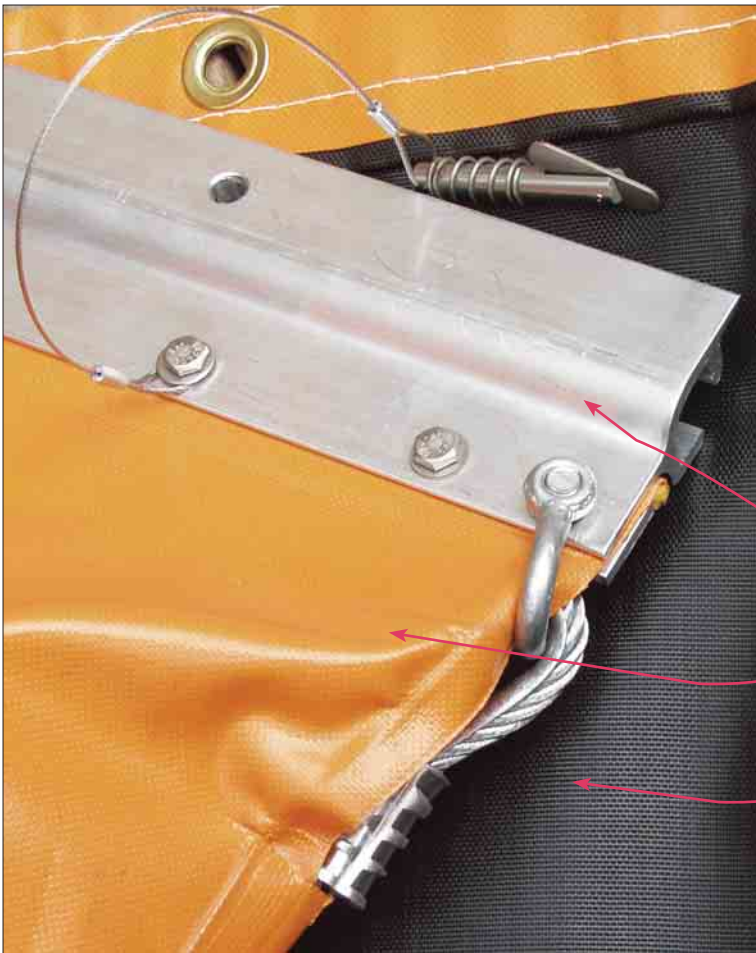


# Turbidity Barriers

# Baffle Curtains

# Containment Booms





Closed cell polyethylene flotation from 150 mm to 300 mm diameter

Aluminium sections clip together and maintain free movement

Oil resistant vinyl coated polyester or nylon

Monofilament filtration (or slit film) geotextile allows water through but retains soil particles

Above photos is a Type 2 (monofilament/ vinyl coated polyester)

## General

Permathene Ltd specialises in custom built silt and debris containment booms, as well as turbidity floating barriers and pond baffles. Baffles are commonly used to improve the hydraulic and treatment efficiency of ponds. There are several ways in which baffles can be built. They can be constructed from concrete, rocks or earth as a part of the original design. However this can limit opportunity to control the process, for which the pond has been designed.

Permathene manufactures baffles in a strong impermeable membrane (PVC or polypropylene), or a combination of impermeable membrane, slit film or monofilament geotextile and marine grade flotation devices. Standard manufacture in sizes from 1 m to 20 m curtain depth and standard boom lengths from 3 m to 15 m (other sizes available upon request). Flotation is by closed cell polyethylene logs. These logs are completely enclosed within sleeves by means of fusion welding to prevent any water from entering. All fittings made from metal are corrosion resistant galvanised steel, stainless steel, brass or aluminium.

Applications include waste water treatment, stormwater retention ponds, sediment control, enclosure and separation, oil and spill containment systems, mining and agriculture.

Flexible removable Permathene baffles have many advantages, such as cost effectiveness, flexibility to allow the possibility of changing the baffle's position in the pond, as well as removal for maintenance, etc.

## Specification

Permathene can provide engineers and designers with variety of options, including heights, length and material of fabrication. Standard impermeable baffle, or partition, consists of a surface floating element, supported on the surface by tensioning wire rope (galvanised steel or plastic), flexible sheeting and ballast, or anchor, chain at the bottom.

## Module

As a "module" Permathene Limited understands a single composed baffle, the number of modules, or baffles for each application can be different, but in general many experts recommend a minimum of 2 baffles and a maximum of 4 with even baffle spacing across the pond as the most effective method.

## Units

Baffles with module sizes longer than 25 m will be fabricated from separate units, anywhere between 5 m and 25 m. Units will be interconnected by frequent bolting through eyelets installed in double liner hem, reinforced with flat sealed galvanised steel bar.

Sections of the anchor chain will be interconnected with D-shackles.

If baffles have to be constructed from multi-units, the units length will be calculated to link with total baffle length.

## Slopes

Permathene will manufacture baffles with specified slope, typically 1:1, 1:2, 1:3 or a combination. Slope part of the baffle will be reinforced with sealed flat galvanised steel bar.



The skirt depth of the baffle is vertically below the floating element's hem. Depending upon application, baffles can be fabricated from 0.5 mm, 0.75 mm or 1.0 mm Permaliner (Flexible Polypropylene) or HDPE, using both fusion and extrusion welding, or various other materials depending upon chemical, heat, strength or other conditions which may affect lifespan and application.

If requested, a special reinforced HDPE strip with brass or SS eyelets can be manufactured for attachment of the module to the pond's wall. Aluminium bars with neoprene gaskets and dynabolts to be used for connection.

## Openings

Openings are holes in baffle's skirt, designed for various purposes. Woven geotextiles can be used for sediment control and filtration baffles, interconnected with main liner body by method as

defined by Permathene. The size and position of geotextile completed or non-covered openings on the baffle's skirt are determined by designer. Permathene will provide engineers with flow rate data for different types of Syntex woven, nonwoven and monofilament geotextiles.

### **Anchoring**

Both, supportive wire rope and anchor chain hems will be reinforced with LDPE, PP or PVC pipe as determined for the particular specified size. Permathene Limited would not recommend utilising external concrete or steel weights attached to the anchor line of the baffle for ballast. This may create local high stress concentration on the liners lower line. Where bottom anchoring is required, we can reinforce the connection point with stainless steel plates to minimise local stress and plastic wire rope to eliminate corrosion issues.

Permathene Limited can supply a complete anchoring system, with custom made galvanised steel or stainless steel plates with through bolts, turn buckles, and tensioners.

The baffles described above are standard. Permathene can custom design floating and tensioned baffles to assist in solving of specific engineering tasks.

### **Maintenance**

Permathene Limited can provide a support guarantee which offers replacement or repair for a period of five years for baffle curtains manufactured entirely by Permathene and supplied in accordance with approved installations and designs.

### **Delivery**

The floating pond baffles shall be delivered to the job site by the manufacturer on four-way entry pallets acceptable for motor freight transport. Containers shall be marked with the modules and units numbers.

### **Field Service**

Permathene Limited can provide the services of a qualified field technician to supervise the installation and repair of the baffle if required by the customer.

## **Material Types**

### **Vinyl Coated Polyester or Nylon (PVC)**

Provide silt containment in a tough reinforced material. These barriers are suitable for a wide range of environments including open water operations such as dredge and drag line. PVC type barriers have very high strength and a more limited UV life and are not recommended for permanent installations beyond 5 years.

### **Permaliner Polypropylene**

Barriers are manufactured in flexible Permaliner polypropylene with or without a slit film or monofilament geotextile curtain or windows. We custom manufacture turbidity barriers, sedimentation control Baffles, separation curtains. These are commonly used in waste treatment ponds as separation barriers and are manufactured to fit the contour of the pond. Typically manufactured in 0.75 mm - 1.0 mm Permaliner flexible polypropylene resists a wide range of chemicals with excellent UV resistance (can last 20 years).

### **HDPE (High Density Polyethylene)**

Barriers manufactured in HDPE maintain the longest UV resistance and mechanical strength. Suitable for permanent installations, especially as separation barriers where a more rigid baffle can withstand higher currents.

## Technical

### General

Boom Length	15 m (Type 1 and 2), custom (Permaliner) - usually from 3 m to 15 m
Flotation Size	150 mm (standard), 200 mm, 300 mm
Buoyancy	150 mm: 19 kg / m 200 mm: 32 kg / m 300 mm: 80 kg / m
Curtain Material	100 % polypropylene geotextile: Type 1 woven slit film, Type 2 monofilament
Ballast	8 mm chain (1.6 kg/ m)
End Connectors	Aluminium (as per photos page 2), or standard eyelets for lacing
Curtain Depth	1 m to 20 m

### Physical Properties Geotextile Curtain (Syntex)

Property	Test Method	Slit Film	Monofilament
Weight	ASTM D 3776	165 g/ m <sup>2</sup>	205 g/ m <sup>2</sup>
Tensile Strength (Grab)	ASTM D 4632	1065 N	1645 N
Elongation at Break	ASTM D 4632	25 %	25 %
Mullin Burst	ASTM D 3786	3440 kPa	3300 kPa
Trapezoidal Tear	ASTM D 4533	420 N	445 x 310 N
AOS	ASTM D 4751 (dry)	.300 - .212 mm	0.212 mm
Permeability	ASTM D 4491	660 l/m <sup>2</sup> / min	730 l/m/min
UV Resistance (% retained)	ASTM D 4355	90 %	90 %

### Physical Properties Permaliner (Flexible Polypropylene)

Property	Test Method	0.75 mm	1.0 mm
Weight	ASTM D 3776	69 g/ m <sup>2</sup>	91 g/ m <sup>2</sup>
Tensile Strength at Break	ASTM D 6693	24 kN/m	22 kN/m
Elongation at Break	ASTM D 6693	900 %	900 %
Tear Resistance	ASTM D 1004	45 N	65 N
Puncture Strength	ASTM D 4833	210 N	250 N
Carbon Black Content	OEE 8.2.4-02-01	2 %	2 %

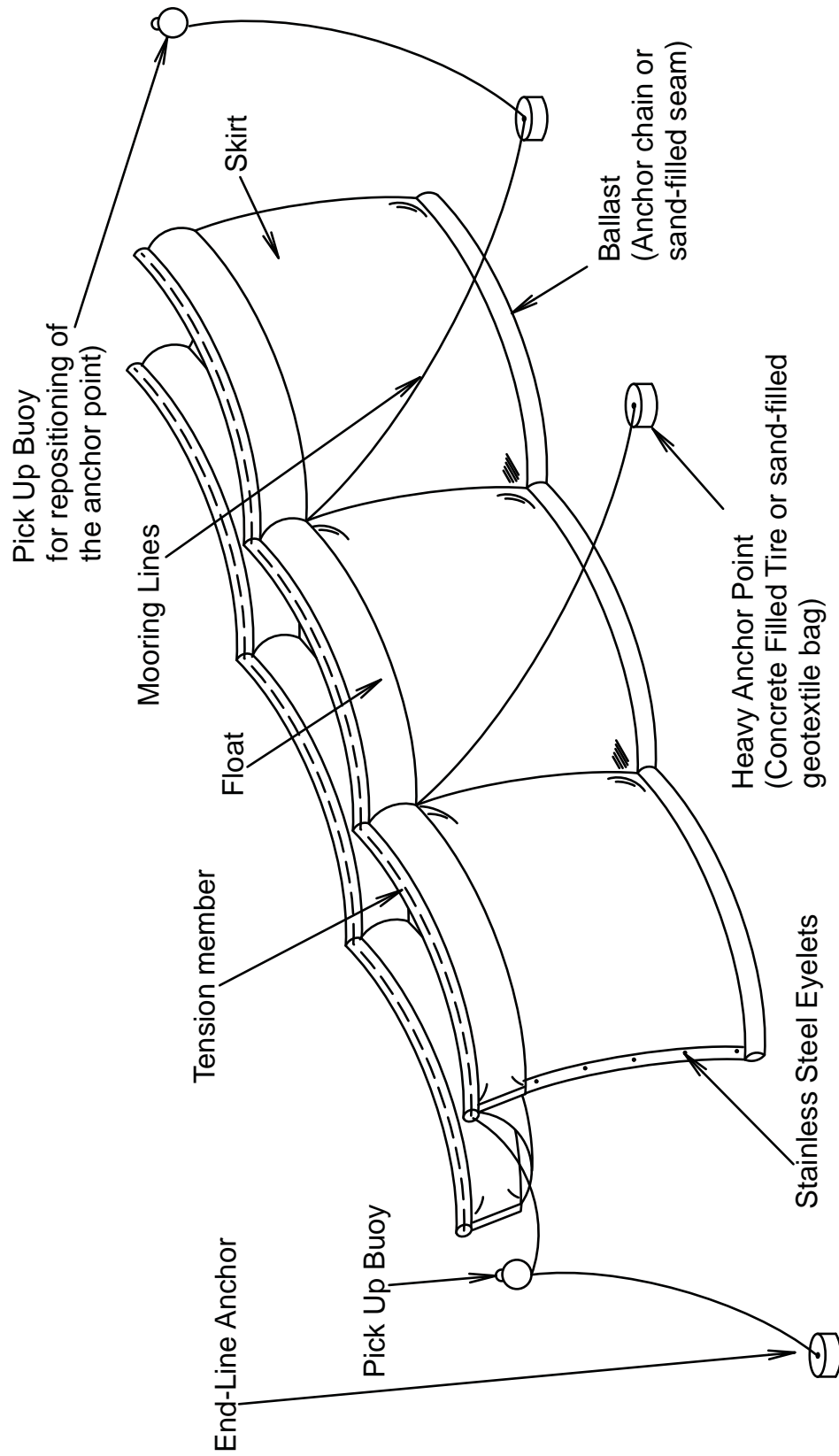
### Chemical Resistance Permaliner (Flexible Polypropylene)

Chemical	Good	Marginal	Poor
Acids Inorganic (eg nitric, hydrochloric)	•		
Bases Organic, Inorganic (eg amines, sodium hydroxide)	•		
Alcohols (eg methanol, ethylene glycol)	•		
Heavy Metals (eg mercury, lead)	•		
Acids Organic (eg acetic, stearic)		•	
Volatile/ Semi-volatile Organics (eg ketones, ethers)		•	
Oil & Grease		•	
Strong Oxidizers (eg chlorine, peroxides)		•	
Allphatic/ Aromatic Halogenated Hydrocarbons (eg trichloroethylene, chlorinated solvents)			•
Allphatic/ Aromatic Hydrocarbons (butane, benzene, toluene, xylene)			•

### Physical Properties Vinyl Coated Polyester or Nylon (PVC)

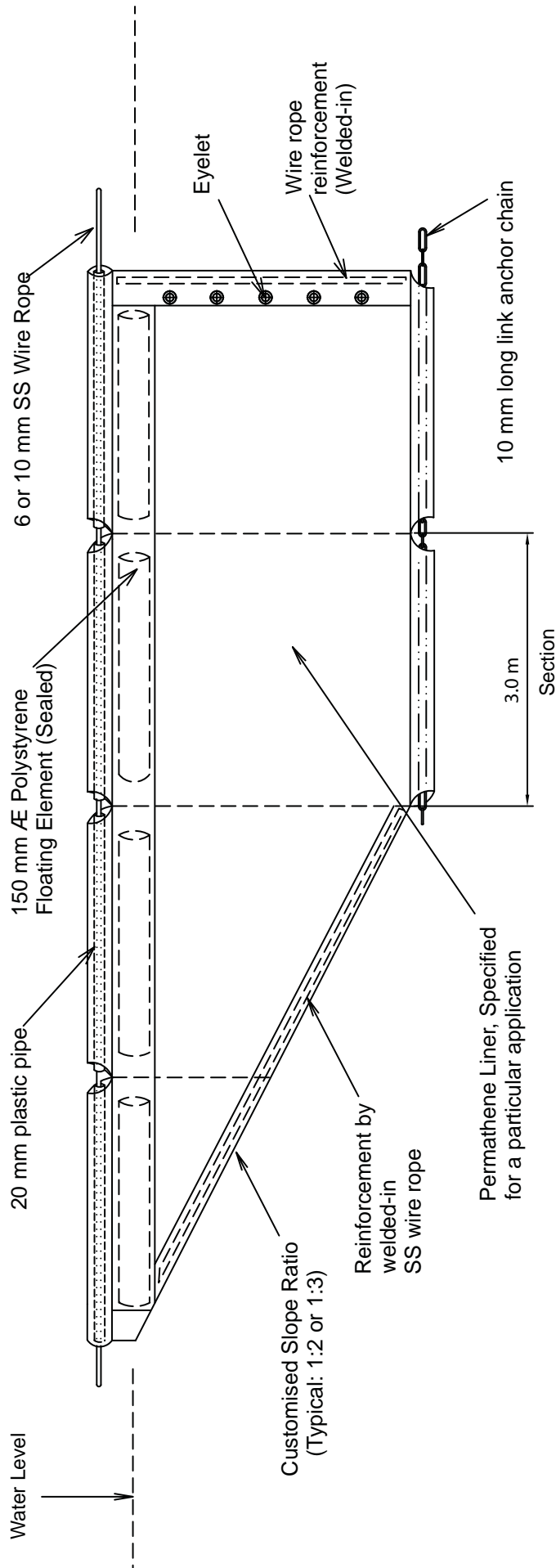
Property	Value
Weight	568 g/ m <sup>2</sup>
Fabric Strength	3.5 kg/ cm tensile strength
Abrasion Resistance	Good. Designed for continual use against rough service
Temperature Range	- 18° C to 60° C
Tensile Strength	3500 kg breaking strength on load carrying components

# Elements of Typical Permathene Baffle



# PERMATHENE BAFFLE

(Not to scale)



Please note that slope units can be built as non-standard length units to fit specified baffle's length

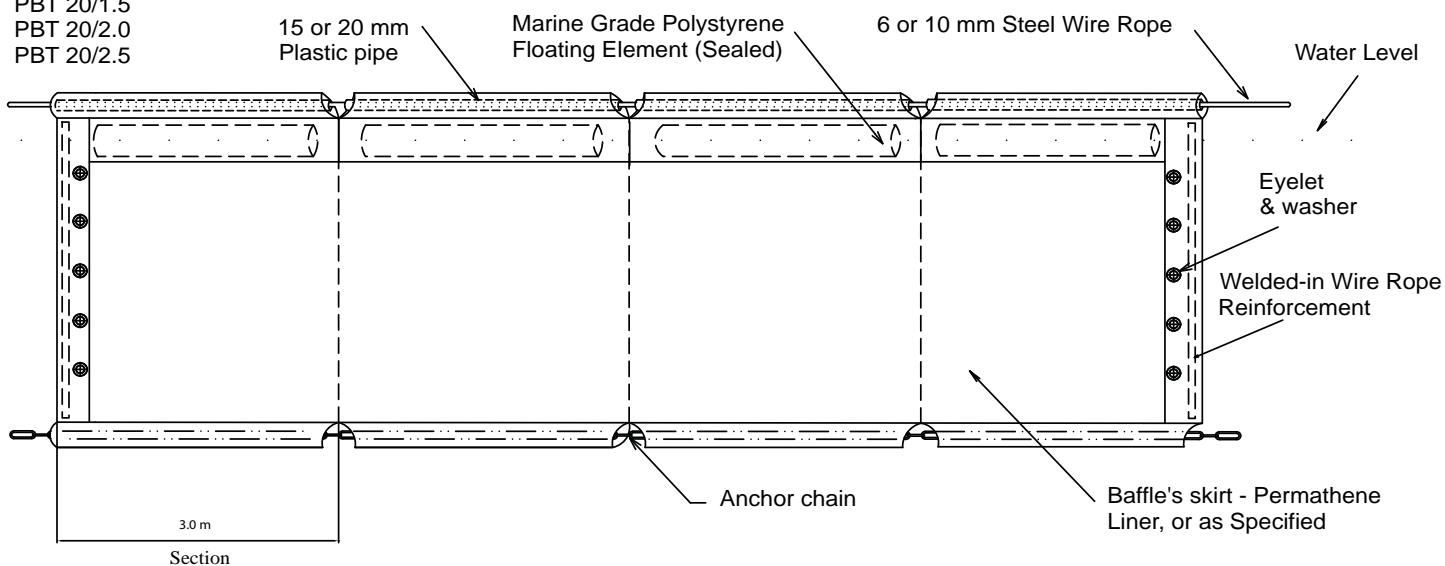
## Standard Baffle Units

Standard Units:

- PBT 15/1.5
- PBT 15/2.0
- PBT 15/2.5
- PBT 20/1.5
- PBT 20/2.0
- PBT 20/2.5

### PERMATHENE BAFFLE (PBT)

(Not to scale)

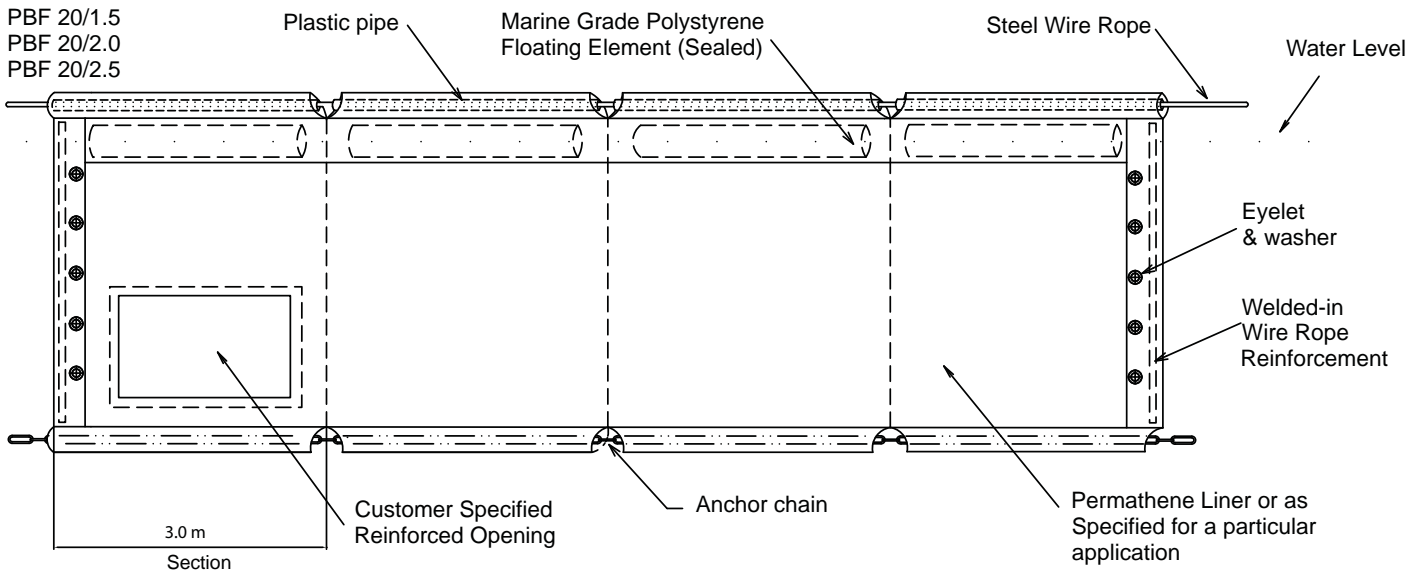


### PERMATHENE FLOW REDIRECTION BAFFLE (PBF)

(Not to scale)

Standard Units:

- PBF 15/1.5
- PBF 15/2.0
- PBF 15/2.5
- PBF 20/1.5
- PBF 20/2.0
- PBF 20/2.5



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