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(54) **METHOD AND SYSTEM FOR A STATIC FLOODWALL SYSTEM**

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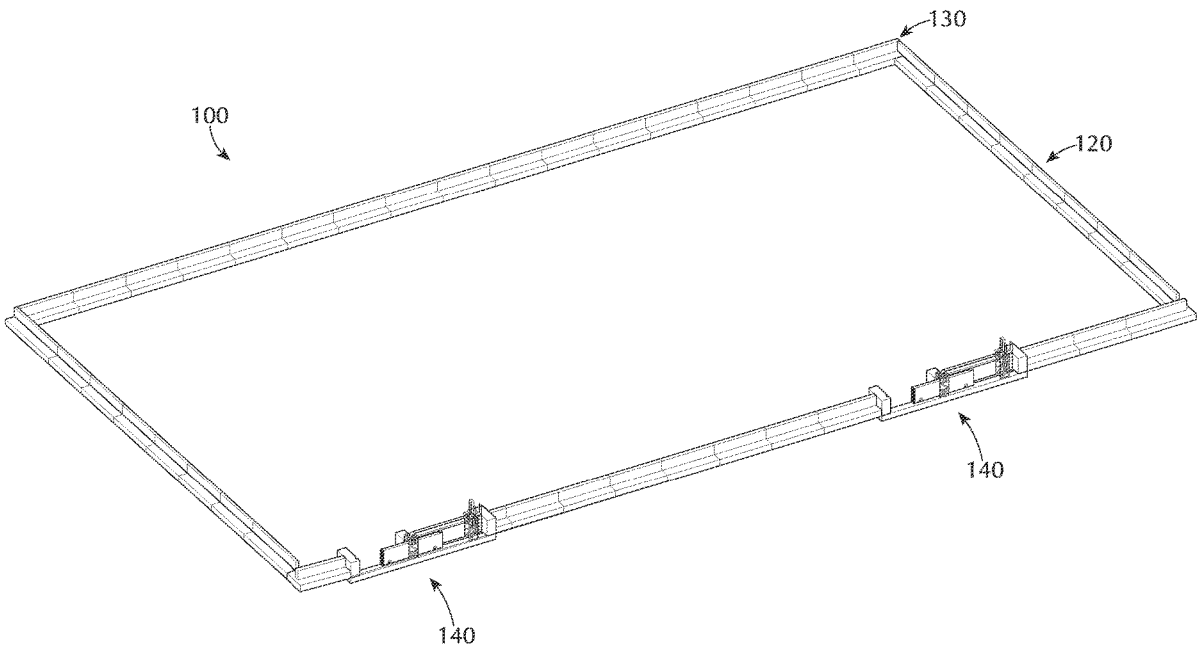
(57) **ABSTRACT**

A static floodwall system that includes at least one floodwall section, and may include an access gate. The access gate may include a motor, control box, and drive system for moving a gate panel between open and closed positions. The static floodwall system may further include a plumbing system for transporting rain water from a dry side to a wet side. The floodwall system may be installed such that it is surface mounted, requiring minimal excavation. Methods of installing the floodwall system include creating a shallow excavation, adding compact fill and a top layer to the excavation site, and installing the floodwall section(s) on the top layer.



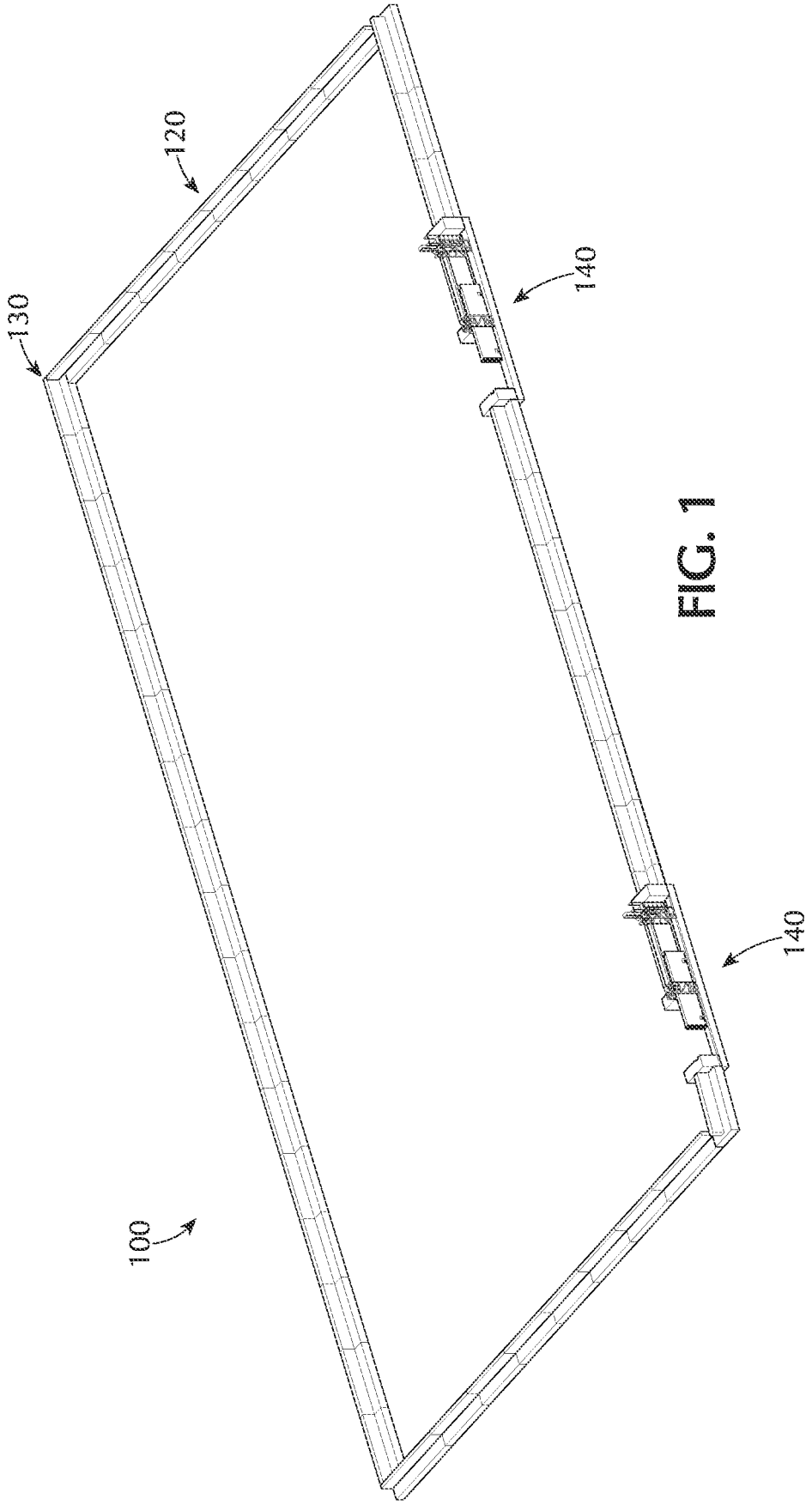


FIG. 1

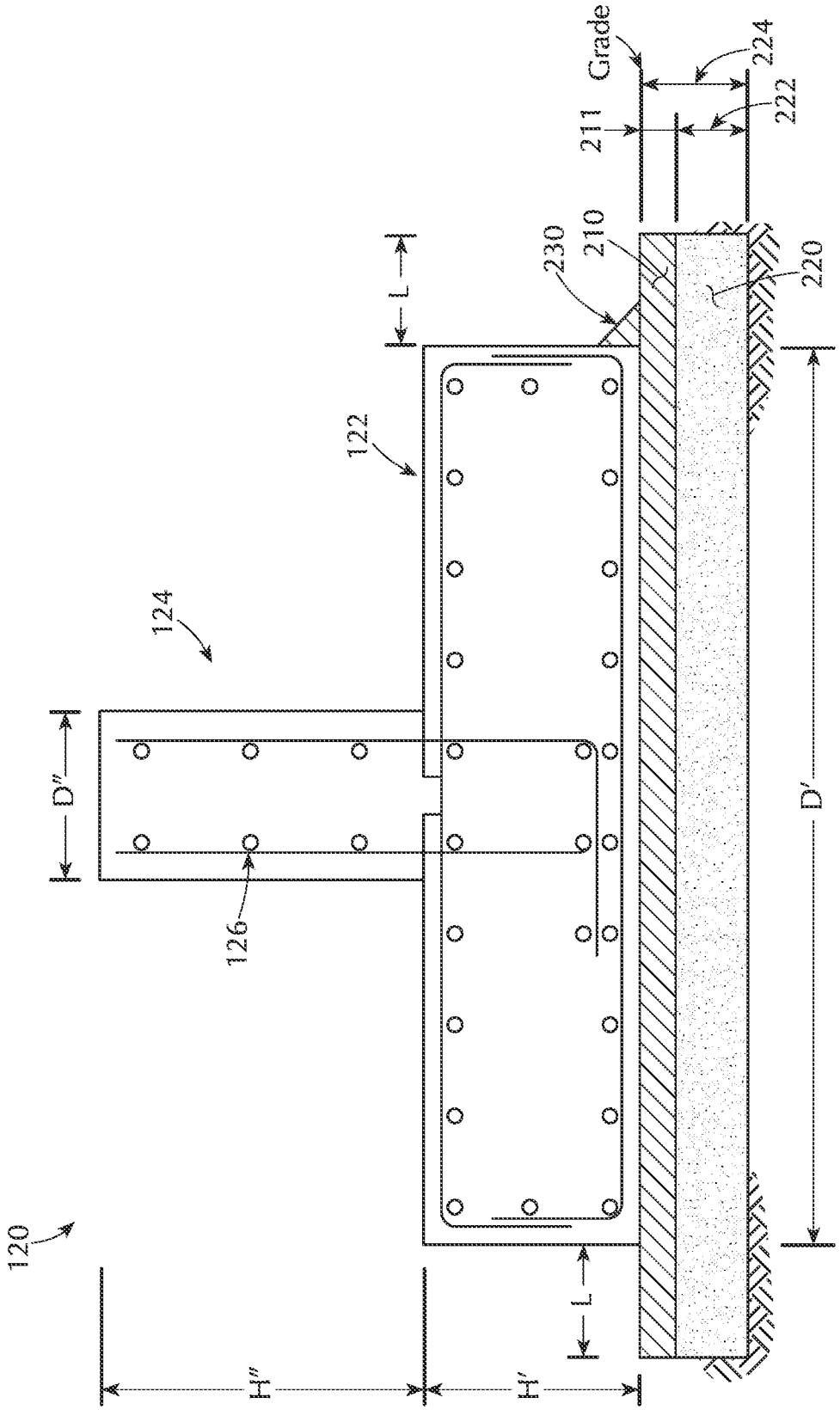


FIG. 2

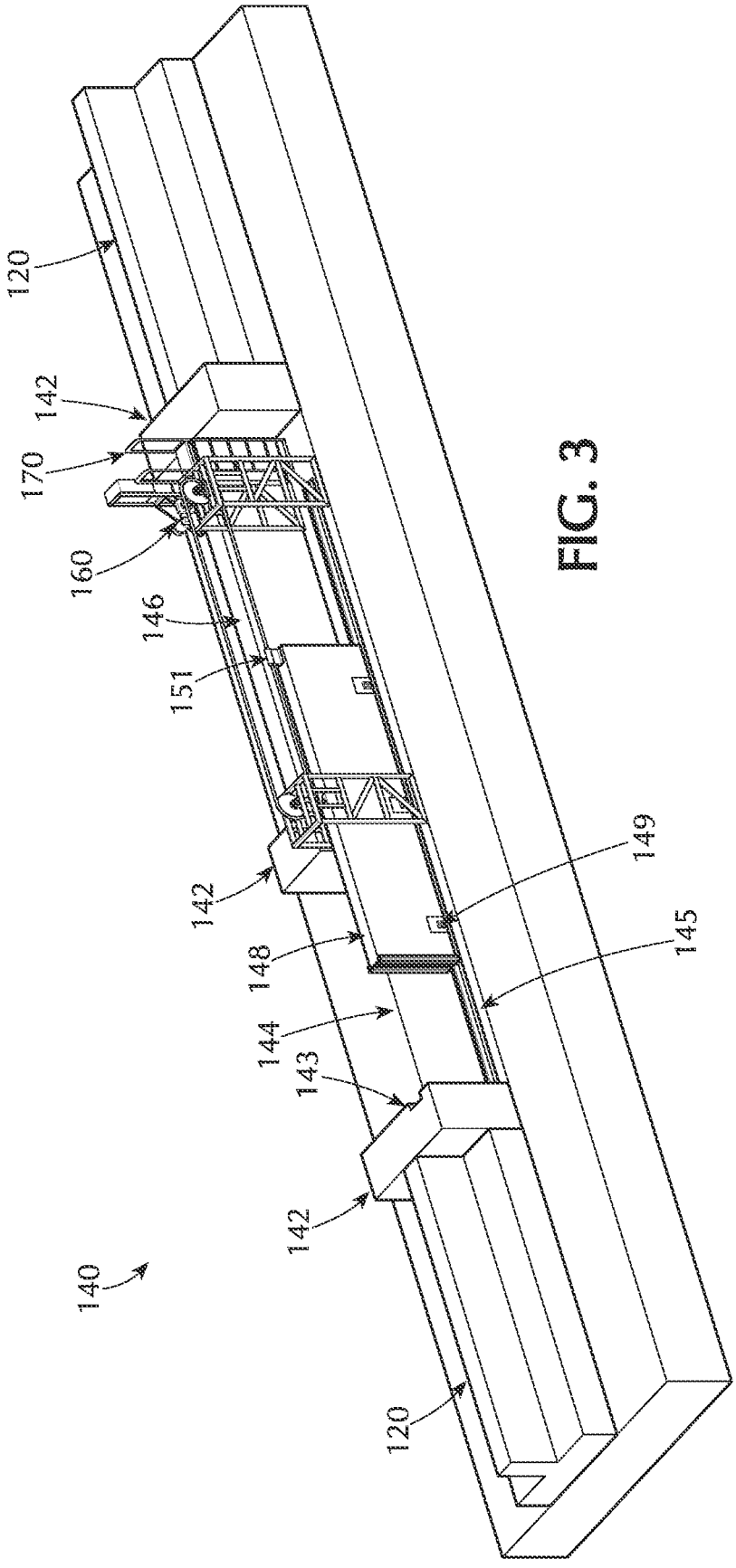


FIG. 3

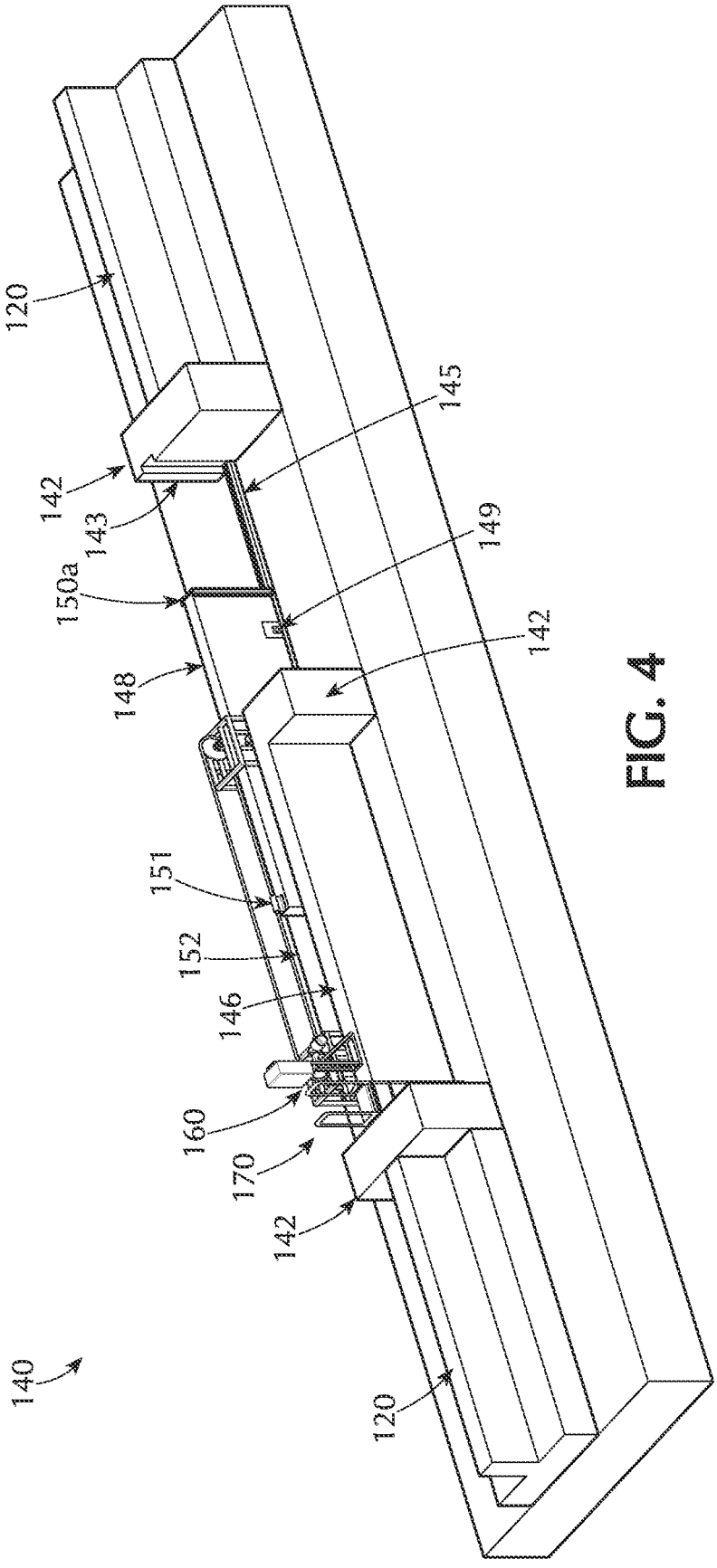


FIG. 4

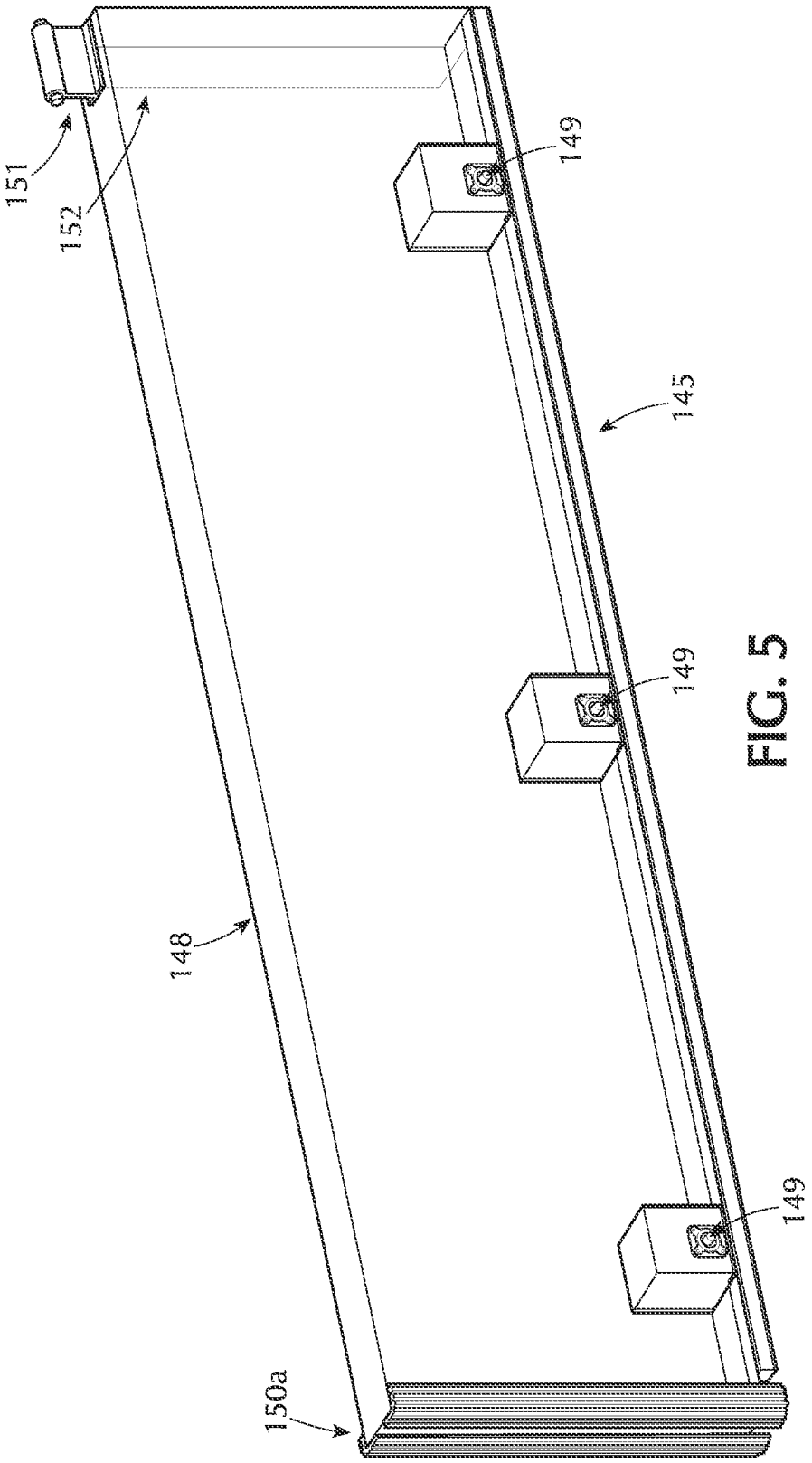


FIG. 5

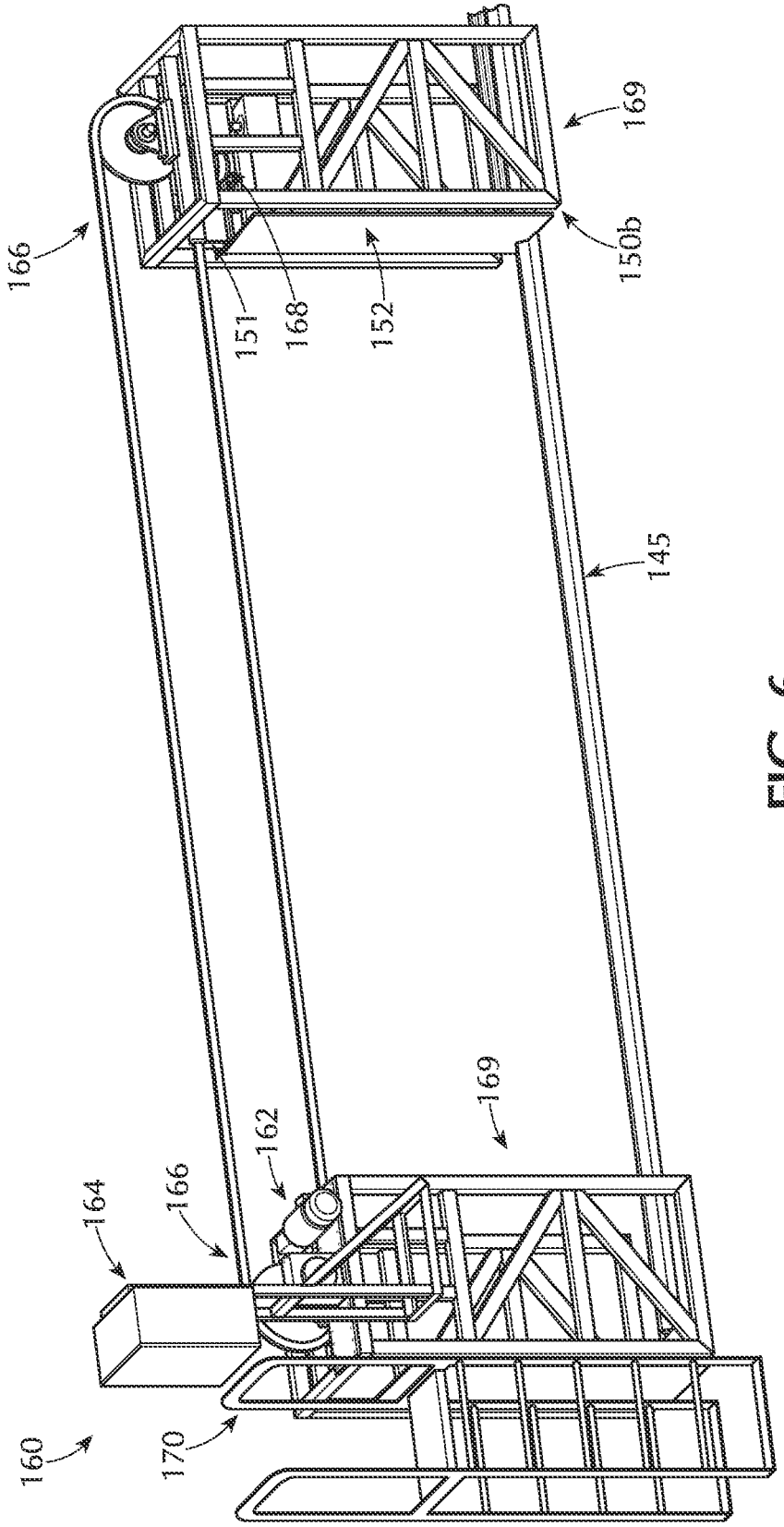


FIG. 6

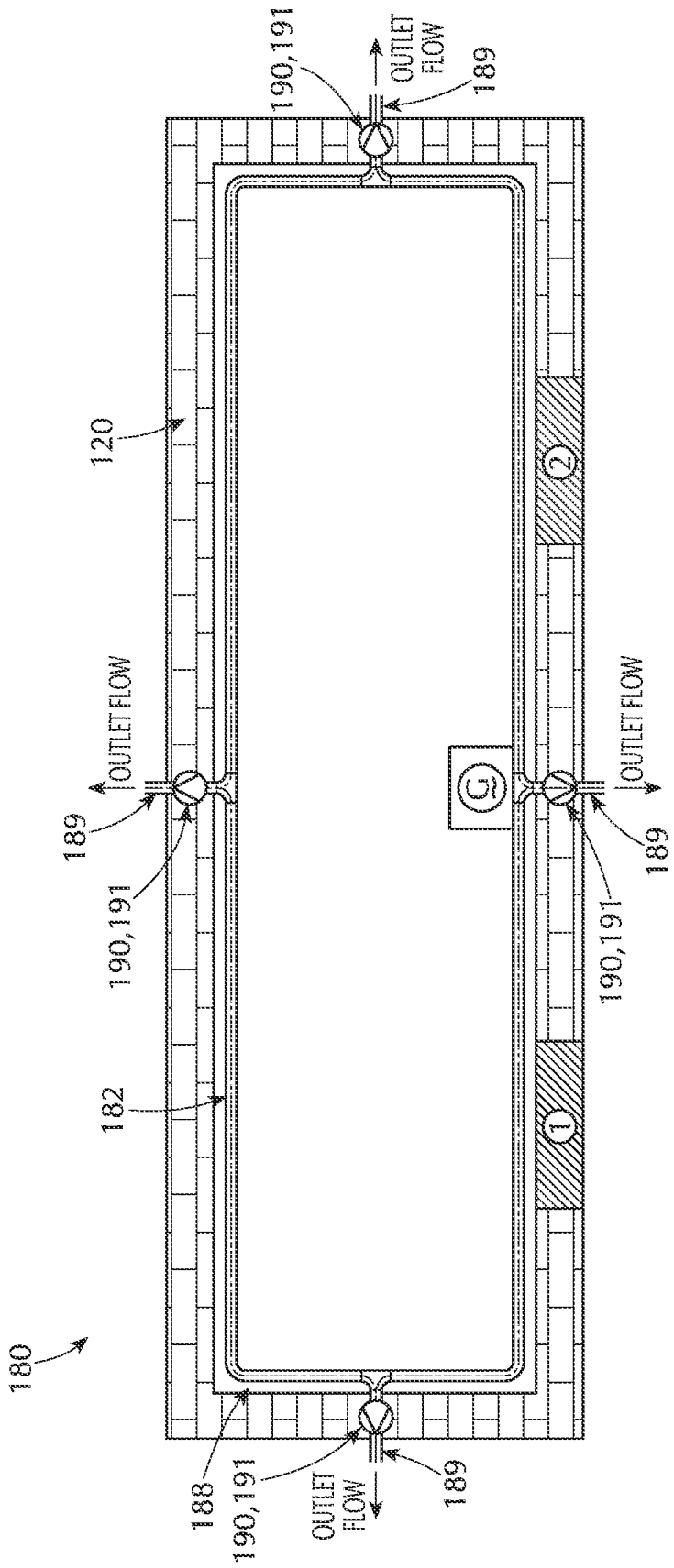

190,191
OUTLET FLOW
189
120
2
OUTLET FLOW
189
190,191
G
OUTLET FLOW
189
190,191
182
1
180
188
190,191
OUTLET FLOW
189

FIG. 7

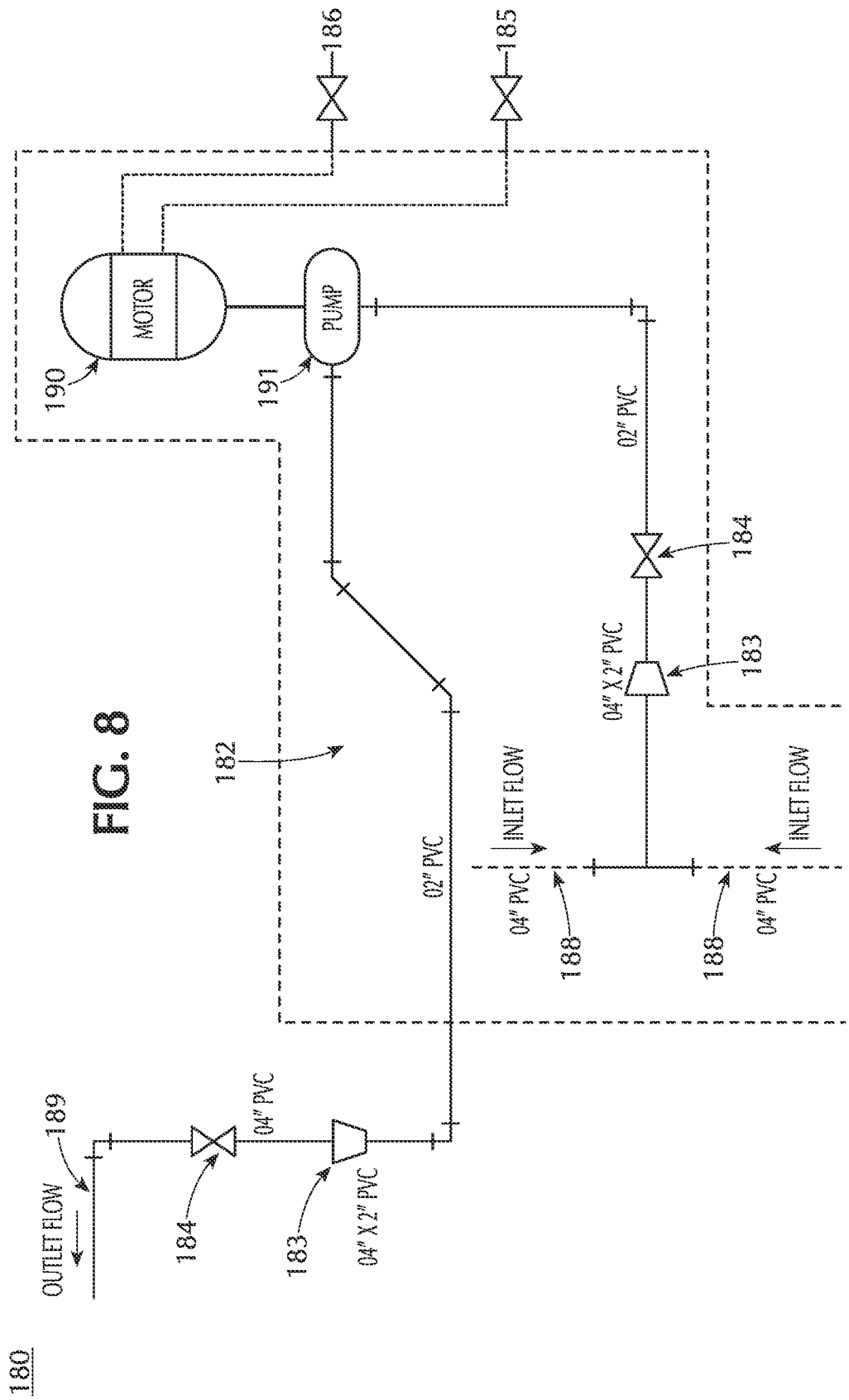

180
OUTLET FLOW
189
184
04" PVC
183
04" X 2" PVC
02" PVC
182
04" PVC
INLET FLOW
188
188
04" PVC
INLET FLOW
04" X 2" PVC
183
184
02" PVC
190
MOTOR
191
PUMP
186
185

FIG. 8

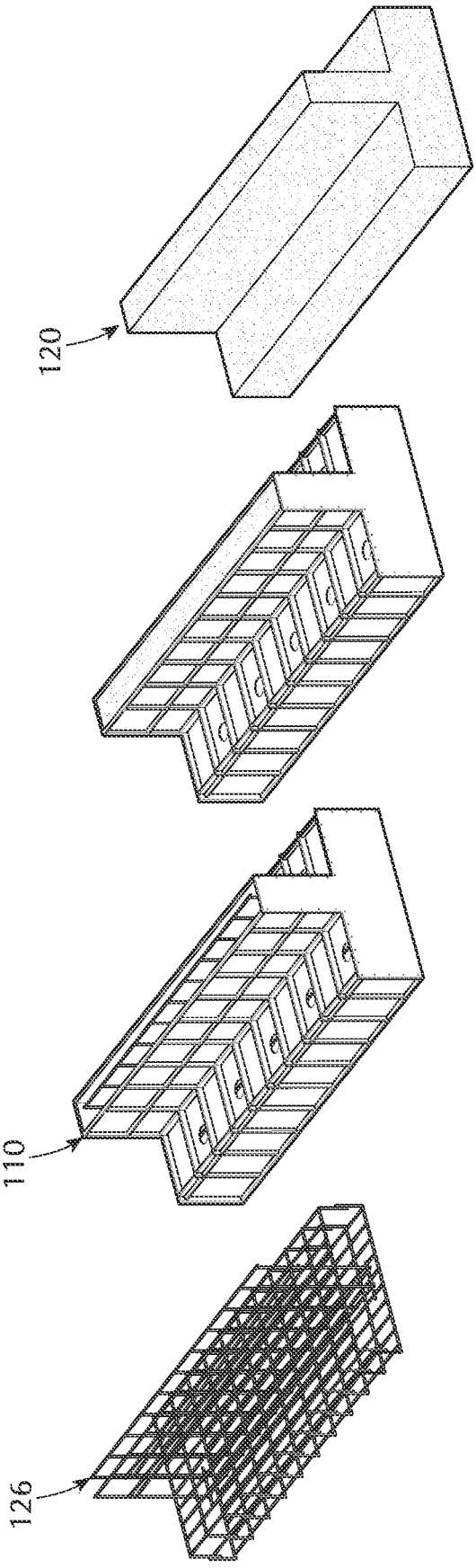


FIG. 9

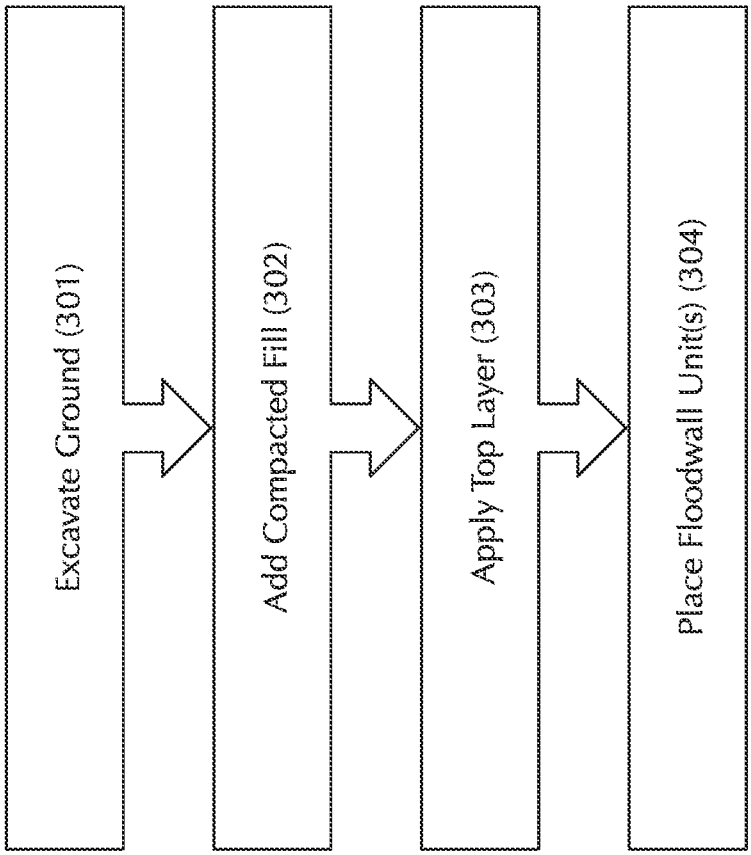

Excavate Ground (301)
Add Compacted Fill (302)
Apply Top Layer (303)
Place Floodwall Unit(s) (304)

FIG. 10

METHOD AND SYSTEM FOR A STATIC FLOODWALL SYSTEM

FIELD OF THE INVENTION

[0001] The invention disclosed herein relates generally to a static floodwall system for flood prevention, and methods of installation and use thereof.

BACKGROUND

[0002] Conventional floodwalls represent permanent structures with fixed heights to protect buildings or lands from flood damage. In order to resist the flood waters, such conventional floodwalls have deep foundations, typically with a required excavation depth of at least the above-ground height of the floodwall, and if ground soil is poor an even deeper foundation including sheet/straight or batter piles. However, in many instances deep excavations are not feasible. For example, commercial refineries typically require a vast array of systems (i.e., electrical systems, plumbing systems, etc.) to be implemented below ground, often time close to the surface. In such situations, deep excavation cannot be performed, and as such conventional floodwalls cannot be implemented to protect structures from floodwater damage.

[0003] One solution to the above is through the use of temporary structures that are brought to the site and set up according to their design. Many of these available temporary systems rely on "passive means" to raise flood-preventing structures. Other similar structures, such as those provided by AquaFence® (see, e.g., U.S. Pat. No. 7,121,764), implement a complex base and wall structure, which requires an array of support structures. Such temporary structures are also prone to failure after repeated use.

[0004] Thus, there is a need for a surface or shallow excavated floodwall system that is robust, strong, and effective against hydrostatic, hydrodynamic and impact loading from flooding waters on the flood walls.

SUMMARY OF THE INVENTION

[0005] One aspect of the invention relates to a floodwall shelter. According to embodiments, the floodwall shelter comprises a plurality of surface mounted floodwall sections, each section comprising: a footing having a first depth; and a wall section having a second depth, wherein the second depth is greater than the first depth; a plurality of corner sections; and at least one access gate. According to one embodiment, each surface mounted floodwall section comprises concrete, wherein the concrete may be reinforced with rebar, rock, soil or combinations thereof.

[0006] According to embodiments, the plurality of surface mounted floodwall sections, the plurality of corner sections, and the at least one access gate are attached to one another with a water impermeable seal.

[0007] According to embodiments, the at least one access gate is located between two surface mounted floodwall sections and comprises: a plurality of gate abutments; a base section; a blank wall; a sliding gate panel; at least one support structure; and an actuating system. The actuating system is configured to move the sliding gate panel between an open and closed position, wherein in the closed position a watertight seal is formed around the floodwall shelter.

[0008] According to at least one embodiment, the access gate further comprises: a first seal located on a first side of the sliding gate panel; and a second seal located the at least one support structure. In the closed position the first seal is located within a notch of one of the plurality of gate abutments and the second seal abuts a second side of the sliding gate panel.

[0009] According to at least one embodiment, a plurality of roller wheels are located on a bottom side of the sliding gate panel and a guide track is located on the base section. The plurality of roller wheels are configured to mate with the guide track and allow the sliding gate panel to move between and open and closed position.

[0010] According to at least one embodiment, a guide is attached to a top surface of the sliding gate panel, and the actuating system comprises: a first motor; and a drive system connected to the guide. The motor is configured to cause the drive system to move, thereby causing the sliding gate panel to move between the open and closed positions.

[0011] According to embodiments, the floodwall shelter further comprises: a plumbing system, comprising: a plurality of pipes, at least one second motor, and at least one pump. The plumbing system is configured to transport fluid from a dry side of the floodwall shelter to a wet site of the floodwall shelter. According to one embodiment, the plurality of pipes comprises: at least one outlet pipe located through one of the plurality of surface mounted floodwall sections; and at least one inlet pipe located on the dry side. According to an embodiment, the at least one inlet pipe has a length, and at least a part of the length is perforated.

[0012] According to embodiments, the plumbing system further comprises: at least one low level switch and at least one high level switch. The high level switch is configured to activate the at least one second motor when a water level reaches a first threshold, and the low level switch is configured to deactivate the at least one second motor when a water level reaches a second threshold that is lower than the first threshold.

[0013] A second aspect of the invention relates to a method of installing at least one floodwall section. According to embodiments, the method comprises excavating a site to an excavation depth of one foot or less to create an excavation site, wherein the excavating is at a location where the at least one floodwall section will be placed; placing fill material into the excavated site; applying a top layer to the fill material to create a flat surface; and placing the at least one floodwall section on top of the top layer. The at least one floodwall section, once placed, is configured to resist flood waters without additional support structures.

[0014] According to embodiments, wherein the top layer has a larger surface area than a bottom surface of the at least one floodwall section.

[0015] According to embodiments, the method further comprises applying a seal to a wet side surface of the at least one floodwall section and the top layer. According to one embodiment, at least one floodwall section has a notch formed on the wet side surface, and applying the seal comprises filling the notch with the seal.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The present disclosure will be further explained with reference to the attached drawing figures, wherein like structures are referred to by like numerals throughout the several views. The drawing figures shown are not necessarily to scale, with emphasis instead generally being placed upon illustrating the principles of the present disclosure, and

some features may be exaggerated to show details of particular components. In addition, any measurements, specifications and the like shown in the drawing figures, or described below, are intended to be illustrative, and not restrictive. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a representative basis for teaching one skilled in the art to variously employ the floodwall system, and methods thereof.

[0017] FIG. **1** depicts a flood wall shelter, according to embodiments of the invention;

[0018] FIG. **2** depicts a cross section of a floodwall section, according to embodiments of the invention;

[0019] FIG. **3** depicts a front-side of an access gate, according to embodiments of the invention;

[0020] FIG. **4** depicts a back-side of an access gate, according to embodiments of the invention;

[0021] FIG. **5** depicts a gate panel of an access gate, according to embodiments of the invention;

[0022] FIG. **6** depicts an actuating system for an access gate, according to embodiments of the invention;

[0023] FIG. **7** depicts a plumping system for a flood wall shelter, according to embodiments of the invention;

[0024] FIG. **8** depicts a line drawing of a portion of a plumping system for a flood wall shelter, according to embodiments of the invention;

[0025] FIG. **9** depicts the process for manufacturing a floodwall section, according to embodiments of the invention; and

[0026] FIG. **10** depicts of method of installing a floodwall section and/or floodwall shelter, according to embodiments of the invention.

DETAILED DESCRIPTION

[0027] According to a first aspect of the invention, FIG. **1** illustrates a floodwall shelter **100** of a static floodwall system. The floodwall shelter **100** is formed by a plurality of floodwall sections **120**, a plurality of floodwall corner sections **130**, and at least one access gate **140**. The plurality of floodwall sections **120**, corner sections **130**, and access gate(s) **140** are attached with each other via a water impermeable seal, for example, by grout, and form watertight connections in order to create a continuous perimeter that protects against floodwater. The length and height of each of the floodwall sections **120**, corner sections **130**, and access gate(s) **140** can be varied to accommodate site conditions. As further described below, minimal excavation is required to implement the floodwall shelter **100**.

[0028] FIG. **2** illustrates a cross-sectional view of an individual floodwall section **120**, according to embodiments of the invention. Each floodwall section **120** comprises a footing **122** and a wall section **124**. The footing **122** has a depth D' and a height H', while the wall section **124** has a depth D" and a height H". The depth D' of the footing **122** is greater than the depth D" of the wall section **124**. According to embodiments, the height H' of the footing **122** is less than the height H" of the wall section **124**. According to one exemplary embodiment for a 5' floodwall section **120**, D' is approximately 8 feet, D" is approximately 1.5 feet, H' is approximately 2 feet, and H" is approximately 3 feet. According to an alternative exemplary embodiment for a 10' floodwall section **120**, D' is approximately 15 feet, D" is approximately 1.75 feet, H' is approximately 3.5 feet, and H" is approximately 6.5 feet. It is noted, according to embodiments, the ratio of the heights H'/H" and/or depths D'/D" may be selected according to ground soil conditions. For example, worse solid conditions require a deeper footing **122**. The depth and height of the footing **122** also increases as the height H" is increased. It is to be noted that the ground on which the floodwall section **120** is placed should be of low permeability and have a minimum 3tsf allowable bearing. The floodwall section **120** should not be implemented on loose sand, gravel or mixtures of the two due to under seepage.

[0029] As further described below, this geometry provides a larger surface area for the floodwall section **120** to occupy on the ground, increasing the frictional force it creates with the ground when subject to floodwater forces. As further illustrated by FIG. **2**, this, at least in part, allows the floodwall section **120** to be surface mounted, such that no portion of the floodwall section **120** is required to be below ground. The floodwall section may be composed of high strength concrete reinforced with rebar **126**. According to alternative embodiments, the floodwall section may be composed of a jacket (e.g., a steel shell) filled with soil and/or rocks, and may be additionally filled with concrete. As further described below, each floodwall section **120** may be pre cast in a desired length and delivered to the site, cast at a desired length on site, or cast in a continuous pour on site. With such a configuration, each floodwall section includes a high surface-area footing **122**, and is of a sufficient weight such that the floodwall section(s) **120** and resulting floodwall shelter **100** can adequately resist floodwater.

[0030] Each corner section **130** may comprise two floodwall sections **120** connected at an angle to one another (e.g., at 90° to create a right angle). In such embodiments the two floodwall sections **120** are attached with each other, for example, by grout. Alternatively, each corner section **120** may be a single unitary piece.

[0031] FIGS. **3** and **4** illustrate a water-side and dry-side view, respectively, of an access gate **140**, according to embodiments of the invention. Each access gate **140** is located between floodwall sections **120**, and has a length that can be adjusted to a desired length, such as the width of a roadway or point of egress. The access gate **140** includes gate abutments **142**, a base section **144**, a blank wall **146**, and a sliding gate panel **148**. The access gate further includes an actuating system **160** for sliding the sliding gate panel **148** between open and closed positions. As FIGS. **3** and **4** illustrate the sliding gate panel is configured to slide between an open and closed configuration, where in the closed configuration the access gate **140** creates a watertight seal between a dry side and a wet side. The gate abutments **142**, base section **144**, blank wall **146**, and sliding gate panel **148** may similarly be composed of high strength concrete reinforced with rebar.

[0032] In order to maintain a watertight seal in the closed configuration, seal **150***a* (see, e.g., FIG. **5**) is located on sliding gate panel **148** and seal **150***b* is located on a surface of support structure **169** (see, e.g., FIG. **6**). A first seal **150***a* is located on the leading edge of sliding gate panel **148**. According to embodiments, first seal **150***a* can generally take a shape that is complementary to the shape of the leading edge of sliding gate panel **148** (see, e.g., FIG. **5**). The leading edge along with first seal **150***a* is configured to fit within a corresponding notch **143** located in gate abutment **142** that acts as one end wall of the access gate (e.g., gate abutment **142** located furthest to the left in FIG. **3**). A second

seal **150***b* is located on a surface of one of the support structures support structure **169**, and is configured to engage with trailing end abutment surface **152** of the sliding gate panel **148** (see, e.g., FIGS. **5** and **6**).

[0033] As FIGS. **3-6** illustrate, second seal **150***b* creates a seal between sliding gate panel **148** and blank wall **146**. According to embodiments, second seal **150***b* can generally take the shape of a flat panel that is attached to the blank wall **146** and the support structure **169**. As further illustrated in FIG. **4**, blank wall **146** and the central gate abutment **142** may be connected to one other, or be a continuous piece.

[0034] FIG. **5** illustrates a sliding gate panel **148** and associated structures. As mentioned above, roller wheels **149** are located within and along the bottom edge of sliding gate panel **148** and are configured to roll along guide track **145**. First seal **150***a* is located on the leading edge of the sliding gate panel **148** and second seal **150***b* is located on the trailing edge. A guide **151** may be attached to the top surface, which connects to the actuating system **160**, to guide sliding of the sliding gate panel **148**.

[0035] Additionally, and as further described below, roller wheels **149** are located within a bottom portion of sliding gate **148**, and mate with a guide track **145** (see, e.g., FIG. **6**) located in the top surface of base section **144**. In this way, sliding gate **148** can readily slide between a open and closed position via roller wheels **149** rolling along guide track **145**.

[0036] As illustrated by FIG. **6**, actuating system **160** includes a motor **162**, a control box **164**, a drive system **166**, guide rollers **168**, and support structures **169**. A first of the support structures **169** supports the motor **162** and control box and a portion of drive system **166**, while a second of the support structures **169** supports another portion of the drive system and the guide rollers **168**. The support structures **169**, as illustrated by FIG. **3** allow the sliding gate panel **148** to pass through when moving from an open to a closed position (or vis versa). Additionally, the guide track **145** is located along base section **144** such that it passes through the support structures **169**. The support structures **169** are also of a sufficient height such that the motor **162**, control box **164**, drive system **166**, and guide rollers **168** are above an expected height of the floodwater.

[0037] FIG. **6** also depicts abutment surface **152**, and guide **151**, which are attached to sliding gate panel **148** (omitted from this figure), and second seal **150***b*, which is attached to one of the support structures **169**, to illustrate how the actuating system **160** provides the necessary force to move the sliding gate panel **148** and to ensure that when the sliding gate **148** is in a closed position a watertight seal, between the wet side and the dry side is maintained. For example, the bottom edge of abutment surface **152** has a notch formed therein to conform to the shape of guide track **145**, and has a shape allowing it to abut second seal **150***b* on the surface of one of the support structures **169**, when the sliding gate panel **148** is in a closed position.

[0038] As FIGS. **3-6** illustrate, motor **162**, control box **164**, and drive system **166** are connected to one another, while drive system **166** is connected to guide **151** that is attached to sliding gate panel **148**. In order to actuate movement of sliding gate panel **148** power is provided by the control box **164** to the motor **162**, which when actuated causes drive system **166** to move. According to one embodiment, drive system **166** includes two sprockets, each of which are located on a respective support structure **169**, and a chain is wrapped around the sprockets. The chain, in turn, is attached to guide **151**. When the motor **162** is activated it causes one of the sprockets to rotate, which causes rotation of the chain, which translates into linear movement of the guide **151** and sliding gate panel **148** along guide track **145**. Roller wheels **168** guide this linear movement while also providing vertical stability to the sliding gate panel **148**. According to further embodiments, the drive system **166** comprises a linear ACME screw and nut, a rack and pinion, or a belt and pulley.

[0039] A ladder **170** may also be implemented to so that aspects of the actuating system **160** are readily accessible for maintenance and the like.

[0040] A plumbing system **180** may also be provided as a part of the floodwall system, as illustrated by FIGS. **7** and **8**. The plumbing system **180** may include an array of piping, at least one motor, and at least one pump, which are configured to transport any water (e.g., rain water) from the dry side back to the wet side. As FIG. **7** illustrates, plumbing system **180** includes piping **182**, having at least one inlet **188**, and at least one outlet **189** located through a floodwall section **120**.

[0041] Along or within a floodwall section **120**, of at least one side of the floodwall shelter, at least one motor **190** and pump **191** are connected to the piping to provide the necessary forces to transport any water that enters the inlet **188** through to the outlets **189**. As FIG. **8** illustrates, piping **182** may include an array of pipes that connect the outlet(s) **189** to the inlet(s) **188**. According to one embodiment, the inlet(s) **188** can take the form of perforated pipes (e.g., sparger pipe(s)). The perforated pipes can extend along a length of a section of the floodwall shelter **100**, and connected to a solid pipe (e.g., a T pipe), which is further connected to additional piping, as well as to the at least one motor **190**, pump **191**, and outlet **189**.

[0042] Sections of the piping **182** may have differing diameters in order to more efficiently drain water that enters the dry side of the floodwall shelter **100**. According to one embodiment, piping located between the outlet **189** and inlet **188** may have a reduced diameter (e.g., 2") as compared to the piping associated with the inlet **188** and outlet **189** (e.g., 4"). In such embodiments, reducers **183** may be implemented to connect adjacent sections of piping that have differing diameters. Valves **184** may also be located along piping **182** at locations near the inlet **188** and outlet **189** in order to provide a means to cut/allow fluid flow through the plumbing system **180**.

[0043] Portions of plumbing system **180**, such as piping **182**, may be located in a trench that surrounds the dry side (see, e.g., FIG. **7**). Although FIG. **7** illustrates piping **182** as having a rectangular shape, the invention is not so limited, and other configurations are contemplated. Additionally, piping **182** does not have to completely surround the dry side. For example, each side of the floodwall shelter **100** may include its own plumbing system **180** that is not directly connected to another side. In such a configuration, each plumbing system **180** includes two linear perforated piping sections, each terminating at a different corner section. In this way each plumbing system **180** can selectively provide a means to drain water as it enters the dry side.

[0044] The plumbing system **180** may also be automated such that it is selectively activated and deactivated based on the amount of water located on the dry side. According to one embodiment, plumbing system **180** implements a low level switch **185** and a high level switch **186**, that are utilized

to deactivate the motor **190** and pump **191**, respectively. By way of example, when rain water enters the dry side water will begin to pool within the trench that the piping **182** is located in. As pooling continues the water level will rise until it reaches a first threshold (i.e., the level of high level switch **186**). Upon reaching this level, switch **186** activates motor **190** and pump **191**, which causes the water to be pumped from the dry side to the wet side. As pumping continues the water level lowers until it goes below a second threshold (i.e., the level of the low level switch **185**), as which point the low level switch **185** deactivates motor **190** and pump **191**. In this way, plumbing system **180** ensures that a minimal amount of water is on the dry side of the floodwall shelter **100** at any given time.

[0045] Aspects of the floodwall shelter **100** may be controlled via a controller connected with the components of the system from a remote location, for example by radio signal. In this way, an operator is able to remotely control the access gate and plumbing system. According to embodiments, the floodwall shelter **100** may be controlled remotely by a controller that communicates with the floodwall system wirelessly. Upon receiving an instruction sent by the controller, a local processor controls the access gate such that it opens and closes.

[0046] According to a second aspect of the invention, FIG. **9** illustrates steps for the manufacture of a floodwall section **120** and/or corner section **130**. According to embodiments, each floodwall section **120** and/or corner section **130** may be pre cast in a desired length and brought to the site, cast at a desired length on site, or cast in a continuous pour on site. Such a casting process, as illustrated by FIG. **9** includes forming the rebar **126** into a cage that generally mimics the desired final shape. A preform **110** is formed around the rebar **126**, having an interior space that corresponds to the final shape. The preform may have an open end and vents, such that the concrete can be properly poured into the preform. Once poured, and after a sufficient drying time, the preform is removed, and the resulting floodwall section **120** and/or corner section **130** is created. Similar steps can be implemented in the creation of portions of the access gate (i.e., the gate abutments **142**, the base section **144**, and the blank wall **146**).

[0047] According to a third aspect of the invention, FIG. **10** illustrates methods of installing floodwall section(s) **120**. As previously discussed, an advantage of the present invention relates to the surface mounted nature of the floodwall section(s) **120** and the lack of need for deep excavation. According to embodiments, minimal excavation of the target site can be achieved, and specifically, excavation to a depth of approximately 1' are contemplated by the present invention. According to a first step **301**, a shallow excavation is effectuated of the ground. The excavation depth **224** (see, e.g., FIG. **2**) may be as shallow as 1'. Once excavated, a second step **302** comprises placing compact fill material **220** and tamping it down within the excavation site. The compact fill material **220** has a depth **222**. According to one preferred embodiment, depth **22** is approximately 8". A third step **303** comprises applying a top layer **210** of an asphalt, compliable-like material to the compact fill **220** to produce a flat surface. The top layer **210** has a depth **211**, which according to one preferred embodiment is 4", such that depth **211** and depth **222** equal the excavation depth **224**. Once the top layer **210** is properly placed, a floodwall section **120** is place on the top layer **210**, as illustrated by FIG. **2**. As FIG. **2** also illustrates, the width of the excavation (and thus the width of compact material **220** and top layer **210**) is greater than the depth D' of footing **122**. Thus, according to embodiments, the top layer **210** extends beyond the footprint of the floodwall sections by a distance L on both the dry side and wet side such that the top layer has a larger surface area than a bottom surface of the footing **122**. According to one exemplary embodiment, L is approximately 1 foot. The result is a shallow excavated site with a surface mounted floodwall section **120** that is configured to resist floodwaters and prevent floodwater from entering the dry side without the need for any additional support structures. The compact fill material **220** in conjunction with the top layer **210** create a surface that can adequately support and distribute the weight of the floodwall section(s) **120**, reduce water ingress into the ground surrounding the floodwall section(s), and aid in the amount of resistance the floodwall section(s) **120** can provide.

[0048] The area corresponding to the access gate may require deeper excavation (e.g., on the order of 2'). However, it is contemplated that the access gate(s) **140** correspond to an area where roadway(s) are already present, and as such a deeper excavation should not interfere with preexisting underground structures, as such structures would not be shallowly located under the roadway.

[0049] An additional optional step includes applying a seal **230** to the wet side. According to this step, as illustrated by FIG. **2**, the seal **230** may be applied such that it adheres to a front surface (i.e., a wet side facing surface) of footing **122** as well as to the top layer **210** at an area where the front surface and the top layer meet. The seal aids in creating a watertight seal around the floodwall shelter **120**. Although not specifically illustrated, the front surface of the footing may include a notch that seal **230** fills when applied to the front surface and top layer. By filling the notch the watertight seal is enhanced.

[0050] The foregoing description is given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as modifications within the scope of the invention may be apparent to those having ordinary skill in the art.

[0051] Detailed embodiments of the present invention, and methods thereof are disclosed herein; however, it is to be understood that the disclosed embodiments are merely illustrative of the floodwall system and methods thereof, and the systems and methods that may be embodied in various forms. In addition, each of the examples given in connection with the various embodiments of the systems and methods are intended to be illustrative, and not restrictive.

[0052] Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise" and variations such as "comprises" and "comprising" will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

[0053] Throughout the specification, where compositions are described as including components or materials, it is contemplated that the compositions can also consist essentially of, or consist of, any combination of the recited components or materials, unless described otherwise. Likewise, where methods are described as including particular steps, it is contemplated that the methods can also consist essentially of, or consist of, any combination of the recited

steps, unless described otherwise. The invention illustratively disclosed herein suitably may be practiced in the absence of any element or step which is not specifically disclosed herein.

[0054] Throughout the specification, where dimensions are described in terms of ranges, it is contemplated that the ranges provide specific support for all values there within, unless described otherwise.

[0055] The practice of a method disclosed herein, and individual steps thereof, can be performed manually and/or with the aid of or automation provided by electronic equipment. Although processes have been described with reference to particular embodiments, a person of ordinary skill in the art will readily appreciate that other ways of performing the acts associated with the methods may be used. For example, the order of various steps may be changed without departing from the scope or spirit of the method, unless described otherwise. In addition, some of the individual steps can be combined, omitted, or further subdivided into additional steps.

[0056] All patents, publications and references cited herein are hereby fully incorporated by reference. In case of conflict between the present disclosure and incorporated patents, publications and references, the present disclosure should control.

1. A floodwall shelter, comprising:
a plurality of surface mounted floodwall sections, each section comprising:
a footing having a first depth; and
a wall section having a second depth, wherein the second depth is less than the first depth;
a plurality of corner sections; and
at least one access gate;
wherein no portion of any floodwall section extends below ground.

2. The floodwall shelter of claim **1**,
wherein each surface mounted floodwall section comprises concrete.

3. The floodwall shelter of claim **2**,
wherein the concrete is reinforced with rebar.

4. The floodwall shelter of claim **3**,
wherein the concrete is reinforced with rock or soil.

5. The floodwall shelter of claim **1**,
wherein the plurality of surface mounted floodwall sections, the plurality of corner sections, and the at least one access gate are attached to one another with a water impermeable seal.

6. The floodwall shelter of claim **1**,
wherein the at least one access gate is located between two surface mounted floodwall sections and comprises:
a plurality of gate abutments;
a base section;
a blank wall;
a sliding gate panel;
at least one support structure; and
an actuating system.

7. The floodwall shelter of claim **6**,
wherein the actuating system is configured to move the sliding gate panel between an open and closed position, and
wherein in the closed position a watertight seal is formed around the floodwall shelter.

8. The floodwall shelter of claim **7**,
wherein the access gate further comprises:
a first seal located on a first side of the sliding gate panel; and
a second seal located the at least one support structure.

9. The floodwall shelter of claim **8**,
wherein in the closed position the first seal is located within a notch of one of the plurality of gate abutments and the second seal abuts a second side of the sliding gate panel.

10. The floodwall shelter of claim **6**, further comprising:
a plurality of roller wheels located on a bottom side of the sliding gate panel; and
a guide track located on the base section,
wherein the plurality of roller wheels are configured to mate with the guide track and allow the sliding gate panel to move between and open and closed position.

11. The floodwall shelter of claim **7**, further comprising:
a guide attached to a top surface of the sliding gate panel,
wherein the actuating system comprises:
a first motor; and
a drive system connected to the guide; and
wherein the motor is configured to cause the drive system to move, thereby causing the sliding gate panel to move between the open and closed positions.

12. The floodwall shelter of claim **1**, further comprising:
a plumbing system, comprising:
a plurality of pipes;
at least one first motor; and
at least one pump;
wherein the plumbing system is configured to transport fluid from a dry side of the floodwall shelter to a wet site of the floodwall shelter.

13. The floodwall shelter of claim **12**,
wherein the plurality of pipes comprises:
at least one outlet pipe located through one of the plurality of surface mounted floodwall sections; and
at least one inlet pipe located on the dry side.

14. The floodwall shelter of claim **13**,
wherein the at least one inlet pipe has a length, and
wherein at least a part of the length is perforated.

15. The floodwall shelter of claim **12**,
wherein the plumbing system further comprises:
at least one low level switch; and
at least one high level switch,
wherein the high level switch is configured to activate the at least one second motor when a water level reaches a first threshold; and
wherein the low level switch is configured to deactivate the at least one second motor when a water level reaches a second threshold that is lower than the first threshold.

16. A method of installing at least one floodwall section, comprising:
excavating a site to an excavation depth of one foot or less to create an excavation site, wherein the excavating is at a location where the at least one floodwall section will be placed;
placing fill material into the excavated site;
applying a top layer to the fill material to create a flat surface; and
placing the at least one floodwall section on top of the top layer,

wherein the at least one floodwall section, once placed, is configured to resist flood waters without additional support structures; and

wherein no portion of any floodwall section extends below ground.

17. The method of installing at least one floodwall section of claim **16**,

wherein the top layer has a larger surface area than a bottom surface of the at least one floodwall section

18. The method of installing at least one floodwall section of claim **16**, further comprising:

applying a seal to a wet side surface of the at least one floodwall section and the top layer.

19. The method of installing at least one floodwall section of claim **18**,

wherein at least one floodwall section has a notch formed on the wet side surface, and

wherein applying the seal comprises filling the notch with the seal.

20. The method of installing at least one floodwall section of claim **16**,

wherein the at least one floodwall section is one of the plurality of surface mounted floodwall sections of claim **1**.

21. The floodwall shelter of claim **1**, wherein:

the plurality of surface mounted floodwall sections comprises at least a first floodwall section and a second floodwall section; and

the first floodwall section and the second floodwall section are cast in a continuous pour on site.

22. The floodwall shelter of claim **22**, wherein the first floodwall section has a first height, the second floodwall section has a second height, and the first height is not equal to the second height.

23. The method of installing at least one floodwall section of claim **16**, wherein:

the at least one floodwall section comprises at least a first floodwall section and a second floodwall section, the first floodwall section and the second floodwall section each separately being one of the plurality of surface mounted floodwall sections of claim **1**; and

the first floodwall section and the second floodwall section are cast in a continuous pour on site.

24. The method of installing at least one floodwall section of claim **22**, wherein the first floodwall section has a first height, the second floodwall section has a second height, and the first height is not equal to the second height.

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