



## Demountable Flood Barrier

Issued Date	Approved By

## FDD Demountable Operation Manual





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# 1 Product Information

The Flow Defence Demountable (FDD) is a manually operated flood barrier, **Figure 1** and **Figure 2**, constructed from aluminium components, stainless steel fasteners and EPDM rubber.

The FDD can be installed to protect driveways/basements, pedestrian access points, window openings, plant room openings or in series to create a levee perimeter.

The FDD is configured with permanently mounted C channels on each end of the flood barrier attached to either masonry retaining walls or door openings. The C channels are concealed by aluminium covers when not in use.

The demountable panels can be easily assembled inside the C channels when flood protection is required.



*Figure 1 - Typical Flow Defence Demountable Flood Barrier (disassembled)*





*Figure 2 - Typical Flow Defence Demountable Flood Barrier (assembled)*

## **1.1 Principles of Operation**

- Remove C channel cover plates.
- Remove vertical compression bracket
- Insert base panel
- Insert intermediate panels
- Insert top panel
- Compress panels
- Repeat procedure in reverse to disassemble



## 1.2 Barrier Sizes

Flow Defence Demountable (FDD) flood barriers panels are available in 200mm increment sections and can be stacked from 200mm to 3500mm above ground surface level.

The length of the flood barriers are sized to suit the application.

### 1.2.1 Flow Defence Naming Convention

A typical Flow Defence Demountable product name would be FDD height x length

Example: FDD0.6x2.7m = 0.6m high and 2.7m wide, **Figure 3**



Figure 3 - Example FDD0.6x2.7m







### 1.3 Installation Location

FDD flood barriers are designed to be installed between either masonry retaining walls or door openings **Figure 4** and **Figure 5**.



*Figure 4 – FDD Driveway/Basement Protection*



*Figure 5 - FDD Door/Lift Protection*



## 1.4 Sealing Mechanism

The FDD barrier sealing mechanism consists of EDM rubber strips in both the vertical and horizontal surfaces.

25mm thick in the vertical C channels, 6mm between the aluminium panels and 38mm on the base panel to account for uneven ground surfaces, **Figure 6**.



*Figure 6 - FDD Sealing Mechanism*

M16 stainless steel bolts compress the seals to create a water tight join between components. As water pushes against the barrier, the seals become more compressed.

Maximum leakage rate = 0.008L/s per lineal metre.



## 2 Maintenance Procedures

Maintaining the demountable flood barrier system:

- Flow Defence can be engaged to perform the following procedures on an annual basis
- Remove C channel end caps
  - Check that there is no damage to the C channel vertical EPDM seals
  - Check that the 40x40mm SHS compression bars are located inside the C channel
  - Check that the Vertical Compression angle clamp is located inside the C channel
- Check that all removable panels are accounted for **Figure 7**
- Check that there is no damage to the removable panel horizontal EPDM seals



*Figure 7 - FDD Removable Panels*







### 3 Inspections

We believe that the unit life will be enhanced significantly by using Flow Defence staff to monitor and maintain the flood barrier.

Flow Defence flood barriers should be inspected annually to ensure they are clean and free from material buildup.

12 Month Inspection:

- Remove any build up of debris from permanently mounted C channels
- Inspect EPDM rubber seals
- Perform standard maintenance checks as listed in section 2 above

### 4 Service and Repairs

Most service and repairs can be performed onsite without removing the flood barrier components from site.

Flow Defence flood barriers have a 25 year warranty covering all flood barrier components. However damage caused by vandalism and outside parties is not covered by the warranty.



## 5 Product Specification

### 5.1 Materials

Material	Description	Components
EPDM	<b>Ethylene Propylene Diene Monomer (EPDM)</b> rubber tear, water and UV resistant.	Vertical and horizontal seals
HDPE	<b>High Density Polyethylene (HDPE)</b> plastic is a ridged high tensile strength sheet. The material is sturdy and resists vigorous handling, stabilised against ultraviolet light, is resistant to both hot and cold extremes and is used in the mining, oil/gas, agriculture, marine and chemical storage industries.	Barrier component wear surfaces
Aluminium	<b>6000 Series Aluminium</b> is light weight, has excellent corrosion resistance structural alloys used in highly stressed applications such as bridges, cranes and marine environments.	Barrier C channels, panels and SHS compression bars
Stainless Steel	<b>316 Stainless Steel</b> is a chromium-nickel-molybdenum austenitic stainless steel with good strength and excellent corrosion resistance, as supplied in the annealed condition with a typical brinell hardness of 175. Characterised by high corrosion resistance in marine and industrial atmospheres. The addition of 2% to 3% of molybdenum increases its resistance to pitting corrosion and improves its creep resistance at elevated temperatures.	Barrier compression fasteners
Hot-Dip Galvanising	<b>Galvanising</b> provides outstanding corrosion performance in a wide variety of environments. The galvanising process creates a durable, abrasion-resistant coating of metallic zinc and zinc-iron alloy layers which are bonded metallurgically to the steel and completely covers the item providing a number of significant advantages. It provides outstanding toughness, resistance to mechanical damage and slows corrosion to about one sixteenth that of steel.	Cast in I beam base plates
Polyurethane Foam	<b>Polyurethane Foam</b> has a closed cell structure and has better insulation properties than many other insulation materials. Polyurethane foam is widely used for marine buoyancy. One cubic metre of 35kg/M <sup>3</sup> polyurethane foam would have a positive buoyancy of 965kg.	Barrier panel core





## 5.2 Flood Barrier Components





### 5.3 Component List

1. Cover Plate:
  - a. Aluminium 3mm folded sheet protective cover
2. Horizontal compression bolt:
  - a. M16 316 stainless steel
3. Permanently Mounted C Channel:
  - a. Aluminium extruded C channel
  - b. 25mm EPDM rubber vertical seal
4. Vertical Compression Angle:
  - a. 316 stainless steel angle
  - b. M16 316 stainless bolt
5. Top Removable Panel:
  - a. Aluminium extruded RHS
  - b. 3mm aluminium end caps
  - c. 10mm HDPE wear plate
  - d. 6mm EPDM rubber horizontal seal
6. Mid Removable Panel:
  - a. Aluminium extruded RHS
  - b. 3mm aluminium end caps
  - c. 6mm EPDM rubber horizontal seal
7. Base Removable Panel:
  - a. Aluminium extruded RHS
  - b. 3mm aluminium end caps
  - c. 25mm EPDM rubber horizontal seal
8. Vertical Compression Bar:
  - a. Aluminium extruded SHS
  - b. 10mm HDPE wear plate







## 5.4 Commissioning and Warranty

Barrier components tested during installation commissioning:

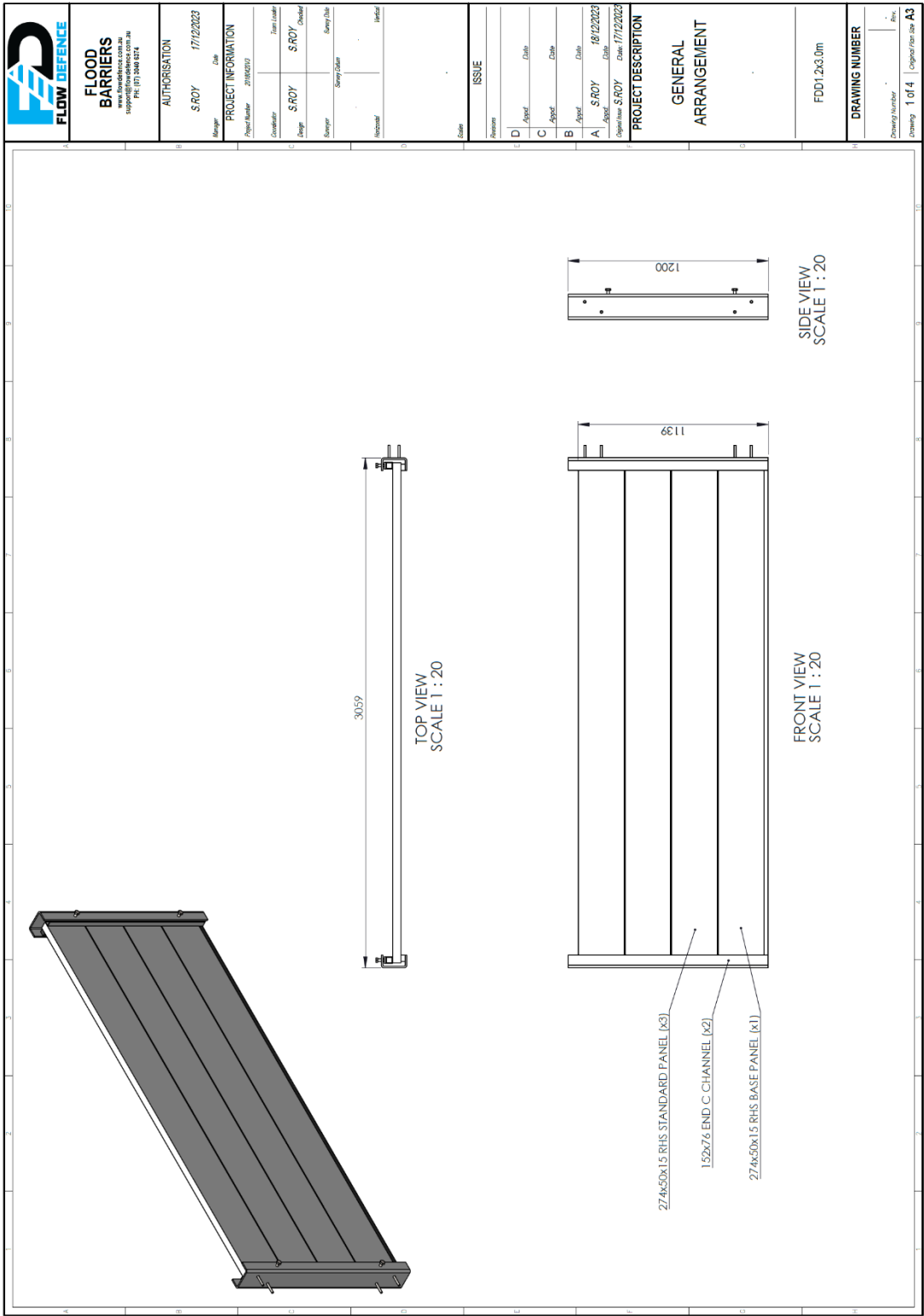
- Final flood barrier assembly
- Check list
  - 316 stainless steel male and aluminium female threads for smooth operation
  - EPDM seal compression
  - HDPE wear surfaces
  - Removable panel identification markers
  - Vertical compression angle and SHS bar stored inside of C channel end caps after disassembly
  - Removable panels are the only components to be stored away from the permanently mounted flood barrier assembly
- **The Flow Defence flood barrier is covered by a 25 year warranty covering all flood barrier components**
- No additional allowances have been included for impact loads, unless specifically detailed in additional documentation provided
- All water pressure loads, impact loads, and operating loads are transferred to the building structure. Building structure design, capacity to accept loads from flood barriers, and evaluation of loads to structure is by others
- If the water height exceeds the level of water protective design height, leakage will occur

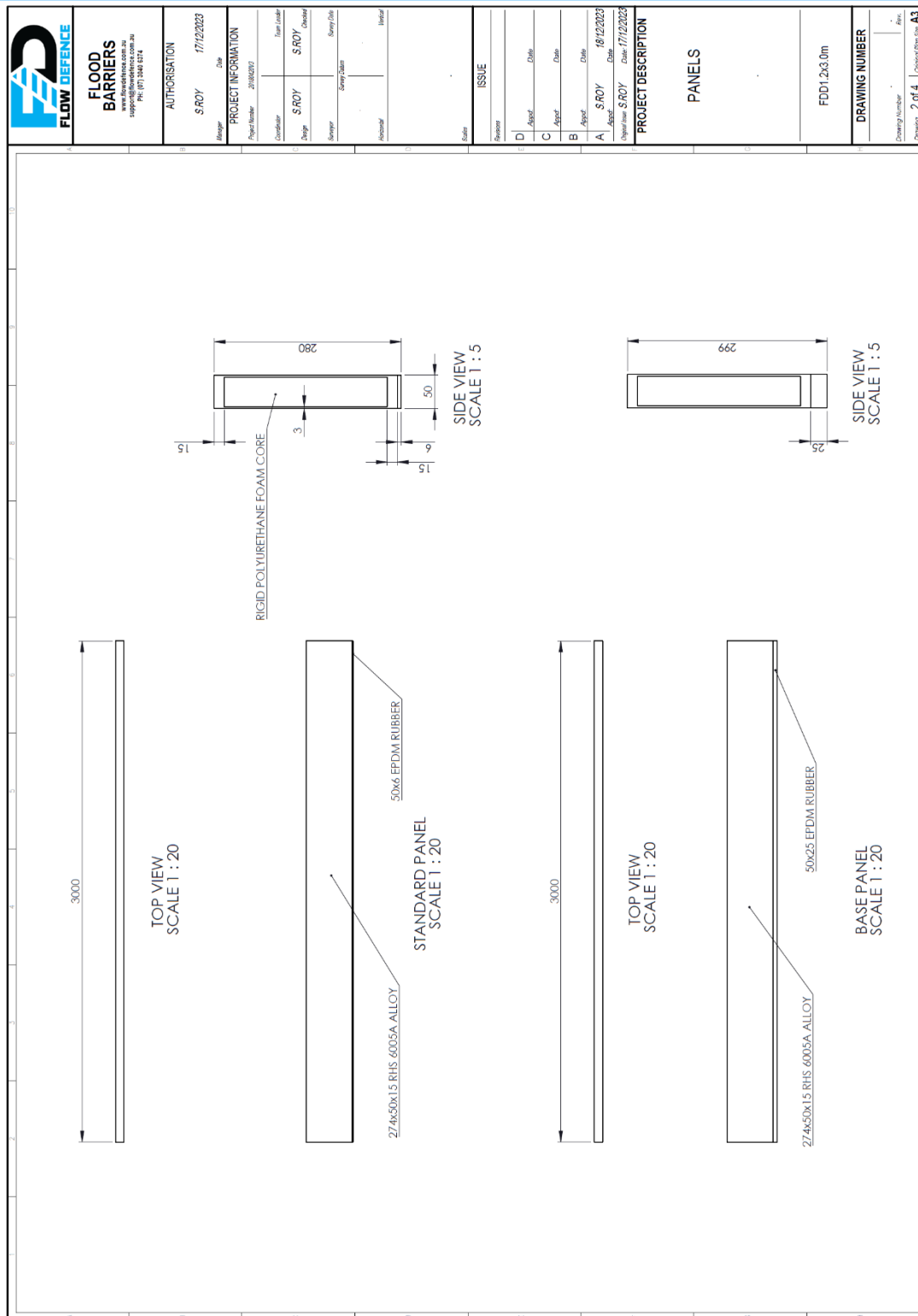
*Note: Flow Defence reserves the right to amend this product specification based on continuous, on-going development and will advise all clients of any proposed modifications to the design that may affect this product specification.*





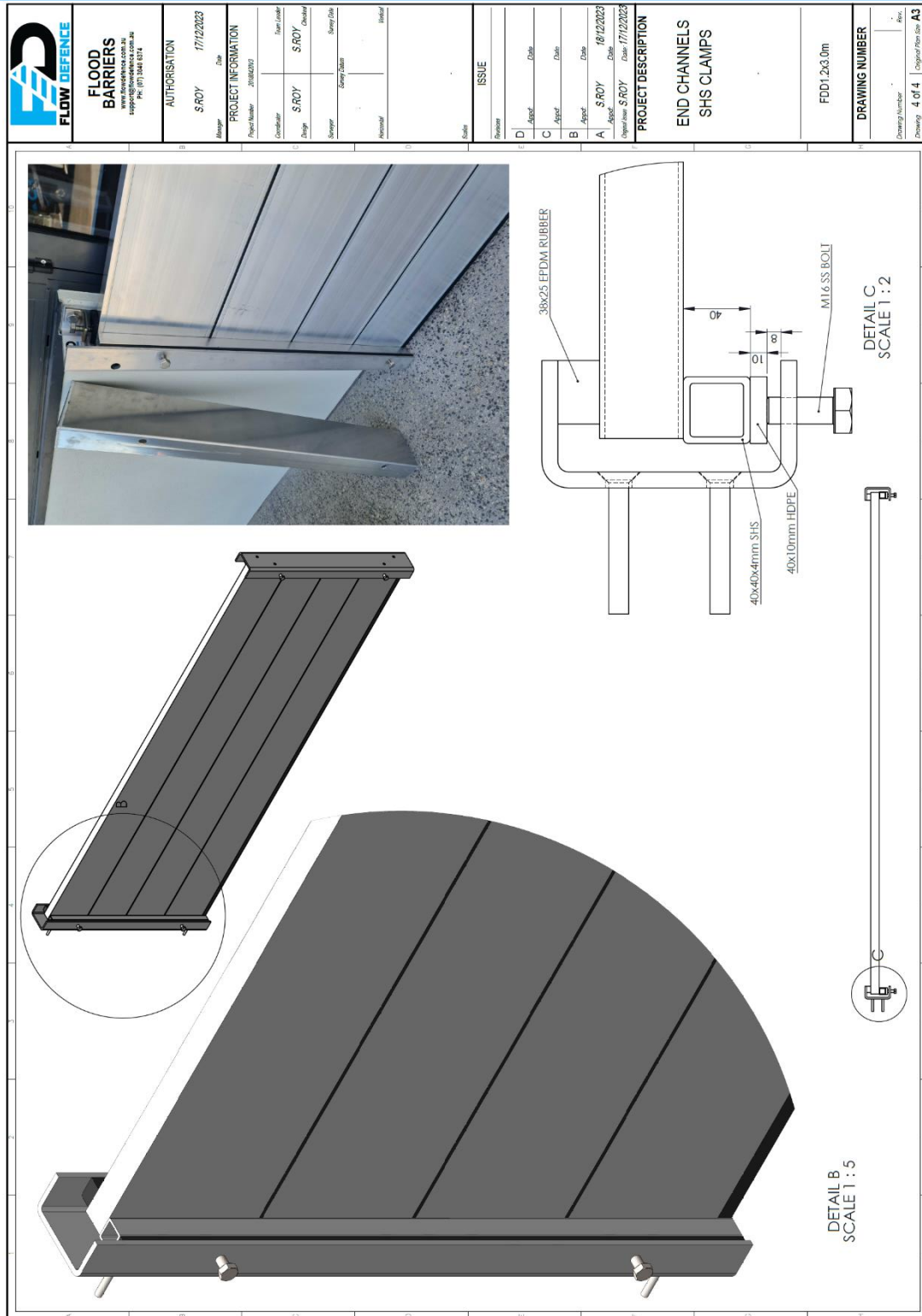
## 6 Typical FDD General Arrangement



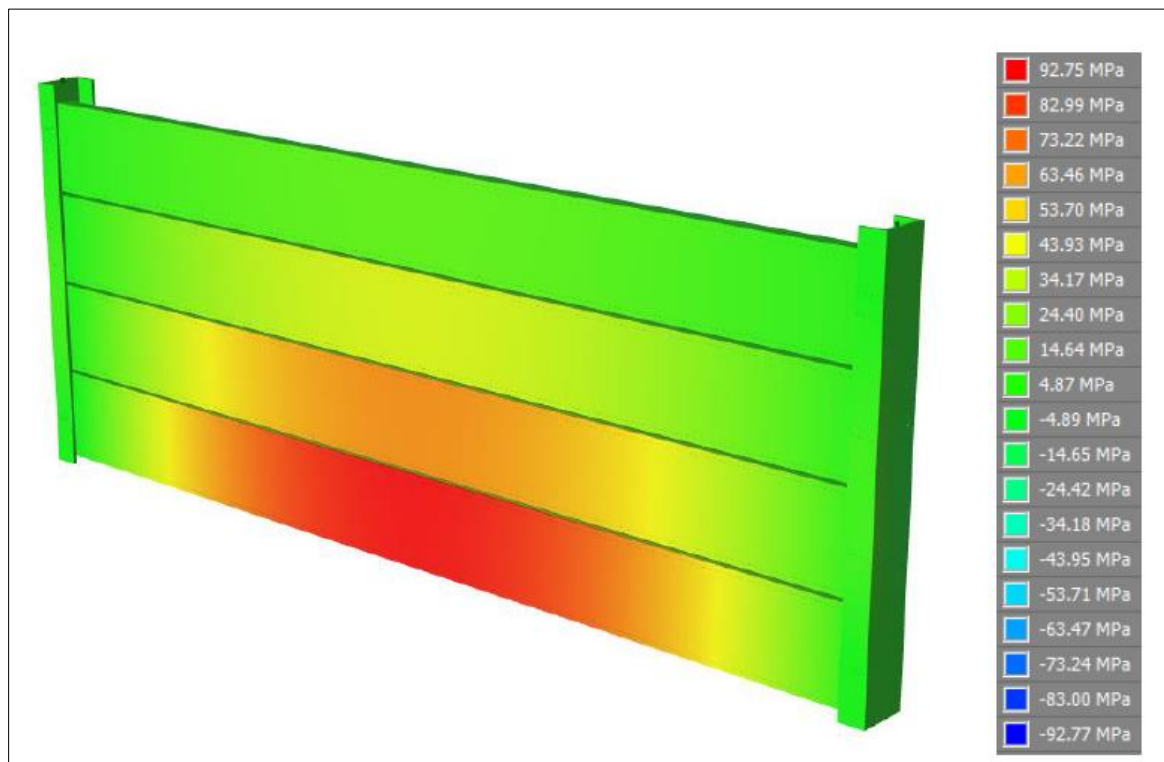
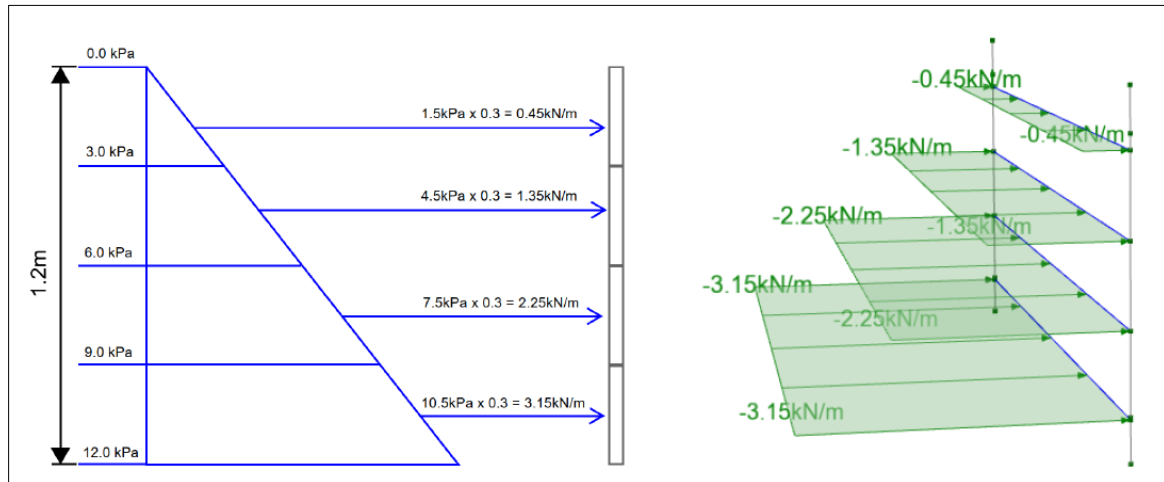






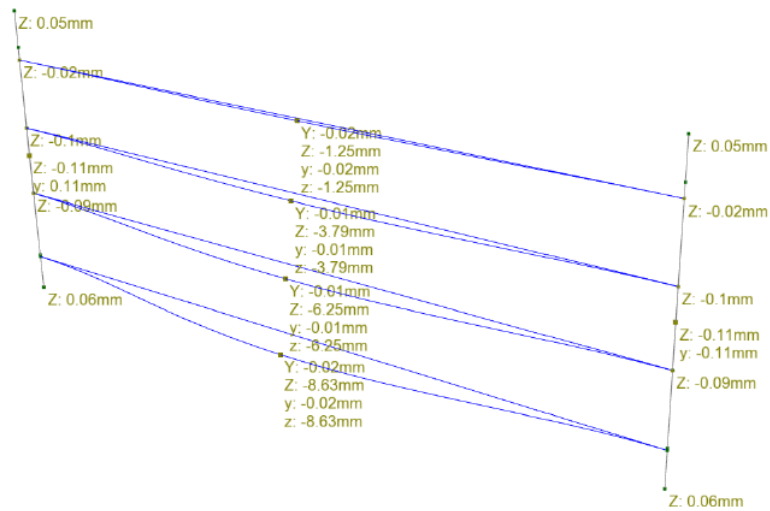


## 7 Finite Element Analysis FEA





RHS	Deflection (mm)
1 (Top)	1.25
2	3.79
3	6.25
4	8.63



#### CALCULATION OF SECTION PROPERTIES



##### Area

$A = 2964.00 \text{ mm}^2$

##### 2<sup>nd</sup> moment of area

$I_u = 32.5 \times 10^6 \text{ mm}^4$

$I_v = 1.13 \times 10^6 \text{ mm}^4$

$I_x = 32.5 \times 10^6 \text{ mm}^4$

$I_y = 1.13 \times 10^6 \text{ mm}^4$

##### Radius of gyration

$r_u = 104.7 \text{ mm}$

$r_v = 19.5 \text{ mm}$

$r_x = 104.7 \text{ mm}$

$r_y = 19.5 \text{ mm}$

##### Plastic section modulus (only shapes with all rectangles at 90 degs)

$S_x = 284. \times 10^3 \text{ mm}^3$

$S_y = 53.2 \times 10^3 \text{ mm}^3$

##### Distance to combined centroid

$X_e = 0.2 \text{ mm}$

$Y_e = 0.1 \text{ mm}$

##### Distance to equal axis area (only shapes with all rectangles at 90 degs)

$X_p = 0.2 \text{ mm}$

$Y_p = 0.1 \text{ mm}$

##### Elastic section modulus

$Z_x = 237. \times 10^3 \text{ mm}^3$

$Z_y = 44.9 \times 10^3 \text{ mm}^3$



## 8 Project Details

<b>Client</b>	Example Project
<b>Location</b>	
<b>Flood Barrier Type</b>	Demountable
<b>Panel Weight</b>	10.5 kg/m (each)

Barrier Description
B1 Sub Doors B1.14(D0.4): FDD0.84x1.0m
B1 Sub Doors B1.11(D0.1): FDD0.84x1.0m
B3 Stair B3.2: FDD1.14x1.2m
B3 Lift Lobby B3.05: FDD1.14x1.2m
B1 Sub Doors B1.12(D0.1): FDD0.84x2.0m
B3 Lift Lobby B3.05: FDD1.14x2.0m
B1 Sub Doors B1.14(D0.1): FDD0.84x2.7m
B1 Sub Doors B1.14(D0.2): FDD0.84x2.7m
B1 Sub Doors B1.14(D0.3): FDD0.84x2.7m
B1 Sub Doors B1.11(D0.2): FDD0.84x2.7m

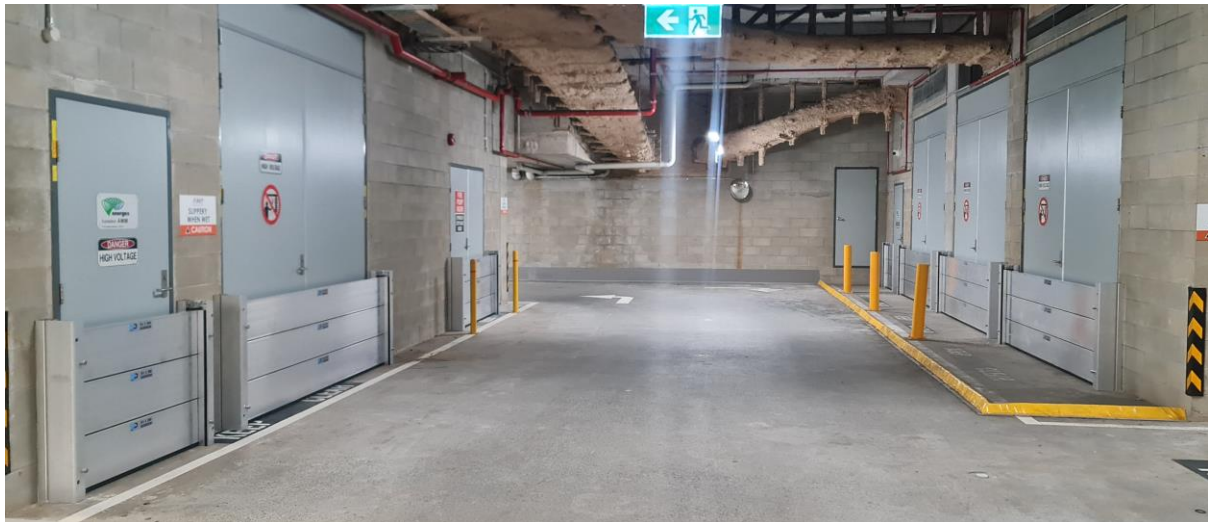


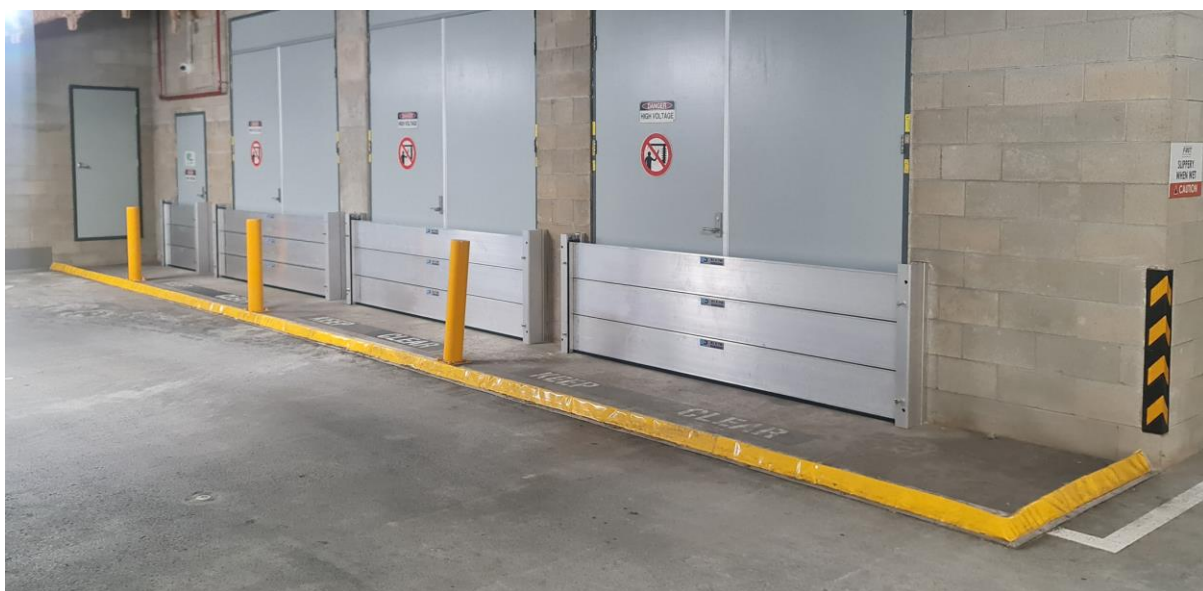
Figure 8 - B1 Barriers







*Figure 9 - B1 Barriers*



*Figure 10 - B1 Barriers*





Figure 11 - B1 Sub Doors B1.11(D0.1): FDD0.84x1.0m



Figure 12 - B1 Sub Doors B1.11(D0.2): FDD0.84x2.7m





Figure 13 - B1 Sub Doors B1.12(D0.1): FDD0.84x2.0m



Figure 14 - B1 Sub Doors B1.14(D0.1): FDD0.84x2.7m





*Figure 15 - B1 Sub Doors B1.14(D0.2): FDD0.84x2.7m*



*Figure 16 - B1 Sub Doors B1.14(D0.3): FDD0.84x2.7m*







Figure 17 - B1 Sub Doors B1.14(D0.4): FDD0.84x1.0m



Figure 18 - B3 Lift Lobby B3.05: FDD1.14x2.0m








*Figure 19 - B3 Lift Lobby B3.05: FDD1.14x1.2m*



*Figure 20 - B3 Stair B3.2: FDD1.14x1.2m*





If you require further information or details about our competitive inspection, cleaning and reporting service please contact Scott Roy on 0409 940 922.



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