FLOODBREAK VG
INSTALLATION MANUAL

VEHICULAR TRAFFIC RATED PASSIVE FLOOD BARRIER

A step by step guide for the installation of the FloodBreak Vehicular Traffic Rated Fully Passive Flood Barrier

FloodBreak
REVOLUTIONARY FLOOD CONTROL

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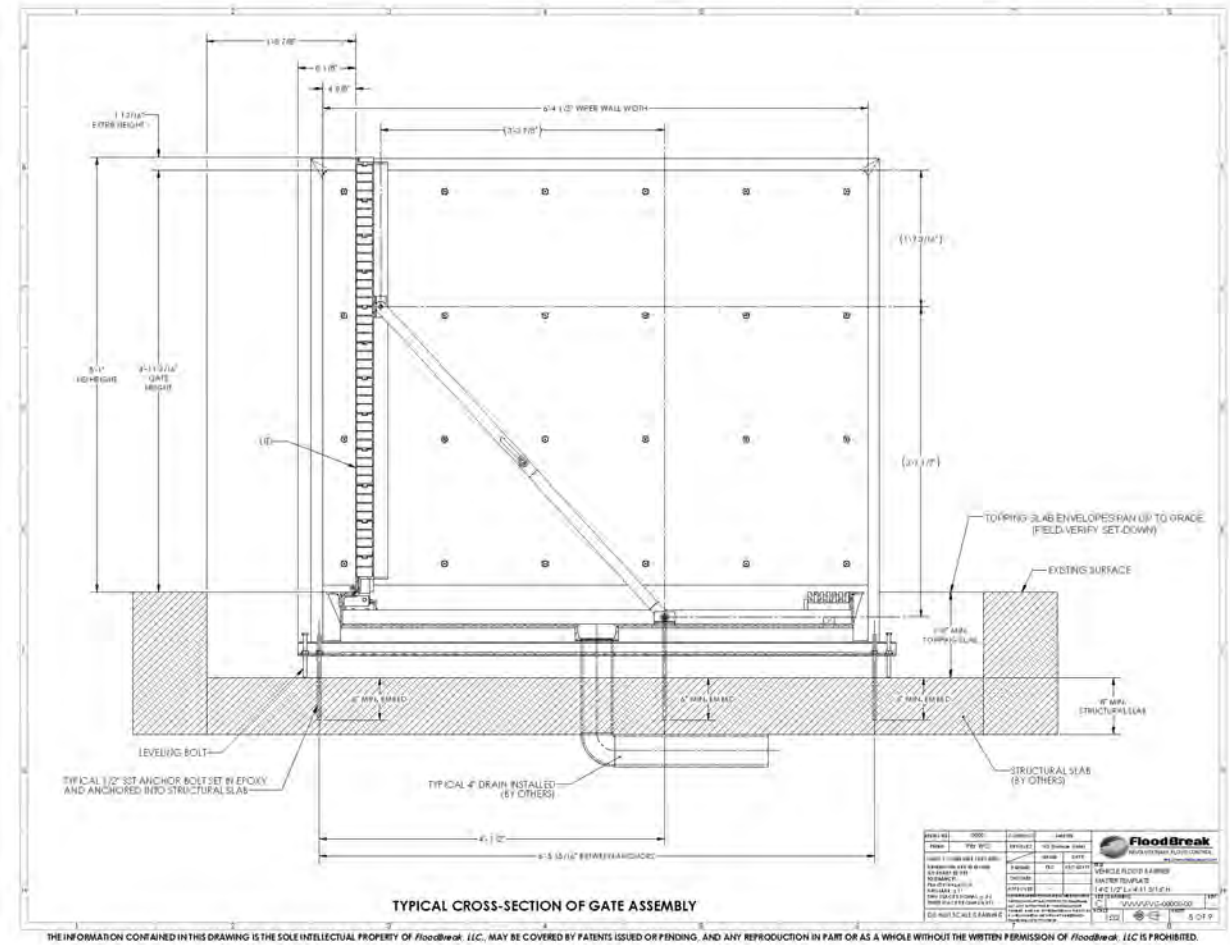
Site Preparation

Every FloodBreak barrier is custom fabricated to suit the flood protection height required and is sized to fit the specific property being protected. For this reason, it is important to refer to the drawings that pertain to the unique gate being installed for all dimensional criteria.

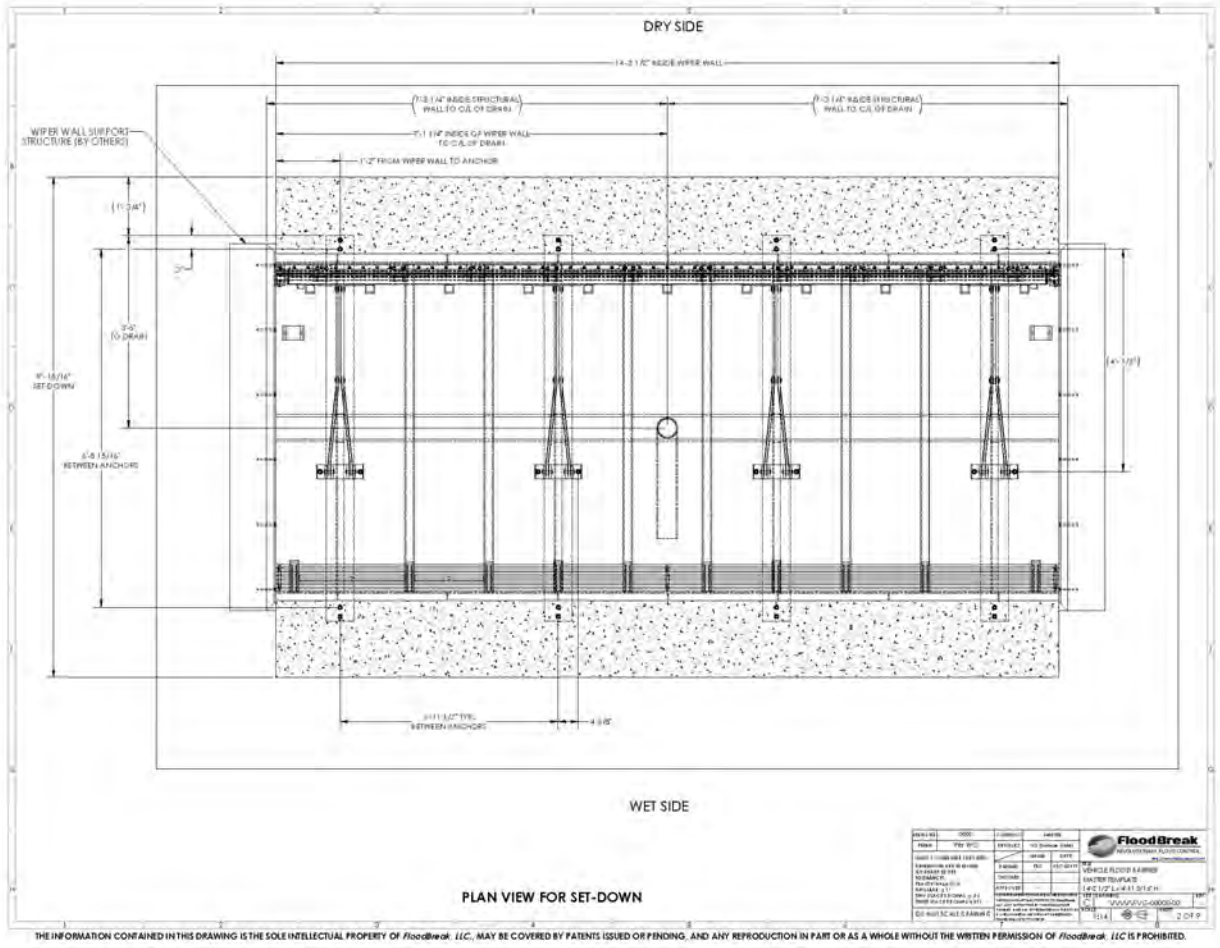
- Structural footing or “foundation” slab requirement
    - ***Example- 1*** - In this example the drawing sheet showing the cross-section of the gate and concrete, provides details such as the minimum structural slab thickness, topping slab thickness, set down width and a gate to slab relationship. The drawing sheet on which this can be found may differ by product and gate but is included with the drawing package provided for your installation.



Example- 1

All concrete foundation pours and the tie-downs to existing foundations shown in the drawings are for illustrative purpose only. Design of the concrete foundation slabs is by others unless specifically noted otherwise.

- Plan view of installation
    - ***Example- 2*** – In this example, the plan view includes the dimensioned concrete leave-out, distance between the wiper wall support structures, placement of the drain as well as the “wet side” and “dry side” indicators which are important for orientating the gate properly.



Example- 2

The drainpipe placement and optional hydraulic supply conduit connections are non-typical and special attention must be paid to the drawing set provided for each gate. It is important to be aware of the wet side and dry side indications on the drawing for the proper understanding of the orientation and how that relates to the plumbing layout. It is strongly advised that an additional small “leave out” be left around the intended plumbing connections to allow access if plumbing positioning must be altered during installation and before topping slab is completed.

Receiving and Temporary Storage

Barrier shipping configuration

Often, the FloodBreak barrier is shipped completely assembled requiring minimal to no final assembly of the component in the field. Depending upon the size of the barrier and shipping logistics available, the barrier may be delivered in sections or segments if required. The sections will be modular and involve minimal effort to join or assemble on site. Wiper walls are also optionally removeable depending upon logistics. Detailed assembly instruction is provided in the ***Installation*** section of this manual.

Delivery Planning and Scheduling

FloodBreak will notify the contractor or designated coordinator prior to scheduling the shipment of the flood barrier(s). This is important to allow for the proper preparation of required equipment, rigging, personnel as well as temporary storage space of the barrier(s).

Unloading the Barrier

As covered in the previous section, it is important to have the proper equipment and rigging available to unload the barrier to avoid damage.

- Do not pick up the barrier by placing forklift forks underneath the unit regardless of size. This can cause damage to the aluminum pan and other structure on bottom side.
- Barriers should be lifted utilizing soft sided nylon lifting straps and “basket” or “cradle” rigging attachment method. ***Example- 3***
- Multiple straps should be placed no more than 6 feet apart and at no more than a 10-degree angle back to lift. A minimum of 2 straps or pick points required for all barriers.
- The use of an adequately sized spreader bar is recommended for larger sections.
- Lift one barrier or section at a time. I.e. if barriers are stacked for shipment, do not lift stack. Lift each piece or segment independently to avoid damage.
- Remove barrier(s) from trailer one at a time, starting with the topmost accessible barrier section. If there are installation kits, boxes or other items stacked on the barrier section to be lifted, please remove these items before lifting the barrier.

Unloading the Accessories

All barriers will include an installation and accessory kit. Depending upon configuration, there may also be additional components such as hydraulic power units, hoses, cabling etc. included in the shipment. It is important that these components are accounted for and unloaded from delivery truck. In some cases, the items are in small boxes and can be transported in the cab or toolboxes of delivery truck. PLEASE REFER TO BILL OF LADING to insure all items shipped have been unloaded.

- Unload installation/accessory box(es) and or pallet(s) by hand or using forklift.
- Larger components such as hydraulic power units are typically shipped on a pallet. If lifting the unit on a pallet, make certain that the unit is secured to the pallet and that the pallet is in a condition suitable to accomplish the lift. If the HPU is not secured sufficiently to the pallet, and or the pallet has been damaged or otherwise unsuitable, please use implemented lifting points on the HPU.

Example- 3

Temporary Storage of the Barrier, Accessories and Components

It is very important to store the barrier and the accompanying accessories and components thoughtfully and purposefully, especially on active job sites and when the installation is not immediate.

- The barrier(s) must be placed on firm flat surface to fully support and prevent possible deformation. ***Example- 4***
- If possible DO NOT STACK barriers. If barriers must be stacked, extreme care must be taken to protect the barrier surfaces while fully supporting and spreading the weight of the barriers equally.
- Choose a location away from jobsite activity that may cause damage to the barrier(s)
- Installation kits contain items such as paints, epoxies and sealants, which are temperature and humidity sensitive. Please store the installation kits in a cool dry place. If hardware kits are too large and space does not permit, please remove the items such as paints, epoxies, and sealants from the hardware kits and place in cool dry place.
- Hydraulic power units should be stored in cool dry place or otherwise protected from the elements.

Example- 4

Installation

In this section, we will cover the typical installation procedure, areas of special attention and overall requirements to insure the barrier functions properly. This section should be fully reviewed by the installation crew prior to installation day. Pre-arrangements are typically made to have a FloodBreak representative on-site for the installation(s). FloodBreak can also be contacted at any time for advice or guidance concerning your barrier and installation.

Planning the installation

The installation timing should be considered and planned to maximize efficiency and minimize impact to the property access as well as protect the newly installed barrier from excessive construction site damage. FloodBreak barriers are often placed in areas that are access points to and from the property being protected. For this reason, it is advised that the barrier installation be done near the end of the construction project to reduce inadvertent damage caused by heavy construction traffic and processes, such as heavy equipment, concrete work, painting etc. If the barrier must be installed in an active construction path, care must be taken to protect the barrier from damage. Some examples are:

- Light foot traffic, and possible small spills:

  - Use plastic sheeting to cover all exposed surfaces
  - Smooth plywood sheets or similar can be added on top of the protective sheeting to protect from light impact.
- Construction equipment or vehicle traffic: (Roadway and Vehicle Barriers only)
  - Road plates or trench plates should be used in addition to the primary protection.
  - Road or trench plates *must be configured to support the entire load and prevent overloading of the barrier, especially before the barrier has been properly installed and fully supported by concrete encasement.*
    - IMPORTANT: ROAD PLATES OR TRENCH PLATES MUST BE ISOLATED FROM THE BARRIER SURFACES TO PREVENT SLIPPAGE, TRANSFER, MARRING AND CORROSION.

Please contact FloodBreak during the planning process to help answer any preparation questions and to secure an installation date available for FloodBreak advisor to attend.

Review and inspect the installation location

Final review and inspection of the installation site and preparations is critical. Please take time to verify that installation site has been prepared to the specifications outlined in the drawings pertaining to each barrier. See the ***Site Preparation*** section of this manual for more details. Verify the following:

- Drain placement and height
- Structural slab thickness
- Structural wall placement
- Hydraulic supply line conduit(s) *if applicable*
- Placement of the HPU(s) *if applicable*
- Site accessibility for equipment used to transport the barrier into position

Installation Tools and Materials Needed

Each FloodBreak barrier is supplied with and installation kit ***Example- 5.*** Below is a list of basic hand tools and building materials that may be needed in addition to the installation kit provided.

- Materials to temporarily support barrier at elevation while adjusting height
  - Masonry blocks. Size increments per installation requirements
  - Lumber dunnage may be used temporarily, but cannot be encased in concrete, therefore must be removed during final leveling and before concrete encasement.
- Rotary laser level or builders transit level
- 4-foot beam level
- Tape measure
- Putty knife
- Orbital sander
- Hammer drill with SDS plus chuck or adapter
- Compressed air or vacuum (for cleaning out holes drilled in masonry)
  - Small hole, long reach (+*12"*) extension for vacuum or compressed air
  - Long reach brush (+*12"*) to help remove debris in 9/16" diameter holes
- Hand tap(s)
  - ½-13 UNC

  - 3/8-16 UNC
- Hex key wrenches
  - 3/16”
  - 7/32”
  - 5/16”
- Adjustable wrench
- ¾” Open end wrench
- ¾” Deep well socket and wrench
  - *Optional* - Cordless drill with adapter to connect to ¾” *socket* (improves efficiency while adjusting levelers on large barriers)
- 1”-1/2” deep well socket and 12” extension (for barriers with hydraulic assist units)
- Claw hammer
- Reciprocating saw
  - Short blade suited for cutting aluminum
- 4” angle grinder
  - Cutoff wheel for steel and stainless steel
  - Cutoff wheel for aluminum
- Painting supplies
  - Paint brush
  - Paint roller assembly
  - Masking tape
  - Paint mixing stick
- Additional ***aluminum or non-compressible plastic shims*** (installation dependent)
  ***Note** Shims are provided with installation kit(s), however additional shims may be needed to accommodate site conditions)*
  - Horseshoe shims ideal. (used around wiper wall wedge anchors)
  - 1/16” to 1/8” increments
- Protective masking supplies to protect barrier during concrete pour
  - Plastic sheeting
  - Masking tape
  - Plywood sheeting
  - Etc.
- Materials to support wiper walls during grouting
  - Lumber for whalers
  - Temporary anchors
  - Etc.
- Armor All brand vinyl protectant spray or equivalent
  (Installation/maintenance tip)
  - Used to lubricate the wiper walls during opening and closing of the barrier lid, which helps prevent the gasket from “flipping” or “rolling”.
  - DO NOT USE PETROLEUM BASED LUBRICANTS

Example- 5

Installation Steps

Step 1 Clean the installation area

Clear excess dirt and debris from the structural slab and the structural walls that the barrier will be anchored to.

Step 2 Determine final elevation and position

The surface of the barrier, when closed, will be at finished elevation. Before moving the barrier into position, it is advised that a guideline or mark be placed on the structural walls that will help the installers rough in the barrier elevation. Final elevation can be verified with a transit level if required. Similar markings can be placed within the leave out to further help roughly position the barrier while lowering.

Step 3 Cut excess drainpipe length

If the barrier is designed for a vertical drainpipe (which enters the pan from the bottom side), it is suggested that some of the excess length be trimmed before moving the barrier into position. This is important because the barrier will be in the closed position initially and will not be able to rest at the desired elevation if the drainpipe meets the underside of the barrier lid. Using the final elevation determinations from ***Step 2*****,** along with measurements taken from the barrier, cut the excess drainpipe length leaving approximately ½" to 1" protruding into the pan or drain trough. This will allow for some fine adjustment and the drainpipe will be cut to flush after concrete encasement.

Step 4 Move the barrier into position

IMPORTANT: The barrier must be properly rigged and supported using appropriately sized rigging, spreader bars, and machinery during the placement procedure. See ***Receiving and Temporary Storage*** section of this manual for proper rigging, lifting and transporting instruction.

- Verify that the barrier is oriented correctly. Dry side of barrier must face the protected property. Please refer to the barrier specific drawing and the ***Site Preparation*** section of this manual for more details.

- Rough position the barrier between the structural walls and within the leave out. If the barrier has a vertical pan mounted drain, stop just above drainpipe for inspection.

- Slowly lower the barrier onto the foundation taking care to align with pre-cut opening for vertical drain if equipped. ***Example- 6***

- If the barrier will need no more than the 4.5" of elevation adjustment provided by the leveling screws, the barrier may be lowered completely to rest upon the foundation.

  Note: If the barrier will need to be elevated from the foundation more than the leveling screws will allow, masonry blocks should be used beneath each mounting channel to rough in elevation. Final leveling will still be accomplished by the leveling screws, therefore masonry blocks will also need to be placed under the leveling screws to allow for adjustment. These blocks will remain and be encased in concrete.

- Align the barrier within the leave out before installing the leveling screws. If the barrier must be adjusted after the leveling screws are in contact with the foundation, care must be taken not to "drag" the barrier on the leveling screws. The screws will bend in the aluminum channel causing them to fail. Furthermore, the leveling screws will leave gouges in the foundation making it difficult to move the barrier out of the gouges.

Example- 6

Step 5 Install the leveling screws and raise to approximate elevation

- Clean the ½-13 UNC threaded holes in the mounting channel before installing the leveling screws. If necessary, carefully "chase" the threads with ½-13 UNC hand tap. ALUMINUM THREADS - DO NOT CROSS THREAD!
- Install all the leveling screws into the mounting channels. Thread into the channel until in contact with the foundation. IMPORTANT: DO NOT try to lift the barrier at this point.
- After all the leveling screws are installed, begin the process of raising the barrier by carefully adjusting each leveling screw no more than ½" at a time. REMEMBER - The mounting channel threads are ALUMINUM and will fail if overloaded by trying to lift entire barrier on single screw. Move around the perimeter as many times as necessary to equally raise the barrier no more than ½" of thread at a time. It is helpful to use lumber as a lever to relieve the stress on the leveling screw while adjusting.

Step 6 Level the barrier

- The barrier must be level to function properly. It is important that the surrounding surfaces are not used to dictate barrier level.
- Using a transit level, start the leveling process by finding the mounting channel that is at the highest elevation after the rough leveling process. All other points will be adjusted to match this elevation.
- Working on whichever side of the barrier the highest elevation was found or established, start moving away from this point and along that barrier edge to each leveling screw. Adjust each screw slightly up or down to match the established high point elevation. *NOTE: it is usually required to adjust several screws in a row to uniformly raise or*

lower the barrier, especially if the barrier needs to be lowered and the leveling screw loses contact with the foundation. Several passes at each screw along the barrier may be required.

- After completing the leveling process on one side of the barrier, move to the other side and continue the process of gradually moving all leveling points to the established high point elevation.
- The expected result of the leveling process should be within 1/16" or better at all leveling points. The FloodBreak field representative should be consulted if this is not the case.
- Double check your work. After the gate has been leveled. Check again and make certain that each leveling screw is in contact with the foundation.

Step 7 Install mounting channel anchors

- Using the appropriately sized extended length hammer drill bit provided in the installation kit, begin match drilling the holes required for installing the mounting channel anchors. **See drawings for minimum embedment depth**. *NOTE: If obstructions such as rebar are encountered while drilling the mounting channel anchor holes, use a rebar cutting drill to overcome the obstruction **if allowed**. If the cutting of rebar obstruction is **disallowed**, please consult FloodBreak with actual achieved depth and number of affected holes for disposition **before** installing the anchors.*
- Clean the holes using brush and compressed air or vacuum. See literature included with the HILTI 200 Epoxy provided in the installation kit for further details.
- Prepare the stainless-steel threaded rods to be installed by placing a nut and washer on one end. This will ensure that the threads are in working order before the rod is inserted into the epoxy.
- Following the manufacturer's instructions included with the *HILTI 200* epoxy provided, epoxy the stainless-steel threaded rods into the holes drilled. *NOTE: If the concrete is wet or does not meet the requirements outlined by the manufacturer for the epoxy provided, please contact FloodBreak field representative for alternative solutions.*
- Refer to the *HILTI 200* data sheet concerning cure time for your ambient and base material temperature.
- Once the epoxy has reached the cure time, hand tighten all the nuts. Hand tighten only at this point.

Step 8 Open the barrier

- Prepare the barrier for opening by generously spraying Armor All brand vinyl protectant onto the wiper wall surface(s) to help prevent the gasket from "rolling" or "flipping" during manual operation.
- Remove the inlet grating using the tools provided in the installation kit and set aside
- Attach the stainless cable(s) to the integrated lifting lugs using the hardware provided. *NOTE: some very small barriers that do not require machinery to lift, may not be supplied with a cable. See packing slip included with the hardware kit.*
- Rig the cable to the forklift or machinery being used to lift the barrier, utilizing a nylon strap or lifting ring. DO NOT place the stainless-steel cable directly onto a forklift fork! The cable can be cut rapidly by the edges of the fork while sliding! Please rig appropriately!
- Use the machinery to lift the barrier lid gently along its swing radius. **DO NOT ONLY LIFT VERTICALLY!!! Be mindful that the barrier lid is hinged and will need to be "walked" up in a progressive up and forward motion.**
- Once the barrier lid is vertical and still being held safely by the lifting equipment, place the prop rods into the receivers and secure with pin(s) provided.
- After all the prop rods are installed and secured, the machinery used to open the barrier may be disconnected and moved away if needed.

Step 9 Install retention arm anchors

- Using the appropriately sized extended length hammer drill bit provided in the installation kit, begin match drilling the holes required for installing the retention arm anchors. **See drawings for minimum embedment depth**. *NOTE: If*

*obstructions such as rebar are encountered while drilling the retention arm anchor holes, use a rebar cutting drill to overcome the obstruction **if allowed**. If the cutting of rebar obstruction is **disallowed**, please consult FloodBreak with actual achieved depth and number of affected holes for disposition **before** installing the anchors.*

- Clean the holes using brush and compressed air or vacuum. See literature included with the HILTI 200 Epoxy provided in the installation kit for further details.
- Prepare the stainless-steel threaded rods to be installed by placing a nut and washer on one end. This will ensure that the threads are in working order before the rod is inserted into the epoxy.
- Following the manufacturer's instructions included with the *HILTI 200* epoxy provided, epoxy the ½-13 UNC stainless steel threaded rods into the holes drilled. *NOTE: If the concrete is wet or does not meet the requirements outlined by the manufacturer for the epoxy provided, please contact FloodBreak field representative for alternative solutions.*
- Refer to the *HILTI 200* data sheet concerning cure time for your ambient and base material temperature.
- Once the epoxy has reached the cure time, hand tighten all the nuts. Hand tighten only at this point.

Step 10 Install hydraulic lift arm anchors (if equipped)

- Using the appropriately sized diameter extended length hammer drill bit provided in the installation kit, begin match drilling the holes required for installing the hydraulic lift arm anchors. **See drawings for minimum embedment depth**. *NOTE: If obstructions such as rebar are encountered while drilling the lift arm anchor holes, use a rebar cutting drill to overcome the obstruction **if allowed**. If the cutting of rebar obstruction is **disallowed**, please consult FloodBreak with actual achieved depth and number of affected holes for disposition **before** installing the anchors.*
- Clean the holes using brush and compressed air or vacuum. See literature included with the *HILTI 200* Epoxy provided in the installation kit for further details.
- Prepare the stainless-steel threaded rods to be installed by placing a nut and washer on one end. This will ensure that the threads are in working order before the rod is inserted into the epoxy.
- Following the manufacturer's instructions included with the HILTI 200 epoxy provided, epoxy the stainless-steel threaded rods into the holes drilled. *NOTE: If the concrete is wet or does not meet the requirements outlined by the manufacturer for the epoxy provided, please contact FloodBreak field representative for alternative solutions.*
- Refer to the *HILTI 200* data sheet concerning cure time for your ambient and base material temperature.
- Once the epoxy has reached the cure time, hand tighten all the nuts. Hand tighten only at this point.

Step 11 Connect parallel exiting drain (if equipped)

If the barrier is equipped with hydraulic lift assist, the drains will exit parallel to the barrier on the wet side. Make appropriate connections per drawing layout.

Step 12 Connect the hydraulic supply and return lines (if equipped)

Route the hydraulic supply and return lines into the pan thru the connection point provided. The supply and return lines should be routed to the barrier through appropriately sized soft bend conduit. It is never advised to run the hydraulic lines without conduit. The lines need to be accessible for maintenance and replacement if required.

Step 13 Trim excess anchor length

It is critical that any excess length be trimmed from the retention arm mounting anchors before lowering the barrier lid. Failure to do so will damage the interior lid surface by puncturing it. The anchors must be cut off below the support rib elevation.

Step 14 Close the barrier

- Attach the stainless cable(s) to the integrated lifting lugs using the hardware provided. *NOTE: some very small barriers that do not require machinery to lift, may not be supplied with a cable. See packing slip included with the hardware kit.*
- Rig the cable to the forklift or machinery being used to lower the barrier, utilizing a nylon strap or lifting ring. DO NOT place the stainless-steel cable directly onto a forklift fork! The cable can be cut rapidly by the edges of the fork while sliding! Please rig appropriately!
- Use the machinery to put a very slight tension on the cable(s) ensuring that the machinery is supporting the barrier lid during the prop rod removal.
- Once it is verified that the barrier lid is safely supported in place with the machinery, remove the prop rods from the receivers and place back into the appropriate stowed position in the pan. *IMPORTANT: Make certain that the prop rods and included hardware are lying flat and will not be an obstruction for the barrier lid once lowered.*
- Use the machinery to lower the barrier lid slowly along its swing radius. **DO NOT ONLY LOWER VERTICALLY!!! Be mindful that the barrier lid is hinged and will need to be "walked" down in a progressive down and away motion.**
- Once the barrier lid is closed and resting in pan, disconnect the cables from the lifting lugs and remove from the barrier. IMPORTANT: DO NOT leave the cables attached to the barrier lid. Cables can become obstructions for the barrier lid.
- Replace the inlet grating and verify that it rests flat on all contact points. If the grating does not sit flat after re-installing, it may be necessary to make minor adjustments to the anchoring points. Please contact FloodBreak field representative for advice.

Step 15 Shim and anchor wiper walls

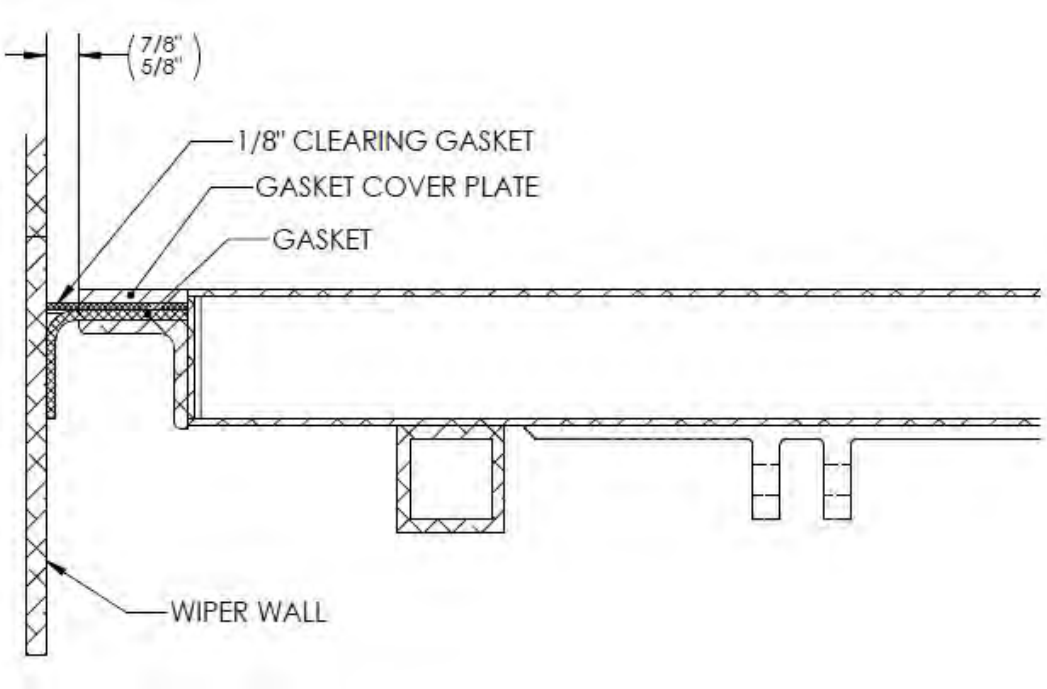
It is crucial that this step be done properly. Failure to properly align and anchor the wiper walls can cause the barrier to fail to deploy or leak excessively resulting in property damage.

- Begin placing approved shim materials between the wiper wall and structural wall to achieve proper spacing.
    - Shims must be non-compressible, non-organic and compliant with dissimilar materials criteria to avoid galvanic corrosion. Use only approved shim materials.
    - Assure that there is no re-bar or non-approved materials in contact with the wiper wall surface.
    - Use a level and straight edge to verify perpendicularity and flatness of wiper wall.
    - Wiper wall must be perpendicular to the barrier lid surface.
    - Straight edge should be used horizontally across wiper wall surface to indicate flatness or high and low spots in addition to the perpendicularity requirement.
    - Ideally, shims are installed at every accessible anchoring hole in the wiper wall. This is typically the first horizontal row from the top and vertical rows from each edge. Additional shims can be utilized if necessary, if they can be secured, preventing movement during grouting process.
- Using the appropriately sized masonry bit provided, match drill the wiper wall to the structural wall. Holes should be drilled to a depth to allow for wedge anchor to be completely flush with wiper wall once installed. **See drawings for minimum embedment depth**.
- Working perimeter holes first, begin installing anchors one at a time, ensuring that the wiper wall will be flat and perpendicular to the barrier surface once anchors are fully tightened.
    - Hint: Before tightening anchors, press firmly on the wiper wall and shim(s) in the location being anchored to determine if shim(s) will need to be adjusted before tightening the anchor.
    - Continually evaluate and verify perpendicularity and flatness as each anchor is installed.

- Install the anchors in the inner rows.
    - These anchor points may be unsupported with shims due to inaccessibility.
    - Utilize straight edge to determine flatness of wiper wall plane. Do not overtighten unsupported anchors as this can cause a depression in the wiper wall plane surface.
        - Slight depression(s) in the unsupported areas of the wiper wall plane, measuring ¼" or less, are acceptable. Depressions exceeding ¼" must be remedied.
        - Raised areas in the wiper wall plane are **NOT ACCEPTABLE**. Raised areas must be drawn down to the perpendicular plane established. Failure to do so may result in barrier binding during deployment.

Step 16 Evaluate the wiper wall to barrier alignment.

- Test the function of the barrier by opening the barrier as described in ***Step 8*** or by utilizing the hydraulic lift assist *(if equipped) see* ***Step 17***
- Perform this procedure very slowly, with a spotter watching the interface of barrier lid and each wiper wall simultaneously during opening.
    - If any binding occurs, STOP IMMEDIATELY to avoid damaging the barrier. Safely lower the barrier lid and adjust wiper walls as required.
- The ideal gap between the gasket cover plate and the wiper wall is specified in the drawings provided. ***Example- 7***
- If the barrier lid can open fully without any binding and the gasket maintains uniform contact throughout deployment arc, the wiper walls are adjusted properly, and the barrier may be lowered.



Example- 7

Step 17 Run in of Hydraulic system (if equipped)

Note: *If barrier is not visible from the location of the hydraulic controls, please use a spotter located at the barrier that can communicate back to the operator. This is for safety as well as preventing unnecessary damage.*

It is critical that there be no traffic, pedestrians or any obstruction on or around the flood barriers during the deployment with the hydraulic assist.

- Make certain that there is no traffic, pedestrians or any obstruction on or around the barrier.
- Once operator(s) have established communication or line of sight to barrier, the remote HPU may be energized.
- After powering on the HPU, use the up/down actuation lever or button to lift the flood barrier to the fully upright position. Continue to hold the actuator for about 5 seconds after reaching full extension to help purge air pockets introduced during installation.
- Lower the barrier by using the up/down actuation lever or button. ENSURE THAT THE BARRIER IS FOLLOWING OR MAINTAING CONTACT WITH THE LIFT ARM(S) DURING THE LOWERING PROCESS. STOP IMMEDIATELY AND ADDRESS IF NOT. Once the barrier has completely closed, continue to hold the actuator in the down direction for about 5 seconds.
- Do the steps of raising and lowering the barrier described above, two or three times or until smooth, predictable operation is achieved and the lift arms are in sync. If the barrier up/down operation does not operate smoothly and predictably or the lift arms are not in sync after performing these steps a few times, please contact FloodBreak field representative for advice. Failure to achieve uniform lifting and synchronization of all lifting arms in the system could result in potential damage to the barrier and/or lifting system.

NOTE: If work is to be done inside the pan once the barrier has been opened with the hydraulic assist, please install the prop rods as described in ***Step 8*** *for safety while working within the barrier.* ***DO NOT FORGET TO DISENGAGE AND PROPERLY STOW THE PROP RODS BEFORE ATTEMPTING TO LOWER.***

Step 18 Pour enveloping/topping slab

- IMPORTANT: *Consult the structural engineer for concrete and or grout design.*
- Prepare the barrier for the final concrete and grouting pours by covering and protecting the barrier surfaces to prevent damage and protect from concrete and grout splashing etc.
- Calculate the amount of concrete needed to complete the pour in a single stage.
- Concrete must be poured at a consistency or slump that will allow for complete **VOID FREE** encasement. ***Failure to provide complete void free encasement can result in excessive wear, metal fatigue and potential failure of the barrier.***
- Utilization of a vibration tool to work out air pockets is required, however take care not to perform this process in excess and cause movement or distortion of the barrier.
- It is advised to pour the concrete from the wet side of the barrier and work it through to the dry side to ensure complete encasement. Vibrating from both wet and dry sides is highly recommended.

Step 19 Fill space behind wiper wall(s)

- Prepare the barrier for the final concrete and grouting pours by covering and protecting the barrier surfaces to prevent damage and protect from concrete and grout splashing etc.
- **IMPLEMENT ADEQUATE SUPPORT STRUCTURE(S) I.E WHALER BOARDS AND FRAMING STRUCTURE TO COMPLETELY SUPPORT THE WIPER WALL(S) DURING THE GROUTING PROCESS.** ***FAILURE TO PROPERLY AND ADEQUATELY SUPPORT THE WIPER WALL(S) DURING THE GROUTING PROCESS CAN RESULT IN MOVEMENT OF THE WIPER WALL(S) AND POTENTIAL BARRIER FAILURE!***
- See step above!!!!

- Using a high flow non-shrink grout, carefully fill the area between the aluminum wiper wall(s) and the structural support wall(s) they are anchored to. Ensure there are no voids and that the wiper wall(s) are not moved out of alignment while grouting.

Step 20 Seal cold joints and exposed grout

- Use only approved sealants shipped with the installation kit
- Self-leveling sealant, *SIKAFLEX 1CSL* or equivalent, should be applied to all horizontal cold joints or where the barrier meets the topping slab.
- *SIKAFLEX 1A* or equivalent sealant should be applied to all exposed grout surfaces between wiper wall(s) and structural walls. This important step is to prevent efflorescence through the wiper wall seams.

Step 21 Seal drain

- After the encasement concrete work has been completed and allowed time for initial cure, open the barrier (See ***Step 8*** or ***Step 17*** if equipped)
- Ensure that the drainpipe is cut flush with the drain trough or pan surface. Leaving the drainpipe above flush may keep the barrier from properly and fully draining.
- Seal around the drainpipe with *SIKAFLEX 1A* or *SIKAFLEX 1CSL* self-leveling sealant provided or equivalent.
- Close the barrier and replace the inlet grating.

Step 22 Finish out wiper wall surfaces

- Prepare to finish out the putty and painting process of the wiper walls by covering and protecting the other barrier surfaces with plastic sheeting, masking tape or equivalent procedures.
- Clean the wiper wall with denatured alcohol to remove any remaining dirt or Armor All residue
- Mix the two-part metal to metal epoxy supplied per the manufacturer's instructions. *(TIP: use small amounts to start with until you have a good understanding of how quickly the epoxy will harden.)*
- Apply the epoxy resin to the heads of the anchors in the counter-sunk holes with the goal of having enough material to perform a final sanding leaving a flat smooth finish. Perform in stages if required.
- After the countersinks have been filled completely, allow to harden.
- Using an orbital sander and 100 to 180 grit sandpaper, sand the epoxied areas to blend smoothly into the wiper wall surface.
- Inspect for high spots, low spots, voids etc. Repair and areas needed to achieve perfectly flat and smooth surface for the barrier gasket to seal against.
- Once the all the epoxy work is completed satisfactorily, prepare the wiper wall surface for painting by lightly sanding the entire surface. This will help ensure a well bonded uniform finish once painted.
- Mix the two-part epoxy paint (color should match barrier lid surface) by simply combining the part A and part B cans provided.
- Completely paint the wiper walls to provide a clean smooth finish. *Tip: utilize a*
- *roller if possible. Brushing the epoxy paint on large surfaces does not provide a uniform smooth finish.*

Step 23 Installation verification

- Make sure the manual lifting cables and shackles are removed from the barrier.
- Ensure that the inlet grating section(s) are properly installed and fastened if equipped with fasteners.
- Prepare the manual lifting cables, shackles and inlet grating removal tools to be delivered to the end user or end users maintenance team
- Complete the FloodBreak installation verification form providing required photos as indicated.