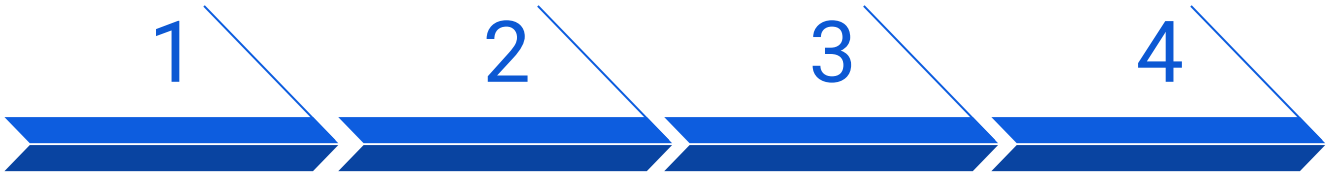


To install, line up the anchor arms with the pre-installed drop-in anchors.



Once you can see the anchor through the slot in the anchor arm. Insert the washer and bolt before tightening fully.

Deployment and Anchoring Recap:



Set Up The System

Set up entire protection line with AquaFence Floodwall

Pilot Holes

Unfold all the anchors to be in place and make the pilot holes

Anchor Installation

Install the anchors

Secure The Barriers

Secure the barriers with the anchors

WATER PUMPS

Any flood mitigation system will experience some water seepage, along with rainfall and runoff from the protected structure into areas behind the system. Therefore, it is always recommended to use water pumps in conjunction with flood barrier systems. Seepage rates through the flood barrier can vary based on several factors; however, as a reference, the AquaFence FloodWall is tested and approved to meet the ANSI/FM Approvals 2510 standard, which specifies a maximum allowed seepage rate of:

0.25 gallons per minute per foot length
3.10 liters per minute per meter length

The pumps should be located on the dry side of the system, in a sump or low point. The required pump capacity should be determined by a site engineer, taking into account expected precipitation, drainage systems, surface conditions, the length of the flood protection system, power availability (battery, generator, etc.), and other relevant factors. For illustration, please refer to the following example:

An AquaFence FloodWall spanning 100 linear meters (approximately 300 linear feet) is used to protect an area of 1,000 m² (approximately 10,000 ft²). With an expected rainfall of 200 millimeters (approximately 8 inches) over the next 12 hours, 200 cubic meters (approximately 50,000 gallons) of rain water is expected to accumule behind the flood barrier. This equates to 16.7 cubic meters (4,200 gallons) of rainwater accumulated per hour. Additionally, there will be approximately 18.6 cubic meters (4,500 gallons) per hour from seepage through the system, installed correctly on even ground. In this example, the pumps must handle a minimum of 35.2 cubic meters (9,000 gallons) per hour, or 588 liters (150 gallons) per minute.

General Reccomendations:

- Water pump suction height should start from as low as possible to the ground level - preferably 0.03 inches / 1mm.
- Water pump power supply should be an alternative to the regular electricity grid.
- Flooding is an emergency situation and extra pumps are recommended for safety purposes in all cases.

Cleaning the panels

Following use in a flood event, each panel should be thoroughly washed with fresh water while in the unfolded position to remove any dirt, debris, or residue from the panel. The panels should either be left to dry in the open air or wiped down with a towel before being folded and stored in a dry location with no exposure to the sun.

It is important to wash the panels to remove sediments from underneath the levers to make sure they don't get jammed for later use. These cleaning and maintenance activities will ensure the longer lifespan of the modules.

Conduct post-deployment inspection of the system.

Each module should be inspected to identify any wear or damage, specifically looking at the following items.

1. **PVC Canvas:** Inspect for rips or holes. If there are any rips or holes the PVC sheeting should be patched or replaced.

   Note: A certified AquaFence technician or service center should complete PVC canvas replacements.

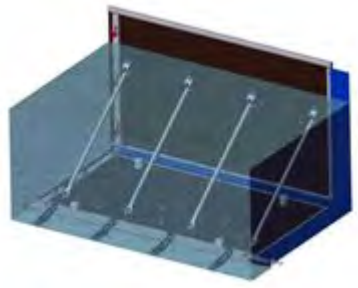
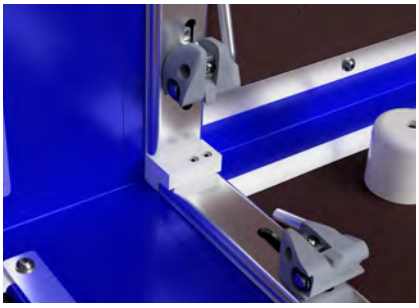
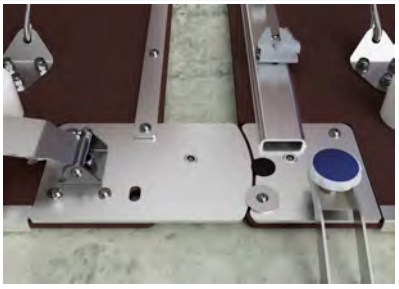
2. **Foam gasket:** Ensure that the gasket retains its softness and elasticity and verify there is no tearing, deformation or compression damage. If the gasket is torn, damaged or its thickness has been reduced by more than 30% of its original thickness it must be replaced. The original thickness of the standard gasket is 1 1/4” inches. The gasket should be replaced if thickness is less than 7/8”.
3. **Metal parts:** Aluminum stabilizer rods, aluminum clamps, and stainless steel eccentric locks that are damaged or show significant wear should be replaced.
4. **Laminate plywood panels:** Inspect for significant damage, large cracks or delamination or decay. While it would be extremely unusual, significant damage from deployments or mishandling may require taking the panel out of service. Scrapes or chips in the laminate panels should be coated with marine-grade sealant provided by AquaFence

   Note: Any panels needing repairs should be marked at the time of inspection and repaired before storage. A certified AquaFence technician or service center must make certain repairs. All of the component parts mentioned above are available from AquaFence as spare parts.

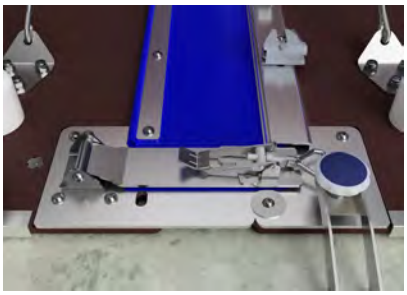
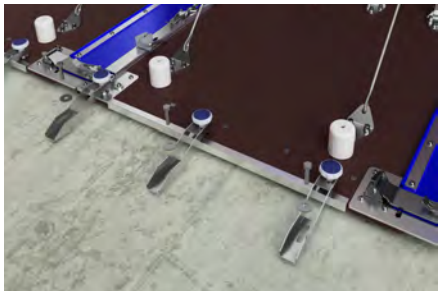
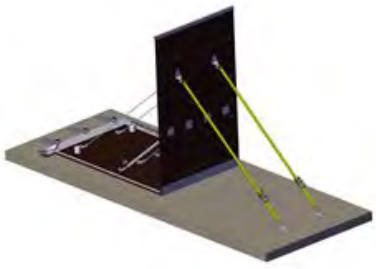
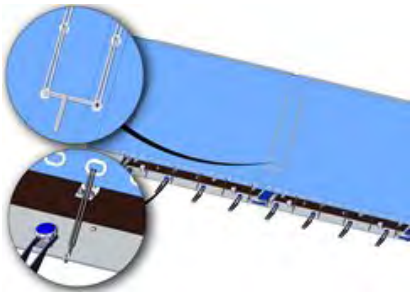
Follow the removal steps:

1. Remove the fastening hardware from the ground anchors
2. Unlock the eccentric latch connecting the two panels
3. Unlock the eccentric latch on the horizontal canvas clamp
4. Loosen the levers on the horizontal and vertical clamps and pull the PVC canvas out from under the clamps. The panels are now liberated from each other
5. Slide the horizontal canvas clamp out toward the edge of the panel, so that the white corner block is positioned away from the vertical panel in the corner. Secure the clamp in that position by re-engaging the levers.
6. Slide the vertical canvas clamp upwards toward the top of the panel. Secure the clamp in that positon by re-engaging the levers.
7. Remove the stabilization struts and place them in the plastic storage clamps.
8. Fold the vertical panel down once the canvas clamps and eccentric latches are arranged so they are not in position to interfere with the folded panels
9. Place the folded panel into the storage crate. Ensure that the panels are arranged so that all of the gaskets are facing downward and are aligned on the same side of the crate.

POST-INSTALLATION CHECKLIST

No.	Description	Image	Checkbox
1	The horizontal panels are on the anticipated wet side of the flood barrier		
2	Each of the stabilizer rods are locked into place with the cotter pin in their corresponding bracket		
3	The eccentric latch is engaged, ensuring that the white cube on the horizontal canvas clamp is tightly secured into the corner with the canvas rope located in the notched out section of the cube		
4	The vertical clamp has been shifted downward to rest on top of the white cube, and the wheels on both horizontal and vertical clamps have been tightened to ensure the clamps lie flush against the plywood. Levers are in locked position.		
5	The concave and convex front beaks of adjacent panels are mated without overlapping and the front beak latch connecting the panels is secured		

POST-INSTALLATION CHECKLIST

No.	Description	Image	Checkbox
6	The gaskets on neighboring panels are firmly connected beneath the front beak latch and the gasket lies flush against the ground underneath the full length of the panels.		
7	There are no visible rips or punctures to the blue PVC canvas		
8	The anchor arms are secured to the foundation / ground with a proper fasteners		
A	In areas prone to high winds from behind, ensure that the wind straps are installed and tight		
B	In areas expecting high impact loads, ensure that the debris shields are interconnected as well as secured to the top and bottom of the AquaFence panels		

CONTACT US

Please share your feedback with with us at **info@aquafence.com**

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Jan Wiegman

From:	Keith Anderson <keith.anderson@flooddefensegroup.com>
Sent:	Wednesday, August 28, 2024 1:21 PM
To:	Jan Wiegman
Cc:	Alison Nahas
Subject:	RE: Flood Barriers
Attachments:	NOAQ Boxwall BW102.pdf; User instructions BW 1.6.pdf

Hello Jan (and Alison)

Thanks for your request and Alison(cc'd) will get you a quote for the 40" tall NOAQ Boxwall product with a price that is discounted from a list price of $325 to $275 per unit. She will also confirm the dimensions of the shipping pallets.

You would require 280 units of the NOAQ Boxwall BW102 to cover 840' as well as 3 Inward Corner Pieces and 3 Outward Corner Pieces.

Delivery to Damariscotta, Maine

Availability: Currently, this product has a 2 week availability but hurricanes will drive consumption. If this product gets 'bought out' because of a regional flood event, we quote a 45 day lead time.

Is this a commercial location with machinery capable of offloading shipping pallets?
NOTE: You would receive 9 – 10 shipping pallets that can be vertically stacked 2 high.

I answered the questions on the PDF you sent me immediately below.

Thanks and I look forward to you receiving your quote!

All the Best,

Keith Anderson
Flood Defense Group
Keith.Anderson@flooddefensegroup.com
1-208-585-1815

QUESTIONS ANSWERED BELOW:

Installation/set-up Instructions: ATTACHED

Product Warrantee:
3 Year Manufacturer Warrantee against product defect
Flood Defense Group offers a 6 year option to purchase any serviceable units of the NOAQ Boxwall back for any reason at 30% off the sale price should the customer want to return it for any reason. The customer would pay for return shipping.

Time to install 300 foot length of barrier and number of people necessary
1 person is capable of executing the deployment by themselves.

We have timed how long it takes 2 people to do this and it took less than 30 minutes.

Process to store after use
If they came in contact with flood water, we suggest hosing them off. Let them dry and stack them up like a bunch of chairs and put them back in their STACKABLE storage crate for storage.

Number of crates and volume of storage crates

Anchoring requirements
There are no anchoring requirements but if you are experiencing a high wind event, you should place sandbags on the toe of the product to prevent movement from high wind

Barrier material
ABS Plastic

Narrative of how product performs
This product is amazing!! It is simple and super effective. It is designed for 'firm flat surfaces like concrete' but we have tested this product over a huge variety of surfaces and situations and have video that can clearly show how effective it is.

Examples of where the product has been used within the USA:

TESTING DEBRIS IMPACT ON THE NOAQ BOXWALL
https://www.youtube.com/watch?v=eAVP30vuAfE

BUILDING ON POOR AND POROUS SURFACES USING PLASTIC:
If you need to build on soft and erosive surfaces or if it is not level and you cannot correctly connect your boxwall units, here is an example of how a simple piece of plastic solves these problems:
https://www.youtube.com/watch?v=ojLjcXvx_No

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TESTING THE NOAQ BOXWALL AGAINST AN OVERWHELMING/OVERTOPPING WAVE
https://www.dropbox.com/scl/fo/9jroo858446s9004qoa32/AP8x8i2RZDBNbkz0D1cIB_g?rlkey=wnox3vqw6bxw2kx0j8nxg7bnv&dl=0
NOTE: See the "NOAQ Boxwall Wave" file

HOW DOES THE NOAQ BOXWALL PERFORM ON GRASS (POOR SPOTTY GRASS)
https://www.dropbox.com/scl/fo/9jroo858446s9004qoa32/AP8x8i2RZDBNbkz0D1cIB_g?rlkey=wnox3vqw6bxw2kx0j8nxg7bnv&dl=0
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THIS VIDEO SHOWS THE NOAQ BOXWALL STOPPING A MINIMAL AMOUNT OF WATER:
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Can barrier be repaired and what is the process

No, this product cannot be repaired. However, if you have a damaged unit, you can simply overlap the broken unit with another unit (like stacking chairs) to repair/reinforce the damaged unit.

NOTE: This may result in extra seepage which we would seal up by covering this area with a section of plastic what is anchored to the ground in front of the 'repair' using sandbags.

NOTE: We have never had this problem. We tried to simulate this problem within the 'debris impact' video we made above and……we were unable to break it so it is on our to-do list to film this situation.

From: Jan Wiegman <jan.wiegman@wright-pierce.com>
Sent: Wednesday, August 28, 2024 10:31 AM
To: Keith Anderson <keith.anderson@flooddefensegroup.com>
Subject: RE: Flood Barriers

Keith,
Here is the quotation request form and information on the project. Let me know if you have any questions.

Thank you.
Jan Wiegman

From: Keith Anderson <keith.anderson@flooddefensegroup.com>
Sent: Wednesday, August 28, 2024 12:29 PM
To: Jan Wiegman <jan.wiegman@wright-pierce.com>
Subject: Flood Barriers

Sure, send me the details and I can get you a quote.

From: mailer@multiscreensite.com <mailer@multiscreensite.com> On Behalf Of www.flooddefensegroup.com
Sent: Wednesday, August 28, 2024 10:25 AM
To: info@flooddefensegroup.com
Subject: Contact Form Message

Form Response Notification

You've received the following form submission from the Contact us any time form on the Contact Us page of your website - https://www.flooddefensegroup.com.
Name: Jan Wiegman
Email: Jan.wiegman@wright-pierce.com
Phone: 2073191520
Company Name: Wright-Pierce
Message: We are working with the town of Damariscotta, Maine to obtain quotations for a deployable flood barrier and would like to send you information on the requirements for the barrier.

Reply to customer

Jan Wiegman

From: Alison Nahas <alison@flooddefensegroup.com>
Sent: Wednesday, August 28, 2024 5:22 PM
To: Jan Wiegman; Keith Anderson
Subject: Re: Flood Barriers
Attachments: #MA BW102 x280 08.24.pdf

Hi Jan,

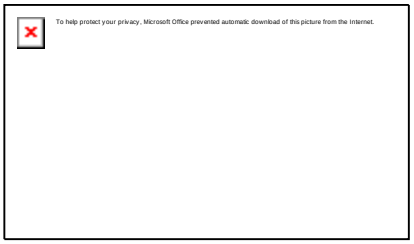
I hope this finds you well, I've attached your requested quote. The pallet/case size is 85" x 58" x 46"

If you have any other questions or would like to proceed with a purchase order/invoice let us know.

We remain available to support you in any way we can. Thanks again for your request, we really do appreciate it!

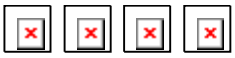
All the best,

Alison



Alison Nahas
Manager | Flood Defense Group
'We Offer the Largest Variety of Proven Flood Defense Barriers in North America'

m. 208.703.5914 | t. 208.585.1815
e. alison@flooddefensegroup.com | w. flooddefensegroup.com



From: Jan Wiegman <jan.wiegman@wright-pierce.com>
Sent: Wednesday, August 28, 2024 11:25 AM
To: Keith Anderson <keith.anderson@flooddefensegroup.com>
Cc: Alison Nahas <alison@flooddefensegroup.com>
Subject: RE: Flood Barriers

Keith,
Thanks you for the prompt response. The Town does have a loader with forks to unload the pallets if they are stacked.

Jan Wiegman

From: Keith Anderson <keith.anderson@flooddefensegroup.com>
Sent: Wednesday, August 28, 2024 1:21 PM
To: Jan Wiegman <jan.wiegman@wright-pierce.com>
Cc: Alison Nahas <alison@flooddefensegroup.com>
Subject: RE: Flood Barriers

Hello Jan (and Alison)

Thanks for your request and Alison(cc'd) will get you a quote for the 40" tall NOAQ Boxwall product with a price that is discounted from a list price of $325 to $275 per unit. She will also confirm the dimensions of the shipping pallets.

You would require 280 units of the NOAQ Boxwall BW102 to cover 840' as well as 3 Inward Corner Pieces and 3 Outward Corner Pieces.

Delivery to Damariscotta, Maine

Availability: Currently, this product has a 2 week availability but hurricanes will drive consumption. If this product gets 'bought out' because of a regional flood event, we quote a 45 day lead time.

Is this a commercial location with machinery capable of offloading shipping pallets?
NOTE: You would receive 9 – 10 shipping pallets that can be vertically stacked 2 high.

I answered the questions on the PDF you sent me immediately below.

Thanks and I look forward to you receiving your quote!

All the Best,

Keith Anderson
Flood Defense Group
Keith.Anderson@flooddefensegroup.com
1-208-585-1815

QUESTIONS ANSWERED BELOW:

Installation/set-up Instructions: ATTACHED

Product Warrantee:
3 Year Manufacturer Warrantee against product defect
Flood Defense Group offers a 6 year option to purchase any serviceable units of the NOAQ Boxwall back for any reason at 30% off the sale price should the customer want to return it for any reason. The customer would pay for return shipping.

Time to install 300 foot length of barrier and number of people necessary
1 person is capable of executing the deployment by themselves.
We have timed how long it takes 2 people to do this and it took less than 30 minutes.

Process to store after use

If they came in contact with flood water, we suggest hosing them off. Let them dry and stack them up like a bunch of chairs and put them back in their STACKABLE storage crate for storage.

Number of crates and volume of storage crates

Anchoring requirements
There are no anchoring requirements but if you are experiencing a high wind event, you should place sandbags on the toe of the product to prevent movement from high wind

Barrier material
ABS Plastic

Narrative of how product performs
This product is amazing!! It is simple and super effective. It is designed for 'firm flat surfaces like concrete' but we have tested this product over a huge variety of surfaces and situations and have video that can clearly show how effective it is.

Examples of where the product has been used within the USA:

TESTING DEBRIS IMPACT ON THE NOAQ BOXWALL
https://www.youtube.com/watch?v=eAVP30vuAfE

BUILDING ON POOR AND POROUS SURFACES USING PLASTIC:
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Message: We are working with the town of Damariscotta, Maine to obtain quotations for a deployable flood barrier and would like to send you information on the requirements for the barrier.

Reply to customer

NOAQ
Flood Protection AB

NOAQ Boxwall BW102

The NOAQ Boxwall is a freestanding temporary flood barrier. It is designed specifically for the urban environment, with even surfaces like asphalt streets, but it works as well on lawns etc.

A NOAQ Boxwall BW102 is able to dam 1 meter of water and is self-anchoring, as it is automatically ballasted by the weight of the flood water. The higher the water rises, the harder is the barrier pressed against the ground. Utilizing the weight of the water, the barrier itself doesn't need to be heavy. The BW102 "boxes" weigh only 15.2 kg each and the barrier not more than 17 kg per meter. This makes it easy to use, and fast to deploy. Two people can build 100 linear metres of boxwall in an hour.

A Boxwall is built by snapping the boxes together. No tools are needed. Gradual curves are made by connecting the boxes at a slight angle.

There is also a lower Boxwall model, the BW52, which is able to hold back 50 cm of water (see separate fact sheet).

The boxes are stackable, which means they require very little space for storage and transport. They are loaded on pallets, with 32 boxes (29 m) on each pallet. A 40' container can take 16 such pallets, or in total 460 meters of Boxwall.

Damming ability	100 cm (40")
Dimension of boxes (lxwxh)	992 x 1,199 x 1,060 mm
Effective length	900 mm (3') per box
Weight	15.2 kg (34 lb) per box
Speed of deployment	Ca 100 m per hour
Minimum curve radius	26 m (in both directions)
Material	Polypropylene
Temperature resistance	-30° – +90°C

NOAQ
Flood Protection AB

User instructions

NOAQ Boxwall BW50

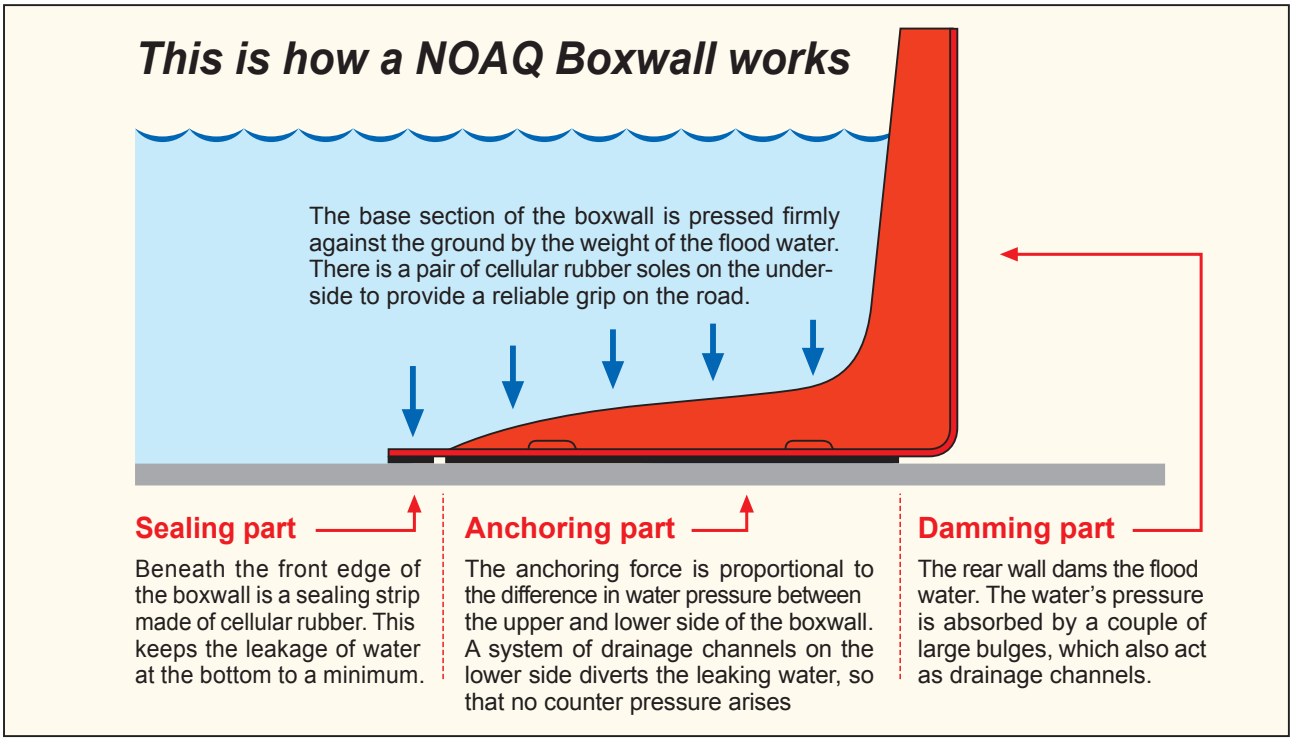
A NOAQ Boxwall is a mobile self-anchoring flood barrier. The NOAQ Boxwall BW50 creates a dam for water up to a height of 50 cm. The boxwall is so light that it can quickly be set up to protect buildings and other property against water damage, and also to keep roads open. A boxwall is designed for use on an even, firm surface, such as a paved street or a concrete floor. The boxwall is patented in a large number of countries.

A boxwall consists of sections (boxes) that are linked together by means of a simple manual operation. Each joint is then fixed using a special clamp.

Each box consists of a damming part (the rear wall), an anchor part (the horizontal section that rests on the ground) and a sealing part (the front edge of the horizontal section. Sealing strips of cellular plastic are fitted under the front and side edges. Each box is also fitted with a pair of cellular rubber soles to create a good grip on the road.

A boxwall is built up by snapping boxes one at a time onto the previous one. The easiest way is to work from left to right (viewed from the dry side). You should avoid working from two directions, as it is difficult to make the two wall sections meet at exactly the same point.

The boxes are easy to handle and move, and you can also adjust the setting of a constructed boxwall as long as the water has not started to press firmly against the base. But you must avoid dragging the boxes on the ground, as the sealing strips on the underside are vulnerable to wear.



Follow these instructions:

1. Inspect the area where the boxwall is to be constructed

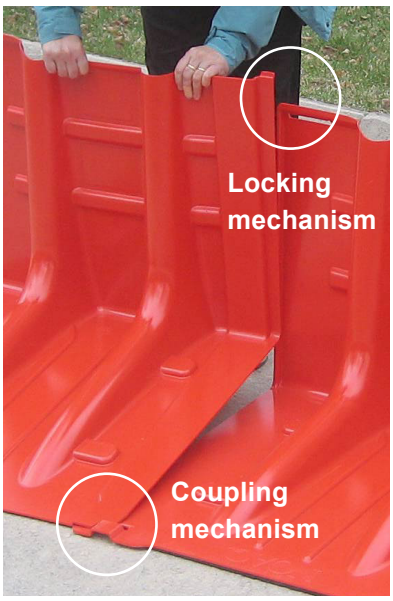
The boxwall has been specially designed for firm, even surfaces such as asphalt and concrete. It is therefore ideal for setting up on streets and paths, across car parks, in industrial areas, around shopping malls, in harbours and at airports. It must not be used on uneven surfaces or on ground that is prone to erosion. Inclinations of the ground of up to 1:10 is no problem, but sudden transitions from a surface with one inclination to an other need to be done perpendicularly. Holes or bumps should be avoided. The boxes are 705 mm long but overlap one another, which means each box adds 625 mm to the total barrier length. The boxwall requires a free width of 680 mm.

Loose sand and gravel must be brushed away from where the wall is to be erected. The soles attached beneath each box have just as good a grip as the rubber soles on your shoes. If there is sand on the road you run the risk of slipping, and the same applies for the boxwall.

The coupling between the individual boxes has a built-in flexibility of +/-3°, which means a boxwall can be drawn in curves. For abrupt changes in direction there are certain corner boxes. These have an angle of 30° and are available for both inward and outward corners.

The boxwall can be placed on land that is already flooded, but if the ground surface is difficult to see through the water, you must take particular care to make sure that the boxes are not placed on uneven surfaces, on the wrong side of surface water drains, etc

2. Lay out the boxes and connect them one by one



Start from the left (seen from the dry side) and connect the boxes one at a time to the previous one. The boxes have a **coupling mechanism** (at the front) and a **locking mechanism** (at the top). Tip the box slightly forwards and connect it with the previous box by inserting the protruding ”tongue” (on the far left) beneath the ”bridge” (on the right-hand side of the previous box).

Now lean the box a little to the side, press down its rear edge and insert the pin of the locking mechanism into the groove in the previous box. Turn the box so that the pin ends up in the middle of the groove. This is the normal position. Straight boxes are now connected in line and corner boxes in a 30° angle. However, the locking mechanism has a certain flexibility allowing the boxes to be turned +/-3° against one another.

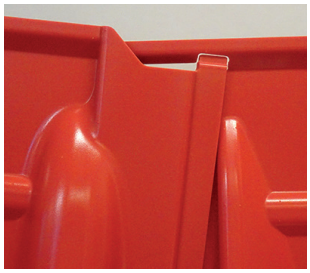
In February 2017 a modification of the locking mechanism was introduced, to facilitate assembly and disassembly. At the same time the height of the pin was somewhat increased. Boxes of newer and older type still fit together, but because of the increased height of the pin new boxes should be put to the left, and old ones to the right, to facilitate dismantling.

Secure the position of the boxes in relation to one another by placing a clamp over each joint. This is not absolutely necessary. The boxwall will still work, but in the event of high water levels and wave action the clamps will also help to secure the zone around the joints. Corner boxes have a slightly different design and do not need clamps.

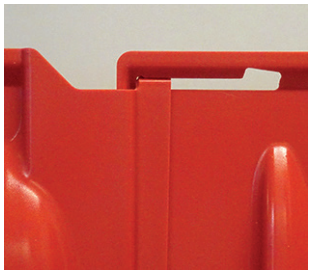
To help the sealing strip underneath create a tight seal against an uneven surface, you can place a weight on the front edge of each box, for example a sandbag. This has the best effect if it is placed on top of the joint zone (the “bridge”). It can also be necessary to ballast the boxes in this way if there is a strong wind, before the water arrives. The boxwall is not very susceptible to winds coming from the front, but winds from behind will try to lift it.

Also when deploying a boxwall in deep water the boxes need to be ballasted from start to prevent them from floating. A difference in levels between the water in front of the boxwall and behind it is necessary to achieve the pressure difference that keeps the barrier in place.

If you want to improve the seal, you can cover the boxwall and its connections with a specific thin plastic sheeting. The sheeting is 2.0 m wide and can be fixed with clamps along the upper edge and with a line of gravel or sandbags on the ground in front of the front edge.

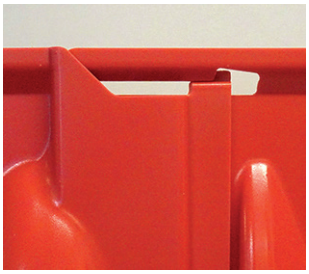


Assembly position



3° in one direction

Normal position



3° in the other direction

3. Corners

To create corners there are a couple of corner elements, one for outer corners and one for inner ones. Both have an angle of 30°, so three connected boxes make a 90° angle. Corner boxes can easily be connected to straight boxes as they share the same coupling mechanism.

Outward corner boxes may be used to protect a single object, like a detached building. To surround a rectangular area, 4 x 3 outward corner boxes for the corners can be combined with an appropriate number of straight boxes for the sides.

Inserting corner boxes at appropriate positions in a boxwall makes it possible to let it pass around different kinds of obstacles, turn in an intersection etc.

Inward corner boxes can also be used to build up temporary basins. 12 boxes are enough to build a circular pool, a ”NOAQ Boxpool” (se separate user instructions). By combining the corner boxes with a number of straight boxes a basin of any desired size can be deployed.

4. Connect to wall or façade

When a boxwall needs to end in deep water, like against a wall or a façade, the outermost box must be supported from the rear. If the boxwall is connected alongside a wall or at an oblique angle to it, it is provided with support by the wall itself.

If the boxwall approaches the wall in a right angle or in a sharp angle, one or more inward corner boxes can be used to let the boxwall make a turn up along the wall. See photo below.

An other possibility for connections in a right angle is to use a gable section (a section of the NOAQ Gablewall, see p. 5 below). A third alternative is bolting a plank to the façade, as support, or placing something heavy behind the last box.

Some kind of sealing strip must be placed between the box and the wall to reduce water leakage. A pair of cellular plastic strips are supplied with each order for this purpose. An other possibility is to cover the connection with some kind of thin plastic film.

5. Kerb stones

Kerb stones or minor steps can be passed using a couple of gables, i.e. a couple of sections of the NOAQ Gablewall. The passage must be made at a right angle. Two between themselves reversed gable sections are put together, side by side, one at the higher level, the other one at the lower level, and screwed together.

The lower and the higher boxwall parts are put against the corresponding gable sections. To reduce leakage sealing may need to be improved between boxwall and gable, and between gable and kerb stone.

6. Length adjustments

Gable sections can also be used to adjust the length of a boxwall. If the boxwall needs to have an exact length, like between the two opposite walls of an entrance, the length of the boxwall can be adjusted by putting a gable element in each end and let the boxwall overlap those to a smaller or larger extent. If this is not enough the length can be adjusted further by dividing the boxwall in two and inserting a pair of gables inbetween. Also in this case the two gable elements are reversed between themselves, and screwed together. And also in this case sealing may need to be improved.

7. Pump away leaking water

There will always be some leakage. If the ground is level or if it slopes towards the flood, this water must be pumped clear with a pump. If the ground slopes away from the flood (e.g. on the crown of permanent embankments), the water will run away without the need for pumps.

Be aware of any surface water drains. The boxwall should ideally be laid behind any of these. If there is a risk that surface water drains or culverts might divert the flood water under the wall and into the protected area, these channels must be plugged or blocked in a suitable way in order to reduce the need for pumping capacity

8. Combine boxwall and tubewall

A NOAQ Boxwall can be combined with a NOAQ Tubewall. The walls are laid so that they overlap by a metre or so, ideally with the tubewall closest to the flood and the boxwall beneath and behind the tubewall. One or a pair of the tubewall's joint covers are used to form a seal between the two wall sections. The joint covers are used in the same way as when the tubewall connects to a wall (see the user instructions for the tubewall).

9. Flash flooding

The boxwall can also be used in flash flooding, when water is running fast over the streets. When this happens the most obvious measure is to protect low entrances and vulnerable objects by redirecting the water flow toward areas where flooding will cause less damage. A similar situation can occur when snow is melting, and the water tries to take unacceptable routes. As for the use in calm water, the boxwall should only be used on firm and even surfaces, like paved roads.

If water is already running fast at the place of the intended action, the first measure would be to place a number of boxes in the water flow, to break down the speed of it and reduce its power. Put the boxes close to each other, facing upstream, but do not try to connect them. They will be anchored directly by the weight of the water entering upon them.

Behind this protective row of boxes a continuous boxwall is then assembled. When the boxwall is completed, the front row of boxes can be removed.

This way the boxwall can be used to lead away watermasses in a controlled manner down the streets, hereby reducing water levels and flood problems upstream. To divert the water off the street the boxwall may be deployed diagonally. The angle chosen, in relation to the direction of the current, depends on the amount of water and the speed of it.t.

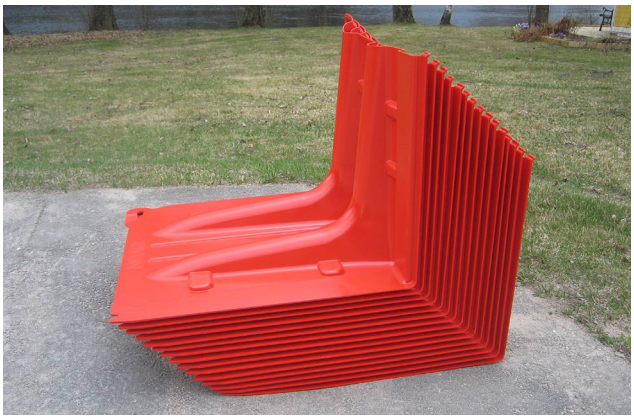
10. After use

Disconnect the boxes. By leaning one of the boxes (the one with the pin) against the other, they are easily disconnect

Rinse the boxes clean using a garden hose or by rinsing them in water, and stand them on their side to dry (when they are placed on the side the water runs off more quickly from the pores in the sealing strip). If there is a risk of temperatures falling below zero, the boxes must be taken indoors and stored in a heated area until all “soft parts” (soles and sealing strips) have dried out properly.

Inspect all soft parts. Damaged or worn sealing strips can be replaced, but if the soles have suffered big damage, the entire box should instead be replaced.

The boxes can be stacked to take up as little space as possible during transport and storage.



Important!

Floods result from a course of events controlled by forces of nature that can only be controlled to a limited degree. Furthermore, no two events are the same, which means that all protective equipment must be used not only with good knowledge of its function and limitations, but also with generally sound judgement. Those who provide the equipment, manufacturers, resellers, hirers, etc. can never accept liability for the actual use and any possible personal injury or damage to property that might arise.

Jan Wiegman

From: Rich Kenny <rfkennyjr@comcast.net>
Sent: Tuesday, September 17, 2024 1:59 PM
To: Jan Wiegman
Subject: RE: Town of Damariscotta flood barrier procurement questions
Attachments: DamariscottaFloodBarrierQuoteForm - FloodDefender barriers.pdf; Town of Damariscotta RFP Response 20240917.pdf; FM Approval Certificate.pdf

Jan -

We are pleased to provide a quote to the Town of Damariscotta for 840 linear feet of our 48" high FloodDefender barriers, inclusive of an inside and an outside corner.

The Installation and setup instructions are included in the document titled "Flood Defender Instruction Manual 2024." A link was sent to you to access the document, since it was too large to include in this email. If there is a better way for me to get this document to you, please let me know.

I will call to follow up on your receipt of the documents.

Regards,
Rich Kenny
FD Depot, Inc.
Authorized reseller of Portadam's FloodDefender barriers
908-635-6969

From: Jan Wiegman <jan.wiegman@wright-pierce.com>
Sent: Friday, September 13, 2024 1:37 PM
To: Rich Kenny <rfkennyjr@comcast.net>
Subject: RE: Town of Damariscotta flood barrier procurement questions

Rich,
Nice to hear from you today. My responses are in red below.
Jan Wiegman

From: Rich Kenny <rfkennyjr@comcast.net>
Sent: Thursday, September 12, 2024 1:42 PM
To: Jan Wiegman <jan.wiegman@wright-pierce.com>
Subject: Town of Damariscotta flood barrier procurement questions

Jan – a couple questions:

1) Can quotes be sent by email or do you require them to be sent on paper? Email responses are allowed.
2) When you review quotes, will you be taking into consideration that some flood barriers require extra material and labor cost to fill them with water or sand, and then costs to drain them or dispose of them? The Town will take into consideration the effort and complexity to deploy the barriers including if they need to be filled with water or sand, etc.

3) Are you limiting responses to FM Approved barriers? No the Town is not limiting the barriers under consideration to FM Approved barriers.

Thank you.

Richard Kenny
(Portadam's Flood Defender barriers)

Town of Damariscotta
21 School Street
Damariscotta, Maine, 04543

Description: The Town of Damariscotta, Maine is seeking quotations to purchase a deployable flood barrier for use in a municipal parking lot along the Damariscotta River.

Barrier Length: 840 feet in length, 3' height min., barrier intent is to prevent flood water from adjacent tidal river from flooding parking lot and adjacent buildings. Barrier will be deployed on an asphalt paved surface and be deployed by the Town work force. Refer to attached plan for barrier length and arrangement. Barrier shall come with storage bins for handling and deployment. Parking lot elevation is approximately 8.0 and rises to 11.0 the base flood elevation is 10.0 and barrier must have 1' of freeboard. One 90 degree interior angle, One 90 degree exterior angle.

Delivery will be preferred by December 1, 2024.

Flood Barrier Bid Criteria:

Product name: __FloodDefender 48" barriers_____

Manufacturer:___Portadam_____

Distributor: _____FD Depot, Inc._____

Location of Manufacture: _Plattsburgh, NY / Williamstown, NJ_____

Product Cost: __$192,000.00_____

Delivery to Damariscotta, Maine: _$2,100.00_____

Total cost: _____**$194,100.00**_____

(Note: purchaser is the Town of Damariscotta, a municipality, and not subject to state sales tax)

Quotations are due September 17, 2024 by 5:00 PM EST.

Prices will be held for 60 days.

Submit quotations to :

Jan Wiegman, PE
Wright-Pierce
11 Bowdoin Mill Island, Suite 140
Topsham, ME 04086

Questions may be submitted to :

Jan Wiegman, PE,
Wright-Pierce
Tel: 207-319-1520
Email: Jan.wiegman@wright-pierce.com

Delivery Time Frame from date of order: _up to 8 weeks_____

Product information to be provided with quotation:

- Installation/set-up Instructions:
- Product Warrantee:
- Time to install 300 foot length of barrier and number of people necessary:
- Process to store after use:
- Number of crates and volume of storage crates:
- Anchoring requirements:
- Barrier material:
- Narrative of how product performs:
- Examples of where the product has been used within the USA:
- Can barrier be repaired and what is the process:

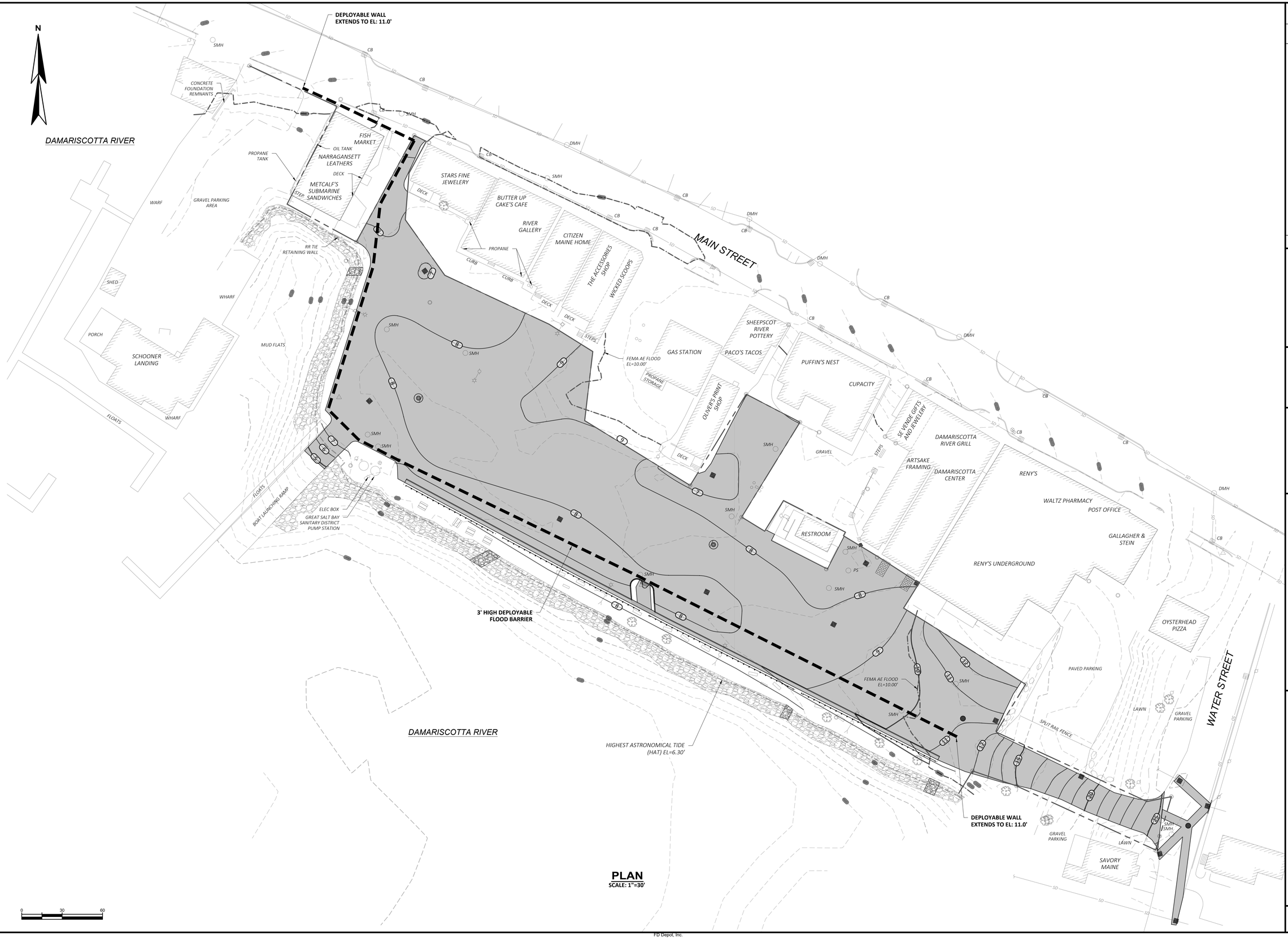
The information requested above is included under separate cover.

Bid Clarifications:

1) Standard Payment Terms are as follows: 50% of total upon issuance of Purchase Order, 25% of total upon delivery, 25% of total 30 days from delivery date
2) All pricing is not inclusive of applicable taxes, if any.
3) Pricing does not include in person training. In person training is available through a separate transaction.
4) Standard Terms and Conditions shall be provided upon request.

LAST SAVED BY: RYAN.BEISAW 8/19/2024 10:01 AM

J:\ENG\ME\DAMARISCOTTA\20459-DOWTOWNFLOODPROTECTION-MUNPARKINGLOTIMP\DRAWINGS\CIVL_FIGURES\20459-CS-TEMPFLOODWALLLAYOUT.DWG | 20459 Figure TempFloodWallLayout | 1:2,584 | ---- | 8/26/2024 2:54:20 PM | RYAN.BEISAW



PLAN
SCALE: 1"=30'

0 30 60

NO	REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			

PROJECT NO: 20459
DESIGNED: J.WIEGMAN
CAD COORD: R.BEISAW
CAD: R.BEISAW
CHECKED: J.WIEGMAN
DATE: 08-2024
APPROVED: J.WIEGMAN
DATE: 08-2024
SUBMISSION: ISSUED FOR QUOTATION

STATE OF MAINE
JAN B.S. WIEGMAN
No. 9852
REGISTERED PROFESSIONAL ENGINEER
8/26/2024

WRIGHT-PIERCE
(207) 725-8721 | www.wright-pierce.com
11 BOWDOIN MILL ISLAND, TOPSHAM, ME 04086

TOWN OF DAMARISCOTTA
DOWNTOWN PARKING LOT IMPROVEMENTS
DAMARISCOTTA, MAINE

TEMPORARY FLOOD BARRIER PLAN

DRAWING
1

9/17/2024

FD Depot, Inc.

September 17, 2024

Town of Damariscotta Flood Barrier Bid

Submitted by: FD Depot, Inc. authorized distributor of Portadam's FloodDefender barriers

Submitted to: Jan Wiegman, PE, Wright-Pierce, 11 Bowdoin Mill Island, Suite 140, Topsham, ME 04086

We are pleased to provide a quote to the Town of Damariscotta for 840 linear feet of our 48" high FloodDefender barriers, inclusive of an inside and an outside corner.

Installation and set up instructions are included in the attached document titled "Flood Defender Instruction Manual 2024."

Product Warranty:

From our standard sales agreement:

FD Depot, Inc. hereby represents and warrants that:

(a) *all Equipment provided under these terms and conditions: (i) shall be free of defects in design, materials, or workmanship and will conform strictly and in all respects to the Buyer's specifications; (ii) shall conform to any statements made on the containers or labels or advertisements for such Equipment; (iii) shall be adequately contained, packaged, marked and labeled; and (iv) shall be safe and appropriate for the purposes for which Goods of that kind are normally used;*

(b) *FD Depot, Inc. is and shall be the legal owner of the Equipment at the time of delivery to the Delivery Site, and the Equipment is being transferred to buyer free of all liens, security interests, claims, charges and encumbrances;*

In the event that FD Depot, Inc. breaches any of the warranties in clause (a) above, FD Depot, Inc. shall replace or correct any defects (including latent defects), without expense to Buyer when notified of such defect within ten (10) days of delivery of the Equipment to the Delivery Site.

Time to install 300 foot length of barrier and number of people necessary:

Installation of the FloodDefender barrier is volunteer friendly. No tools are required and no piece weighs more than 25 pounds. With four individuals, 300 linear feet can be installed in 80 minutes or less. There is no requirement for more than one person, though we assume four to be the typical team size.

Process to store after use:

All equipment fits compactly back into the storage racks they come in. The racks are 4 ft Wide x 6'3" long x 4 ft tall. When fully loaded with 150 linear feet of protection, they weigh roughly 3,800 pounds. The racks come with a storage cover so they can be stored outside. The racks are designed to be moved

by a lull, forklift or equipment with forks, such as a skid steer. The racks can be stacked three high to conserve space. See pictures below:

<u>Number of crates and volume of storage crates</u>:

There will be 7 storage crates. One crate will hold the equipment for the corner sections. The other crates will hold all the materials needed for up to 150 linear feet of protection.

<u>Anchoring Requirements</u>:

There is no anchoring requirement for FloodDefender barriers. Flood water holds the frame in place. A ballast chain on the leading edge of the system holds the sealing sheet in place until flood water is on it.

Barrier Material:

The frame of the barrier is galvanized steel. The sealing sheet is an engineered fabric – reinforced PVC. The sealing sheet is UV rated for seven years of constant exposure.

Narrative of how the product performs:

The system deploys rapidly. See the link to the video below this paragraph. As flood water gathers on the barriers, the load is redistributed vertically and downward to secure the structure. That same hydrostatic pressure pushes down on the impervious sealing sheet keeping any seepage to a bare minimum. No water or sand is required to deploy the barriers. No ground penetration is required to deploy the system, making deployment even more flexible and fast.

Flood Barrier Deployment Demonstration

The system is designed to hold water to its full height, so no freeboard is necessary. In the case of this project, we are providing enough height to allow for 1' of freeboard as required. When the flood is over, the system breaks down as quickly as it goes up and stores away compactly.

The system's flexibility allows it to follow curves, hop curbs and follow slopes. It is designed to handle fast flowing water if that risk presents itself. The system's modularity allows for linkage to taller barriers where needed and can easily be added to as future needs dictate.

The frame of the system is galvanized steel, and the reinforced PVC sealing sheet is UV rated for seven years of constant exposure, so this system should last for decades.

The FloodDefender barriers are a system designed, engineered and manufactured in the USA to mitigate flood risks for critical assets. The patented system (US Patent# 11,486,107) is fully engineered to meet or exceed ANSI 2510, AISC 14th edition and ASCE 7-10 standards. The product is FM Approved and has been tested by the US Army Corps of Engineers at their Vicksburg, MS Engineering and Research facility for overturning, sliding, seepage, overtopping, frame stress analysis, fabric stress analysis, was subjected to wave action, and took hits from 800-pound logs. During FM Approval testing, the equipment was put in an oven for six months to see if it would artificially degrade, then deep frozen for a month and when taken out of the freezer, 50-pound weights were dropped on it to see if it would break.

Examples of where the product has been used within the USA:

A few examples:

Washington County, Florida – protecting a portion of their government campus (980 linear feet of 48" high barriers)

Borough of Schwenksville, PA – protecting their borough hall from the Perkiomen River (476 linear feet of 48" barriers)

South Branch Church, Hillsborough NJ – protecting their church from the South Branch of the Raritan River (215 linear feet of 48” barriers)

Northeastern Pennsylvania – electric utility protecting five substations (1,530 linear feet of 48” and 72” barriers)

Grain Storage Facility in Minnesota – protecting their facility from the Mississippi River (705 linear feet of 48” barrier)

North Carolina utility in the Charlotte area – protecting substations (280 linear feet of 48” barriers)

North Carolina utility in the Greenville area – protecting substations (477 linear feet of multiple size barriers)

Can the barrier be repaired and what is the process?

The barriers come with a repair kit for the sealing sheet should it get punctured by floating debris. The repair kit comes with instructions. Those instructions are also laid out on the final page of the attached instruction manual. There are no mechanical parts on the steel frame of the system. Given the structure of the system, any damage the system would take would affect individual A frames and or their associated link bars. Depending on the severity of the damage, the quickest course may be to replace them as it won’t be very costly.

Certificate of Compliance

This certificate is issued for the following:

Flood Mitigation Equipment

Perimeter Flood Barriers - FloodDefender® 48 and 72

Prepared for:

Portadam Inc.
3082 South Black Horse Pike
Williamstown, NJ 08094
USA

FM Approvals Class: 2511
FM Approval Standard: Class Series 2510 (Dec. 2022)
Class Series ANSI/FM 2510-2020 (Sept. 2020)

Approval Identification: PR463598 Approval Granted: 2 January 2024

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

David Fuller
VP - Manager of Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062

Member of the FM Global Group

Jan Wiegman

From: rfkennyjr@comcast.net via Adobe Acrobat <message@adobe.com>
Sent: Tuesday, September 17, 2024 1:53 PM
To: Jan Wiegman
Subject: FloodDefender instruction manual 2024

rfkennyjr@comcast.net has shared
FloodDefender instruction manual 2024

You can also comment on it.

Open

Your public profile is visible to others who can access this document. You can leave the document at any time by selecting ‘Remove me’ from the in-context menu.

SENT BY

rfkennyjr@comcast.net

MESSAGE FROM SENDER

Jan - This instruction manual was too large for me to add to the email with the other documents for the Damariscotta flood barrier RFP response. Please view this document.

Rich Kenny

SHARED ON

September 17, 2024 5:52:30 PM UTC

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Report Abuse

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Registered Office: Adobe Systems Software Ireland Limited, 4-6 Riverwalk, Citywest Business Park, Dublin 24, Ireland. Registered number: 344992

Stop notifications for reviews.

Jan Wiegman

From:	Cheryl Witmer <cheryl@tigerdam.com>
Sent:	Tuesday, September 3, 2024 3:30 PM
To:	Jan Wiegman
Subject:	RE: Damariscotta, Maine deployable flood barrier
Attachments:	Tiger Dam Warranty.pdf; Crates Stackable.JPG; Tiger Dam Specs - April 2020.pdf; References updated 2022.pdf; CLEANING AND MAINTANCE OF TIGER DAMS TM.doc; concrete anchor test report .pdf; Tiger Dam Concrete Anchor Diagram.docx; 2-1 19inch Installation Manual Oct 3- TDIP 42092413 - UPDATED July 16th.pdf; DamariscottaFloodBarrierQuoteForm.pdf; Damariscotta Flood Barrier Bid 36inch TD Single USFCQ80323-2.pdf; Single 36inch Installation Manual UPDATED January 2016.pdf

Hi Jan, thanks for including us in your RFI. Find the answers to your questions below as well as in the attachments. There are 2 configurations that will work for your needs. I attached both but put the single 36" dam quote in the bid document. I would be happy to talk further about both.

Please let me know if this is an acceptable format for the information, I am not use to a request being so simple. I appreciate it!

Instillation instructions – attached

Product warranty – attached

Time to install 300ft of barrier and number of people to do it – spec sheet including fill time – 300ft of 36" Tiger Dam can be erected in approximately 2hours with 4 people.

Process to sore after use – picture of stackable crates attached. The system should be cleaned and returned to the stackable storage crates. Cleaning and maintenance instructions attached.

Number of crates and volume of storage crates – picture of stackable crates attached – crates are stackable 3 high – 4 crates required for full deployment including deployment tools - 43.3 sqft if stacked 2 high

Barrier Material – Nylon Scrim coated on either side with a proprietary flexible PVC, 28mil

Anchoring requirements – The Tiger dam system must be anchored to the ground surface. Anchor quantity is subject to the flood conditions expected, anchor report and computations attached

Narrative on how product preforms –
~Tiger Dam is a reusable system that is filled with water at the onset of flooding (orange tubes in the pictures attached). It's comprised of tubes that link together to make a barrier of any length and are stackable to attain almost any height needed, making it a buildable system. You deploy what you need for the flood event in question each time. It is commonly used to protect critical infrastructure, commercial buildings, Parking garages, Utilities, communities, to keep roadways passable, and to divert water from critical sites.
The Tiger Dam system is FM approved with a Platinum level certification through the Army Corps of Engineers. We are the ONLY deployable system with a certification of this efficacy.
USFV has been manufacturing and distributing this system for 20 years, and it has been used around the country for most major hurricanes and of course all types of rain, river, coastal flooding.

Examples of where the product has been used within the USA – reference list attached
New York City Office of Emergency Management – interim Flood protection program – all 5 boroughs
Duke Energy – 5 plants in the Carolinas
State of FL Emergency Management – Flood protection program for declared disasters – utilizing 15+ Miles of Tiger Dam
HCA Hospital system – for Texas and Florida
HEB Grocery Texas – used across all flood prone stores
Wal-Mart – flood protection for flood prone stores

Can product be repaired and what is the process – the system comes with patch kits, it can be repaired in the field. There is very little pressure inside the Dam. The scrim acts as a rip stop and keeps any holes or punctures from ripping into a bigger issue. The patches can be used temporarily while the system is in use, and then once the system is down, it can be cleaned and permanently patched.

Cheryl Witmer
Director – Florida – Mid Atlantic – North East
(504) 235-5233 – mobile
cheryl@usfloodcontrol.com
cheryl@tigerdam.com
www.USFloodControl.com
Click on this link to see the TIGER DAMS in ACTION. https://usfloodcontrol.com/tiger-dams-in-action/

From: Jan Wiegman <jan.wiegman@wright-pierce.com>
Sent: Wednesday, August 28, 2024 4:56 PM
To: Cheryl Witmer <cheryl@tigerdam.com>
Subject: Damariscotta, Maine deployable flood barrier

We are working with the Town of Damariscotta, Maine to obtain quotations for a deployable flood barrier in a parking lot . I have attached a request for quote form and information about the proposed barrier.
Please let me know if you have any questions.

Thank you,
Jan Wiegman

Jan Wiegman, PE
Wright-Pierce | Senior Project Manager
direct 207.319.1520 | **cell** 207.576.0282

Town of Damariscotta
21 School Street
Damariscotta, Maine, 04543

Description: The Town of Damariscotta, Maine is seeking quotations to purchase a deployable flood barrier for use in a municipal parking lot along the Damariscotta River.

Barrier Length: 840 feet in length, 3' height min., barrier intent is to prevent flood water from adjacent tidal river from flooding parking lot and adjacent buildings. Barrier will be deployed on an asphalt paved surface and be deployed by the Town work force. Refer to attached plan for barrier length and arrangement. Barrier shall come with storage bins for handling and deployment. Parking lot elevation is approximately 8.0 and rises to 11.0 the base flood elevation is 10.0 and barrier must have 1' of freeboard. One 90 degree interior angle, One 90 degree exterior angle.

Delivery will be preferred by December 1, 2024.

Flood Barrier Bid Criteria:

Product name: __Tiger Dam_____

Manufacturer:____US Flood Control Corp_____

Distributor: __US Flood Control Corp_____

Location of Manufacture: __New Orleans_____

Product Cost: ____$97,803.00_____

Delivery to Damariscotta, Maine: _$1695.00_____

Total cost: _____$99,498.00_____

(Note: purchaser is the Town of Damariscotta, a municipality, and not subject to state sales tax)

Quotations are due September 17, 2024 by 5:00 PM EST.

Prices will be held for 60 days.

Submit quotations to :

Jan Wiegman, PE
Wright-Pierce
11 Bowdoin Mill Island, Suite 140
Topsham, ME 04086

Questions may be submitted to :

Jan Wiegman, PE,
Wright-Pierce
Tel: 207-319-1520
Email: Jan.wiegman@wright-pierce.com

Delivery Time Frame from date of order: _7 days_____

Product information to be provided with quotation:

- Installation/set-up Instructions:
- Product Warrantee:
- Time to install 300 foot length of barrier and number of people necessary:
- Process to store after use:
- Number of crates and volume of storage crates:
- Anchoring requirements:
- Barrier material:
- Narrative of how product performs:
- Examples of where the product has been used within the USA:
- Can barrier be repaired and what is the process:

LAST SAVED BY: RYAN.BEISAW 8/19/2024 10:01 AM

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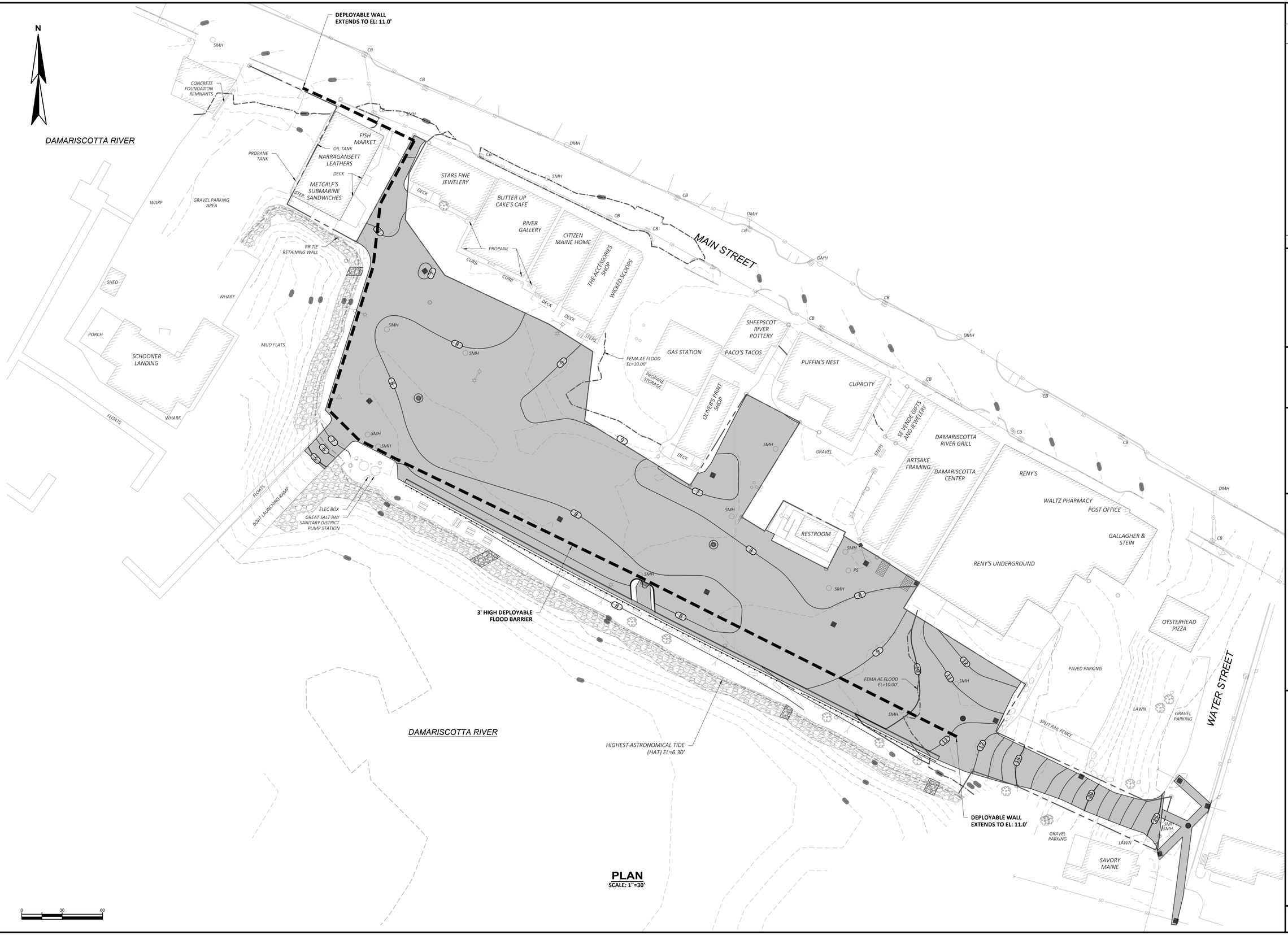

PLAN
SCALE: 1"=30'

NO	REVISIONS	APP'D	DATE
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PROJECT NO: 20459
DESIGNED: J.WIEGMAN
CAD COORD: R.BEISAW
CAD: R.BEISAW
CHECKED: J.WIEGMAN
DATE: 08-2024
APPROVED: J.WIEGMAN
DATE: 08-2024
SUBMISSION: ISSUED FOR QUOTATION

STATE OF MAINE
JAN B.S. WIEGMAN
No. 9852
REGISTERED PROFESSIONAL ENGINEER
8/26/2024

WRIGHT-PIERCE
(207) 725-8721 | www.wright-pierce.com
11 BOWDOIN MILL ISLAND, TOPSHAM, ME 04086

TOWN OF DAMARISCOTTA
DOWNTOWN PARKING LOT IMPROVEMENTS
DAMARISCOTTA, MAINE

TEMPORARY FLOOD BARRIER PLAN

DRAWING
1

Single 36” Tiger Dam Installation Procedure
Doc# TDIP 36-082515 – January, 2016

Single 36” Tiger Dam Installation Procedure
Doc# TDIP 36-082515 – January 2016

ASFPM Listed & FM Approved Single 36” Tiger Dam Installation Procedure

1-866-852-1118
www.usfloodcontrol.com

ASFPM Listed & FM Approved Single 36” Tiger Dam Installation Procedure

Congratulations! You have purchased the world’s number one flood protection equipment. Please pay close attention to the safety information and warnings discussed in this installation manual. At U.S. Flood Control Corp., your safety is our first priority.

Foreword

Tiger Dams are a product of their environment and all safety precautions must be taken for optimum safety of your deployment team.

Tiger Dams are used world-wide for a variety of flood conditions. Because each deployment is unique and has distinct circumstances, please consult your engineer before deploying Tiger Dams. Your engineer will help you determine the ideal tube layout for your flood fight; please follow all these guidelines, and any others your engineer requires.

Water is the most destructive force on earth. Standing flood waters can harbor many strains of bacteria, staph infection, deadly chemicals, and contaminants. Be sure to check with your local officials prior to coming in contact with any standing flood waters.

U.S. Flood Control Corporation and its products have been used successfully by thousands of clients worldwide. Whether for flood control, hazmat, or containment purposes, your Tiger Dam system can be set up and deployed in minutes - protecting communities, businesses, and infrastructure, thus eliminating the use of sandbags forever! Tiger Dams allow you to use water to fight water!

To ensure you obtain the maximum benefits possible from the Tiger Dam Flood Control System, this training manual was designed specifically for use of the ASFPM Listed & FM Approved Single 36” Configuration Tiger Dam. In these “simple to follow” instructions, you’ll easily be able to install the Tiger Dam. In order to navigate effortlessly through the installation process, this installation manual has been broken down into the following chapters or segments:

- Essential Equipment
- Site Survey & Preparation
- Poly (Vapor) Barrier
- Strap Layout
- Tube Layout
- End Capping & Joining
- Filling Tubes
- Anchoring and Strapping
- Completing the Poly Barrier
- Emptying the Tubes & Storage

- Cleaning and Repairing the Tiger Dam System

Essential Equipment

Let's go over some of the basic, yet essential, equipment and tools needed to get your Tiger Dams up and running.

US Flood Control Supplied (or available):

- Tiger Dams
- Tube sleeves (2) per Tiger Dam
- Anchors (appropriate type)
- Anchor straps
- Anchor brackets (as applicable)
- D-rings & connectors
- Tube chocks
- Poly (vapor) barrier
- Fill adaptor
- Hydrant wrench

Other Equipment:

- Marine silicone sealant
- Caulking guns
- Rollers
- Duct tape
- Liquid spray rubber
- Expandable foam sealant
- Double sided carpet tape
- Utility knife
- 50 lb. sandbags
- Fire hoses
- Pump (if required to fill)
- Tape measure
- Level
- Small rubber squares
- Equipment to clean ground surface
- Anchor driver (earth surface)
- Power drill & bits (paved surface)

Before inflating your Tiger Dams you must, by Law, have a qualified city employee on hand to operate a city fire hydrant. Contact your local authorities before attempting to operate a fire hydrant.
When starting the process of connecting to a fire hydrant, there are some important points that must be discussed. First, check with your local authorities to find out what the regulations are to operate a fire hydrant. They may require you to get a "Use Permit" or some sort of "Check Meter" or "Flow Meter".

Then, there's the safety of opening up a fire hydrant. Whenever you attempt to open up a hydrant, the first thing you want to make sure of is that the hydrant is closed. Generally there's a valve on top that requires the use of a hydrant wrench to open and close. Fire hydrants can either be right hand thread or left hand thread. Always make sure the fire hydrant is closed before opening- since any built up pressure could pose a danger. Once determining that the fire hydrant is closed, slowly open one of the ports.

Tiger Dams are highly adaptable in that they can also be inflated with a fill hose, transfer pump, standing water source, river or any nearby body of water.

Single 36” Tiger Dam Installation Procedure
Doc# TDIP 36-082515 – January, 2016

Deployment Time: 0.5 man-hours per linear foot[1]

Minimum Personnel Requirements: 4 workers – 1 skilled[2], 3 unskilled[3]

Site Survey & Preparation

Consult with your engineer to perform a site survey, which will dictate where your Tiger Dams will be placed. Since these, like any other tubular structure have the potential to roll, never fill a dam on a hill or at an angle. First, obtain proper authorization to install the tubes at the desired location, and determine the access points for deployment. Then, determine the source of fill water and obtain proper authorization to use that water source.

Once the setup location has been identified, prepare the site by removing any sharp or penetrating objects as well as any debris which may hinder the dam’s ability to hold back water.

Poly (Vapor) Barrier

10 mil reinforced, or stronger poly sheeting is required. We suggest you use 50 x 100 ft. or 40 x 200 ft. Should you need to alter the size based on the project, you may join the sections of poly barrier together, side by side, using duct tape to achieve the length required for your deployment. You can also custom order your poly for the exact size of your project requirements giving a better seal (i.e. 175’ long section).

Lay out the poly sheet so that the outside edge will be about 10 ft. from where the Tiger Dam tube will be placed. For installations on concrete or asphalt surfaces, before laying out the poly sheet, apply two beads of marine silicone sealant to the ground along the path where the tube will be placed. Also apply marine silicone sealant underneath the edge that will extend under the tube on the water side. Apply the silicone bead about 4” from the edge. Use rollers to press down the poly sheet and silicone sealant to provide an effective seal. For additional sealing, use duct tape and liquid spray rubber on the edges of the poly sheet, as shown below.

Single 36” Tiger Dam Installation Procedure
Doc# TDIP 36-082515 – January, 2016

[1]Not including fill time. Fill time will vary depending on water supply.
[2]A skilled worker is someone who has prior knowledge and who is familiar with the setup process.
[3]An unskilled worker is someone who has no prior knowledge of the setup process.

Strap Layout

Once the poly is in place, you are ready to lay the straps out on top of the poly. The straps are placed between 5 - 6 ft apart, beginning at the starting point of your structure. The first strap should be approximately 3 ft from the end of the tubes. There will be 9 straps per 50 ft. Lay the straps with the red strip facing down, with all the d-rings on the same side, preferably on the dry side of the structure. Don’t worry if the straps begin to shift as the tubes are being laid out. You can readjust them once the dams are in place

. 

Tube Layout

Once the poly sheet has been positioned and the straps are in place, you are ready to lay out your tubes. Start by identifying the low point of the grade and try to lay out the tubes so that the black fill port is near that point. This will help later when emptying the tube. In order to establish which end the fill port on, simply look for the tube’s serial number; the fill port is on the same end. Unroll the tubes next to the outside edge of the poly. Once layout is complete, you will have approximately 10 ft. of poly on the water or “threat’ side of the tube.

Single 36” Tiger Dam Installation Procedure
Doc# TDIP 36-082515 – January, 2016

If your set up calls for a bend or turn in the tiger dam, simply pull or maneuver the dam in the direction you need the turn to go. The dams can make as much as a 90 degree turn, however a soft turn is preferable to maintain ideal ground surface coverage.

If your set up calls for attachment of the barrier to rigid surfaces such as walls, be sure to leave half the diameter of the tube to run up against the surface of the structure.

End Capping & Joining

Every dam will either have its ends capped or joined. In either case, this simple fold will prevent the tremendous pressure of the water inside the dam from pressing directly on the end seam. Even though the end seams are made of a very sturdy “double RF weld”, it’s important that they be protected. You will not have any free ends that are not folded. When the tube ends are not being joined to other tubes, you simply “cap” them by folding the end of the dam to the solid line labeled “Fold to Here”. The end of the tube should be folded underneath. Then pull a sleeve over the fold and up to the dotted line labeled “Sleeve to Here”. Lastly, fold the excess sleeve underneath the tube. Two sleeves are included with each Tiger Dam.

It may be easier for you to fold the end of the dam into a point to get it inside the sleeve, as shown below. Since the dams and the sleeves are the same diameter, it will be a tight fit. Once the end is inside the sleeve, undo the point and make sure the fold of the dam is nice and flat inside the sleeve in order to create a solid “pinch” to prevent the water from moving past it.

When making your dams into long configurations, you will need to join Tiger Dams together to reach your required distance. The joining procedure is as follows:

- First, slide a sleeve onto the existing dam past the “Sleeve Here” indicator so it is out of the way while joining.
- Lay the joining dam on top of existing dam so that the joining dam overlaps approximately 6 feet.
- With a couple of people on each side of the dam – hold the two dams together and then fold one end of the overlapped section over the other. Refer to the picture below. You’ll essentially be creating an “S Fold”. Check to see if the edges are flat, and that you’ve created a solid “S Fold”.

- Now pull the sleeve back over the “S-Fold”. **Take Care Not To Dislodge This Fold.** In order to pull the sleeve on easily and smoothly, slightly roll up the edges of the folded tube. Hold it with one hand, and pull the sleeve over the join until you have an equal amount of sleeve on either side. Once the sleeve is in position, unroll the tube edges and check to be sure the fold is flat inside the sleeve.

Keep in mind, if you make this fold too big, the join will not completely be covered by the sleeve when you pull it over. It’s important that the join be completely inside the sleeve. And if you make the overlap too small, the fold may NOT be strong enough to create a solid join, and the pressure of the water could actually push it apart.

Never Fill A Tiger Dam Without Capping or Joining!

Filling Tubes

Several steps are involved when filling the tubes:

- The first step is to prepare the fill valve. Unscrew the cap and ensure the fill valve is in the “closed” or up position so the flow of water can be regulated.

- Double check that the tube is placed in the correct position, that the ends are either capped or joined, and that the sleeves & folds haven’t shifted while working around it.

- **Be sure to open the yellow vent valve**. This will allow the air to escape from the dam as the tube is filling up. If this vent is not opened the pressure of the air inside **will** cause the tube to burst.

- Place tube chocks on both sides of the dam to prevent any rolling.

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- Connect the fill adapter to the fill valve. Your fill adapter has 2 tabs on it that will interlock into the notches inside the valve. You simply insert and twist, which will lock the fill adapter into the fill valve and hold the check open. When you remove it, the check will return to the closed position keeping the water from flowing out. Be careful not to over tighten- as this will make it difficult to take off later.

- Connect your water source to the fill adapter and open the ball valve to begin filling. Make sure to start opening the ball valve slowly. There’s a gasket inside the fill valve, and if you start flowing too quickly, the water may rush through and blow the gasket out of place. Once you have a steady flow, slowly open to full pressure. While filling, also be sure to hold the fill adapter vertical so that it doesn’t pull on the tube fabric.

- Monitor the fill height closely, since this process can happen very quickly depending on the amount of water pressure available. Over-filling may result in the tube bursting. Measure the height by placing a level across the top of the tube and extending outward until a tape measure can be used to measure the distance from the level to the ground, as shown below.

- **Stop filling once the optimal height is reached and all air is exhausted from the tube.** Maximum fill height of the 36” tube is 32”. Close the ball valve on the fill adapter and remove it by pressing down gently, turning to the left, and pulling straight up. The spring-loaded fill valve

will automatically close once the fill adapter is removed. Do this quickly to prevent excessive water from flowing out.

Please be extremely careful when filling any Tiger Dam, as they can roll and severely harm your deployment crews. Plan to appoint a safety person to watch the filling process, ready to advise on when to stop filling, or issue a warning, should rolling or any other danger arise.

Stacking Tubes

Several steps are involved when stacking the tubes:

- The first step is to layout the first layer of tubes. Fill the first tube - see “Filling Tubes” section.

- Then layout the second tube along the same formation as the first and fill.
- Use chocks to secure the tubes ensuring that they do not roll from their position.
- Layout the top layer tube flat along the center of the bottom layer of filled tubes and fill the top tube.

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Anchoring and Strapping

The Tiger Dams must be secured by using anchors that are appropriate for the surface type and conditions. Each anchor scenario is unique and it’s very important that there’s enough strength to secure the dam. **At minimum, the anchored straps are required to be spaced no more than 5 ft. apart with at least one anchor installed on each end of the strap. For stacked configurations, install anchors on both sides of the configuration. You must consult your engineer to determine the appropriate type and number of anchors needed on your flood fight project.**

Start on the water side of the tube and drill or cut holes in the poly where the anchors will be placed. Place your first anchor point no more than 3 ft. from the end of the dam within a few inches away from the tube, as shown below. Continue to space the anchor points no more than 4 ft. apart across the entire length of dam. Drill anchors firmly into the ground at each point. Repeat drilling the corresponding anchors on the dry side of the tube. Use marine silicone sealant to cover any holes around the anchor points as necessary.

Note: A hydraulic anchor driver is required for installing earth anchors. A power drill is required for installing concrete anchors. Anchor drilling instructions are provided by your anchor supplier. Be careful when installing earth anchors. Call before you dig. Underground utilities can harm or fatally injure your deployment personnel.

Once your anchors are secure, you’re ready to attach the straps. Whenever possible we suggest the strap be threaded directly through the anchor eye bolt or anchor head, which ever type your engineer has identified for your project. If this is not possible, use threaded connectors to attach the strap to the anchor. Use small rubber squares with slits in them to cover the anchoring components and to protect the tube from any damage.

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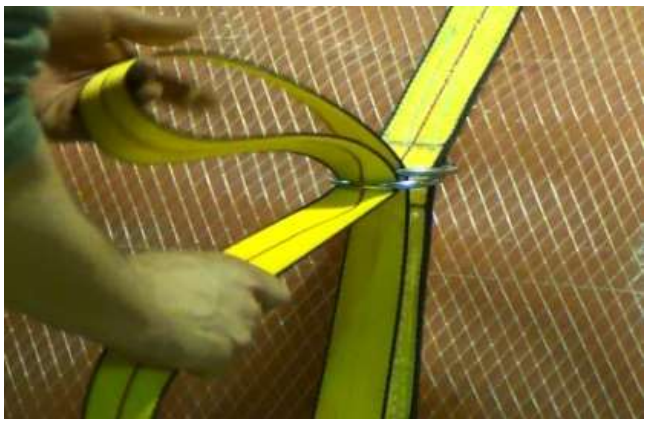
Each strap will have two ends; one with D-rings and one without. Start by attaching the end with D-rings to the anchor point on the water side. Do this for each strap. Then, pass all straps over the tube to the dry side and line up with the corresponding anchor points. It’s important to make sure the red stripe is facing up. At this point, do not attach the straps to the anchors on the dry side.

Apply double-sided carpet tape along the outside of the tubing between each strap. Then, pull the free end of the poly sheet on the dry side over the tube and strap. Pull the poly sheet tight so that it is firmly wrapped around the tube and pressed against the carpet tape. Apply duct tape on top of the structure to the outside of the poly sheet directly above the straps. Using a utility knife, cut slits in the poly sheet where you applied the duct tape, while taking extra precaution not to cut the tube material itself. Pass the free end of the straps through these slits from under the poly sheet, as shown below.

Pull the strap all the way through and weave the free end through the anchor or threaded connector (on dry side). Then loop the free end around and pass it through the two D-rings located in the middle of the strap. Loop it back over one D-ring, under the other, and pull. Refer to the picture below.

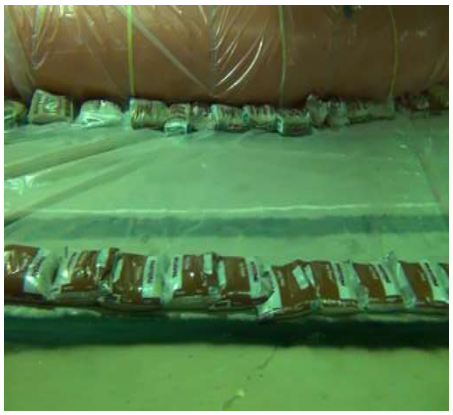


Pull each strap as tight as possible to allow for minimal movement of the structure. Now the Tiger Dam is anchored and stabilized! You may now remove the tube chocks from both sides of the dam.

Completing the Poly Barrier

Pull the poly barrier firmly and wrap around the Tiger Dam as tight as possible. Fold and smooth it over as you follow the structure around corners and bends.

Be sure the poly sheet is pressed close to the tiger dam on the water side of the structure. Secure the poly sheet in this area using sandbags throughout the entire length of the dam. Also place sandbags along the outside edge of poly sheet. Sand bags must be placed end to end with no spacing in between as shown below.



When installing on concrete or asphalt surfaces, seal the outside edge of poly sheet using marine silicone sealant, duct tape, and liquid rubber spray as earlier described in the Poly (vapor) Barrier section.

If the Tiger Dam ends will be connected to a wall or other structure, use expandable foam at the connection for added sealing capability, as shown below.

Remember, it may be necessary to have pumps on the dry side of the structure to mitigate rain fall, seepage or over toping of the tube. Bentonite clay may also be used to absorb seepage and fill gaps and crevices.

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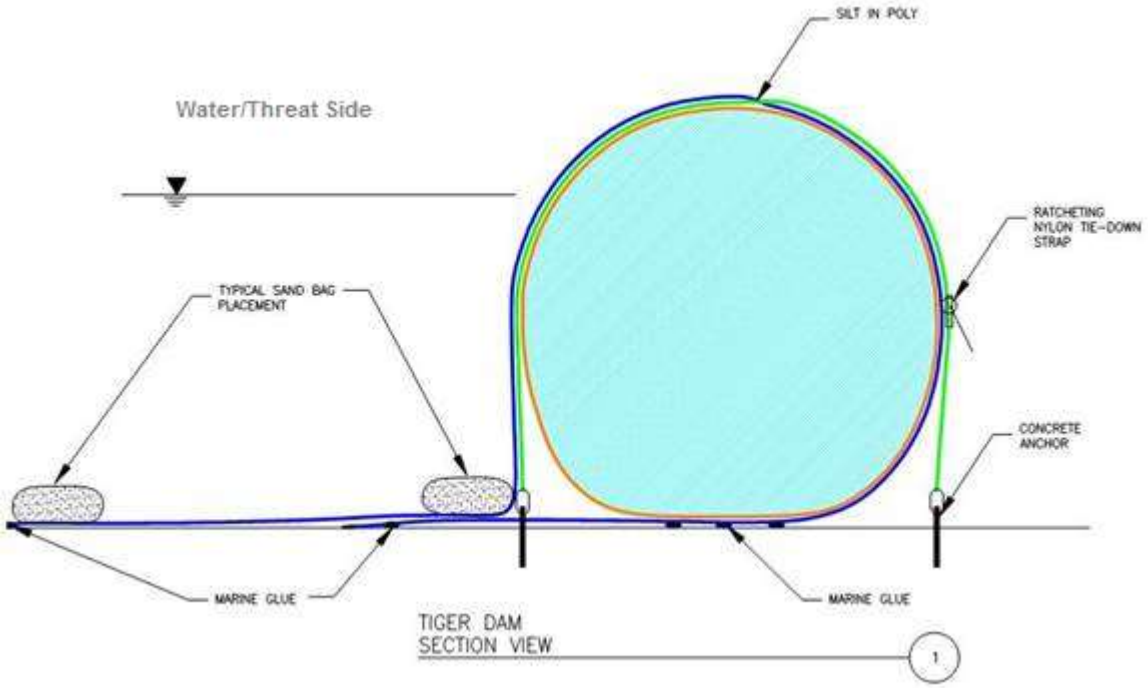
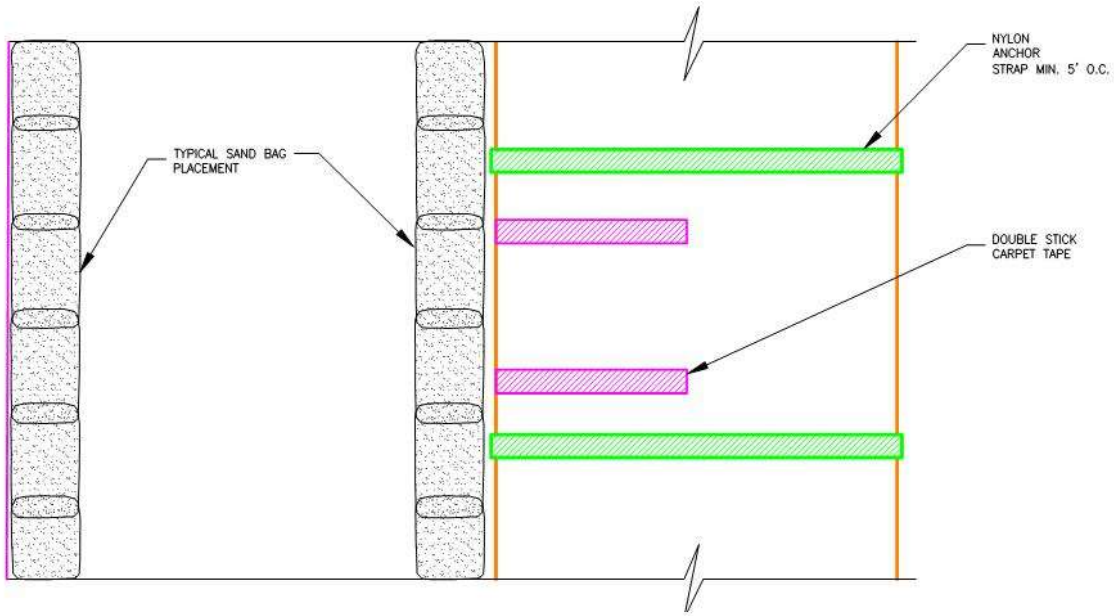
The following sketches provide a general layout of a completed Single 36” Tiger Dam setup:



TIGER DAM
SECTION VIEW 1



TIGER DAM
PLAN VIEW 2

Emptying the Tubes & Storage

To empty the tubes, simply twist the fill valve, push it down, then twist again to lock open. The tube will drain automatically if the fill valve is located at the low point. It may be necessary to use a pump to remove the remaining water inside the tube.

After the tube is emptied, it may be rolled up and re-used for the next possible flood event. Store the tube and other Tiger Dam components in a cool, dry location away from any potential damage.

SUGGESTIONS FOR CLEANING PVC COATED FABRIC

Periodic cleaning of surface dirt deposition on the fabric is a necessity to keep the coated fabric aesthetically pleasing and retard fungus growth. Investigation of several commercially available cleaners and found that Formula 409® All-Purpose Cleaner, Mr. Clean, Fantastik®, Spray Nine, and Zep all do a good job of cleaning the dirt and do not harm the vinyl coating.

We recommend using a cleaning solution diluted 1:1 with water.

Apply with sponge, cloth, or spray directly onto vinyl.

Allow to penetrate briefly.

Rinse or wipe off with damp cloth, or use medium pressure spray gun.

NOTE: Please make sure to wipe off all cleaners and residue. Repeat the above procedure as necessary. Be sure to follow all the safety precautions and suggestions on the label of the commercial cleaners. A mild bleach solution diluted 1:100 with water may be used when fungus is present followed by thorough rinsing to ensure the bleach and residue has been removed.

We believe this information is the best currently available on the subject. It is offered as a possible helpful suggestion in experimentation you may care to undertake along these lines. It is subject to revision as additional knowledge and experience are gained. We make no guarantee of results and assume no obligation or liability whatsoever in connection with this information.

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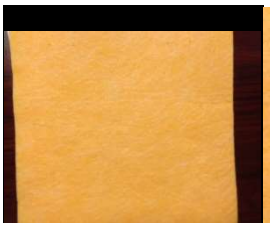
Suggested Repair Kits

Option #1 Patch Repair Kit TEAR-AID Type B

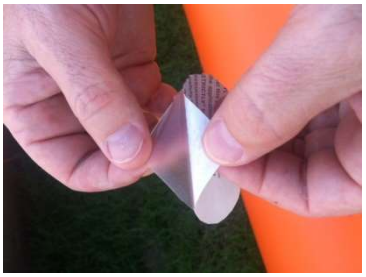
Materials, Tools, PPE and Other



Step 1

From the Repair Kit included with your Tiger Dam System, cut a circular patch from the Tear Aid sheet large enough to extend 1 inch beyond the damaged area. Peel back of patch ½” from the edge. (For smaller pinholes use the small Tear Aid patch and follow the same process

Cycle Time = 35.31 seconds

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Step 2

Dry the area to be patched as much as possible with a clean absorbent cloth.

Cycle Time = 3 seconds

Step 3

Immediately apply the Tear Aid patch centering it on the damaged portion of the tube, smoothing out any air or water bubbles from underneath the patch. Once the patch is secure you will see a noticeable reduction in the amount of leakage.

Cycle Time = 19.75 seconds

Step 4

Now take the circular orange fabric cutout repair piece while continuing to wipe away water from the patch area. Apply a liberal amount of Gorilla Glue directly onto the orange patch and apply OVER the Tear Air patch so that the entire damaged spot and area at least 1” beyond is covered. This will act a second layer of repair protection. The excess glue will also help bond the water once it dries. Do not disturb the patch after this point.

Use protective gloves when applying Gorilla Glue or any type of adhesive

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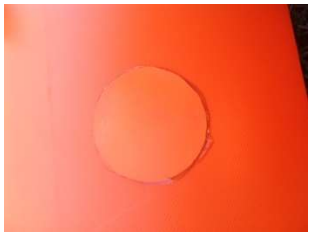
Cycle Time = 17.60 seconds

Step 5

Again, you will notice a significant decrease in the amount of leakage; however, curing time might take up to 24 hours.



Additional

Simple duct tape or Gorilla glue may be used as an alternative to impede water extrusion.

In the event that a repair kit is not available, simple duct tape or Gorilla Tape can be used to slow water leakage.

Cycle Time = 10.44 (not included in total)

Option #2 Liquid Patch Repair Kit

1. Wipe around area that appears to be damaged with soap and water depending on status of fabric. Rubbing alcohol is recommended for absolute clean surface ensuring no debris left behind.

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2. The fabric surface should be roughened on and around the edges with a light grit sand paper (150-180 grit) or 3M Scotch Brite (green color) general purpose pad. Make sure when roughening surface to not penetrate the white scrim below the surface. Roughening is only used for grasping purposes when applying liquid sealant and clear patch.

3. Apply liquid seal (Vyna-Bond or Aqua Seal / Patent Products) on top of the damaged area and around repair to hold patch on. Better to use a disposable brush when applying for an even surface and equal amount. Provide a 1/16” to ¼” bead of liquid seal on top of tear.

4. Next step is to apply the clear repair tape over prepped surface. All cutout materials applied to repaired area should be cut out in a circular form. NEVER apply a patch with a right angle edge. When applying the clear circle patch (Rite Aid patch) to place center over the hole and apply patch in the middle. Work your way out by pressing down from the middle of patch to the outer edge of patch. Be sure not to press too hard as all your liquid will run out of the patch.

5. Last step is to apply your color coated patch over the clear by applying more liquid seal or Hot air welded. The two types of patches we use are the vinyl material which the tubes are made from which requires liquid adhesive and also an orange ultra-strong repair tape we use that has adhesive already applied. Depends on your personal preference and job at hand. If welding a vinyl patch is preferred rather than applying a liquid stage patch, please ask your USFC rep. for a ”How to” on hot air welding patches.

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ASFPM Listed & FM Approved 19” 2-1 Configuration Tiger Dam Installation Procedure

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ASFPM Listed & FM Approved 2-1 19” Configuration Tiger Dam Installation Procedure

Congratulations! You have purchased the world’s number one flood protection equipment. Please pay close attention to the safety information and warnings discussed in this installation manual. At U.S. Flood Control Corp., your safety is our first priority.

Foreword

Tiger Dams are a product of their environment and all safety precautions must be taken for optimum safety of your deployment team.

Tiger Dams are used world-wide for a variety of flood conditions. Because each deployment is unique and has distinct circumstances, please consult your engineer before deploying Tiger Dams. Your engineer will help you determine the ideal tube layout for your flood fight; please follow all these guidelines, and any others your engineer requires.

Water is the most destructive force on earth. Standing flood waters can harbor many strains of bacteria, staph infection, deadly chemicals, and contaminants. Be sure to check with your local officials prior to coming in contact with any standing flood waters.

U.S. Flood Control Corporation and its products have been used successfully by thousands of clients worldwide. Whether for flood control, hazmat, or containment purposes, your Tiger Dam system can be set up and deployed in minutes - protecting communities, businesses, and infrastructure, thus eliminating the use of sandbags forever! Tiger Dams allow you to use water to fight water!

To ensure you obtain the maximum benefits possible from the Tiger Dam Flood Control System, this training manual was designed specifically for use of the ASFPM Listed & FM Approved 19” 2-1 Configuration Tiger Dam. In these “simple to follow” instructions, you’ll easily be able to install the Tiger Dam. In order to navigate effortlessly through the installation process, this installation manual has been broken down into the following chapters or segments:

- Essential Equipment
- Site Survey & Preparation
- Poly (Vapor) Barrier
- Strap Layout
- Tube Layout
- End Capping & Joining
- Filling Tubes
- Stacking Tubes
- Anchoring and Strapping
- Completing the Poly Barrier

- Emptying the Tubes & Storage
- Cleaning and Repairing the Tiger Dam System

Essential Equipment

Let’s go over some of the basic, yet essential, equipment and tools needed to get your Tiger Dams up and running.

US Flood Control Supplied (or available):

- Tiger Dams
- Tube sleeves (2) per Tiger Dam
- Anchors (appropriate type)
- Anchor straps
- Anchor brackets (as applicable)
- D-rings & connectors
- Tube chocks
- Poly (vapor) barrier
- Fill adaptor
- Hydrant wrench

Other Equipment:

- Marine silicone sealant
- Caulking guns
- Rollers
- Duct tape
- Liquid spray rubber
- Expandable foam sealant
- Double sided carpet tape
- Utility knife
- 50 lb. sandbags
- Fire hoses
- Pump (if required to fill)
- Tape measure
- Level
- Small rubber squares
- Equipment to clean ground surface
- Anchor driver (earth surface)
- Power drill & bits (paved surface)

Before inflating your Tiger Dams you must, by Law, have a qualified city employee on hand to operate a city fire hydrant. Contact your local authorities before attempting to operate a fire hydrant.
When starting the process of connecting to a fire hydrant, there are some important points that must be discussed. First, check with your local authorities to find out what the regulations are to operate a fire hydrant. They may require you to get a “Use Permit” or some sort of “Check Meter” or “Flow Meter”.

Then, there’s the safety of opening up a fire hydrant. Whenever you attempt to open up a hydrant, the first thing you want to make sure of is that the hydrant is closed. Generally there’s a valve on top that requires the use of a hydrant wrench to open and close. Fire hydrants can either be right hand thread or left hand thread. Always make sure the fire hydrant is closed before opening- since any built up pressure could pose a danger. Once determining that the fire hydrant is closed, slowly open one of the ports.

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Tiger Dams are highly adaptable in that they can also be inflated with a fill hose, transfer pump, standing water source, river or any nearby body of water.

Deployment Time: 0.5 man-hours per linear foot[1]

Minimum Personnel Requirements: 4 workers – 1 skilled[2], 3 unskilled[3]

Site Survey & Preparation

Consult with your engineer to perform a site survey, which will dictate where your Tiger Dams will be placed. Since these, like any other tubular structure have the potential to roll, never fill a dam on a hill or at an angle. First, obtain proper authorization to install the tubes at the desired location, and determine the access points for deployment. Then, determine the source of fill water and obtain proper authorization to use that water source.

Once the setup location has been identified, prepare the site by removing any sharp or penetrating objects as well as any debris which may hinder the dam’s ability to hold back water.

Poly (Vapor) Barrier

10 mil reinforced, or stronger poly sheeting is required. We suggest you use 50 x 25 ft. or 100 x 25 ft. Should you need to alter the size based on the project, you may join the sections of poly barrier together, side by side, using duct tape to achieve the length required for your deployment. You can also custom order your poly for the exact size of your project requirements giving a better seal (i.e. 175’ long section).

Lay out the poly sheet so that the outside edge will be about 10 ft. from where the Tiger Dam tube will be placed. For installations on concrete or asphalt surfaces, before laying out the poly sheet, apply two beads of marine silicone sealant to the ground along the path where the tube will be placed. Also apply marine silicone sealant underneath the edge that will extend under the tube on the water side. Apply the silicone bead about 4” from the edge. Use rollers to press down the poly sheet and silicone sealant to provide an effective seal. For additional sealing, use duct tape and liquid spray rubber on the edges of the poly sheet, as shown below.

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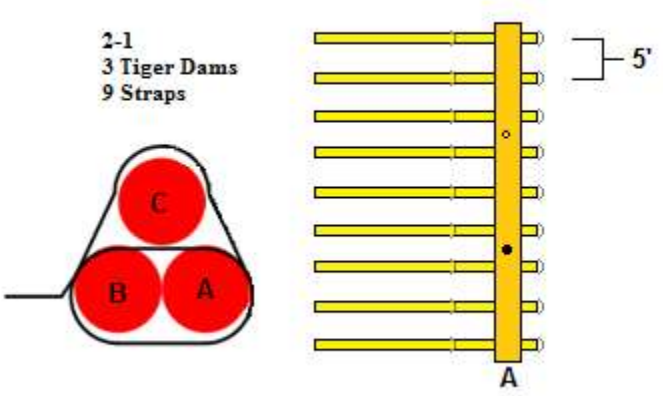
[1]Not including fill time. Fill time will vary depending on water supply.
[2]A skilled worker is someone who has prior knowledge and who is familiar with the setup process.
[3]An unskilled worker is someone who has no prior knowledge of the setup process.



After the vapor barrier is affixed to the ground surface:

Strap Layout

1. Lay out straps approximately 5 feet apart from each other. Red line down.
2. Position the first dam (Tube A) about 1 foot from the end D-link, and fill it up.
3. Position the second dam (Tube B) directly adjacent to it, and fill it up.
4. Be sure both dams fit between the two D-links.
5. Throw all straps over the 2 dams and run them through the end D-link to tighten securely.
6. Position a third dam (Tube C) on top the previous two dams, and fill it up.
7. Throw all straps over the third dam and tighten securely into the D-links on the other side.

Tube Layout

Once the poly sheet has been positioned, you are ready to lay out your tubes. Start by identifying the low point of the grade and try to lay out the tubes so that the black fill port is near that point. This will help later when emptying the tube. In order to establish which end the fill port on, simply look for the tube’s serial number; the fill port is on the same end. Unroll the tubes next to the outside edge of the poly. Once layout is complete, you will have approximately 10 ft. of poly on the water or “threat’ side of the tube.

If your set up calls for a bend or turn in the tiger dam, simply pull or maneuver the dam in the direction you need the turn to go. The dams can make as much as a 90 degree turn, however a soft turn is preferable to maintain ideal ground surface coverage.

If your set up calls for attachment of the barrier to rigid surfaces such as walls, be sure to leave about 3 ft. of extra tube length against the surface.

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End Capping & Joining

Every dam will either have its ends capped or joined. In either case, this simple fold will prevent the tremendous pressure of the water inside the dam from pressing directly on the end seam. Even though the end seams are made of a very sturdy “double RF weld”, it’s important that they be protected. You will not have any free ends that are not folded. When the tube ends are not being joined to other tubes, you simply “cap” them by folding the end of the dam to the solid line labeled “Fold to Here”. The end of the tube should be folded underneath. Then pull a sleeve over the fold and up to the dotted line labeled “Sleeve to Here”. Lastly, fold the excess sleeve underneath the tube. Two sleeves are included with each Tiger Dam.

It may be easier for you to fold the end of the dam into a point to get it inside the sleeve, as shown below. Since the dams and the sleeves are the same diameter, it will be a tight fit. Once the end is inside the sleeve, undo the point and make sure the fold of the dam is nice and flat inside the sleeve in order to create a solid “pinch” to prevent the water from moving past it.

When making your dams into long configurations, you will need to join Tiger Dams together to reach your required distance. The joining procedure is as follows:

- First, slide a sleeve onto the existing dam past the “Sleeve Here” indicator so it is out of the way while joining.
- Lay the joining dam on top of existing dam so that the joining dam overlaps approximately 6 feet.
- With a couple of people on each side of the dam – hold the two dams together and then fold one end of the overlapped section over the other. Refer to the picture below. You’ll essentially be creating an “S Fold”. Check to see if the edges are flat, and that you’ve created a solid “S Fold”.

- Now pull the sleeve back over the “S-Fold”. **Take Care Not To Dislodge This Fold.** In order to pull the sleeve on easily and smoothly, slightly roll up the edges of the folded tube. Hold it with one hand, and pull the sleeve over the join until you have an equal amount of sleeve on either side. Once the sleeve is in position, unroll the tube edges and check to be sure the fold is flat inside the sleeve.

Keep in mind, if you make this fold too big, the join will not completely be covered by the sleeve when you pull it over. It’s important that the join be completely inside the sleeve. And if you make the overlap too small, the fold may NOT be strong enough to create a solid join, and the pressure of the water could actually push it apart.

Never Fill A Tiger Dam Without Capping or Joining!

Filling Tubes

Several steps are involved when filling the tubes:

- The first step is to prepare the fill valve. Unscrew the cap and ensure the fill valve is in the “closed” or up position so the flow of water can be regulated.

- Double check that the tube is placed in the correct position, that the ends are either capped or joined, and that the sleeves & folds haven’t shifted while working around it.

- **Be sure to open the yellow vent valve**. This will allow the air to escape from the dam as the tube is filling up. If this vent is not opened the pressure of the air inside **will** cause the tube to burst.

- Place tube chocks on both sides of the dam to prevent any rolling.

- Connect the fill adapter to the fill valve. Your fill adapter has 2 tabs on it that will interlock into the notches inside the valve. You simply insert and twist, which will lock the fill adapter into the fill valve and hold the check open. When you remove it, the check will return to the closed position keeping the water from flowing out. Be careful not to over tighten- as this will make it difficult to take off later.

- Connect your water source to the fill adapter and open the ball valve to begin filling. Make sure to start opening the ball valve slowly. There’s a gasket inside the fill valve, and if you start flowing too quickly, the water may rush through and blow the gasket out of place. Once you have a steady flow, slowly open to full pressure. While filling, also be sure to hold the fill adapter vertical so that it doesn’t pull on the tube fabric.

- Monitor the fill height closely, since this process can happen very quickly depending on the amount of water pressure available. Over-filling may result in the tube bursting. Measure the height by placing a level across the top of the tube and extending outward until a tape measure can be used to measure the distance from the level to the ground, as shown below.

- **Stop filling once the optimal height is reached and/or all air is exhausted from the tube.** Close the ball valve on the fill adapter and remove it by pressing down gently, turning to the left, and pulling straight up. The spring-loaded fill valve will automatically close once the fill adapter is removed. Do this quickly to prevent excessive water from flowing out.

Please be extremely careful when filling any Tiger Dam, as they can roll and severely harm your deployment crews. Plan to appoint a safety person to watch the filling process, ready to advise on when to stop filling, or issue a warning, should rolling or any other danger arise.

Stacking Tubes

Several steps are involved when stacking the tubes:

- The first step is to layout the first layer of tubes. Fill the first tube - see “Filling Tubes” section.

- Then layout the second tube along the same formation as the first and fill.
- Use chocks to secure the tubes ensuring that they do not roll from their position.
- Next, use the provided straps to band the bottom layer of tubes together.

- Layout the top layer tube flat along the center of the bottom layer of filled tubes and fill the top tube.

As needed, use chocks to secure the top tube of the configuration to secure the tube in place.

Anchoring and Strapping

The Tiger Dams must be secured by using anchors that are appropriate for the surface type and conditions. Each anchor scenario is unique and it’s very important that there’s enough strength to secure the dam. **At minimum, the anchored straps are required to be spaced no more than 5 ft. apart with at least one anchor installed on each end of the strap. For stacked configurations, install anchors on both sides of the configuration. You must consult your engineer to determine the appropriate type and number of anchors needed on your flood fight project.**

Start on the water side of the tube and drill or cut holes in the poly where the anchors will be placed. Place your first anchor point no more than 3 ft. from the end of the dam within a few inches away from the tube, as shown below. Continue to space the anchor points no more than 4 ft. apart across the entire length of dam. Drill anchors firmly into the ground at each point. Repeat drilling the corresponding anchors on the dry side of the tube. Use marine silicone sealant to cover any holes around the anchor points as necessary.

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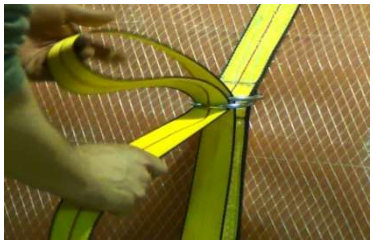
Note: A hydraulic anchor driver is required for installing earth anchors. A power drill is required for installing concrete anchors. Anchor drilling instructions are provided by your anchor supplier. Be careful when installing earth anchors. Call before you dig. Underground utilities can harm or fatally injure your deployment personnel.

Once your anchors are secure, you’re ready to attach the straps. Whenever possible we suggest the strap be threaded directly through the anchor eye bolt or anchor head, which ever type your engineer has identified for your project. If this is not possible, use threaded connectors to attach the strap to the anchor. Use small rubber squares with slits in them to cover the anchoring components and to protect the tube from any damage.

Each strap will have two ends; one with D-rings and one without. Start by attaching the end with D-rings to the anchor point on the water side. Do this for each strap. Then, pass all straps over the tube to the dry side and line up with the corresponding anchor points. It’s important to make sure the red stripe is facing up. At this point, do not attach the straps to the anchors on the dry side.

Apply double-sided carpet tape along the outside of the tubing between each strap. Then, pull the free end of the poly sheet on the dry side over the tube and strap. Pull the poly sheet tight so that it is firmly wrapped around the tube and pressed against the carpet tape. Apply duct tape on top of the structure to the outside of the poly sheet directly above the straps. Using a utility knife, cut slits in the poly sheet where you applied the duct tape, while taking extra precaution not to cut the tube material itself. Pass the free end of the straps through these slits from under the poly sheet, as shown below.

Pull the strap all the way through and weave the free end through the anchor or threaded connector (on dry side). Then loop the free end around and pass it through the two D-rings located in the middle of the strap. Loop it back over one D-ring, under the other, and pull. Refer to the picture below.

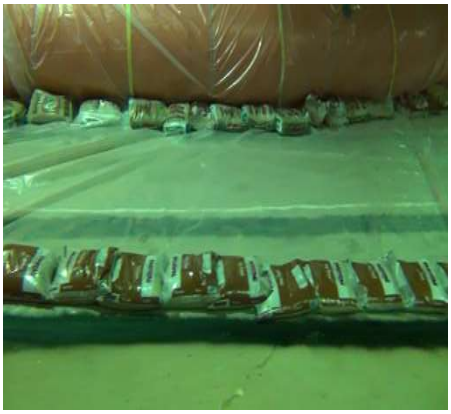


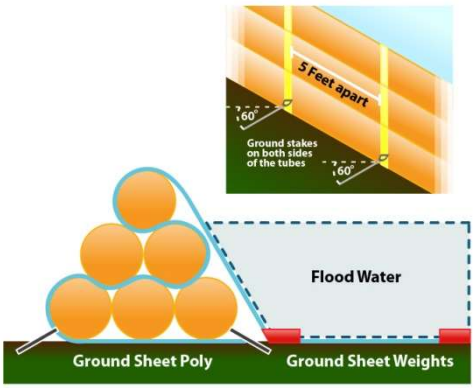
Pull each strap as tight as possible to allow for minimal movement of the structure. Now the Tiger Dam is anchored and stabilized! You may now remove the tube chocks from both sides of the dam.

Completing the Poly Barrier

Pull the poly barrier firmly and wrap around the Tiger Dam as tight as possible. Fold and smooth it over as you follow the structure around corners and bends.

Be sure the poly sheet is pressed close to the tiger dam on the water side of the structure. Secure the poly sheet in this area using sandbags throughout the entire length of the dam. Also place sandbags along the outside edge of poly sheet. Sand bags must be placed end to end with no spacing in between as shown below.





When installing on concrete or asphalt surfaces, seal the outside edge of poly sheet using marine silicone sealant, duct tape, and liquid rubber spray as earlier described in the Poly (vapor) Barrier section.

If the Tiger Dam ends will be connected to a wall or other structure, use expandable foam at the connection for added sealing capability, as shown below.

Remember, it may be necessary to have pumps on the dry side of the structure to mitigate rain fall, seepage or over toping of the tube. Bentonite clay may also be used to absorb seepage and fill gaps and crevices.

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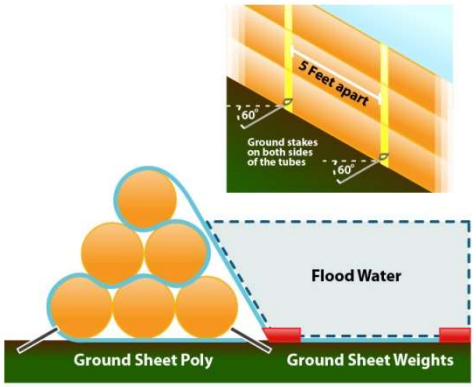
The following sketches provide a general layout of a completed 19” 2-1 Configuration Tiger Dam setup:



Emptying the Tubes & Storage

To empty the tubes, simply twist the fill valve, push it down, then twist again to lock open. The tube will drain automatically if the fill valve is located at the low point. It may be necessary to use a pump to remove the remaining water inside the tube.

After the tube is emptied, it may be rolled up and re-used for the next possible flood event. Store the tube and other Tiger Dam components in a cool, dry location away from any potential damage.

SUGGESTIONS FOR CLEANING PVC COATED FABRIC

Periodic cleaning of surface dirt deposition on the fabric is a necessity to keep the coated fabric aesthetically pleasing and retard fungus growth. Investigation of several commercially available cleaners and found that Formula 409® All-Purpose Cleaner, Mr. Clean, Fantastik®, Spray Nine, and Zep all do a good job of cleaning the dirt and do not harm the vinyl coating.

We recommend using a cleaning solution diluted 1:1 with water.

Apply with sponge, cloth, or spray directly onto vinyl.

Allow to penetrate briefly.

Rinse or wipe off with damp cloth, or use medium pressure spray gun.

NOTE: Please make sure to wipe off all cleaners and residue. Repeat the above procedure as necessary. Be sure to follow all the safety precautions and suggestions on the label of the commercial cleaners. A mild bleach solution diluted 1:100 with water may be used when fungus is present followed by thorough rinsing to ensure the bleach and residue has been removed.

We believe this information is the best currently available on the subject. It is offered as a possible helpful suggestion in experimentation you may care to undertake along these lines. It is subject to revision as additional knowledge and experience are gained. We make no guarantee of results and assume no obligation or liability whatsoever in connection with this information.

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Suggested Repair Kits

Option #1 Patch Repair Kit TEAR-AID Type B

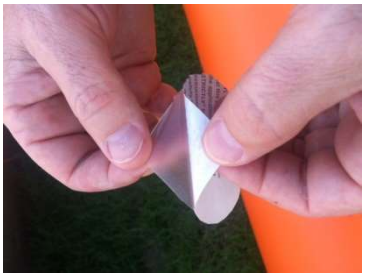
Materials, Tools, PPE and Other






Step 1

From the Repair Kit included with your Tiger Dam System, cut a circular patch from the Tear Aid sheet large enough to extend 1 inch beyond the damaged area. Peel back of patch ½” from the edge. (For smaller pinholes use the small Tear Aid patch and follow the same process

Cycle Time = 35.31 seconds

Step 2

Dry the area to be patched as much as possible with a clean absorbent cloth.

Cycle Time = 3 seconds

Step 3

Immediately apply the Tear Aid patch centering it on the damaged portion of the tube, smoothing out any air or water bubbles from underneath the patch. Once the patch is secure you will see a noticeable reduction in the amount of leakage.

Cycle Time = 19.75 seconds

Step 4

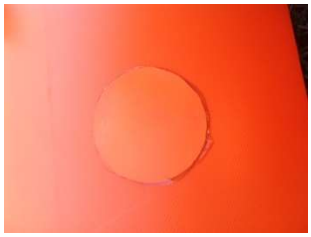
Now take the circular orange fabric cutout repair piece while continuing to wipe away water from the patch area. Apply a liberal amount of Gorilla Glue directly onto the orange patch and apply OVER the Tear Air patch so that the entire damaged spot and area at least 1” beyond is covered. This will act a second layer of repair protection. The excess glue will also help bond the water once it dries. Do not disturb the patch after this point.

Use protective gloves when applying Gorilla Glue or any type of adhesive

Cycle Time = 17.60 seconds

Step 5

Again, you will notice a significant decrease in the amount of leakage; however, curing time might take up to 24 hours.



Additional

Simple duct tape or Gorilla glue may be used as an alternative to impede water extrusion.

In the event that a repair kit is not available, simple duct tape or Gorilla Tape can be used to slow water leakage.

Cycle Time = 10.44 (not included in total)

Option #2 Liquid Patch Repair Kit

1. Wipe around area that appears to be damaged with soap and water depending on status of fabric. Rubbing alcohol is recommended for absolute clean surface ensuring no debris left behind.

2. The fabric surface should be roughened on and around the edges with a light grit sand paper (150-180 grit) or 3M Scotch Brite (green color) general purpose pad. Make sure when roughening surface to not penetrate the white scrim below the surface. Roughening is only used for grasping

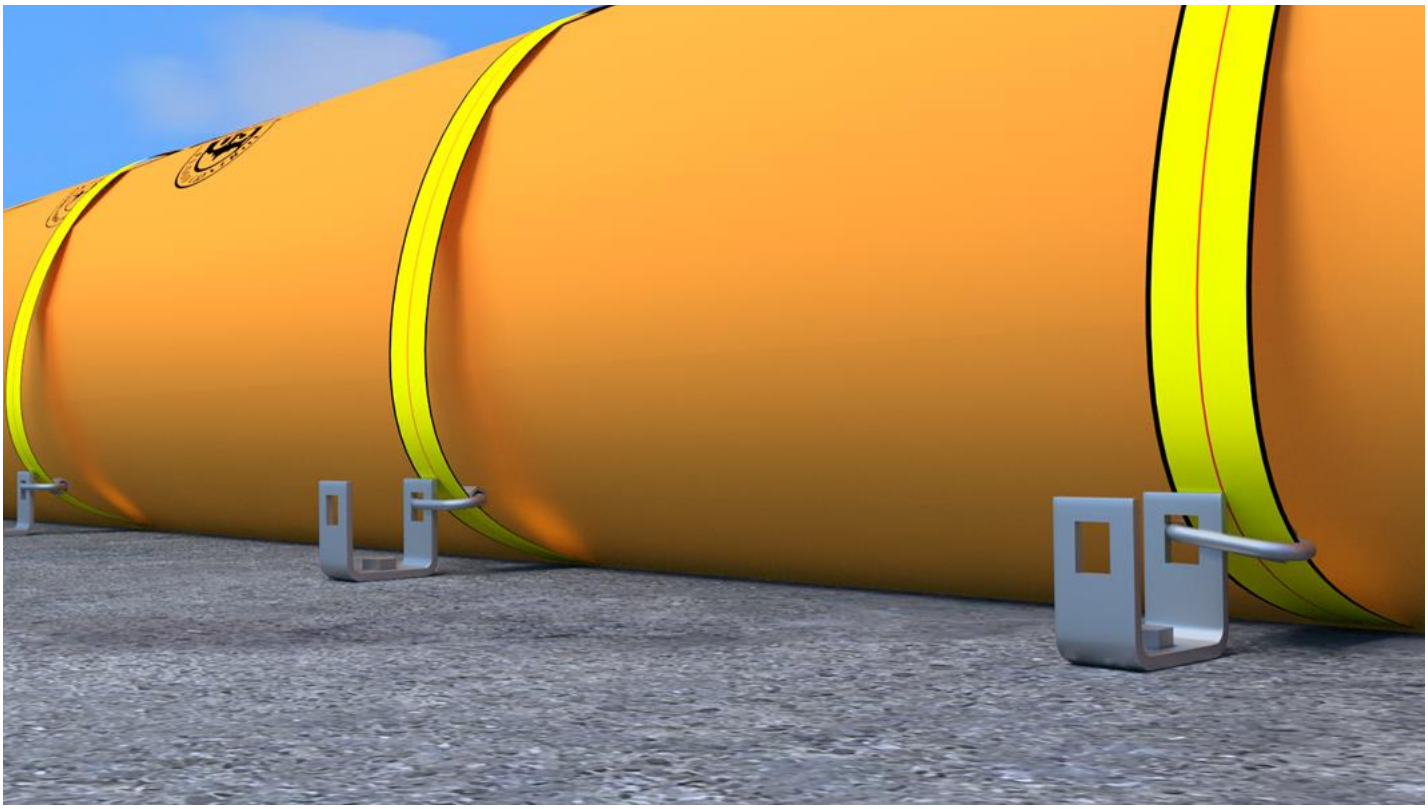
purposes when applying liquid sealant and clear patch.

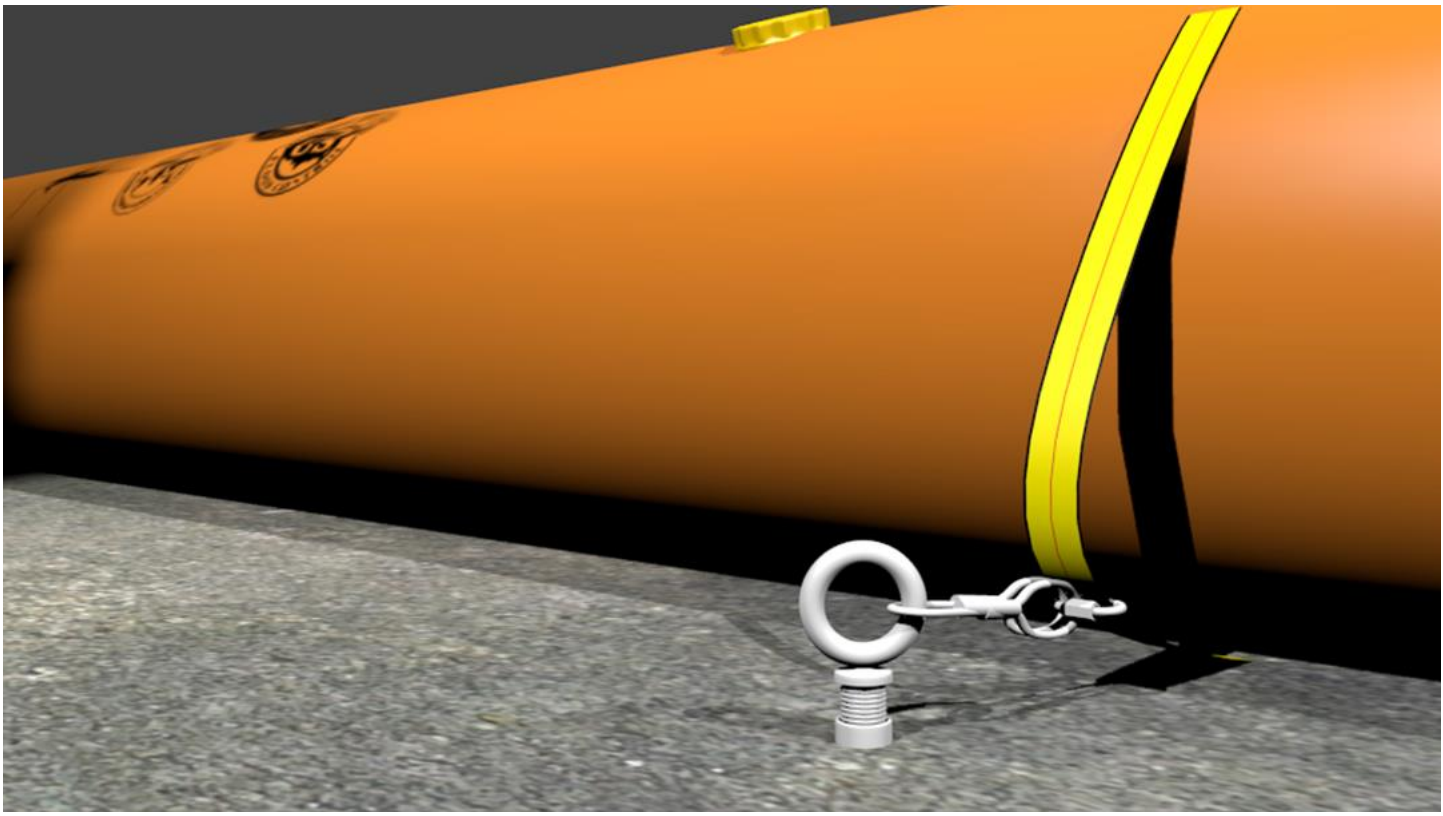
3. Apply liquid seal (Vyna-Bond or Aqua Seal / Patent Products) on top of the damaged area and around repair to hold patch on. Better to use a disposable brush when applying for an even surface and equal amount. Provide a 1/16” to ¼” bead of liquid seal on top of tear.

4. Next step is to apply the clear repair tape over prepped surface. All cutout materials applied to repaired area should be cut out in a circular form. NEVER apply a patch with a right angle edge. When applying the clear circle patch (Rite Aid patch) to place center over the hole and apply patch in the middle. Work your way out by pressing down from the middle of patch to the outer edge of patch. Be sure not to press too hard as all your liquid will run out of the patch.

5. Last step is to apply your color coated patch over the clear by applying more liquid seal or Hot air welded. The two types of patches we use are the vinyl material which the tubes are made from which requires liquid adhesive and also an orange ultra-strong repair tape we use that has adhesive already applied. Depends on your personal preference and job at hand. If welding a vinyl patch is preferred rather than applying a liquid stage patch, please ask your USFC rep. for a ”How to” on hot air welding patches.

Tiger Dam Concrete Anchors – Diagram





SECTION A

Summary of Testing

Two (2) sets of three (3) wet concrete anchors, Model Nos. 210JDH - Swivel Concrete Anchor and 210PDH Patio Concrete Anchor were tested in the forty-five degree (45^0) (+/- 2^0), inward horizontal pull from the concrete edge and also in the ninety degree (90^0) (+/- 2^0) vertical direction, for their load capacities. These two (2) anchor models were placed into a wet concrete footer section that was ten inches (10") thick, at the edge and six inches (6") wide at the bottom with a forty-five degree (45^0) angle tapered upward to reach the six inch (6") width. The concrete mix was approximately 3,000 pounds per square inch.

One (1) set of three (3) concrete anchors, Model No. THDHLS - Concrete Anchor with the use of one (1) 3.5"x5/8" diameter Kofix sleeve anchor was tested in the forty-five degree (45^0) (+/- 2^0), inward horizontal from the concrete edge for their load capacities. This anchor bolt hole was drilled to a depth of 3.5" using a 21/32" diameter drill bit. The anchor bolt, sleeve, washer and nut were placed in the hole and snugged up. Then the washer and nut were removed and the anchor head set. The washer and nut were set and the nut was tightened using a socket and ratchet. This concrete anchor was placed into a hardened concrete floor slab section that was four inches (4") thick., with the mix being approximately 3,000 psi concrete strength.

The three (3) anchor Model Nos. 210JDH, 210PDH, and THDHLS that were manufactured by Minute Man Anchors, Inc., were found to meet the inward minimum specification requirements of 4,725 pounds, without displacement exceeding two inches (2"). Also, the Model Nos. 210JDH and 210PDH were found to meet the upward minimum specification requirement of 4,725 pounds.
The minimum specification requirement is accordance with the following regulations:

* Rules of the State of Florida, Department of Highway Safety and Motor Vehicles, Chapter 15C-1, Section 1.0108 "Anchor and Anchor Component Test Specifications
* Rules of the Alabama Manufactured Housing Commission, Code of Alabama, Chapter 535-X-13.09 "Standards for the Manufacture of Anchor and Tiedown Devices"
* Rules of the State of Missouri Public Service Commission, Department of Economic Development, Chapter 124 - Manufactured Home Tiedown Systems which adopted the standards for the Federal Manufactured Home Construction and Safety Standards (24 CFR, Part 3280).
* Administrative Rules of the Texas Department of Housing & Community Affairs, Division of Manufacturing Housing, Rule 80.62(c)(13) which adopted the standards for: Federal Manufactured Home Construction and Safety Standards (24 CFR, Part 3280) and the 2000 International Residential Code, Appendix E

The field pull testing was witnessed by state representatives from Florida, Alabama, and Missouri. The testing was conducted by Bob Prophet, Scott Prophet, Joe Guy, Sr. and Bob Caudel, P.E., all personnel of Product Testing, Inc., Jacksonville, Florida.

SECTION B

Site Information - Field Pull Testing

The field pull testing was conducted at Product Testing, Inc., located at 111 Spring Street, Jacksonville, Fla. A section of the ground was selected and formed that was approximately seven feet (7') wide by twenty-eight feet (28') in length. The soil was removed from the center of the formed area and then divided into two (2) different sections. One (1) section was to be made into a seven foot (7') by twelve foot (12') foundation footer slab and the other section was made seven foot (7') by sixteen foot (16') as a floor slab section. Prior to testing, a small section remained from some original R&D testing that was conducted previously.

The foundation footer slab section was ten inches (10") thick on the edge and a minimum of six inches (6") across at the bottom. The soil was then tapered at a forty-five degree (45°) upward angle to four inches (4") thick from the surface. This area was for the placement of the wet concrete anchor Model Nos. 210JDH and210PDH, along with two (2) No. 4 rebar that were thirty-six inches (36") in length. The remainder of the sixteen foot (16') length concrete slab was only four inches (4") thick using and consisted of three (3) pounds of Fibermesh Inforce 6891 per yard, in the concrete mix. This section was for testing of the anchor Model No. THDHLS, concrete anchor with 3.5" long Kofix 5/8" diameter sleeve anchor bolt.

Due to the dead weight of the concrete being below the 5,000 and 6,000 pounds upward load force, the anchors were installed with the head and part of the anchor shaft exposed, to help the concrete from being lifted upward during the loading. Soil ground anchors were placed in Soil Classification 3 and 4. No anchors were placed directly under the anchors tested.

SECTION C

Concrete Information, Concrete Strength & Tensile Properties of Rebar

Concrete Information

The concrete was a uniform mix using a super plasticizer with a water reducing agent to make a concrete strength of approximately three thousand (3,000) psi, on the day of testing. At the time of the concrete pour, six (6) test cylinders of the concrete mix were obtained and compressive tests were conducted for the actual strength of the concrete. The concrete cylinders were tested in accordance with ASTM C39/C 39M - 01 Standard Test Method for Compressive Strength fo Cylindrical Concrete Specimens

Concrete Strength (in psi)

Test Cylinder No.	Breaking Load (lbs)	4x8 Cylinder Area (sq in)	Compressive Strength (psi)
1	35,000	12.57	2,780
2	33,750	12.57	2,680
3	38,000	12.57	3,020 *
4	39,000	12.57	3,100 *
5	40,750	12.57	3,240 *
6	41,250	12.57	3,280 *
* Note: Testing started at 3,020 psi and completion was at 3,280 psi			

Tensile Tests of Rebar

Tensile tests were conducted, on the No. 4 rebar that was placed in the concrete, in accordance with ASTM A615/A 615M - 96a Standard Specification for Deformed & Plain Billet Steel Bars for Concrete Reinforcement

Bar Type	Cross Section Area (sq in)	Yield Strength (psi)	Tensile Strength (psi)	Percent Elongation (at 8")	Type of Break Occurred
4	0.20	66,500	105,750	9.4%	Angular
4	0.20	67,130	106,000	8.9%	Angular

SECTION D

Anchor Material & Hardness Information

Description	Model No.	Part Description & Maring	Type of Steel
Wet concrete anchor	210JDH	Head / Stamped MMA42	A36 modified
Wet concrete anchor	210JDH	Rod - 5/8" diameter	A36 modified
Wet concrete anchor	210JDH	Rubber clip	N/A
Wet concrete anchor	210JDH	Plate	A36
Wet concrete anchor	210JDH	Washer	A36
Wet concrete anchor	210PDH	Head / Stamped MMA14	A36 modified
Wet concrete anchor	210PDH	Rod - 5/8" diameter	A36 modified
Hardened concrete anchor	THDHLS	Head / Stamped MMA18	A36 modified
Hardened concrete anchor	Anchor bolt	Bolt	Grade 55
Hardened concrete anchor	Anchor bolt	Nut	A194
Hardened concrete anchor	Anchor bolt	Washer	A36
Hardened concrete anchor	Anchor bolt	Shield	A36

Hardness Test - Rockwell 'B' Scale

Material Description	Model No.	Hardness Value
210JDH Anchor Head	MMA42	78.8 HRB
210PDH Anchor Head	MMA14	82.5 HRB
THDHLS Anchor Head	MMA18	87.5 HRB
210 JDH Rod	5/8" diameter	78.8 HRB
210PDH Rod	5/8" diameter	82.8 HRB
Bolt ½" diameter	Kofix	89.5 HRB
Steel Plate	210JDH	88.8 HRB
Nut	Kofix	96.3 HRB
Washer	Kofix	65.0 HRB
Shield	Kofix	58.0 HRB
Type "D" Durometer Hardness		
Rubber Washer	210JDH	16.5 D

SECTION E

Actual Measurements on Anchors & Components

Anchor Description		Model No.	Head Marking	Head Length (inches)	Head Width (o.d. inches)	Head Thickness (inches)
Wet Concrete Anchor		210JDH	MMA42	2.78	2.21	0.187
Wet Concrete Anchor		210PDH	MMA14	2.76	2.20	0.189
Hardened Concrete Anchor		THDHLS	MMA18	2.77	2.23	0.197
Model No. & Washer/Rod Connection	**Rod Diameter (inches)**	**Rod Depth Under Head (inches)**	**Rod Bend at Hook (degrees)**	**Washer Diameter (o.d. inches)**	**Plate Length (inches)**	**Plate Width (inches)**
210JDH (Welded thru washer hold and around bottom)	0.6265	9.06	177.5	1.27	3.04	1.37
	Plate Hole Diameter (inches)	**Plate Thickness (inches)**	**Rubber Clip Diameter (o.d. inches)**	**Rubber Clip Thickness (inches)**	**Type of Coating**	
	0.82	0.112	1.05	0.203	Red ~~Black~~ painted	
Model No. & Head/Rod Connection	**Rod Diameter (inches)**	**Rod Depth Under Head (inches)**	**Rod Bend at Hook (degrees)**	**Length of Hook Bend (inches)**	**Type of Coating**	
210PDH (Welded 360° under head)	0.625	8.71	86.5	2.59	Red painted	
Model No.	**Bolt Hole Diameter (inches)**	**Type of Coating**				
THDHLS	0.660	Red ~~Black~~ painted				
Description	**Bolt Shank Diameter (inches)**	**Bolt Length (inches)**	**Thread Length (inches)**	**Thread Diameter (inches)**	**Nut Height (inches)**	**Nut Diameter at Flats (inches)**
Kofix 5/8" Diameter Concrete Anchor	0.449	3.495	1.87	0.493	0.427	0.743
	Washer Diameter (o.d. inches)	**Washer Hole Diameter (inches)**	**Washer Thickness (inches)**	**Shield Diameter (inches)**	**Shield Thickness (inches)**	**Shield Length (inches)**
	1.264	0.511	0.082	0.619	0.047	2.584

SECTION F

Installation Information of Anchors Tested

Anchor Model No.	Installation Method	Date Installed	Date Pulled
210JDH	Placed in wet concrete	03-17-03	03-19-03 & 03-20-03
210PDH	Placed in wet concrete	03-17-03	03-19-03 & 03-20-03
THDHLS	Drilled hold into hardened concrete slab	03-19-03	03-19-03

Listing of Test Equipment Used

Item	Description of Equipment	Date of Calibration
A	Trailer mounted hydraulic system to applied force	N/A
B	10,000 lb Dillon Dynamometer S/N APD890701	01-27-03 / Checked 3-19-03 & 3-20-03
C	Pro-Smart Level (+/- 0.1 degree)	3-17-03
D	Johnson Magnetic Angle Locator (0.5 degrees)	Checked 3-17-03
E	Newport Digital Readout (to 0.001")	3-14-03
F	Uni-Measure Measurement Gauge (0.001" to 10.000")	01-23-03
G	Starrett Ball Micrometer (0.001" to 0.750")	01-23-03
H	Fowler Micrometer (0.0001" to 1.000")	01-23-03
I	Mitutoyo Caliper (0.0005" to 6.0005")	01-23-03
J	Tempered Ridge Ruler (0.00" to 24.00")	01-23-03
K	Model 307L Type D Durometer Hardness Tester, S/N 12082	01-23-03 Checked 4-8-03
L	Tinius Olsen Testing Machine, S/N 95800 (200K lbs)	02-17-03
M	Forney Concrete Testing Machine, S/N 87064 (400K lbs)	02-17-03
N	Wilson Rockwell Hardness Tester, S/N 4MM695	02-04-03

SECTION F - Continued

Copy of Current Calibration for Dillon Dynamometer

Product Testing, Inc.
P.O. Box 37634
Jacksonville, FL 32236-7634

Calibration of 10,000 lb Dillon Dynamometer
S/N APD890701

Date Performed:	January 27, 2003
Next Calibration Due:	**January 27, 2004**
Calibration Equipment:	Tinius Olsen Testing Machine, S/N 95800 Calibrated February 17, 2003
Capacity & Division:	10,000 lb Capacity; 50 lb Division
Calibration Standard:	Load Cell with Traceability to N.I.S.T.

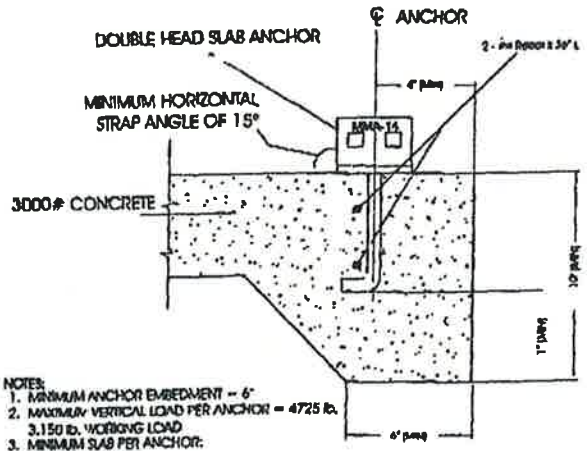
Dillon 10,000 lb Dynamometer S/N APD890701 (Readings in lbs)	Readings As Found Tinius Olsen Testing Machine S/N 95800 (Readings in lbs)	Readings As Adjusted Tinius Olsen Testing Machine S/N 95800 (Readings in lbs)
0	0	0
2,000	1,950	1,990
4,000	3,950	3,995
6,000	5,950	6,000
8,000	7,900	8,025
10,000	9,900	10,050

The 10,000 lb Dillon Dynamometer, S/N APD890701 was calibrated and found to be -1.0% of full range. The unit was adjusted and re-calibrated and then found to be +/- 0.5%, of full range. The calibration was performed in accordance with ANSI/NCSL Z540-1, at a room temperature of 76° Fahrenheit, with a relative humidity of 58%, by Scott Prophet. If you should have any questions concerning this report, please don't hesitate to give us a call at (904) 384-8150.

CONCRETE ANCHOR INSTALLATION INSTRUCTIONS

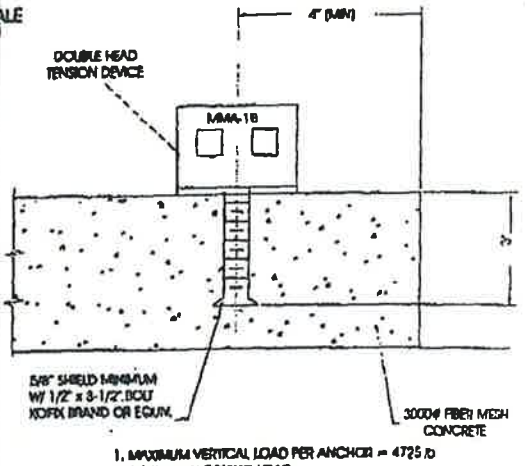
210 PDH CONCRETE ANCHOR

NOT TO SCALE



NOTES:
1. MINIMUM ANCHOR EMBEDMENT = 6"
2. MAXIMUM VERTICAL LOAD PER ANCHOR = 4725 lb. 3,150 lb. WORKING LOAD
3. MINIMUM SLAB PER ANCHOR:
   4" SLAB = 96 S.F.
   6" SLAB = 65 S.F.
   8" SLAB = 48 S.F.
4. MARK: MMA-14

THDHLS CONCRETE ANCHOR



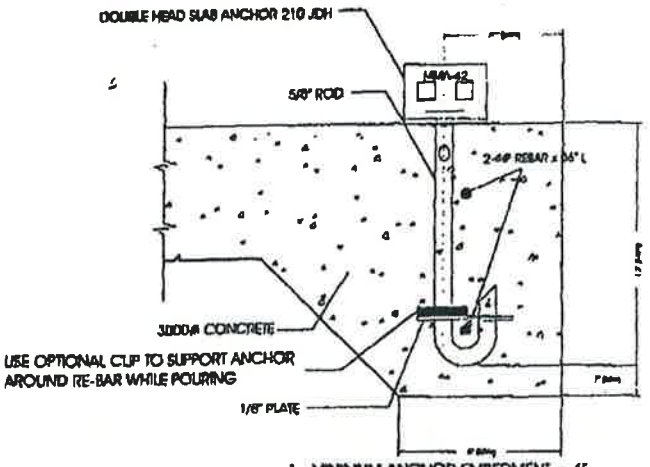
1. MAXIMUM VERTICAL LOAD PER ANCHOR = 4725 lb 3,150 lbs. WORKING LOAD.
2. MINIMUM SLAB AREA PER BOLT
   4" SLAB = 96 S.F.
   6" SLAB = 65 S.F.
   8" SLAB = 48 S.F.
3. MARK: MMA 18

INSTALLATION NOTE

1. DRILL 21/32" DIAM. HOLE 4" FROM EDGE OF SLAB AND INSERT SHIELD
2. PLACE TENSION HEAD ON SLAB AND INSTALL 1/2" DIAM. SHIELD BOLT

NORTH CAROLINA PROFESSIONAL A677 ENGINEER RODERICK M. HUDGINS, JR.

210 JDH CONCRETE ANCHOR



1. MINIMUM ANCHOR EMBEDMENT = 6"
2. MAXIMUM VERTICAL LOAD = 4725 lb. 3150 lbs. WORKING LOAD.
3. MINIMUM SLAB PER ANCHOR:
   4" SLAB = 96 S.F.
   6" SLAB = 65 S.F.
   8" SLAB = 48 S.F.
4. MARK: MMA 42

NOTE:

Your set must be designed by a Registered Professional Engineer if the location is within 1500 feet of the coastline.

The allowable working load on concrete anchor models 210 PDH, THDHLS, and 210 JDH is 3,150 pounds vertical for single or double ties in 3,000 PSI concrete. There must be a minimum 4" of distance from the edge of the concrete to the center of the anchor shaft.

38" Super Tiger Dam & 19" Concrete Tiger Dam Testing Report

We recommend using the helical anchors provided with the Tiger Dam system.

The analysis completed only used one tube / ground surface interface friction angle of, what was calculated to be 16.7 degrees for friction coefficient = 0.3 (coefficient of friction = tan (friction angle in degrees)). A range of friction angles should be considered for analysis, ranging from 10 to 20 degrees for varying surfaces that the dyke is placed on, i.e. wet grass or clay to being placed on dry asphalt or concrete pavement.

See attached computations.

Also, the analysis of the rebar anchors in the soil should range for assumed soil conditions from a wet, loose silt material to firm clay, showing how the assumption of soil type will impact the capacity of the anchor and therefore the required anchor spacing.

See response above regarding helical anchors. The capacity of the anchors should be field tested to determine whether the anchors provided for each section of Tiger Dam are adequate.

Base uplift pressure, from the hydrostatic head of water being retained by the dyke, is conservatively assumed to affect 50% of the base area; the calculations should be revisited with this force included in the analysis.

See attached computations.

More detailed calculations regarding the Factors of Safety for Overturning and Sliding, including consideration and inclusion of the abovementioned points, need to be provided; an actual FS must be calculated based on the set of design variables assumed:

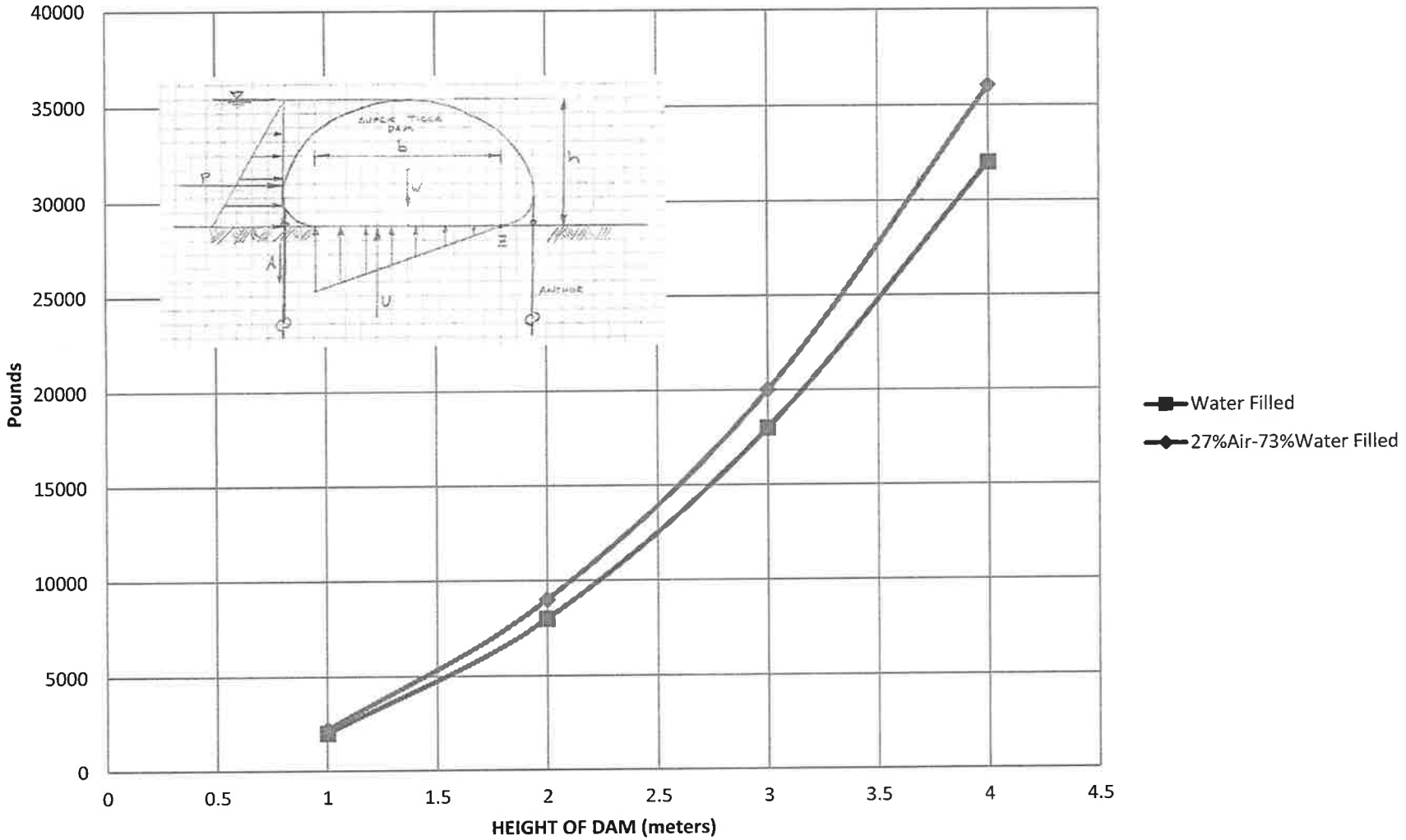
a. Height of water retained
b. Anchor spacing
c. Soil properties around anchor
d. Tube / ground surface interface friction angles
e. Wave and impact forces (if any are being taken into account)
f. Any other applicable assumptions

See attached computations. The computations show the anchors provided with the system have excess capacity that may be used to address wave, impact, and ice forces.

REQUIRED ANCHOR STRENGTH FOR SUPER TIGER DAMS

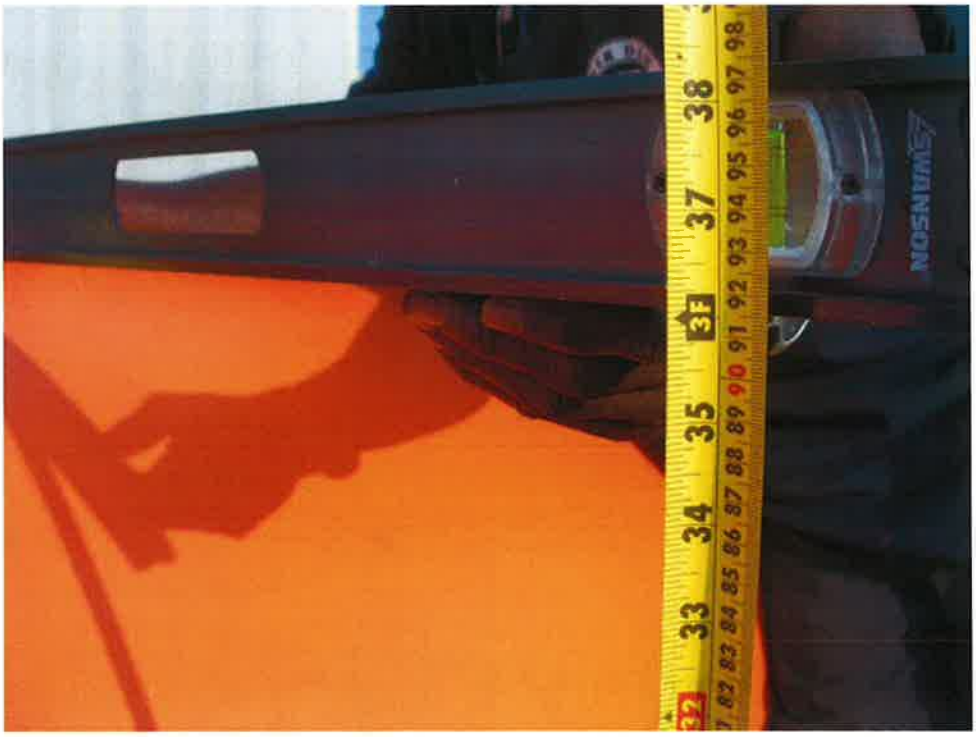
FOR FACTOR OF SAFEFY OF 1.5 AND 5-FOOT ANCHOR SPACING.

HIGHER FACTOR OF SAFETY IS NEEDED FOR CRITICAL STRUCTURES. SITE SPECIFIC INFORMATION IS ESSENTIAL FOR DESIGN. TIGER DAM MATERIAL, ANCHOR STRAPS, AND CONNECTIONS ARE ASSUMED CAPABLE OF WITHSTANDING REQUIRED LOADS.



PHOTOS SHOWING EFFECTIVE HEIGHT OF SUPER TIGER DAM
(note black level in foreground)

EFFECTIVE HEIGHT = 36-inches



Summary:

The following set of computations is in regards to a single 38-inch diameter water-filled Super Tiger Dam system. Specific assumptions used herein are as follows:

Length of system: 100 feet (30.48 m)
Height of system in place: 36 inches (914 mm)
Height of water retained: 24 inches (610 mm)
Amount of freeeboard: 12 inches (305 mm)
Width of base in contact with ground: 12 inches (305 mm)
Percentage of base used for uplift force: 100%

Number of anchors: 18
Anchor spacing: 5.6 feet (1.7 m)

Factor of Safety against sliding > 1.5 when considering sliding on pavement, sand, clay, or grass surfaces. Anchor pullout force: 10,000 pounds (44.48 kN); pullout testing should be completed to verify the proposed anchor capacity.

Formula Abbreviations Used in this Document:

$psf := \frac{lb}{ft^2}$ $kip := 1000 \times lb$ $psi := \frac{lb}{in^2}$ $pcf := \frac{lb}{ft^3}$ $pcf := 16.018 \frac{kg}{m^3}$ $N := \frac{kg}{9.8067}$ $kN := 1000N$

References:

1. Bowles, J.F (1996). *Foundation analysis and design (5th edition)*. New York, NY: The McGraw-Hill Companies, Inc.
2. U.S. Army Corps of Engineers (29 Spetember 1989). *Retaining and flood walls*. EM-1110-2-2502, Washington, D.C.: Department of the Army.
3. Day, R.W. (2000). *Geotechnical engineer's portable handbook*.New York, NY: The McGraw-Hill Companies, Inc.
4. Bureau of Reclamation (1987). *Design of small dams (3rd edition)*. Washington, D.C.: U.S. Department of the Interior.

Factors of Safety:

$FS_{reqdSliding} := 1.50$

Factor of safety against sliding. Value must be at least 1.50 per Refs 1, 2, and 3 (design flood) for permanent structures. Value must be at least 1.33 per Ref 2 (for water at top of wall) and at least 1.0 (for extreme loading) according to Ref 4.

Fill materials:

$\gamma_w := 62.4pcf$ $\gamma_w = 9.8 \frac{kN}{m^3}$

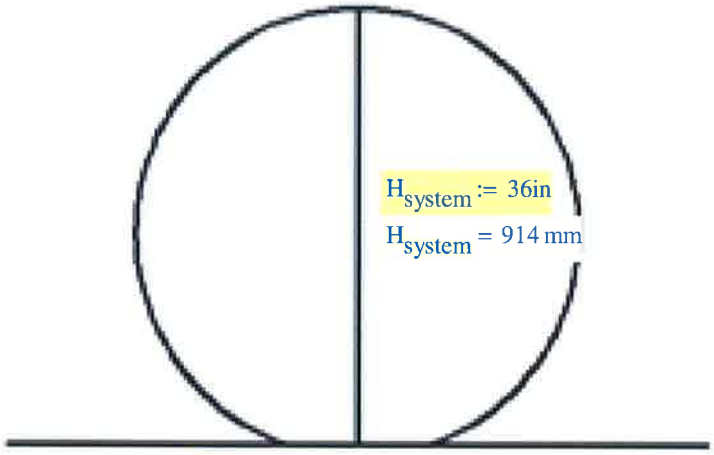
Infill water unit weight used in these analyses.

Anchor capacity:

$F_{anchor} := 10000lb$ $F_{anchor} = 44.48\,kN$

This is the assumed anchor capacity used herein. This value should be evaluated in the field.

38-inch diameter, water-filled tube:



Dimensions of Tube and Freeboard:

$H_{initial} := 38in$ $H_{initial} = 965\,mm$

The tubes are initially 38-inches in diameter. It is assumed that they will flatten to a width of approximately 12-inches at the base, thus an effective height of H_{system} is being used herein.

$H_{freeboard} := 12in$ $H_{freeboard} = 305\,mm$

$H_{water} := H_{system} - H_{freeboard}$

$H_{water} = 24\,in$ $H_{water} = 610\,mm$

$H_{water} = 2.0\,ft$

Area and Weight of Tube:

$A_{tube} := \frac{\pi}{4} \times H_{initial}^2$ $A_{tube} = 7.88\,ft^2$ $A_{tube} = 0.73\,m^2$ Area of tube.

$W_{tube} := A_{tube} \times \gamma_w$ $W_{tube} = 491.4\,\frac{lb}{ft}$ $W_{tube} = 731.3\,\frac{kg}{m}$ Weight of tube per foot of length.

Forces against Tube:

$F_{horiz} := \frac{1}{2} \times \gamma_w \times H_{water}^2$ $F_{horiz} = 124.8\,\frac{lb}{ft}$ $F_{horiz} = 185.7\,\frac{kg}{m}$ Horizontal forces acting against water side of tube.

$\%B_{uplift} := 100\%$ $L_{uplift} := (0.5 \times W_{base}) + (0.5 \times H_{initial})$ $L_{uplift} = 25.0\,in$ Length and percentage of base being considered for uplift force.

$W_{baseuplift} := \%B_{uplift} \times L_{uplift}$ $W_{baseuplift} = 25\,in$ $W_{baseuplift} = 635\,mm$

$F_{uplift} := \frac{1}{2} \times \gamma_w \times H_{water} \times W_{baseuplift}$ $F_{uplift} = 130.0\,\frac{lb}{ft}$ $F_{uplift} = 193.5\,\frac{kg}{m}$ Uplift force acting against base of tube, assuming a triangular pressure distribution.

Stability Calculations:

$L_{system} := 100ft$ $L_{system} = 30.48\,m$ Length of system.

$W_{normal} := W_{tube} - F_{uplift}$ $W_{normal} = 361.4\,\frac{lb}{ft}$ $W_{normal} = 537.9\,\frac{kg}{m}$ Effective normal weight of tube considering uplift.

$W_{normal} := W_{normal} \times L_{system}$ $W_{normal} = 36144\,lb$ $W_{normal} = 160.78\,kN$ Resisting force.

$F_{horiz} := F_{horiz} \times L_{system}$ $F_{horiz} = 12480\,lb$ $F_{horiz} = 55.51\,kN$ Driving force.

The coefficient of friction (COF) will vary for differing materials and soil types. The COF may vary as follows and includes a factor of safety of 1.5:

$COF_{pavement} := 0.30$ Using a phi equal to 25 degrees.

$COF_{sand} := 0.26$ Using a phi equal to 22 degrees.

$COF_{clay} := 0.18$ Using a phi equal to 15 degrees.

$COF_{grass} := 0.12$ Using a phi equal to 10 degrees.

Factor of safety values without anchors:

$$FS_{slidingpavement} := \frac{W_{normal} \times COF_{pavement}}{F_{horiz}}$$ $FS_{slidingpavement} = 0.87$ Factor of safety against sliding on pavement.

$$FS_{slidingsand} := \frac{W_{normal} \times COF_{sand}}{F_{horiz}}$$ $FS_{slidingsand} = 0.75$ Factor of safety against sliding on sand.

$$FS_{slidingclay} := \frac{W_{normal} \times COF_{clay}}{F_{horiz}}$$ $FS_{slidingclay} = 0.52$ Factor of safety against sliding on clay.

$$FS_{slidinggrass} := \frac{W_{normal} \times COF_{grass}}{F_{horiz}}$$ $FS_{slidinggrass} = 0.35$ Factor of safety against sliding on grass.

Factor of safety values with anchors:

$N_{actual} := 18$ This is the number of anchors being supplied with this system.

$$Spacing := \frac{L_{system}}{N_{actual}}$$ $Spacing = 5.6\,ft$ $Spacing = 1.69\,m$ Spacing of anchors.

$$FS_{slidingpavement} := \frac{(W_{normal} \times COF_{pavement}) + (N_{actual} \times F_{anchor})}{F_{horiz}}$$ $FS_{slidingpavement} = 15.29$ Factor of safety against sliding on pavement.

$$FS_{slidingsand} := \frac{(W_{normal} \times COF_{sand}) + (N_{actual} \times F_{anchor})}{F_{horiz}}$$ $FS_{slidingsand} = 15.18$ Factor of safety against sliding on sand.

$$FS_{slidingclay} := \frac{(W_{normal} \times COF_{clay}) + (N_{actual} \times F_{anchor})}{F_{horiz}}$$ $FS_{slidingclay} = 14.94$ Factor of safety against sliding on clay.

$$FS_{slidinggrass} := \frac{(W_{normal} \times COF_{grass}) + (N_{actual} \times F_{anchor})}{F_{horiz}}$$ $FS_{slidinggrass} = 14.77$ Factor of safety against sliding on grass.

Summary:

The following set of computations is in regards to a system composed of 12 19-inch diameter concrete-filled Tiger Dam tubes. Specific assumptions used herein are as follows:

Length of system: 50 feet (15.24 m)
Height of system in place: 68.5 inches (1,740 mm)
Height of water retained: 56.5 inches (1,435 mm)
Amount of freeeboard: 12 inches (305 mm)
Width of base in contact with ground: 95 inches (2,413 mm)
Percentage of base used for uplift force: 100%

Number of anchors: 18
Anchor spacing: 2.8 feet (0.85 m)

Factor of Safety against sliding > 1.5 when considering sliding on pavement, sand, clay, or grass surfaces. Anchor pullout force: 10,000 pounds (44.48 kN), pullout testing should be completed to verify the proposed anchor capacity.

Formula Abbreviations Used in this Document:

$psf := \frac{lb}{ft^2}$ $kip := 1000 \times lb$ $psi := \frac{lb}{in^2}$ $pcf := \frac{lb}{ft^3}$ $pcf := 16.018 \frac{kg}{m^3}$ $N := \frac{kg}{9.8067}$ $kN := 1000N$

References:

1. Bowles, J.F (1996). *Foundation analysis and design (5th edition).* New York, NY: The McGraw-Hill Companies, Inc.
2. U.S. Army Corps of Engineers (29 Spetember 1989). *Retaining and flood walls.* EM-1110-2-2502, Washington, D.C.: Department of the Army.
3. Day, R.W. (2000). *Geotechnical engineer's portable handbook.*New York, NY: The McGraw-Hill Companies, Inc.
4. Bureau of Reclamation (1987). *Design of small dams (3rd edition).* Washington, D.C.: U.S. Department of the Interior.

Factors of Safety:

$FS_{reqdSliding} := 1.50$

Factor of safety against sliding. Value must be at least 1.50 per Refs 1, 2, and 3 (design flood) for permanent structures. Value must be at least 1.33 per Ref 2 (for water at top of wall) and at least 1.0 (for extreme loading) according to Ref 4.

Fill materials:

$\gamma_w := 62.4pcf$ $\gamma_w = 9.8 \frac{kN}{m^3}$ $\gamma_{concrete} := 145pcf$ $\gamma_{concrete} = 22.8 \frac{kN}{m^3}$

Infill unit weight used in these analyses: water and concrete.

Anchor capacity:

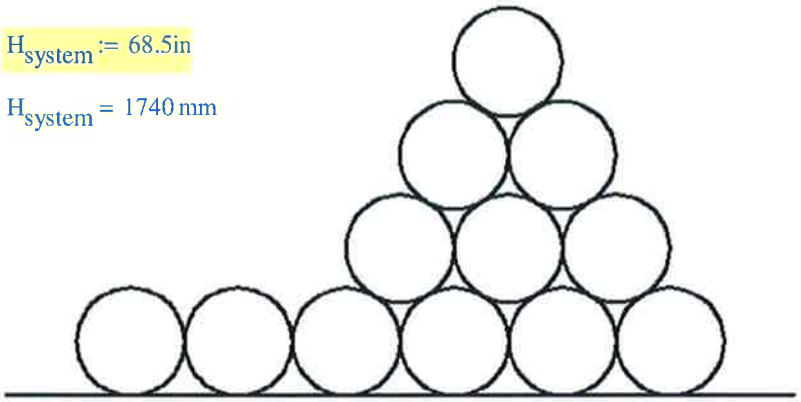
$F_{anchor} := 10000lb$ $F_{anchor} = 44.48\,kN$

This is the assumed anchor capacity used herein. This value should be evaluated in the field.

19-inch diameter, concrete-filled tubes:

$H_{system} := 68.5in$

$H_{system} = 1740\,mm$



$W_{base} := 95in$ $W_{base} = 2413\,mm$

$N_{tubes} := 12$ Number of tubes used.

Dimensions of Tube and Freeboard:

$H_{initial} := 19in$ $H_{initial} = 483\,mm$

The tubes are initially 19-inches in diameter. It is assumed that they will reposition themselves to have an overall system height of about 52 inches.

$H_{freeboard} := 12in$ $H_{freeboard} = 305\,mm$

$H_{water} := H_{system} - H_{freeboard}$

$H_{water} = 56.5\,in$ $H_{water} = 1435\,mm$

$H_{water} = 4.7\,ft$

Area and Weight of Tube:

$A_{tube} := \frac{\pi}{4} \times H_{initial}^{2} \times N_{tubes}$ $A_{tube} = 23.63\,ft^2$ $A_{tube} = 2.20\,m^2$ Area of tube.

$W_{tube} := A_{tube} \times \gamma_{concrete} \times N_{tubes}$ $W_{tube} = 41110.5\,\frac{lb}{ft}$ $W_{tube} = 61179.1\,\frac{kg}{m}$ Weight of tube per foot of length.

Forces against Tube:

$F_{horiz} := \frac{1}{2} \times \gamma_w \times H_{water}^{2}$ $F_{horiz} = 691.63\,\frac{lb}{ft}$ $F_{horiz} = 1029.3\,\frac{kg}{m}$ Horizontal forces acting against water side of tube.

$\%B_{uplift} := 100\%$ $L_{uplift} := W_{base} + (0.5 \times H_{initial})$ $L_{uplift} = 104.5\,in$ Length and percentage of base being considered for uplift force.

$W_{baseuplift} := \%B_{uplift} \times L_{uplift}$ $W_{baseuplift} = 104.5\,in$ $W_{baseuplift} = 2654\,mm$

$F_{uplift} := \frac{1}{2} \times \gamma_w \times H_{water} \times W_{baseuplift}$ $F_{uplift} = 1279.22\,\frac{lb}{ft}$ $F_{uplift} = 1903.7\,\frac{kg}{m}$ Uplift force acting against base of tube, assuming a triangular pressure distribution.

Stability Calculations:

$L_{system} := 50ft$ $L_{system} = 15.24\,m$ Length of system.

$W_{normal} := W_{tube} - F_{uplift}$ $W_{normal} = 39831.3\,\frac{lb}{ft}$ $W_{normal} = 59275.4\,\frac{kg}{m}$ Effective normal weight of tube considering uplift.

$W_{normal} := W_{normal} \times L_{system}$ $W_{normal} = 1991563\,lb$ $W_{normal} = 8858.96\,kN$ Resisting force.

$F_{horiz} := F_{horiz} \times L_{system}$ $F_{horiz} = 34582\,lb$ $F_{horiz} = 153.83\,kN$ Driving force.

The coefficient of friction (COF) will vary for differing materials and soil types. The COF may vary as follows and includes a factor of safety of 1.5:

$COF_{pavement} := 0.30$ Using a phi equal to 25 degrees.

$COF_{sand} := 0.26$ Using a phi equal to 22 degrees.

$COF_{clay} := 0.18$ Using a phi equal to 15 degrees.

$COF_{grass} := 0.12$ Using a phi equal to 10 degrees.

Factor of safety values without anchors:

$FS_{slidingpavement} := \frac{W_{normal} \times COF_{pavement}}{F_{horiz}}$ $FS_{slidingpavement} = 17.28$ Factor of safety against sliding on pavement.

$FS_{slidingsand} := \frac{W_{normal} \times COF_{sand}}{F_{horiz}}$ $FS_{slidingsand} = 14.97$ Factor of safety against sliding on sand.

$FS_{slidingclay} := \frac{W_{normal} \times COF_{clay}}{F_{horiz}}$ $FS_{slidingclay} = 10.37$ Factor of safety against sliding on clay.

$FS_{slidinggrass} := \frac{W_{normal} \times COF_{grass}}{F_{horiz}}$ $FS_{slidinggrass} = 6.91$ Factor of safety against sliding on grass.

Factor of safety values with anchors:

$N_{actual} := 18$ This is the number of anchors being supplied with this system.

$Spacing := \frac{L_{system}}{N_{actual}}$ $Spacing = 2.8\,ft$ $Spacing = 0.85\,m$ Spacing of anchors.

$FS_{slidingpavement} := \frac{(W_{normal} \times COF_{pavement}) + (N_{actual} \times F_{anchor})}{F_{horiz}}$ $FS_{slidingpavement} = 22.48$ Factor of safety against sliding on pavement.

$FS_{slidingsand} := \frac{(W_{normal} \times COF_{sand}) + (N_{actual} \times F_{anchor})}{F_{horiz}}$ $FS_{slidingsand} = 20.18$ Factor of safety against sliding on sand.

$FS_{slidingclay} := \frac{(W_{normal} \times COF_{clay}) + (N_{actual} \times F_{anchor})}{F_{horiz}}$ $FS_{slidingclay} = 15.57$ Factor of safety against sliding on clay.

$FS_{slidinggrass} := \frac{(W_{normal} \times COF_{grass}) + (N_{actual} \times F_{anchor})}{F_{horiz}}$ $FS_{slidinggrass} = 12.12$ Factor of safety against sliding on grass.

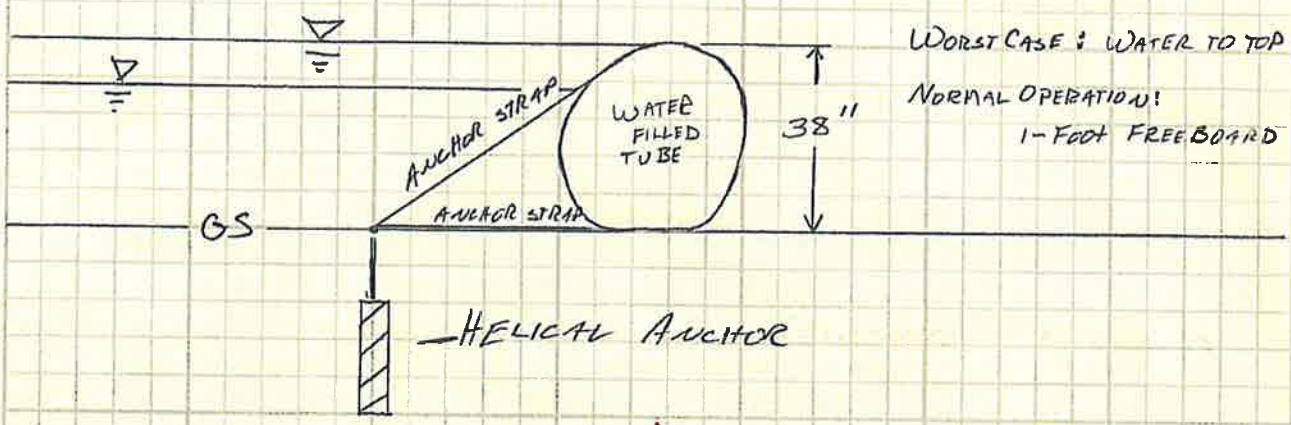
Anchor Testing Report for use with 100' Super Tiger Dam

The computations attached are for the 100' long Super Tiger Dam. The tables show that for the condition where the water is at the top of the dam, the number of anchors required ranges from three to eleven depending on local soil conditions. For the case of 300 mm of freeboard, the number of anchors required ranges from one to three depending on local soil conditions. Both scenarios provide a factor of safety of 1.5. Super Tiger Dams come with 18 anchors for a standard 100' long dam providing a5-foot spacing between anchors. This far exceeds the minimum required.

Further anchor testing may be required on site as Tiger Dams are a product of their environment, so different anchors may be required for each case.

By JMW Date 7/05/11 Client US FLOOD CONTROL Sheet 1 of 2

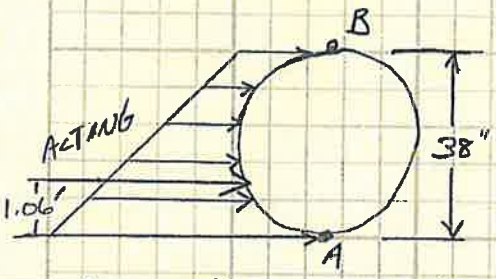
Chkd. By _____ Description ANCHOR CALCULATIONS Job No. 2493-02



WORST CASE: WATER TO TOP

NORMAL OPERATION: 1-FOOT FREEBOARD

DRIVING FORCES



STATIC WATER FORCE PER 100 FT OF LENGTH

$\frac{1}{2} h^2 \gamma = \frac{1}{2} (3.167 \text{ ft})^2 (62.4 \text{ lb/ft}^3)(100)$

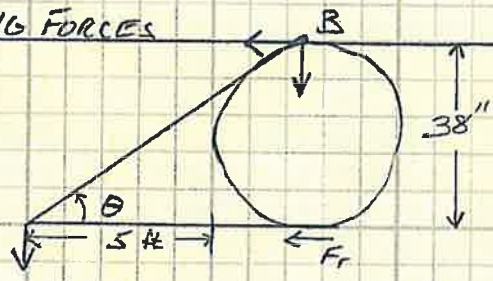
$\Rightarrow$ 31,293 lb PER 100 FT $\rightarrow$

ACTING POINT: $h/3 = \frac{3.167}{3} = 1.06$ ft FROM BOTTOM

OVERTURNING MOMENT AT A

$M_A = 31,293 \text{ lbs} (1.06 \text{ ft}) =$ 33,171 lb-ft PER 100 FT $\circlearrowright$

RESISTING FORCES



$\theta = \tan^{-1}\left(\frac{3.167}{6.5835}\right)$

$\theta = 25.7°$

FRICTIONAL RESISTANCE: Weight (Friction coefficient) $= \left[\pi r^2 (\gamma_w)\right](0.3) = 147.43 \text{ lb/ft}_{\text{LENGTH}}$

FRICTIONAL RESISTANCE PER 100 FT OF LENGTH: 14,743 lbs $\leftarrow$ PER 100 FT

Wenck

Wenck Associates, Inc.
(763) 479-4200
Fax (763) 479-4242

1800 Pioneer Creek Center
P.O. Box 249
Maple Plain, MN 55359-0249

By _____ Date _____ Client _____ Sheet _____ of _____

Chkd. By _____ Description _____ Job No. _____

ANCHOR RESISTANCE NEEDED PER 100 FT

HORIZONTAL = ACTING FORCE − FRICTIONAL RESISTANCE

⇒ 31,293 lbs − 14,743 lbs = 16,550 lbs WATER AT TOP

⇒ 14,651 lbs − 14,743 lbs = 0 lbs 1 FT FREEBOARD

ASSUME MINIMUM FACTOR OF SAFETY = 1.5

WATER AT TOP: 16550 lbs (1.5) = 24,825 lbs NEEDED

1 FT FREEBOARD: 14,743 (1.5) − 14743 = 7,372 lbs NEEDED

Wenck

Wenck Associates, Inc.
(763) 479-4200
Fax (763) 479-4242

1800 Pioneer Creek Center
P.O. Box 249
Maple Plain, MN 55359-0249

TIGER DAM™ SYSTEM
5-YEAR LIMITED MANUFACTURER'S WARRANTY

Warranty Statement:
U.S. Flood Control Corp. ("**USFC**"), as manufacturer of the Tiger Dam™ products and equipment ("**Product**"), hereby warrants for a period of sixty (60) months ("**Warranty Period**") from the date a Product is received by the Purchaser from U.S. Flood Control Corp. ("**USFC**"), that the Product or any component or part of the Product shall be free of defects in materials and workmanship arising from normal intended use, subject to the limitations below.

Warranty Obligations and Limitations:
USFC will, at its option and cost, repair or replace the Product, parts or components thereof manufactured by USFC, that in USFC's sole opinion is an original manufacturing defect, during the Warranty Period. Under no circumstances shall USFC be responsible or liable to reimburse to the Purchaser any Product purchase price or related costs or expenses, whatsoever. The Purchaser shall be responsible for all costs and expenses to transport the Product to and from USFC's manufacturing plant at the address specified below. This Warranty is contingent upon proper use and maintenance of the Product, in accordance with USFC's express use and maintenance instructions provided with the Product, and does not apply to damage caused by the Purchaser howsoever arising.

This Warranty is also subject to the following limitations, exclusions and terms:

a) USFC shall not be responsible for warranty services or any costs or expenses for defects or damages caused by the misapplication, misuse, neglect or improper storage of the Product by the Purchaser, including: improper installation, application, maintenance, upkeep, and storage; combination or use in any manner with non-Tiger Dam™ flood control equipment; and ordinary wear and tear.

b) Notification of alleged defect must be made in writing to USFC within thirty (30) days after the appearance or discovery thereof, and where necessary, the defect may be confirmed through appropriate testing conducted by USFC following return of the Product by Purchaser.

c) USFC shall be released from all obligations and liabilities under this Warranty if the Product has been altered, repaired or modified by any person other than USFC, without USFC's prior written approval, after the delivery of the Product to the Purchaser. No cost or expense of any kind will be accepted by USFC for replacement materials or services carried out by or through the Purchaser, for which USFC gave no prior written approval.

d) In the case of any components or parts of the Products supplied but not manufactured by USFC, USFC will not provide warranty service, but the Purchaser may be entitled to the applicable third party (original equipment manufacturer) warranty only, if any (copies available upon request).

e) The costs of the return of defective Products, parts or components to USFC, or to a third party manufacturer for specific components or parts, for inspection and repair or replacement, shall be borne by the Purchaser at its own expense "freight prepaid". All Product returned to USFC must be packaged to safely withstand the method of transport or carriage chosen by the Purchaser and must be accompanied by the proof of sale and warranty coverage by USFC. No warranty service

will be undertaken by USFC on Products damaged in transit until any insurance claim or dispute is resolved between the carrier and the Purchaser, to USFC's satisfaction. USFC shall not be responsible for payment of any duties, taxes or levies of any kind applicable to the exportation or re-importation of repaired or replaced Products, in the country of import, and these shall be to the account of and payable directly by the Purchaser to the appropriate authorities.

f) This Warranty is non-transferrable or assignable and may only be exercised by the original Purchaser of the Product from USFC.

Warrant Disclaimer:

EXCEPT AS EXPRESSLY PROVIDED HEREIN, USFC MAKES NO REPRESENTATION, WARRANTY OR CONDITION WITH RESPECT TO ANY PRODUCT INCLUDING ANY AND ALL EXPRESS OR IMPLIED REPRESENTATIONS, WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, RELIABILITY OR INFRINGEMENT OF INTELLECTUAL PROPERTY OR OTHER THIRD PERSON RIGHTS, WHETHER ARISING BY LAW, USAGE OR TRADE, COURSE OF DEALING, COURSE OF PERFORMANCE OR OTHERWISE, REGARDING ANY PRODUCT OR ANY SERVICES PERFORMED BY USFC OR ITS REPRESENTATIVES, AGENTS OR CONTRACTORS. USFC'S ENTIRE LIABILITY AND PURCHASER'S EXCLUSIVE REMEDY, FOR ANY DEFECT IN THE PRODUCT WHATSOEVER, IS THIS WARRANTY, AND PURCHASER HEREBY WAIVERS ANY AND ALL RIGHT OF ACTION AGAINST USFC, AND RELEASES USFC FROM ANY AND ALL LIABILITY ARISING AT LAW, RELATING THERETO, HOWSOEVER ARISING.

Limitation of Liability:

UNDER NO CIRCUMSTANCES WILL USFC BE LIABLE TO PURCHASER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, EXEMPLARY, PUNITIVE, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOSS OF GOODWILL, LOSS OF ACTUAL OR ANTICIPATED PROFITS OR REVENUE, FAILURE TO REALIZE EXPECTED SAVINGS, OR ANY OTHER ECONOMIC LOSS WHATSOEVER, HOWEVER CAUSED AND WHETHER OR NOT FORESEEABLE, EVEN IF USFC HAD BEEN INFORMED IN ADVANCE OR OUGHT REASONABLY TO HAVE KNOWN OF THE POTENTIAL FOR SUCH DAMAGES. THE ENTIRE CUMULATIVE LIABILITY OF USFC, AND THE EXCLUSIVE RECOURSE OF THE PURCHASER, IN THE EVENT OF ANY CLAIM BY PURCHASER, SHALL BE LIMITED IN THE AGGREGATE (REGARDLESS OF THE NUMBER OF CLAIMS) TO THE ACTUAL PROVEN DIRECT DAMAGES SUFFERED BY THE PURCHASER AND SHALL NOT EXCEED IN ANY EVENT THE AMOUNT OF THE TOTAL PURCHASE PRICE ACTUALLY PAID BY PURCHASER FOR THE PRODUCT PURCHASED BY PURCHASER FROM WHICH SUCH DAMAGE IS ALLEGED TO HAVE ARISEN. NO LEGAL ACTION OR PROCEEDING MAY BE BROUGHT BY PURCHASER AGAINST USFC MORE THAN TWELVE (12) MONTHS AFTER THE FACTS GIVING RISE TO THE CAUSE OF ACTION HAVE OCCURRED. THE FOREGOING LIMITATIONS OF LIABILITY APPLY REGARDLESS OF THE FORM OF ACTION OR BASIS OF LIABILITY, INCLUDING WITHOUT LIMITATION STATUTE, CONTRACT, TORT, NEGLIGENCE, GROSS NEGLIGENCE, STRICT LIABILITY, BREACH OF A FUNDAMENTAL TERM OR FUNDAMENTAL BREACH. THE LIMITATION OF LIABILITY PROVISIONS OF THIS WARRANTY REFLECT AN INFORMED VOLUNTARY ALLOCATION OF THE RISKS (KNOWN AND UNKNOWN) THAT MAY EXIST IN CONNECTION WITH THE PRODUCTS.

Address for Product Return:

U.S. Flood Control Corp.
802 Short Street, Bldg. J
Kenner, LA 70062

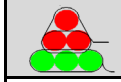
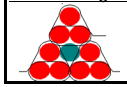
U.S. FLOOD CONTROL CORP.
802 Short Street, Building J
Kenner, LA 70062
Phone: 504-467-5185

Tiger Dam Specs

TIGER DAM ™ SYSTEM	18" Standard Dam	24" Super Tiger Dam	30" Super Tiger Dam	36" Super Tiger Dam	42" Super Tiger Dam
Filled Size	18.5" x 50 ft	24" x 50 ft	30" x 50 ft	36" x 50 ft	45" x 50 ft
Fold Lengths, Sleeve Length	2' Folds, 4' Sleeves	3' Folds, 6' Sleeves	4' Folds, 8' Sleeves	5' Folds, 10' Sleeves	8' Folds, 16' Sleeves
Rolled-up/Storage Dimensions *(Packaged w/ 2 sleeves)*	12" x 30"	14" x 38"	14" x 52"	14" x 70"	14" x 92"
Single Dry Weight *(Packaged w/ 2 sleeves)*	69 lbs.	92 lbs	136 lbs	196 lbs.	302 lbs.
Single Filled Weight	6100 lbs	10,950 lbs.	17,700 lbs.	36,000 lbs.	56,000 lbs.
Fill Time using Standard Fire Hydrant	4-6 min.	10 min	14 min	30 min.	50 min.
How many Gallons in each Dam	730 gal.	1,300 gal.	2,100 gal.	4,300 gal.	7,200 gal.
How many sandbags each replaces	500	1,500	4,000	5,500	15,000

Tiger Dam Configuration Specs

Values are approximate and can vary depending on the water/air ratio

		18" Standard Dam	24" Super Tiger Dam	30" Super Tiger Dam	36" Super Tiger Dam	42" Super Tiger Dam
Single Tiger Dam 	**Height**	1' 6.5" (18.5")	2' (24")	2.5' (30")	3' (36")	3' 9" (45")
	Base Width	1' 9" (21")	2' 10" (34")	3' 3" (39")	5' 6" (66")	6' 11" (83")
2-1 Configuration 	**Height**	2' 10" (34")	3' 6.75" (42.75")	4' 2" (50")	5' 6" (66")	7' (84")
	Base Width	3' 7" (43")	5' 10" (70")	6' 8" (80")	10' 6" (126")	13' 1" (157")
3-2-1 Configuration 	**Height**	4' 1" (49")	5' (60")		8' 6" (102")	10' 4" (124")
	Base Width	5' 9" (69")	8' (96")		14' 8" (176")	19' (230")
4-3-2-1 Configuration 	**Height**	5' 4" (64")	6' 3" (75")		11' (132")	13' 4" (160")
	Base Width	7' 11" (95")	10' 8" (128")		20' 6" (246")	25' 10" (310")

CLEANING AND MAINTANCE OF TIGER DAMS ™

1. Upon draining the Tiger Dams Lay the dams flat and remove the sleeves. Close the small yellow vent.
2. Use a leaf blower or vacuum (reverse air) to fill the tubes with air. This air will assist in drying out the inside of the tubes.
3. Wash the outside of the tube with a high pressure hose, using antibacterial soap or another chlorine base agent to remove any dirt or other contaminants. . Be sure ALL organic material (leafs, grass or anything that can decompose) is removed from the outside and inside of the dams as it will damage the tubes as is decomposes.
4. While the tube is filled with air, let sit for 5 – 15 minutes to check for leaks. If the tube stays firm and rigid there are no holes. If the tube slumps, check for holes and use patch kit to repair.
5. When the tubes have been checked, cleaned and repaired if necessary, testing is now complete and the tubes can be rolled up and stored.
6. Clean and roll up straps.
7. Place 2 cleaned sleeve over the fill valve. Fold the dam in half (yellow valve end towards the black fill valve end) then begin rolling the tube up from the folded end. Once the dam is rolled up, place it inside the second sleeve. This will insure you always have 2 sleeves with each dam.
8. Place the dams on pallets, normally 20 – 25 will fit on each pallet, secure with plastic stretch wrap.
9. Tiger Dams do not need to be stored in temperature controlled environment extreme hot or cold is fine.
10. Tiger Dams must be stored out of UV sunlight. Although they are UV protected, like with all protected PVC, direct sunlight when not in use will reduce the life span of dams.
11. Be sure your deployment equipment (hoses, pumps, fill attachments, anchors etc...) is store in good working order and easily accessible when you need to deploy the Tiger Dams.

Jan Wiegman

From: Jordan Légaré <jordan.legare@megasecur.com>
Sent: Wednesday, August 28, 2024 3:52 PM
To: Jan Wiegman
Subject: Megasecur - Deployable Flood barrier
Attachments: 3869.pdf

Hi Jan,

We think the Water-Gate flood barrier (39'' high) would be perfect for this project.
I first want to start by showing you a video that is very interesting for this project: 🎬 FLOOD PROTECTION: a life jacket for our cities | Water-Gate© technology - YouTube

here is the answer for all your questions:

Product name: Water-Gate
Manufacturer: Megasecur
Distributor: Megasecur
Location of Manufacture: Victoriaville, Québec, Canada

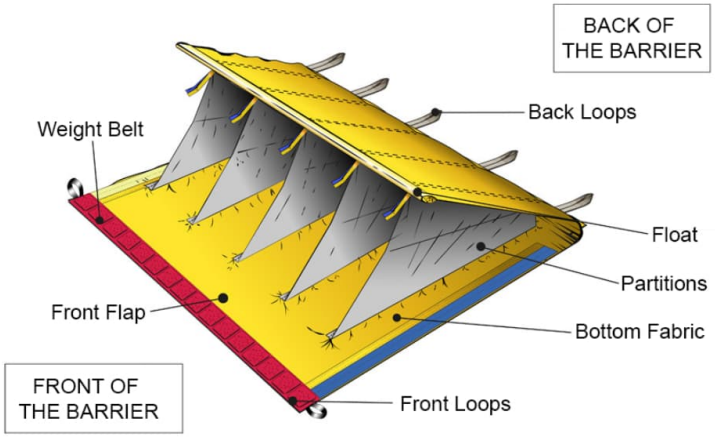
Product cost: $ 134,908.68 USD
Delivery to Damariscotta: $ 1,200.00 USD
Total cost: $ 135,508.68 USD (QUOTE 3869)

Product information to be provided with quotation:

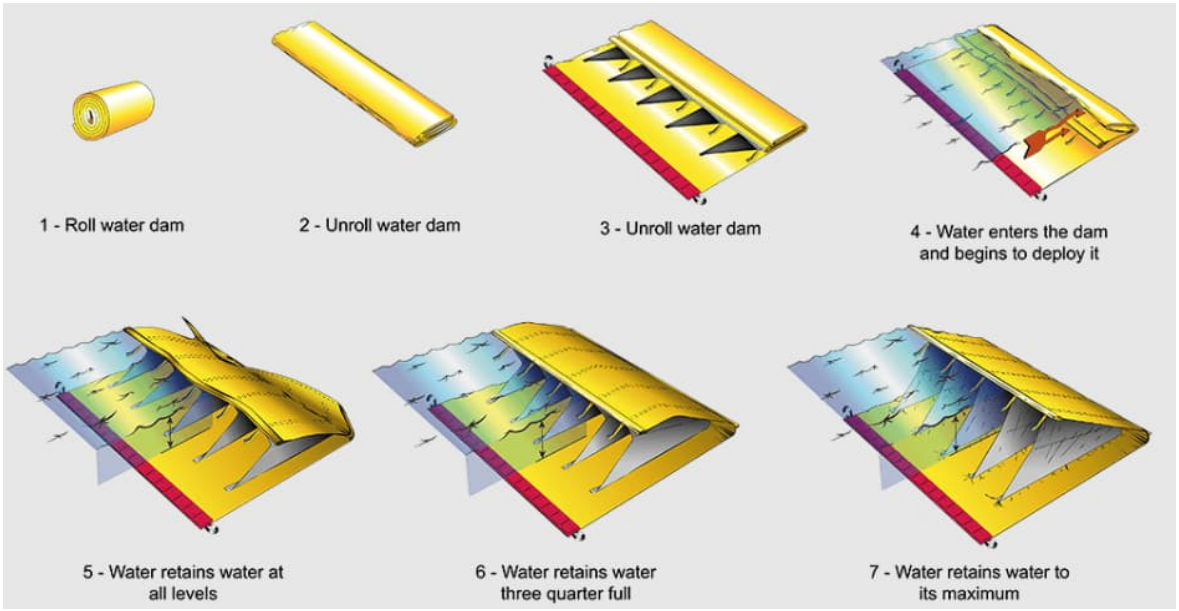
- Installation / Set up instruction
  - We honestly have the fastest flood protection system to deploy on the market.
  - 850' would come in 4 different crates, they are easy to transport and store
  - 


  - Here is an interesting video of the Water-Gate being deploy (European distributor): https://youtu.be/lxMRINJUppY?t=211
  - Please note that we could make 1 single crate, but it would be a lot bigger (30' long) so they will be a lot harder to handle
- Product Warrantee:

- We have the standard one-year warranty. This covers defects in materials and workmanship but doesn't include coverage for damage from misuse or improper maintenance.

- Time to install 300 foot length of barrier and number of people necessary:
  - Time: 15 minutes (assuming the crates are on a forklift or any vehicle)
  - Number of people necessary: 5
- Process to store after use:
  - Barriers need to be put back in the crate, just like in this video: https://youtu.be/kS9JCauwek8?t=273
  - They can than be store where you think is the best, it can be inside or outside as long as the crates are well close.
- Number of crates and volume of storage crates:
  - Each crate will be around: 46'' x 96'' x 43'' H
  - Total of 4 crates:
    - 1 of 250' long of barrier
    - 3 of 200' long of barrier
    - Total = 850 ft
- Anchoring requirements
  - No need for an anchoring system other than the one integrated in the barrier (weight belt)
  - 

  - This is one of the best features of the water-Gate: no need for anchoring ! The Water-Gate works through a simple but effective principle of hydrostatic pressure.
  - When filled with water, the barrier becomes heavy and hold itself because of all the water above it. Thus, it forms a strong barrier against incoming floodwaters.
- Barrier Material:
  - Polypropylene (2%)
  - Polyester (4%)
  - Polyethylene fabric (13%)
  - Steel (26%)
  - PVC Coated Polyester (55%)
- Narrative of how product performs:
  - Here is how easy it is to use :

- 

  - The barrier efficiency is incredible, it will stop floodings without a need for surveillance. However: No temporary water barrier - no matter how excellent - is completely watertight.
  - FM approvals tests results tell us that the barriers as an average leak rate of 0.13 gpm/ft. This is minor (considering the fact that we are FM approved)
  - Beside its incredible performance at stopping flood, here are all the products advantages
    - Product lifespan: ± 20 years
    - Eco-friendly
    - Reusable
    - Cost-effective
    - Quick to deploy
    - Easy to install
    - Space-saving, thus simple to store
    - Adapts to all types of surfaces
    - Requires minimal installation resources
    - Designed to be connected together for customizable length
    - Water retention of up to 5 feet (1.5 meters) in height
    - Approved by FM Global
- Examples of where the product has been used within the USA
  - T-Mobile is using our system to protect their cell tower in flood zones
  - San Carlos (California) Airport (takeoff runway)
  - We also sold crates to multiple municipalities, but mostly in Canada and Europe

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    - I am sorry, I do not have access to the whole clients database because we recently changed our ERP
- Can barrier be repaired and what is the process:
    - Yes, they can be. Minor holes can be patch by just putting a layer of PVC from the inside while the flood is happening (the water pressure will old the PVC piece in place.)
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Hope this makes sense ! Let me know if I forget anything.

Looking forward to work with you in the future. Have a great day !

Jordan Legare

SALES & MARKETING

jordan.legare@megasecur.com

www.water-gate.com
Office : 819.751.0222 #223
Cell : 819.751.5198
Toll Free : 1.888.756.0222 #223

MegaSecur

940 Bd. Pierre-Roux E
Victoriaville, Québec, Canada
G6T 2H6

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Quote

MegaSecur
ENVIRONMENTAL SECURITY

940 A, blvd Pierre-Roux Est
VICTORIAVILLE (QC) G6T 2H6
CANADA
Phone : +1 819 751-0222
www.megasecur.com

Date	Nbr
28/08/2024	**3869**

CUSTOMER NO. : DAMA1520
Town of Damariscotta
11 Bowdoin Mill Island, Suite 140
Topsham
Damariscotta, ME, 04086
USA
Phone : 207-319-1520 Fax :
Contact : Jan Wiegman

SHIP TO :
SAME

SHIPMENT	FOB	CARRIER	CUSTOMER ORDER
August 28, 2024	DAP-Delivered at Place Unloa		

FEDERAL TAX	PROVINCIAL TAX	PAYMENT TERMS	SALES REP.
840739221RT0001	1214547020TQ0001		JL & JD

QTY	PRODUCT	DESCRIPTION	UOM	UNIT PRICE	AMOUNT
17	WL-3950	Water Barrier 39" x 50' (1 M X 15,2 M)	UN	7,376.12	125,394.04
4	CSM (6 PI À 8 PI 4)	CAISSON DE MÉTAL (6 PI À 8 PI 4)	PI	2,228.66	8,914.64

Terms and conditions:
1- Megasecur is not responsible for improper installation by the customer, please refer to the user manual.
2- The goods belong to Megasecur until full payment of the invoice.
3- The U.S. exchange rate may vary from the quote to date invoice and payment, governed by the Bank of Canada daily rate.

Terms and conditions of the quotation will be accepted automatically.

FREIGHT :	1,200.00
SUBTOTAL :	135,508.68
TOTAL (USD) :	135,508.68

Accepted By :
Print name
Date
Signature

Your order # :

Signature :

Jan Wiegman

From: Jordan Légaré <jordan.legare@megasecur.com>
Sent: Friday, September 13, 2024 1:58 PM
To: Jan Wiegman
Subject: RE: Megasecur - Deployable Flood barrier

Hi Jan,

No lead time, the barriers are ready. The only lead time is for the crates (we need to customized depending on your order) it can take 3-5 weeks.

Have a great day !

Jordan Legare

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jordan.legare@megasecur.com

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Toll Free : 1.888.756.0222 #223

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Victoriaville, Québec, Canada
G6T 2H6

Let's stay connected ! Follow us on social media !

De : Jan Wiegman <jan.wiegman@wright-pierce.com>
Envoyé : 13 septembre 2024 13:49
À : Jordan Légaré <jordan.legare@megasecur.com>
Objet : RE: Megasecur - Deployable Flood barrier

Jordan,
Thank you. What is the availability of the barrier once the order is placed? Is there a lead time?
Jan Wiegman

From: Jordan Légaré <jordan.legare@megasecur.com>
Sent: Friday, September 13, 2024 12:37 PM
To: Jan Wiegman <jan.wiegman@wright-pierce.com>
Subject: RE: Megasecur - Deployable Flood barrier

Hi Jan,

Wonderful, I am waiting on your feedback, let me know if I can help ! Note that we have been selling to multiple municipalities and they are always happy with the result, the product is amazing if I am being honest !

Have a good weekend, let me know if I can help in any way.

Jordan Legare

SALES & MARKETING

jordan.legare@megasecur.com

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Victoriaville, Québec, Canada
G6T 2H6

Let's stay connected ! Follow us on social media !

De : Jan Wiegman <jan.wiegman@wright-pierce.com>
Envoyé : 28 août 2024 15:54
À : Jordan Légaré <jordan.legare@megasecur.com>
Objet : RE: Megasecur - Deployable Flood barrier

Jordan,
Thank you very much for your response. I will review the information and let you know if we have any follow up questions.
Jan Wiegman

From: Jordan Légaré <jordan.legare@megasecur.com>
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To: Jan Wiegman <jan.wiegman@wright-pierce.com>
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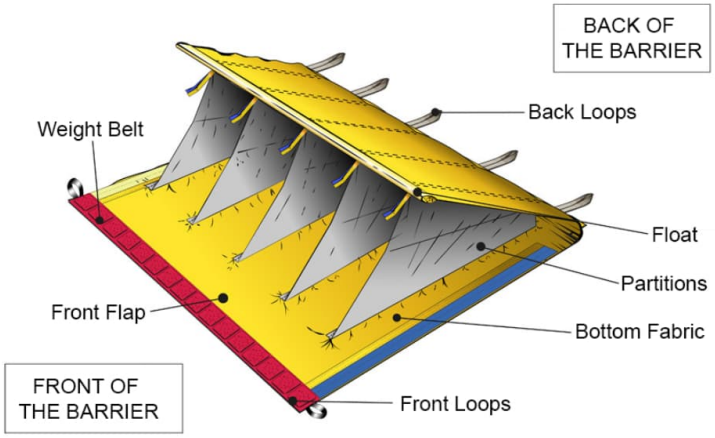
- 

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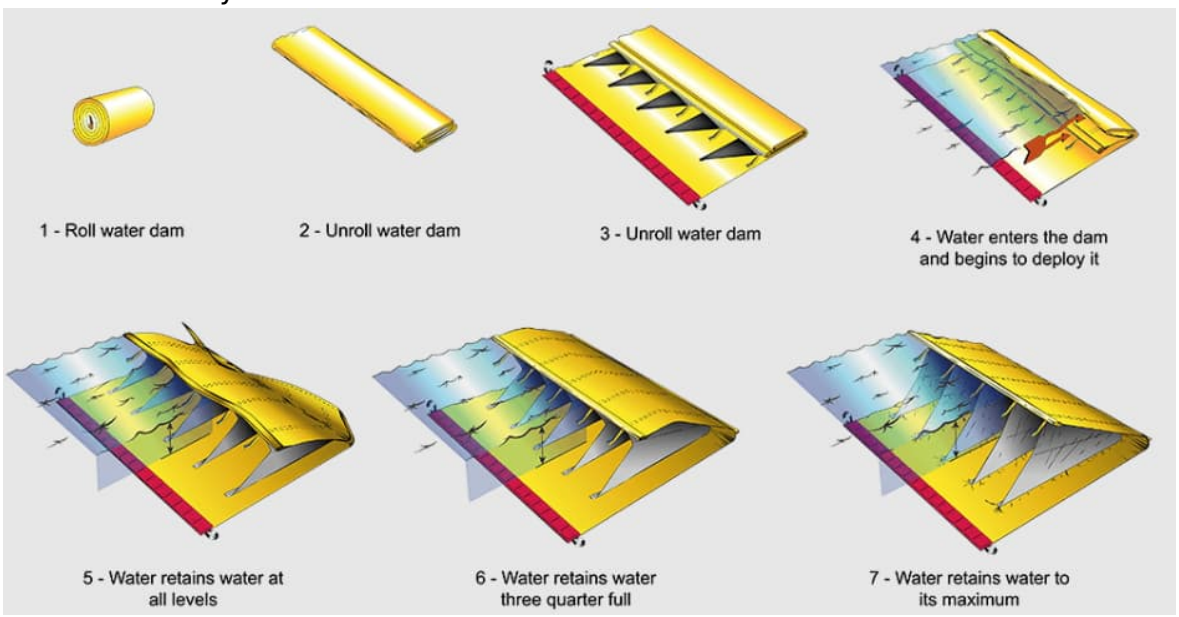
  - 

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Looking forward to work with you in the future. Have a great day !

Jordan Legare

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MegaSecur

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Victoriaville, Québec, Canada
G6T 2H6

Let’s stay connected ! Follow us on social media !

Jan Wiegman

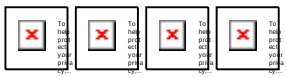
From:	Sam Kullberg <samuel.kullberg@geodesignbarriers.com>
Sent:	Tuesday, September 17, 2024 1:27 PM
To:	Jan Wiegman
Subject:	Re: Geodesign Barriers Response
Attachments:	Geodesign Flood Barrier Limited Warranty - USA.pdf; Industrial Flood Barrier - Product Broschure.pdf; P40 Straight sections Setup manual Original US.pdf; PR453294coc220920.pdf

Please find the limited warranty, FM Approval Certificate, setup instructions and a product brochure attached to this email.

Best regards,

Sam

On Tue, Sep 17, 2024 at 12:24 PM Sam Kullberg <samuel.kullberg@geodesignbarriers.com> wrote:

> Good afternoon Jan.
>
> Here is the response submittal from Geodesign Barriers attached. I will send an additional email with separate documents for the instruction manual, warranty, and product brochure for our 40" option.
>
> Please confirm that you have received this, as my last email ended up in your junk folder. :)
>
> Thanks.
>
> **Sam Kullberg,** Senior Field Engineer
>
> 
>
> 39W790 Carney Ln. 561-339-5250
> Geneva, IL 60134 844-570-5700

Jan Wiegman

From: Sam Kullberg <samuel.kullberg@geodesignbarriers.com>
Sent: Tuesday, September 17, 2024 1:24 PM
To: Jan Wiegman
Subject: Geodesign Barriers Response
Attachments: Geodesign Barriers Industrial P40 - Damariscotta RFI Wright-Pierce.pdf

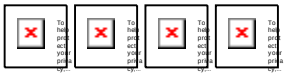
Good afternoon Jan.

Here is the response submittal from Geodesign Barriers attached. I will send an additional email with separate documents for the instruction manual, warranty, and product brochure for our 40" option.

Please confirm that you have received this, as my last email ended up in your junk folder. :)

Thanks.

Sam Kullberg, Senior Field Engineer

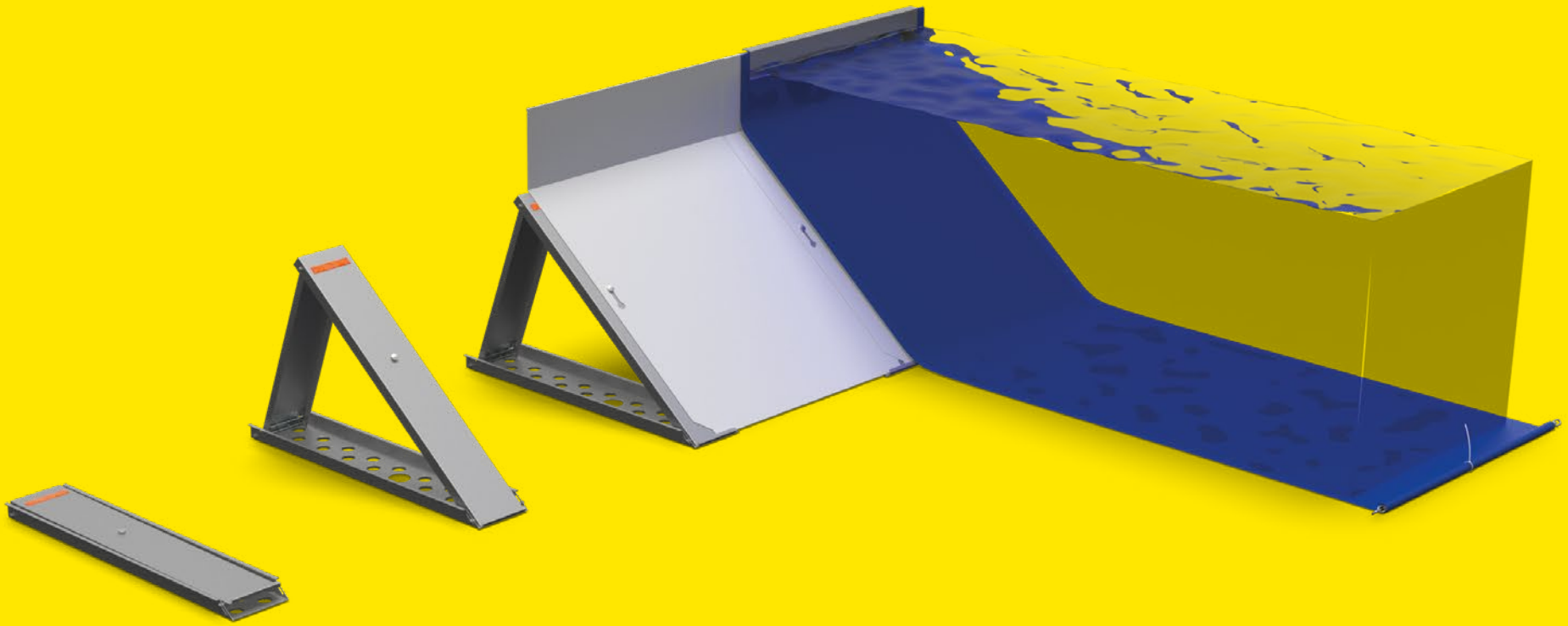


39W790 Carney Ln. 561-339-5250
Geneva, IL 60134 844-570-5700

GEODESIGN BARRIERS

Industrial Flood Barrier

Product brochure



European patent No. EP3359743

ANSI 2510-2020
Maximum Rated Water Depth 40"
Flood barriers for perimeter barrier applications

ISO 9001-2015, ISO 14001-2015

US Patent No.: US 10,508,396 B1

Four simple steps. One refined solution.

The Industrial Flood Barrier by Geodesign has been designed and engineered to enable a fast installation without the need for tools, heavy equipment or a large workforce. This innovative steel barrier has become a large-scale favorite with government entities for its great logistical advantages and ingenious simplicity.

1

PLACE, UNFOLD & LOCK STEEL SUPPORTS

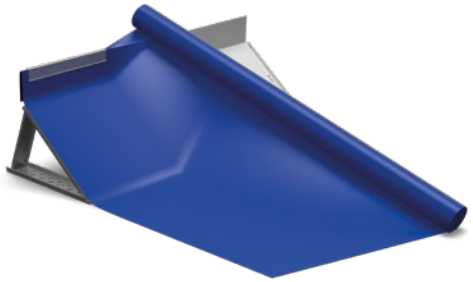
Place the frames 3 ft 3 in (2 ft 7 in, for P48) apart to form your intended barrier line. Unfold the a-frame and secure the upright position with the snap lock.

2

MOUNT STEEL PANELS

Hang the panels between the frames by sliding the cutout over the protruding mount knobs on the supports and overlapping the neighboring panels.

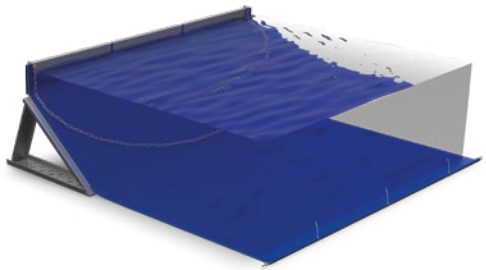
3



LINE WITH MEMBRANE

Roll out the poly membrane along the barrier and fixate it with panel clips at the top. Add chains as ballast to manage windy conditions.

4



ANCHORED WITH WATER

Allow water to come onto the liner and the face of the barrier and let it anchor itself using the forces exerted by the flood water.


FLOOD BARRIER

Design Features

The Industrial Flood Barrier has been continuously developed through dialogue with our clients and has gradually improved its features to become the user friendly and effective flood barrier it is today. The barrier is manufactured in ultra high strength steel with a focus on achieving light-weight components with optimal logistical properties. 25 years of flood protection and continuous feedback from our clients have taught us to prioritize speed and simplicity without ever compromising on safety. This has resulted in a FM certified flood barrier where 12 workers can install 1640 linear feet in less than one hour.

ANCHOR COLLARS WITH POINTS

Protruding steel collars underneath the bottom beam to establish a grip and increase friction between the self-anchored barrier and the ground surface.

MOUNT KNOB PANEL LOCK

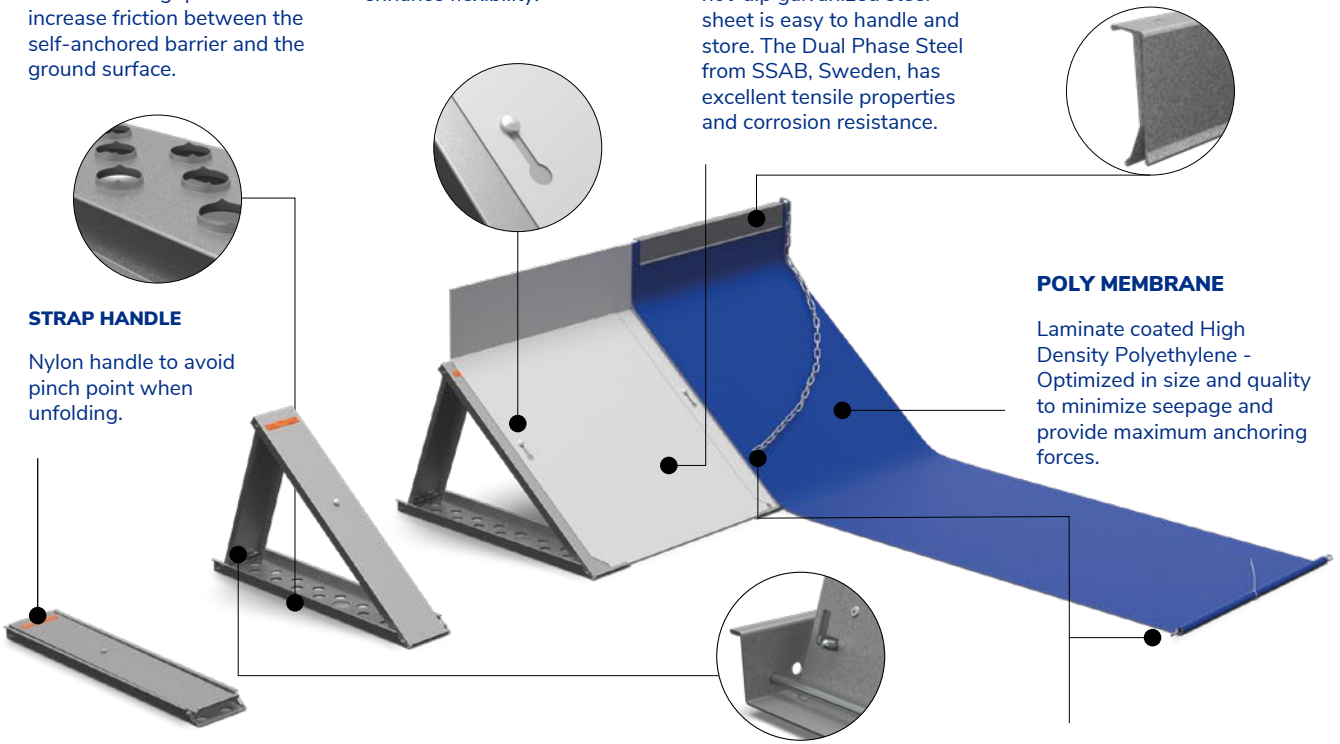
Smart and innovative solution to speed up assembly and enhance flexibility.

LIGHTWEIGHT STEEL PANEL

At merely 26 pounds per P101- panel, the 1 mm hot-dip galvanized steel sheet is easy to handle and store. The Dual Phase Steel from SSAB, Sweden, has excellent tensile properties and corrosion resistance.

PANEL CLIP

Fixates the liner and strengthens the structure.



STRAP HANDLE

Nylon handle to avoid pinch point when unfolding.

POLY MEMBRANE

Laminate coated High Density Polyethylene - Optimized in size and quality to minimize seepage and provide maximum anchoring forces.

A-FRAME STEEL SUPPORTS

The barrier frames are collapsible and stackable for better usability and storage properties between floods. In their upright positions, the supporting beams transfer forces from the hydrostatic pressure to the friction-optimized bottom beam, thus increasing the barrier's stability as it absorbs more load.

ULTRA HIGH STRENGTH STEEL

All load-bearing components of the Industrial Barrier are manufactured in high strength and ultra high strength steel with micro-alloy elements. Both steels are hot-dip galvanized with a zinc coating to provide optimal corrosion protection.

SPRING-LOADED SNAP LOCK

Quick and easy snap-in-place lock to fixate the supporting beam in the right angle and prevent the structure from dispositioning in the event of any unforeseen impact to the barrier's dry side.

CHAINS - DIN 763

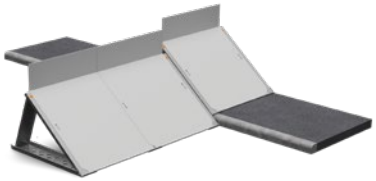
1/2 in x 16 ft Galvanized Steel Chain with carabiners as ballast and to weigh down the membrane before water has come onto the barrier.

Fixed obstacles. Flexible modules.

The Industrial Flood Barrier can be installed in places where infrastructure or natural objects create the most challenging conditions. The flexibility in the system allows the barrier to be installed around, over and up against obstacles such as undulations, curbs, walls and other permanent structures. All Geodesign Flood Barriers are interchangeably compatible with each other and can be combined in various constellations to meet the needs of the specific topography and conditions on site.

ADJUSTABLE LENGTH

Assemble from two directions and meet in the middle or adjust the length of the barrier to end up at a specific spot by simply overlapping two panels. Mount one fixture and let the bottom of the panel rest in the slot located by the toe of the frame.



UNEVEN GROUND

Sudden shifts in level, such as curbs, steps or uneven ground is easily handled by placing the a-frames' sloping beams aligned and their sides flush against each other. Clamp together the front beams and continue building the barrier on the new level.

SHARP CORNERS

Special designed corner panels allow sharp 45-degree inner and outer turns.

CONNECTION TO WALL

Adjust the length of the barrier to finish flush against the wall. Use our wall connection kit to safely attach to a vertical foundation or structure while minimizing seepage.

COMPATIBILITY

The Industrial Flood Barrier is not only compatible with other models within the same product family but also with the taller Heavy-Duty series.

LARGE BENDS

Using only straight sections, the Industrial Flood Barrier allows for larger bends with a 90-degree turn radius of 33 ft thanks to the flexibility of the modular structure and the thin steel panels.

Different heights. Same family.

The Industrial Flood Barrier consists of four different models. Same fundamental design and overall features but different in dam height. The Industrial Barrier, also known as the P-series, is distinguished by its crease across the panel and the patented panel mount knob on the front beams.

P48	
Max water column:	48 in
Section width: (ctc)	32 in
Setup time: (300 ft / 6 workers)	1 h 10 min
Footprint: (Barrier and liner)	13 ft
Footprint: (Barrier only)	4 ft 9 in
Weight / section:	73 pounds
Storage vol, weight: (One set, 40 sections)	100 cubic ft

P40	
Max water column:	40 in
Section width: (ctc)	39 in
Setup time: (300 ft / 6 workers)	50 min
Footprint: (Barrier and liner)	10 ft
Footprint: (Barrier only)	3ft 9 in
Weight / section:	59 pounds
Storage vol, weight: (One set, 50 sections)	90 cubic ft

P32	
Max water column:	32 in
Section width: (ctc)	39 in
Setup time: (300 ft / 6 workers)	50 min
Footprint: (Barrier and liner)	10 ft
Footprint: (Barrier only)	2 ft 11 in
Weight / section:	49 pounds
Storage vol, weight: (One set, 50 sections)	70 cubic ft

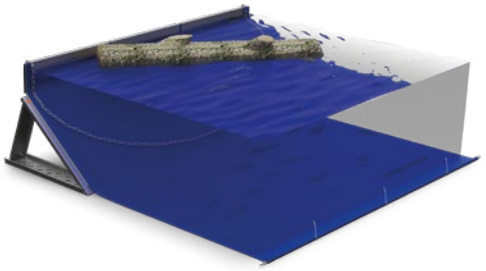
P24	
Max water column:	24 in
Section width: (ctc)	39 in
Setup time: (300 ft / 6 workers)	35 min
Footprint: (Barrier and liner)	6 ft
Footprint: (Barrier only)	1ft 10 in
Weight / section:	37 pounds
Storage vol, weight: (One set, 50 sections)	53 cubic ft

US Army Corps of Engineers
Coastal and Hydraulics Laboratory
Vicksburg, MS.

ANSI 2510-2020
Maximum Rated Water Depth 40”
Flood barriers for perimeter barrier applications

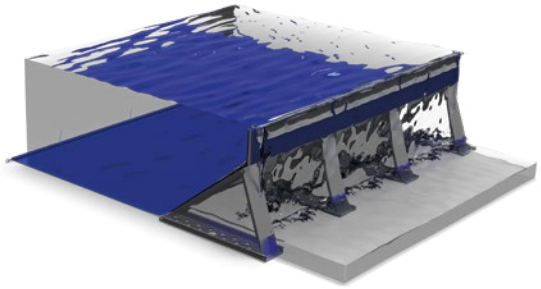
Stability through adversity.

Floods are unpredictable in their nature. Rough weather conditions and other coinciding meteorological events often make it difficult to predict when, where and how severely a flood will hit.
The Industrial Flood Barrier has been engineered to perform under the most difficult conditions imaginable and has been tested in both real life environments and hydraulic laboratories.



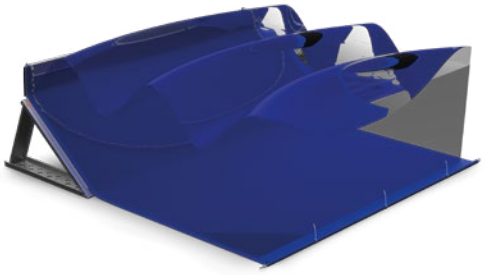
DEBRIS IMPACT

Uncontrolled floating objects are not uncommon during floods and the impact from such objects can cause severe damage if the barrier structure has a low factor of safety under loads. The Industrial Flood Barrier has been tested and certified with logs weighing 610 pounds and 790 pounds ramming into the barrier at velocities of over 7 ft / s.



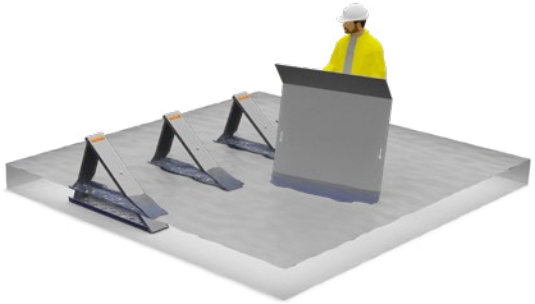
OVERTOPPING

Rising flood water is unpredictable and can overwhelm any barrier put up to protect against it. It is of utmost importance that a flood barrier is stable through an overtopping event and that there is no risk of displacement. Geodesign's Industrial Flood Barrier was tested at the US Army Corps of Engineers Coastal and Hydraulics Laboratory with at least 1 in of overtopping for over one hour.



WAVES

Hydrodynamic loads exert significant forces on a submerged structure and will occur naturally in the form of waves during a flood. The Industrial Flood Barrier has been tested and certified for waves of three different sizes (low, medium, high) at two different water depths in the Coastal and Hydraulics Lab in Vicksburg, MS, United States.



IN-WATER INSTALLATION

The steel frames and panels are easy to install in water. Make sure the liner is properly deployed before starting the pumps.

1

STEEL SUPPORTS

Folded.
Stacked in three rows.

2

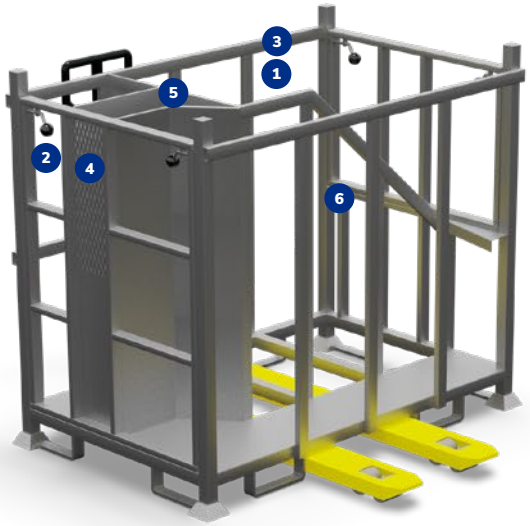
POLY MEMBRANE

Folded and rolled.

5

CABLE TIES

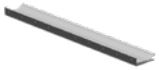
Packed in a bundle.
Not reusable.



3

PANEL CLIPS

Stacked on top of Steel supports.



6

STEEL PANELS

4

CHAINS

Length 16 ft.

Everything complete in One crate.

The Industrial Flood Barrier is delivered, transported and stored in a special crate designed to fit all components needed to install 164 linear feet of a complete barrier. The crate is divided into separate compartments and both short sides have detachable gates that ease and speed up loading and unloading. A fully loaded crate weighs up to 3053 pounds and can be moved with a pallet jack. The outer dimensions vary between the models and all crates are stackable three high.

GEODESIGN BARRIERS

www.geodesignbarriers.com

E-mail address:
contact@geodesignbarriers.com


GEODESIGN BARRIERS
PERIMETER FLOOD BARRIERS
For consideration in feasability study
Geodesign Barriers Inc.
12947 SE Suzanne Drive, Hobe Sound, FL 33455
United States of America

Town of Damariscotta
21 School Street
Damariscotta, Maine, 04543

Description: The Town of Damariscotta, Maine is seeking quotations to purchase a deployable flood barrier for use in a municipal parking lot along the Damariscotta River.

Barrier Length: 840 feet in length, 3' height min., barrier intent is to prevent flood water from adjacent tidal river from flooding parking lot and adjacent buildings. Barrier will be deployed on an asphalt paved surface and be deployed by the Town work force. Refer to attached plan for barrier length and arrangement. Barrier shall come with storage bins for handling and deployment. Parking lot elevation is approximately 8.0 and rises to 11.0 the base flood elevation is 10.0 and barrier must have 1' of freeboard. One 90 degree interior angle, One 90 degree exterior angle.

Delivery will be preferred by December 1, 2024.

Flood Barrier Bid Criteria:

Product name: Industrial Flood barrier P40

Manufacturer: Geodesign Barriers

Distributor: Geodesign Barriers

Location of Manufacture: Sweden

Product Cost: $124,684

Delivery to Damariscotta, Maine: $5,000

Total cost: $129,684

(Note: purchaser is the Town of Damariscotta, a municipality, and not subject to state sales tax)

Quotations are due September 17, 2024 by 5:00 PM EST.

Prices will be held for 60 days.

Submit quotations to :

Jan Wiegman, PE
Wright-Pierce
11 Bowdoin Mill Island, Suite 140
Topsham, ME 04086

Questions may be submitted to :

Jan Wiegman, PE,
Wright-Pierce
Tel: 207-319-1520
Email: Jan.wiegman@wright-pierce.com

Delivery Time Frame from date of order: 3-4 weeks

Product information to be provided with quotation:

- Installation/set-up Instructions: Deploy supports, mount steel panels, line with membrane
- Product Warrantee: 5 years limited warranty
- Time to install 300 foot length of barrier and number of people necessary: 50 minutes, 6 people
- Process to store after use: dry, in crates
- Number of crates and volume of storage crates: 6 crates, stackable, each measure 66" x 45" x 52"
- Anchoring requirements: None on asphalt
- Barrier material: Galvanized high strength steel and a PVC coated vinyl membrane
- Narrative of how product performs: FM Approved free standing barrier, anchored by water pressure
- Examples of where the product has been used within the USA: SC, PA, NM
- Can barrier be repaired and what is the process: Yes.


THIS SIDE TOWARDS WATER

BACKGROUND

The Town of Damariscotta, Maine is seeking quotations to purchase a deployable flood barrier for use in a municipal parking lot along the Damariscotta River. Barrier Length: 840 feet in length, 3’ height min., barrier intent is to prevent flood water from adjacent tidal river from flooding parking lot and adjacent buildings. Barrier will be deployed on an asphalt paved surface and be deployed by the Town work force. Refer to attached plan for barrier length and arrangement. Barrier shall come with storage bins for handling and deployment. Parking lot elevation is approximately 8.0 and rises to 11.0 the base flood elevation is 10.0 and barrier must have 1’ of freeboard. One 90 degree interior angle, One 90 degree exterior angle.

COMPANY INFORMATION

Geodesign Barriers, Inc. is a pioneer in flood protection technology. Based in Stockholm, Sweden, with a subsidiary in New York, New York, our company has been at the forefront of designing and manufacturing innovative flood barriers since 1995. Our commitment to quality, combined with extensive research and development, has led us to create barrier solutions that are not only effective but also economical and environmentally friendly.

PRODUCT PERFORMANCE

The Geodesign P40 is a cost-effective solution, balancing performance and affordability with a focus on logistics and speed of deployment.
It is classified as a free-standing perimeter flood barrier for temporary protection against water inundation.
The P40 has an effective dam height of 40” (100% of the barrier’s vertical height) and does not require any tools, heavy equipment or fill-materials to function.
It is tested and certified to the ANSI 2510 standard, by the US Army Corps of Engineers and FM Approvals.

QUALITY AND LIFESPAN

Quality in flood protection should first and foremost be about performance in flooding situations but should also include durability, quality of materials, and quality in manufacturing.
The most reliable method of evaluating perimeter flood barrier quality is by looking for the FM Approval certification and the product's compliance with ANSI 2510.

The Industrial P40 is manufactured in galvanized high-strength steel.
Galvanized steel has an expected lifespan of 75+ years when exposed to the elements. Properly stored in dry conditions, that number is likely higher. PVC coated Heavy Duty vinyl (LDPE) has an expected lifespan of 25 years in proper storage conditions (dry, tempered, and dark) and 4-5 uses in real flooding situations. The price of the liner is less than 5% of the total price of the barrier and is easily replaced and replenished with new when needed.

The manufacturing facility in Västervik, Sweden is audited annually by FM Approvals and conforms to all relevant ISO standards.

Geodesign Barriers offers a 5-year limited warranty on all products (provided as a separate document).

REPAIR

It is important to note that the Geodesign Industrial P40 has been thoroughly tested for rips, wear and tear, aging, and deterioration, as part of the FM Approval certification. ANSI 2510 includes debris hits with 12 in diameter/610 lbs AND 17 in diam./790 lbs logs, as well as lab testing with exposure to hot/cold temperatures, UV-light, repeated tension and compression tests etc. The Industrial P40 has passed all requirements.

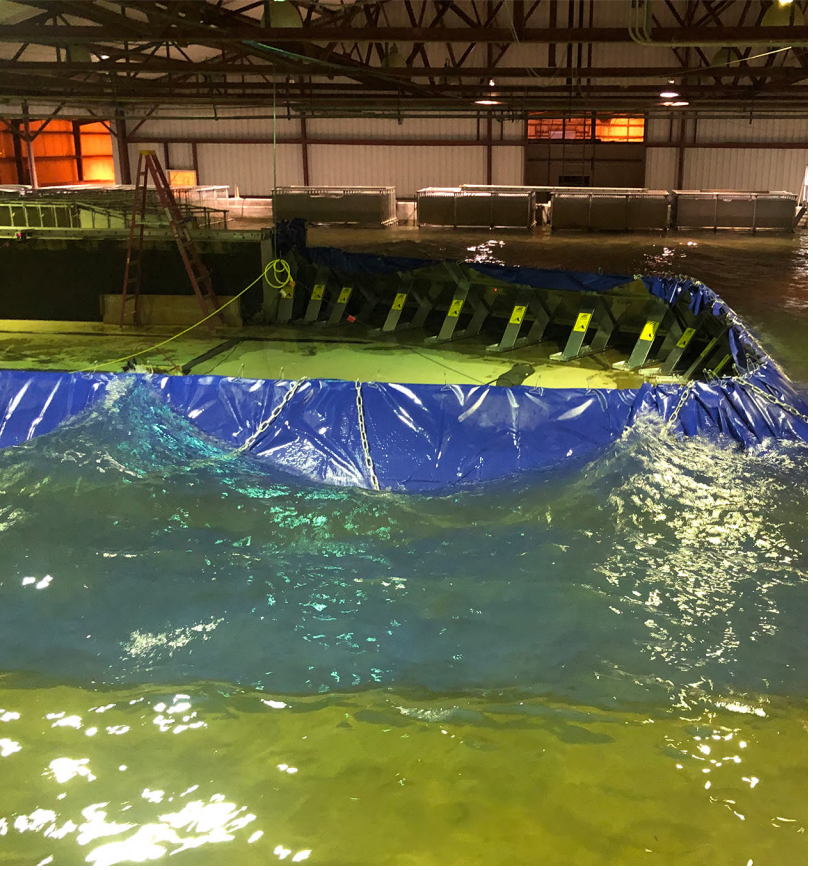
To repair an eventual rip in the liner during a flood, a simple patching process is utilized where an overlapping piece of liner is placed on top of the slit and taped with waterproof tape. The pressure from the water will then press the piece in place and seal by the sama principle as the liner is sealed to the ground.

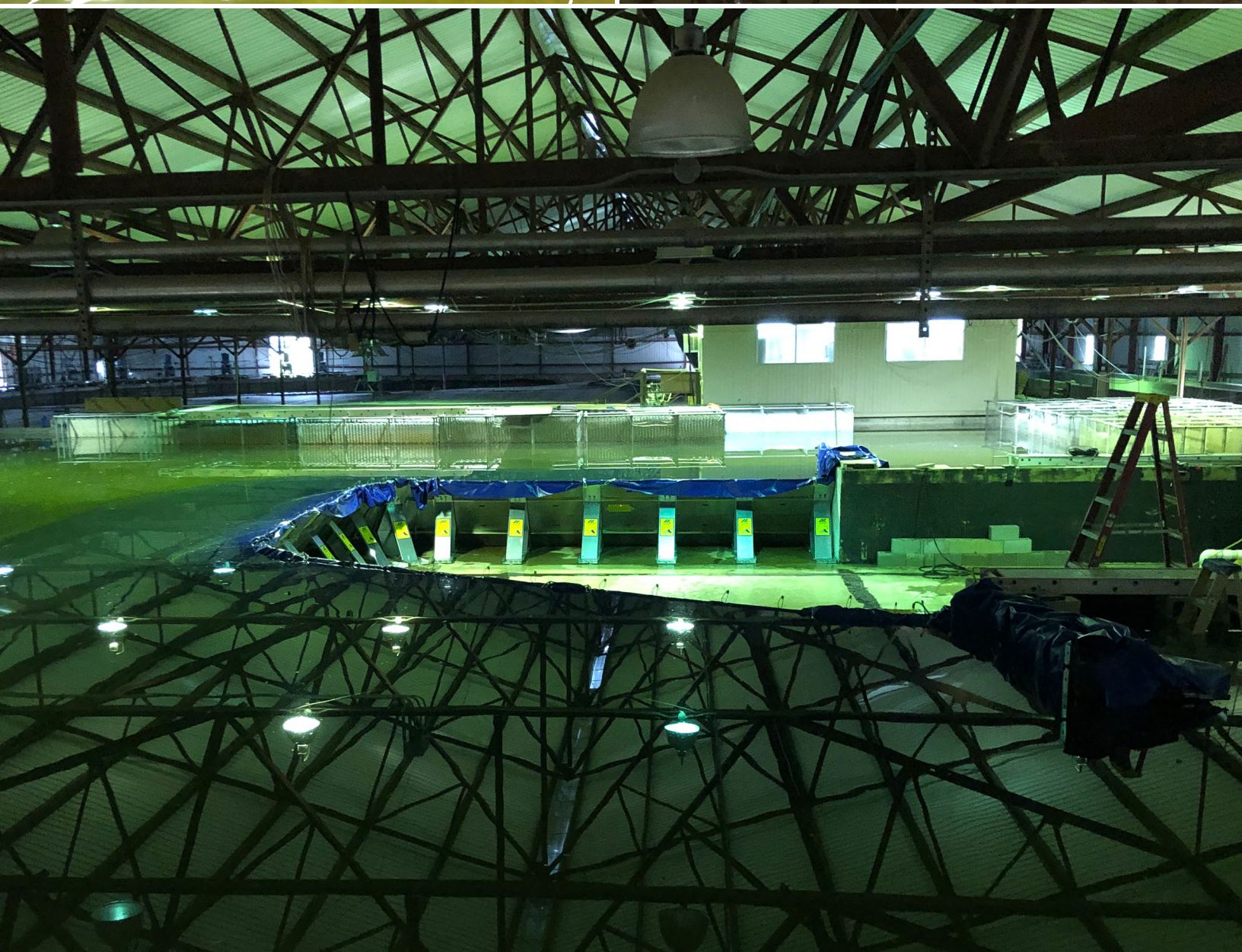
The steel components should be replaced if buckling or permanent yield in the material has occurred.

SPEED OF DEPLOYMENT

300 linear ft of the Industrial P40 can be installed by 6 workers in less than 50 minutes.

This number is based on untrained workers with access to printed setup manuals and can be significantly reduced with proper training.
It is important to note that the speed of deployment only hinges on the number of workers and not the accessibility to fill materials such as water or sand which require pumps and fillers that act as bottlenecks. When fully trained, an increase in workforce reduces the setup time proportionally.





INSTALLATION

The Industrial P40 is easily assembled in three simple steps:

PLACE, UNFOLD & LOCK STEEL SUPPORTS

Place the frames 3 ft 3 in (2 ft 7 in, for P48) apart to form your intended barrier line. Unfold the a-frame and secure the upright position with the snap lock.

MOUNT STEEL PANELS

Hang the panels between the frames by sliding the cutout over the protruding mount knobs on the supports and overlapping the neighboring panels.

LINE WITH MEMBRANE

Roll out the poly membrane along the barrier and fixate it with panel clips at the top. Add chains as ballast to manage windy conditions.

Full instruction manual provided separately.

STORAGE OF FLOOD BARRIERS

The Industrial P40 is stored in a 66” x 45” x 52” galvanized, stackable, crate covered in a PVC hood.

Industrial Flood Barrier Metal Crate

Option 1: Warehouse with Solid Concrete Floor

Description: In this option, the modular flood barrier 'Industrial P40' crates, each housing 168 linear feet of panels, supports, clips, and chains, are stored on a solid concrete floor in a warehouse near the final deployment site.

Advantages:

- The crates can be stacked three high, maximizing vertical storage space.
- Equipment can be stored in two compact stacks, each with a footprint of 66" x 45".

Considerations:

- Requires available indoor storage space with high sealings and a solid concrete floor.

This image depicts four stacks and a single crate. The four stacks contain over 2,000 linear feet of Industrial P40 on a 16'x5.5' footprint.

Option 2: Outside Storage

Description: In this option, the crates are stored outside on the site, and each crate comes with covers to protect against the elements, including rain.

Advantages:

- Cost-effective. No need to allocate indoor storage space.
- Can stack crates two high due to asphalt's support capabilities in warm climates.
- Covers provide protection against rain and basic weather conditions.

Considerations:

- Even with covers, long-term exposure to the elements may reduce the lifespan of the flood barriers.
- Requires three stacks to store the necessary crates.
- Stacking limitations exist due to the softness of asphalt in the summer.

This image depicts eight crates in four stacks.The back row fits on a 17’ x 4’ footprint and contains over 1,000 ft of P40

Option 3: Container Storage

Description: In this option, the crates are stored in 20-foot containers with doors on the long sides, offering an array of benefits.

Advantages:

- Can be placed and stored in parking spaces at the final deployment site.
- Easily transported and moved to other sites if needed
- Ensures dry conditions, maximizing the lifespan of the barriers: FM Approved Liner (20 years), Galvanized steel components (75+ years).
- Crates are stored in one layer on the container floor and can be emptied and moved manually, reducing the risk of forklift malfunctionand thereby enables deployment in 100% of the circumstances.
- Containers can be locked to prevent theft.
- All flood fighting material stored in one place, reducing the risk of misplacing critical parts over time.

Considerations:

- Requires access to a 20-foot container and appropriate space for its placement.

TRAINING

In our commitment to providing the town of Damariscotta with a comprehensive flood protection solution, we recognize that the effectiveness of flood barriers extends beyond their physical presence; it hinges on the competence of those responsible for their deployment. To this end, we strongly advocate for regular training sessions to ensure that the knowledge and skills required for flood protection are ingrained within the organization.
We recommend annual or, at the very least, biennial training sessions to maintain proficiency and preparedness.

Training Overview

Our training program includes a full day of instruction conducted on-site following the delivery of all materials. This training day is designed to equip the town workforce with the necessary skills and understanding to effectively utilize the flood barriers when needed. The training is divided into two components:

1. Indoor Theoretical Session: This segment focuses on the theoretical aspects of barrier assembly and covers essential flood-fighting methodologies and techniques. Participants will gain a comprehensive understanding of the barrier system, its components, and how to assemble them efficiently. Theoretical knowledge lays the foundation for practical application.
2. Outdoor Hands-On Session: The outdoor portion of the training provides a practical, hands-on experience with the flood barriers. ASML's team will have the opportunity to work directly with the barriers, gaining valuable experience in deploying them effectively. This hands-on session reinforces the theoretical knowledge acquired indoors, ensuring that participants are well-prepared for real-world flood situations.

Training Resources

- Setup Manuals: The flood barriers will be delivered with printed setup manuals, providing step-by-step guidance for assembly and deployment.
- Digital Training Materials: We will provide digital copies of the training materials, including slides from the theoretical session, for easy reference and sharing within the organization.
- QR Codes: QR codes will be provided to grant convenient digital access to all training manuals, enabling quick and convenient reference when needed.

PRODUCT USE WITHIN THE USA

In the six years that Geodesign Barriers has had a presence in the United States, the Industrial P40 has been used in real flooding situations in Myrtle Beach, SC, Hartsville, SC, Pennsylvania, and Las Vegas, NM.

In addition to those flood-fighting cases, the product has been sold to prominent enterprises such as Exxon Mobil, ASML, Duke Energy, Ameren, PP&L, and Evergy.

We hope this information will be useful in your evaluation and that you don't hesitate to reach out with questions or requests for clarifications or additional information that might arise from this document.

Sincerely,

Sam Kullberg, Senior Field Engineer

GEODESIGN BARRIERS INC.
228 E 45th St, Ste 9E
New York, NY 10017
United States

(630) 720-5578
samk@geodesignbarriers.com

GEODESIGN BARRIERS

Limited Warranty

We would like to express our gratitude for your purchase of flood barriers (hereinafter referred to as "The Product") from Geodesign Barriers (hereinafter referred to as "The Manufacturer"). We hope that The Product serves you well and meets your needs.

This Limited Warranty shall apply solely to the physical goods comprising The Product or any constituent parts thereof that have been purchased from The Manufacturer. It shall not apply to any non-physical goods or services, such as any software programs or online services associated with The Product.

The Manufacturer warrants that The Product shall be free from defects in workmanship and materials, under normal use and conditions, for a period of five (5) years from the date of the original invoice. This warranty shall not apply to any defects or damage resulting from abuse, misuse, alteration, modification, or tampering with The Product.

During the warranty period, The Manufacturer shall, at its sole option, either repair any defects in material or workmanship or furnish a repaired or refurbished Product of equal value in exchange, free of charge. Any such repair or replacement is contingent upon the verification of the defect or malfunction and the presentation of proof of purchase, including the model number and original dated sales receipt. The Manufacturer shall not be obligated to repair or replace any Product that has been subjected to abuse, misuse, alteration, modification, or tampering.

A replacement Product or part of The Product shall be entitled to the remainder of the original Product's warranty period or a period of 180 days from the date of replacement or repair, whichever is longer. This provision shall not extend the original warranty period of the Product beyond the five (5) year limit set forth in the warranty.

WARRANTY LIMITATIONS

This warranty does not include:

- Any use of The Product for purposes other than those for which it was intended, such as use in rental or contract trade.
- Any lack of proper maintenance or care.
- Misuse, abuse, negligence, accidents, or shipping damage.
- Buyer's remorse.
- Normal wear and tear.
- Transportation damage.
- Damage incurred during assembly or maintenance.
- Any used or previously displayed items.

Please note that this list is not exhaustive and that The Manufacturer reserves the right to determine, at its sole discretion, whether a defect or damage falls within the scope of this Limited Warranty.

The Manufacturer makes no express warranty or condition whether written or oral and The Manufacturer expressly disclaims all warranties and conditions not stated in this limited warranty. To the extent allowed by the local law of jurisdictions outside the United States, The Manufacturer disclaims all implied warranties or conditions, including any implied warranties of merchantability and fitness for a particular purpose. For all transactions occurring in the United States, any implied warranty of condition of merchantability, satisfactory quality, or fitness for a particular purpose is limited to the duration of the express warranty set forth above.

In order to obtain warranty service, you must first contact The Manufacturer to determine the nature of the problem and the most appropriate solution.

In order to process your request, The Manufacturer will require you to provide photographs of the defective merchandise, along with a copy of the original invoice. These materials will be necessary for The Manufacturer to verify the defect and determine the appropriate course of action.

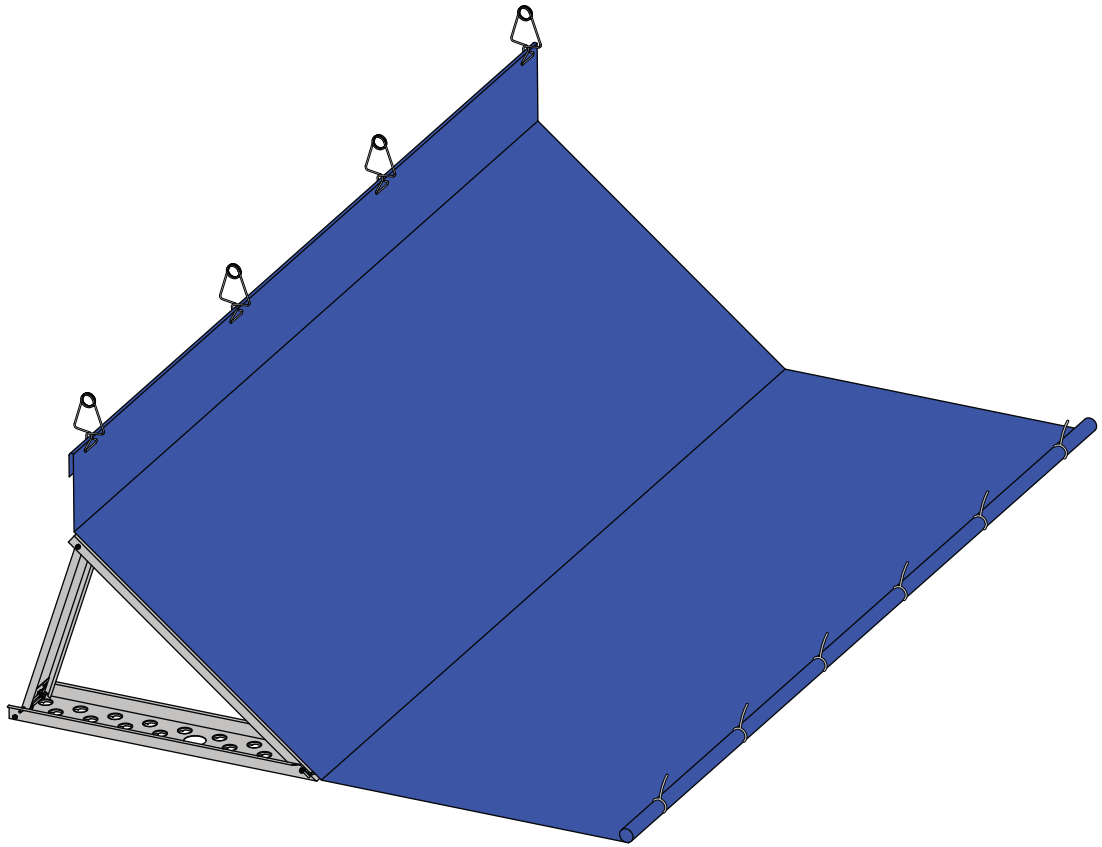
This warranty is provided by:

Geodesign Barriers Inc
228 E 45th Street Ste 9E
New York, NY 10017
United States of America
Phone: +1 (630) 720-5578

GEODESIGN BARRIERS

P40 Industrial

Straight sections - Setup manual



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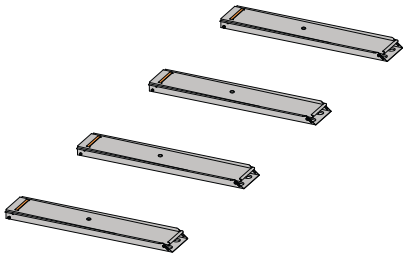
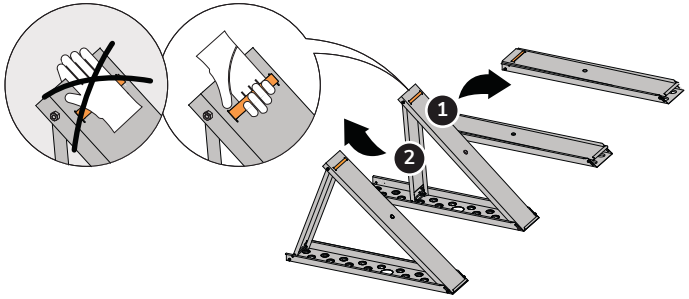


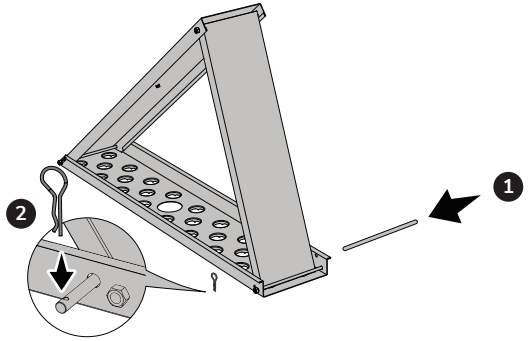
Place the P40 metal supports 3.3 feet apart.

2



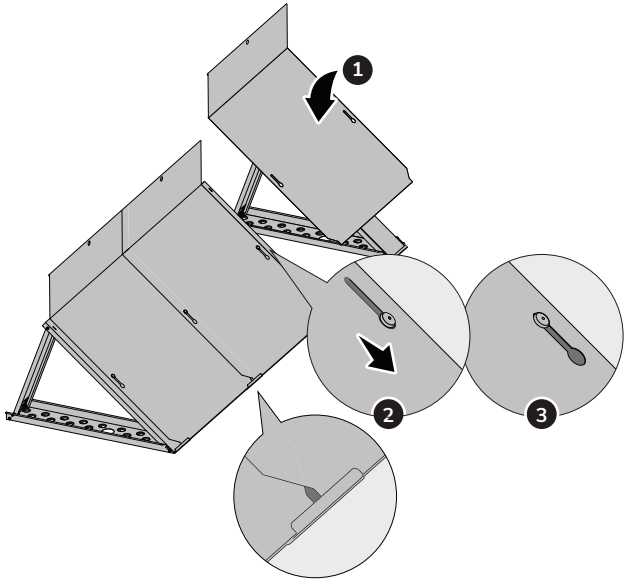
Unfold the P40 metal supports.

3



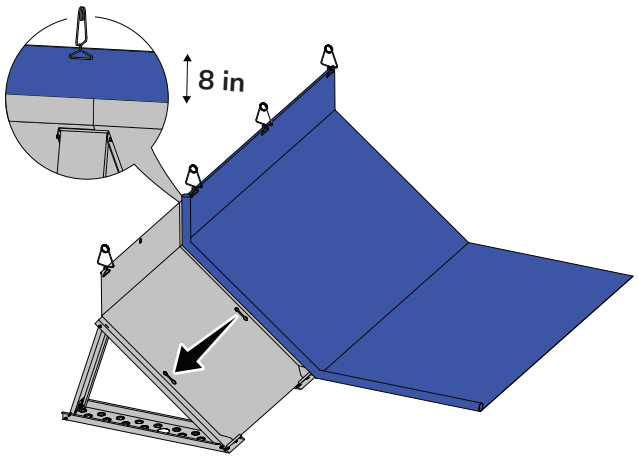
Remove the Security axle and insert it through the bottom beam and supporting beam. Secure with the R-clip.

4



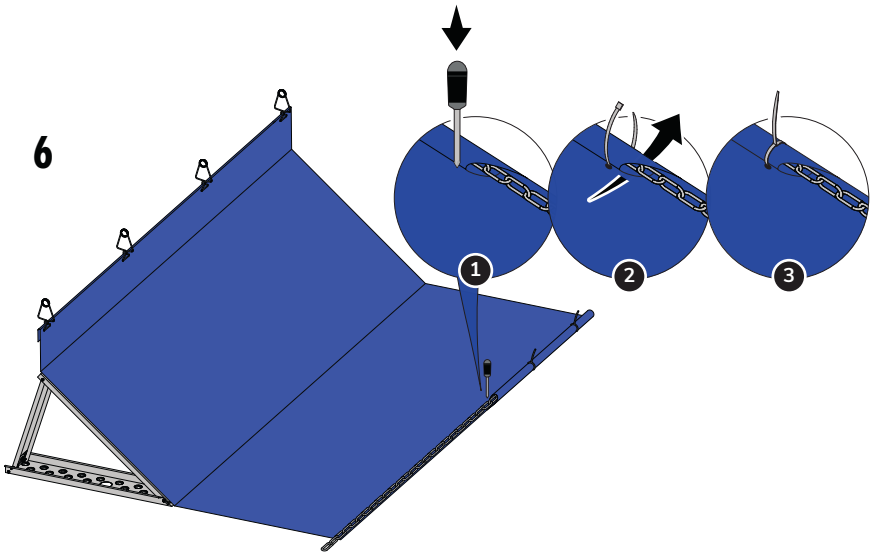
Mount the steel panel by sliding the key hole cut out over the mount button on the P40 metal support. Make sure the steel panel is placed inside the pocket of the front beam.

5



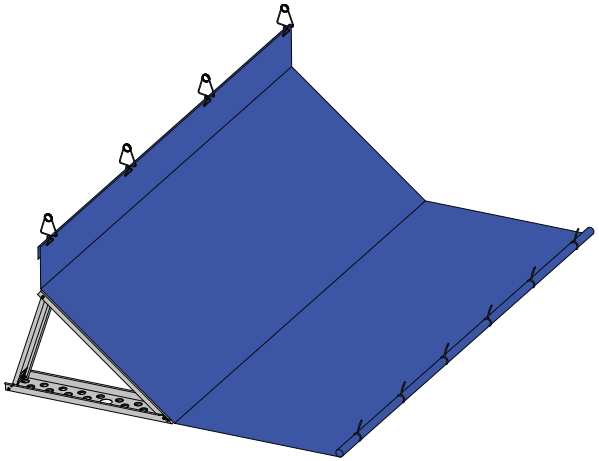
Roll out the membrane and secure it to the barrier with one Sealer clip per section, along the top edge. Ensure that the membrane overlaps 8 inches on the back of the barrier.

6



Connect the chain lengths with the karabiners and place it along the outer edge of the membrane. Wrap the chain in the membrane – no more than 2 turns – and secure with cable ties – one per meter.

7



Installed

GEODESIGN BARRIERS

www.geodesignbarriers.com

FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

Flood Barriers for Perimeter Barrier Applications

Industrial Series Flood Barriers –
Models P24, P32, P40, P48, P61, P81, P101, P121

Heavy Duty Series Flood Barriers –
Models C48, C60, C72, C84, C96, C122, C152, C184, C213, & C245

Prepared for:

GeoDesign Barriers Inc.
12947 SE Suzanne Dr.
Hobe Sound, FL 33455
USA

FM Approvals Class: 2511
FM Approval Standard: Class Series 2510 (Apr. 2019)

Approval Identification: PR453294 Approval Granted: September 20, 2022

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

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