MULTIPLEX

CONSTRUCTION HANDBOOK - WATERPROOFING

Version 3.1

Print Copy

Disclaimer

This is a print version whereas the structure of the construction handbook may have been adapted for ease of reference.

The handbook app should take precedence in case of any ambiguity.

Multiplex Constructions Pty Limited

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1. Waterproofing

1.1 General

What is waterproofing?

Waterproofing is a thin layer of material that is laid over a surface to prevent the penetration of moisture into buildings or parts therein. The material may be a liquid or a sheet.

This layer is continuous and does not allow water to pass through it. For example, on a flat terrace, a waterproofing membrane is laid on the slab, below the finish tiles.

Why do we use waterproofing membrane?

Allowing water to enter building and/or to penetrate behind finishes and into concealed spaces will cause deterioration of the finishes, but more worrisome, the structural fabric of the building.

The deterioration can go unnoticed for years resulting in unhealthy conditions and structural failure. It is common to read articles in the newspapers about balcony collapses. In almost every instance water penetration was the root cause of the collapse. Either by rotting timber framing or corroding reinforcement in concrete. In many of these collapses people have lost their lives.

Any water left standing for 48 hours will promote biological growth, principally mould, but also bacteria. Mould is universally recognised as a danger to human health and the National Construction Code recognises the need to ensure that all buildings are safe to occupy.

Being enshrined in the NCC, we as builders, are legally obliged to ensure the NCC is correctly implemented on all our projects.

Documents and Forms:

Schedule of High Risk Prototypes, Samples and Tests Report

1.2 Bathrooms

Key Considerations

- Material selection
- Preparation
- Installation and application
- Testing

Elements in waterproofing systems include:

- Waterproofing membrane
- Bond breakers and de-bond zones
- Floor Wastes
- Sealant for penetrations
- Water stops and hobs
- Drainage outlets and leak control flanges
- Substrates (floor and wall)
- Falls in substrate and finishes

1.2.1 Design

Internal bathroom design must consider:

- Internal wet area waterproofing shall be generally be in accordance with AS 3740
- Standard MPX 17100 series of drawings.
- Substrates which incorporate a fall to the floor waste.
- Set down of not less than 50 mm (where feasible) and be oversized by up to 20mm each side to allow framing and sheeting to be inside of the set down.
- PT stressing pans and construction joints being avoided.
- Fibre cement sheet linings in all internal shower recesses

Membranes for bathrooms must be:

- Class 3.
- Tested to AS4858
- In accordance with the membrane selection chart

1.2.2 Preparation

Concrete Placement

During concrete placement, ensure that:

- Falls to wastes are as per concrete outline plans
- Falls are diverted away from doors, service penetrations, upstands etc.
- Set downs are formed correctly (Preferably 50mm below outside finish floor level / water stop angle)
- Leak control flanges:
    - Are cast in
    - Are finished level with the concrete surfaces or slightly below
    - Have provision for drainage at the structural level.

Concrete Preparation

- Concrete substrates must:
    - Have a smooth finish
    - Be prepared as specified by the membrane manufacturer.
- Confirm moisture content of substrate meets the requirement of the membrane manufacturer.
- Curing compound must not prevent adhesion of the selected membrane. Concrete may require additional preparation, e.g. grinding, shotblasting, etc., to remove contaminants.
- Prepare the concrete to remove:
    - Form release agents
    - High spots and sharp protrusions
    - Loose or friable concrete
    - Offsets
    - Tie holes
    - Blow holes greater than or equal to 2mm.
- Cracks greater than 1mm or as specified by the membrane manufacturer, must be routed out and filled flush with a sealant if specified.
- Where retrofitted flanges need to be installed they are to be finished level with or slightly below the concrete surface (cutting out or grinding of finished concrete as required), never higher.

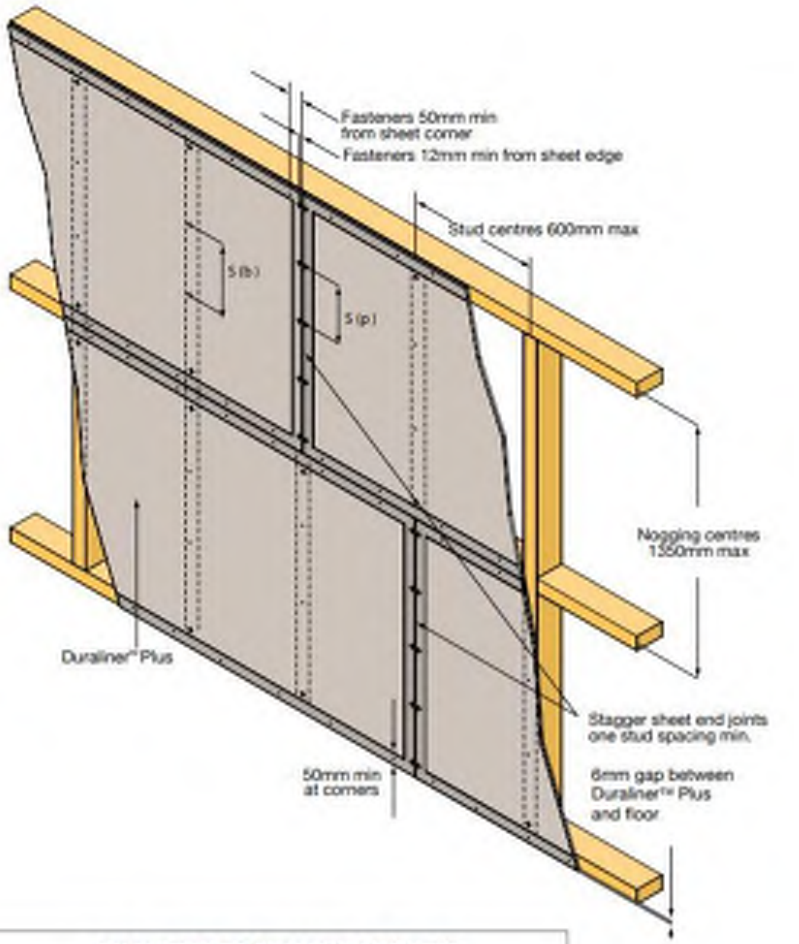
Wall Sheeting

Before applying the membrane to wall sheeting:

- Fix studs correctly to ensure wall sheets are structurally sound as per manufacturer's installation guidelines.
    - 6mm FC sheeting screw spacing is determine by tile weight as per manufacture installation guidelines. For example the maximum screw spacing detailed by BGC is 150mm-200mm (refer Figure below)
    - Moisture Resistance (MR) Plasterboard sheeting screw spacing is determine by tile weight as per manufactures installation guidelines For example the maximum screw spacing by CSR is 100mm (refer Figure below)
- Set joints flush, minimum of 2 coats of wet area base coat and paper tape.
- Prepare internal and external corners ready for membrane as per manufacturer’s instruction.

- Cut circular penetrations with a hole saw (5mm annular gap).
- Bell out/chamfer penetrations.
- Apply approved sealant around plumbing and wall sheeting to seal annular gaps (e.g. shower head spouts, tap bodies, PVC waste pipes).
- Fill bottom of sheeting gaps as appropriate.

FIGURE 2b //
HORIZONTAL SHEET LAYOUT LAYERED FOR TILED WALLS



	FIXING CENTRES		FIX SHEETS TO FRAMING AS NOTED		
	SHEET PERIMETER S(p)	SHEET BODY S(b)	STUDS	NOGGINGS	TOP & BOTTOM PLATES
TILED	150MM	200MM	✓	x	✓

Figure 1: Extract from BGC installation manual - FC Sheeting -

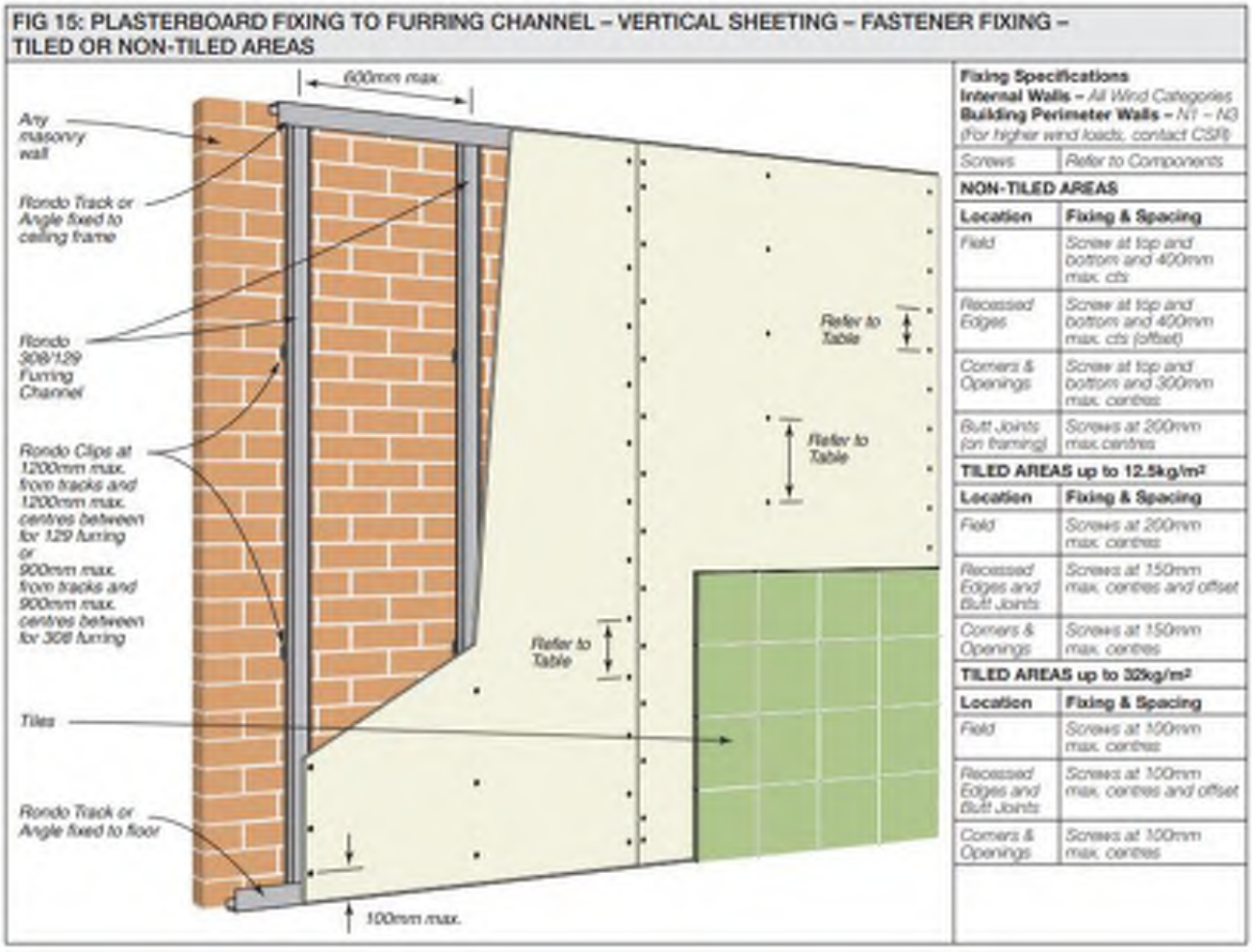


Figure 2: Extract from CSR Gyprock installation manual - Plasterboard fixing to Furring Channel

Water Stops

What is a water stop?

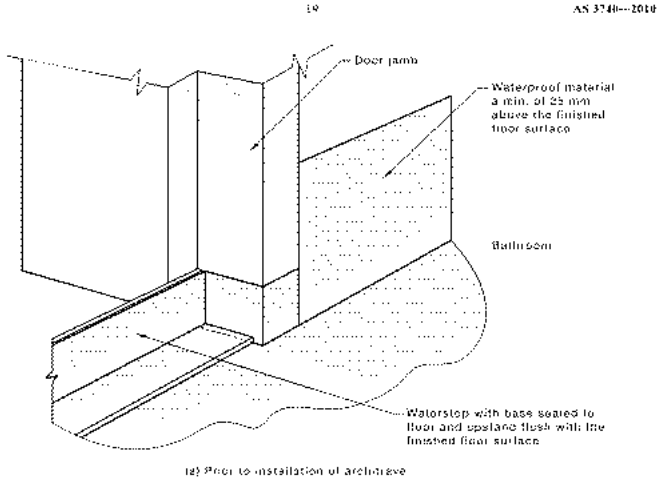
A water stop is an aluminium angle used to create a vertical extension of the waterproofing system, forming a barrier to prevent the passage of moisture out of the shower recess and the wet area.

Water stops must:

- Finish above or at the finished floor level (FFL), not below tiles
- Be fitted tight and hard back to the stop bead at doorways
- Be fixed to the slab with epoxy or mechanical fixing
- Have the gap underneath filled with drypack sand/cement
- Be installed at doorways and showers

Refer to MPX Guide to Waterproofing for further information and detailing for water stop angles.

Figure 3: Water Stop diagram from AS3740



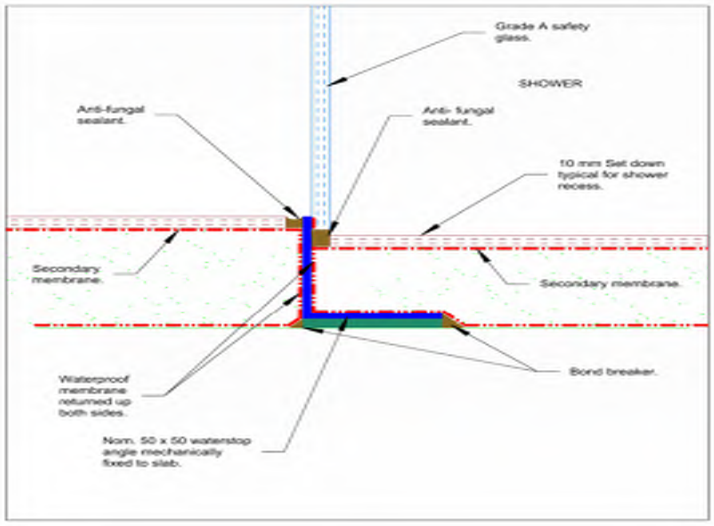


Figure 4: Part Drawing 17140,

Bond Breakers

What are bond breakers?

A bond breaker, as stated in Australian Standard 3740 is a “system that prevents the membrane bonding to the substrate, bedding or lining”

Why is Bond Breaker required?

Bond-breakers allow movement of membranes to cater for differential movements. This will occur at the junction of different materials, and most notably, the:

- Junction of concrete floor and walls
- Vertical internal corners of walls
- Transition from concrete to plastic i.e. cast in leak control flange
- Transition from concrete to aluminium at waterstop angles
- Ends of the waterstop angles and the door frame.
- Cracks in concrete substrate

The bond-breaker material increases the area over which the membrane can elongate.

The bond-breaker material must not adversely affect the performance of the membrane.

Bond breakers must be:

- Applied in accordance with manufacturer’s recommendations
- Fully cured before membrane is applied over. Check manufacturer’s guidelines for curing durations. Compatible with membrane.

1.2.3 Application

Priming

Primers must be:

- Applied as per manufacturer’s guideline
- Covered within the nominated timeframe
- Applied with the required moisture content
- Compatible with substrates, including leak control flange and other components
- Only applied when the air temperature is higher than 5 degrees or as specified by the manufacturer.

Membrane

Membranes must be:

- As per the approved sample
- Applied as per manufacturer’s instructions taking account of the factors that might impact the membrane performance (e.g. moisture content of the concrete, relative humidity, temperature).
- Not applied when temperate is lower than 5 degrees (refer to manufacturer’s guidelines).
- Applied with consideration to the curing time where temperatures are lower than 10 degrees or higher than 30 degrees.
- Completely dry before curing can commence and flood testing or toppings are applied.

Notes:

- *Failure to observe this requirement can lead to membrane re-emulsification that requires expensive remedial work.*
- *There is a fundamental difference between a touch dry membrane and a cured membrane.*
- *When preparing programs, this time frame must be allowed for.*

- *Weather and other environmental factors will influence the time it takes for drying and curing.*
    - *Cold and wet = long time to dry and cure.*
    - *Hot and dry = fast drying and curing.*
    - *Enclosed perimeter with little to no cross ventilation = slow drying and curing.*

Table 1: An example of temperatures and time for curing but refer to manufacture requirements

Temperature (Degrees Celsius)	Typical Curing Time
4.4 - 12.8C	>72 hours
12.8 - 18.3C	12 to 72 hours
18.3 - 29.4C	6 to 12 hours
29.4C	3 to 4 hours

Film Thickness

All membranes, rely upon the final film thickness to be able to function as designed. The correct thickness ensures the mechanical properties will be preserved and the membrane will be durable and perform the desired function.

- Liquid membranes must:
    - Be tested with a comb during application to determine the wet film thickness as per Figure (Note: A membrane with 50% solids applied at a thickness of 2mm out of the can will dry out to 1 mm DFT).
    - Be tested using an ultrasound device for cured acrylic and polyurethane membranes to determine the dry film thickness and destructive testing for cured cementitious membranes with a minimum of onetest conducted and an additional test conducted for each 10m2 chosen at random.
    - Have records of wet and dry film thickness values recorded in the Sub-contractors Checklists

Figure 5: Wet film thickness comb

Figure 6: Ultrasound

Table 2: Example only of membrane thickness for water based and solvent based PU

Membrane Type	Solids Content	Wet Film Thickness Wall (Microns)	Dry Film Thickness Wall (Microns)	Wet Film Thickness Floor (Microns)	Dry Film Thickness Floor (Microns)
Water based Acrylic (one part liquid)	50-60%	1500 (1.5 ltrs/m2)	750-900	2500 (2.5 ltrs/m2)	1250-1500
Water Based PU modified acrylic	60-70%	1250 (1.25 ltrs/m2)	750-875	2000 (2.0 ltrs/m2)	1200-1400
Solvent-based PU	75-85%	Not recommended	Not recommended	1800 (1.8 ltrs/m2)	1350-1500

Flood Testings

- Flood testing for a minimum of 24 hours should be undertaken at the following frequency:
    - Minimum 20% of each type of wet area (i.e. bathroom, laundry) but the recommendation is 100%
    - 100% for shower areas
- Measure the water level at the beginning and end of the flood test
- Carry out visual inspection of all adjoining areas for evidence of leakage.

Protection

- Membranes must be fully cured before accepting light traffic, regardless of program pressures.
- Adequate protection (i.e. corflute) must be put in place by the subcontractor to ensure exposed membranes are protected from damage.
- Signage to be clearly posted.
- Physical barriers to be installed to prevent other trades entering areas where membranes are curing or unprotected

1.3 Vinyl Wet Areas

Key Considerations

- Falls
- Preparation
- Curing of screeds
- Installation and application
- Temporary protection

1.3.1 Design

Vinyl wet area design must consider:

- Standard MPX 17300 series of drawings.
- Falls in the finished vinyl sheet are to be suitable for draining surface water without ponding.
- Falls to ensuite floors are to be 1:80 to 1:100
- Floor wastes located in alignment with the shower head connection point and 600 mm out from the wall.
- Floor wastes being stainless steel or chrome plated brass clamping type purpose made for sheet vinyl.
- Joins being placed away from shower head connection point in the least obtrusive location; preferably behind doors or aligned with the edge of the door frame.
- Floors laid in one piece if practicable.
- Seams, joins, and the like being fully welded and be watertight.
- Seams being true and parallel without gaps and peaking to provide an even and flush finish.

Toppings / Screeds

Toppings/screeds for vinyl floor must:

- Achieve a compressive strength of 20 MPa and tensile strength of 1.5 MPa. This can be achieved using sand-cement screed with polymer additives, or by using a Granolithic topping.
- Have falls in the finished vinyl sheet that can drain surface water without ponding. Where feasible, falls in shower areas must be 1:60 - 1:80, other areas 1:80 - 1:100. In no case is the fall be less than 1:100.
- Be installed with a vapour barrier on slab on ground.

Floor Wastes

Floor waste must be:

- Stainless steel or chrome plated brass clamping type, purpose-made for sheet vinyl.
- Cast into the slab, topping or screed.

Preparation

Material Storage

- Before laying, vinyl must be left on site in accordance with the timeframe nominated by the manufacturer in order to acclimatise.
- Se stored upright and out of direct sunlight.

1.3.2 Application

- Vinyl must be approved as per project sample submission (needs to be tested to AS 4858).
- Floor sheets must be laid first and returned up walls by not less than 150mm.
- Floor and wall junctions must be provided with a compatible pre-manufactured PVC cove with a radius of not less than 25mm.
- Welded joins must be placed outside the shower recess in the least obtrusive location; preferably behind doors or aligned with the edge of the door frame.
- Sheet joints must not be placed closer than 300mm from a floor waste.
- Butterfly joints to corners.

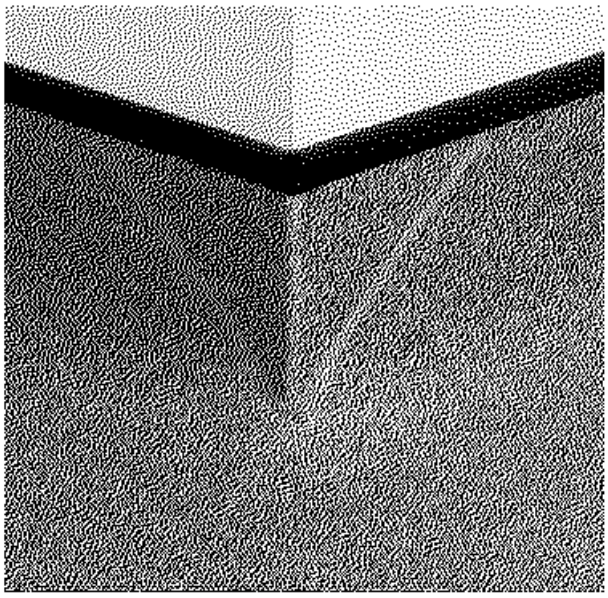


Figure 1: A completed Butterfly Joint, Image copy right of Altro Flooring

Protection

- Adequate temporary protection (i.e. plywood or MDF sheeting) must be put in place to ensure the finished vinyl is protected from damage.
- Do not use temporary protection that contains dies or colourants. Only raw board or clear plastic is permitted.

1.4 Podium, Roofs and External Plantrooms

Key Considerations

- Falls
- Material selection
- Preparation
- Installation and application
- Testing

1.4.1 Design

Podium and roof design must consider:

- Waterproofing to AS 4654
- Standard MPX 17200 series of drawings.
- Documenting falls
- Bunds/Hobs being provided around floor level penetrations.
- Conduits cast into slabs or walls spread apart with a minimum of 50 mm between each.
- Conduit that are fully enclosed by posts, columns or the like, cut not less than 100 mm above the top of the concrete.
- Conduits brought out via vertical surfaces and be angled down to ensure water drains away from the wall.
- Door openings to internal spaces incorporating a hob at a minimum 100 - 150mm above the external FSL and in accordance to AS 4654 for threshold heights
- Stair thresholds having the concrete ramped upwards to ensure water flows away from the stairs.
- Stair well edges incorporating a kerb minimum 100-150 mm high and in accordance to AS 4654 for threshold heights
- Floor wastes suitably arranged to prevent the creation of stresses in the slab that can result in cracking.
- Floor wastes being installed using cast iron or stainless steel floor wastes cast into the concrete
- Floor waste location to be coordinated to plant/ plinths
- Note: Electrical, mechanical and hydraulic penetrations from roof plant decks can be a source of water ingress into buildings. Be aware that water can travel along and within conduits, and within lagging and insulation of pipework from external plant areas to internal areas.
- Light pole, steel framing and any post installed item fixed to the concrete must be installed on a concrete plinth at minimum 150 mm high.
- Conduit cast in slab or walls must be spread apart with a minimum of 50mm between each. Conduit ends must be sealed to prevent water entry unless the conduit is fully enclosed by posts, columns, or the like.
- Concrete hobs must be installed around large service penetrations.
- Penetrations should where possible be installed at high points
- Plant and equipment located on a plant room or roof must be installed on a membraned plinth.

Podium and roof membranes must:

- Be tested to AS4654.1 & AS4858.
- Be in accordance with the membrane selection chart

1.4.2 Preparation

Concrete Preparation

- Concrete substrates must:
    - Have falls 1:80 to 1:100 to the stormwater drainage outlet.
    - Have a smooth finish
    - Be prepared as specified by the membrane manufacturer.
- Confirm moisture content of substrate meets the requirement of the membrane manufacturer.
- Curing compound must not prevent adhesion of the selected membrane. Concrete may require additional preparation, e.g. grinding, shotblasting, etc., to remove contaminants.
- Prepare the concrete to remove:
    - Form release agents
    - High spots and sharp protrusions
    - Loose or friable concrete
    - Offsets
    - Tie holes
    - Blow holes greater than or equal to 2mm.
- Cracks greater than 1mm or as specified by the membrane manufacturer, must be routed out and filled flush with a sealant if specified.
- Where retrofitted flanges need to be installed they are to be finished level with or slightly below the concrete surface (cutting out or grinding of finished concrete as required), never higher.
- Ponding of water on the substrate must not be present. If there is water ponding on the substrate, the substrate may need to have a topping screed laid to falls before laying the membrane to remove ponding, or additional drainage may need to be installed to drain the ponded water or any other method to avoid ponding.

1.4.3 Application

Priming

Primers must be:

- Applied as per manufacturer’s guideline
- Covered within the nominated timeframe
- Applied with the required moisture content
- Compatible with substrates, including leak control flange and other components
- Only applied when the air temperature is higher than 5 degrees or as specified by the manufacturer.

Membranes

Membranes must be:

- As per the approved sample
- Applied as per manufacturer’s instructions taking account of the factors that might impact the membrane performance (e.g. moisture content of the concrete, relative humidity, temperature).
- Not applied when temperature is lower than 5 degrees (refer to manufacturer’s guidelines).
- Do not apply a membrane when rain is forecast during the curing period
- Applied with consideration to the curing time where temperatures are lower than 10 degrees or higher than 30 degrees.
- Completely dry before curing can commence, and flood testing or toppings are applied.

Notes:

- *Failure to observe this requirement can lead to membrane re-emulsification that requires expensive remedial work.*
- *There is a fundamental difference between a touch dry membrane and a cured membrane.*
- *When preparing programs, this time frame must be allowed for.*
- *Weather and other environmental factors will influence the time it takes for drying and curing.*
    - *Cold and wet = long time to dry and cure.*
    - *Hot and dry = fast drying and curing.*
    - *Enclosed perimeter with little to no cross ventilation = slow drying and curing.*

Table 1: Example temperatures and time for curing

Temperature (Degrees Celsius)	Typical Curing Time
4.4 - 12.8C	>72 hours
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18.3 - 29.4C	6 to 12 hours
29.4C	3 to 4 hours

Film Thickness

All membranes, both sheet and liquid, rely upon the final film thickness to be able to function as designed. The correct thickness ensures the mechanical properties will be preserved and the membrane will be durable and perform the desired function.

- Liquid membranes must:
    - Be tested with a comb during application to determine the wet film thickness as per Figure (Note: A membrane with 50% solids applied at a thickness of 2mm out of the can will dry out to 1 mm DFT).
    - Be tested using an ultrasound device for cured acrylic and polyurethane membranes to determine the dry film thickness. For cured cementitious membranes a destructive test must be conducted, with a minimum of one test and an additional test conducted for each 10m2 chosen at random.
    - Have records of wet and dry film thickness values recorded in the Sub-contractors Checklists.

Spark/Holiday Test

Spark/Holiday testing (in lieu of flood test) must be:

- Conducted when the selected membrane is compatible i.e. polyurethane

Tensile/Pull Off Test

Tensile/pull off tests must be:

- Conducted for all external applied membranes where solvent borne polyurethanes, plural component elastomers are applied and screeds are not applied
- Conducted at frequencies based on a risk assessment or as follows:
    - Greater than 10 m2 and less than 30m2 – 2 test sites
    - Greater than 30m2 and less than 100m2 – 3 test sites
    - Exceeding 100m2 – 3 test sites plus 1 test site for each additional 100m2

UV Protective Coatings and Slip Resistance

- Applied as per manufacturer's guideline
- Applied to membrane within the nominated timeframe
- Applied once membrane has cured and surface is dry

- Only applied when the air temperature is higher than 5 degrees or as specified by the manufacturer.
- Achieve the requirement of the UV protection underlying membrane
- Achieve requirement Slip resistance for all trafficable area I.e. on top of lift

Joints

What are temporary movement, permanent movement and construction joints?

Temporary movement joints are deliberate discontinuities in structural members, usually slabs and beams that allow initial shrinkage of concrete to take place. These joints are then locked together at a point in time specified by the structural engineer. Locked together, they continue to transfer shear, but prevent further movement taking place.

Permanent movement joints are deliberate discontinuities between structural members, usually slabs and beams. They are provided to allow movement of the structure for long and short term effects such as thermal movement and long term creep. Permanent movement joints are notorious failure points in a waterproofing system. Changes in direction should be avoided in the structural design if possible.

A **construction joint** (a.k.a. a cold joint) is an interface between two concrete pours.

Waterproofing of joints often fails because of an insufficient allowance for movement in the membrane system.

Temporary Movement and Construction Joints

Even when locked, minor movement will continue and will need to be considered in the waterproofing system.

Construction joints and temporary joints in substrates must:

- Be saw cut or routed out,
- Have bond breakers installed to allow for ongoing movement.

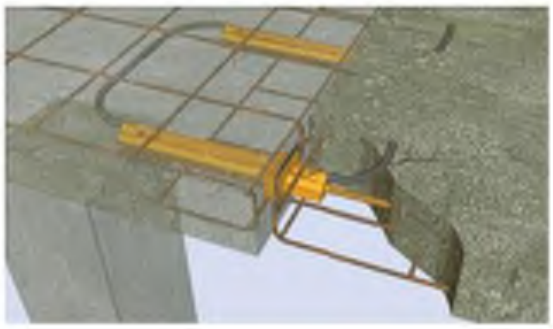

Figure 1: A Sure Lok used for TMJs, image copyright of SRG

Permanent Movement Joints

Permanent movement joints must:

- Have elastomeric bandages
- Be confirmed with the structural engineer or slab designer to determine the maximum expected movement at the joint, and ensure sufficient slack loop remains in the bandage to accommodate this movement.
- Have consideration for changes in direction and transition
- Ensure substrate to which it is affixed is cleaned and primed
- Ensure waterproofing is immediately protected from mechanical damage
- Have gutters (PVC or stainless) installed under permanent movement joints.

Services Penetrations

- Electrical conduits and irrigation pipes must be raised above the base (not less than 50mm) with sufficient separation to allow the application of membrane in between (nominal 50mm).
- Be limited in number.

- Be installed in conduits with all joints and ends sealed.

Steel posts, Columns, Light Poles, Guy Wires and the Like

Steel posts, columns, light poles, guy Wires and the like must be:

- Installed on plinths of reinforced concrete, refer to 17213 for Guy Wire details
- On hobs raised as high as practicable, refer to 17212 for post details
- Held down only with chemical anchors
- Waterproofed before and after casting plinth.

1.5 Balconies

Key Considerations

- Material selection
- Preparation
- Installation and application
- Testing

1.5.1 Design

Balconies design must consider:

- Waterproofing to AS 4654
- Standard MPX 17200 series of drawings
- Membrane termination height sufficient to prevent water entering the building and is to be provided by the Architect or Facade Engineer. Minimum requirements are specified in AS4654.2 Appendix A, Table A1.
- Provision of a hob to the outboard edge of not less than 150 mm above finished tile level.

Balcony membranes must:

- Be tested to AS4654.1 & AS4858.
- Be in accordance with the membrane selection chart

1.5.2 Preparation

Concrete Preparation

- Concrete substrates must:
    - Have a smooth finish
    - Be prepared as specified by the membrane manufacturer.
- Confirm moisture content of substrate meets the requirement of the membrane manufacturer.
- Curing compound must not prevent adhesion of the selected membrane. Concrete may require additional preparation, e.g. grinding, shotblasting, etc., to remove contaminants.
- Prepare the concrete to remove:
    - Form release agents
    - High spots and sharp protrusions
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    - Offsets
    - Tie holes
    - Blow holes greater than or equal to 2mm.
- Cracks greater than 1mm or as specified by the membrane manufacturer, must be routed out and filled flush with a sealant if specified.
- Where retrofitted flanges need to be installed they are to be finished level with or slightly below the concrete surface (cutting out or grinding of finished concrete as required), never higher.

Bond Breakers

What are bond breakers?

A bond breaker, as stated in Australian Standard 4654 is a “system that prevents the membrane bonding to the substrate, bedding or lining”

Why is Bond Breaker required?

Bond-breakers allow movement of membranes to cater for differential movements. This will occur at the junction of different materials, and most notably, the:

- Junction of concrete floor and walls
- Vertical internal corners of walls
- Transition from concrete to plastic i.e. cast in leak control flange
- Cracks in the substrate
- Transition from concrete to aluminium at waterstop angles
- Ends of the waterstop angles and the door frame.

The bond-breaker material increases the area over which the membrane can elongate.

The bond-breaker material must not adversely affect the performance of the membrane.

Bond breakers must be:

- Applied in accordance with manufacturer's recommendations
- Fully cured before membrane is applied over
- Compatible with membrane.

1.5.3 Application

Priming

Primers must be:

- Applied as per manufacturer's guideline
- Covered within the nominated timeframe
- Applied with the required moisture content
- Compatible with substrates, including leak control flange and other components
- Only applied when the air temperature is higher than 5 degrees or as specified by the manufacturer.

Membranes

Membranes must be:

- Turned up and over the hob or set down
- Returned into the spitter not less than 25mm
- As per the approved sample
- Applied as per manufacturer's instructions taking account of the factors that might impact the membrane performance (e.g. moisture content of the concrete, relative humidity, temperature).
- Not applied when temperate is lower than 5 degrees (refer to manufacturer's guidelines).
- Applied with consideration to the curing time where temperatures are lower than 10 degrees or higher than 30 degrees.
- Completely dry before curing can commence, and flood testing or toppings are applied.

Notes:

- *Failure to observe this requirement can lead to membrane re-emulsification that requires expensive remedial work.*
- *There is a fundamental difference between a touch dry membrane and a cured membrane.*
- *When preparing programs, this time frame must be allowed for.*
- *Weather and other environmental factors will influence the time it takes for drying and curing.*
    - *Cold and wet = long time to dry and cure.*

- *Hot and dry = fast drying and curing.*
- *Enclosed perimeter with little to no cross ventilation = slow drying and curing.*

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Film Thickness

All membranes, rely upon the final film thickness to be able to function as designed. The correct thickness ensures the mechanical properties will be preserved and the membrane will be durable and perform the desired function.

Liquid membranes must:

- Be tested with a comb during application to determine the wet film thickness as per Figure (Note: A membrane with 50% solids applied at a thickness of 2mm out of the can will dry out to 1 mm DFT).
- Be tested using an ultrasound device for cured acrylic and polyurethane membranes to determine the dry film thickness and destructive testing for cured cementitious membranes with a minimum of one test conducted and an additional test conducted for each 10m2 chosen at random.
- Have records of wet and dry film thickness values recorded in the Sub-contractors Checklists.

Overflows and Spitters

Overflows and spitters must be:

- Installed as per hydraulic engineer's drawings
- Angled downwards to the outside of the building
- Installed above primary drainage and below internal SSL (structural slab level).
- Installed with a recess of 10mm x 10mm for sealant application.

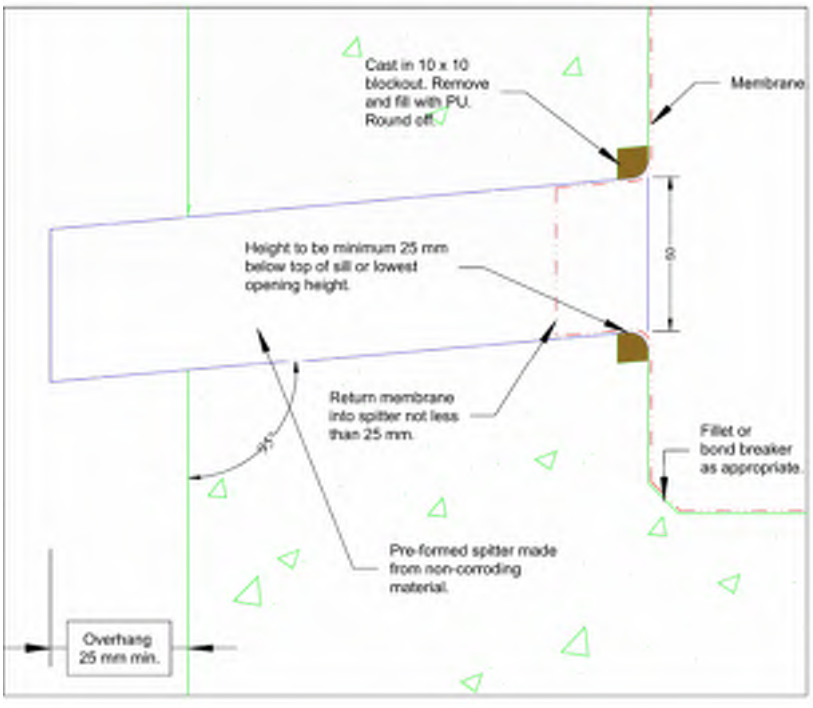

Figure 3: Part drawing 17221, Spitters and Overflows, from MPX Guide to Waterproofing

Downpipes

Downpipes must be:

- Fitted with a safe waste tray.
- Have the membrane turned up the downpipe to finish at the finished floor level (FFL).

Figure 4: Example of a safe waste tray

1.6 Planter Boxes

Key Considerations

- Falls
- Drainage and Overflows
- Material Selection
- Penetrations
- Preparation
- Installation and Application

1.6.1 Design

Planter boxes design must consider:

- Davit arms and other life safety devices not being incorporated within the planter located outside.
- Waterproofing to AS 4654
- Standard MPX 17200 series of drawings and
- Construction from cast in-situ reinforced concrete (Note: Concrete blockwork, reinforced and grouted, is permitted if joints are flush and a plural component membrane is used).
- Base graded to fall to a floor waste.
- Pipes or conduits being located through walls rather than the base
- Pipes or conduits being located not less than 50mm above the floor and spread apart.
- Stand pipes, light poles or similar being only on plinths.

Planter box membranes must:

- Be tested to AS4654.1 & AS4858.
- Be in accordance with the membrane selection chart
- Be resistant to root attack

Drainage

Planter boxes must have drainage:

- Dimensioned as per the hydraulic engineer's details
- With a clean out or inspection opening (IO) provided below planter
- With a clean out riser up to soil level.

Overflows

Planter boxes must have overflows:

- Dimensioned as per the hydraulic engineer's details
- 50mm above the finished soil level
- Protected from blockages caused by soil or mulch

They should also include a clean out or inspection opening (IO) provided below the planter unless the pipe can be cleared or rodded from above.

Services Penetrations

Electrical conduits and irrigation pipes must be:

- Raised above the base (not less than 50mm) with sufficient separation to allow the application of membrane in between (nominal 50mm)
- Limited in number

- Designed in accordance with the drawings 17209, 17210, & 17211

1.6.2 Preparation

Concrete Preparation

- Concrete substrates must:
    - Have falls to the stormwater drainage outlet.
    - Be prepared as specified by the membrane manufacturer.
- Confirm moisture content of substrate meets the requirement of the membrane manufacturer.
- Curing compound must not prevent adhesion of the selected membrane. Concrete may require additional preparation, e.g. grinding, shotblasting, etc., to remove contaminants.
- Prepare the concrete to remove:
    - Form release agents
    - High spots and sharp protrusions
    - Loose or friable concrete
    - Offsets
    - Tie holes
    - Blow holes greater than or equal to 2mm.
- Cracks greater than 1mm or as specified by the membrane manufacturer, must be routed out and filled flush with a sealant if specified.

Concrete Block Walls

Concrete block planter boxes must:

- Have the internal face of the joints struck flush

Bond Breakers

What are bond breakers?

A bond breaker, as stated in Australian Standard 4654 is a “system that prevents the membrane bonding to the substrate, bedding or lining”

Why is Bond Breaker required?

Bond-breakers allow movement of membranes to cater for differential movements. This will occur at the junction of different materials, and most notably, the:

- Junction of concrete floor and walls
- Vertical internal corners of walls
- Transition from concrete to plastic i.e. cast in leak control flange
- Transition from concrete to aluminium at waterstop angles
- Ends of the waterstop angles and the door frame.

The bond-breaker material increases the area over which the membrane can elongate.

The bond-breaker material must not adversely affect the performance of the membrane.

Bond breakers must be:

- Applied in accordance with manufacturer’s recommendations
- Fully cured before membrane is applied over
- Compatible with membrane.

1.6.3 Application

Priming

Primers must be:

- Applied as per manufacturer's guideline
- Covered within the nominated timeframe
- Applied with the required moisture content
- Compatible with substrates, including leak control flange and other components
- Only applied when the air temperature is higher than 5 degrees or as specified by the manufacturer.

Membranes

Membranes must be:

- Terminated in accordance with the manufacturer's guidelines
- Applied as per manufacturer's instructions taking account of the factors that might impact the membrane performance (e.g. moisture content of the concrete, relative humidity, temperature).
- Not applied when temperature is lower than 5 degrees (refer to manufacturer's guidelines).
- Applied with consideration to the curing time where temperatures are lower than 10 degrees or higher than 30 degrees.
- Do not apply a membrane when rain is forecast during the curing period
- Completely dry before curing can commence and flood testing or toppings are applied.

Notes:

- *Failure to observe this requirement can lead to membrane re-emulsification that requires expensive remedial work.*
- *There is a fundamental difference between a touch dry membrane and a cured membrane.*
- *When preparing programs, this time frame must be allowed for.*
- *Weather and other environmental factors will influence the time it takes for drying and curing.*
    - *Cold and wet = long time to dry and cure.*
    - *Hot and dry = fast drying and curing.*
    - *Enclosed perimeter with little to no cross ventilation = slow drying and curing.*

Table 1: Example temperatures and time for curing

Temperature (Degrees Celsius)	Typical Curing Time
4.4 - 12.8C	>72 hours
12.8 - 18.3C	12 to 72 hours
18.3 - 29.4C	6 to 12 hours
29.4C	3 to 4 hours

Film Thickness

All membranes, rely upon the final film thickness to be able to function as designed. The correct thickness ensures the mechanical properties will be preserved and the membrane will be durable and perform the desired function.

Liquid membranes must:

- Be tested with a comb during application to determine the wet film thickness as per Figure (Note: A membrane with 50% solids applied at a thickness of 2mm out of the can will dry out to 1 mm DFT).
- Be tested using an ultrasound device for cured acrylic and polyurethane membranes to determine the dry film thickness with a minimum of one test conducted and an additional test conducted for each 10m2 chosen at random.

Have records of wet and dry film thickness values recorded in the Sub-contractors Checklists.

UV Protective Coating requirement where membrane is exposed to sun light

UV Protective Coating must be:

- Applied as per manufacturer's guideline
- Applied to membrane within the nominated timeframe
- Applied once membrane has cured and surface is dry
- Only applied when the air temperature is higher than 5 degrees or as specified by the manufacturer.
- Achieve the requirement of the UV protection underlying membrane

Protection and Drainage Cell

- Drainage cells must be installed vertical, horizontal and wrapped in geo-fabric

Services Penetrations

Electrical conduits and irrigation pipes must be:

- Installed in conduits with all joints and ends sealed.

Steel posts, Columns, Light Poles, Guy Wires

Steel posts, Columns, Light Poles, Guy Wires and the like must be:

- Installed on plinths of reinforced concrete, refer to Dwg. 17213 for Guy Wire details
- Hobs raised as high as practicable, refer to Dwg. 17212 for post details
- Held down only with chemical anchors
- Waterproofed.

1.7 Internal Plant Rooms

Key Considerations

- Material Selection
- Preparation
- Installation and Application
- Testing

1.7.1 Design

Plant room design must consider:

- Waterproofing to AS 4654
- Standard MPX 17400 series of drawings.
- Falls and drainage outlets arranged to ensure adequate drainage around plinths and other encumbrances
- Floor waste location to be coordinate to plant/plinth
- Drainage outlets cast in and made from cast iron or stainless steel.
- Bunds must be provided around all floor level penetrations
- Water discharge from the plant and equipment must be drained into waterproofed bunds
- Plant must be mounted on plinths
- Plinth location and sizing must never result in trapped water
- Plinth location must never be closer than 100 mm from any other plinth, wall, column, etc.
- Steel framing must be installed on pedestals, minimum 150mm high or above overflows. Conduits cast into slabs or walls spread apart with a minimum of 50 mm between each.
- Conduits that are fully enclosed by posts, columns or the like, cut not less than 100 mm above the top of the concrete.
- Conduits brought out via vertical surfaces and be angled down to ensure water drains away from the wall.
- Door openings to internal spaces incorporating a hob at a minimum 100 to 150mm above the FSL.
- Incorporate a ramp and grated drain to door openings where a hob cannot be installed
- Stair thresholds having the concrete ramped upwards to ensure water flows away from the stairs.
- Stair well edges incorporating a kerb minimum 150 mm high.
- Floor wastes suitably arranged to prevent the creation of stresses in the slab that can result in cracking.

Plant room membranes must:

- Tested to AS4654.1 & AS4858 where used externally
- Be in accordance with the membrane selection chart

1.7.2 Preparation

Concrete Preparation

- Concrete substrates must:
    - Have falls 1:80 to 1:100 to the stormwater drainage outlet.
    - Have a smooth finish
    - Be prepared as specified by the membrane manufacturer.
- Confirm moisture content of substrate meets the requirement of the membrane manufacturer.

- Curing compound must not prevent adhesion of the selected membrane. Concrete may require additional preparation, e.g. grinding, shotblasting, etc., to remove contaminants.
- Prepare the concrete to remove:
    - Form release agents
    - High spots and sharp protrusions
    - Loose or friable concrete
    - Offsets
    - Tie holes
    - Blow holes greater than or equal to 2mm.
- Cracks greater than 1mm or as specified by the membrane manufacturer, must be routed out and filled flush with a sealant if specified.
- Where retrofitted flanges need to be installed they are to be finished level with or slightly below the concrete surface (cutting out or grinding of finished concrete as required), never higher.

Bond Breakers

What are bond breakers?

A bond breaker, as stated in Australian Standard 4654 is a “system that prevents the membrane bonding to the substrate, bedding or lining”

Why is Bond Breaker required?

Bond-breakers allow movement of membranes to cater for differential movements. This will occur at the junction of different materials, and most notably, the:

- Junction of concrete floor and walls
- Vertical internal corners of walls
- Transition from concrete to plastic i.e. cast in leak control flange
- Cracks in the substrate
- Transition from concrete to aluminium at waterstop angles
- Ends of the waterstop angles and the door frame.

The bond-breaker material increases the area over which the membrane can elongate.

The bond-breaker material must not adversely affect the performance of the membrane.

Bond breakers must be:

- Applied in accordance with manufacturer’s recommendations
- Fully cured before membrane is applied over
- Compatible with membrane.

1.7.3 Application

Priming

Primers must be:

- Applied as per manufacturer’s guideline
- Covered within the nominated timeframe
- Applied with the required moisture content
- Compatible with substrates, including leak control flange and other components
- Only applied when the air temperature is higher than 5 degrees or as specified by the manufacturer.

Membranes

Membranes must be:

- As per the approved sample
- Applied as per manufacturer's instructions taking account of the factors that might impact the membrane performance (e.g. moisture content of the concrete, relative humidity, temperature).
- Not applied when temperate is lower than 5 degrees (refer to manufacturer's guidelines).
- Applied with consideration to the curing time where temperatures are lower than 10 degrees or higher than 30 degrees.
- Completely dry before curing can commence and flood testing or toppings are applied.

Notes:

- *Failure to observe this requirement can lead to membrane re-emulsification that requires expensive remedial work.*
- *There is a fundamental difference between a touch dry membrane and a cured membrane.*
- *When preparing programs, this time frame must be allowed for.*
- *Weather and other environmental factors will influence the time it takes for drying and curing.*
    - *Cold and wet = long time to dry and cure.*
    - *Hot and dry = fast drying and curing.*
    - *Enclosed perimeter with little to no cross ventilation = slow drying and curing.*

Table 1: Example temperatures and time for curing

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Film Thickness

All membranes, rely upon the final film thickness to be able to function as designed. The correct thickness ensures the mechanical properties will be preserved and the membrane will be durable and perform the desired function.

Liquid membranes must:

- Be tested with a comb during application to determine the wet film thickness as per Figure (Note: A membrane with 50% solids applied at a thickness of 2mm out of the can will dry out to 1 mm DFT).
- Be tested using an ultrasound device for cured acrylic and polyurethane membranes to determine the dry film thickness with a minimum of one test conducted and an additional test conducted for each 10m2 chosen at random.
- Have records of wet and dry film thickness values recorded in the Sub-contractors Checklists.

Penetrations

- Conduits cast into slabs or walls must:
    - Be spread apart with a minimum of 50mm between each.
    - Have ends sealed to prevent water unless the conduit is fully enclosed by posts, columns, or the like.
- Conduits must be brought out via vertical surfaces and be angled down to ensure water drains away from the wall (whenever practicable).

1.8 Below Grade Waterproofing

Key Considerations

- Material Selection
- Joints and penetrations
- Preparation
- Installation and Application
- Testing
- Ongoing inspection and maintenance

1.8.1 Design

Determine with Client what strategy is to be implemented:

- Total exclusion (entirely dry internal environment)
- A system of control (some water entry and damp patches acceptable)
- A combination of the two.

Below grade design must consider:

- Standard MPX 17600 series of drawings
- Adequately sized (minimum 600mm x 600mm) access panels provided for cavities greater than 600mm and at a minimum 4m centres where cavity is less than 600mm centres
- Cavities as a confined space.
- Hobs cast in monolithically with the floor where practicable.
- Falls to drainage outlets

Basement slabs in contact with stone must:

- Have cut rock faces with intermediate basement slabs set back with a minimum gap of 50 mm. Consider netting to prevent rock fall from bridging the gap.
- Have a slab soffit with a drip groove cast in. As an alternative, a diverter may be used.

Penetrations must:

- Be detailed and installed to prevent water entry.
- Have puddle flanges
- Have hydrophilic wraps and seals
- Slope away from the building.
- Not be located hard to the floor or slab soffit.

Subsoil drains must:

- Have access to clean out subsoil drains as required by AS3500.3 Clause 7.4.1. This includes not just the pipe, but any walls etc. that may conceal the drain.
- Use a geo-fabric over the gravel fill to capture sediment from decomposing from the stone above.

Below grade membranes must:

- Be in accordance with the membrane selection chart
- Withstand the water pressure exerted as a result of hydrostatic head pressure created by water.
- Provide an effective barrier to the passage of liquid water and water vapour from the ground.
- Be able to resist the passage of moisture into the building.

1.8.2 Application

Dry facing walls placed in front of cut rock faces

- Loose and friable rock must be removed before covering over. A piece of fractured rock falling against the wall will “wick” water from the cut face and result in damp patches.
- Projections that may allow water to drip from height and splash onto the back of the wall must be removed.

1.9 Swimming Pool and Recreational Wet Areas

Refer to Guide to Swimming Pools

1.10 Appendix 1 - MPX Standard Details - Internal Wet Areas

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17100 - Drawing Index and Notes
17101 - Typical Layout - Separate Shower
17102 - Typical Layout - Shower Over Bath
17103 - DELETED
17104 - Metal Door Frame Details
17105 - Metal Door Frame Details - Section
17106 - Cavity Door Details – Plan View
17107 - Cavity Door Details – Section Through Threshold
17108 - Floor Wall Junction
17109 - Floor Wall Junction
17110 - DELETED
17111 - Bath Tub Installation, Insert Bath Detail & Bath Front
17112 - Insert Bath Wall Detail
17113 - Bath Tub Installation Details - Plastic Inset Bath - No Shower Over
17114 - Bath Tub Installation Details - Plastic Inset Bath - With Shower Over
17115 - Bath Tub Installation Details - Plastic Rimmed Bath - With Shower Over
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17128 - Bath Tub Installation Details - Elevation of Bath Side Showing Vents
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17130 - DELETED
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17134 - DELETED
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17136 - Typical Vertical Corner Details
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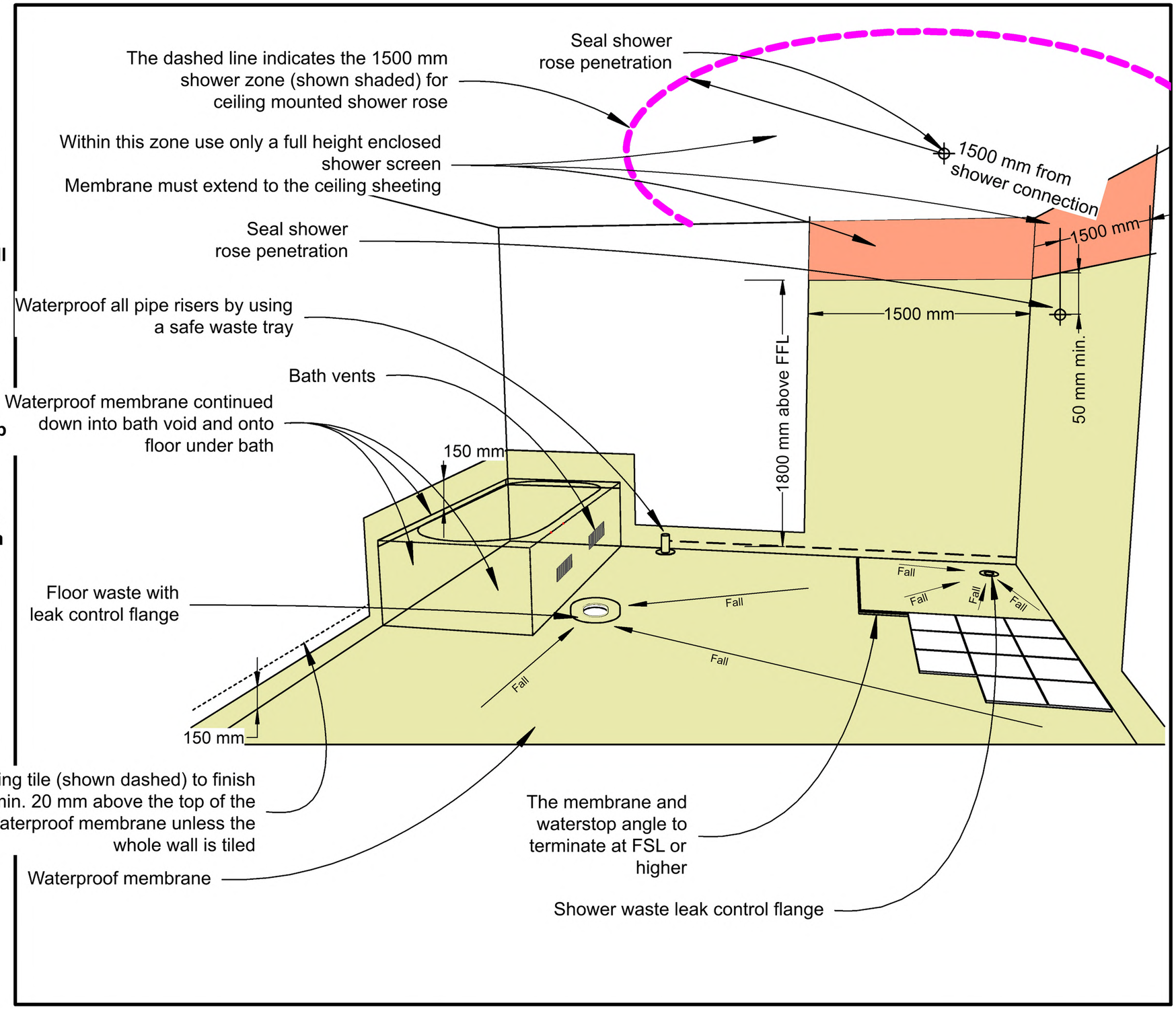
17138 - Cast In Leak Control Flange and Retro-Fitted
17139 - DELETED
17140 - Shower Screens - Floor Details
17141 - Shower Screens - Wall Abutments
17142 - Shower Water-Stop Angle Details - Elevation of Floor Angle
17143 - Shower Water-Stop Angle - Section Through Floor

NOTES:
1. Dimension provided are nominal.
2. Some details may be shown exagerated or exploded to provide clarity.
3. The nomination in a detail of a particular product or system is not intended as an endorsement for that product, system or manufacturer and shall not be interpreted as the only products or system that may be suitable for that situation.

NOTE:
- Except for ceiling mounted shower heads, waterproofing is required to 2000 mm min. from the floor or 50 mm above the shower, whichever is higher.
- When a ceiling mounted shower head is used the waterproofing must extend to the ceiling and a full height shower screen must be used.
- Where a door occurs a waterstop angle is required.
- A waterstop angle must be provided at the edge of the shower recess.
- For enclosed showers a waterstop angle is to continue vertically up each wall.
- Waterproof membrane and angle is to terminate at finished tile level.
- Waterproofing is required 150 mm min. above bath, basin or vanity rim.



MULTIPLEX
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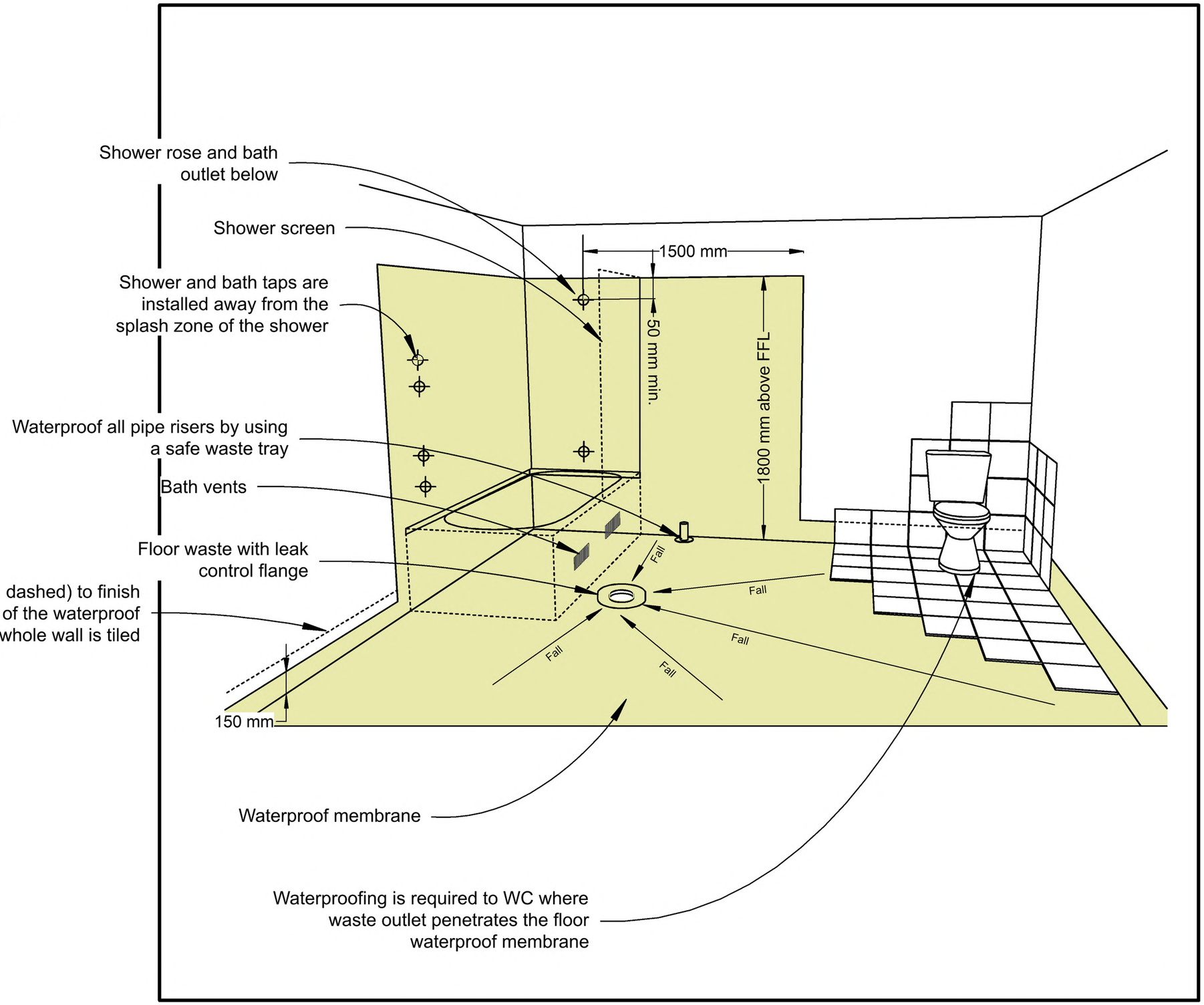
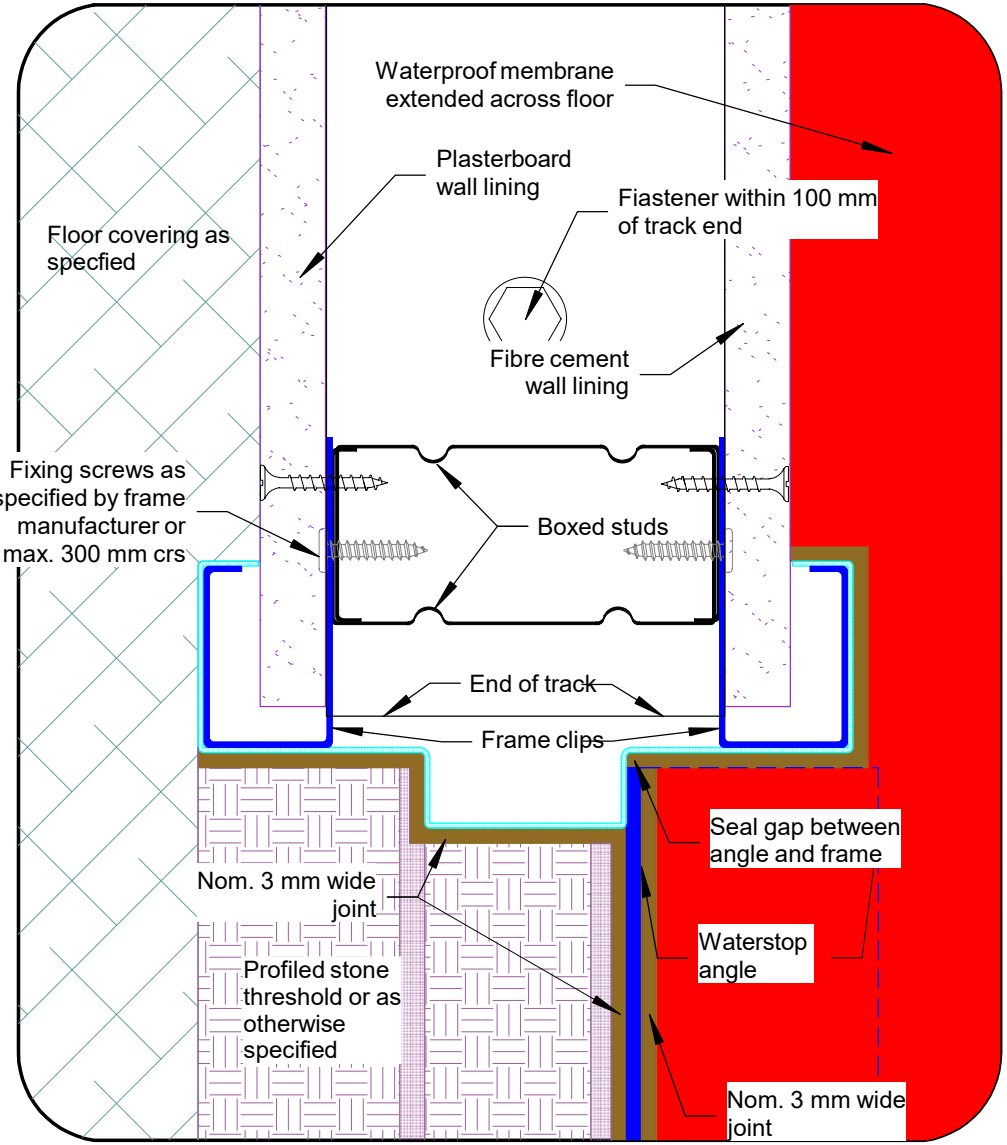
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Typical Layout - Separate Shower	December 2020	17101	D

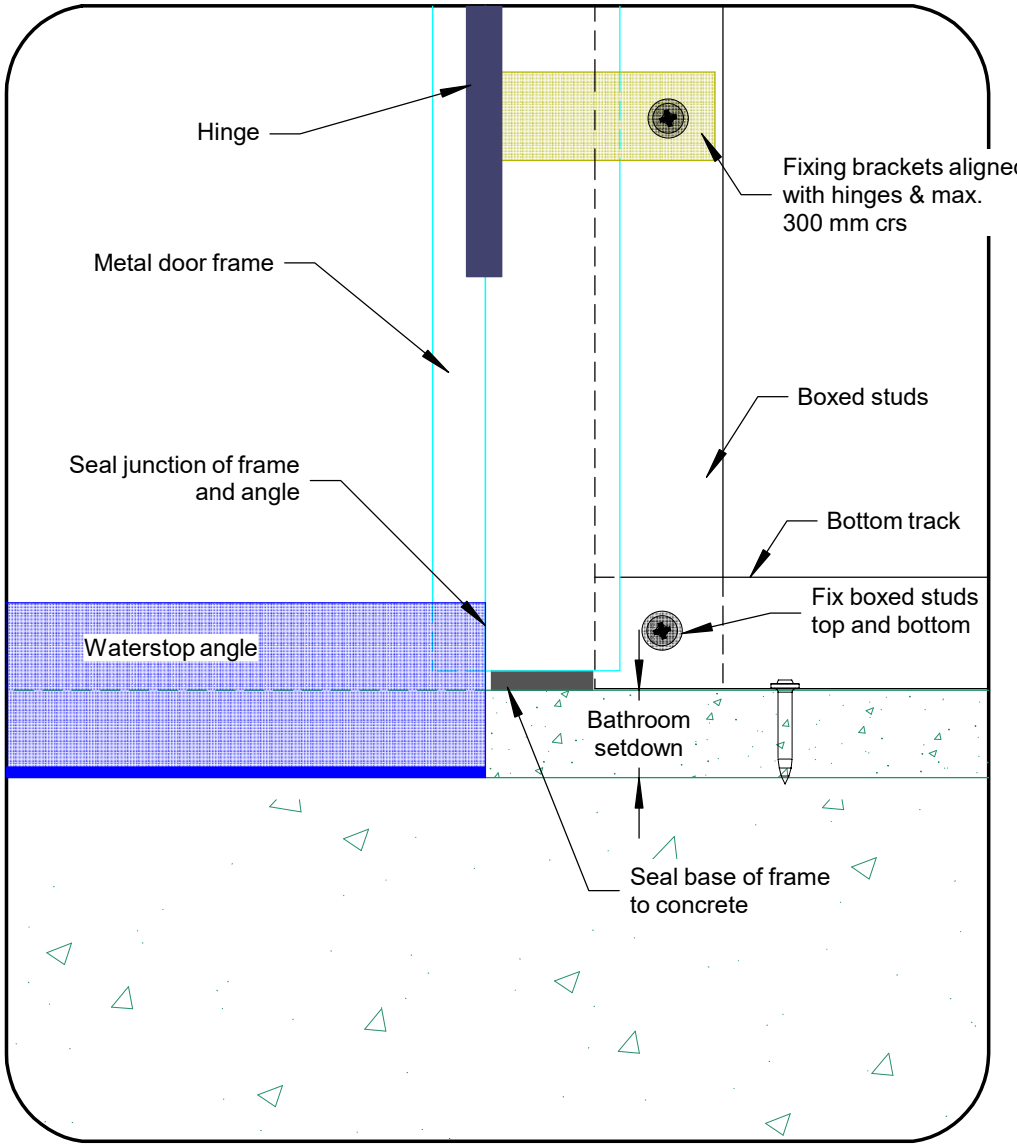
NOTE:
- Waterproofing is required to 2000 mm min. from the floor or 50 mm above the shower, whichever is higher.
- Where a door occurs a waterstop angle is required.
- Waterproof membrane and angle is to terminate at finished tile level.
- Waterproofing is required 150 mm min. above bath, basin or vanity rim.



MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Internal Wet Areas	title: Typical Layout - Shower Over Bath	date: December 2020	drawing no.: 17102	issue: D



PLAN VIEW



ELEVATION

MULTIPLEX
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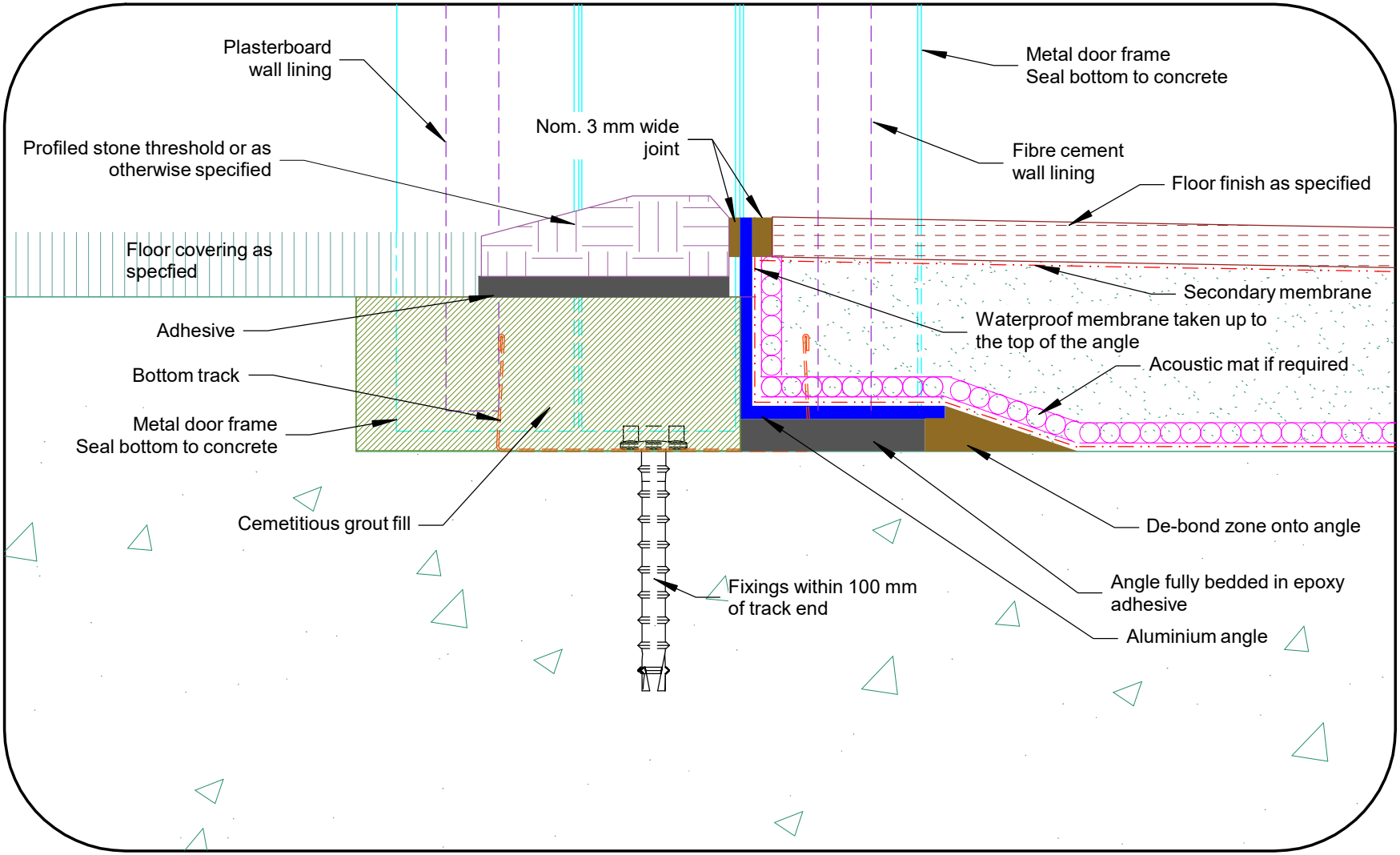
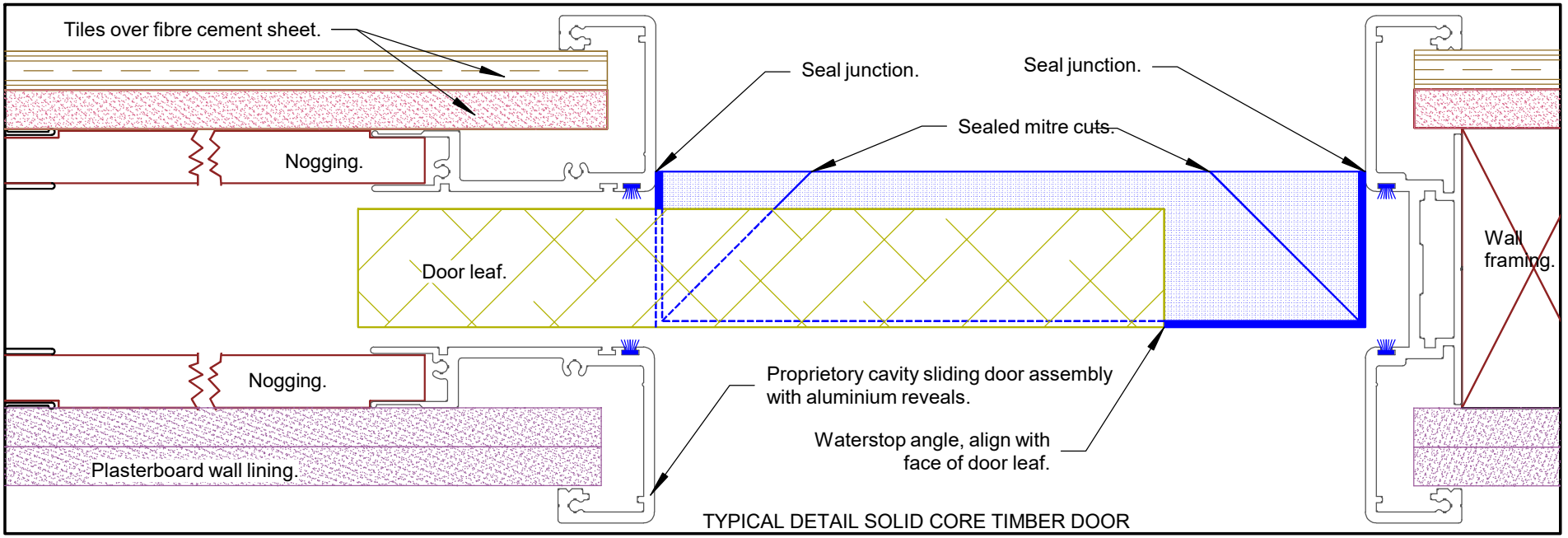
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Metal Door Frame Details	October 2017	17104	D

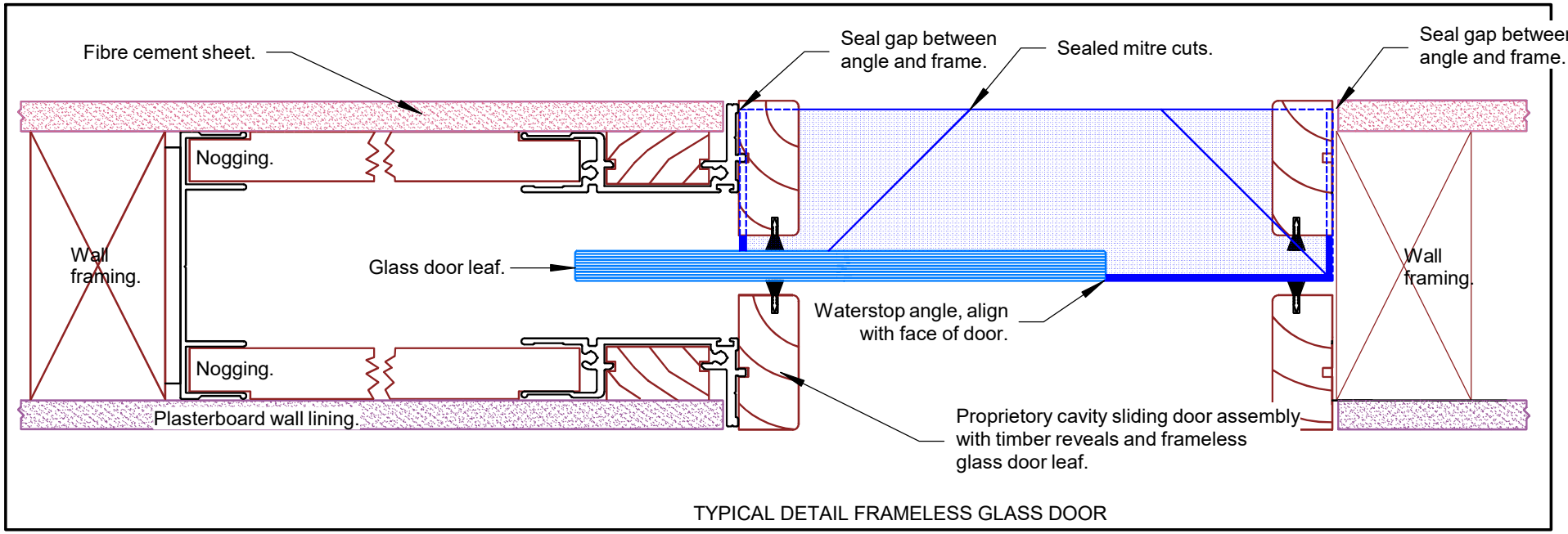


MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Metal Door Frame Details - Transverse Section	October 2017	17105	A



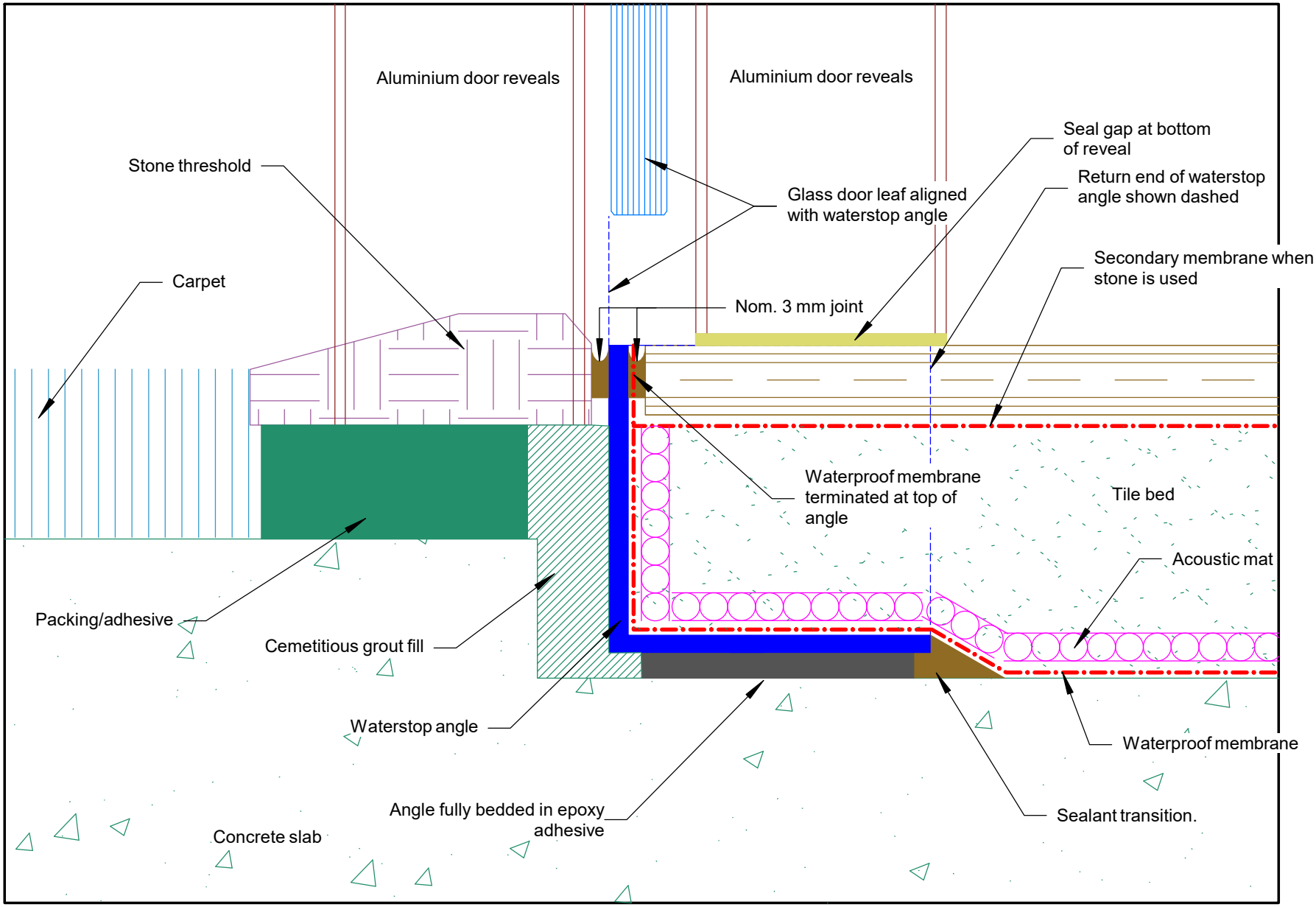
TYPICAL DETAIL SOLID CORE TIMBER DOOR



TYPICAL DETAIL FRAMELESS GLASS DOOR

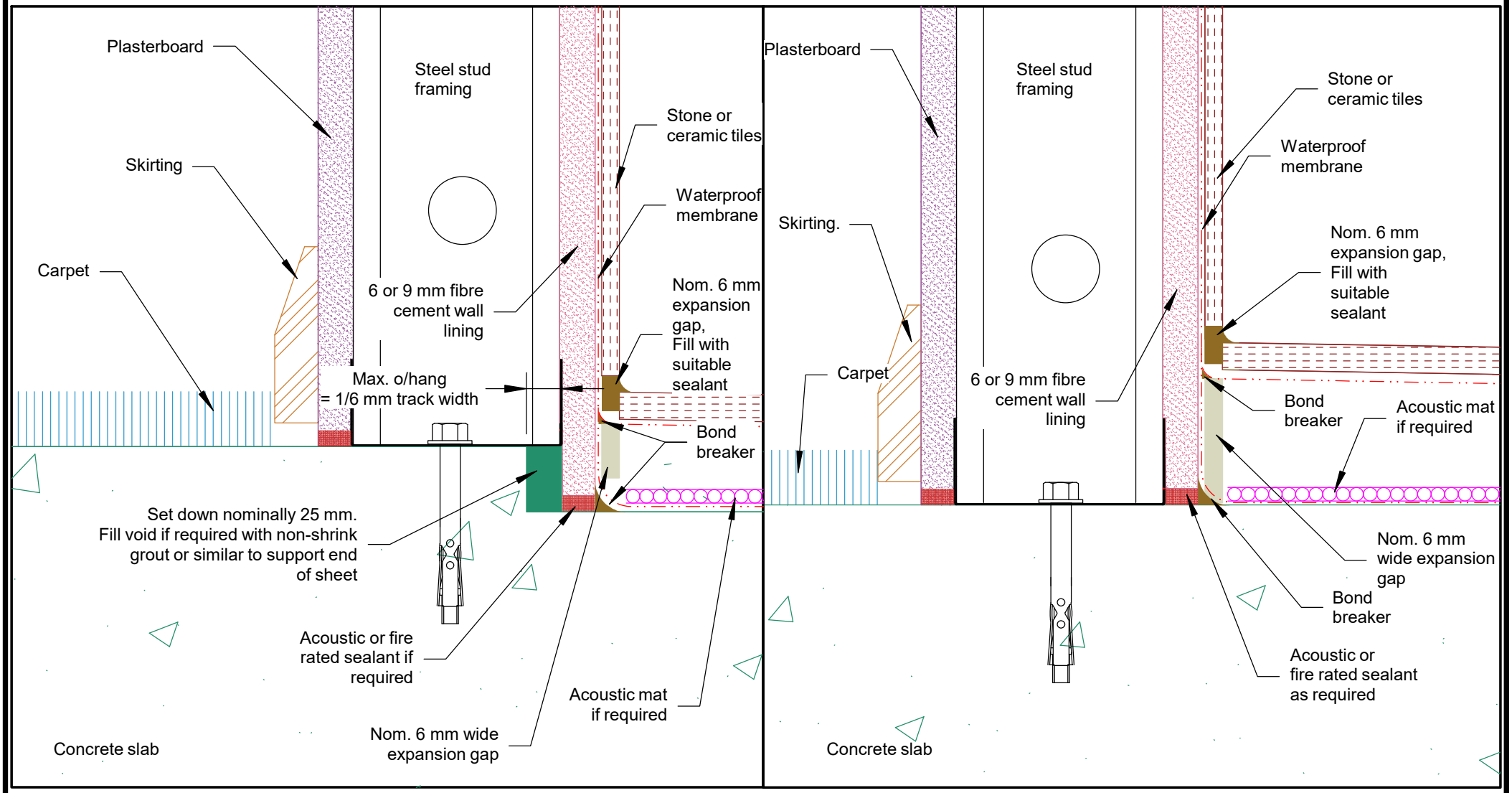
MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Cavity Door Details - Plan View	October 2017	17106	B



MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Internal Wet Areas	title: Cavity Door Details - Section Through Threshold	date: October 2017	drawing no.: 17107	issue: D

NOTE: Set out is critical for Option A.
FC sheet thickness is determined by project class - Resi = 6 mm, Commercial = 9 mm.

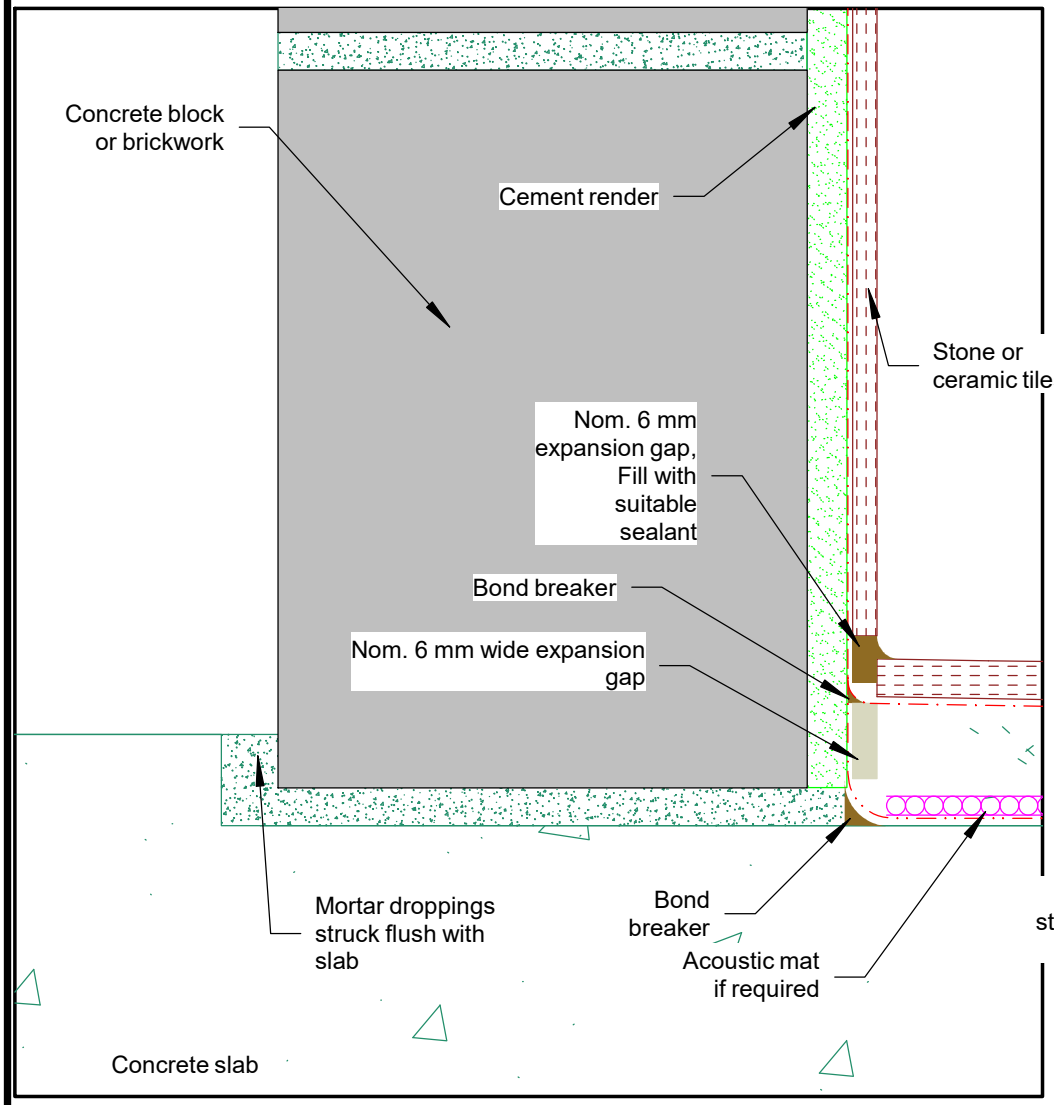


Option A - Set Down

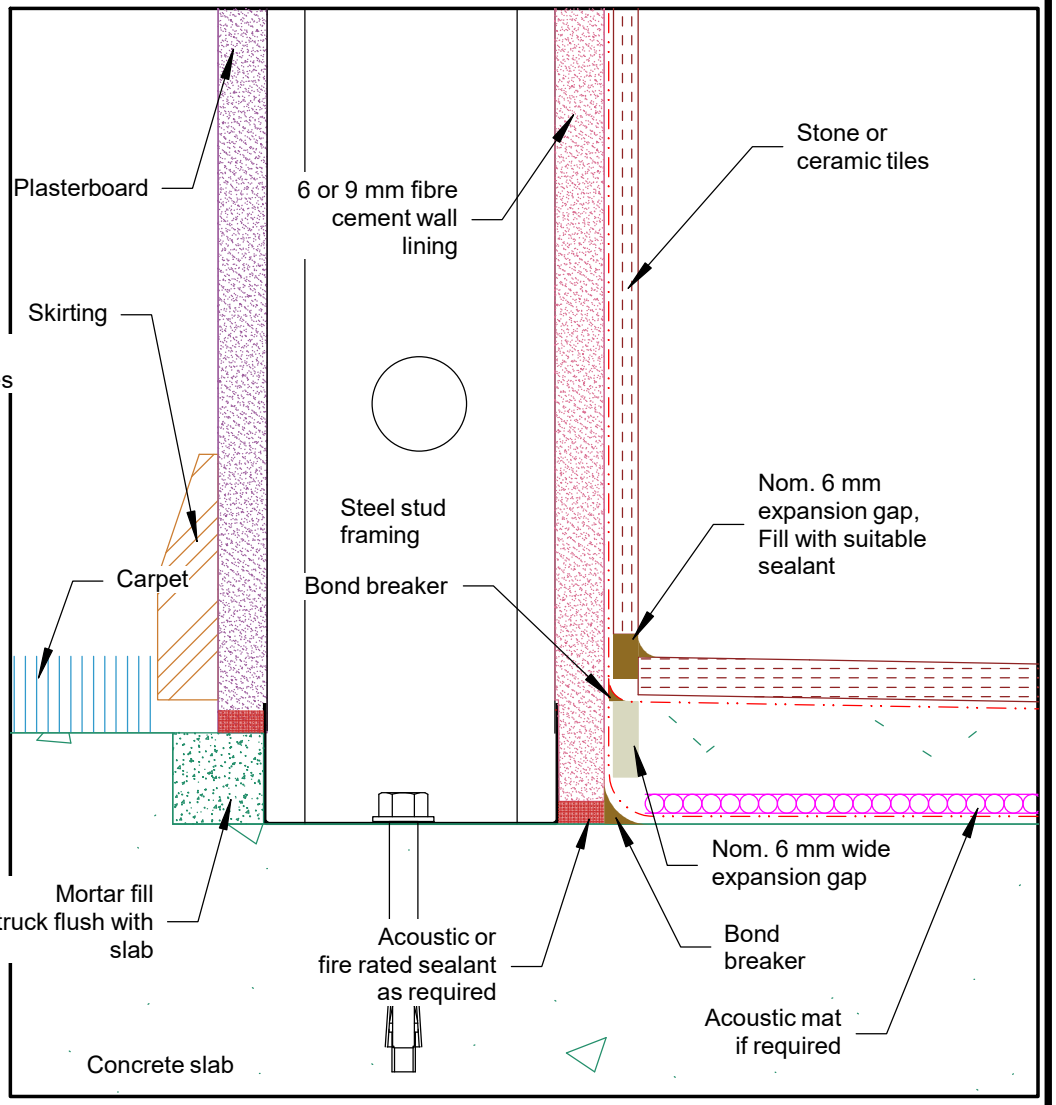
Option B - No Set Down

MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Internal Wet Areas	title: Floor Wall Junction	date: October 2017	drawing no.: 17108	issue: D

NOTE: FC sheet thickness is determined by project class - Resi = 6 mm, Commercial = 9 mm.



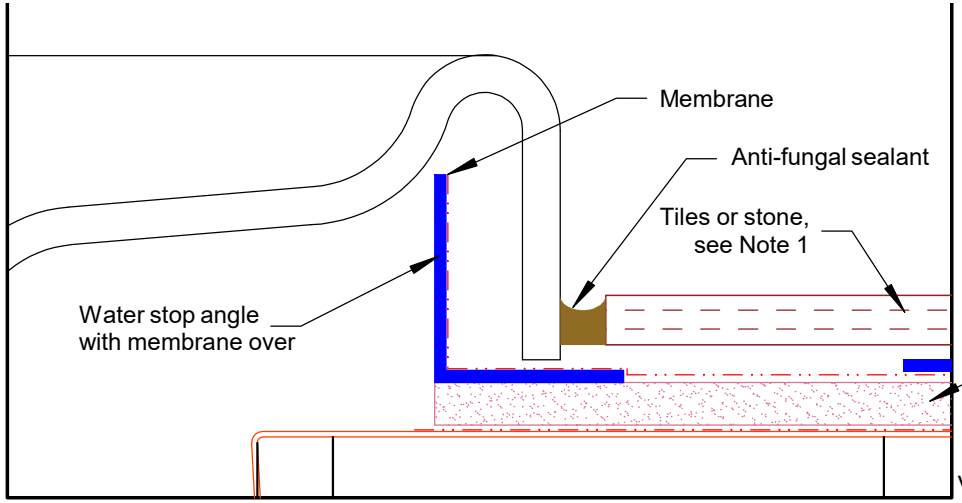
Alternative Set Down Option For Blockwork



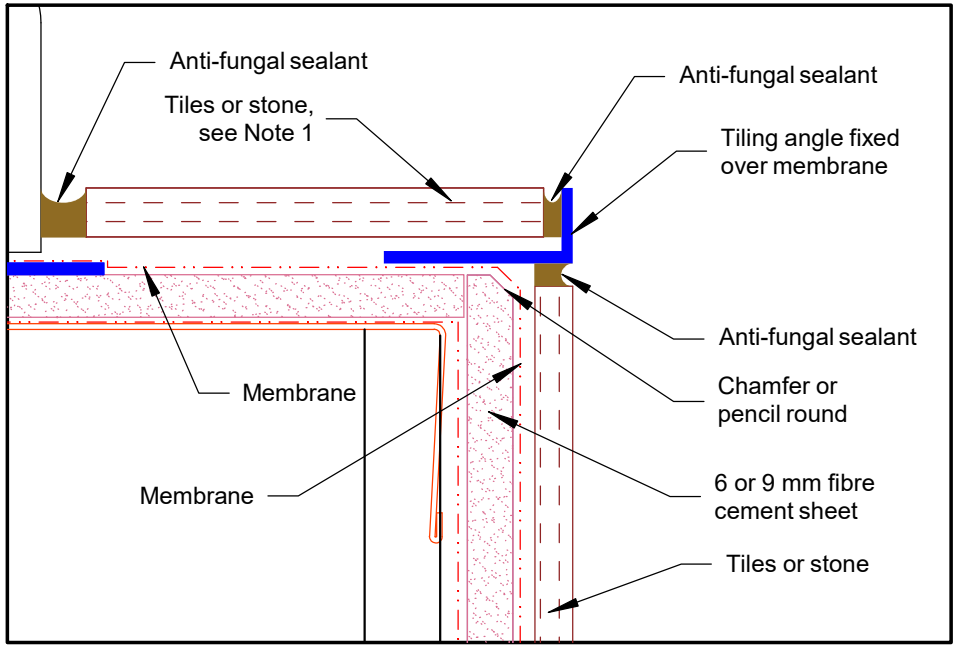
Alternative Set Down Option For Steel Stud Framed

MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Internal Wet Areas	title: Floor Wall Junction	date: October 2017	drawing no.: 17109	issue: C

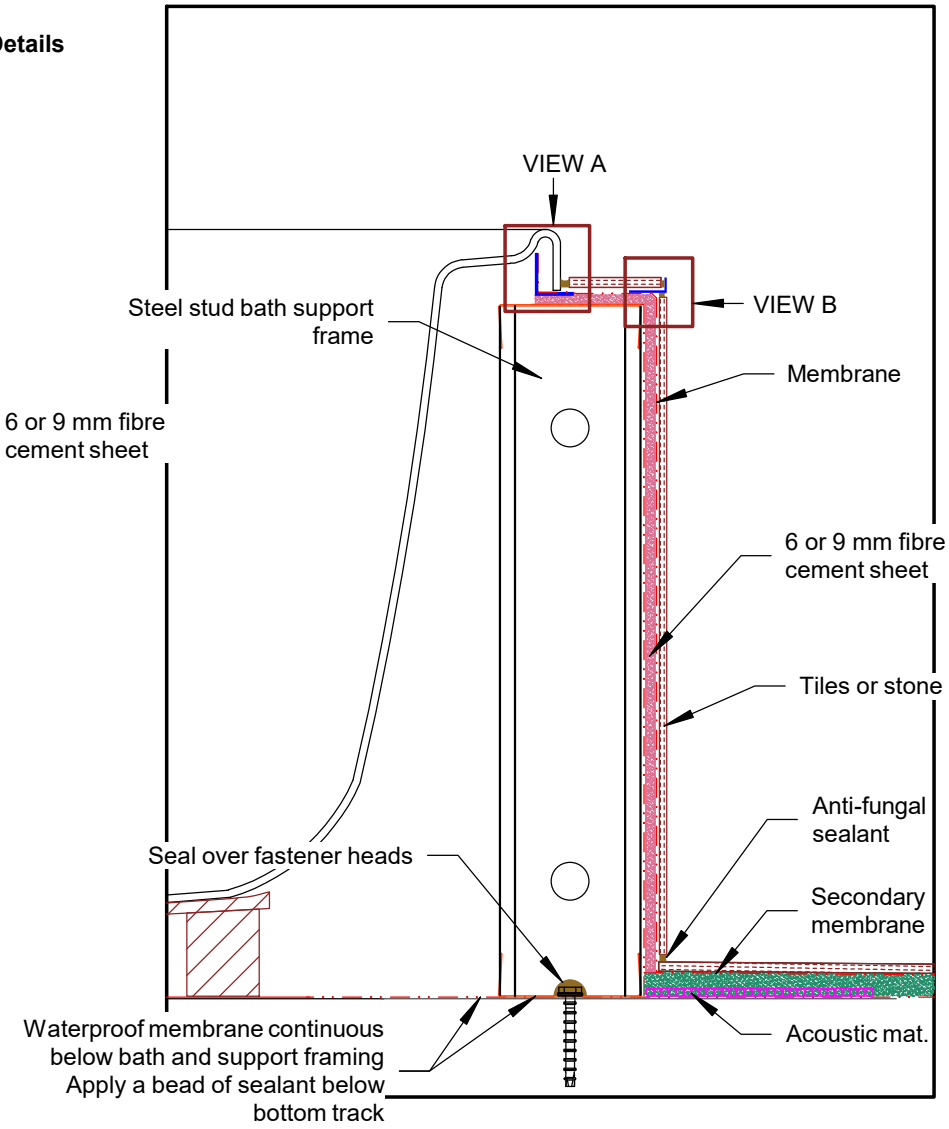
NOTE: 1. Shelf tile may be placed below bath rim if desired.
2. FC sheet thickness is determined by project class - Resi = 6 mm, Commercial = 9 mm.
3. Ensure ventilation is provided to bath void.
4. Bath tub to be installed strictly in accordance with the Manufacturer's instructions. Details provided for guidance only.



View A

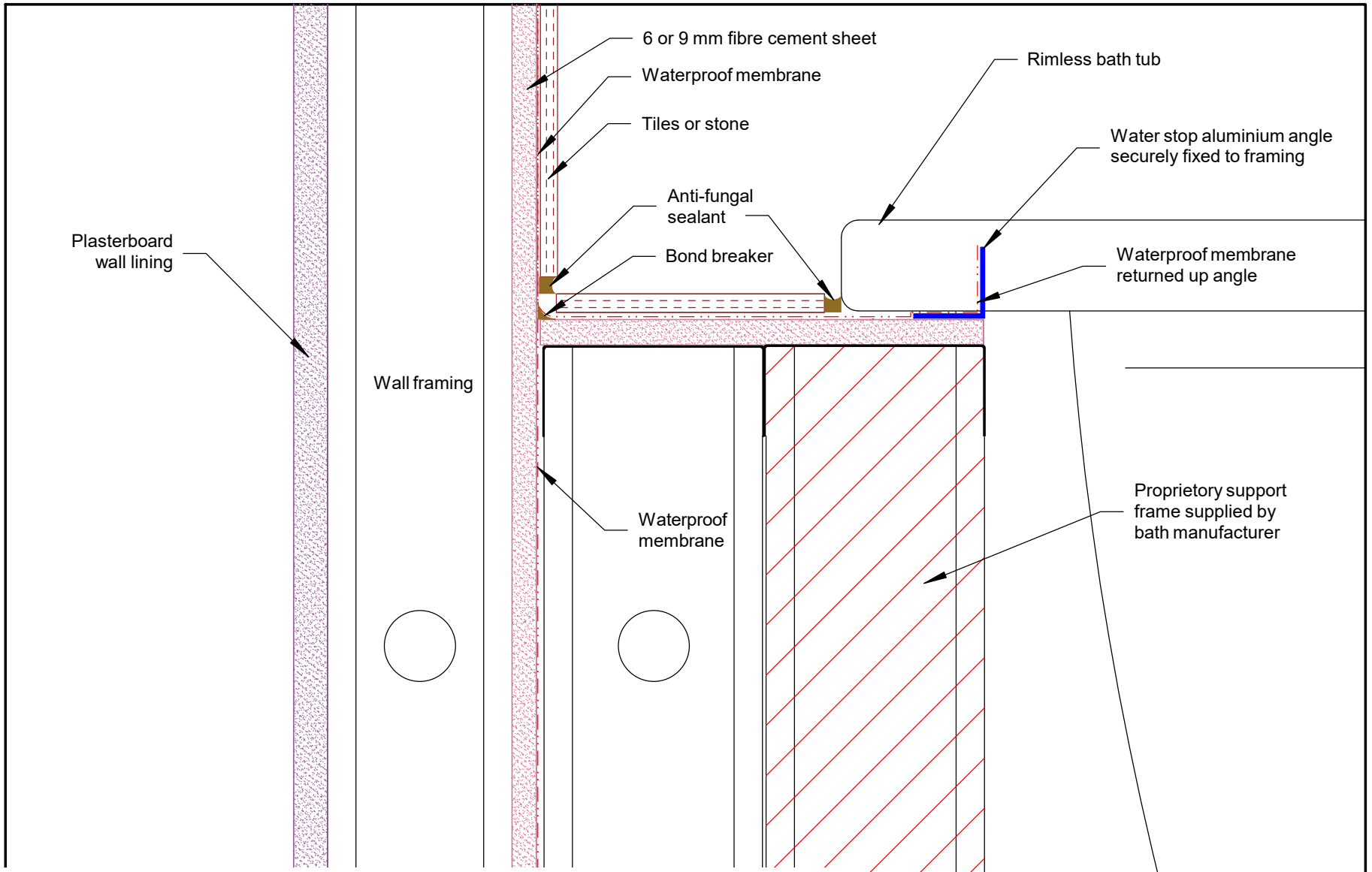


View B



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation - Insert Bath & Bath Front	October 2017	17111	C



NOTE: 1. Shelf tile may be placed below bath rim if desired.
2. FC sheet thickness is determined by project class - Resi = 6 mm, Commercial = 9 mm.
3. Ensure ventilation is provided to bath void.
4. Bath tub to be installed strictly in accordance with the Manufacturer's instructions. Details provided for guidance only.

MULTIPLEX
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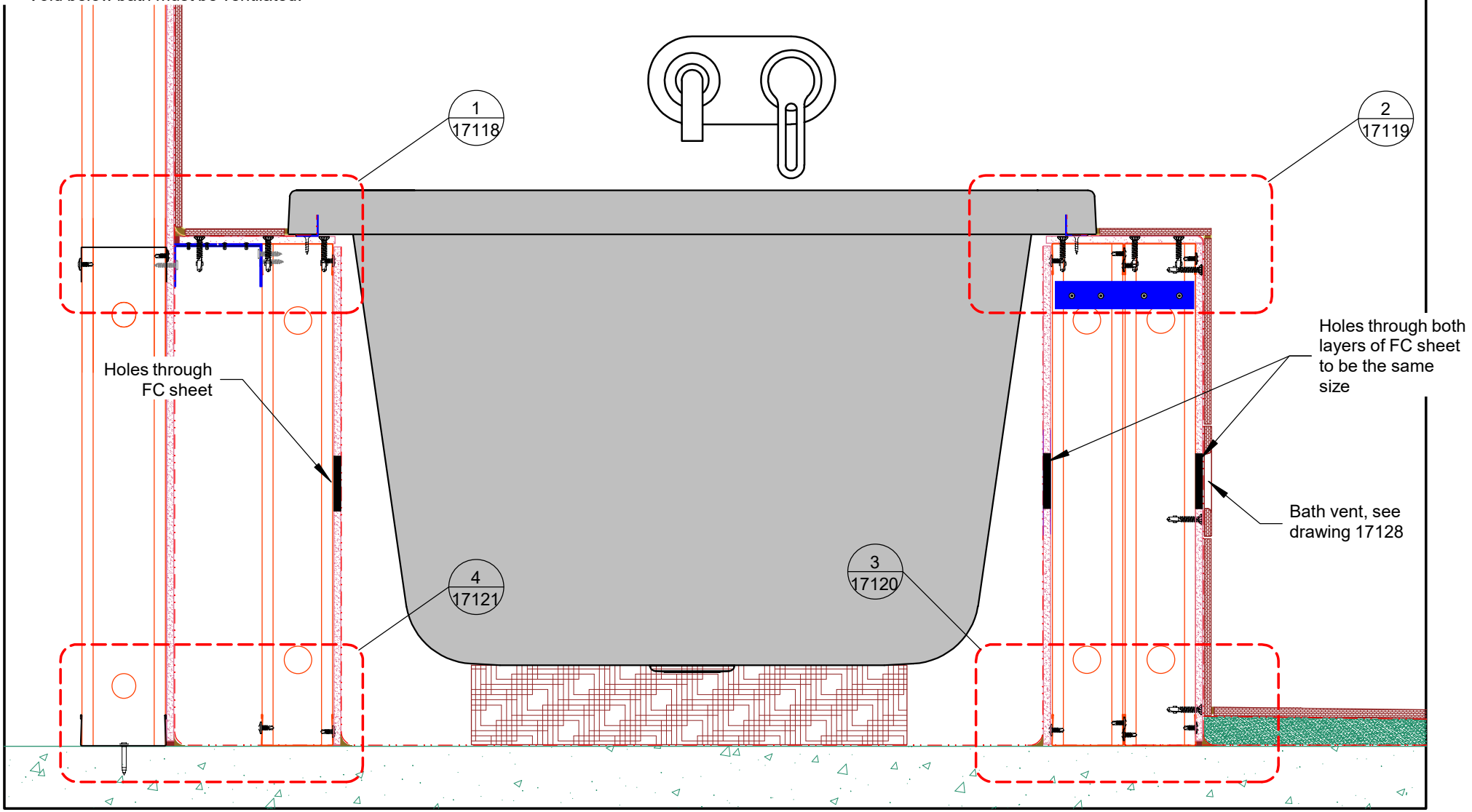
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Insert Bath - Wall Detail	October 2017	17112	B

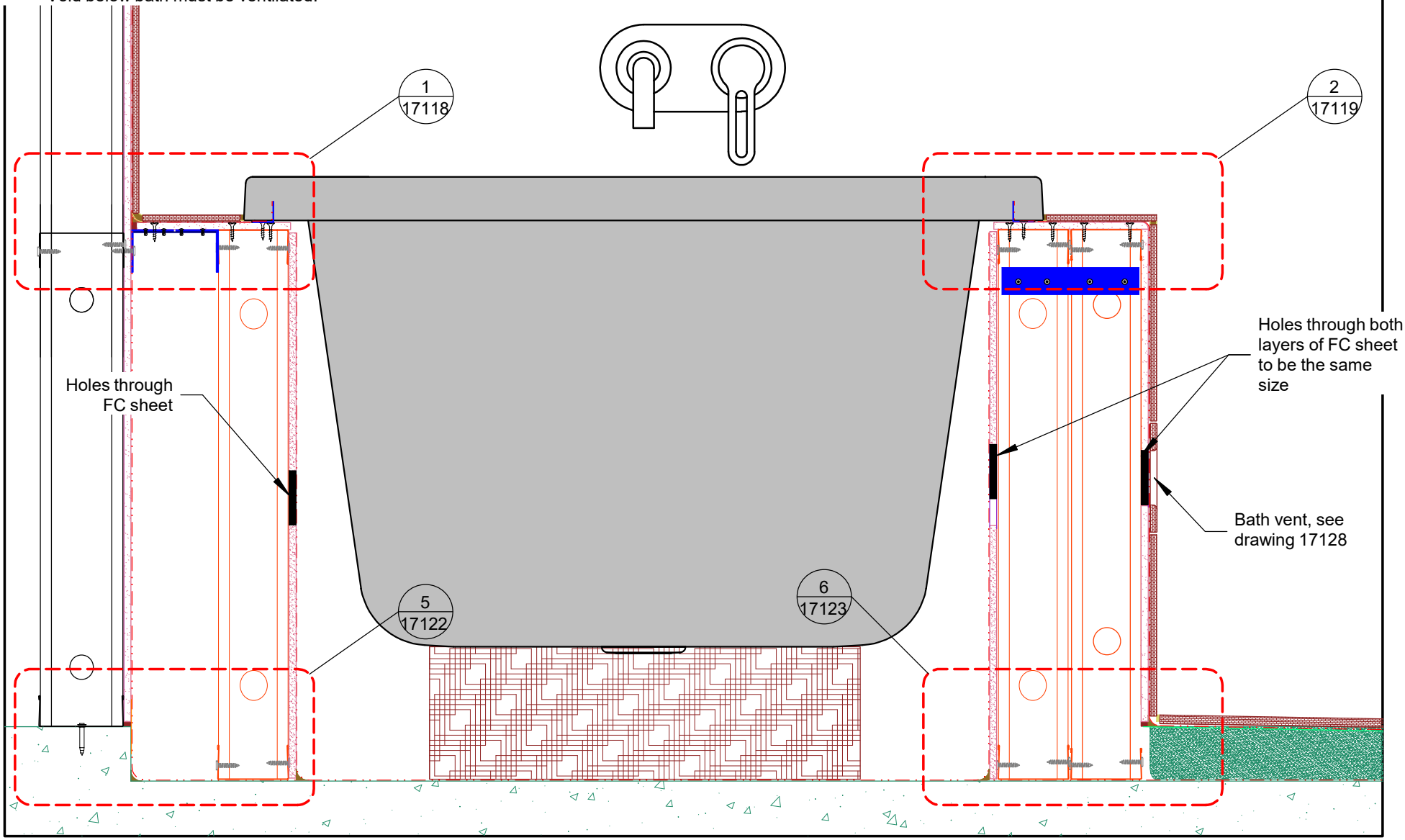
NOTE: Framing design to be confirmed by Structural Engineer or framing Manufacturer.
Bath tub installation details are to be confirmed by bath Manufacturer.
Framing materials to be galvanised steel.
Wall and bath front linings to be 6 mm thick fibre cement sheet.
Height of tapeware, soap holder, etc. to be confirmed by Architect.
Void below bath must be ventilated.



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Plastic Inset Bath - No Shower Over	November 2017	17113	B

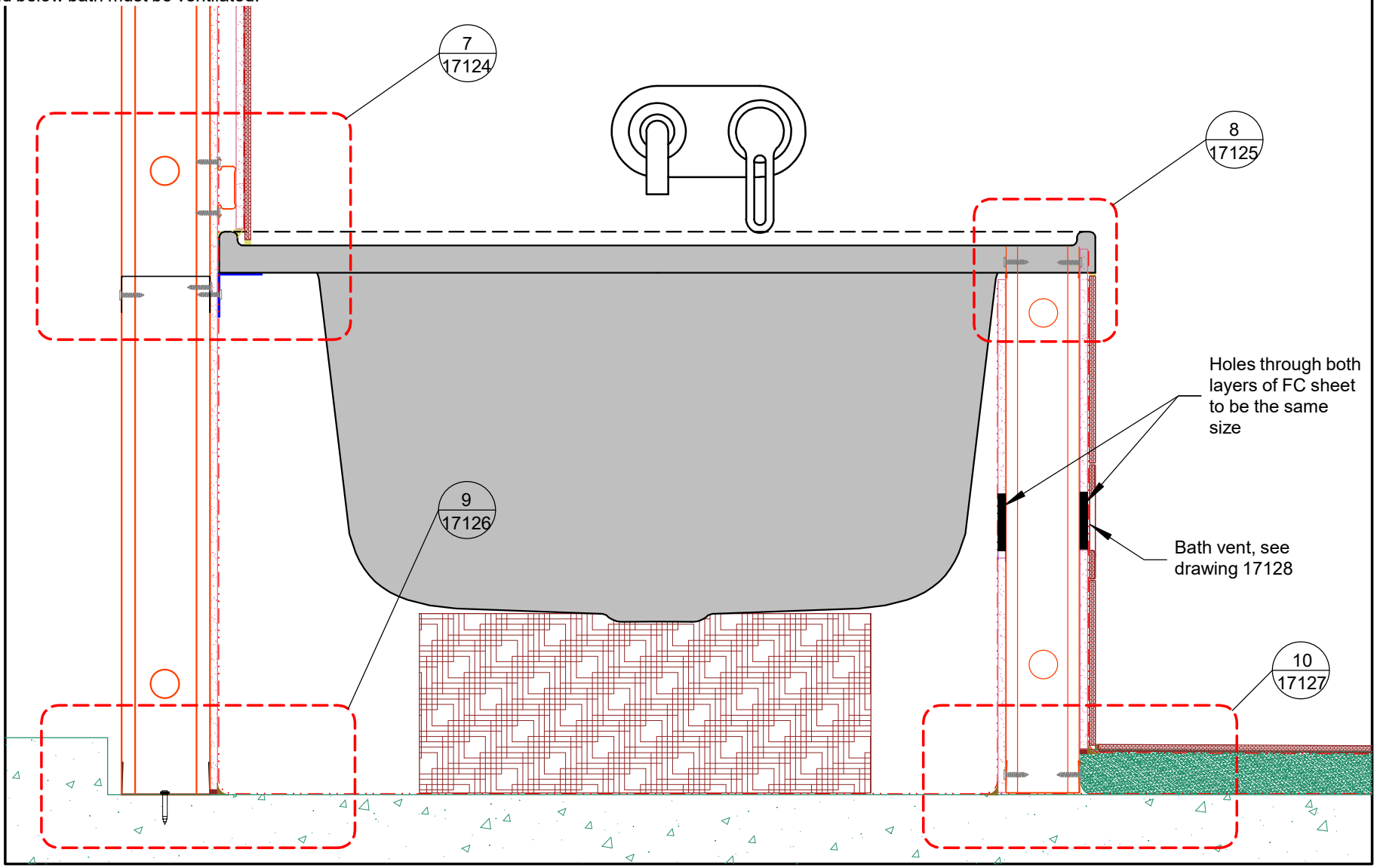
NOTE: Framing design to be confirmed by Structural Engineer or framing Manufacturer.
Bath tub installation details are to be confirmed by bath Manufacturer.
Framing materials to be galvanised steel.
Wall and bath front linings to be 6 mm thick fibre cement sheet.
Height of tapeware, soap holder, etc. to be confirmed by Architect.
Void below bath must be ventilated.



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Plastic Inset Bath - With Shower Over	November 2017	17114	B

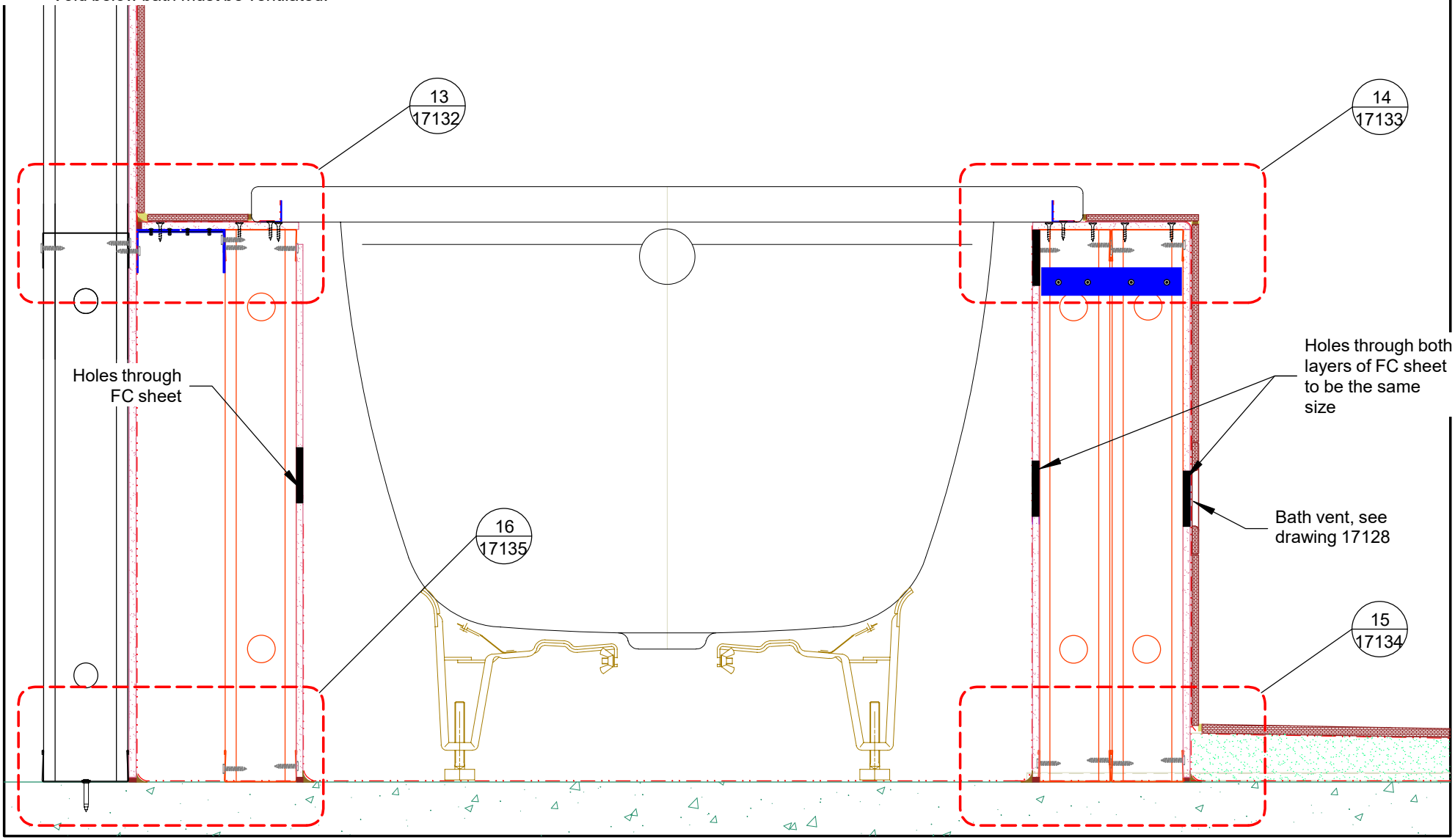
NOTE: Framing design to be confirmed by Structural Engineer or framing Manufacturer.
Bath tub installation details are to be confirmed by bath Manufacturer.
Framing materials to be galvanised steel.
Wall and bath front linings to be 6 mm thick fibre cement sheet.
Height of tapeware, soap holder, etc. to be confirmed by Architect.
Void below bath must be ventilated.



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Plastic Rimmed Bath - With Shower Over	November 2017	17115	B

NOTE: Framing design to be confirmed by Structural Engineer or framing Manufacturer.
Bath tub installation details are to be confirmed by bath Manufacturer.
Framing materials to be galvanised steel.
Wall and bath front linings to be 6 mm thick fibre cement sheet.
Height of tapeware, soap holder, etc. to be confirmed by Architect.
Void below bath must be ventilated.



MULTIPLEX
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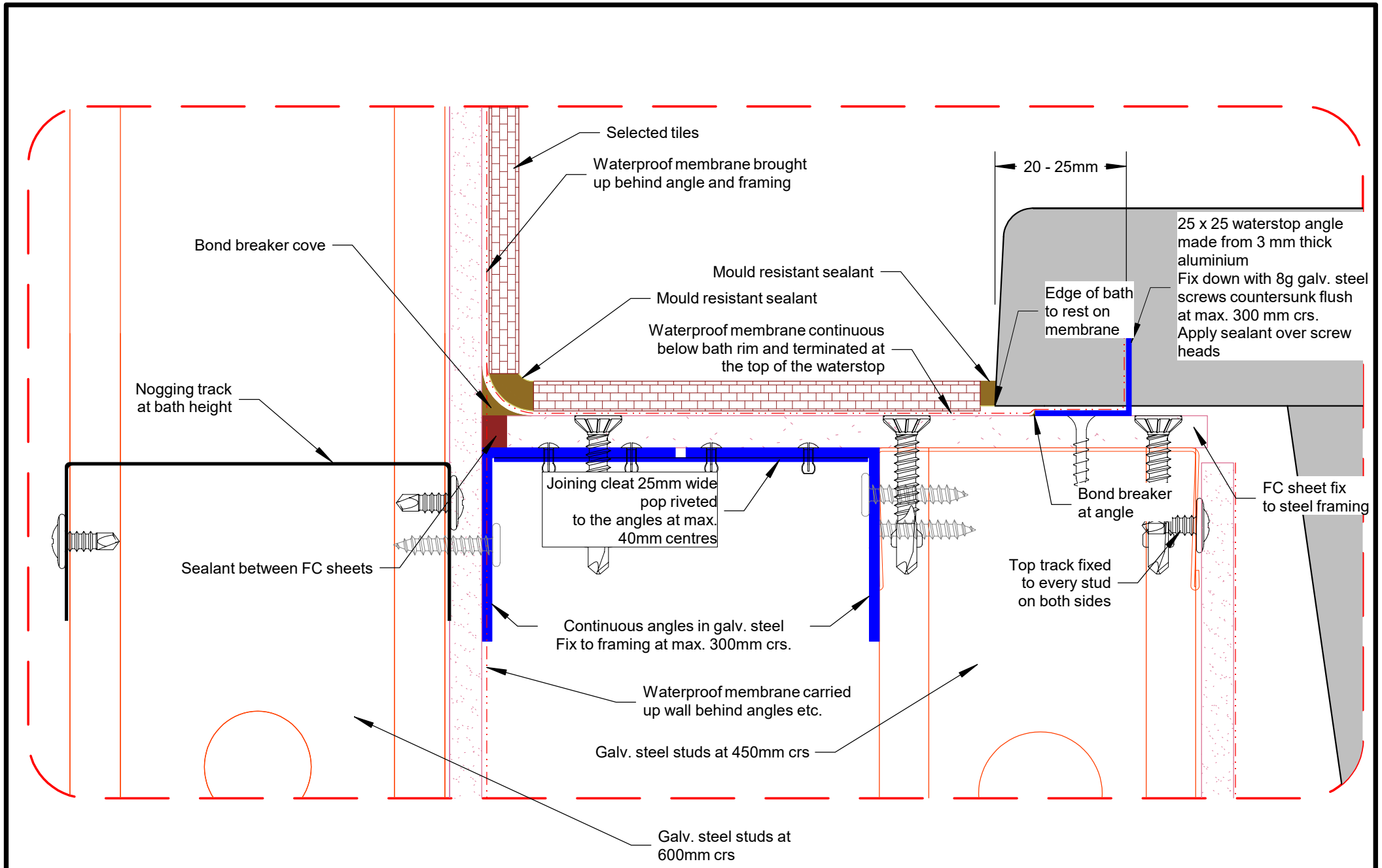
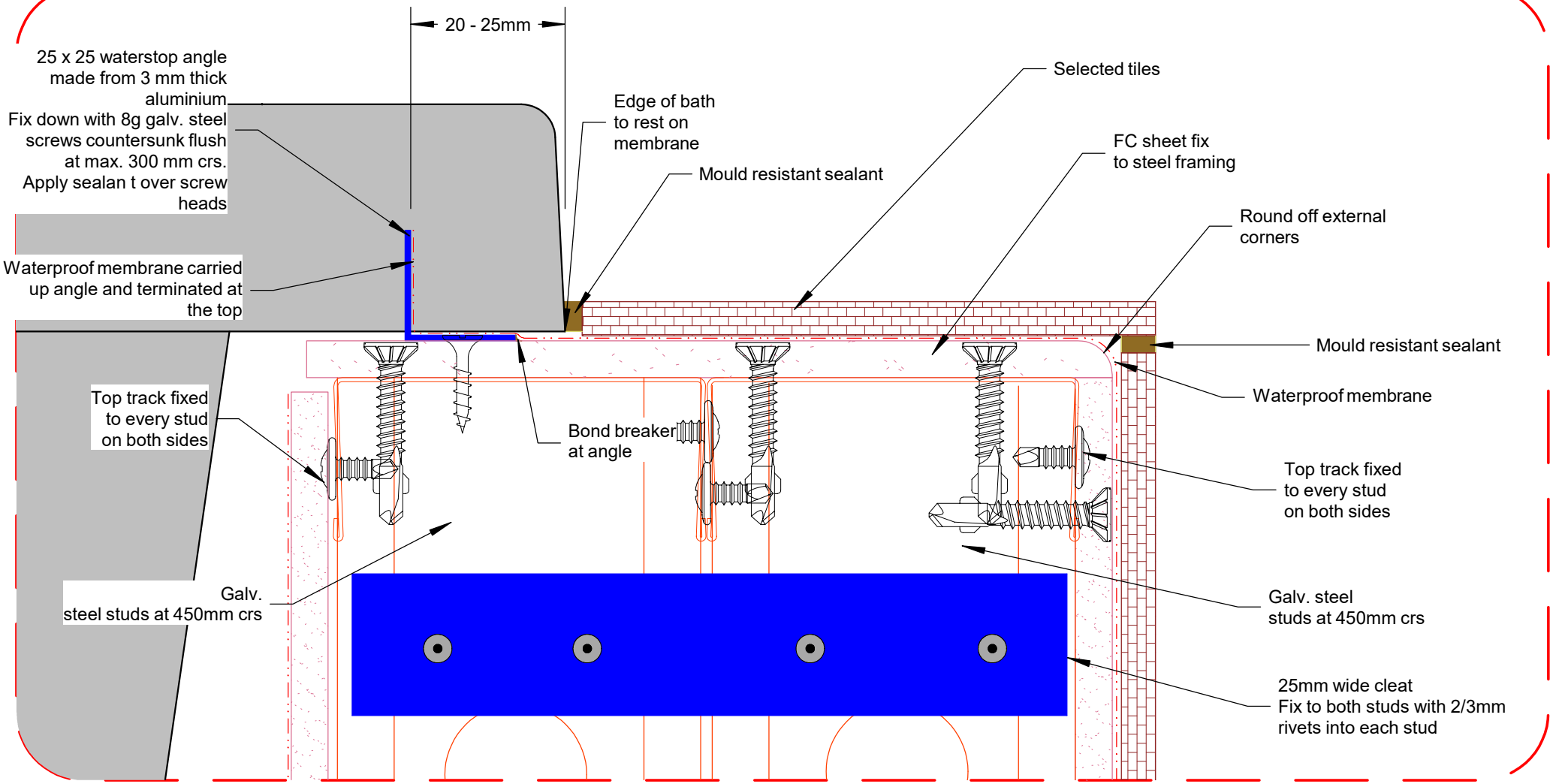
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Free Standing Bath - With Shower Over	November 2017	17117	B



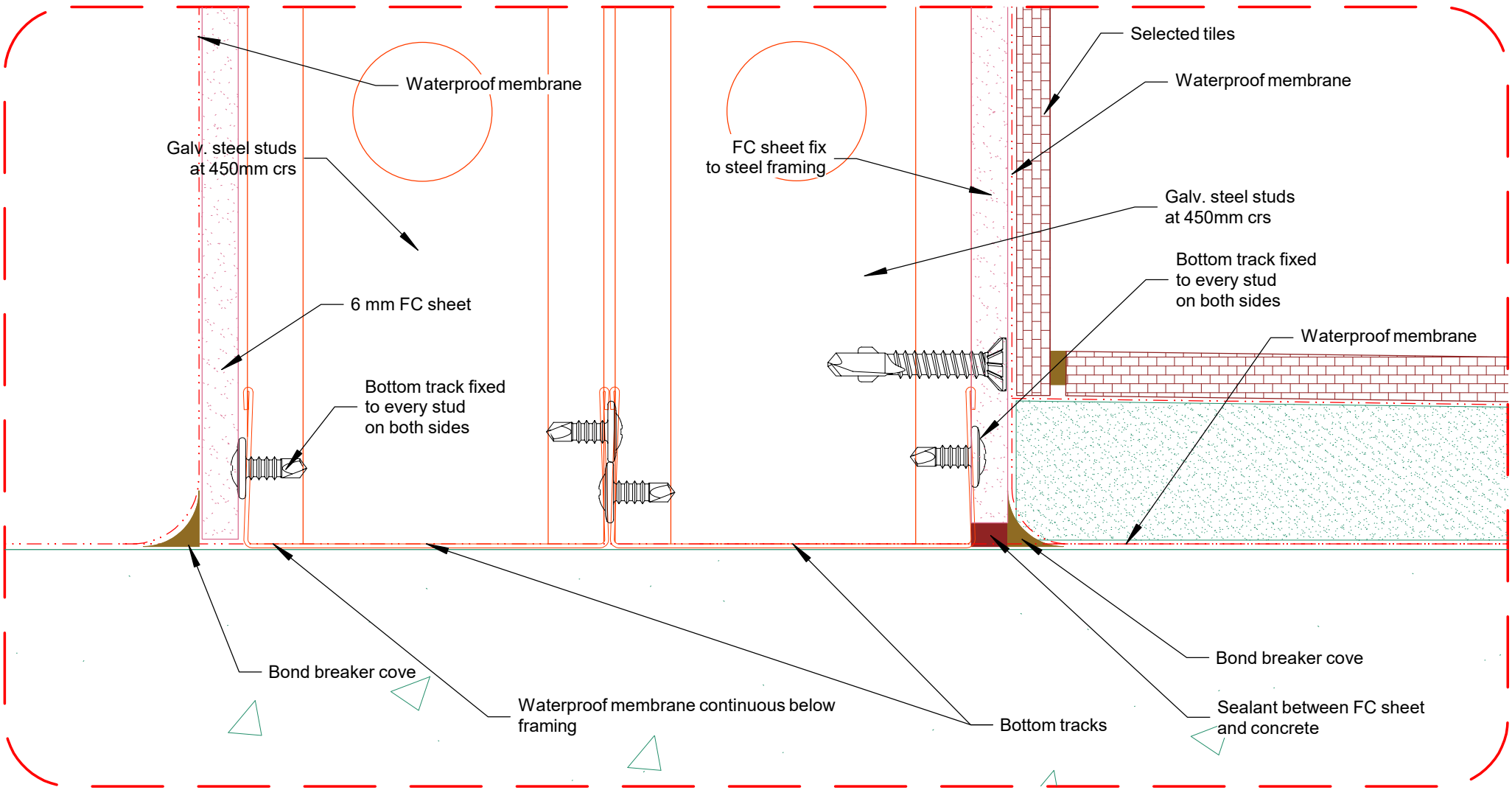
MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Detail 1 From 17113	November 2017	17118	C



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Detail 2 From 17113	November 2017	17119	C



MULTIPLEX
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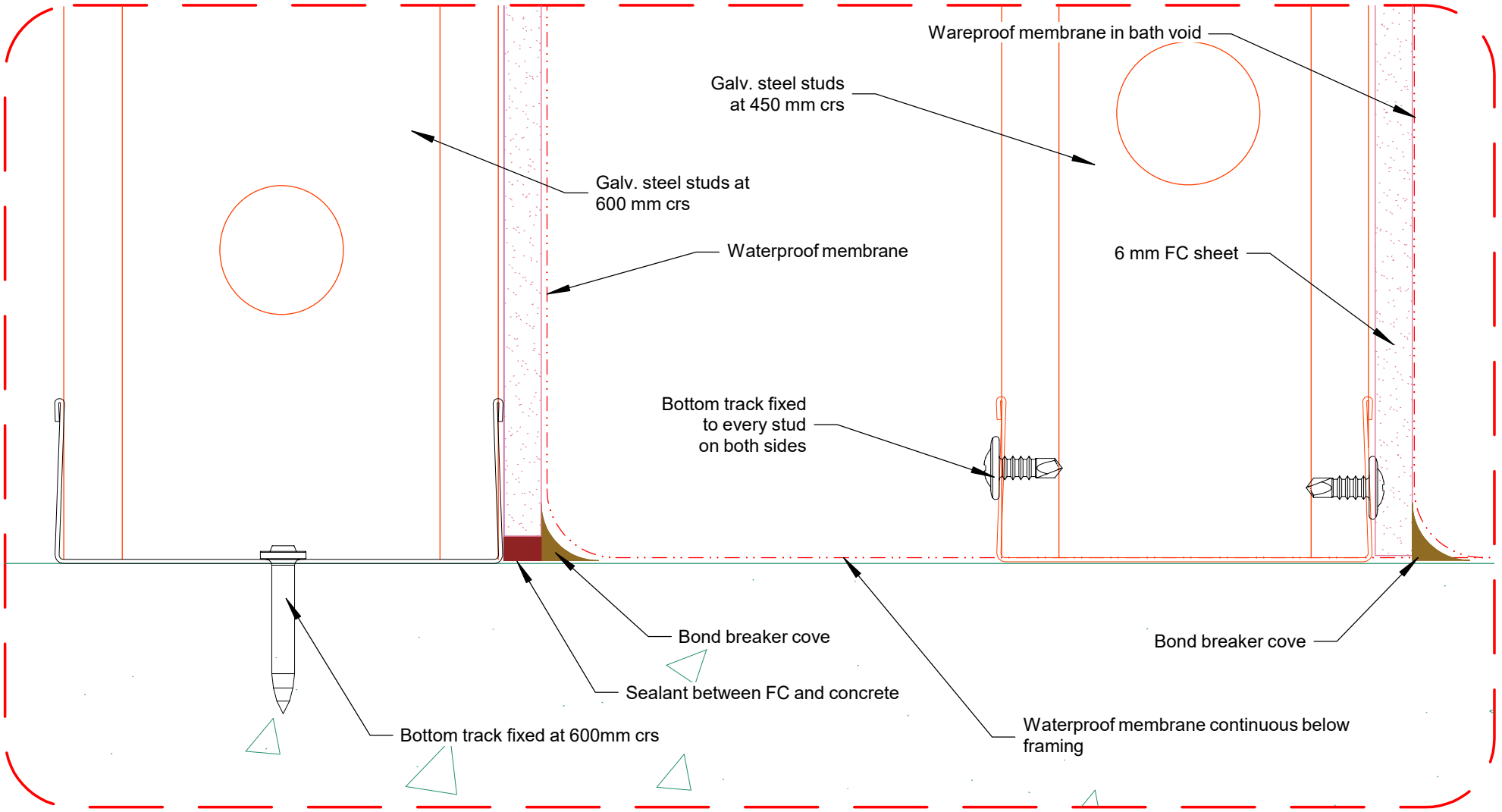
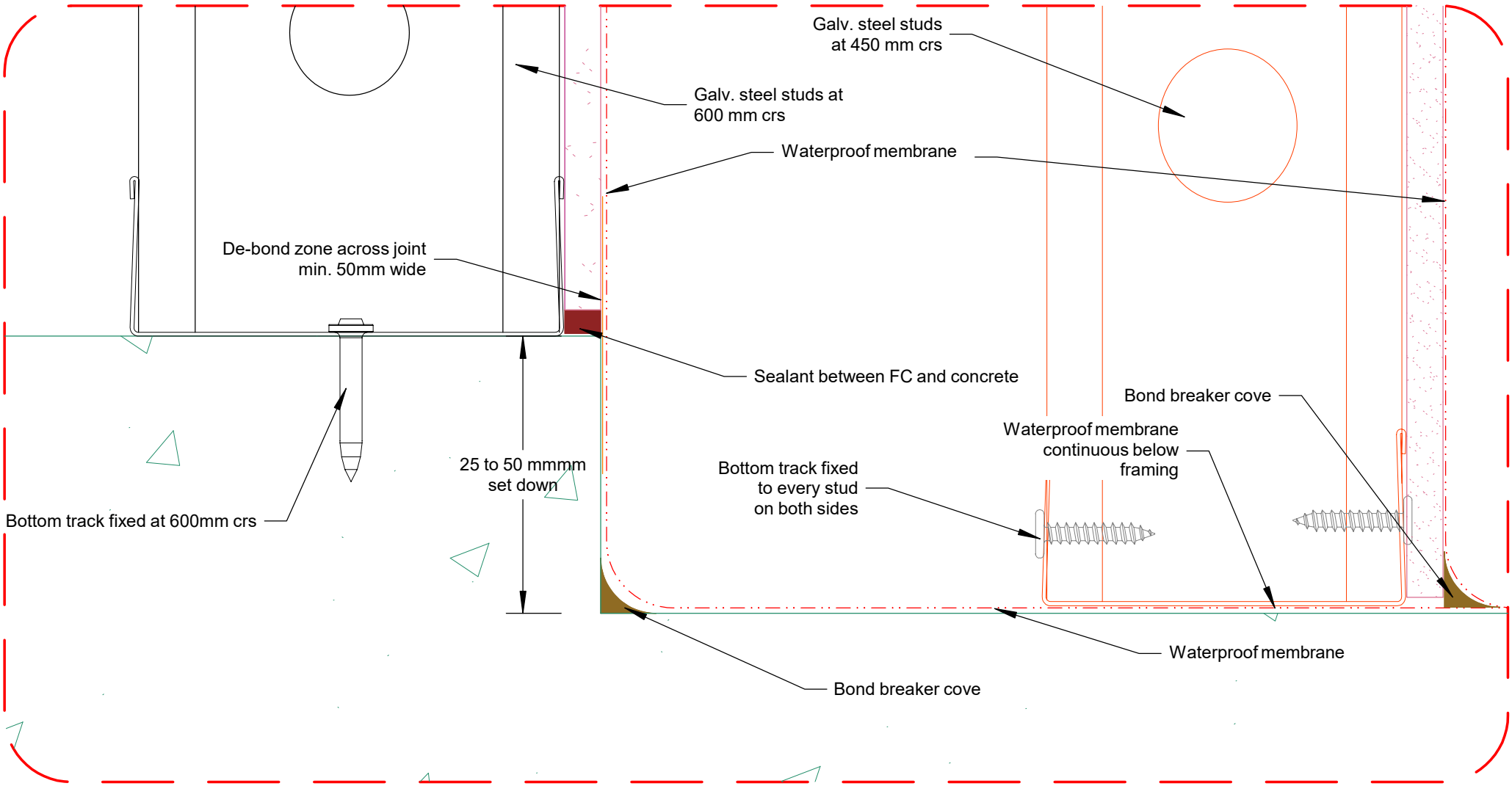
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Detail 3 From 17113	November 2017	17120	B



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Detail 4 From 17113	November 2017	17121	A



MULTIPLEX
Built to outperform.

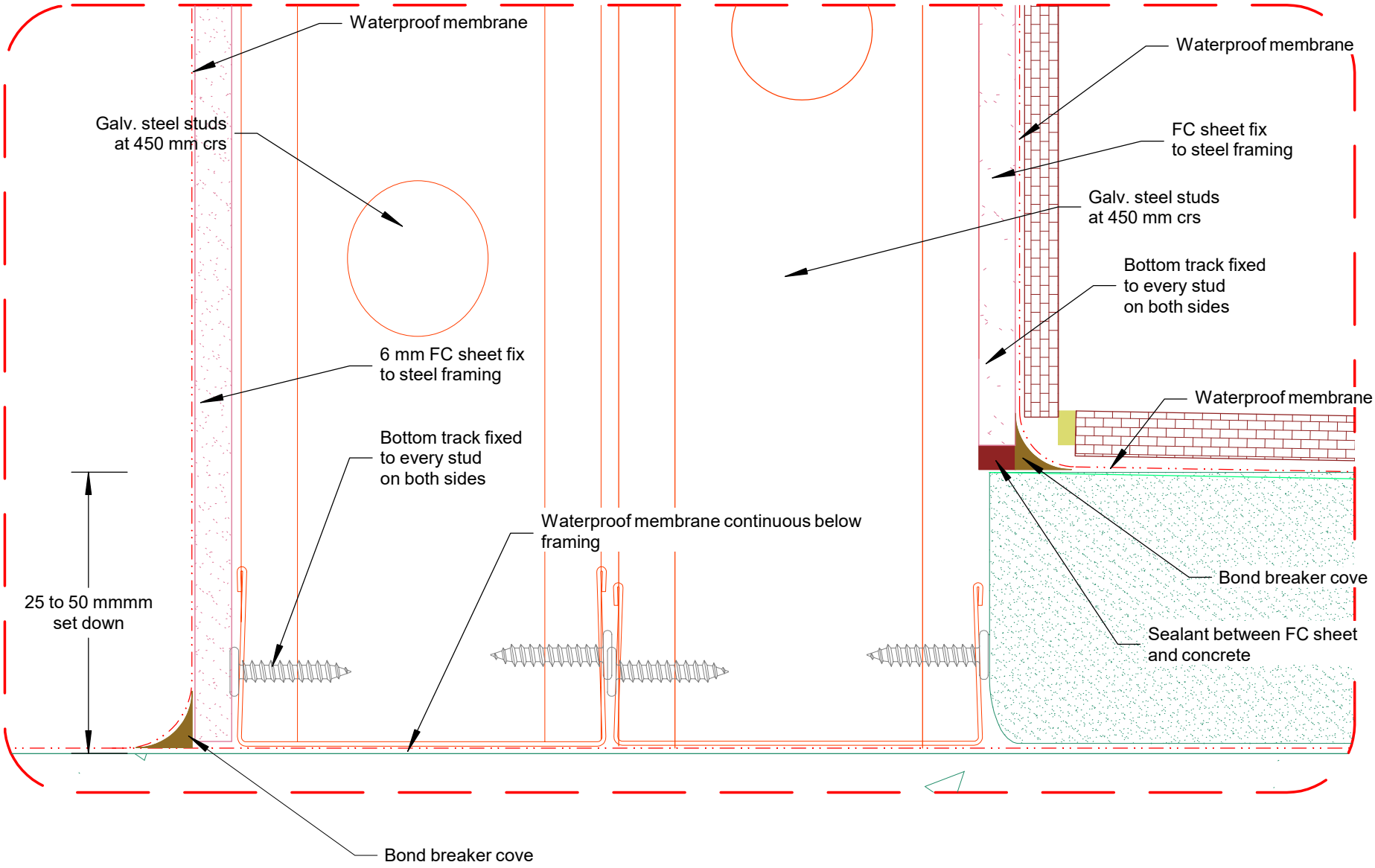
project: Multiplex Standard Details - Internal Wet Areas

title: Bath Tub Installation Details - Detail 5 From 17114

date: November 2017

drawing no.: 17122

issue: A



MULTIPLEX
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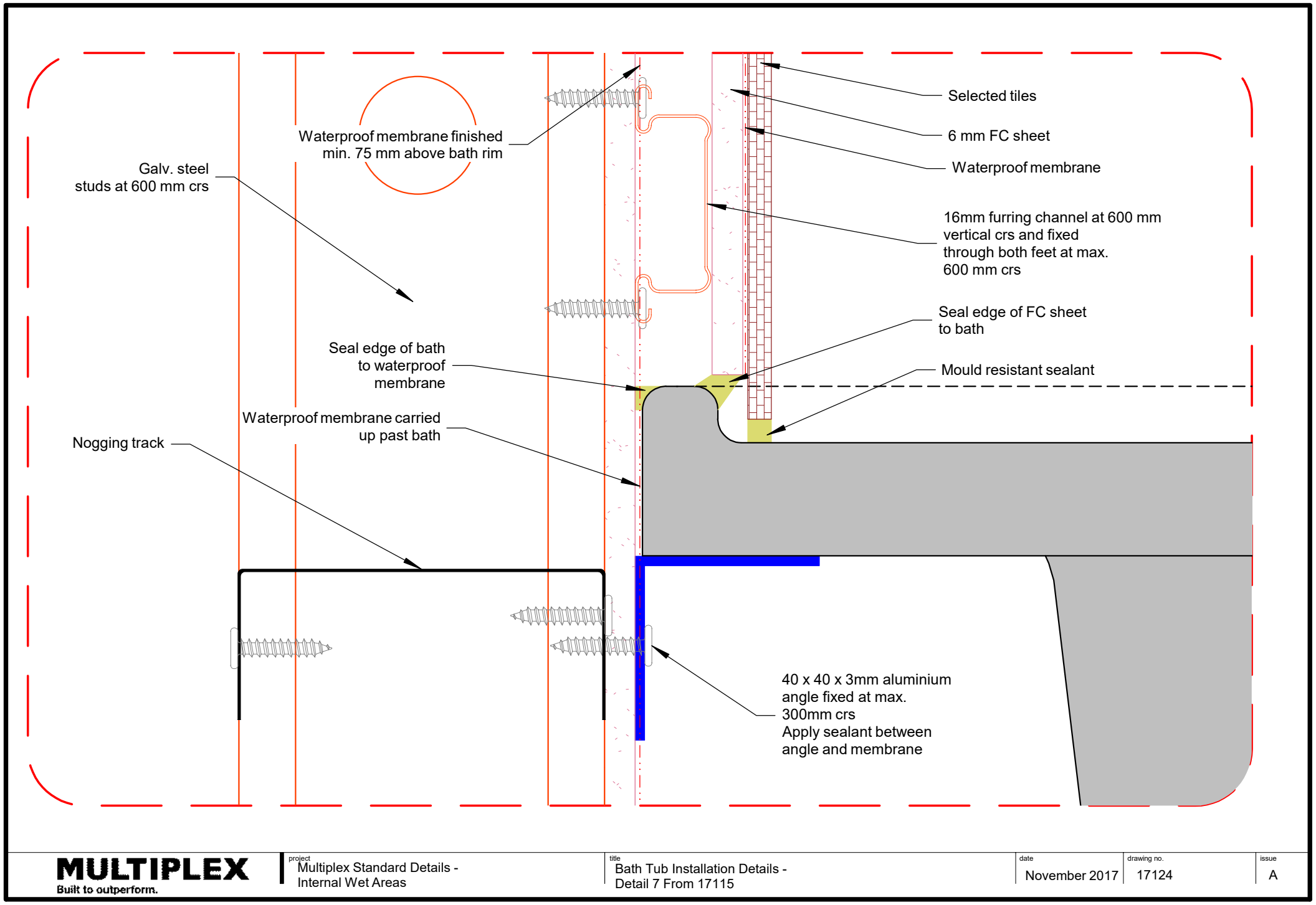
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Detail 6 From 17114	November 2017	17123	C



MULTIPLEX
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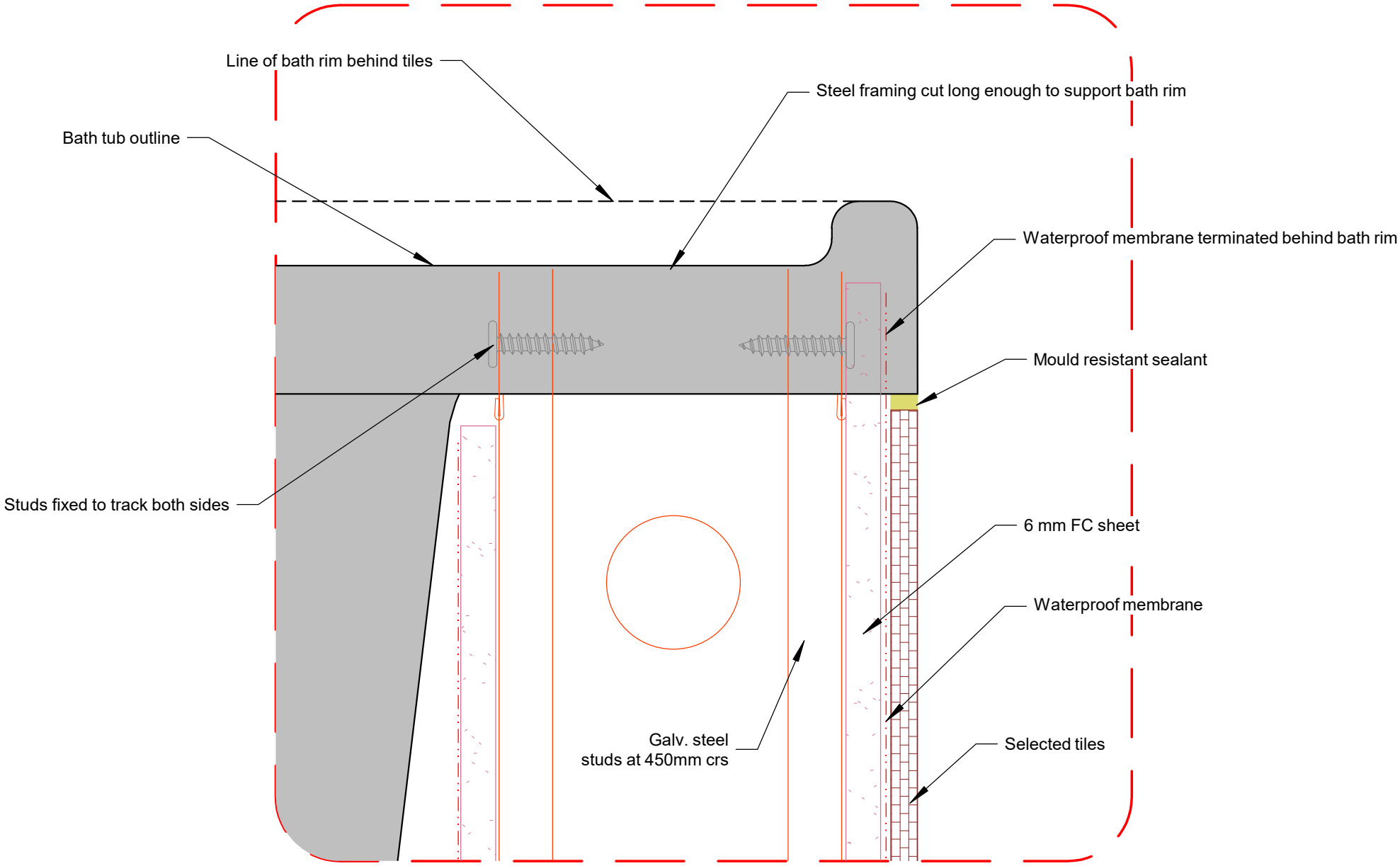
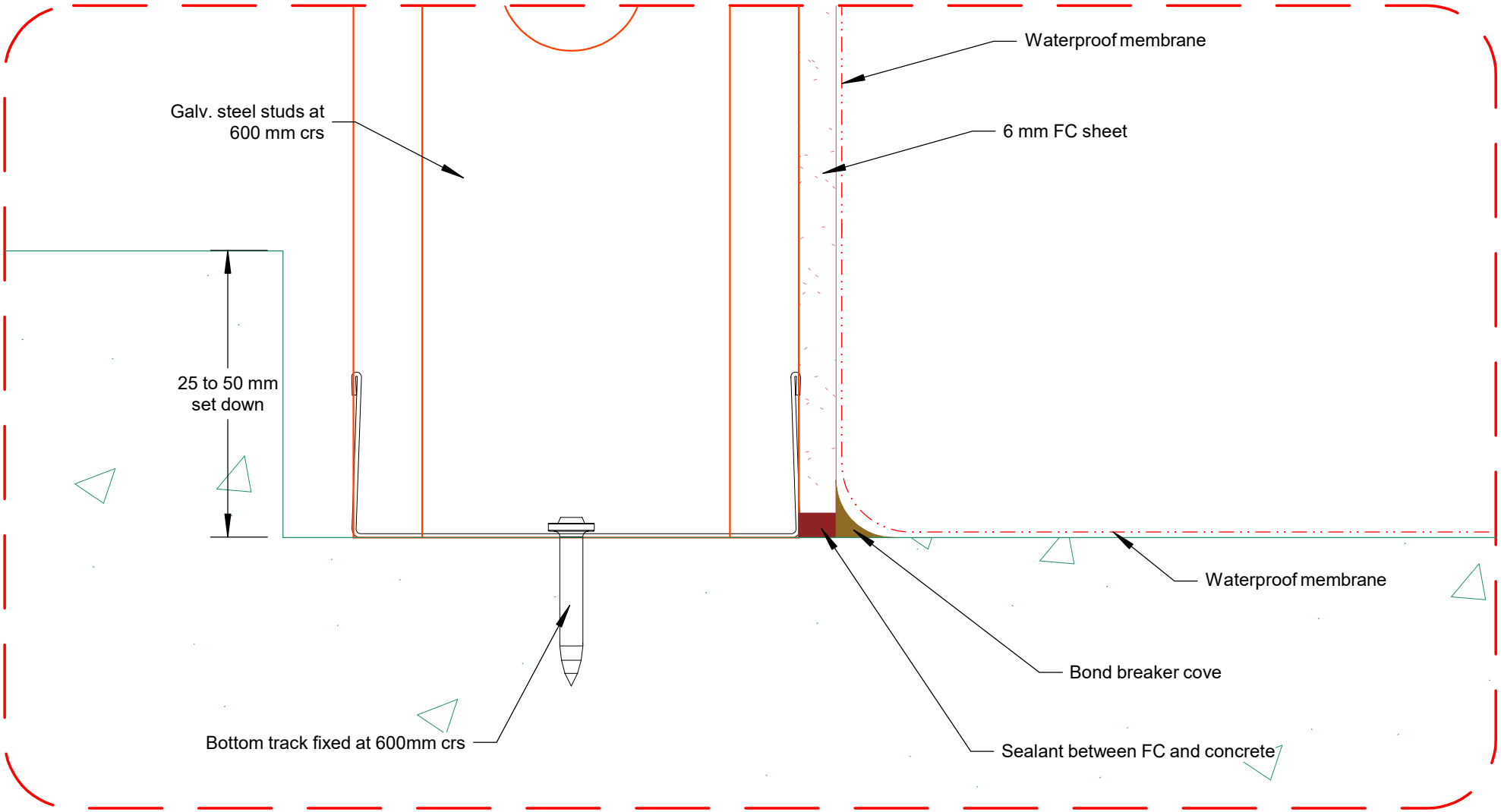
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Detail 7 From 17115	November 2017	17124	A



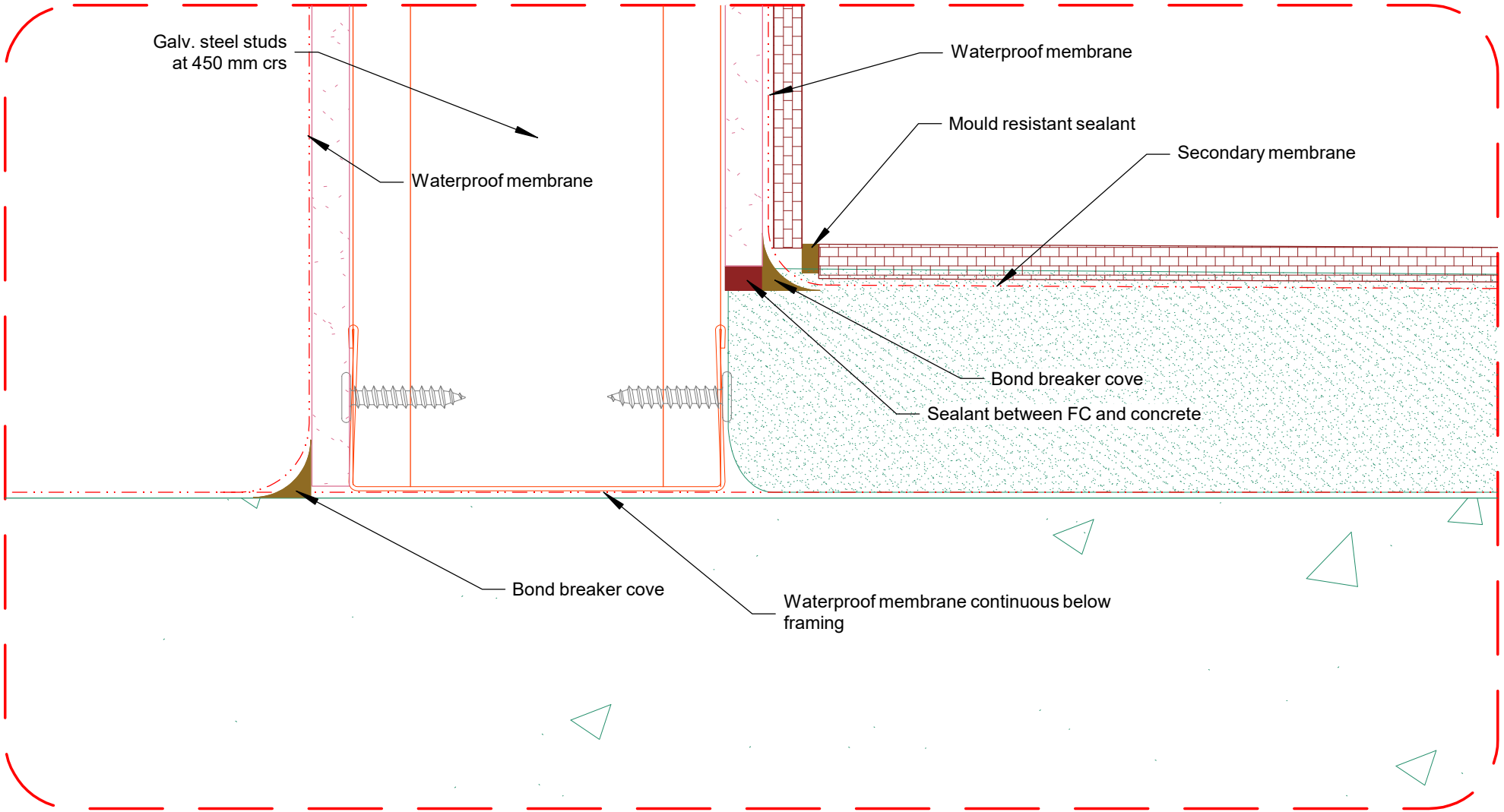
MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Detail 8 From 17115	November 2017	17125	B



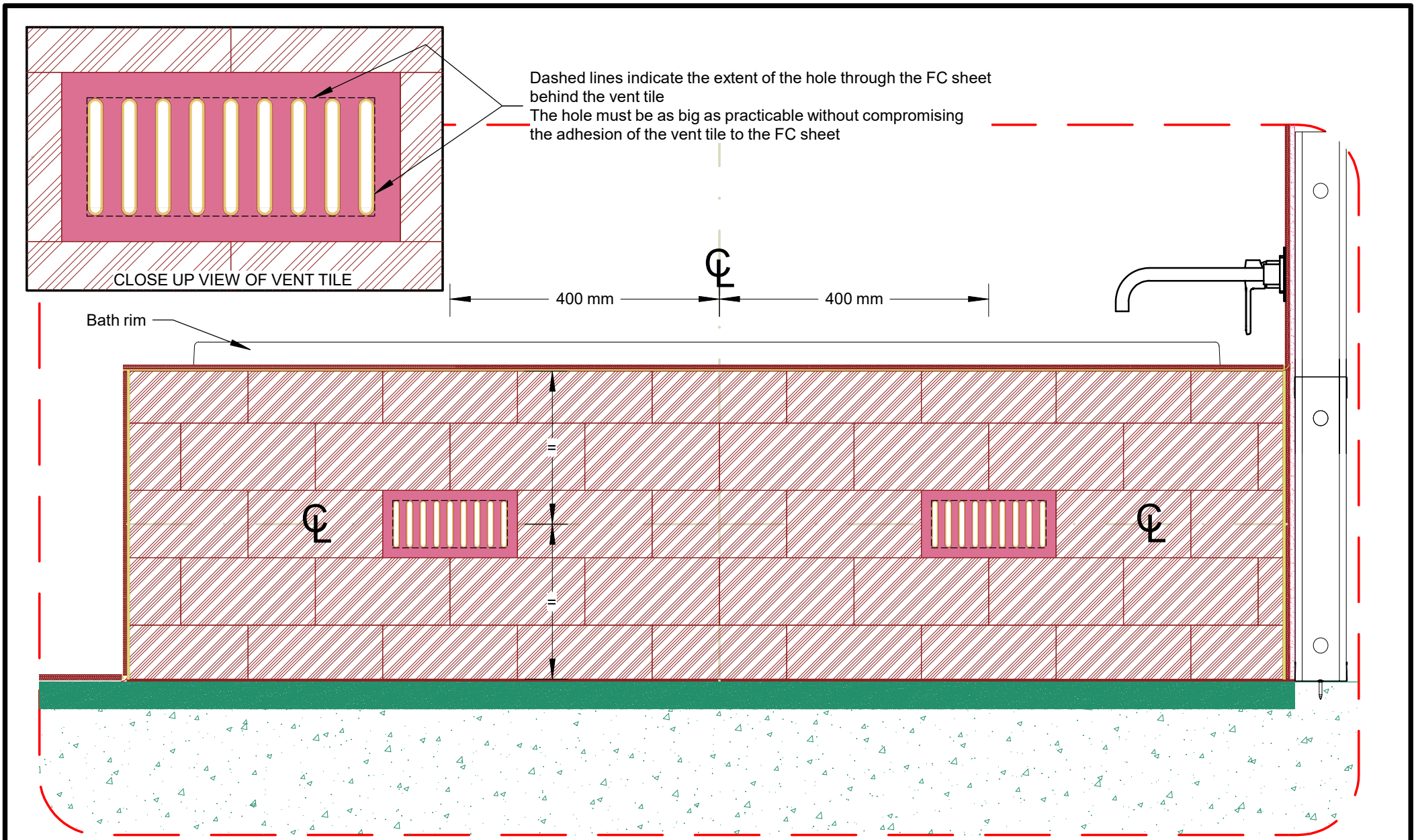
MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Detail 9 From 17115	November 2017	17126	B



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Detail 10 From 17115	November 2017	17127	A



NOTE: Dimensions may be varied to suit the tile selected and bath size.
There must alway be a minimum of 2 bath vents positioned away from each and only on the long side of the bath.
Recommended minimum ventilation openings to be 1000 mm2/m2 of bath front.

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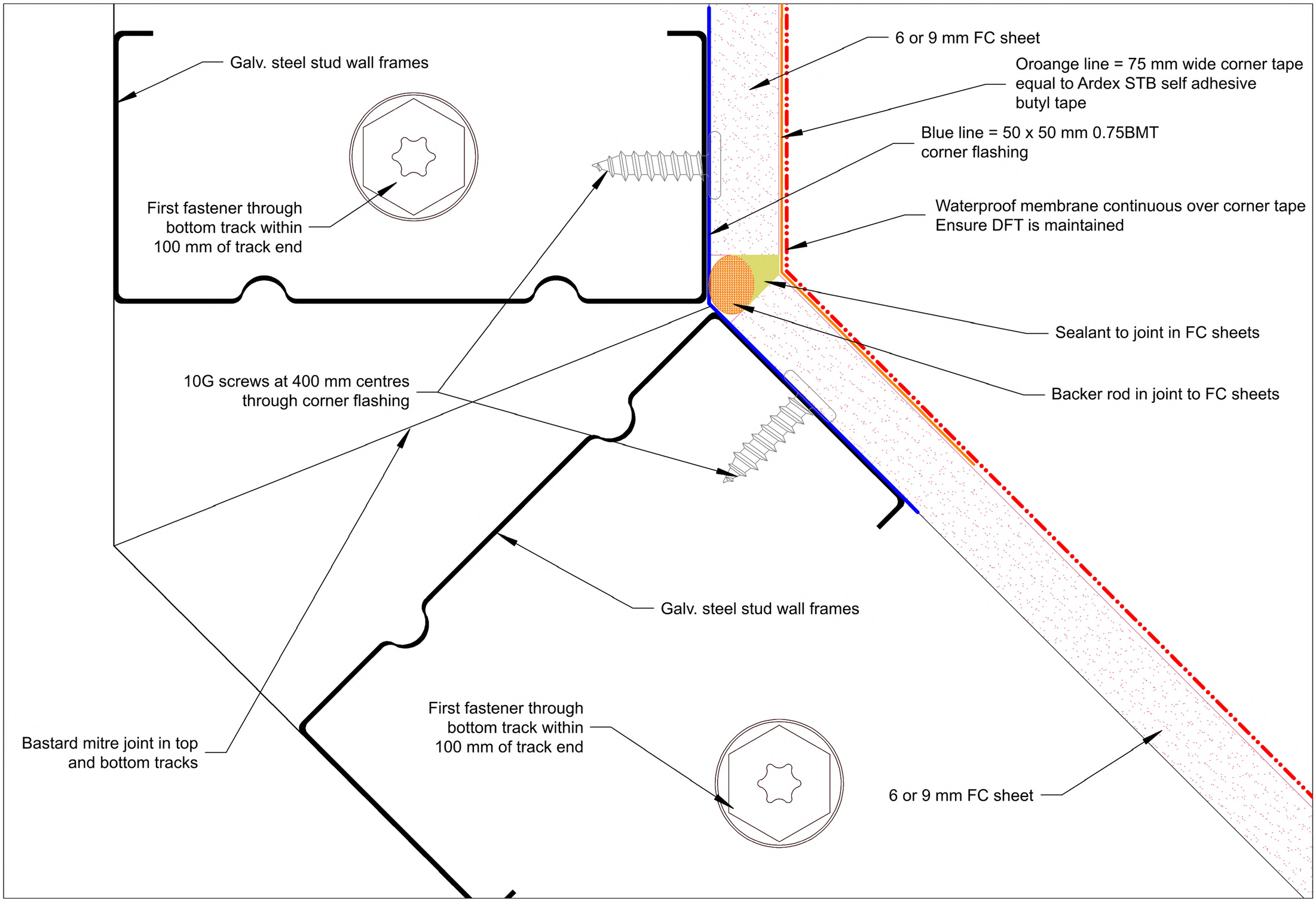
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Bath Tub Installation Details - Elevation of Bath Side Showing Vents	June 2020	17128	A



MULTIPLEX
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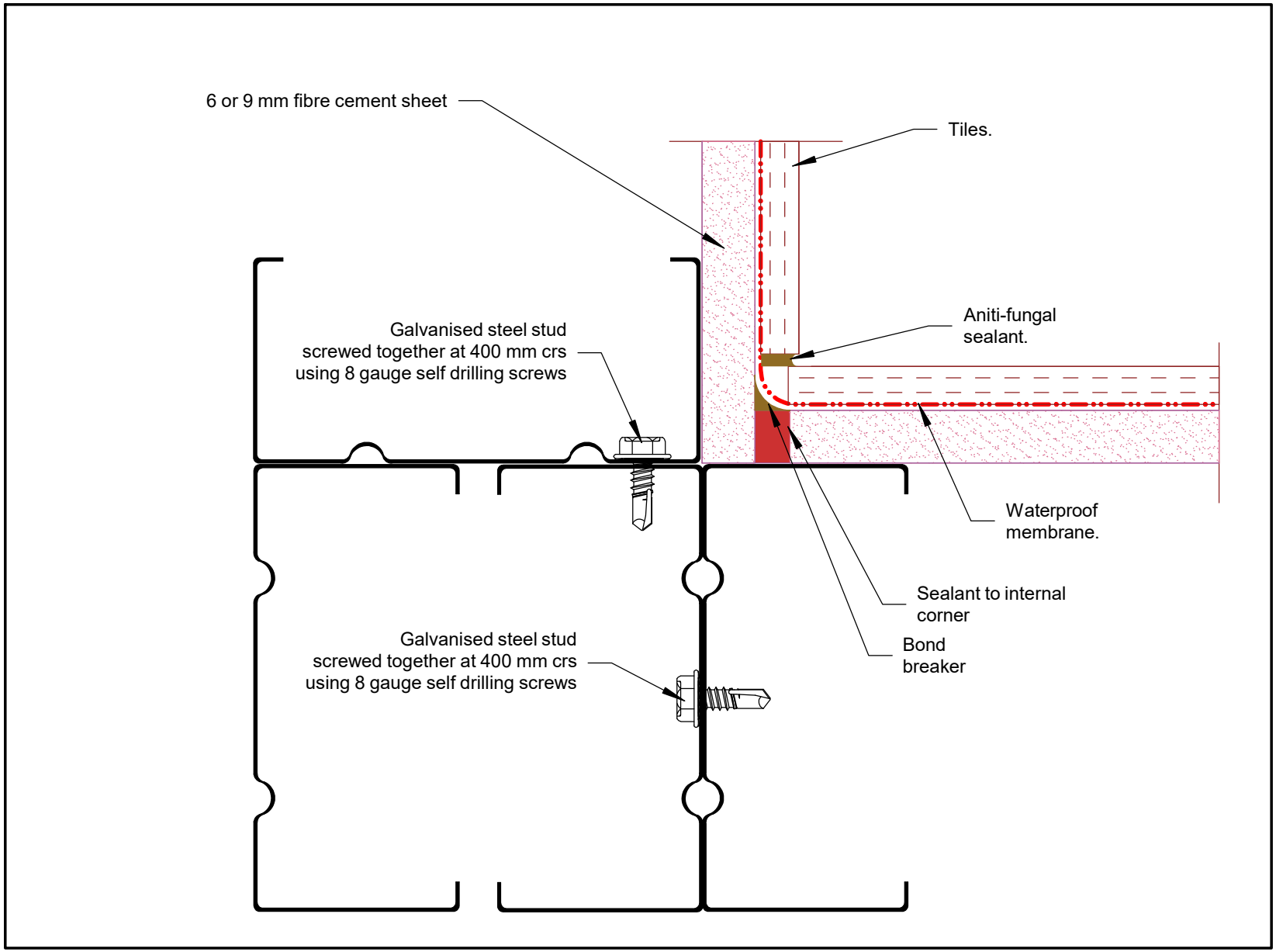
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Typical Vertical Corner Detail - Tiled 135° Corner	November 2020	17135	A



MULTIPLEX
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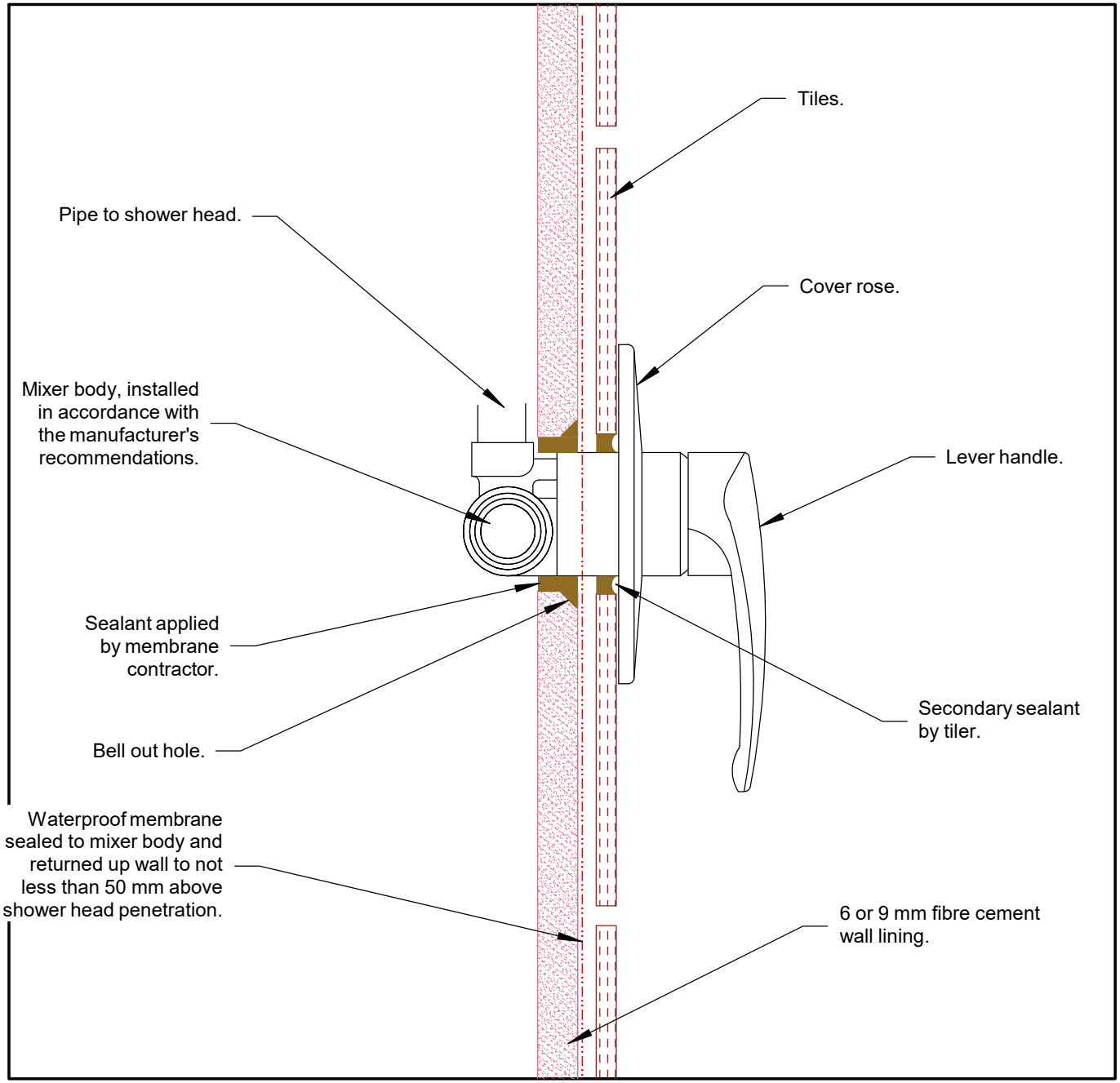
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Typical Vertical Corner Details	October 2017	17136	C



MULTIPLEX
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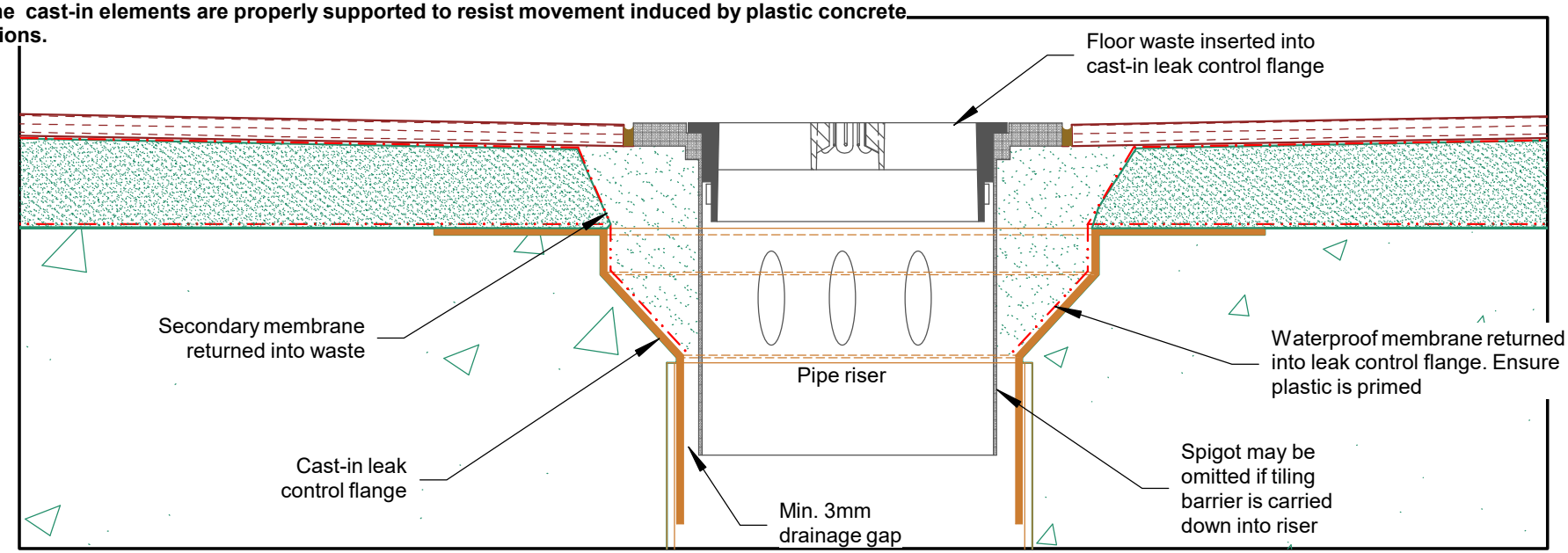
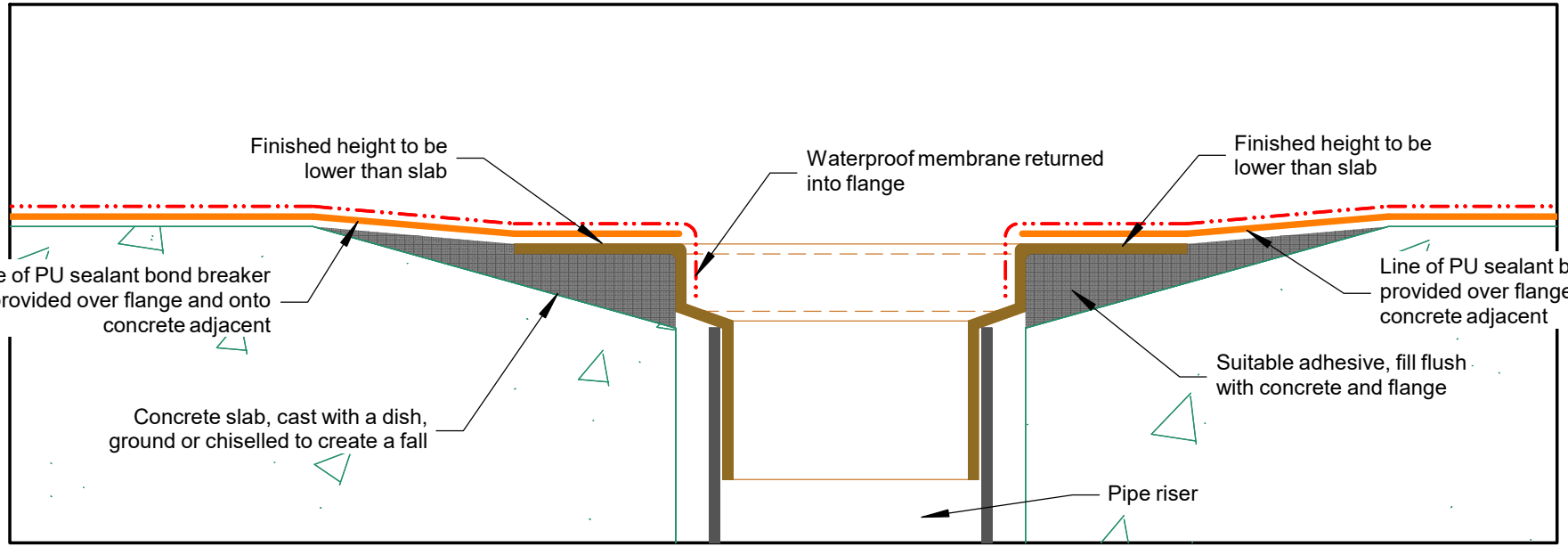
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Mixer Tap Details	October 2017	17137	B

NOTES:

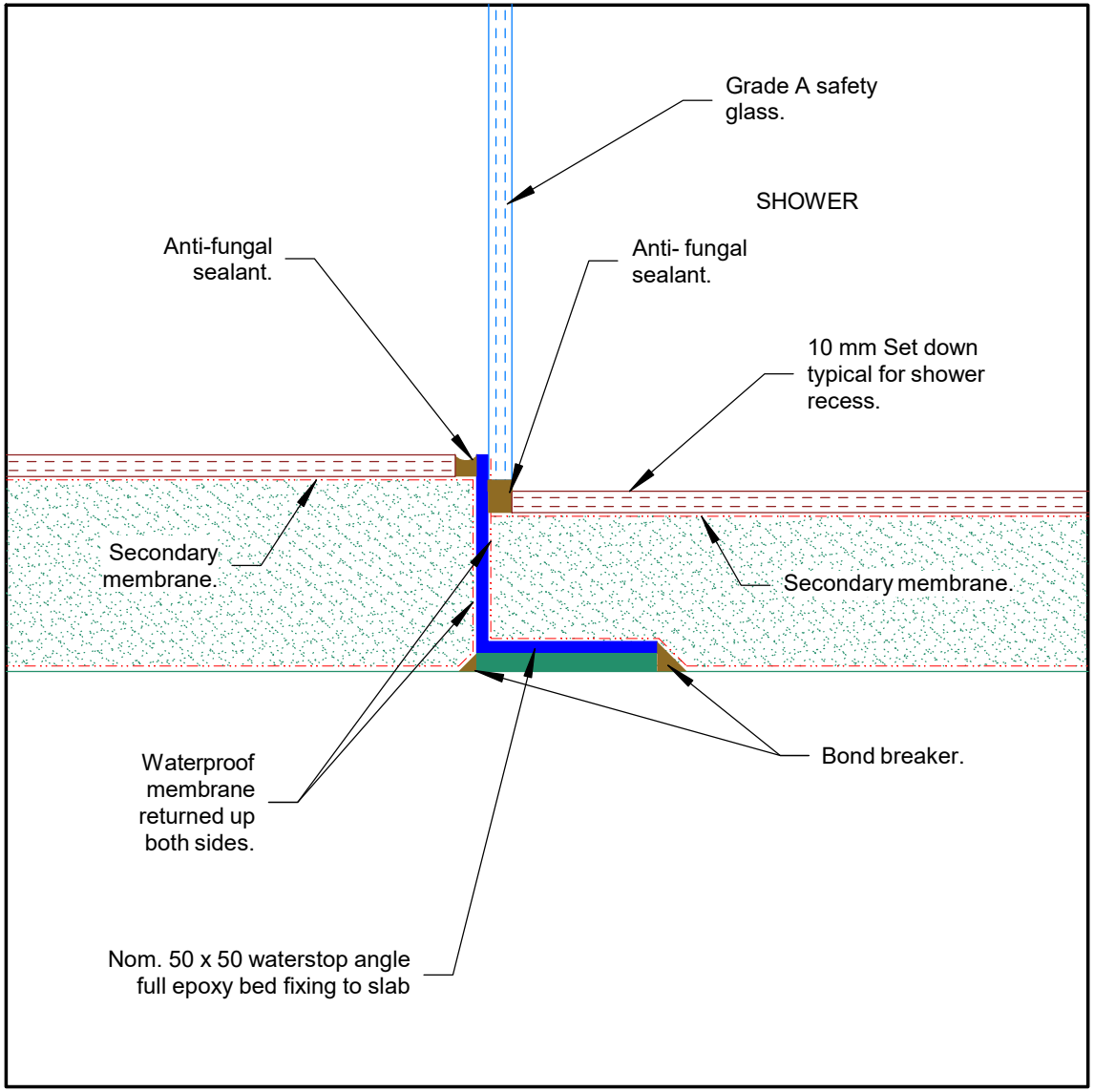
1. Ensure the Structural Engineer details the steel reinforcement to accommodate cast-in elements.

2. Ensure the cast-in elements are properly supported to resist movement induced by plastic concrete or other actions.





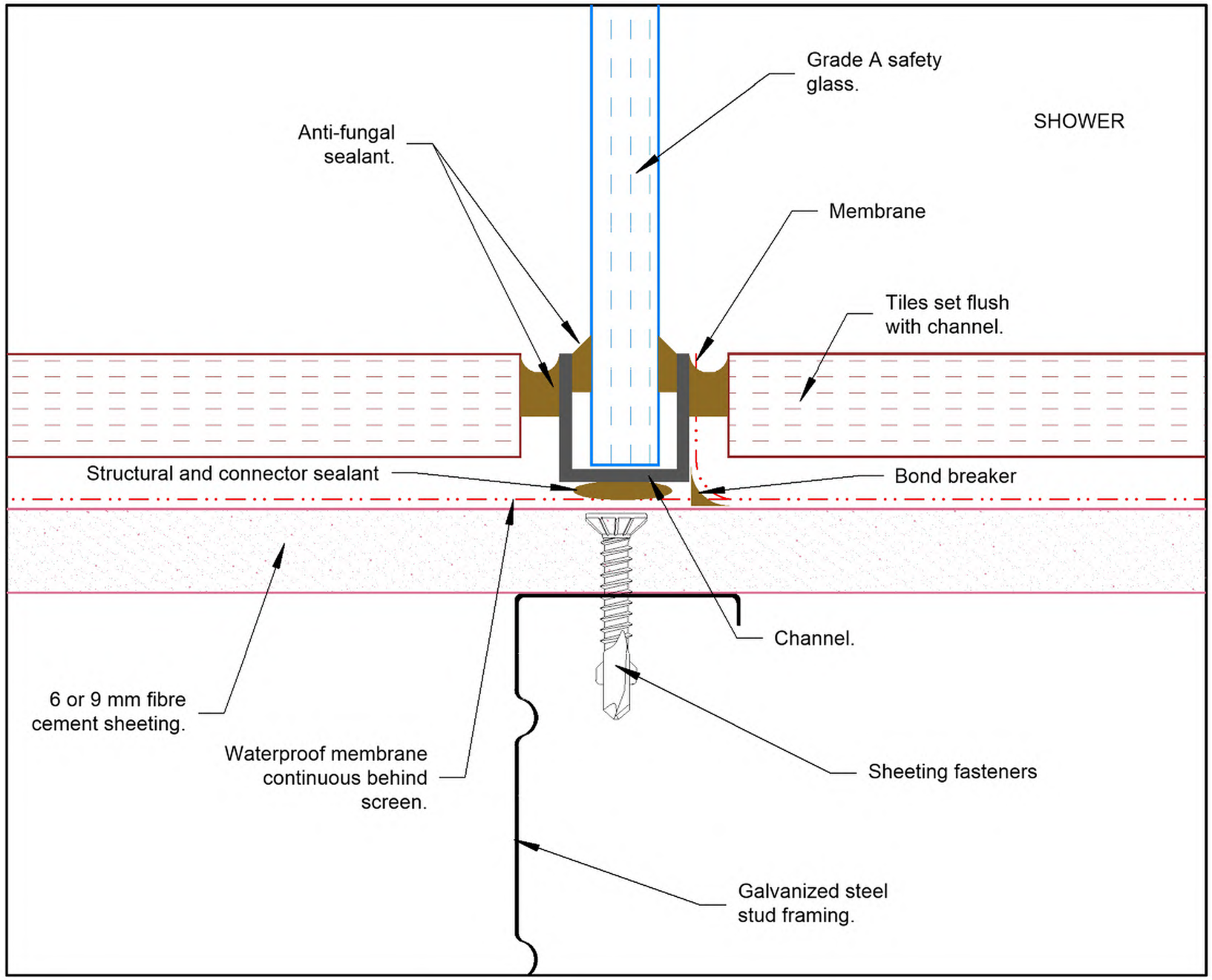
MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Internal Wet Areas	title: Cast In Leak Control Flange and Retro-Fitted	date: October 2017	drawing no.: 17138	issue: A



Typical Frameless Shower Screen With Set Down

MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Shower Screens - Floor Details	October 2017	17140	B

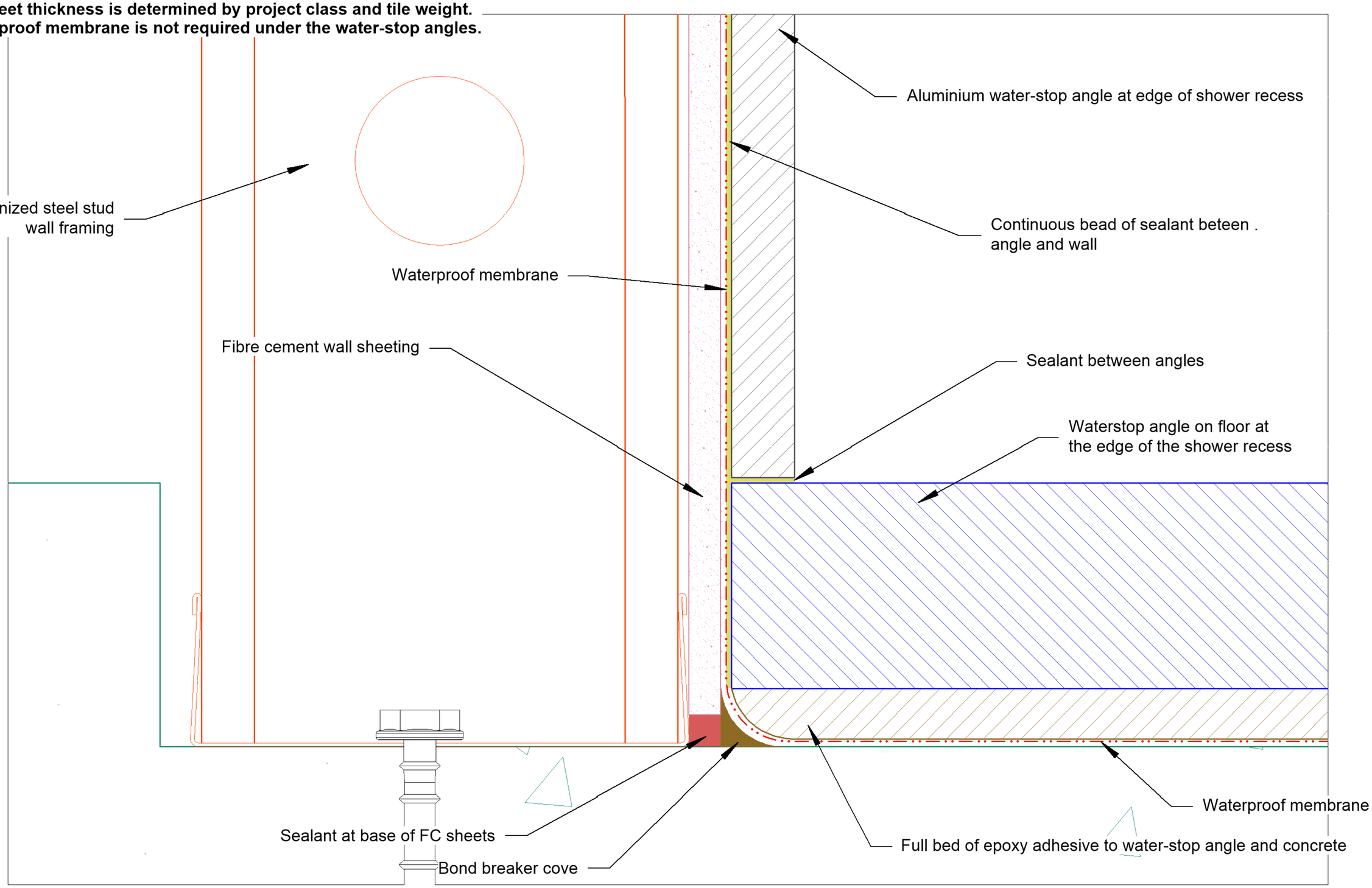


Semi Framed Shower Screen Set Into Tiles

MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Shower Screens - Wall Abutments	November 2020	17141	D

NOTE:
- FC sheet thickness is determined by project class and tile weight.
- Waterproof membrane is not required under the water-stop angles.



MULTIPLEX
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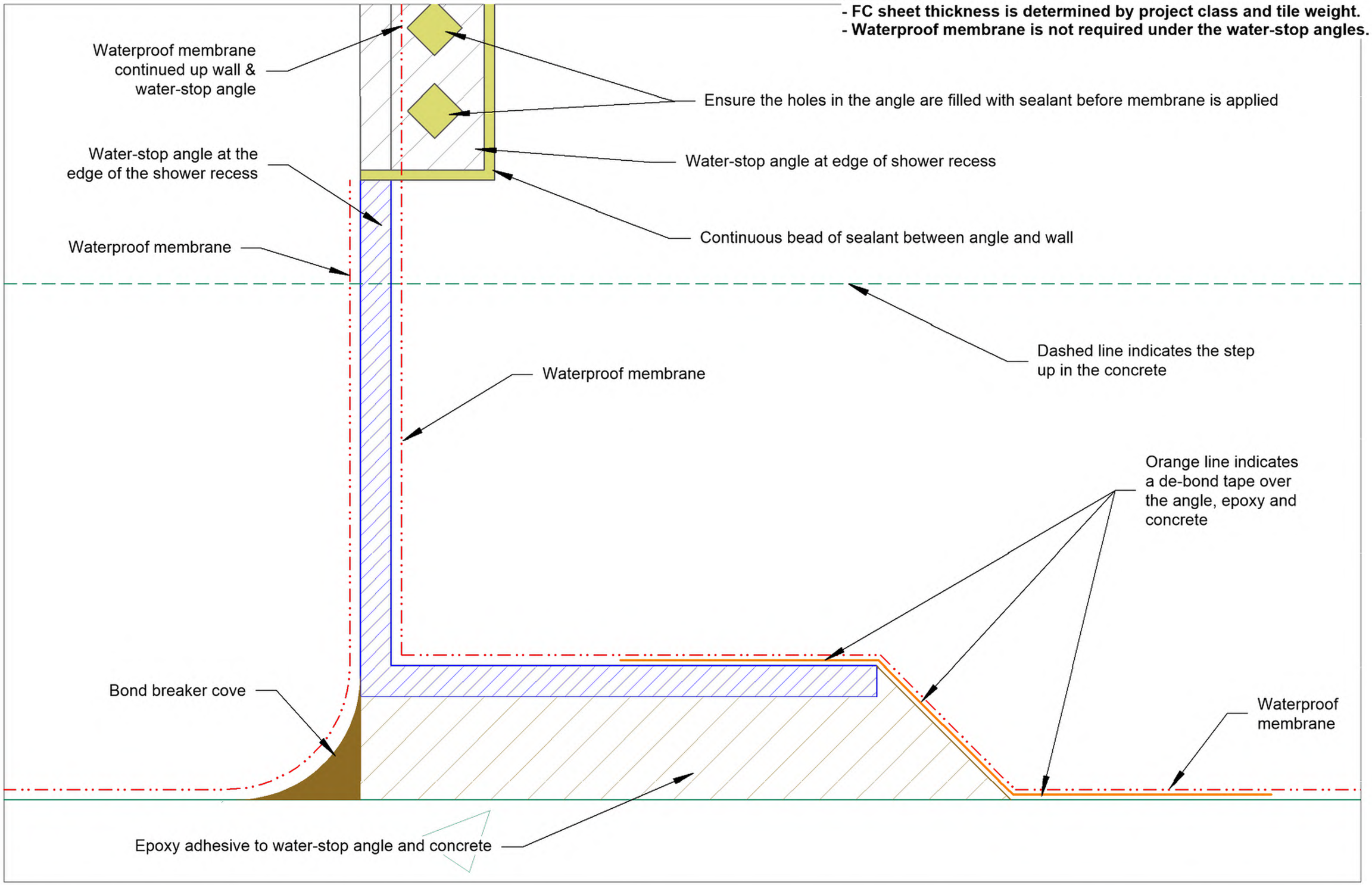
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Shower Water-Stop Angle Details - Elevation of Floor Angle	September 2020	17142	A

NOTE:
- FC sheet thickness is determined by project class and tile weight.
- Waterproof membrane is not required under the water-stop angles.



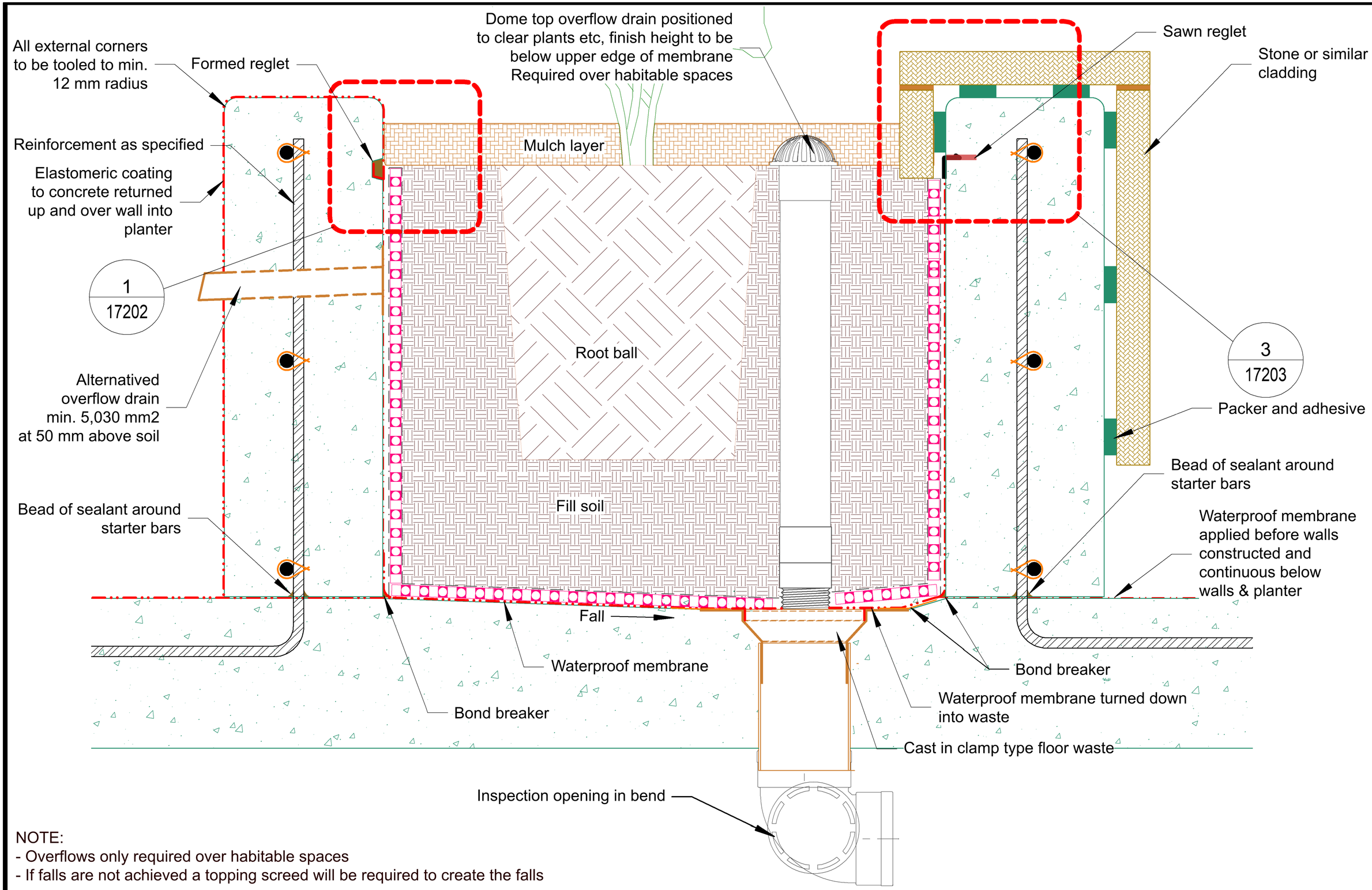
MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Shower Water-Stop Angle - Section Through Floor	September 2020	17143	A

1.11 Appendix 2 - MPX Standard Details - Above Grade External Waterproofing

NOTES:
1. Dimension provided are nominal.
2. Some details may be shown exagerated or exploded to provide clarity.
3. The nomination in a detail of a particular product or system is not intended as an endorsement for that product, system or manufacturer and shall not be interpreted as the only products or system that may be suitable for that situation.

DRAWING INDEX:



NOTE:
- Overflows only required over habitable spaces
- If falls are not achieved a topping screed will be required to create the falls

MULTIPLEX
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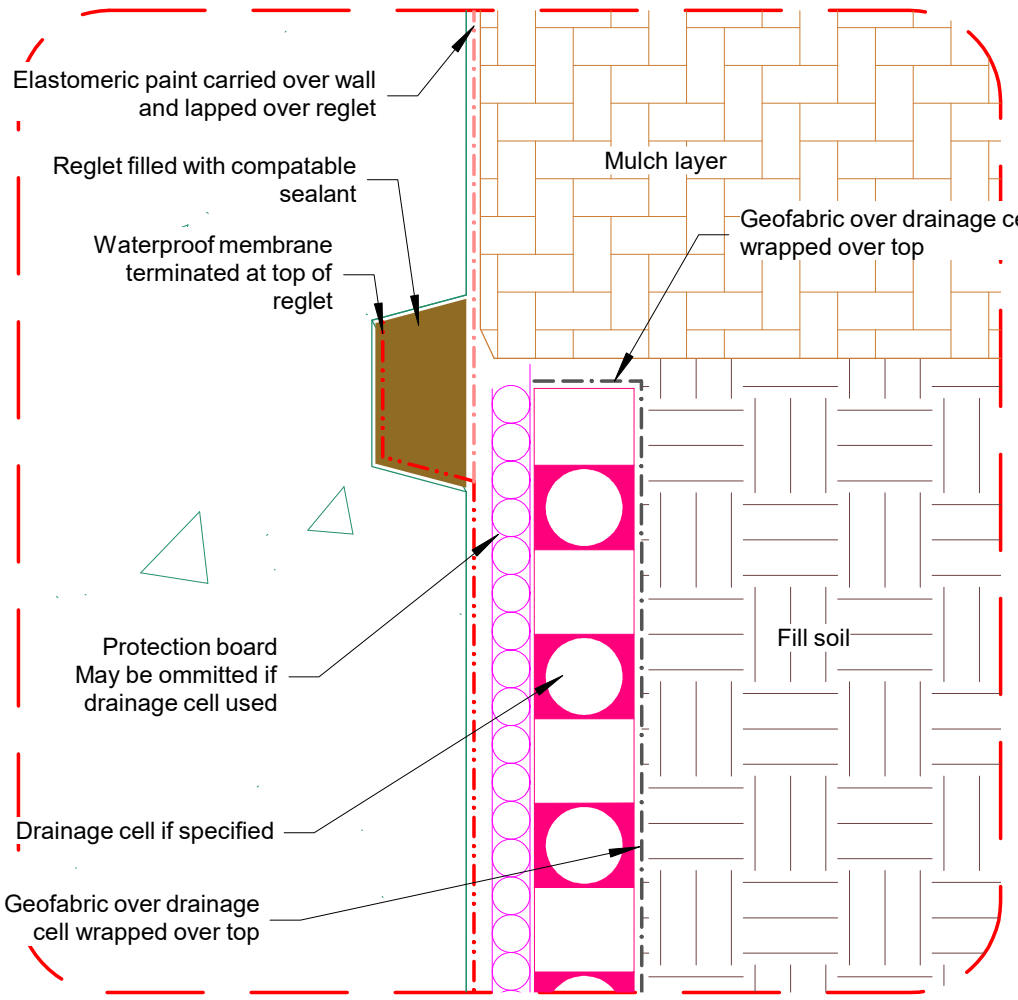
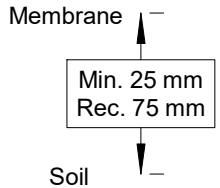
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Planter Box Details - Concrete, Preferred Option	September 2015	17201	B





TERMINATION HEIGHT

1
17201
DETAIL

MULTIPLEX
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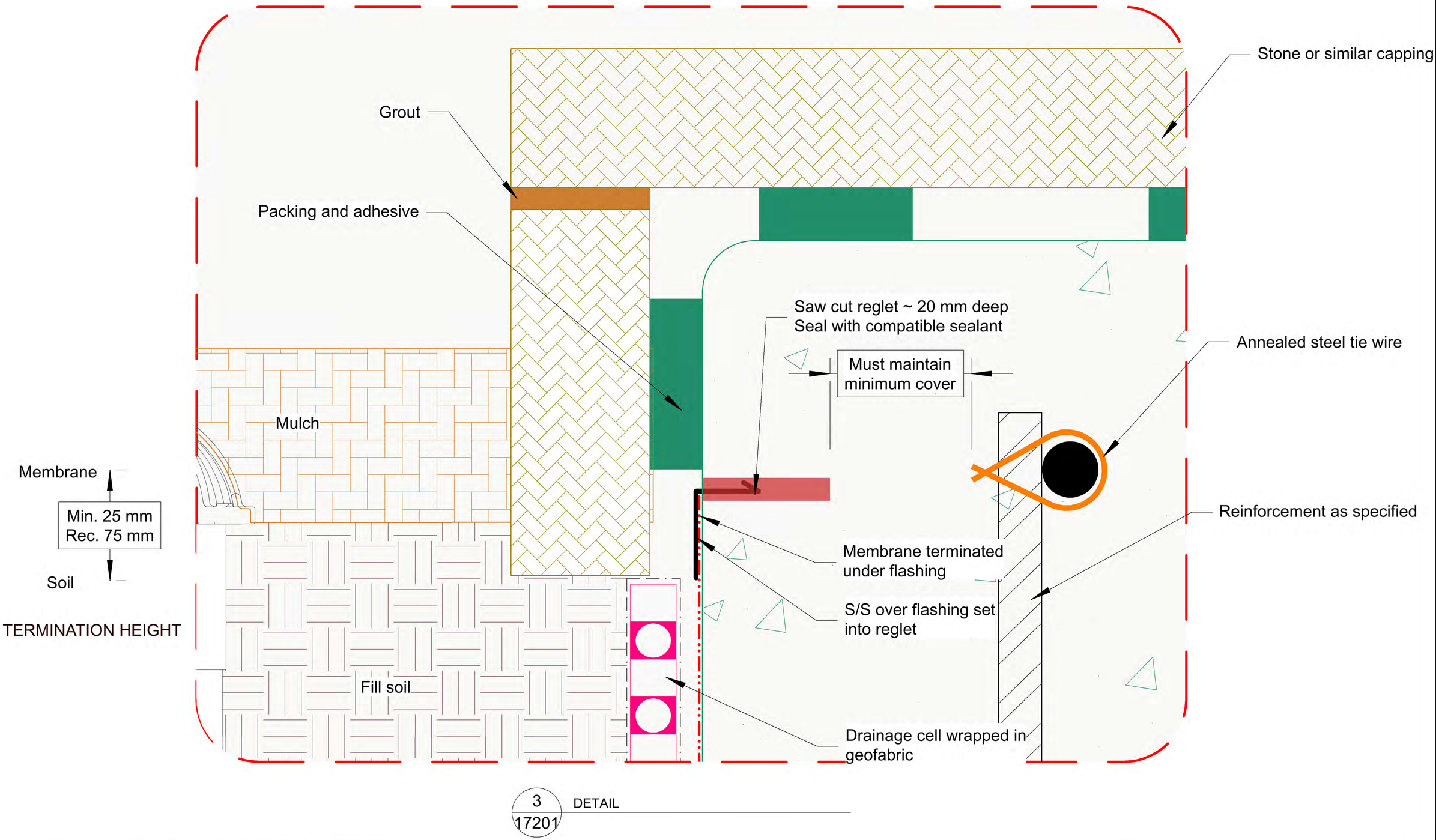
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Planter Box Details - Concrete, Preferred Option - Details	September 2015	17202	C



3
17201
DETAIL

MULTIPLEX
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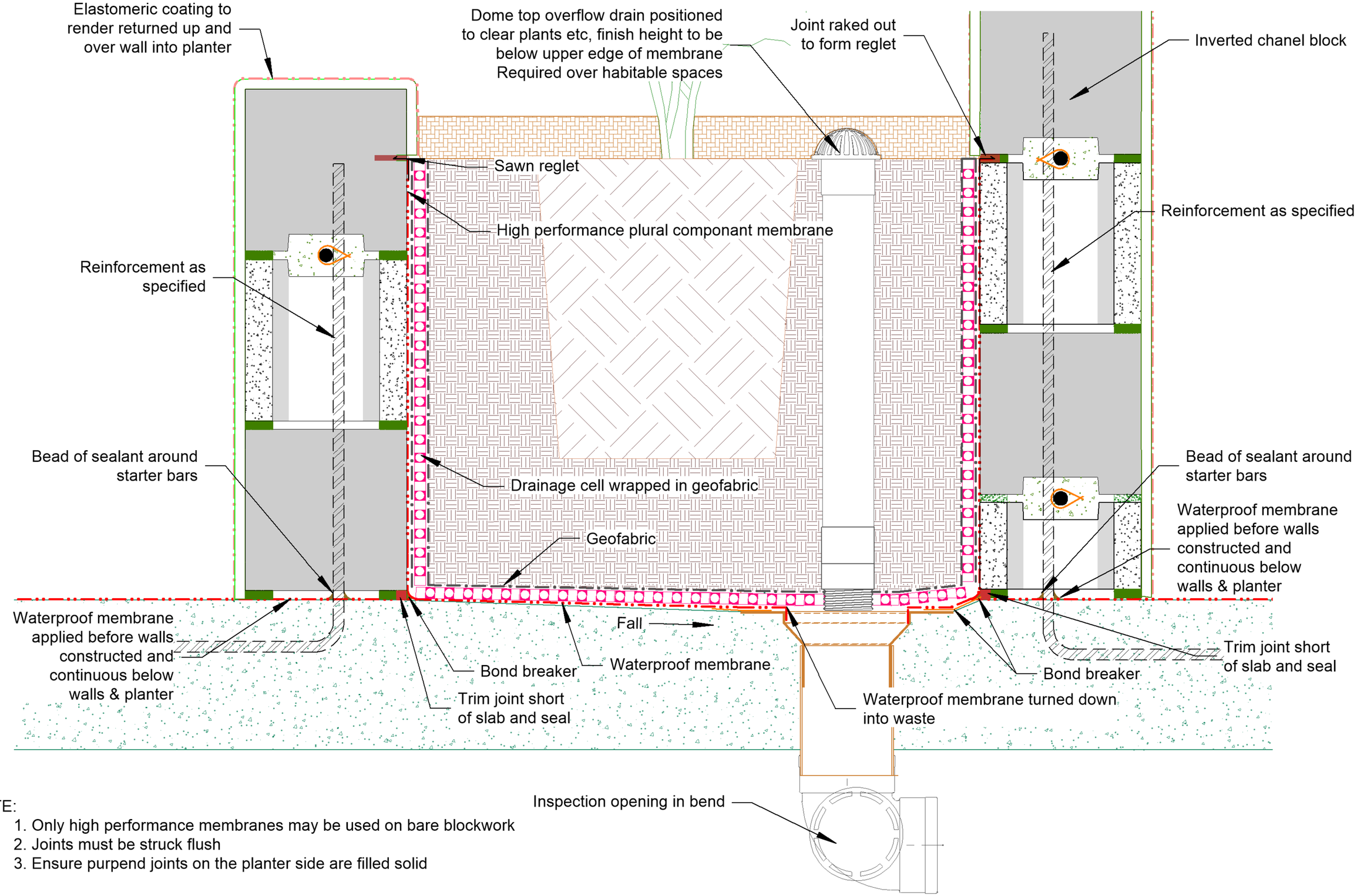
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Planter Box Details - Concrete, Preferred Option - Details	September 2015	17203	C



NOTE:

1. Only high performance membranes may be used on bare blockwork
2. Joints must be struck flush
3. Ensure purpend joints on the planter side are filled solid

MULTIPLEX
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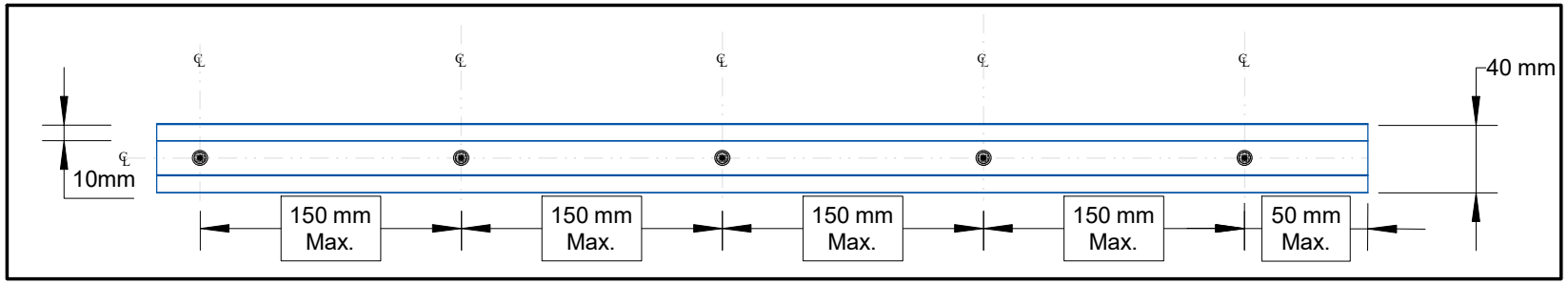
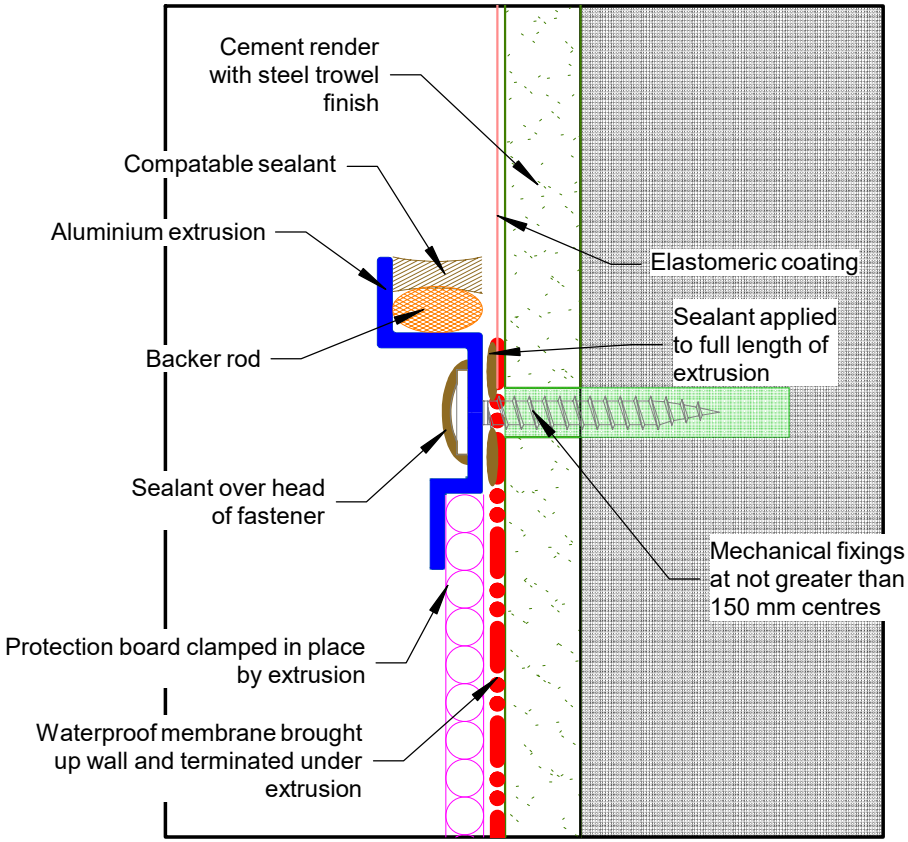
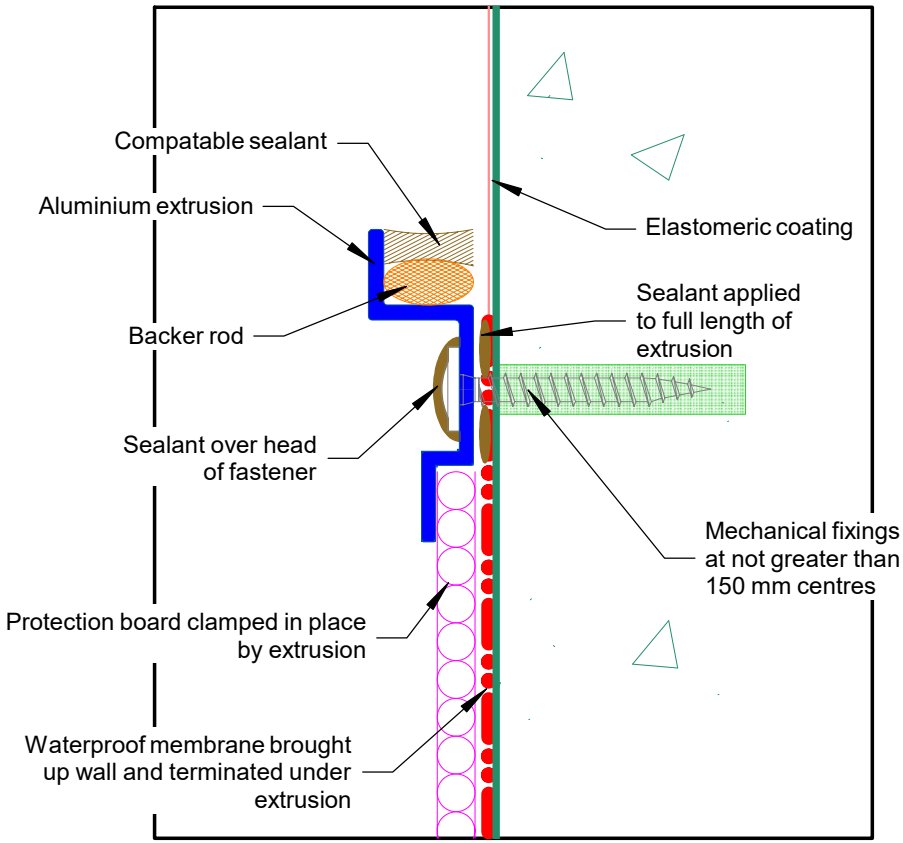
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Planter Box Details - Blockwork, Alternate Option	November 2020	17204	D



TYPICAL ELEVATION



TERMINATION TO CONCRETE BLOCK



TERMINATION TO CAST INSITU CONCRETE

NOTE: It is recommended that the extrusion is anodized to increase durability.

MULTIPLEX
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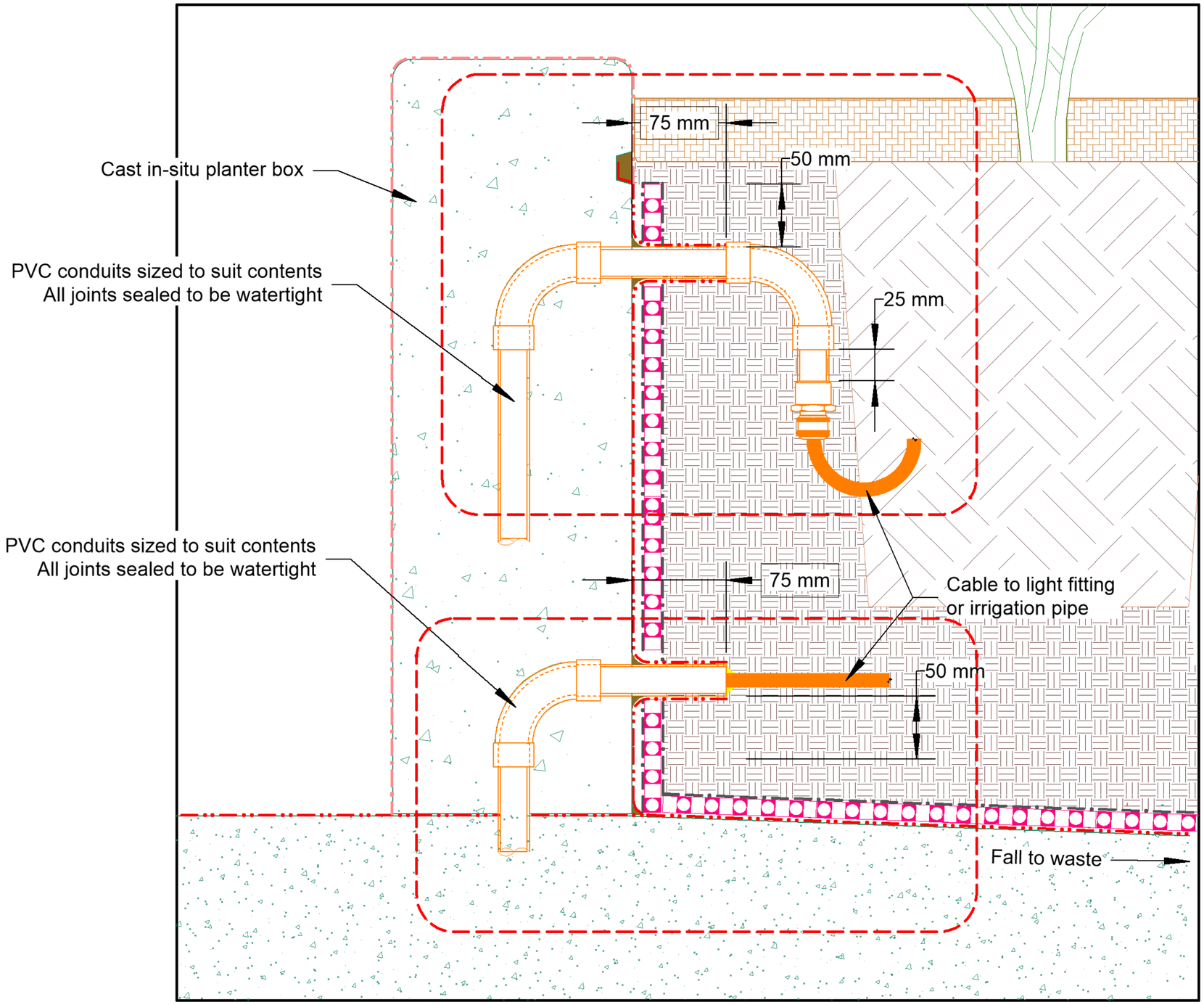
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Pressure Seal Termination Details	September 2015	17207	A



MULTIPLEX
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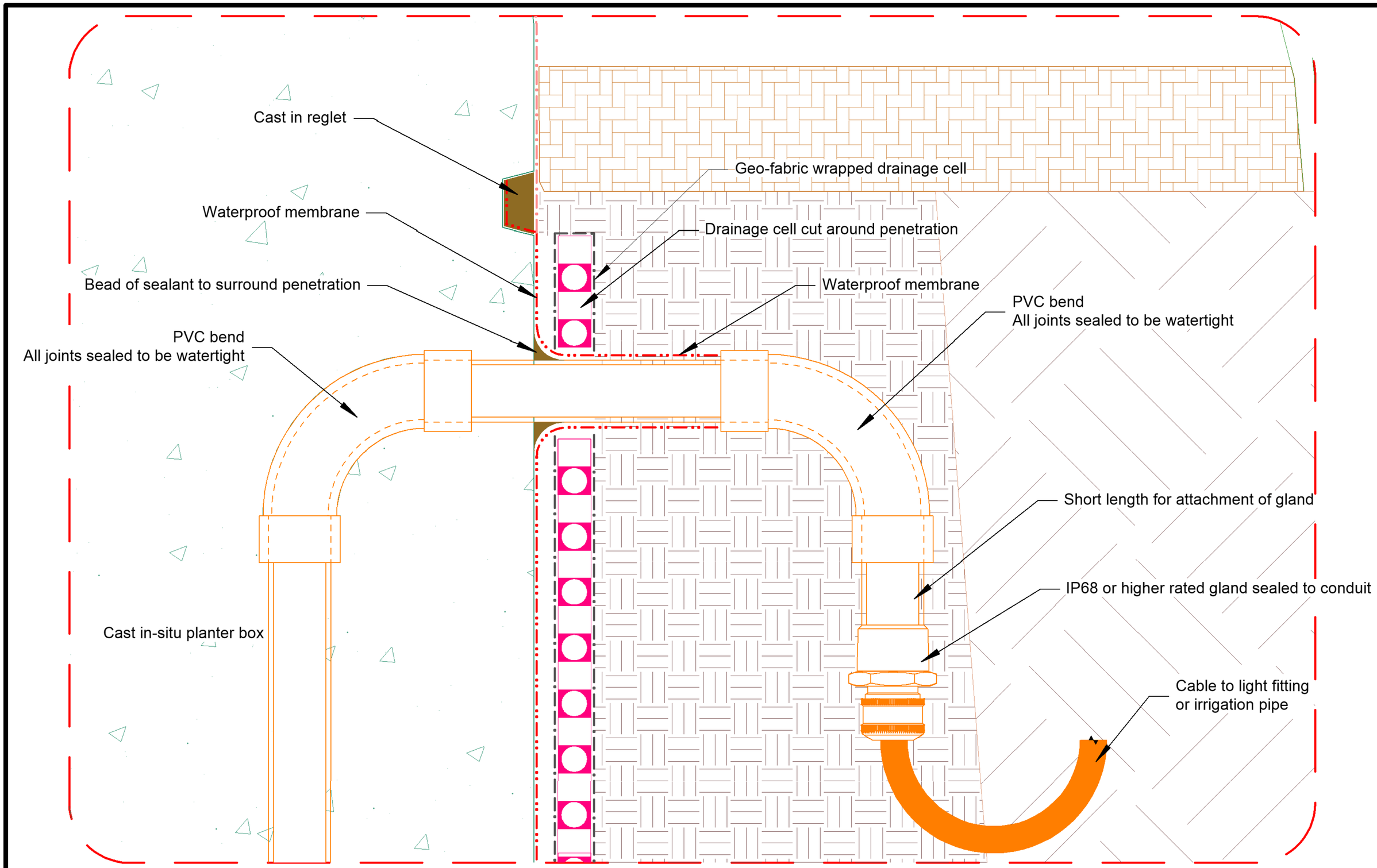
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Planter Box - Cable & Water Pipe Penetration Details Conduit or Irrigation Pipe	November 2020	17208	B



MULTIPLEX
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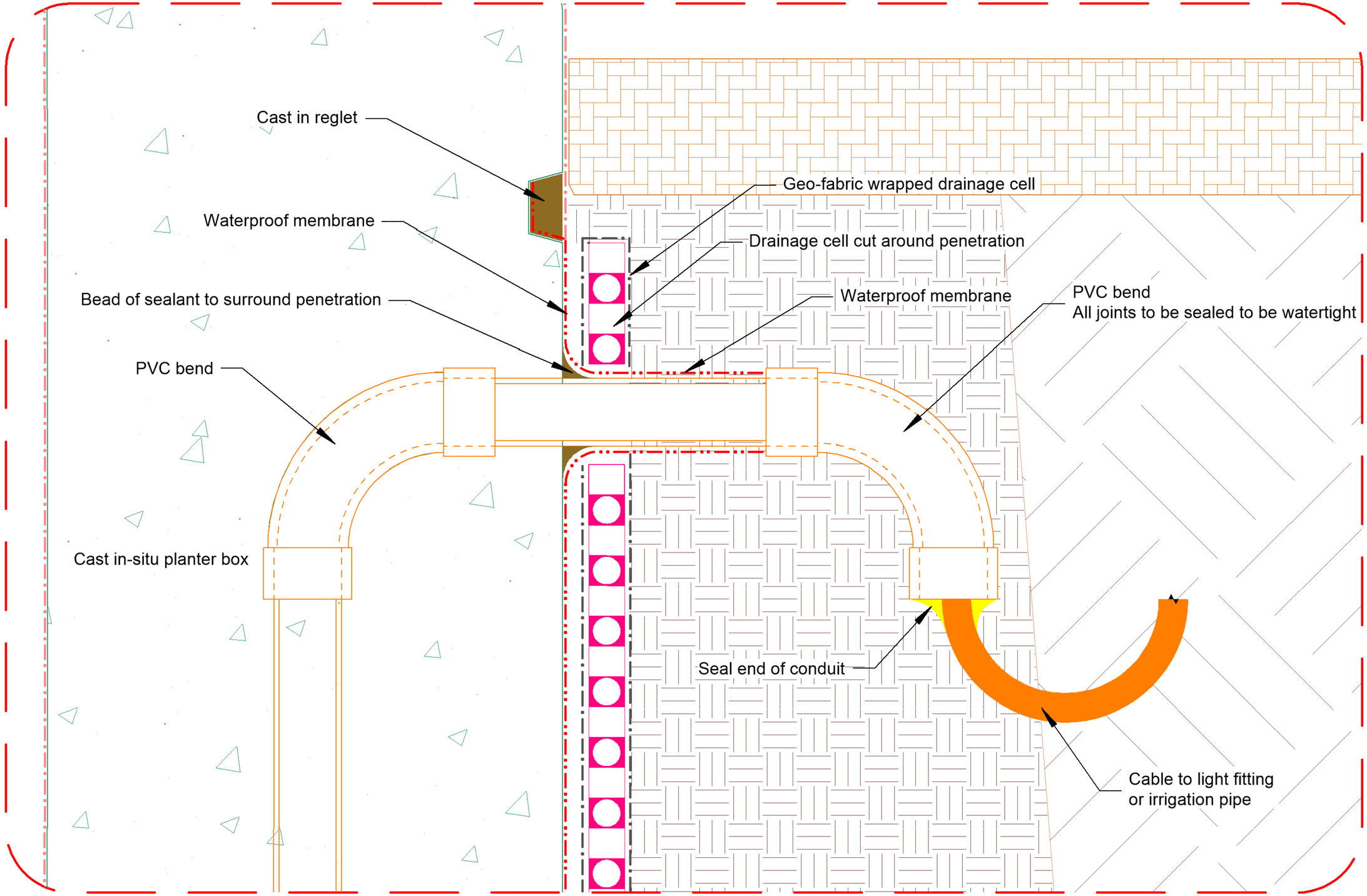
project
Multiplex Standard Details -
Above Grade External Waterproofing

title
Planter Box - Cable & Water Pipe Penetration Details
Conduit or Irrigation Pipe at High Level Option 1

date	drawing no.	issue
November 2020	17209	C



MULTIPLEX
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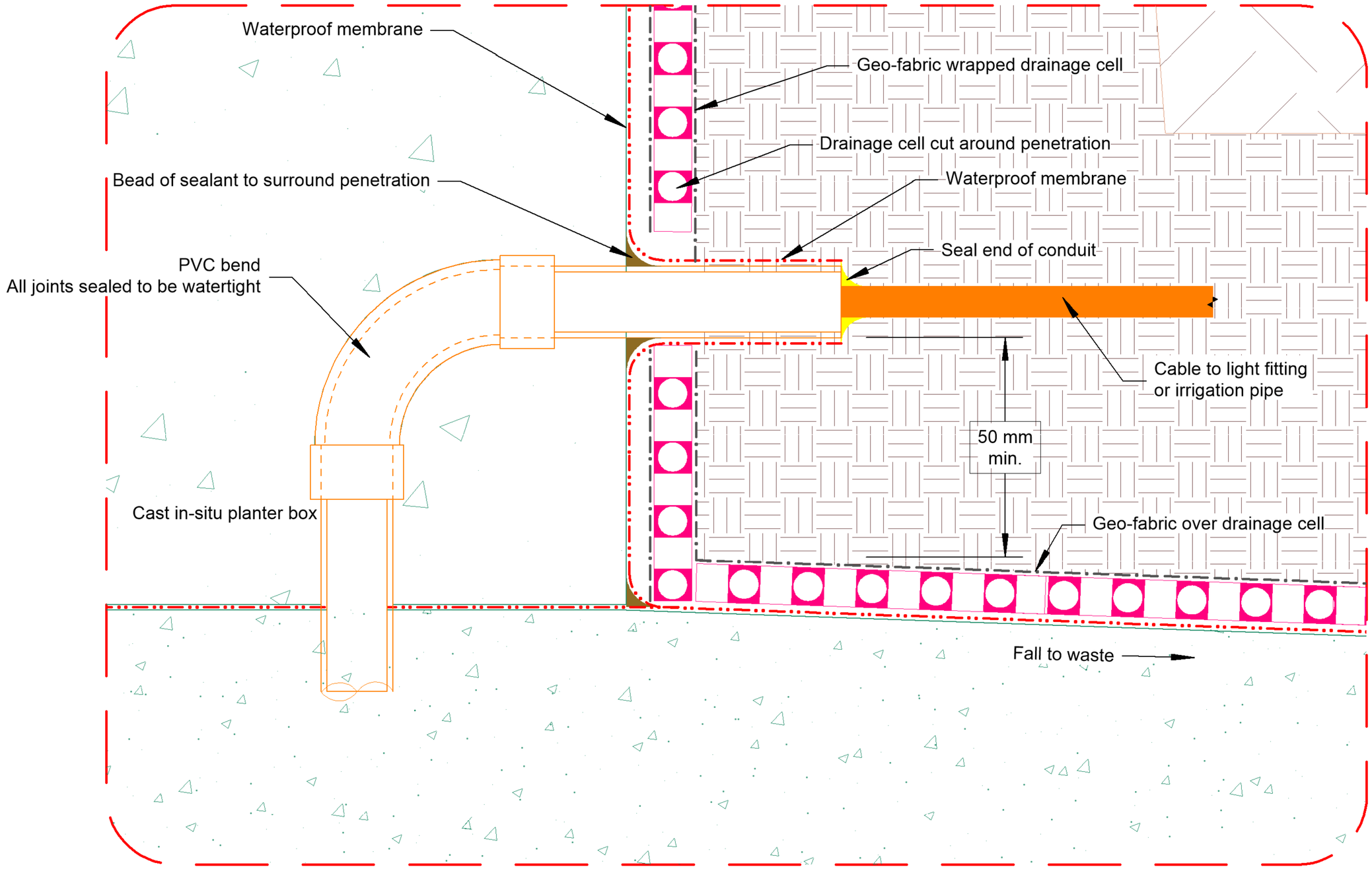
project
Multiplex Standard Details -
Above Grade External Waterproofing

title
Planter Box - Cable & Water Pipe Penetratio Details
Conduit or Irrigation Pipe at High Level Option 2

date	drawing no.	issue
November 2020	17210	C



MULTIPLEX
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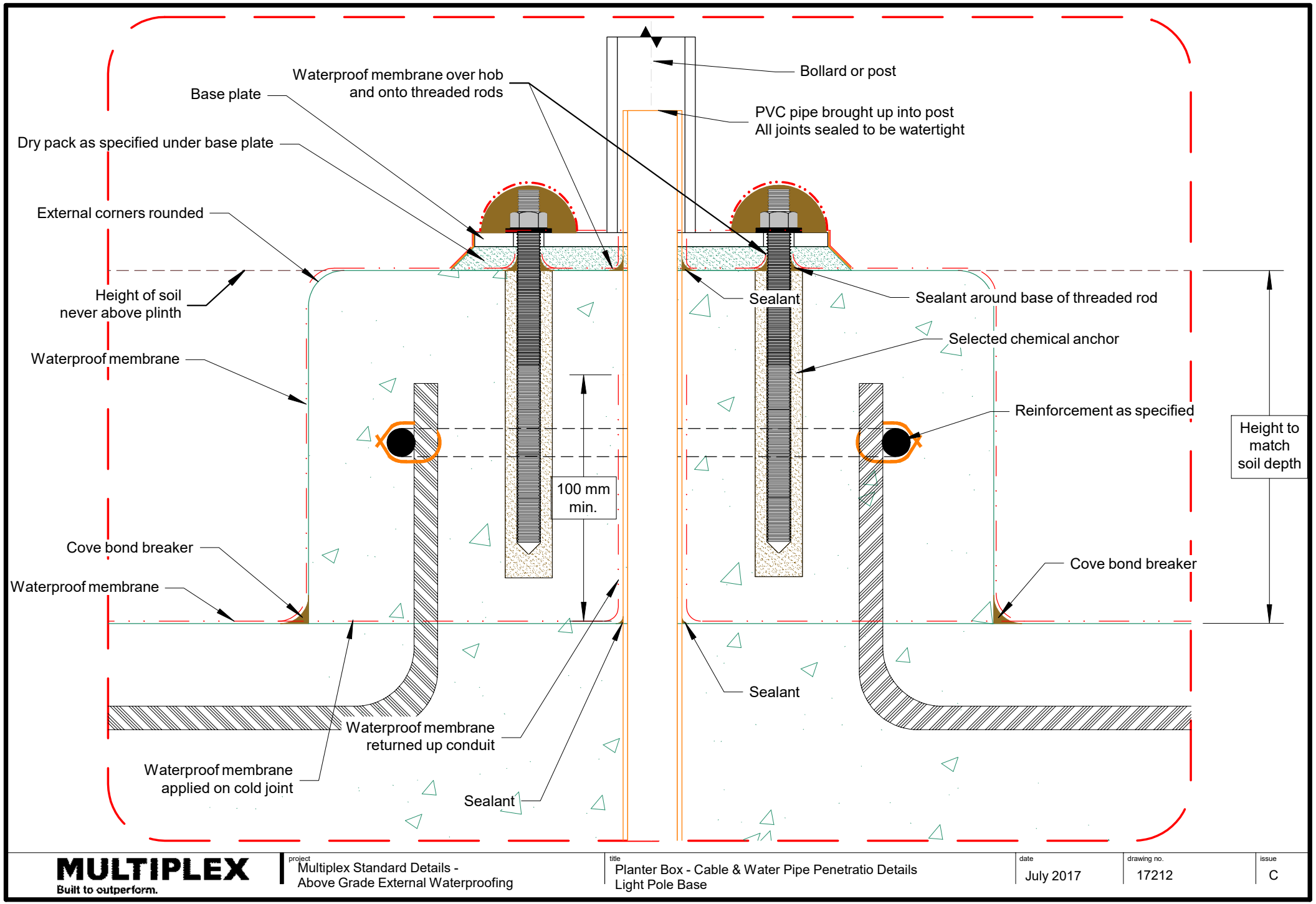
project
Multiplex Standard Details -
Above Grade External Waterproofing

title
Planter Box - Cable & Water Pipe Penetratio Details
Conduit or Irrigation Pipe at Low Level

date
November 2020

drawing no.
17211

issue
C



MULTIPLEX
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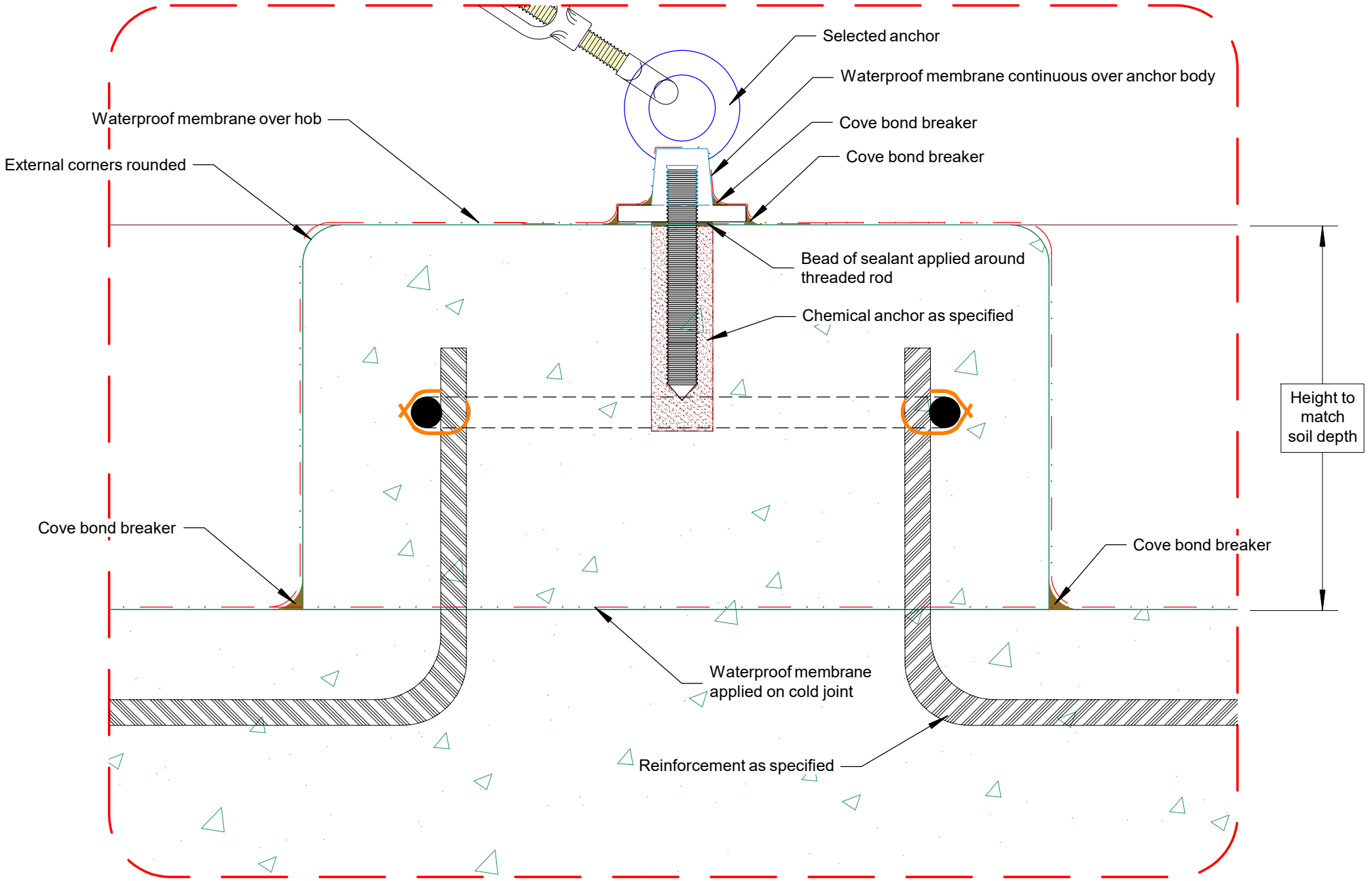
project
Multiplex Standard Details -
Above Grade External Waterproofing

title
Planter Box - Cable & Water Pipe Penetratio Details
Light Pole Base

date	drawing no.	issue
July 2017	17212	C



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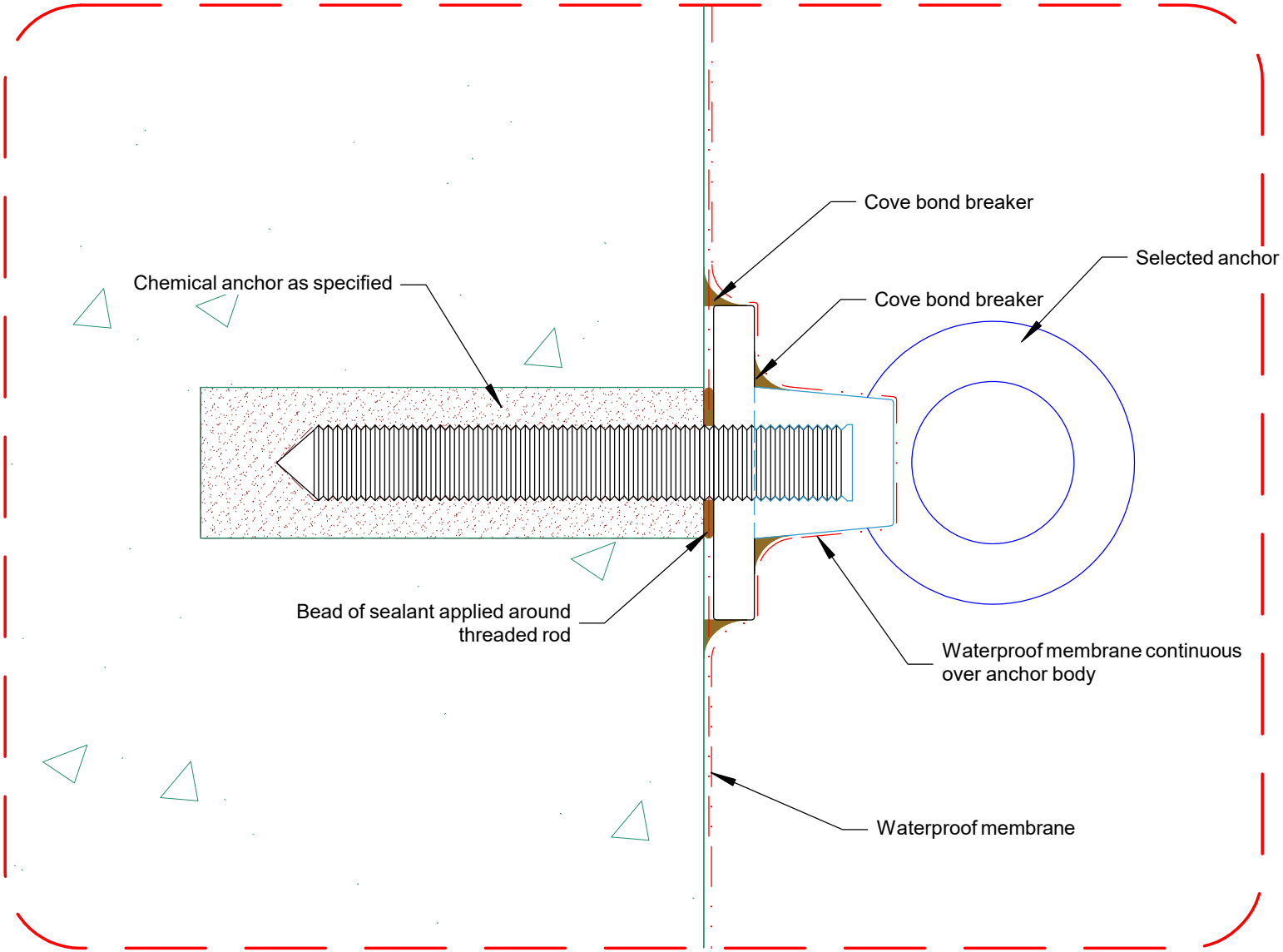
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Planter Box - Cable & Water Pipe Penetratio Details Guy Wire Anchor - Option 1	July 2017	17213	B



MULTIPLEX
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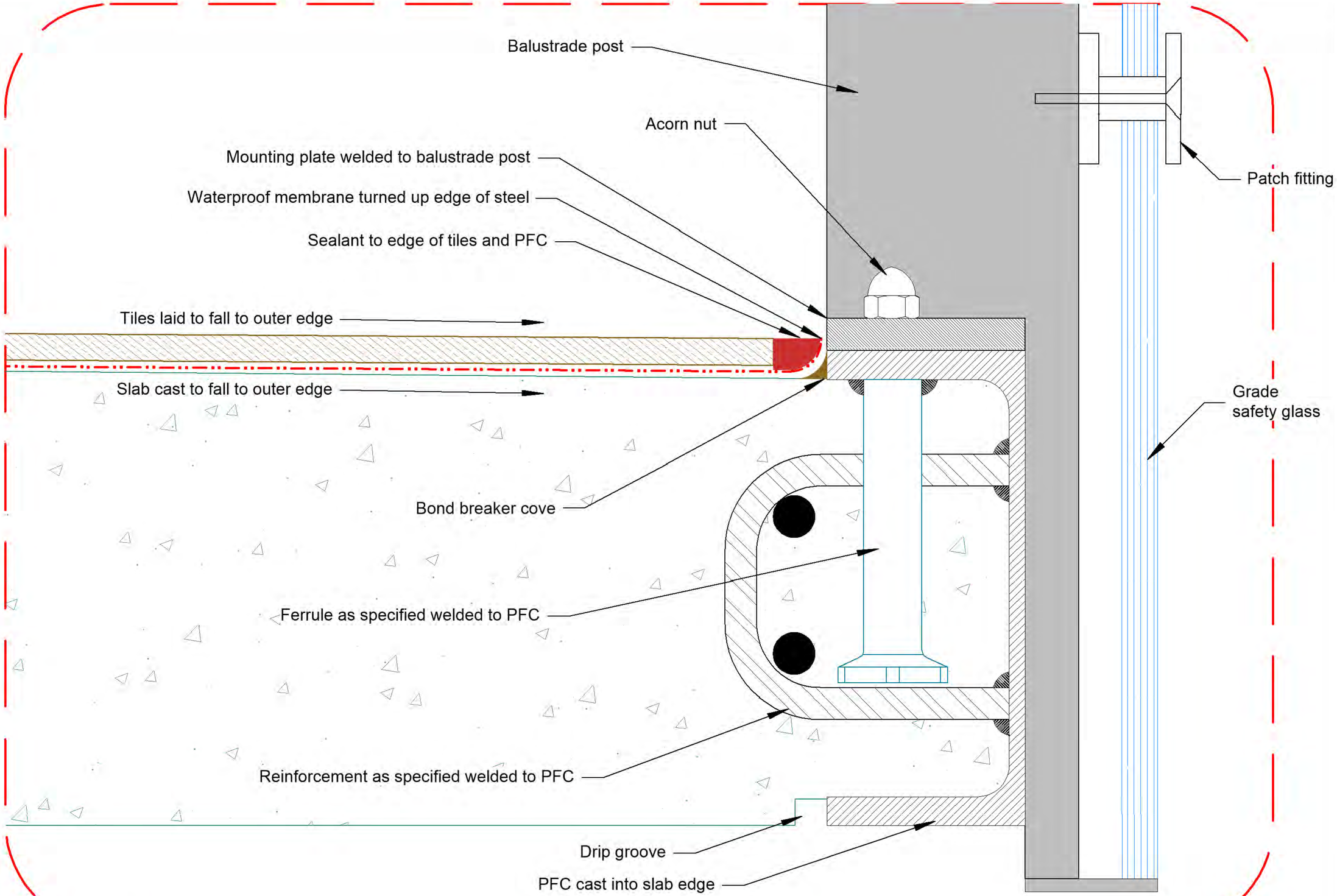
project
Multiplex Standard Details -
Above Grade External Waterproofing

title
Planter Box - Cable & Water Pipe Penetratio Details
Guy Wire Anchor - Option 2

date	drawing no.	issue
July 2017	17214	A



MULTIPLEX
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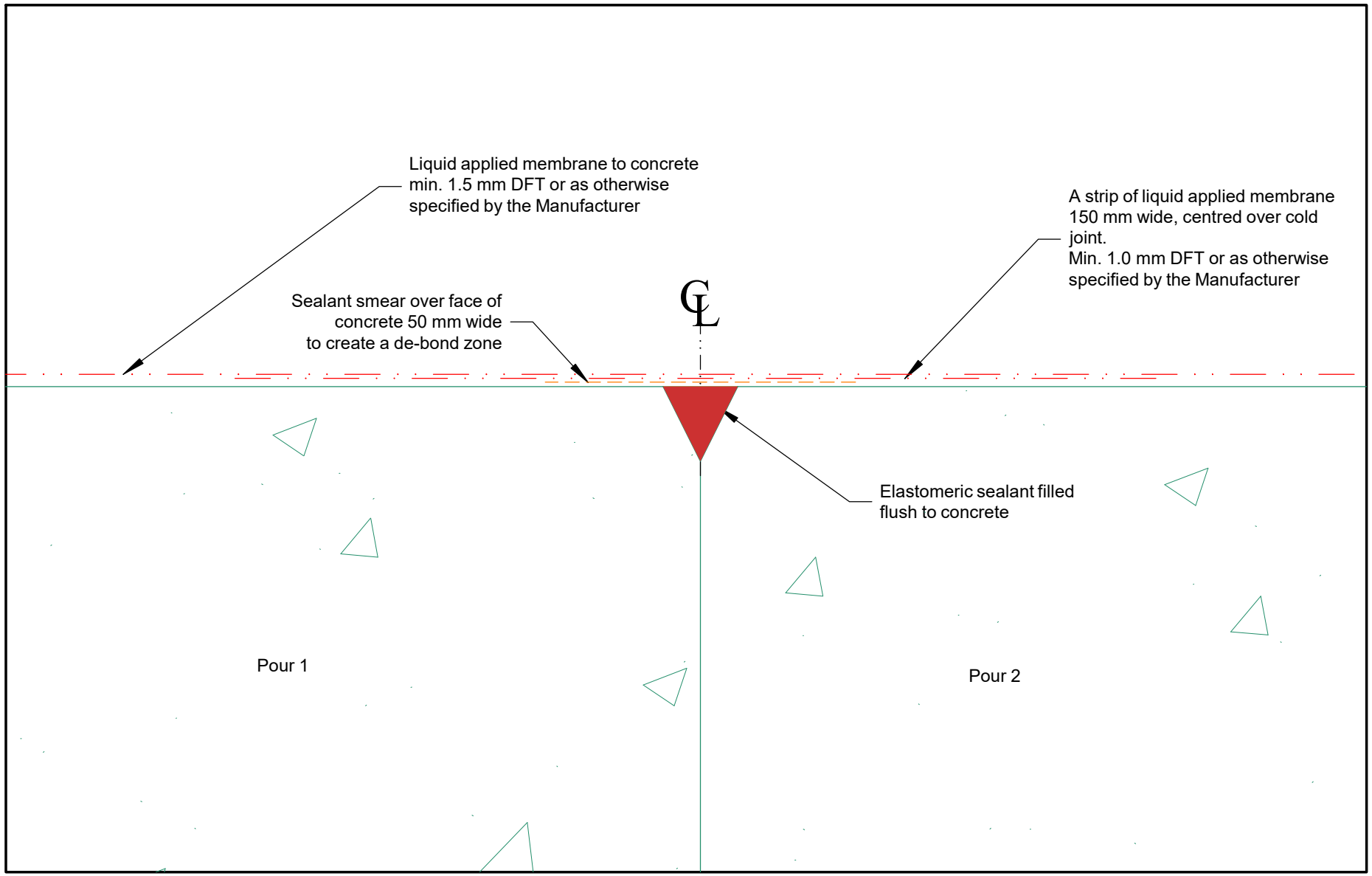
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Balcony Details - Outboard Edge - Victoria	November 2020	17215	B



NOTES:

1. Reinforcement, surface finishes, protection boards, drainage layer, etc. omitted for clarity.
2. This detail must be ratified by the selected membrane manufacturer or amended to suit.
3. A hydrohilic water stop may be used if required.

MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Above Grade External Waterproofing	title: Typical Cold or Temporary Movement Joint - "Triple Detail"	date: March 2019	drawing no.: 17216	issue: A

NOTE:
Overflashing to be made from 3 mm thick HDG steel sheets
Weld all joints and treat with zinc rich primer
All fasteners to be HDG steel, seal over heads or incorporate a weather seal washer

12 mm
9 mm
Sealant on backer rod
Fasteners at max. 40 mm centres
50 mm
Minimum 5° fall
Waterproof membrane brought up into void under flashing
Duct
Reinforced concrete hob 150 mm high or higher if require for roof insulation and ballast
75 mm
25 mm
Fasteners at max. 150 mm centres
Seal over heads
12 mm

MULTIPLEX
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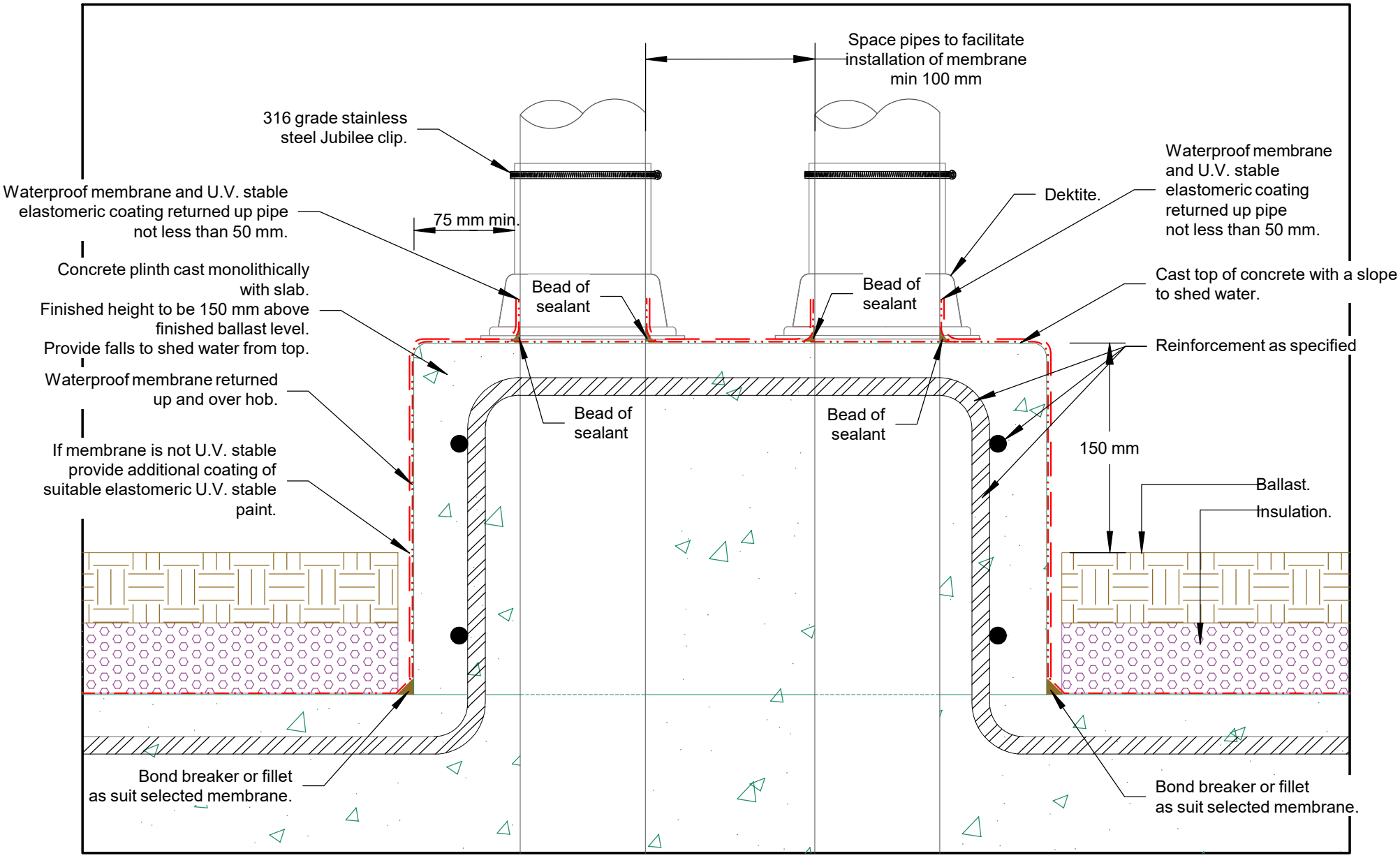
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Flat Roof - Typical AC Duct Penetration - Sectional Detail	November 2020	17217	A



MULTIPLEX
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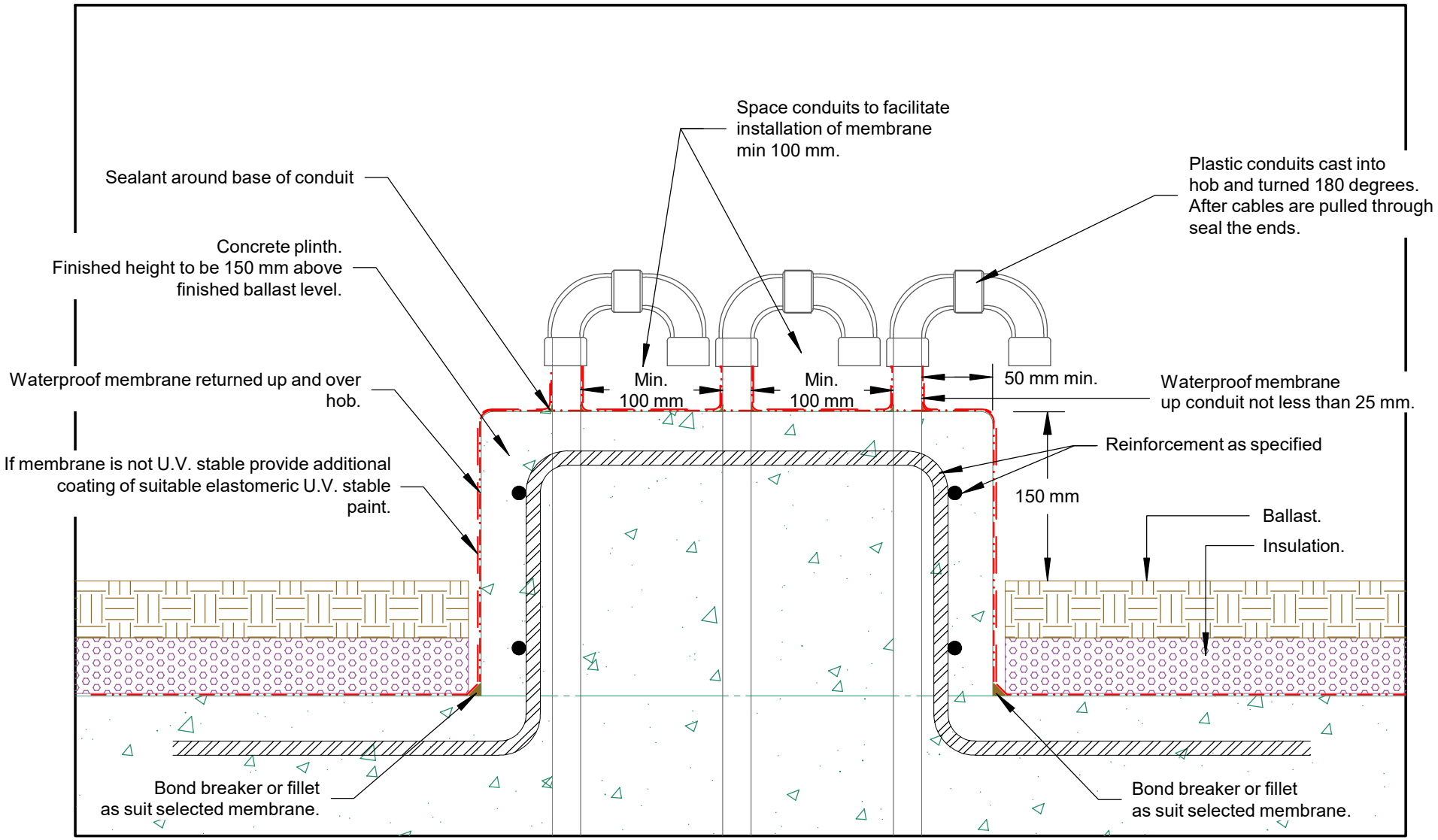
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Flat Roof - Typical Pipe Penetrations	October 2017	17218	B



MULTIPLEX
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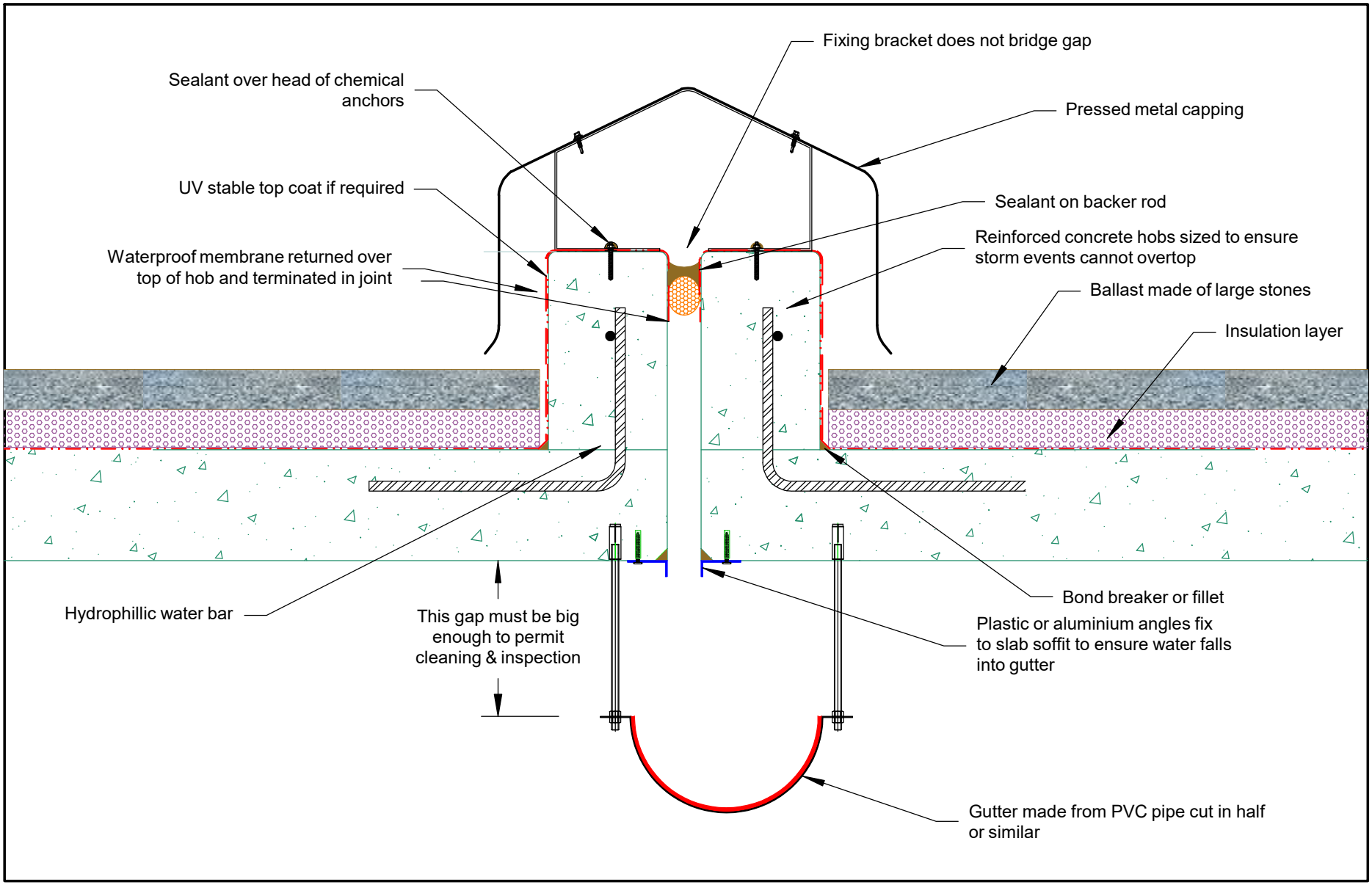
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Flat Roof - Typical Conduit Penetrations	October 2017	17219	C



MULTIPLEX
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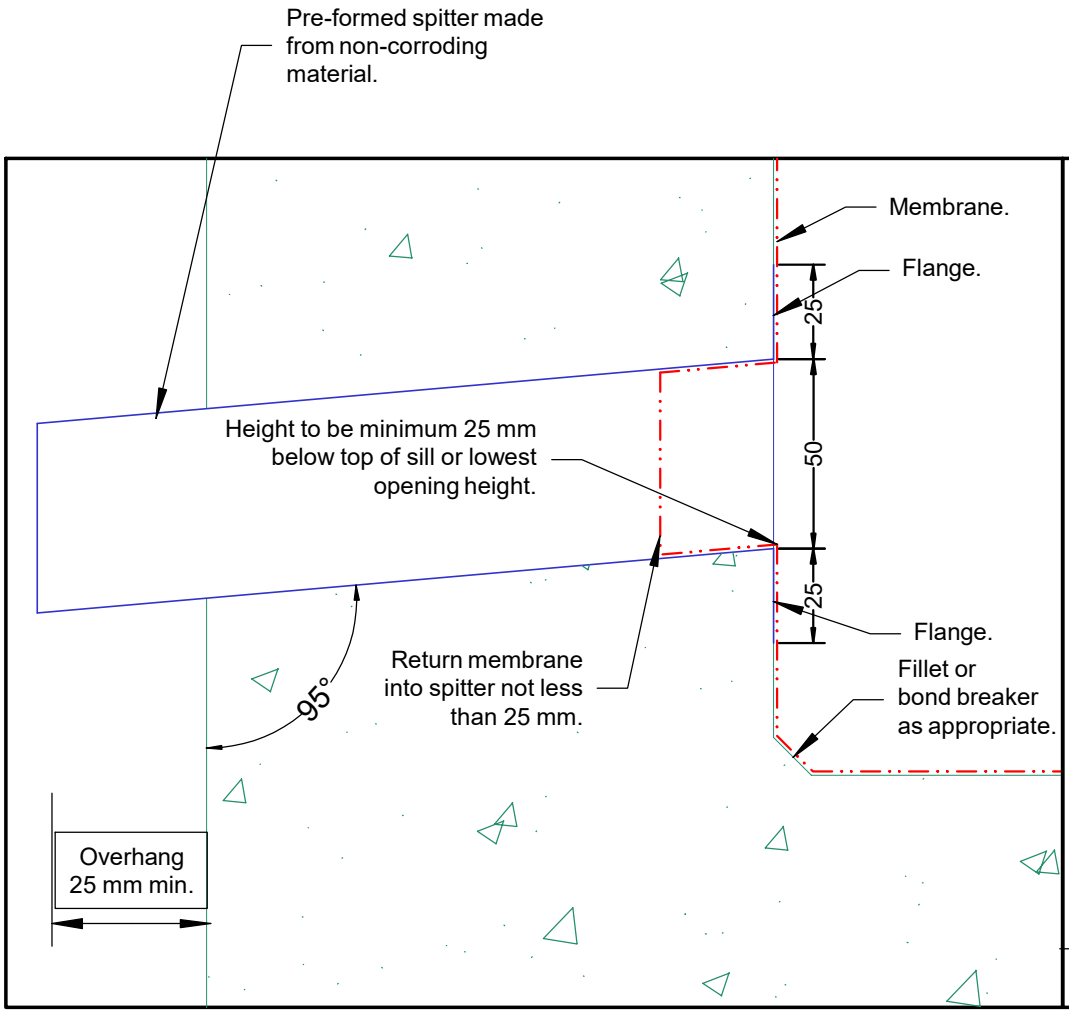
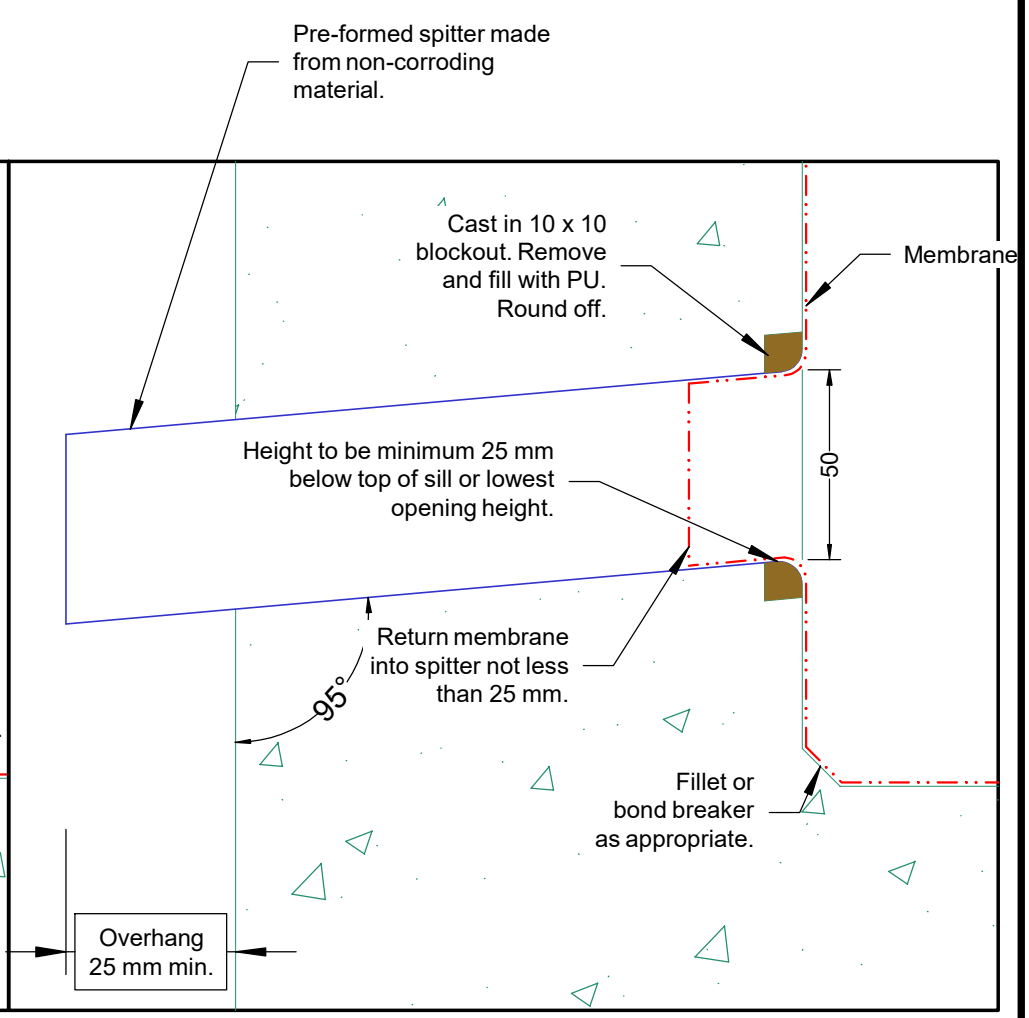
project	title	date	drawing no.	issue
Multiplex Standard Details - Internal Wet Areas	Flat Roof Expansion Joint	December 2019	17220	B



Pre-Formed Flange - Preferred Option.



Membrane Returned Into Spitter.

MULTIPLEX
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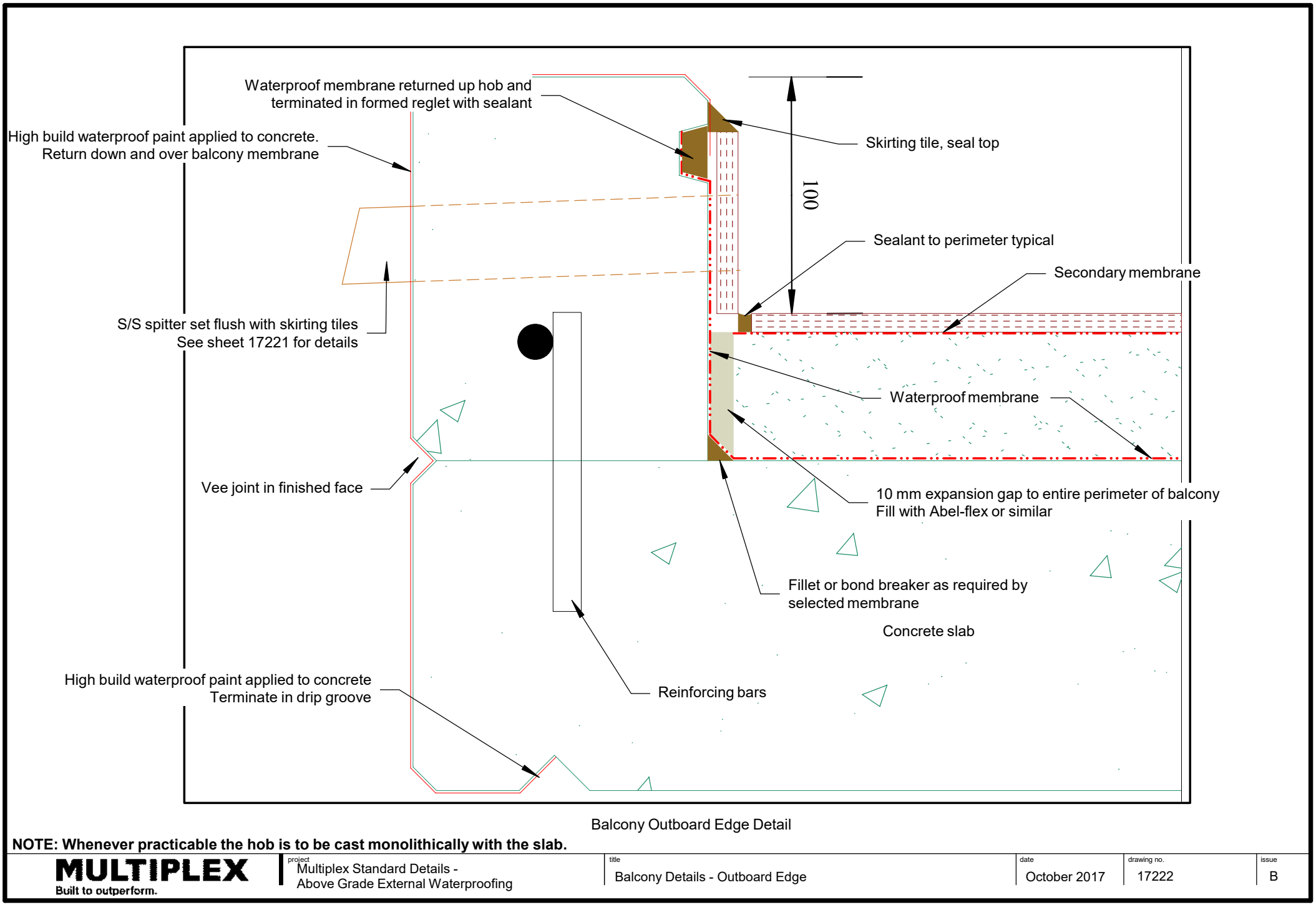
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Spitters and Overflows	October 2017	17221	A



Balcony Outboard Edge Detail

NOTE: Whenever practicable the hob is to be cast monolithically with the slab.

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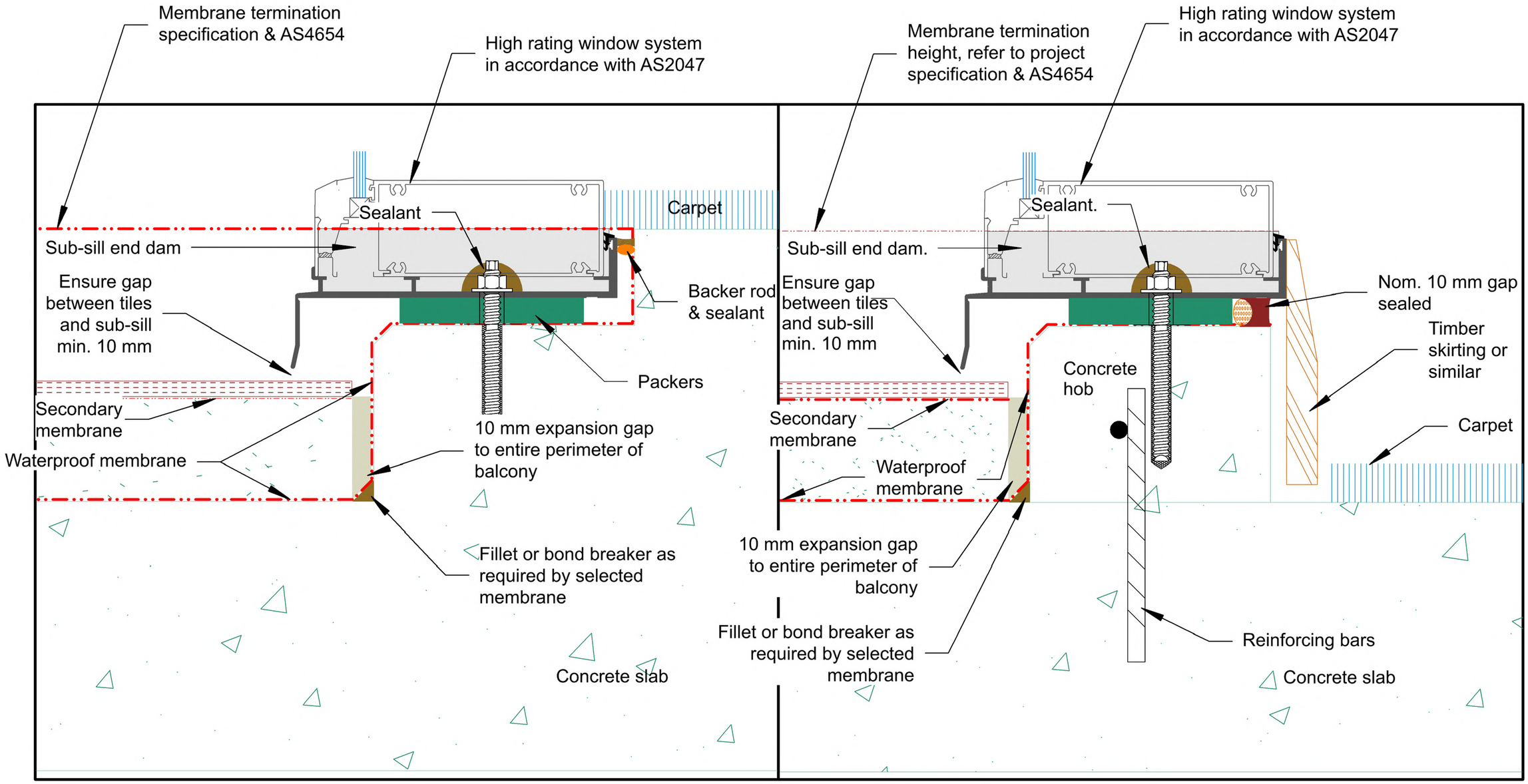
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Balcony Details - Outboard Edge	October 2017	17222	B



Window Sill Detail With Double Set Down - Preferred Option

Window Sill With Hob

MULTIPLEX
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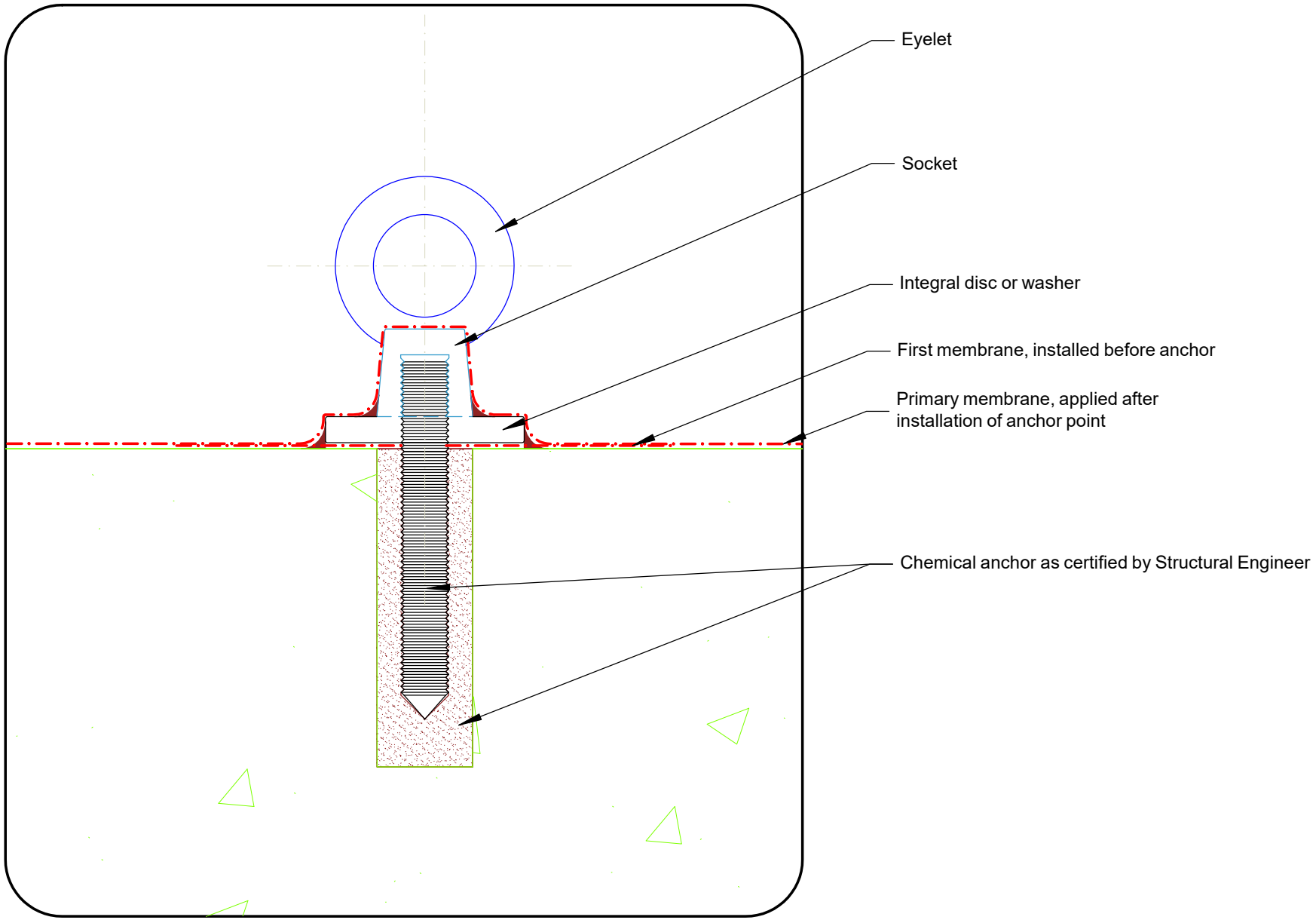
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Balcony Details - Window Sill	October 2017	17223	D



SECTION THROUGH ANCHOR POINT

MULTIPLEX
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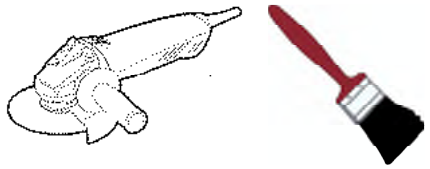
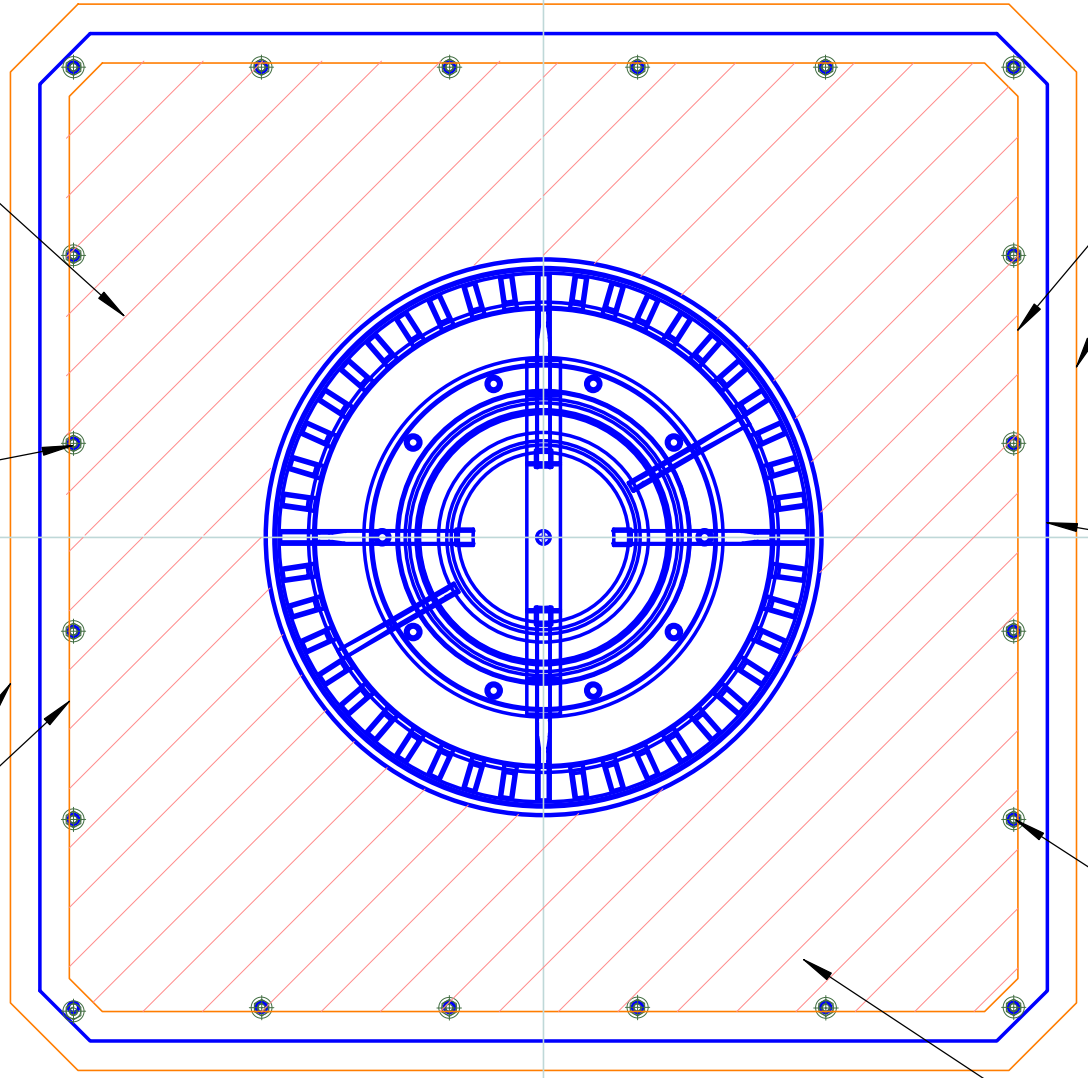
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Flat Roof Typical Anchor Point Detail	October 2017	17225	A

NOTE: Detail shown is an example only. Each project must select the correct components to suit the design requirements.
Waterproof membrane omitted for clarity.
Selected waterproof membrane may require different or greater preparation to ensure adhesion to the contact plate.
Do not use silicone sealant or other silicone containing products on or near the outlets





MULTIPLEX
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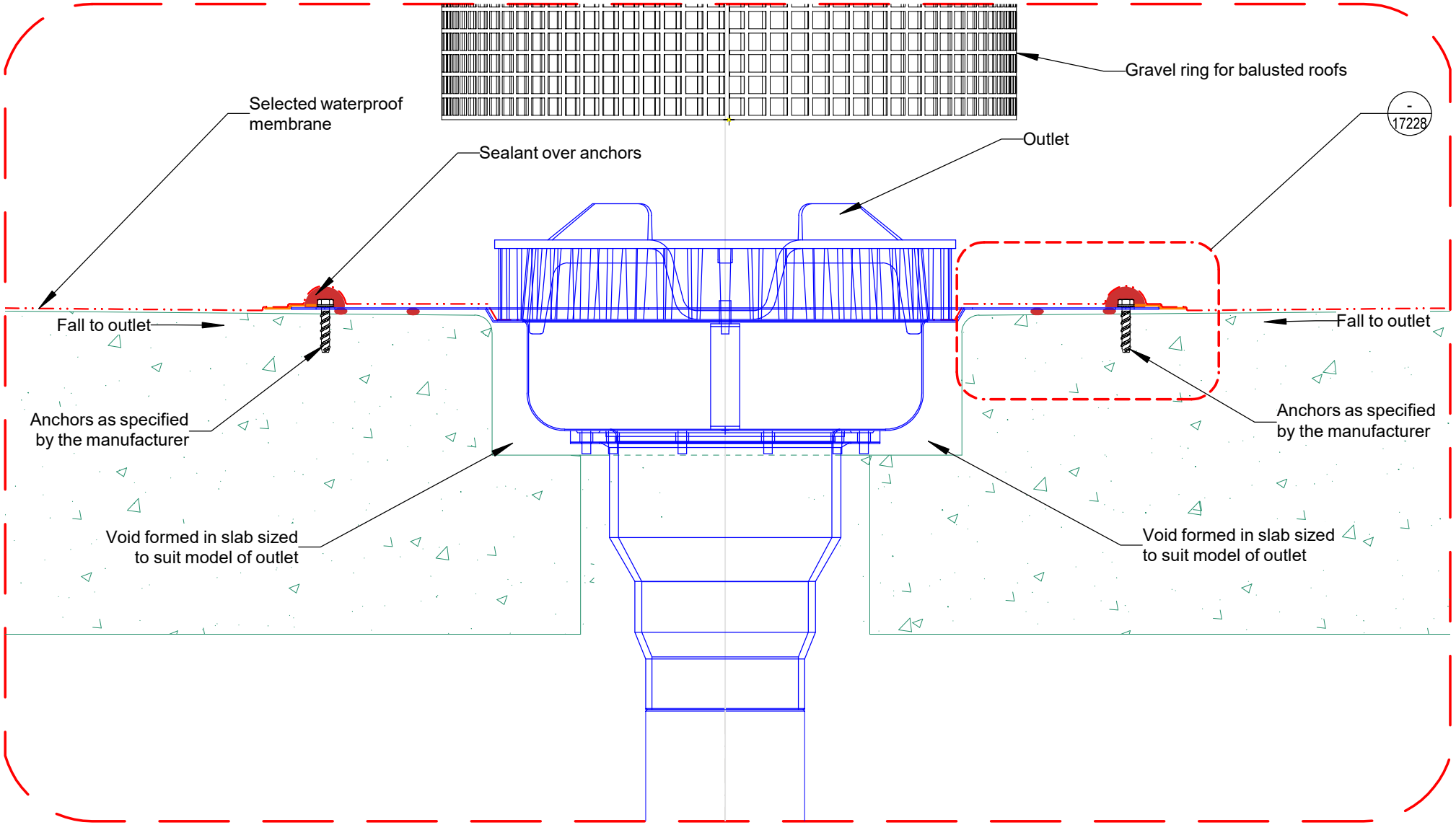
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Siphonic Stormwater Drainage - Geberit Pluvia - Plan	October 2018	17226	B

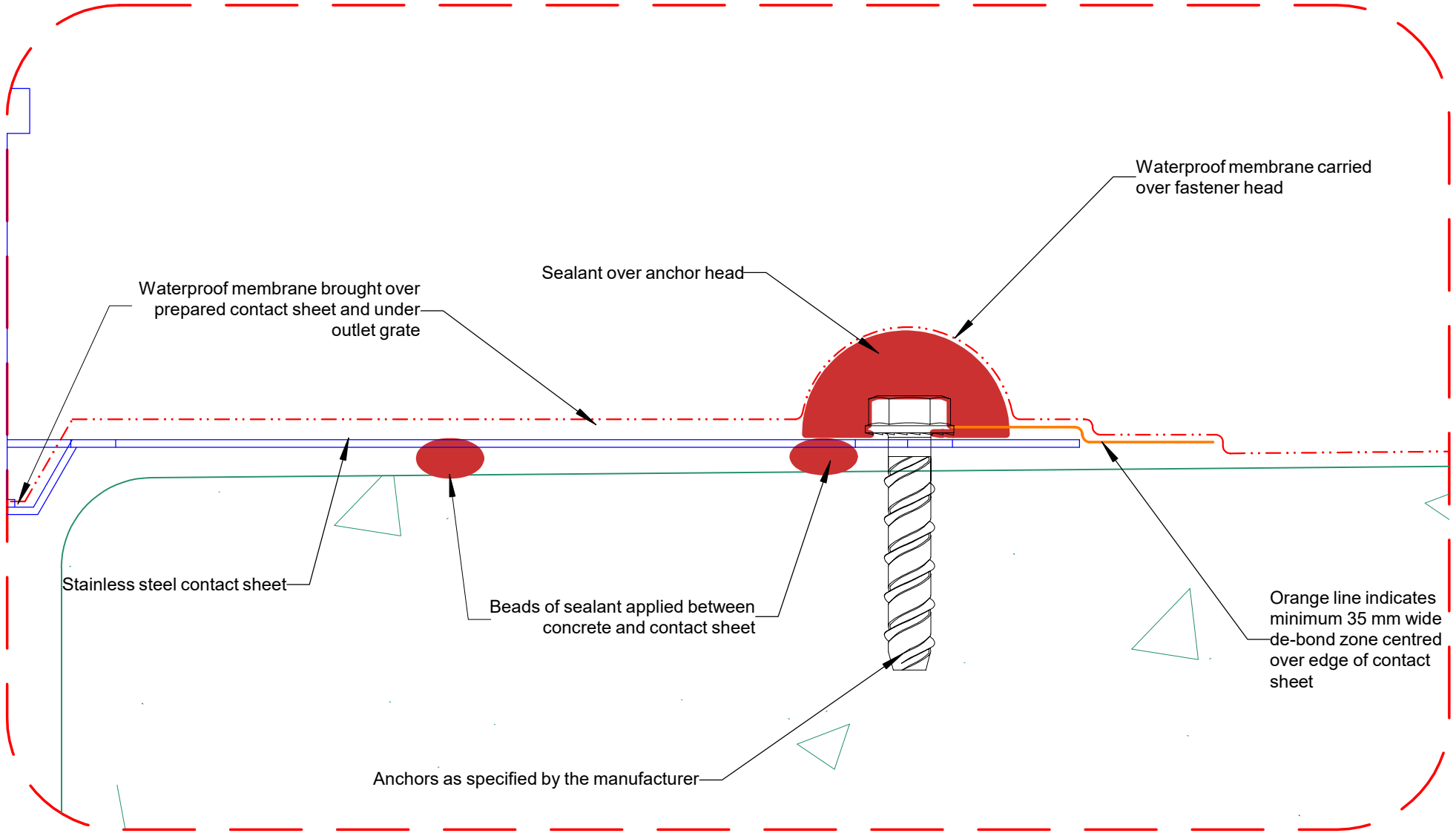
NOTE: Detail shown is an example only. Each project must select the correct components to suit the design requirements.
Selected waterproof membrane may require different or greater preparation to ensure adhesion to the contact plate.
Do not use silicone sealant or other silicone containing products on or near the outlets



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Siphonic Stormwater Drainage - Geberit Pluvia - Section Surface Fixed	October 2018	17227	A

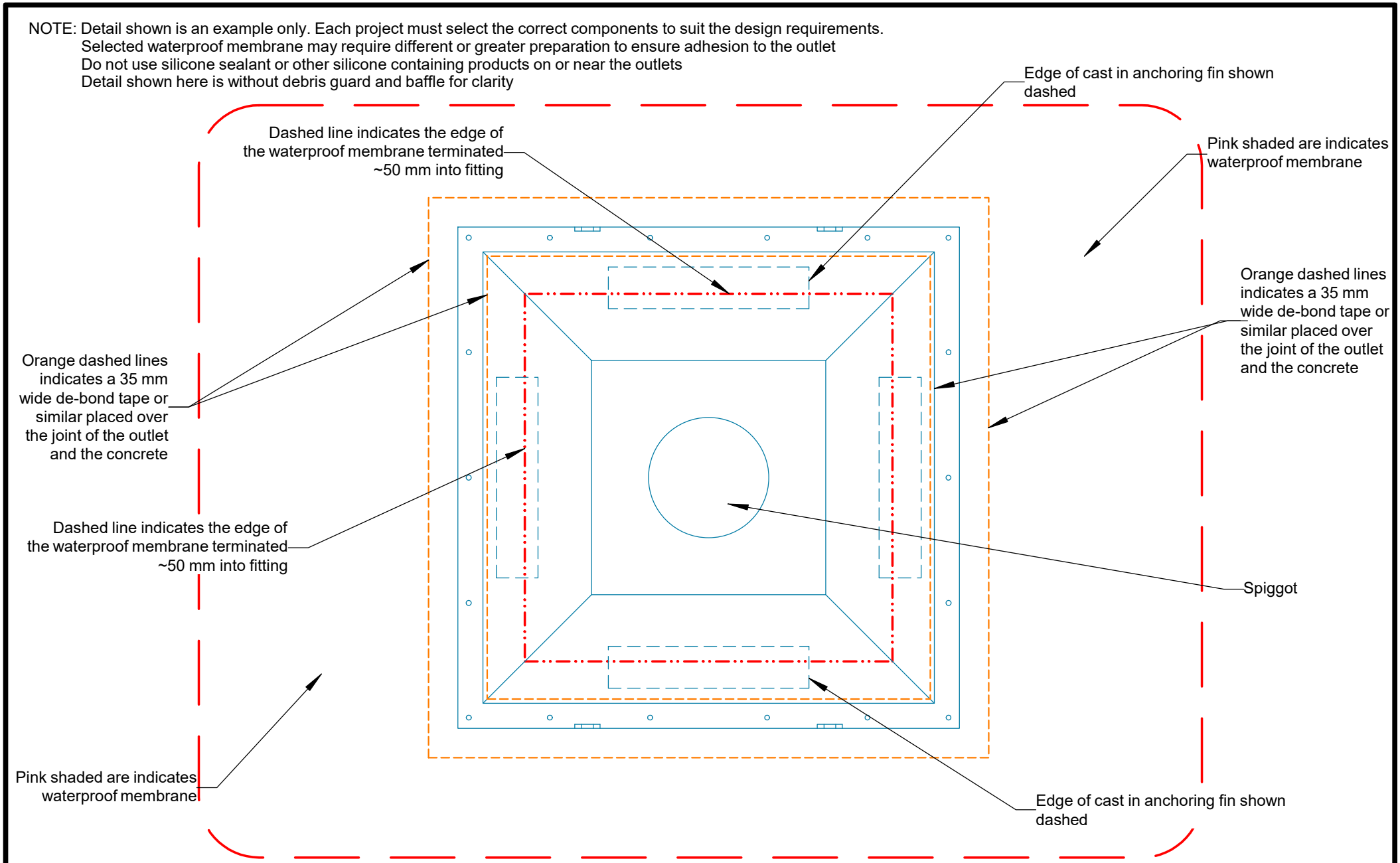
NOTE: Detail shown is an example only. Each project must select the correct components to suit the design requirements.
Selected waterproof membrane may require different or greater preparation to ensure adhesion to the contact plate.
Do not use silicone sealant or other silicone containing products on or near the outlets



MULTIPLEX
Built to outperform.

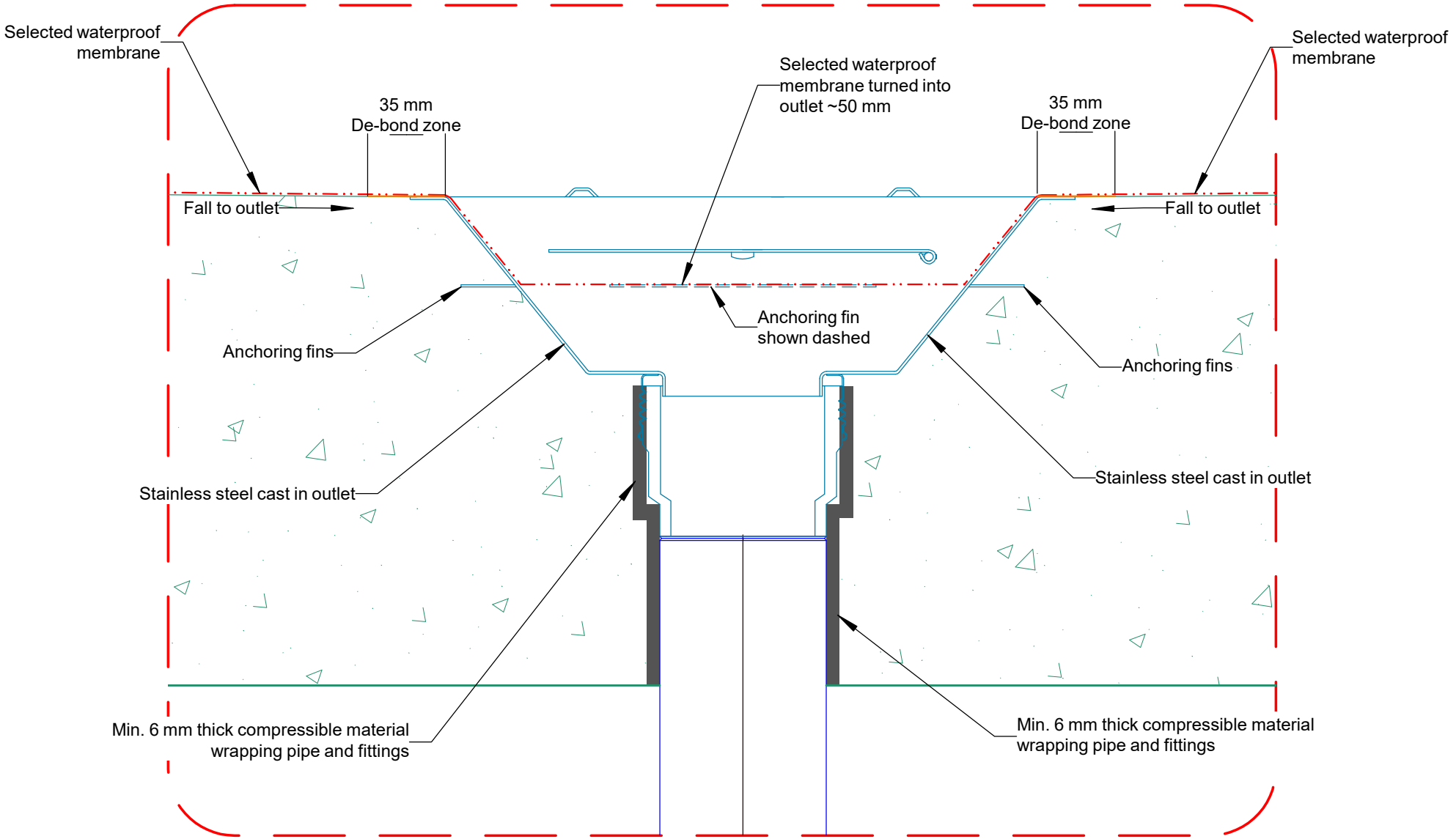
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Siphonic Stormwater Drainage - Geberit Pluvia - Enlarged Edge Detail - Surface Fixed	October 2018	17228	A

NOTE: Detail shown is an example only. Each project must select the correct components to suit the design requirements.
Selected waterproof membrane may require different or greater preparation to ensure adhesion to the outlet
Do not use silicone sealant or other silicone containing products on or near the outlets
Detail shown here is without debris guard and baffle for clarity



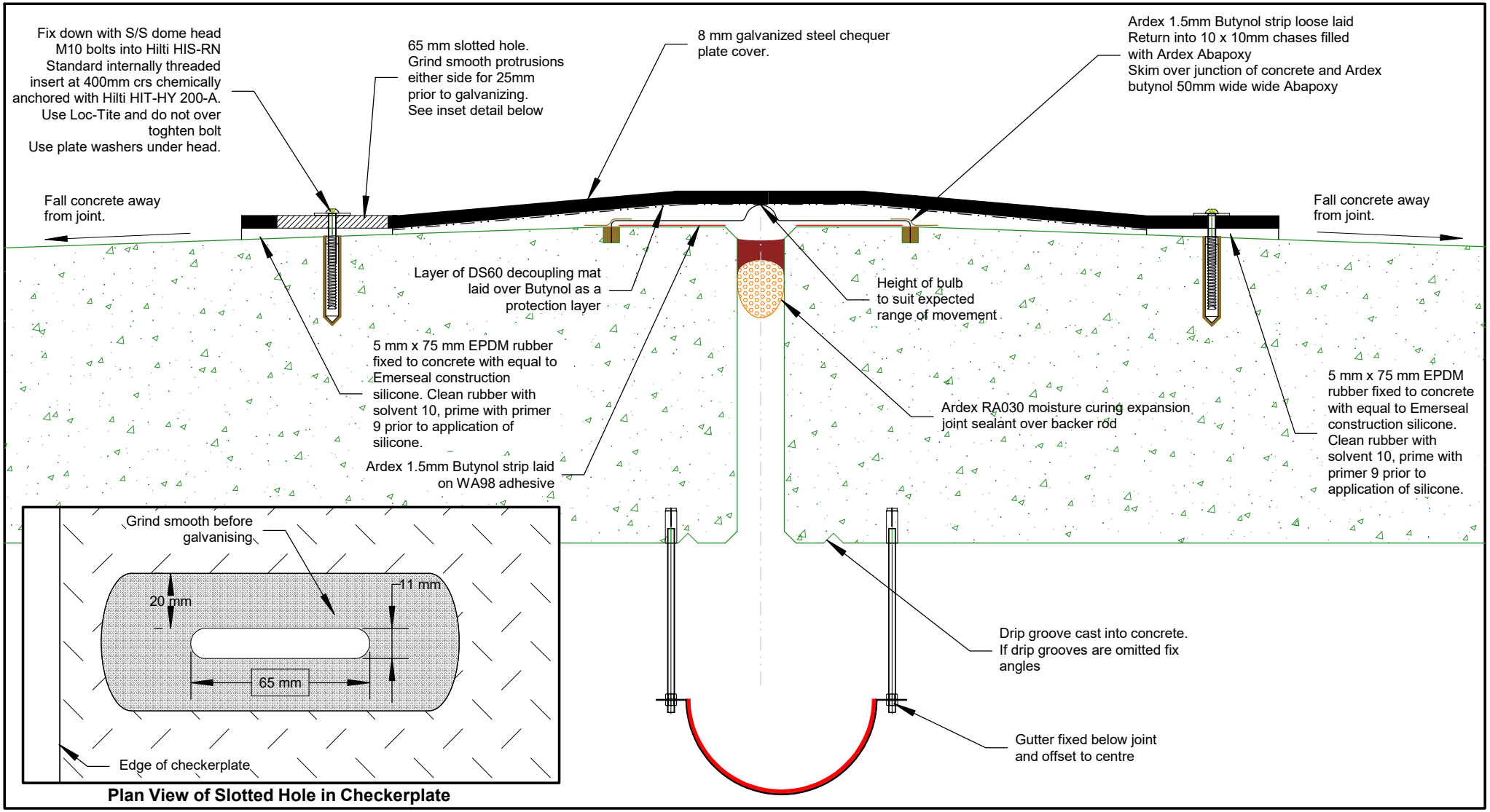
MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Above Grade External Waterproofing	title: Siphonic Drainage - Syphon Systems - Cast In - Plan	date: October 2018	drawing no.: 17229	issue: A

NOTE: Detail shown is an example only. Each project must select the correct components to suit the design requirements.
Selected waterproof membrane may require different or greater preparation to ensure adhesion to the outlet
Do not use silicone sealant or other silicone containing products on or near the outlets
Detail shown here is without debris guard and baffle for clarity



MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Above Grade External Waterproofing	title: Siphonic Drainage - Syphon Systems - Cast In - Section	date: October 2018	drawing no.: 17230	issue: A

NOTE:
1. Offset gutter to joint centre to ensure water drips onto pipe wall to prevent splashing.
2. Cast in drip grooves to slab soffit both sides of joint.
3. Concrete must be of high quality and crack free.
4. Ramp concrete up each side of joint
5. Structural Engineer to confirm all details..



Plan View of Slotted Hole in Checkerplate

MULTIPLEX
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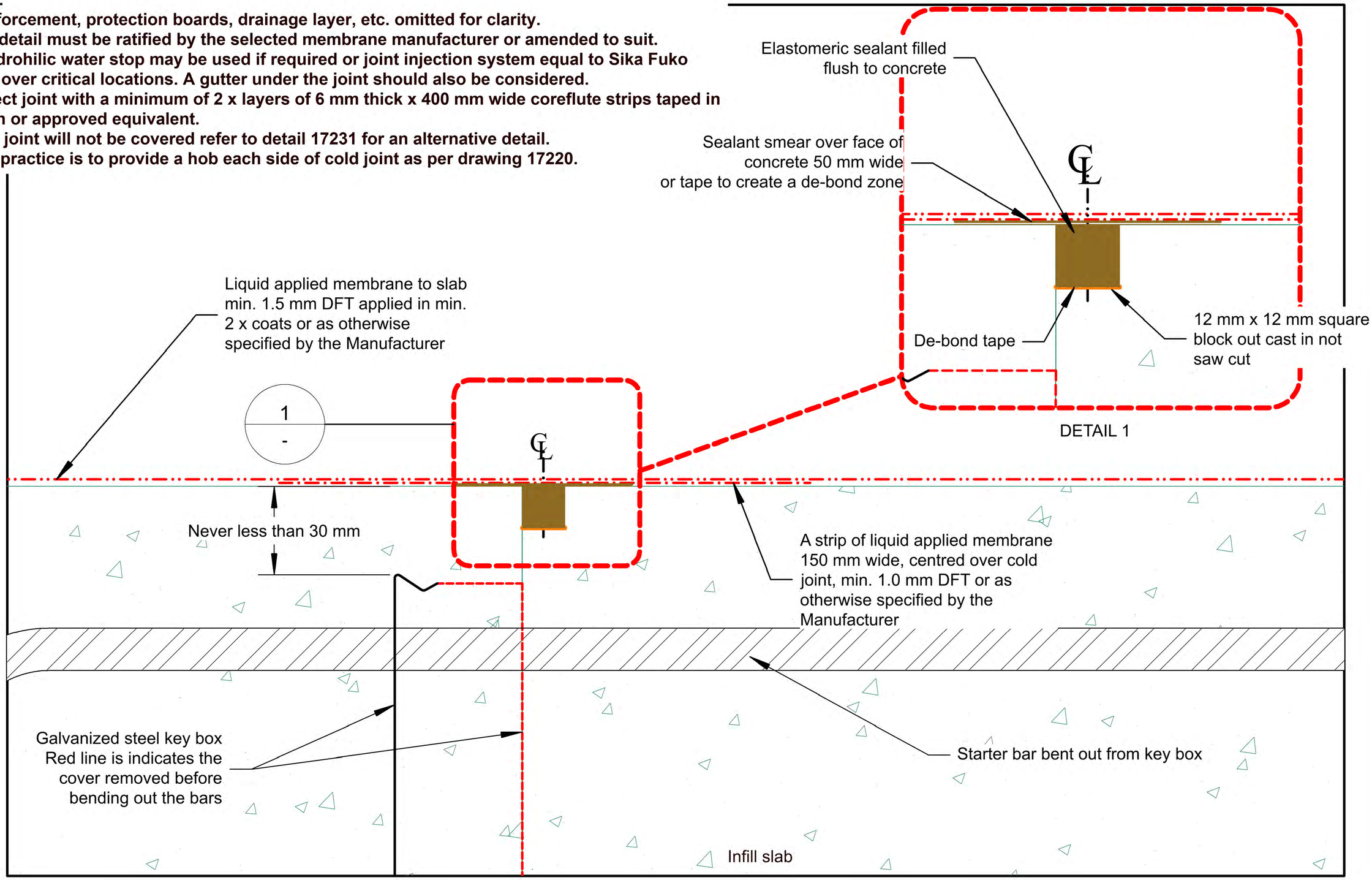
project	title	date	drawing no.	issue
Multiplex Standard Details - Above Grade External Waterproofing	Movement Joints - Permanent, Using Ardex Butynol Strip	October 2017	17231	B

NOTES:

1. Reinforcement, protection boards, drainage layer, etc. omitted for clarity.
2. This detail must be ratified by the selected membrane manufacturer or amended to suit.
3. A hydrohilic water stop may be used if required or joint injection system equal to Sika Fuko for use over critical locations. A gutter under the joint should also be considered.
4. Protect joint with a minimum of 2 x layers of 6 mm thick x 400 mm wide coreflute strips taped in position or approved equivalent.
5. If the joint will not be covered refer to detail 17231 for an alternative detail.
6. Best practice is to provide a hob each side of cold joint as per drawing 17220.



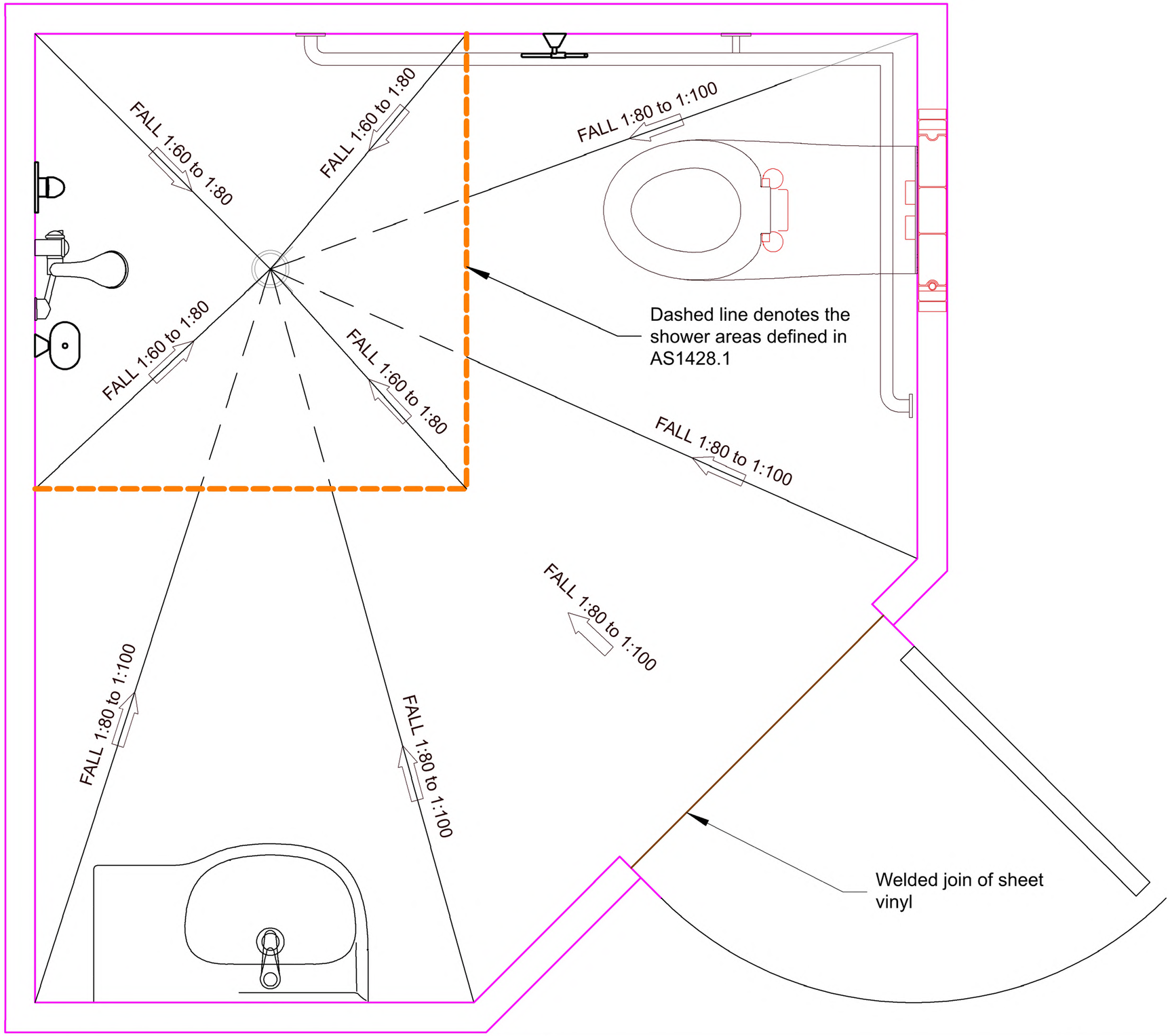
MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Above Grade External Waterproofing	title: Roof or Terrace - Crane/Hoist Penetration - Details	date: November 2020	drawing no.: 17236	issue: A

1.12 Appendix 3 - MPX Standard Details - Hospital and Aged Care Internal Waterproofing

NOTES: -

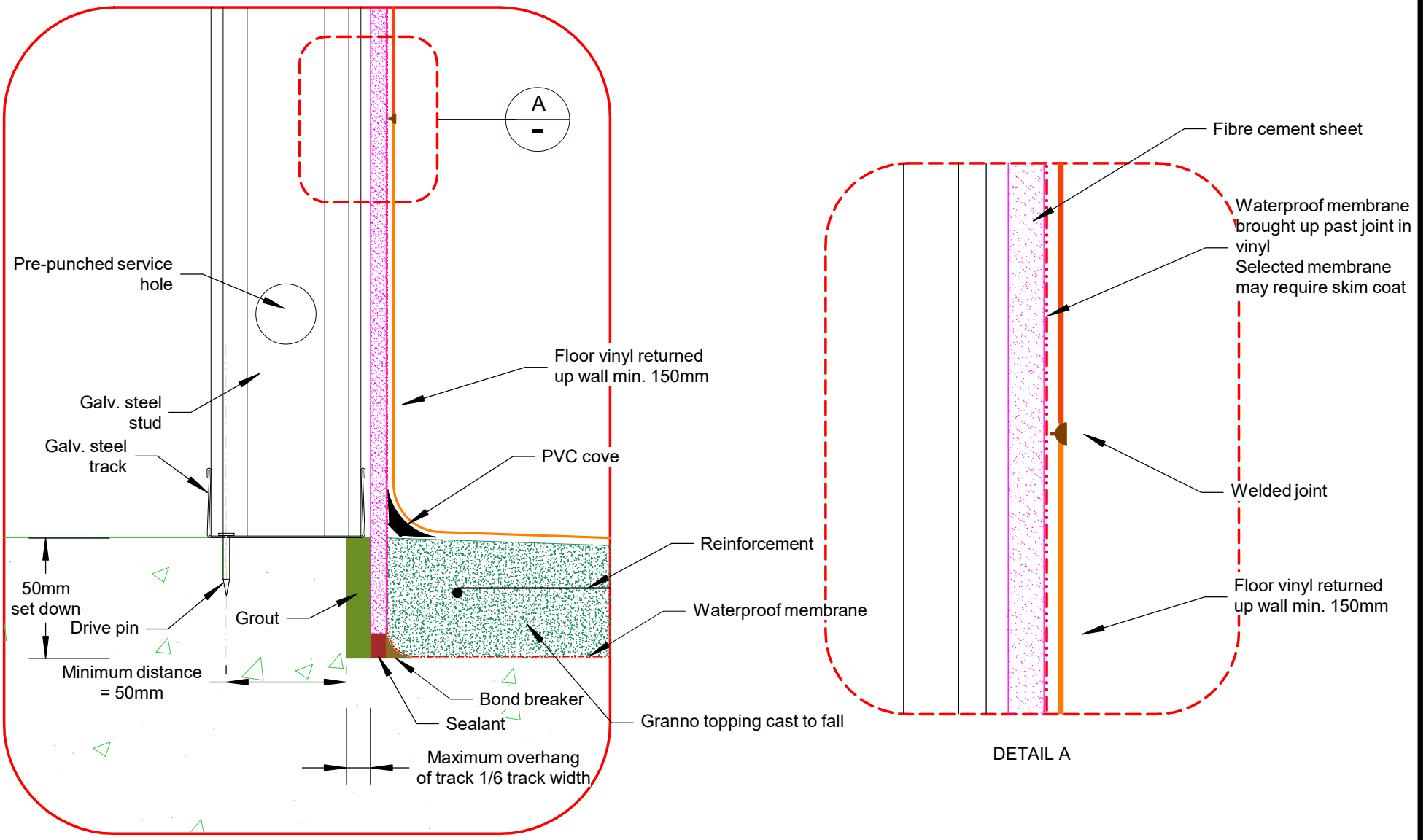
1. Details provided are based upon a Caroma Maxton bath. Installation of alternative makes & models of bath must consider that manufacturer's installation recommendations and modify these details to suit.
2. Any framing details shown are general in nature and provided for information only. The framing design must be provided by a Structural Engineer.
3. Dimension provided are nominal.
4. Some details may be shown exaggerated or exploded to provide clarity.
5. The nomination in a detail of a particular product or system is not intended as an endorsement for that product, system or manufacturer and shall not be interpreted as the only products or system that may be suitable for that situation.
6. Only tested systems and materials may be used.
7. Vinyl sheet details are based upon the Armstrong DtS system as per BRANZ Appraisal 1013 [2018].

DRAWING INDEX:



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing	Typical Ensuite Plan	August 2019	17301	D



MULTIPLEX
Built to outperform.

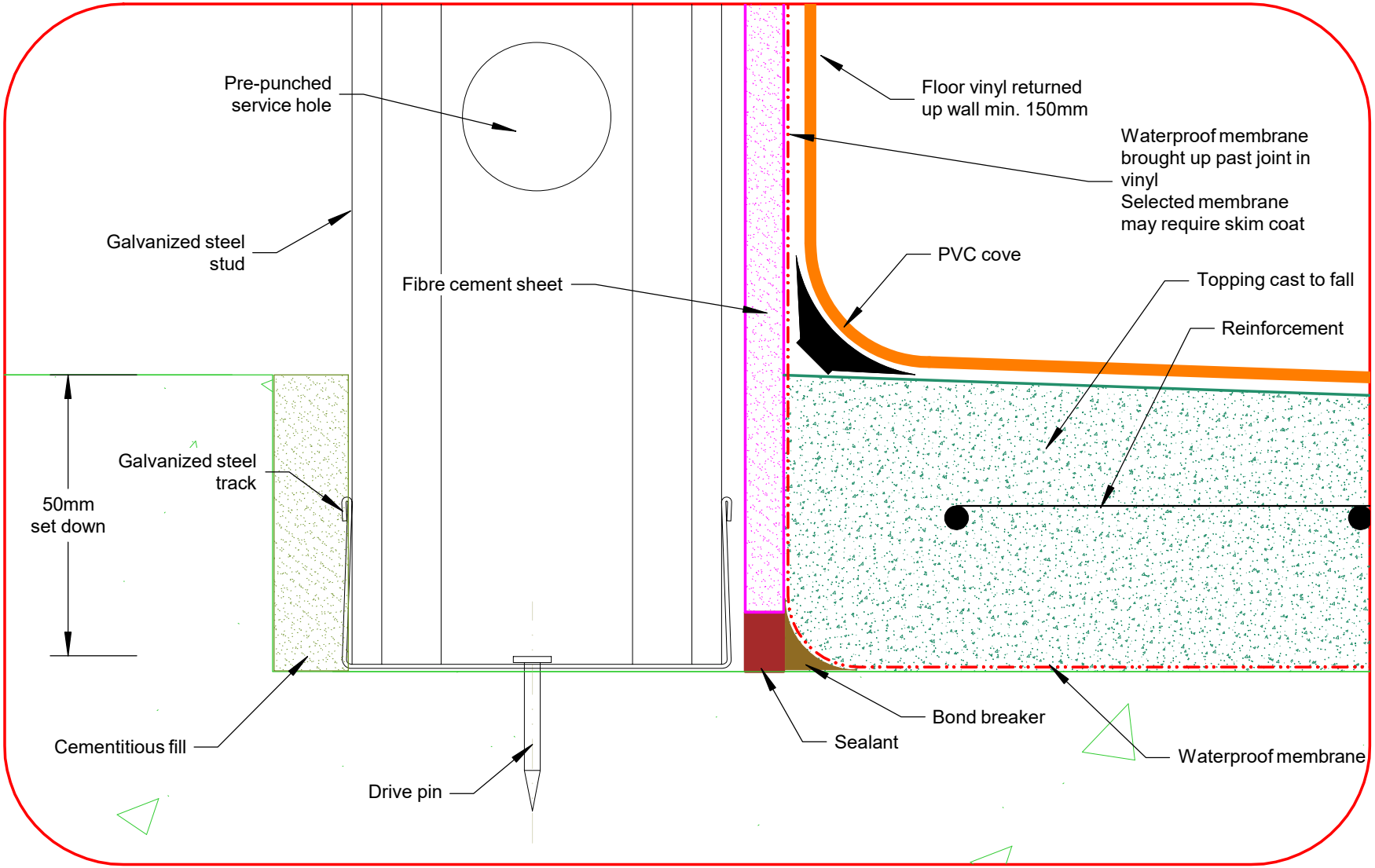
project: Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing

title: Sheet Vinyl Details - Welded Wall Joint

date: October 2017

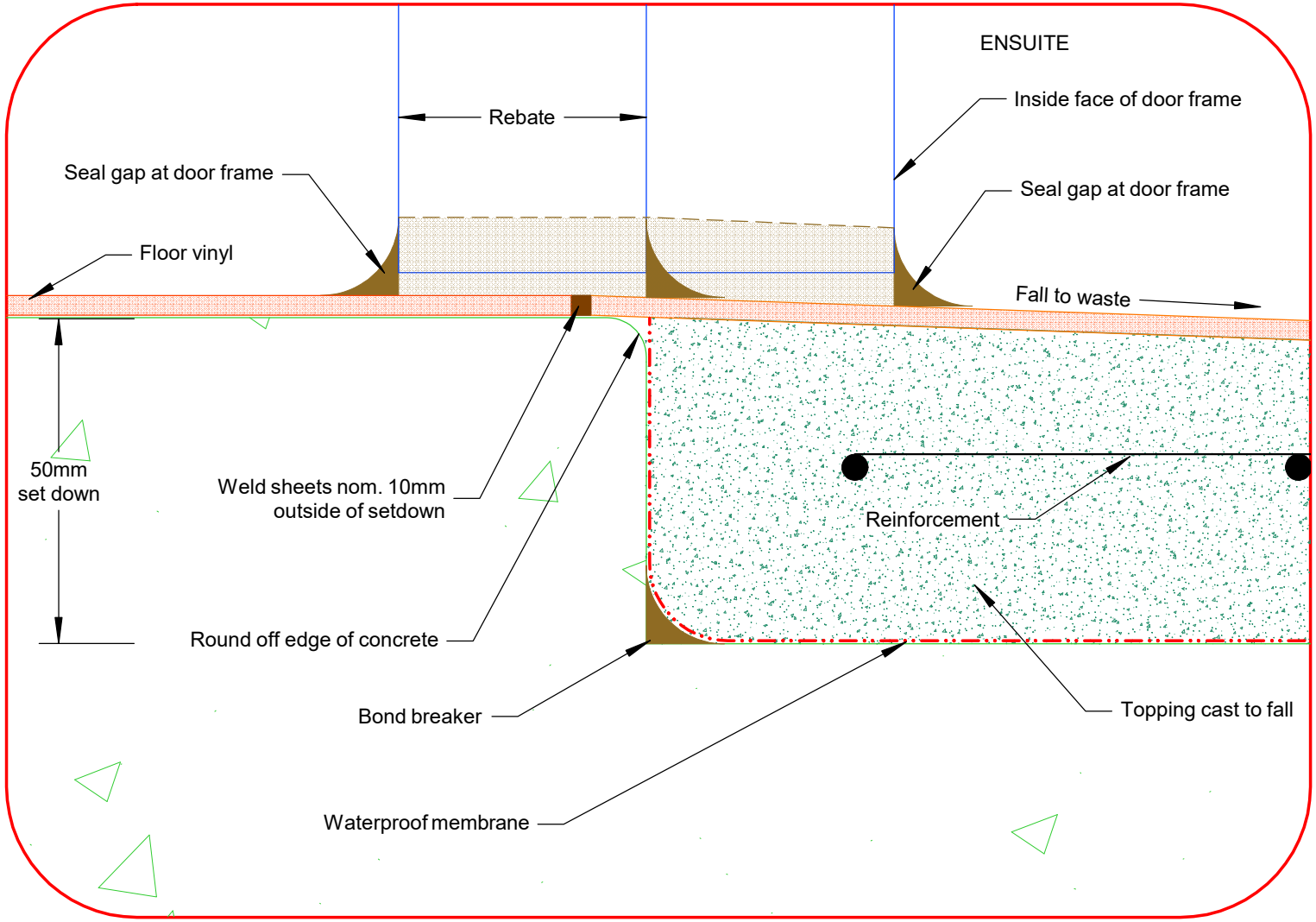
drawing no.: 17302

issue: D



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing	Sheet Vinyl Details - Oversized Set Down	August 2019	17303	C



MULTIPLEX
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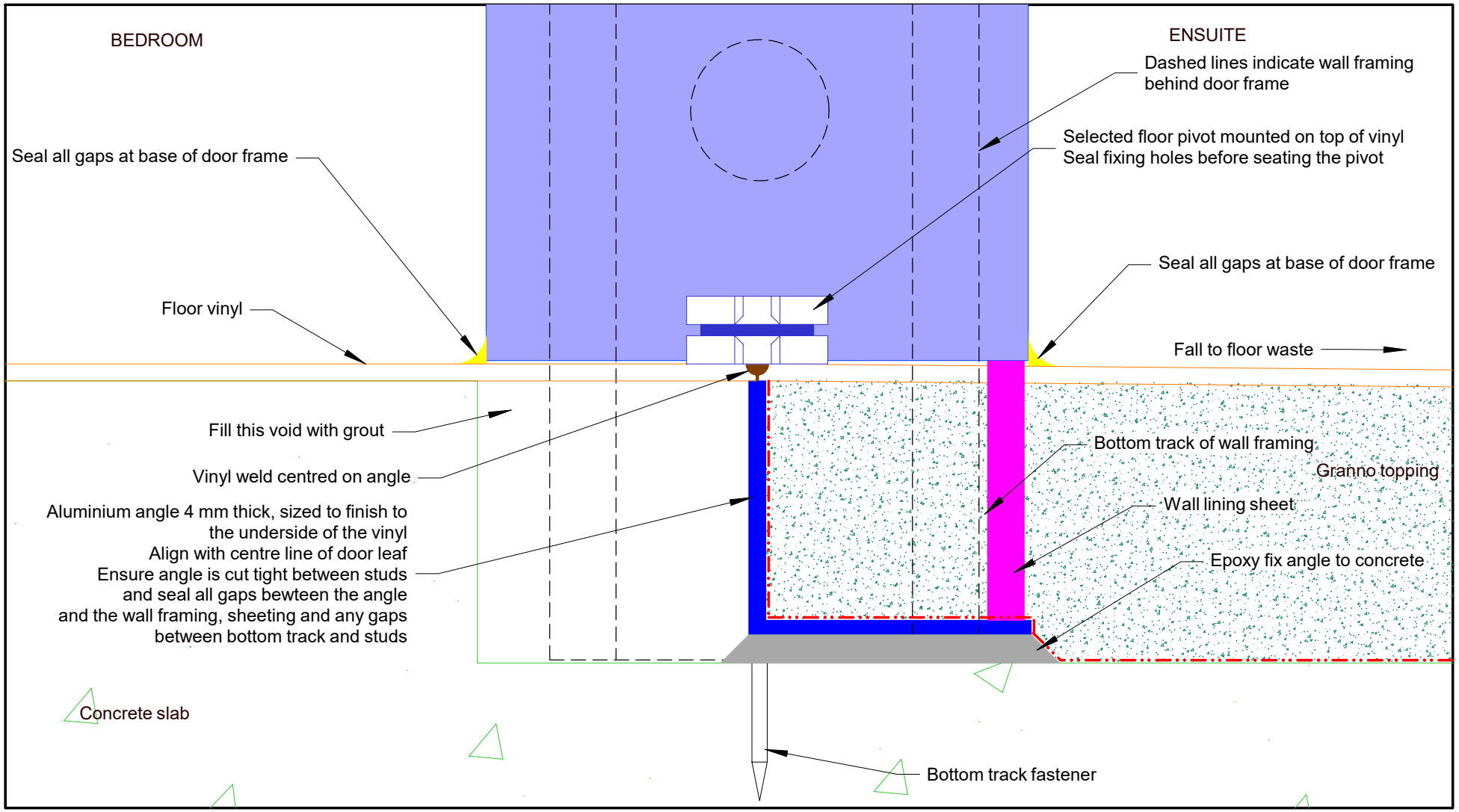
project
Multiplex Standard Details -
Hospital & Aged Care Internal Waterproofing

title
Sheet Vinyl Details - Section Through Door Opening
Slab With Setdown

date
October 2017

drawing no.
17304

issue
C



MULTIPLEX
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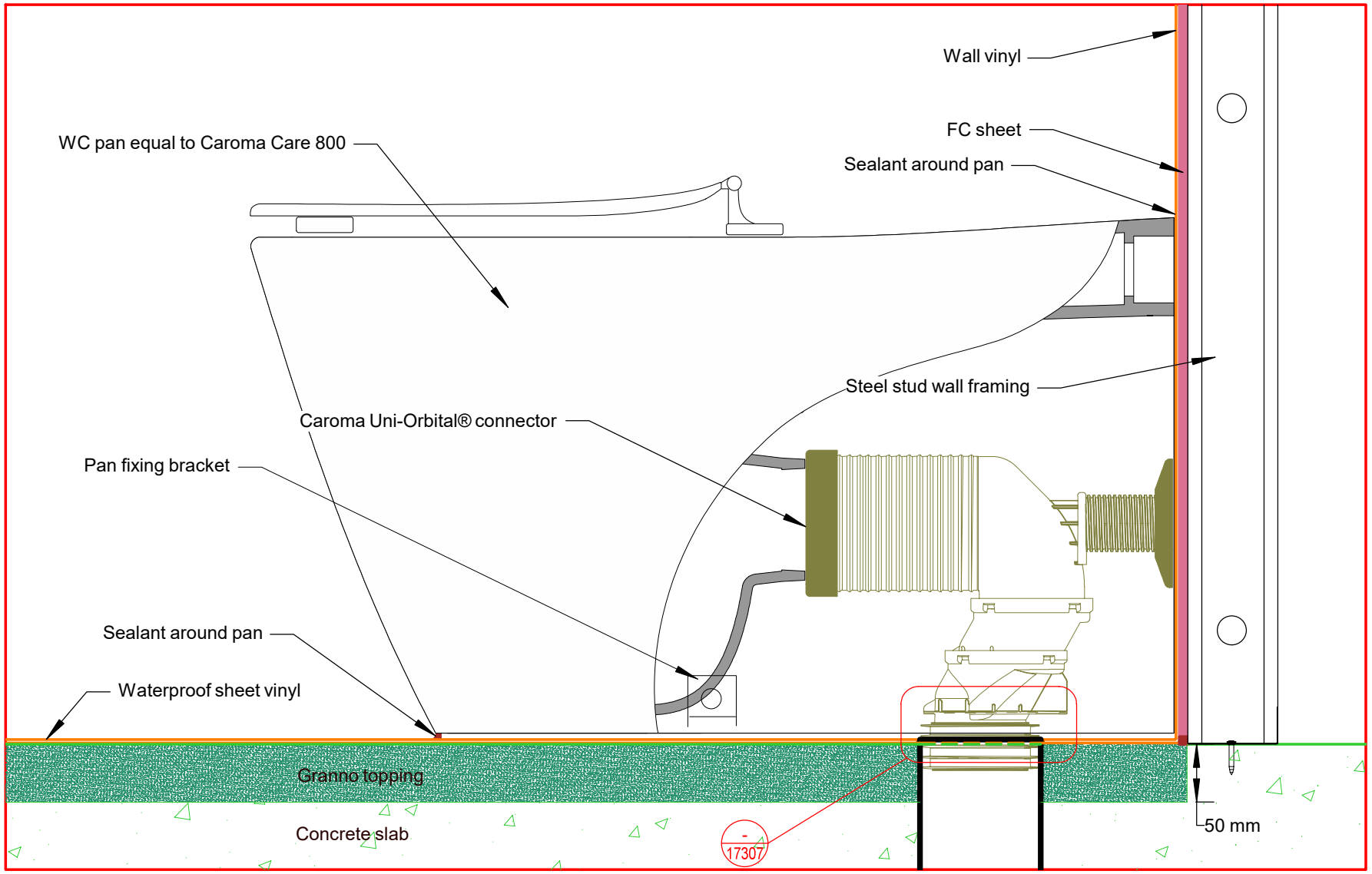
project: Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing

title: Sheet Vinyl Details - Section Through Door Opening Slab With Oversize Set Down

date	drawing no.	issue
October 2018	17305	A



MULTIPLEX
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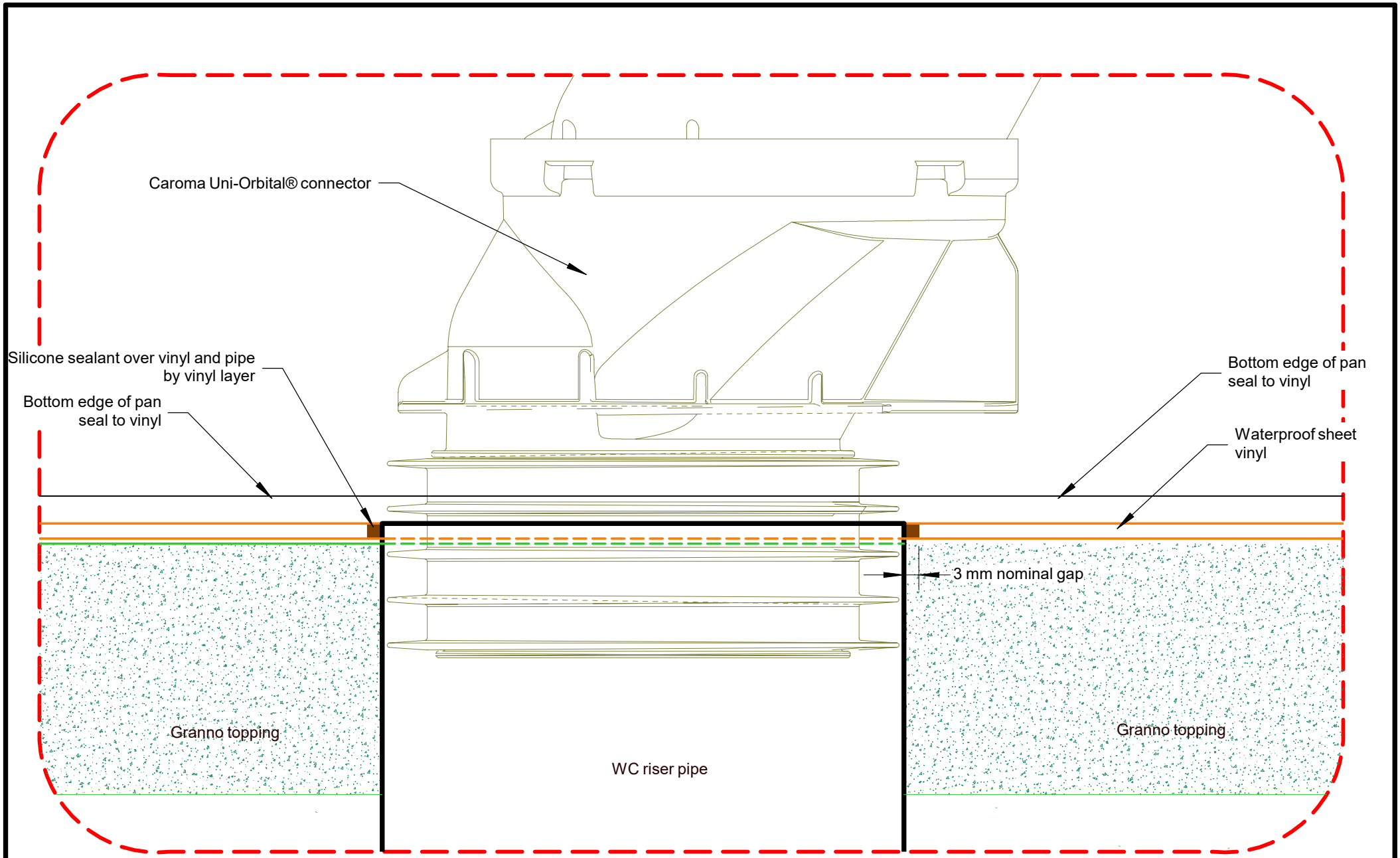
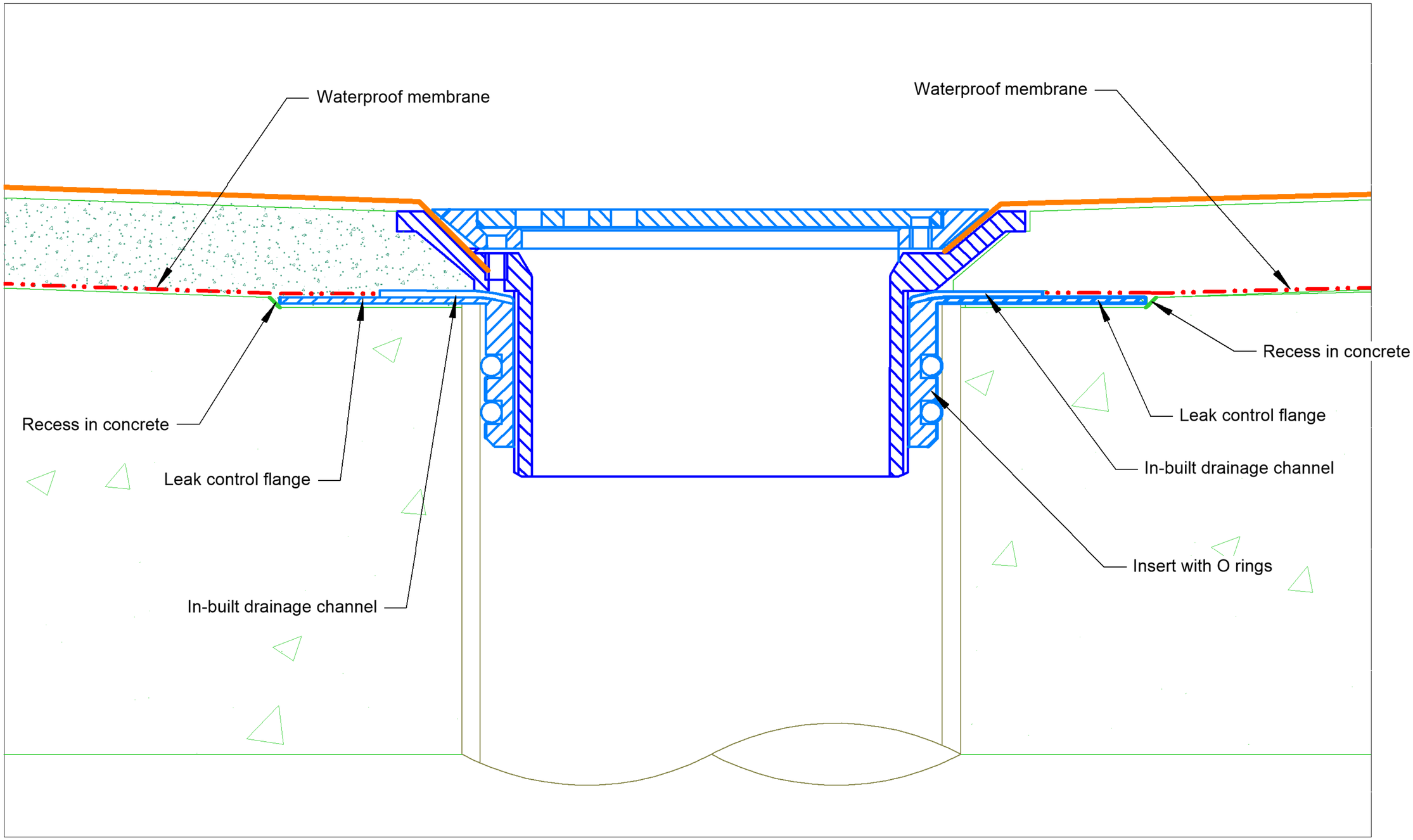
project	title	date	drawing no.	issue
Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing	Sheet Vinyl Details - Side View of WC Pan	August 2018	17306	A



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing	Sheet Vinyl Details - Detail From Drawing 17306	August 2018	17307	A



MULTIPLEX
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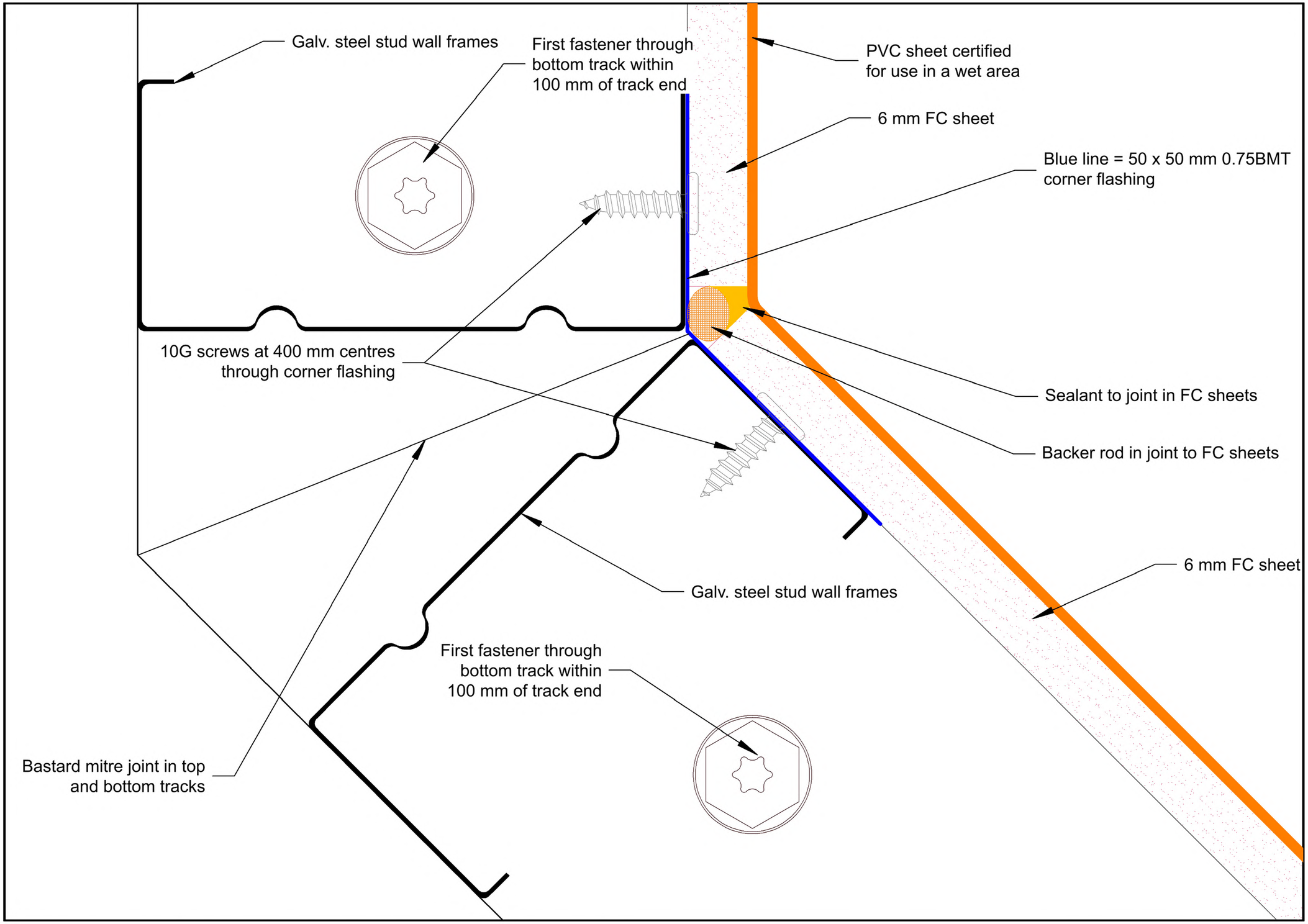
project	title	date	drawing no.	issue
Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing	Sheet Vinyl Details - Section Through S.P.S. Floor Waste With Integral Leak Control Flange	January 2020	17308	A



MULTIPLEX
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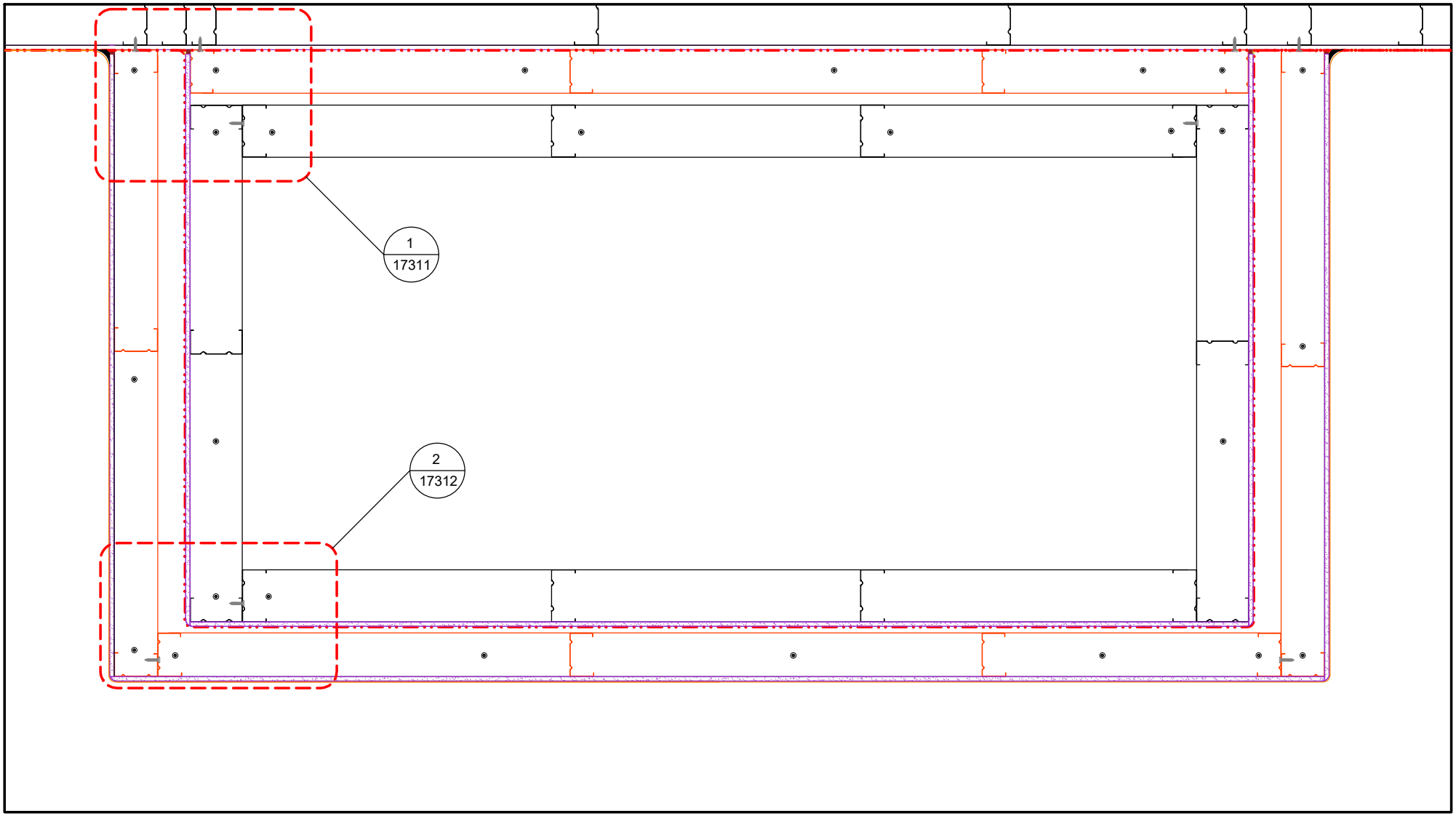
project	title	date	drawing no.	issue
Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing	Sheet Vinyl Details - Section Through 135° Corner	November 2020	17309	A



MULTIPLEX
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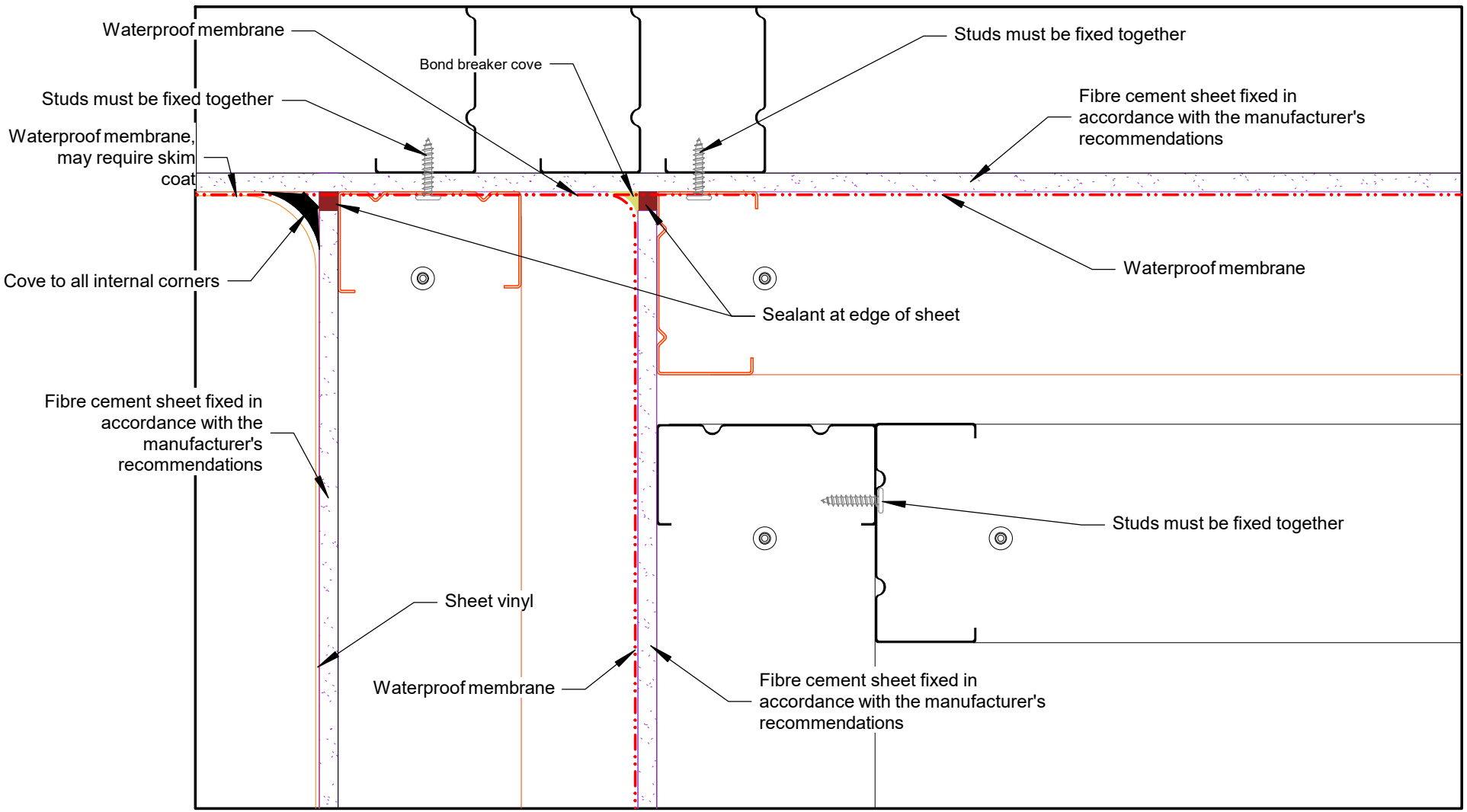
project
Multiplex Standard Details -
Hospital & Aged Care Internal Waterproofing

title
Sheet Vinyl Details - Bath Tub Installation
Framing Plan

date	drawing no.	issue
October 2017	17310	B



MULTIPLEX
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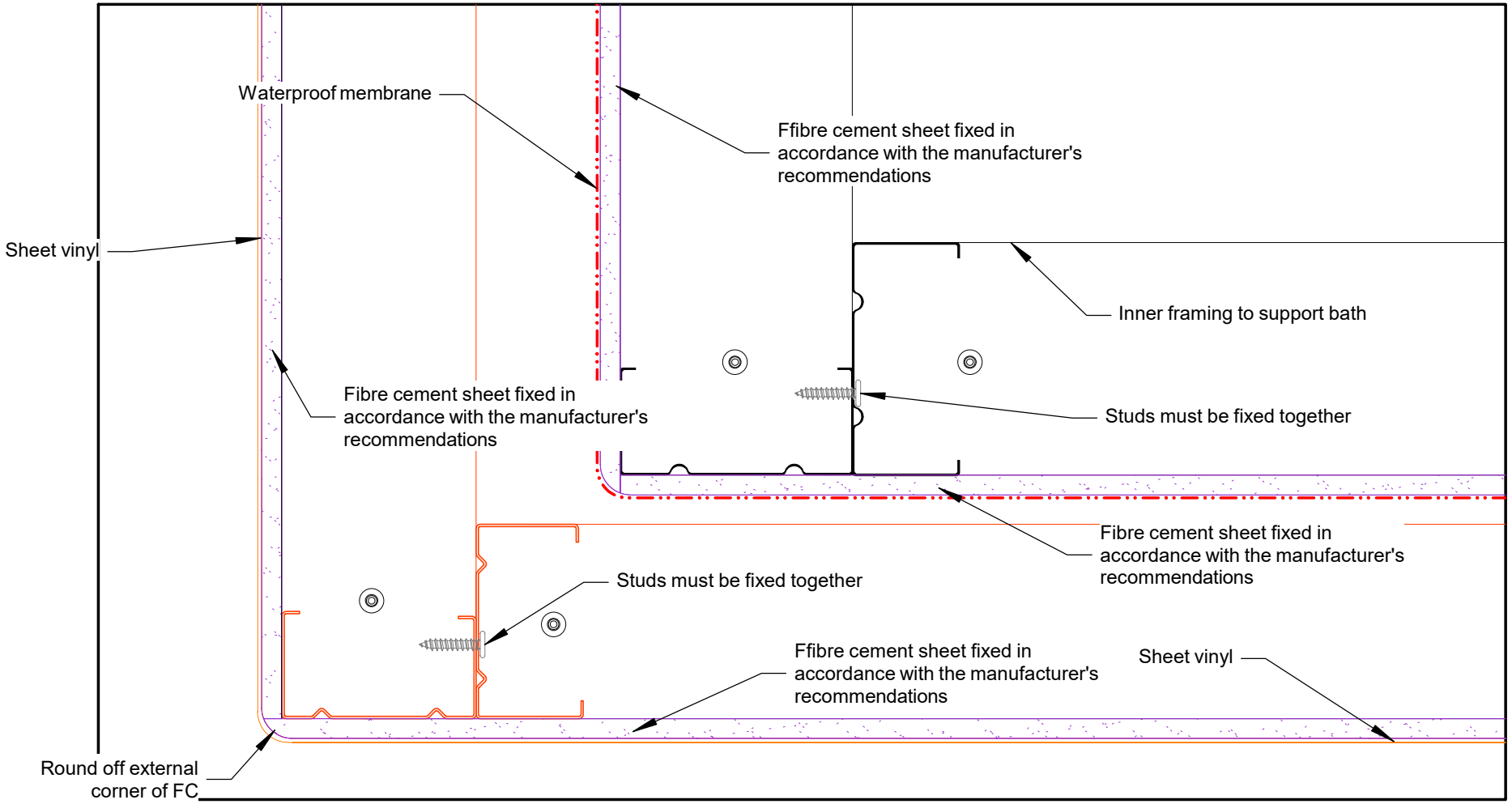
project: Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing

title: Sheet Vinyl Details - Bath Tub Installation Detail 1 from 17310

date	drawing no.	issue
October 2017	17311	B



MULTIPLEX
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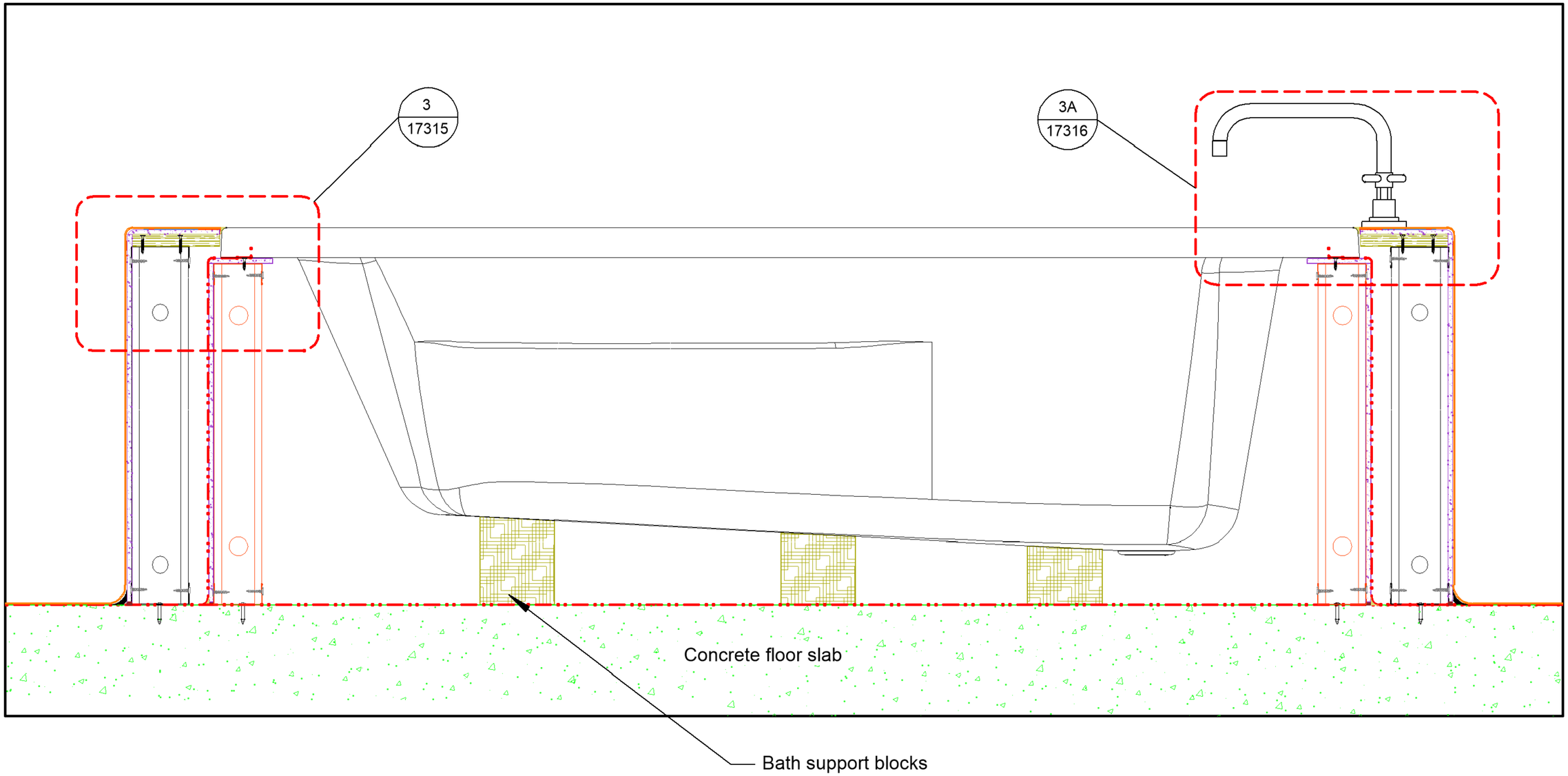
project: Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing

title: Sheet Vinyl Details - Bath Tub Installation Detail 2 from 17310

date	drawing no.	issue
October 2017	17312	B

NOTES: -

1. Details provided are based upon a Caroma Maxton bath. Installation of alternative makes & models of bath must consider that manufacturer's installation recommendations and modify these details to suit.
2. Any framing details shown are general in nature and provided for information only. The framing design must be provided by a Structural Engineer.
3. Dimension provided are nominal.
4. Some details may be shown exaggerated or exploded to provide clarity.
5. The nomination in a detail of a particular product or system is not intended as an endorsement for that product, system or manufacturer and shall not be interpreted as the only products or system that may be suitable for that situation.
6. Only tested systems and materials may be used.
7. Vinyl sheet details are based upon the Armstrong DtS system as per BRANZ Appraisal 1013 [2018].



MULTIPLEX
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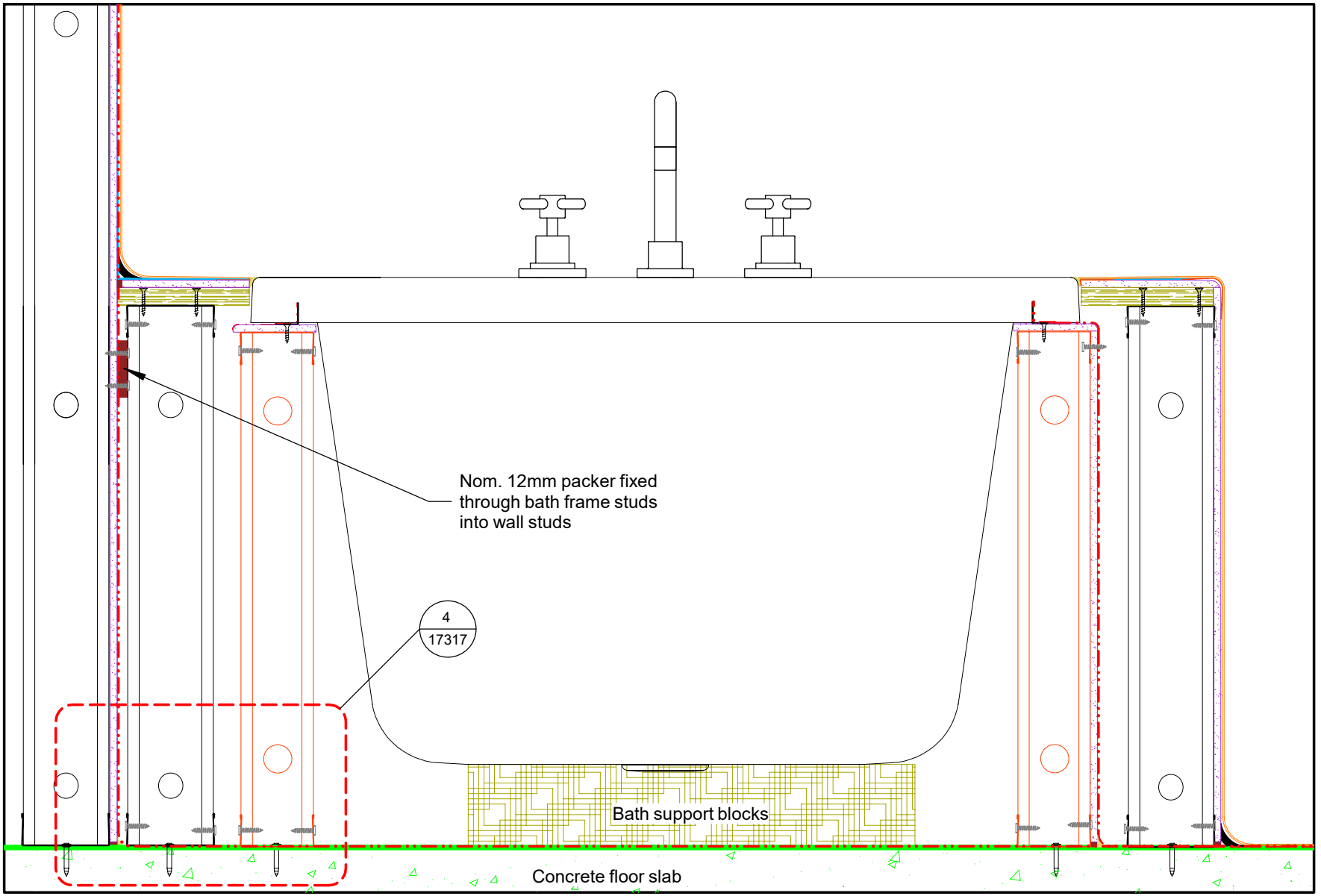
project
Multiplex Standard Details -
Hospital & Aged Care Internal Waterproofing

title
Sheet Vinyl Details - Bath Tub Installation
Longitudinal Section

date
October 2017

drawing no.
17313

issue
B



MULTIPLEX
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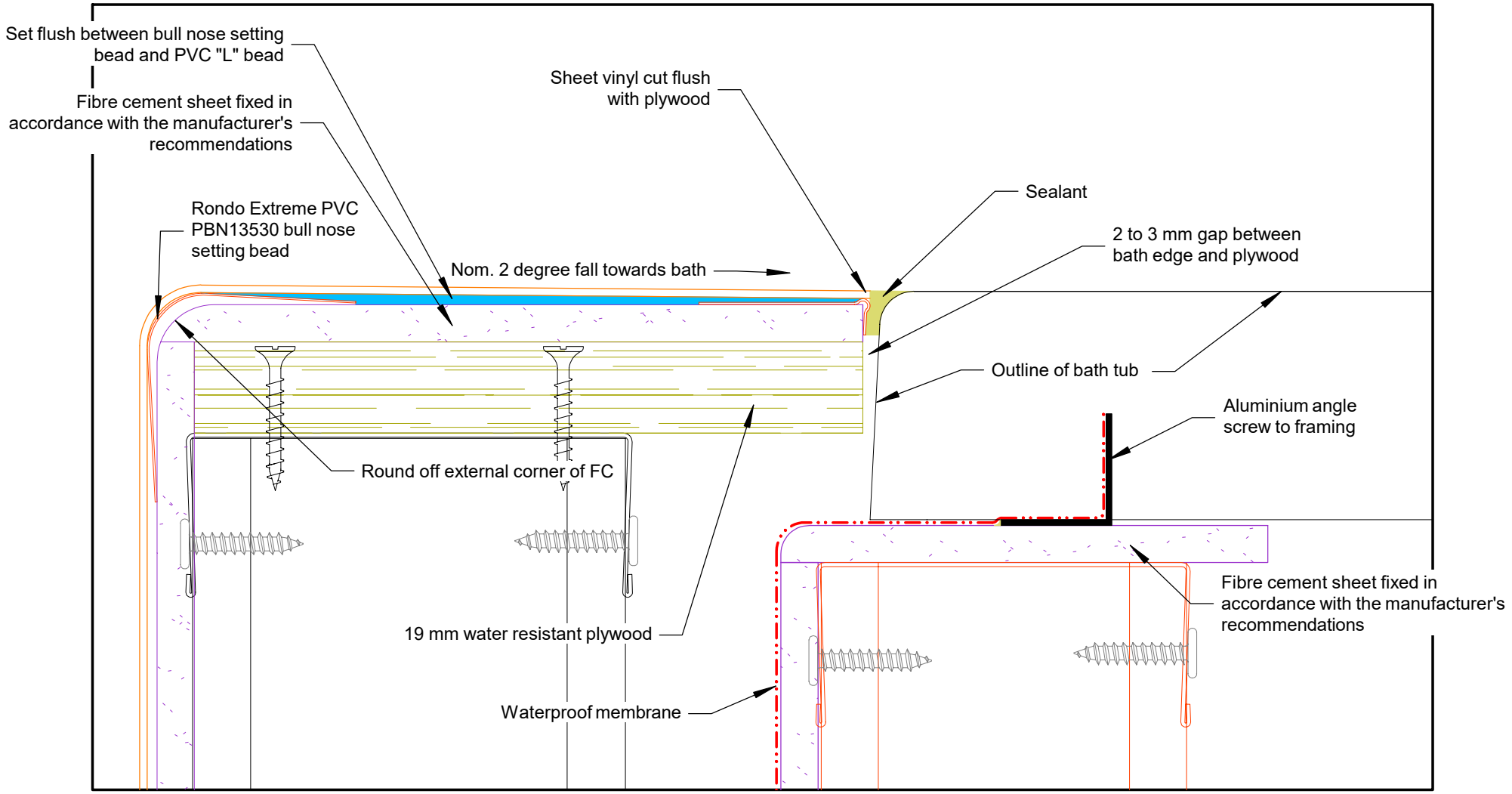
project
Multiplex Standard Details -
Hospital & Aged Care Internal Waterproofing

title
Sheet Vinyl Details - Bath Tub Installation
Transverse Section

date	drawing no.	issue
October 2017	17314	B



MULTIPLEX
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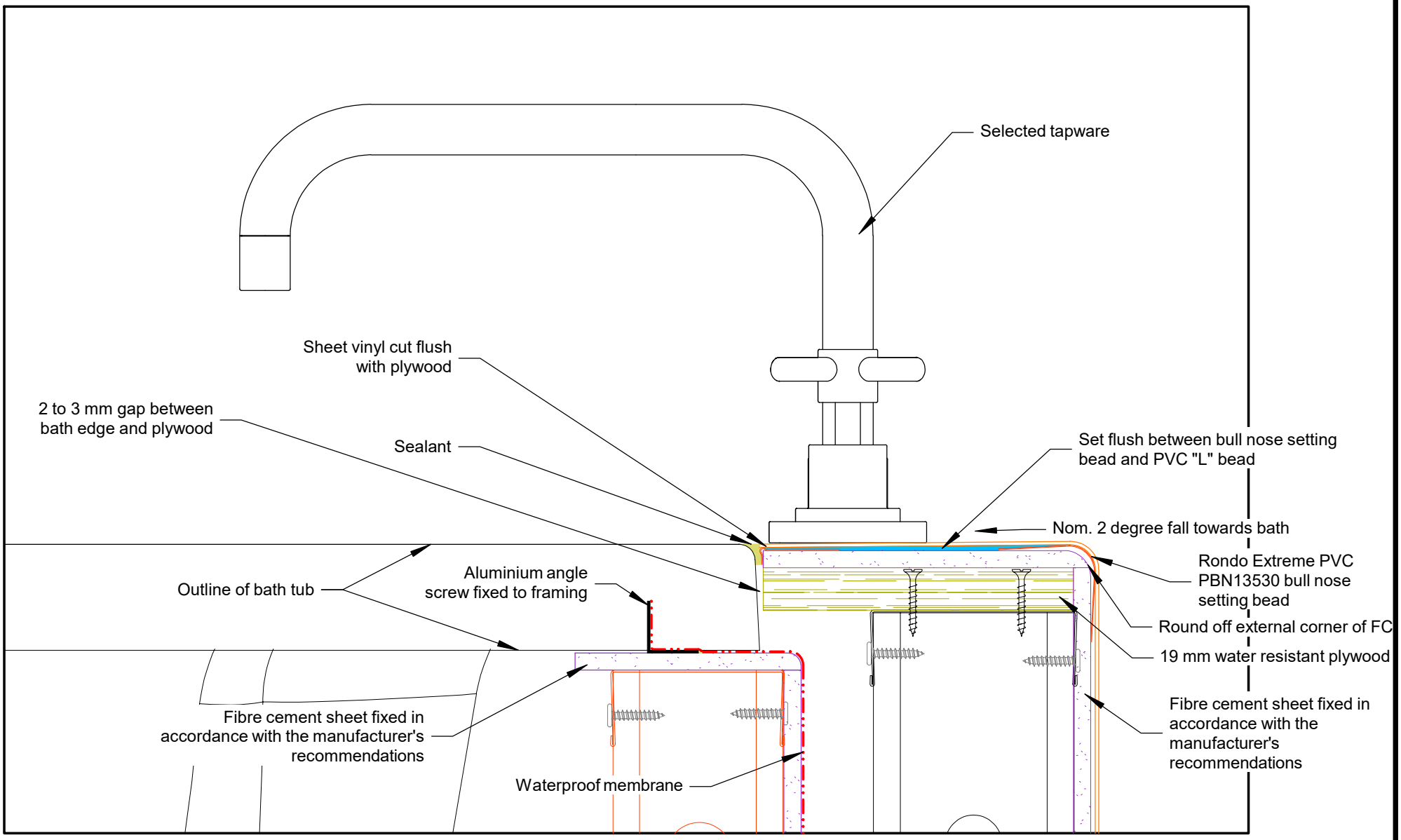
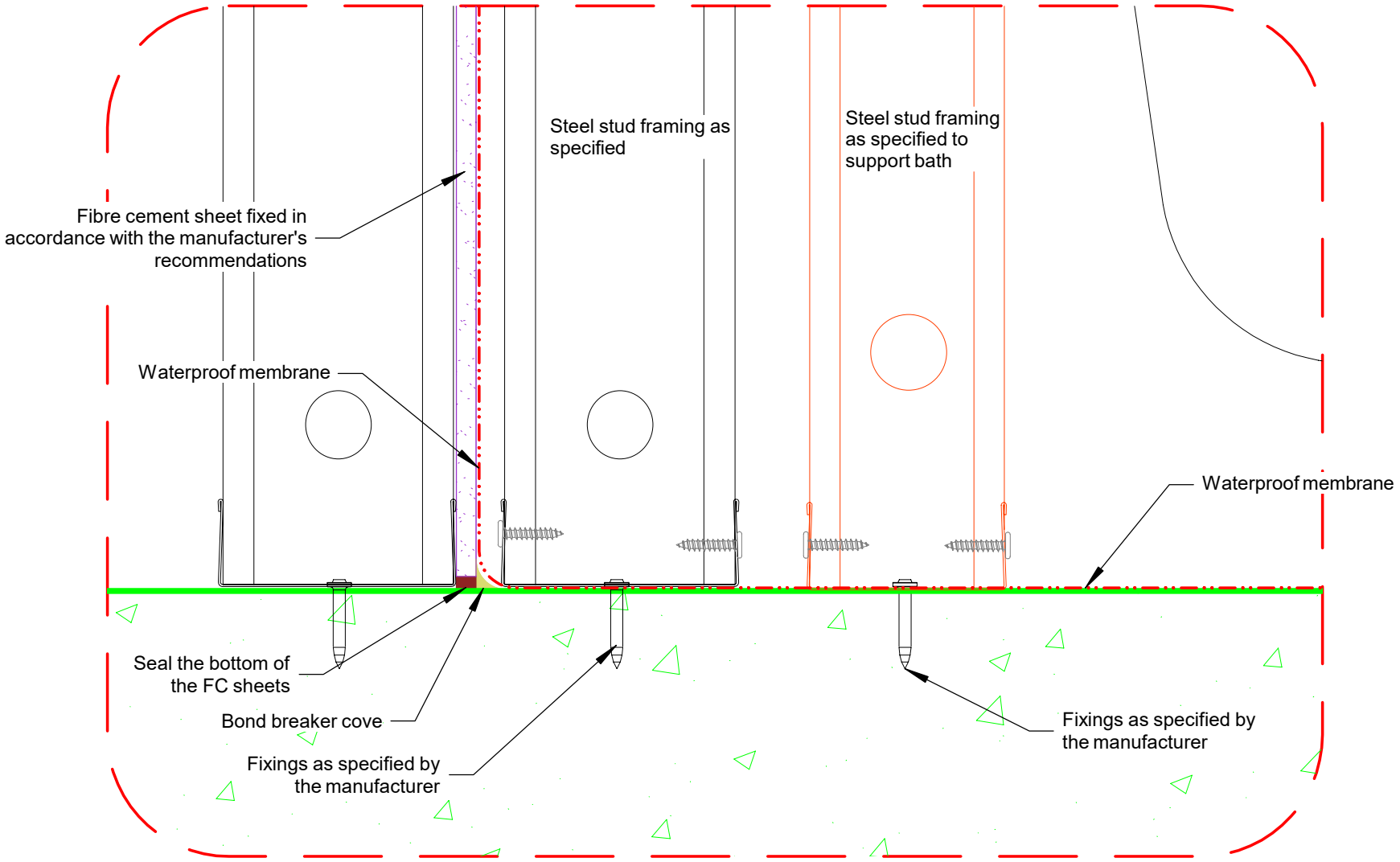
project	title	date	drawing no.	issue
Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing	Sheet Vinyl Details - Bath Tub Installation Detail 3 from 17313	October 2017	17315	B



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing	Sheet Vinyl Details - Bath Tub Installation Detail 3A from 17313	October 2017	17316	B



MULTIPLEX
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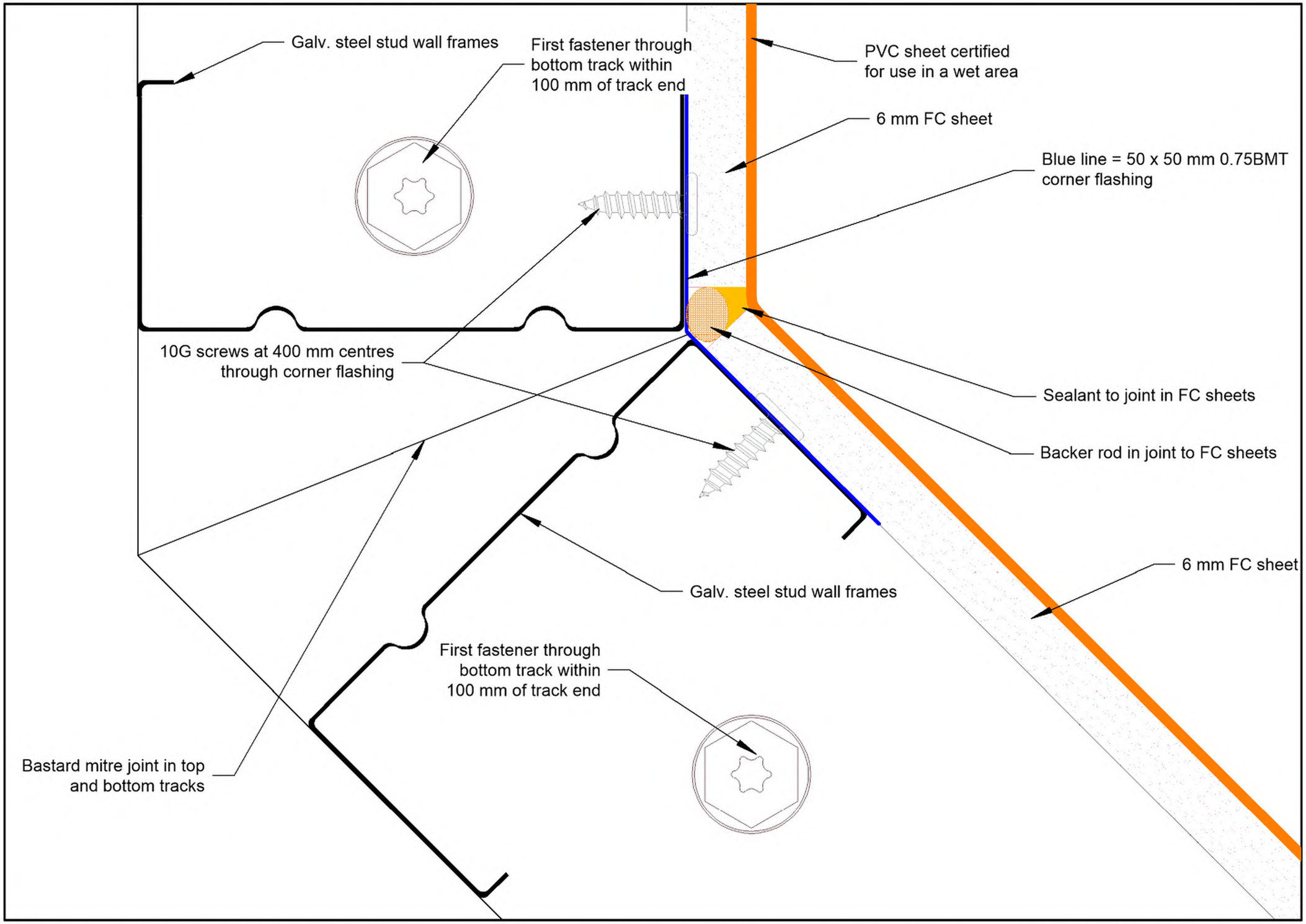
project
Multiplex Standard Details -
Hospital & Aged Care Internal Waterproofing

title
Sheet Vinyl Details - Bath Tub Installation
Detail 4 from 17314

date	drawing no.	issue
October 2017	17317	B



MULTIPLEX
Built to outperform.

project	title	date	drawing no.	issue
Multiplex Standard Details - Hospital & Aged Care Internal Waterproofing	Sheet Vinyl Details - Section Through 135° Corner	November 2020	17318	A

1.13 Appendix 4 - MPX Standard Details - Plant Room Waterproofing

DRAWING INDEX:

NOTES:
1. Dimension provided are nominal.
2. Some details may be shown exagerated or exploded to provide clarity.
3. The nomination in a detail of a particular product or system is not intended as an endorsement for that product, system or manufacturer and shall not be interpreted as the only products or system that may be suitable for that situation.

MULTIPLEX
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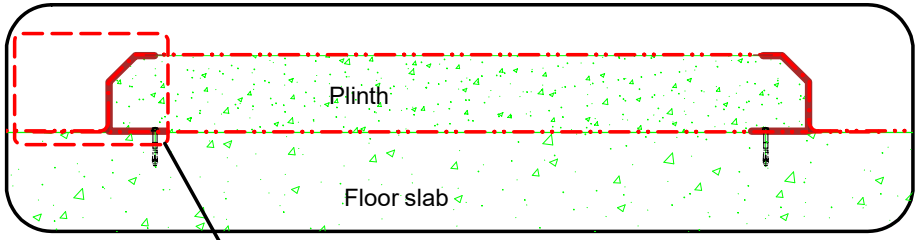
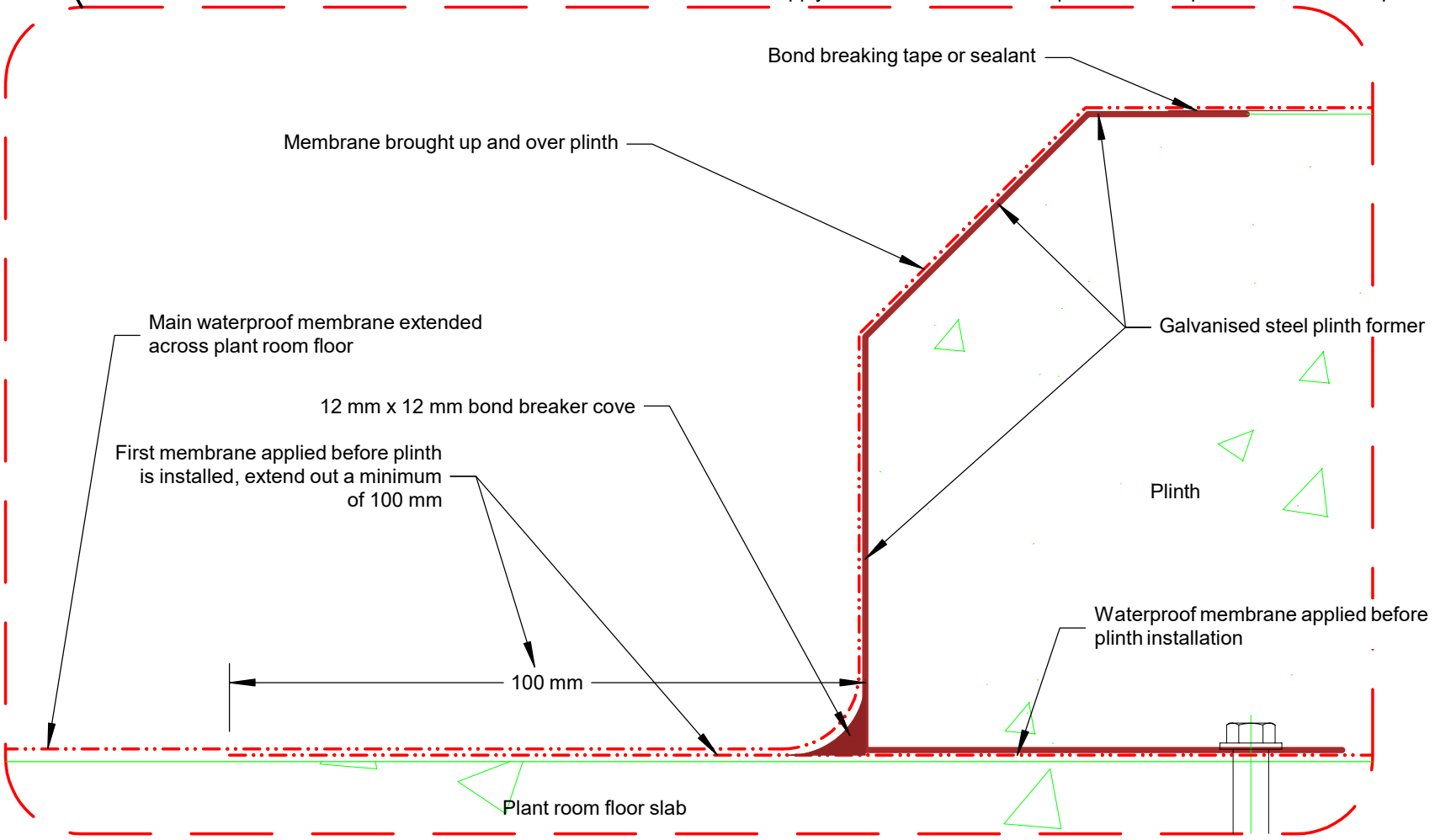
project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Drawing Index	October 2017	17400	A



SECTION

SEQUENCE

1. Install initial waterproofing layer before fixing down plinth former. Extend a minimum of 100 mm beyond each side of the plinth former.
2. Install plinth former as specified.
3. Cast concrete and allow to cure and dry to the membrane manufacturer's recommended maximum moisture content, generally 75% RH.
4. Install bond breakers to each side of plinth former.
5. Install de-bond tape or sealant across the junction of the metal former and concrete infill.
6. Prime the metal and concrete as specified by the membrane manufacturer.
7. Apply the selected membrane up and over the plinth and across the plant room floor.



DETAIL

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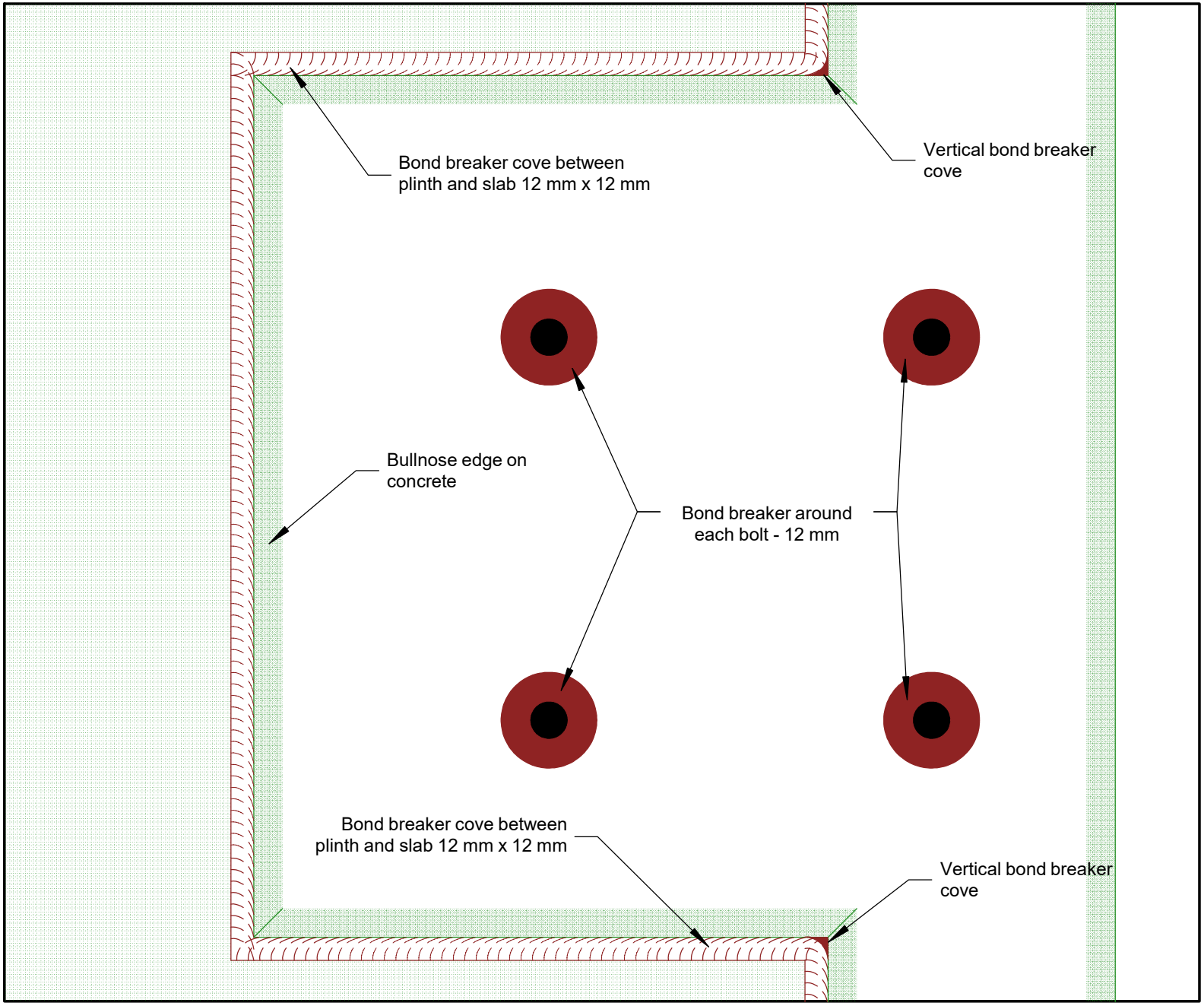
project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Plinths or Machine Bases	October 2017	17401	A



MULTIPLEX
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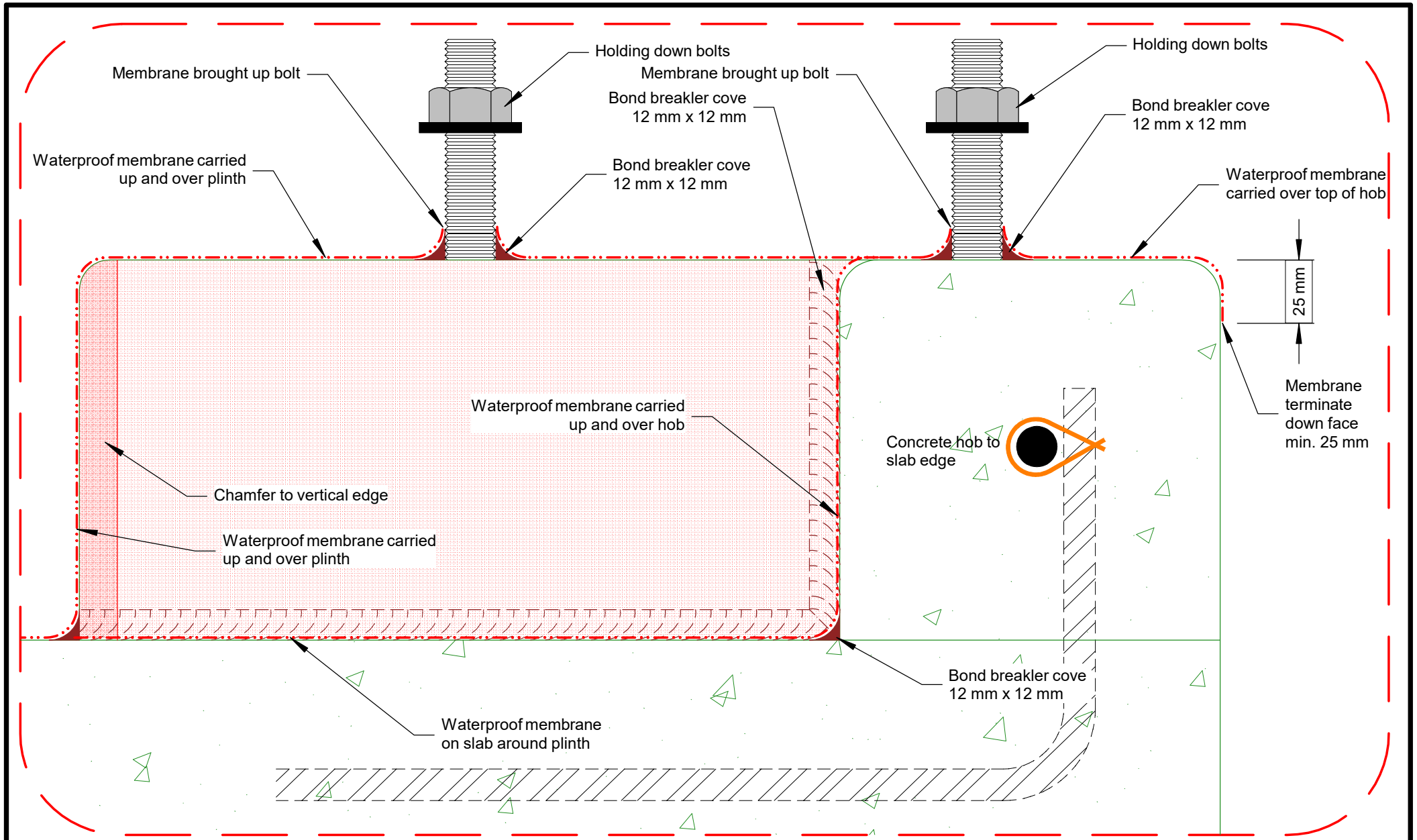
project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Slab Edge With Engaged Plinth - Plan	October 2017	17402	B



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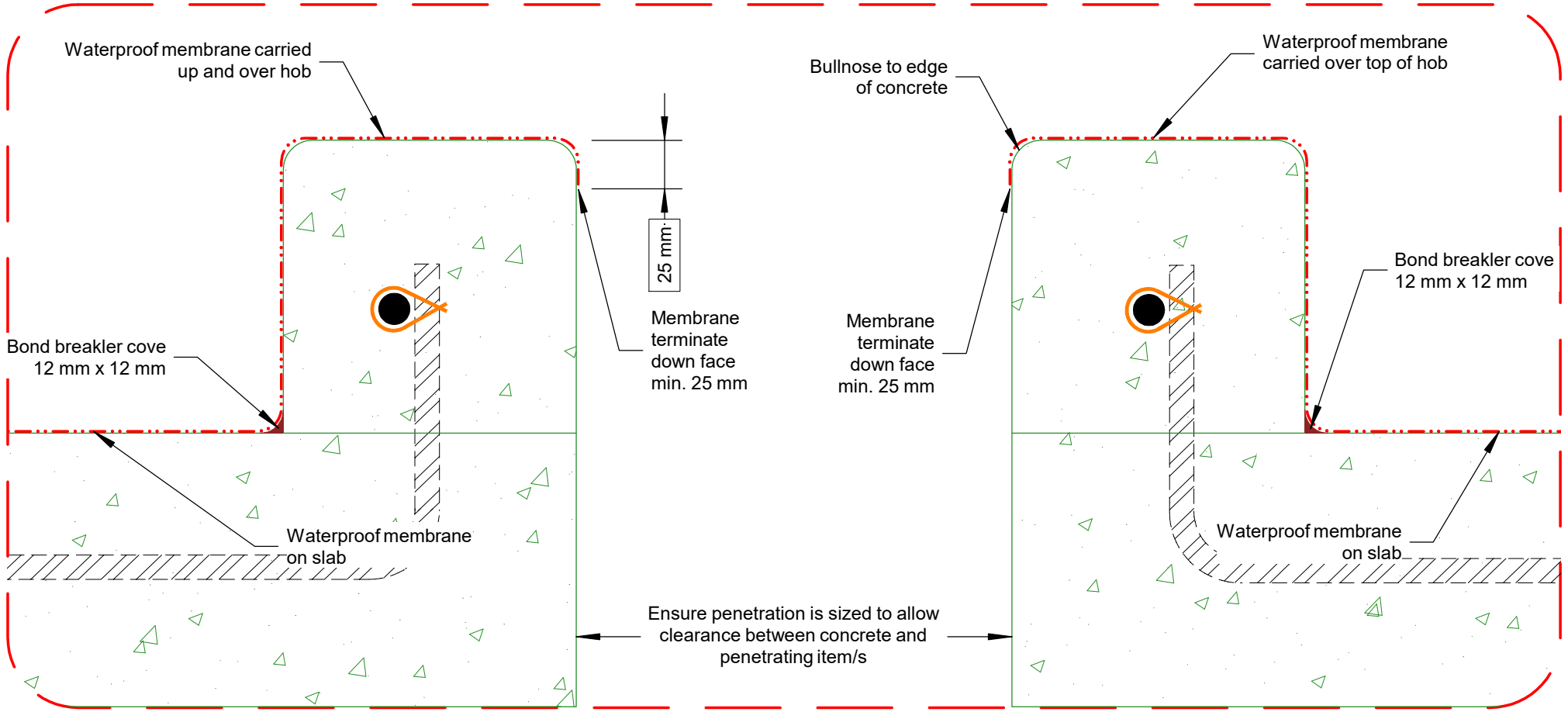
project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Slab Edge With Engaged Plinth - Section	October 2017	17403	A



MULTIPLEX
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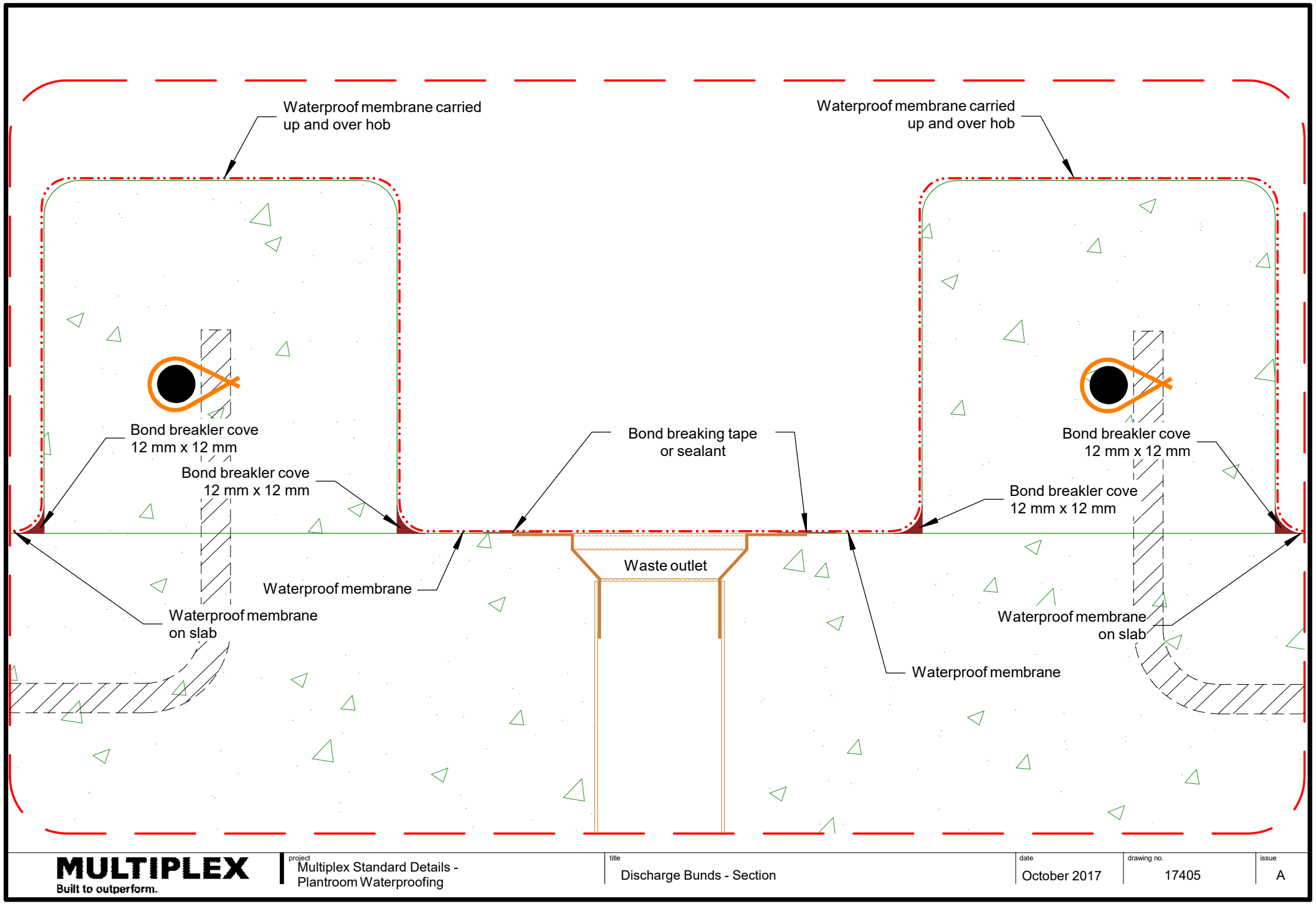
project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Floor Level Penetrations - Section	October 2017	17404	A



MULTIPLEX
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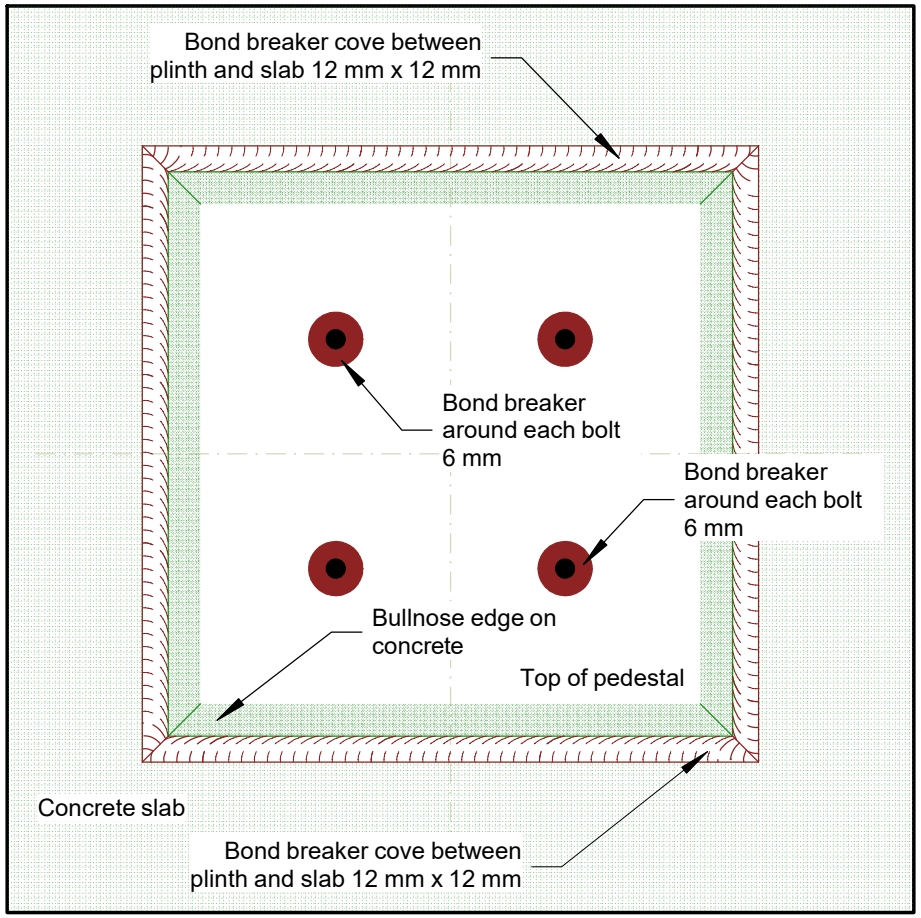
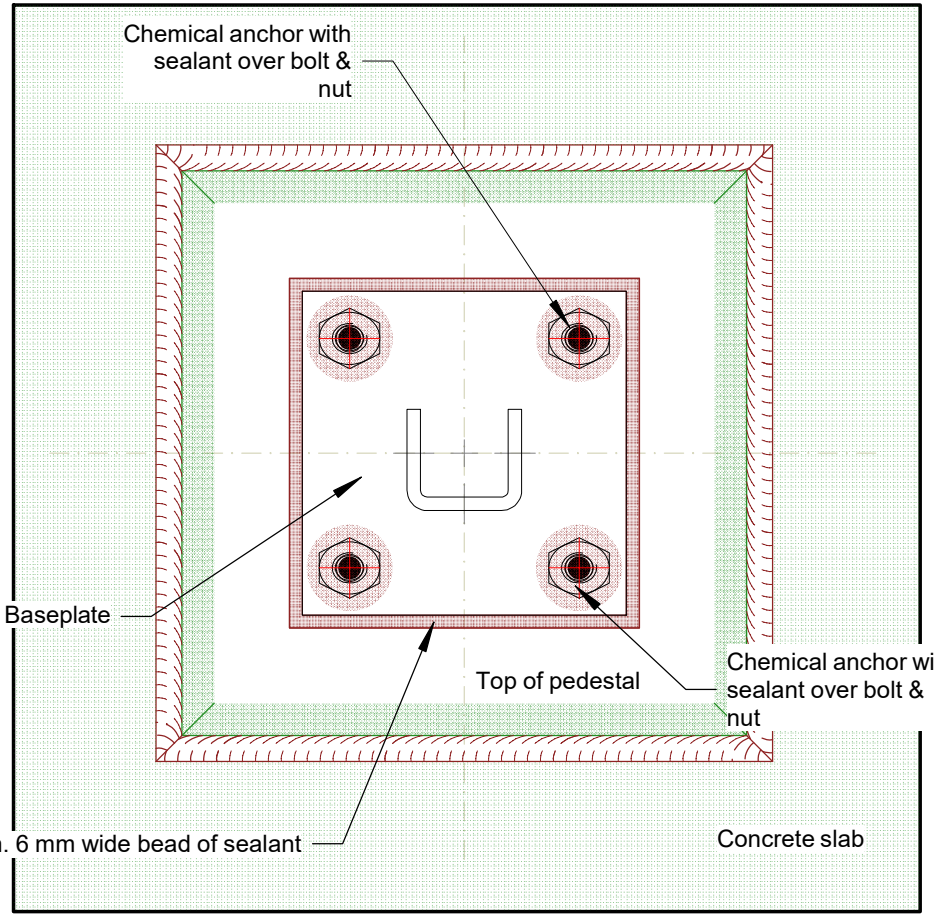
project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Discharge Bunds - Section	October 2017	17405	A

CONSTRUCTION SEQUENCE: -

1. Form and cast pedestal.
2. Prepare concrete as specified my the manufacturer.
3. Drill and insert chemical anchors.
4. Apply primer for waterproof membrane.
5. Apply bond breakers.
6. Apply waterproof membrane.
7. Install base plate and seal as shown.
8. Apply additional coating of waterproof membrane over baseplate and bolts.

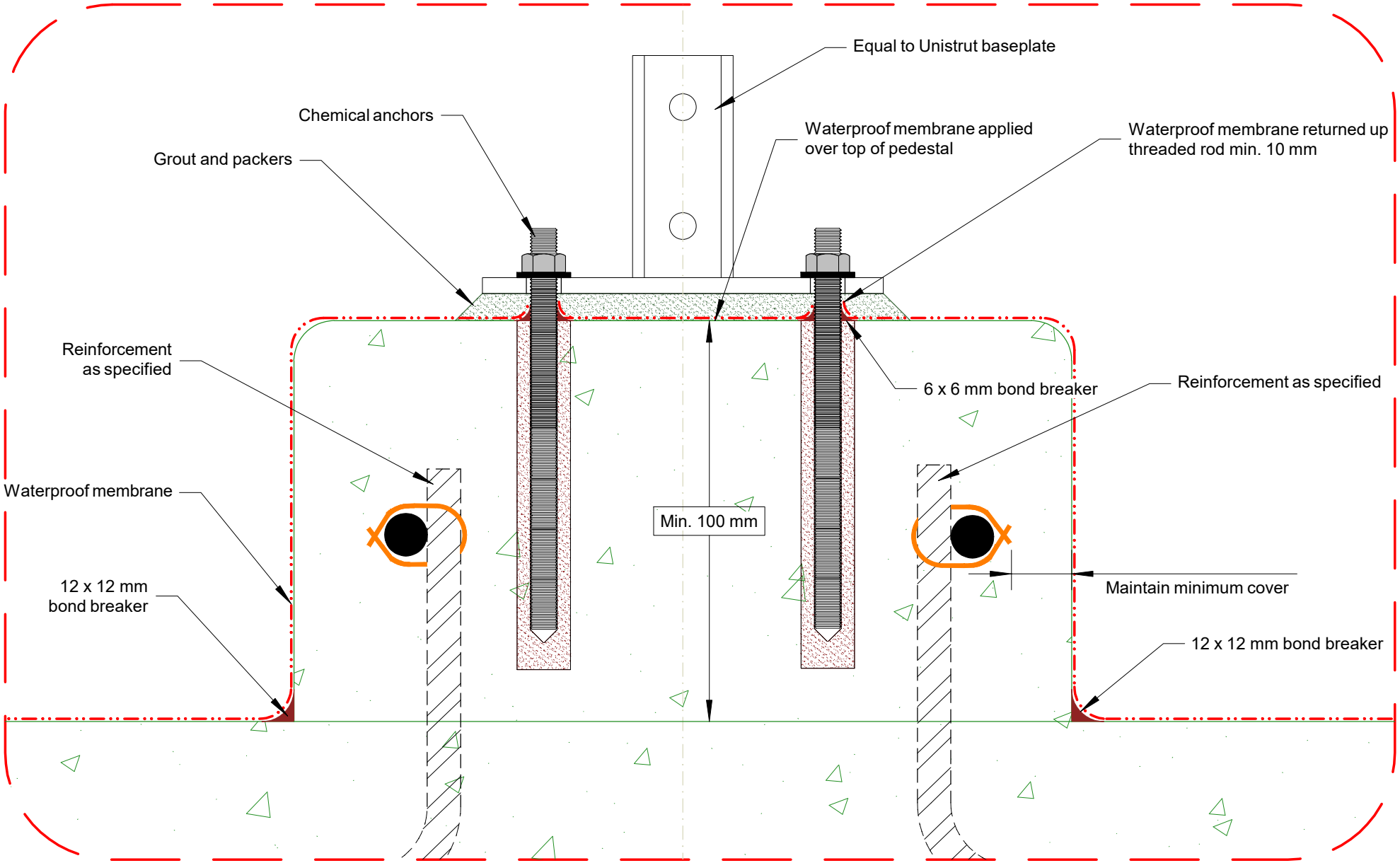


PLAN VIEW SHOWN WITHOUT MEMBRANE OR BASEPLATE



PLAN VIEW SHOWN WITHOUT MEMBRANE BUT INCLUDING BASEPLATE

MULTIPLEX Built to outperform.	project: Multiplex Standard Details - Plantroom Waterproofing	title: Typical Pedestal/Stanchion Details - Plans	date: October 2017	drawing no.: 17406	issue: A



MULTIPLEX
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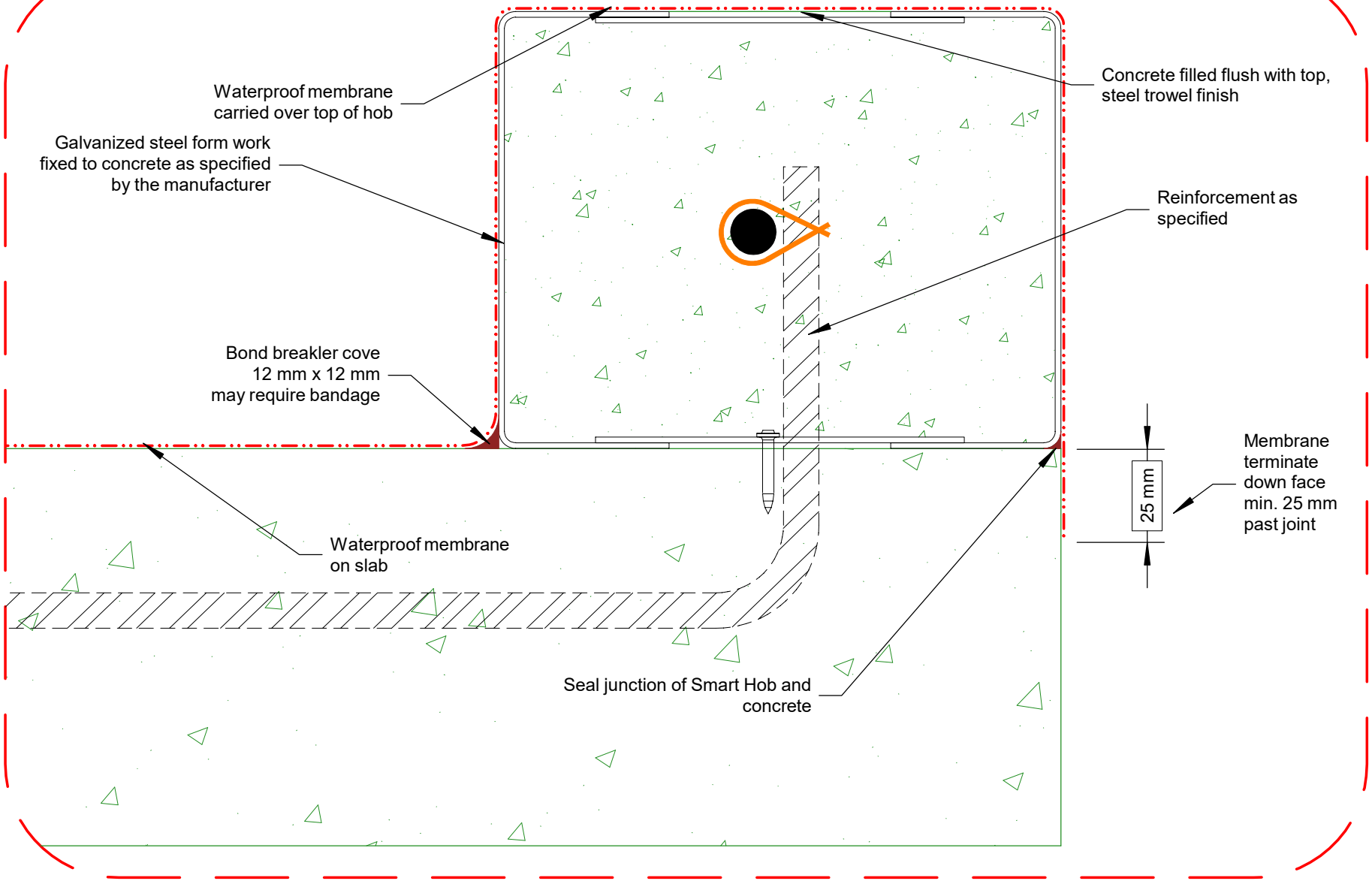
project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Typical Pedestal/Stanchion Details - Section	October 2017	17407	B



MULTIPLEX
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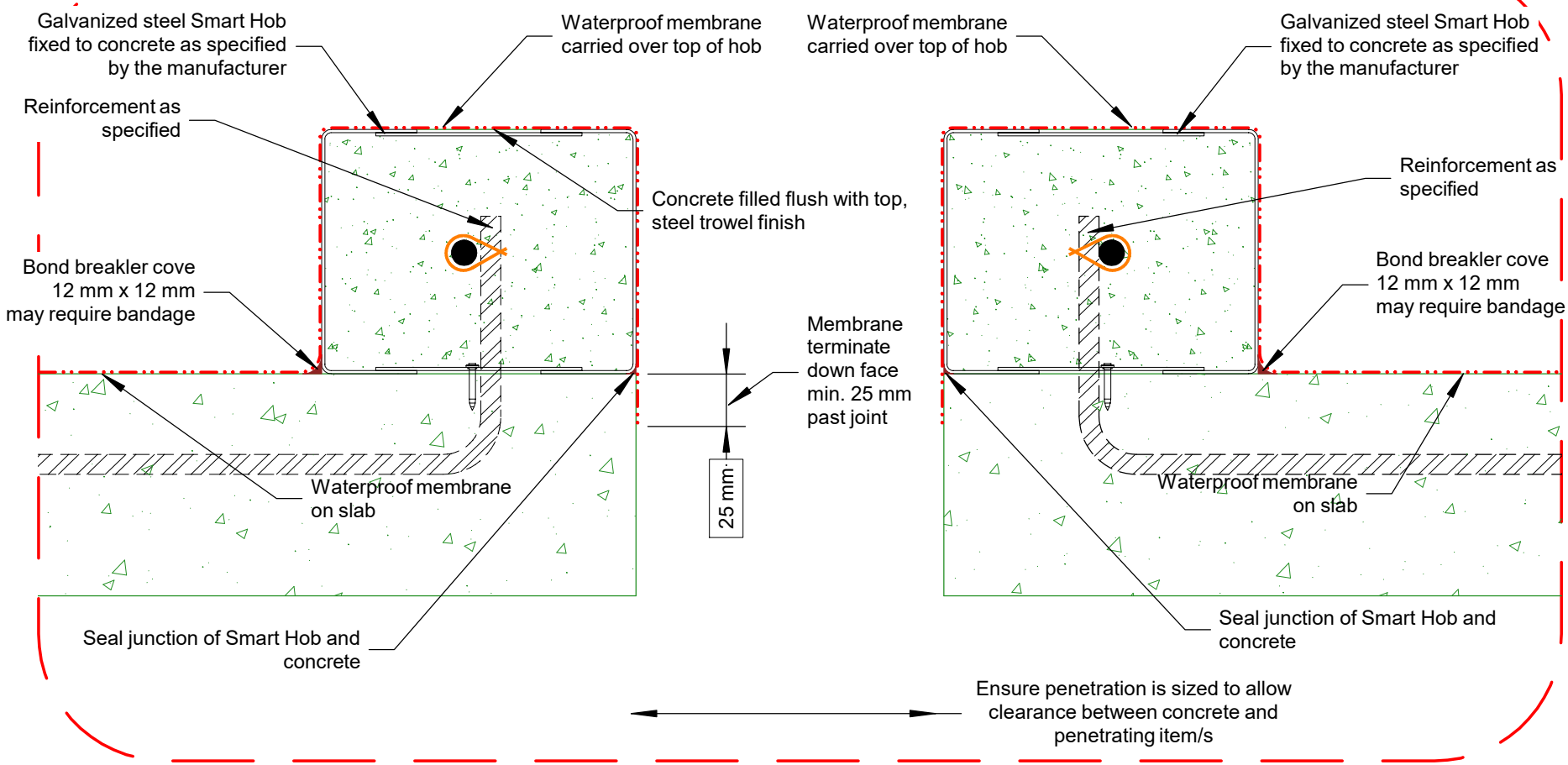
project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Permanant Form Work - Slab Edge - Section	October 2017	17408	A



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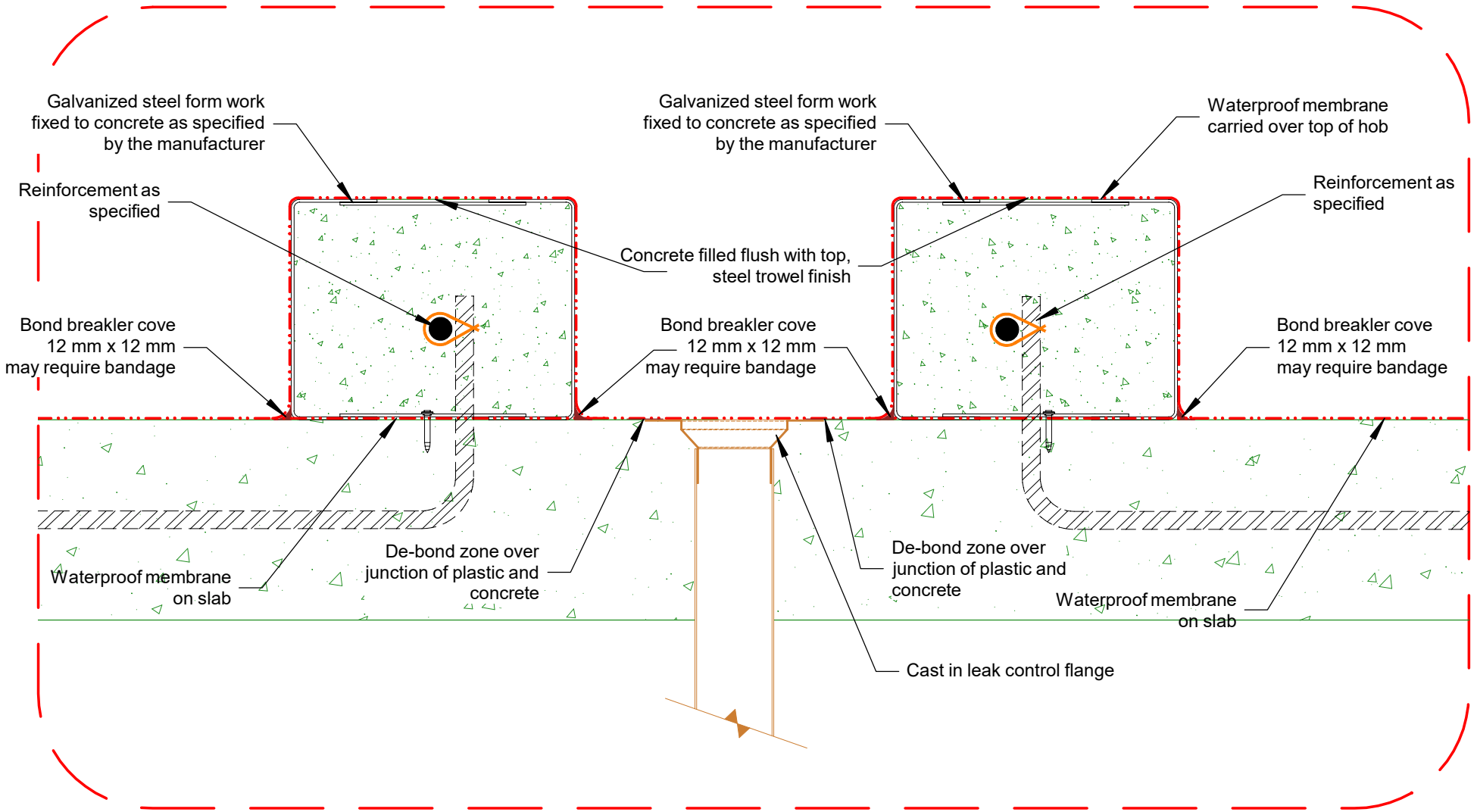
project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Permanant Form Work - Floor Level Penetrations - Section	October 2017	17409	A



MULTIPLEX
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project	title	date	drawing no.	issue
Multiplex Standard Details - Plantroom Waterproofing	Permanant Form Work - Discharge Bunds - Section	October 2017	17410	A

1.14 Appendix 5 - MPX Standard Details - Waterproofing - Miscellaneous Details

NOTES:
1. Dimension provided are nominal.
2. Some details may be shown exagerated or exploded to provide clarity.
3. The nomination in a detail of a particular product or system is not intended as an endorsement for that product, system or manufacturer and shall not be interpreted as the only products or system that may be suitable for that situation.

DRAWING INDEX:

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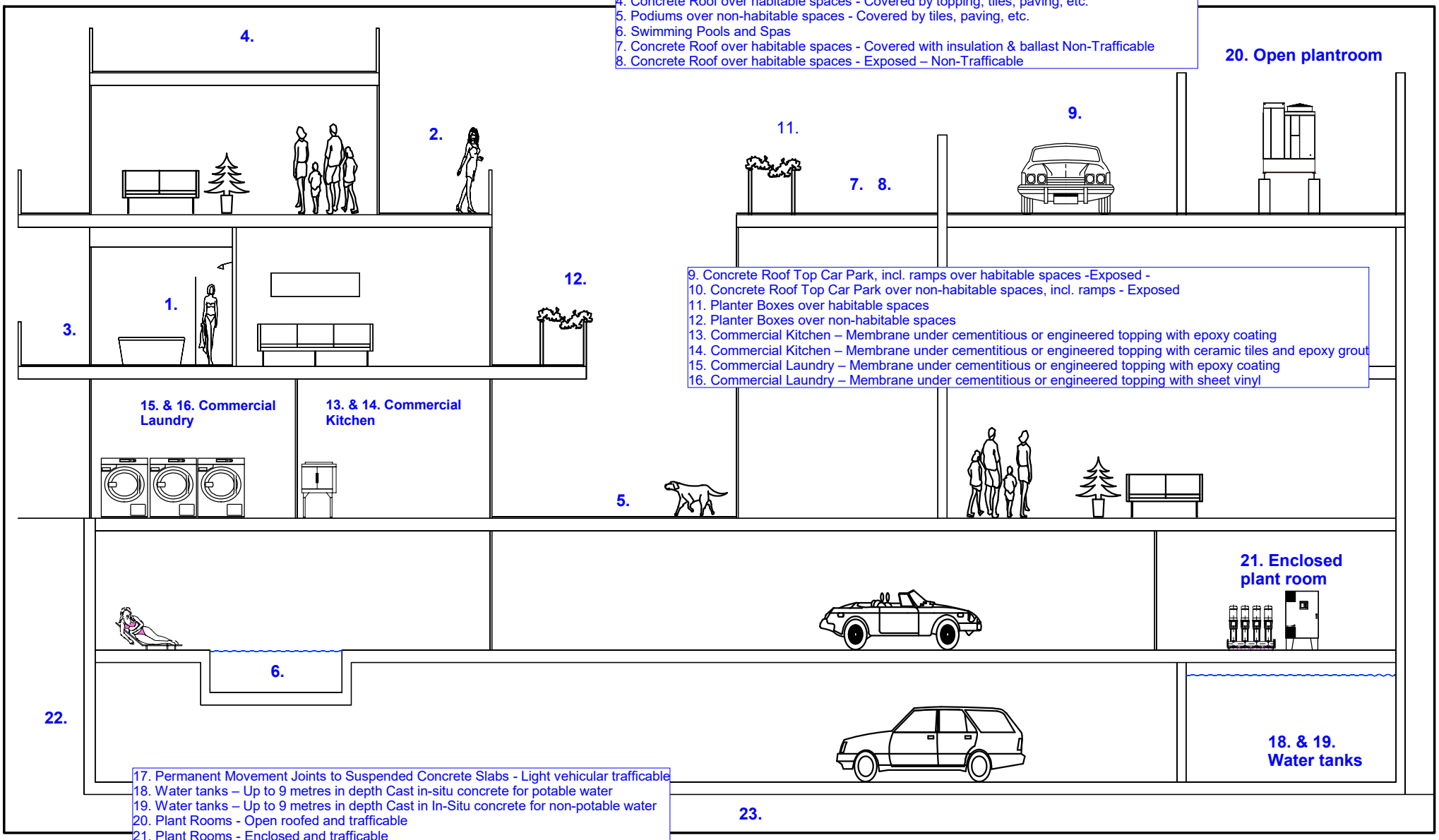
project	title	date	drawing no.	issue
Multiplex Standard Details - Waterproofing - Miscellaneous Details	Notes and Drawing Index	June 2020	17500	A

NOTE: Refer to next sheet for generic membrane types for each location.

Membrane Location -
1. Internal wet areas, e.g. bathroom, laundry
2. Balconies and Terraces over non-habitable areas - Covered by topping, tiles, paving, etc.
3. Balconies and Terraces over habitable areas - Covered by topping, tiles, paving, etc.embranes.
4. Concrete Roof over habitable spaces - Covered by topping, tiles, paving, etc.
5. Podiums over non-habitable spaces - Covered by tiles, paving, etc.
6. Swimming Pools and Spas
7. Concrete Roof over habitable spaces - Covered with insulation & ballast Non-Trafficable
8. Concrete Roof over habitable spaces - Exposed – Non-Trafficable



9. Concrete Roof Top Car Park, incl. ramps over habitable spaces -Exposed -
10. Concrete Roof Top Car Park over non-habitable spaces, incl. ramps - Exposed
11. Planter Boxes over habitable spaces
12. Planter Boxes over non-habitable spaces
13. Commercial Kitchen – Membrane under cementitious or engineered topping with epoxy coating
14. Commercial Kitchen – Membrane under cementitious or engineered topping with ceramic tiles and epoxy grout
15. Commercial Laundry – Membrane under cementitious or engineered topping with epoxy coating
16. Commercial Laundry – Membrane under cementitious or engineered topping with sheet vinyl

17. Permanent Movement Joints to Suspended Concrete Slabs - Light vehicular trafficable
18. Water tanks – Up to 9 metres in depth Cast in-situ concrete for potable water
19. Water tanks – Up to 9 metres in depth Cast in In-Situ concrete for non-potable water
20. Plant Rooms - Open roofed and trafficable
21. Plant Rooms - Enclosed and trafficable
22. Below Grade – Vertical applications
23. Below Grade – Horizontal applications

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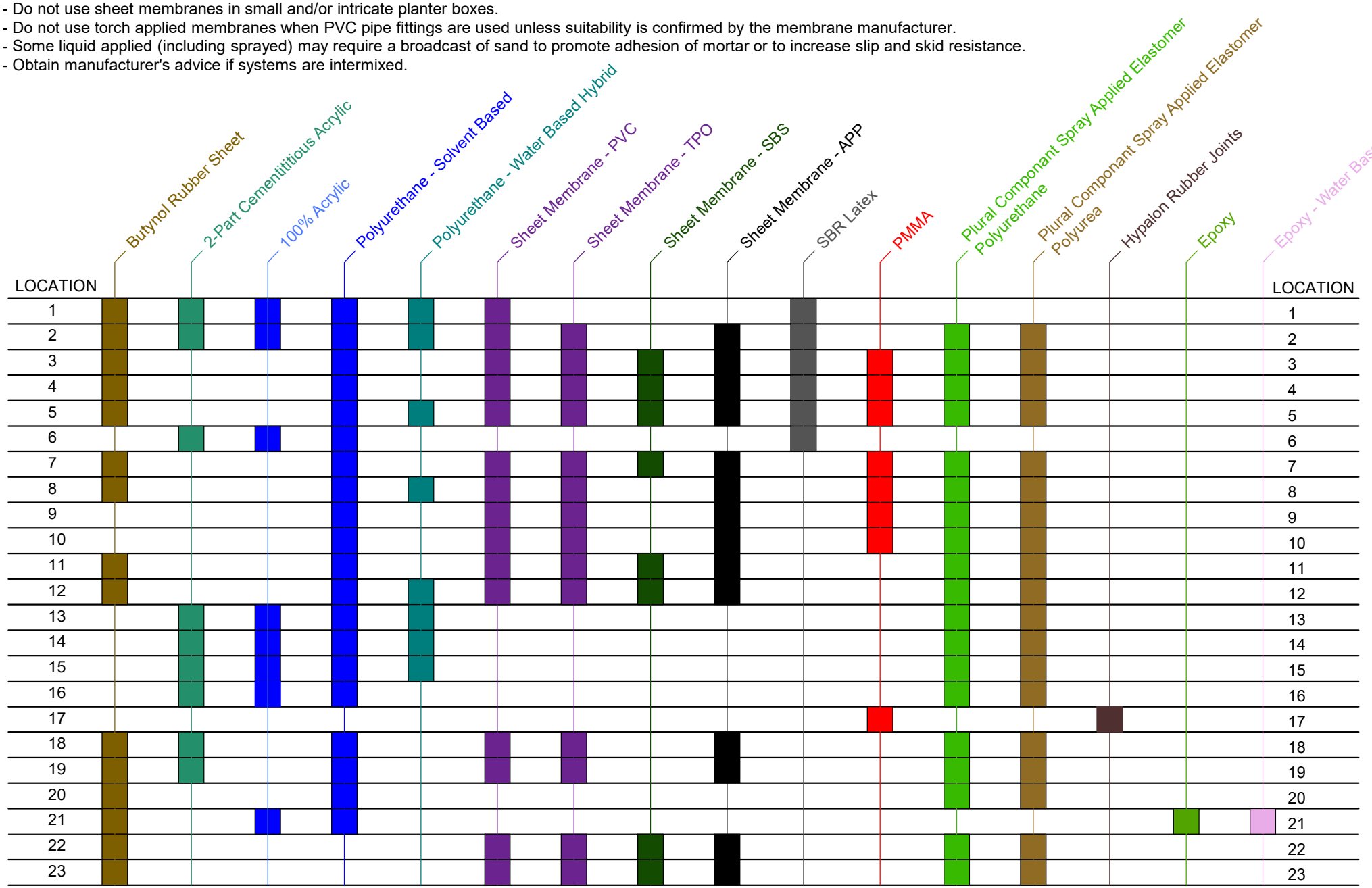
project	title	date	drawing no.	issue
Multiplex Standard Details - Waterproofing - Miscellaneous Details	Membrane Locations and Selection Chart - Locations	June 2020	17501	A

NOTES:
1 - Do not use sheet membranes in small and/or intricate planter boxes.
2 - Do not use torch applied membranes when PVC pipe fittings are used unless suitability is confirmed by the membrane manufacturer.
3 - Some liquid applied (including sprayed) may require a broadcast of sand to promote adhesion of mortar or to increase slip and skid resistance.
4 - Obtain manufacturer's advice if systems are intermixed.



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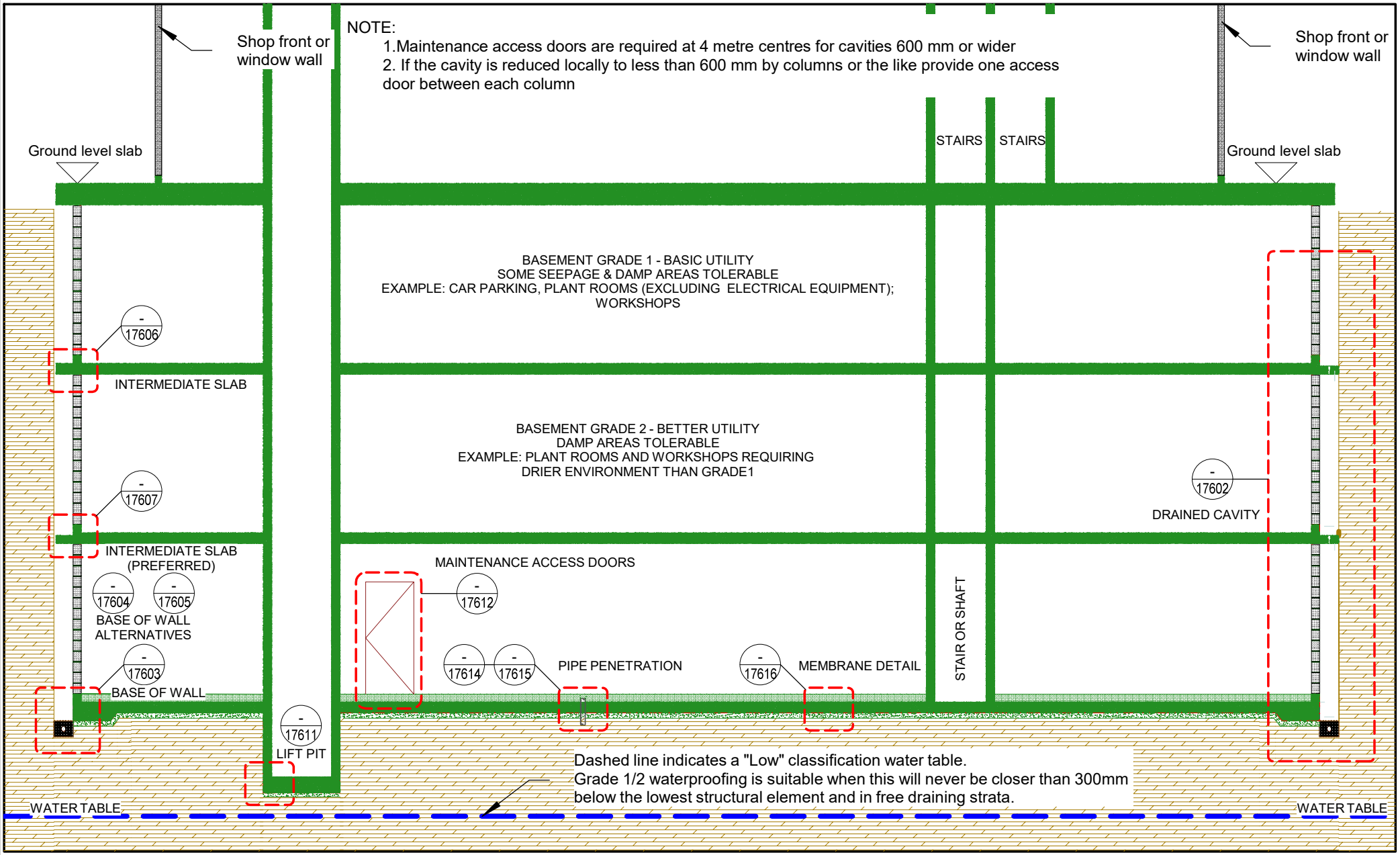
project	title	date	drawing no.	issue
Multiplex Standard Details - Waterproofing - Miscellaneous Details	Membrane Locations and Selection Chart - Selection Chart	June 2020	17502	A

1.15 Appendix 6 - MPX Standard Details - Below Grade Waterproofing

DRAWING INDEX:

NOTES:
1. Dimension provided are nominal.
2. Some details may be shown exagerated or exploded to provide clarity.
3. The nomination in a detail of a particular product or system is not intended as an endorsement for that product, system or manufacturer and shall not be interpreted as the only products or system that may be suitable for that situation.



MULTIPLEX
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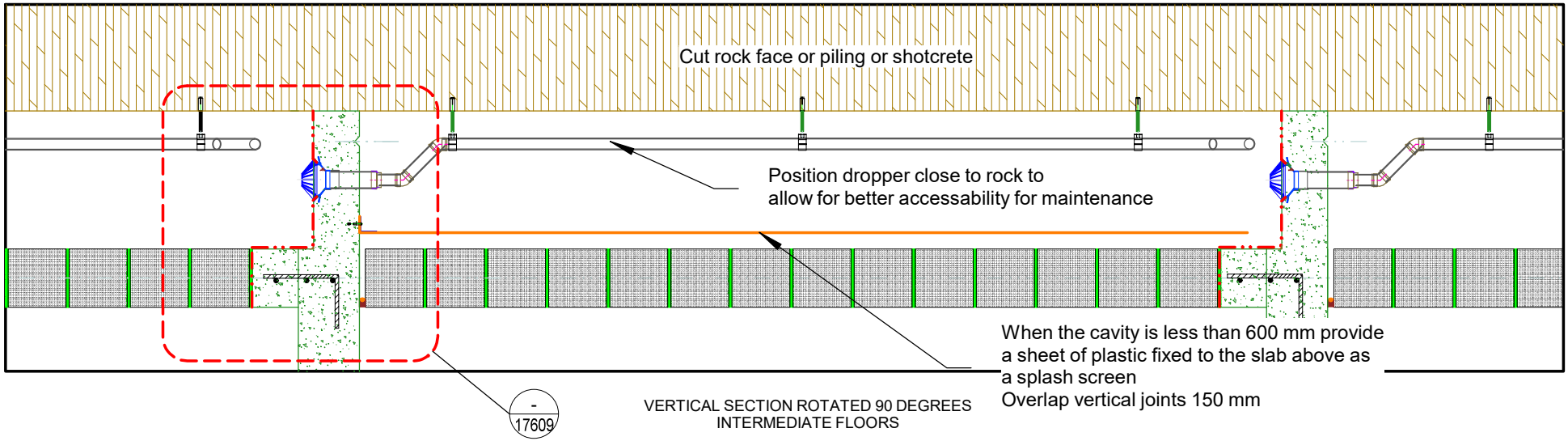
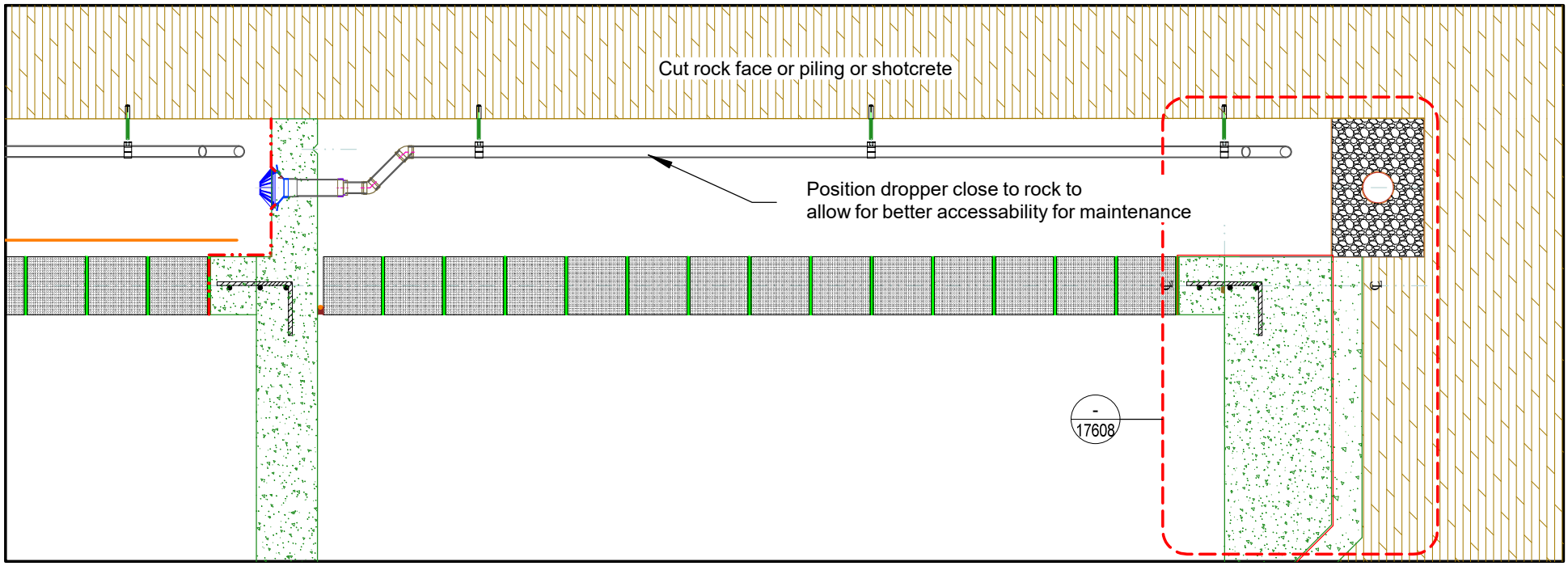
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Type "C" Drained Cavity - Typical Section - Detail References	October 2017	17601	B



VERTICAL SECTION ROTATED 90 DEGREES
INTERMEDIATE FLOORS



VERTICAL SECTION ROTATED 90 DEGREES
LOWEST FLOOR

BOTTOM OF PAGE

MULTIPLEX
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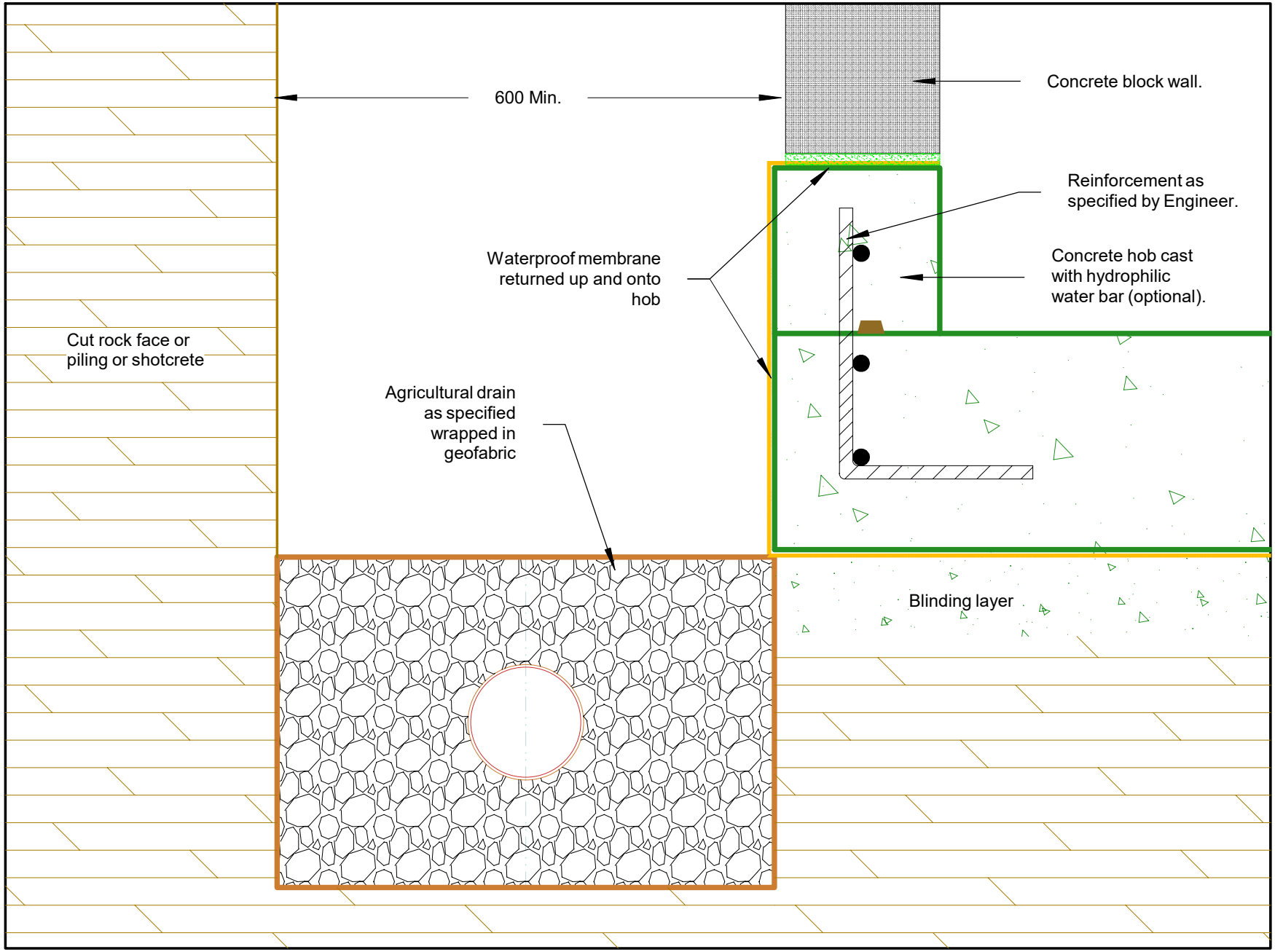
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Type "C" Drained Cavity - Drained Cavity - Vertical Section	October 2017	17602	A



MULTIPLEX
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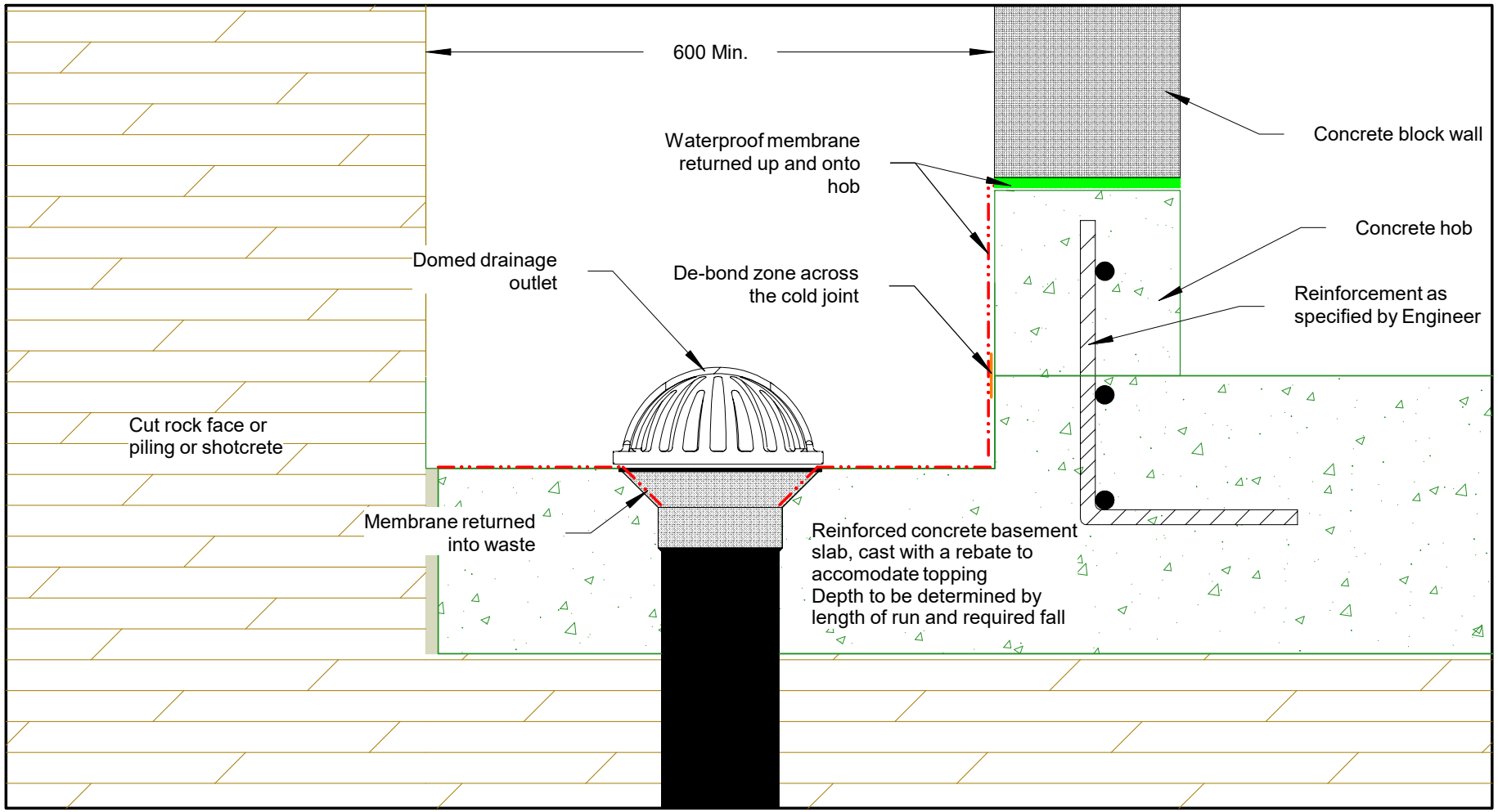
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Type "C" Drained Cavity - Base of Wall Detail - Preferred Option	October 2017	17603	B

NOTE: Depth of rebate shall be sufficient to achieve a 1:200 fall



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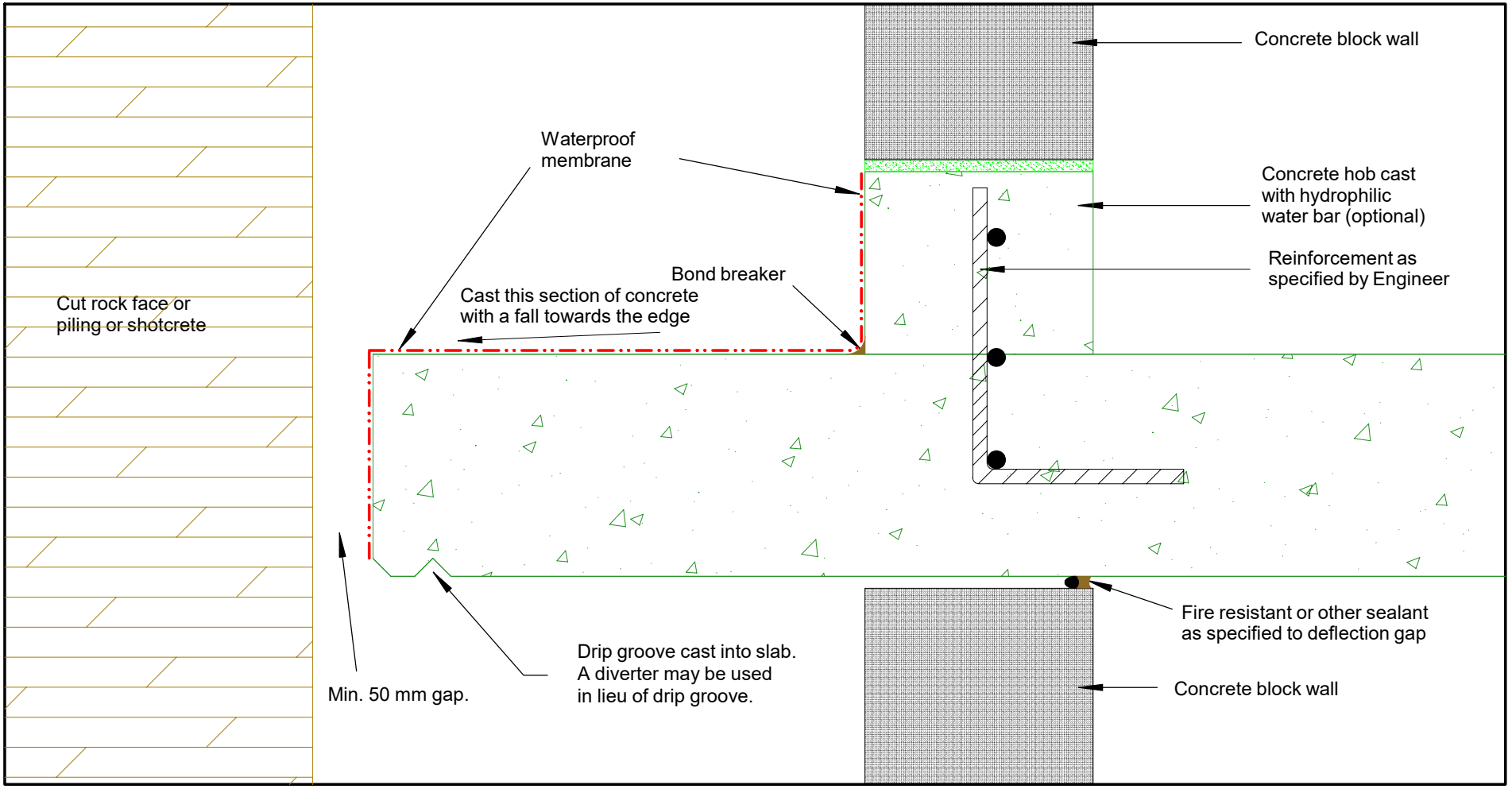
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Type "C" Drained Cavity - Base of Wall Detail - Alternate Option 1	October 2017	17604	C



MULTIPLEX
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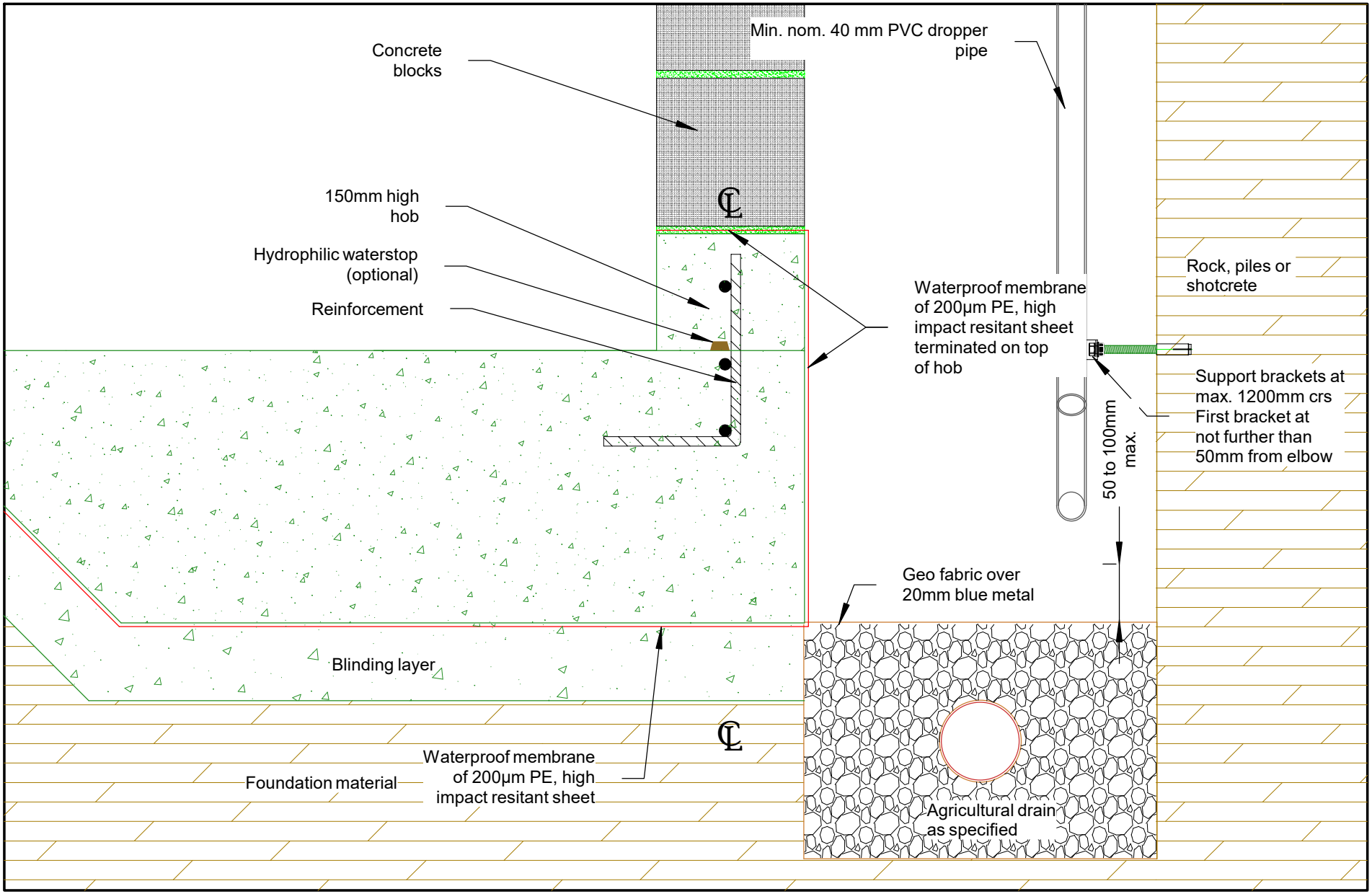
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Type "C" Drained Cavity - Intermediate Basement Floors	October 2017	17606	B



MULTIPLEX
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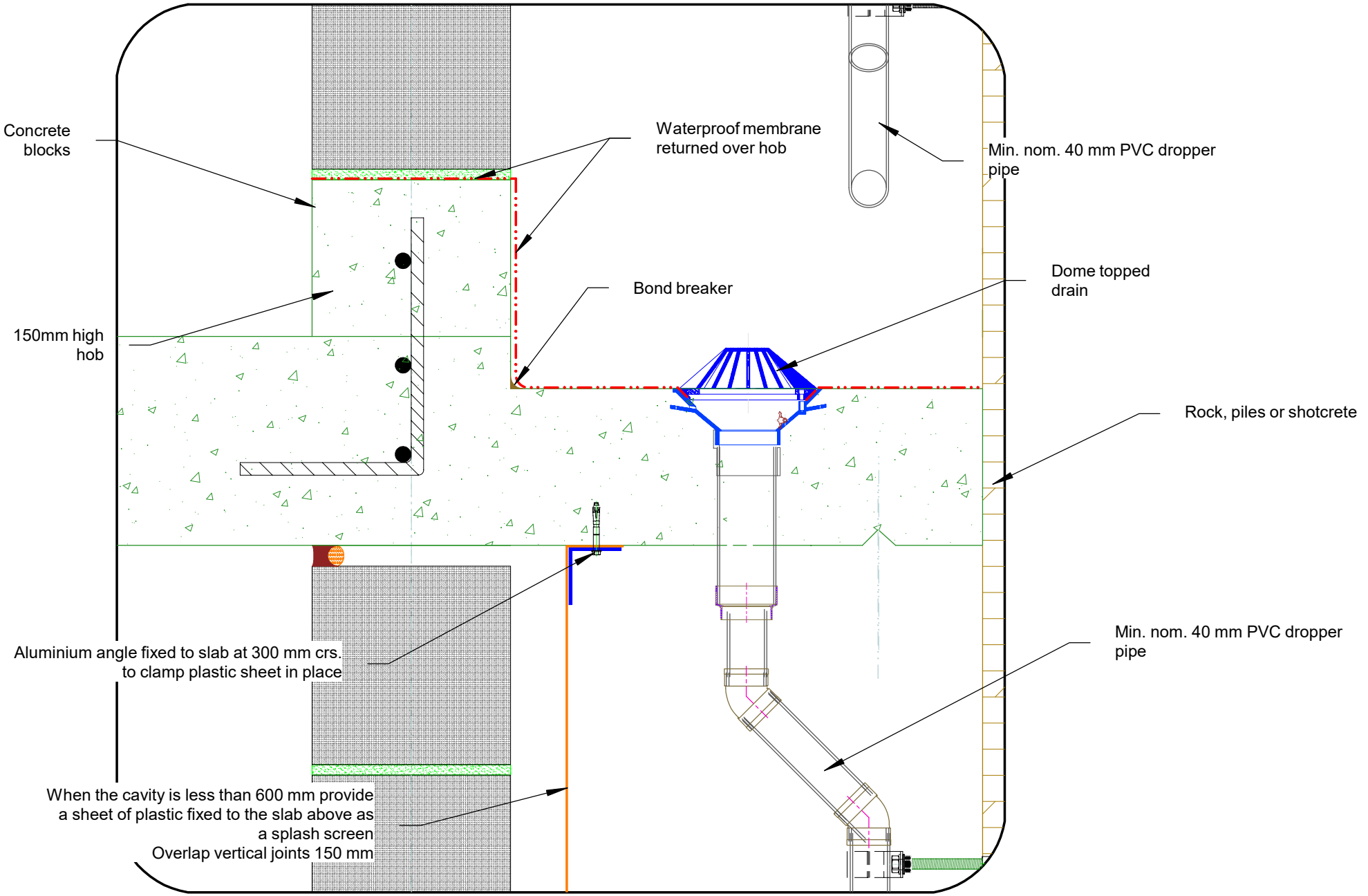
project: Multiplex Standard Details - Below Grade Waterproofing

title: Basement Details - Type "C" Drained Cavity - Drained Cavity - Base of Wall

date	drawing no.	issue
October 2017	17608	A



MULTIPLEX
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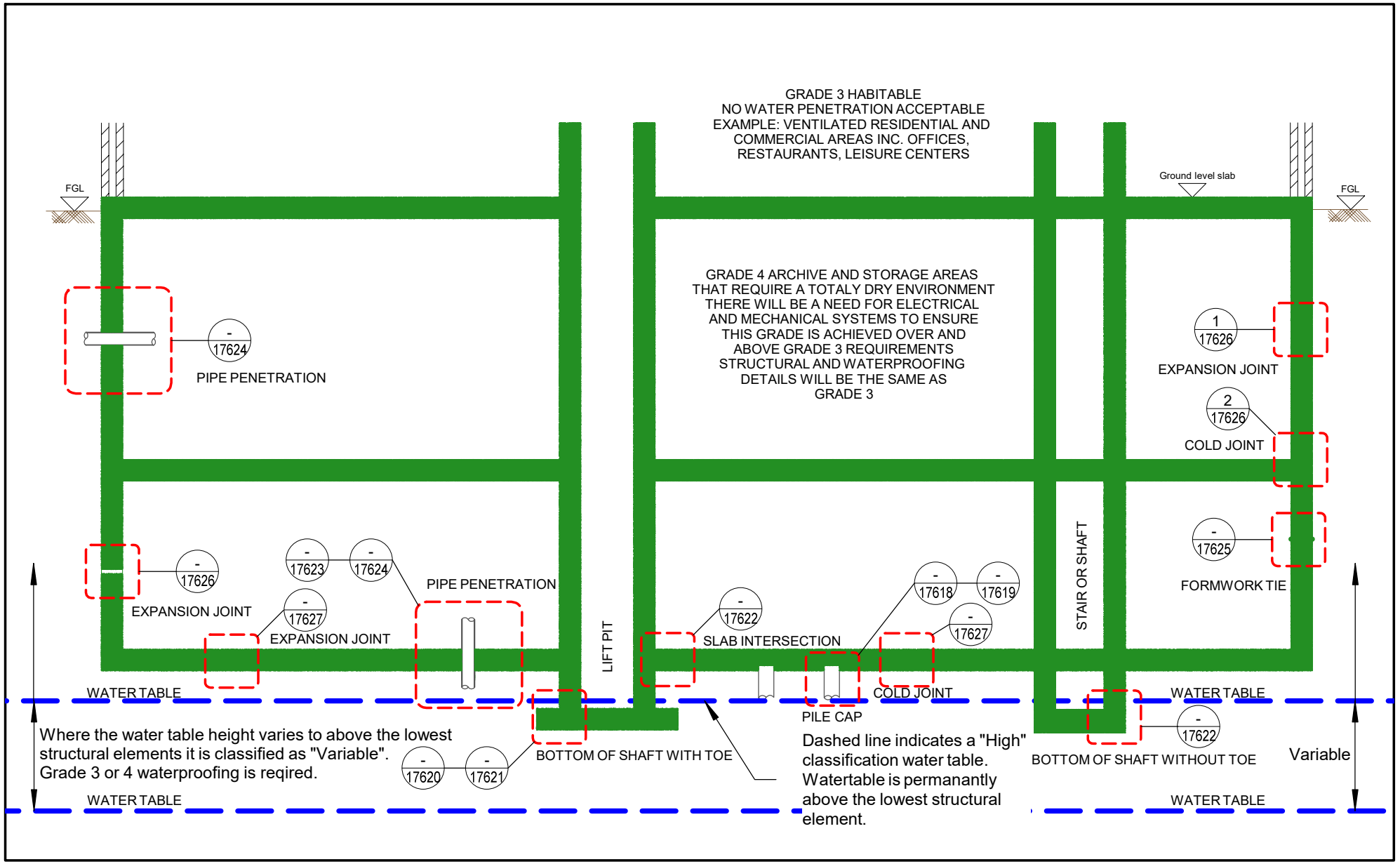
project: Multiplex Standard Details - Below Grade Waterproofing

title: Basement Details - Type "C" Drained Cavity - Intermediate Floor Spoon Drain - Transverse Section At Waste

date	drawing no.	issue
October 2017	17609	B



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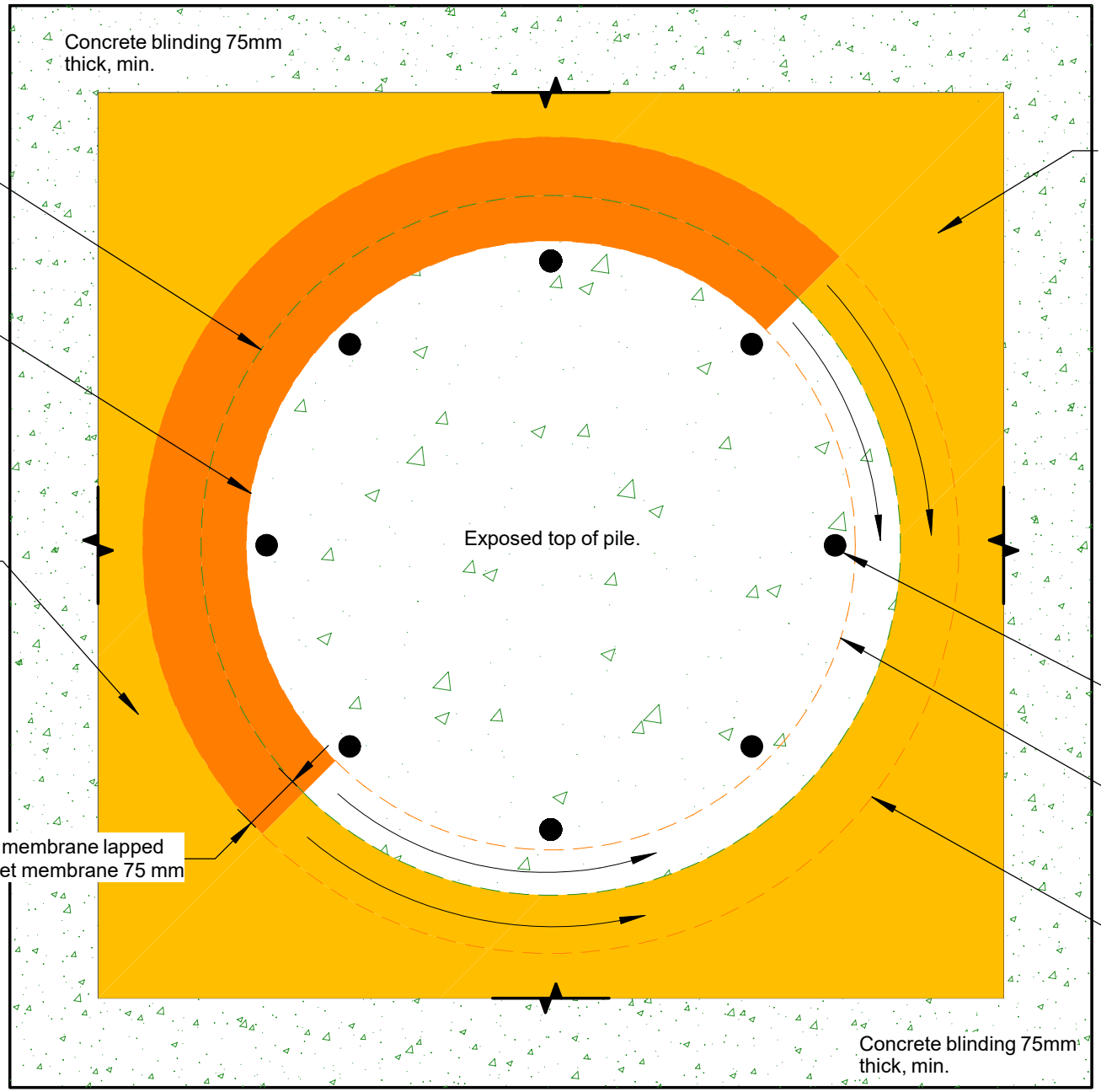
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Waterproofing Grade 3 - Typical Section - Detail References	October 2017	17617	B



NOTE: MANUFACTURER'S DETAILS SHALL PREVAIL OVER ANY DETAIL SHOWN HEREIN.
MEMBRANE SHOWN PARTIALLY REMOVED FOR CLARITY.

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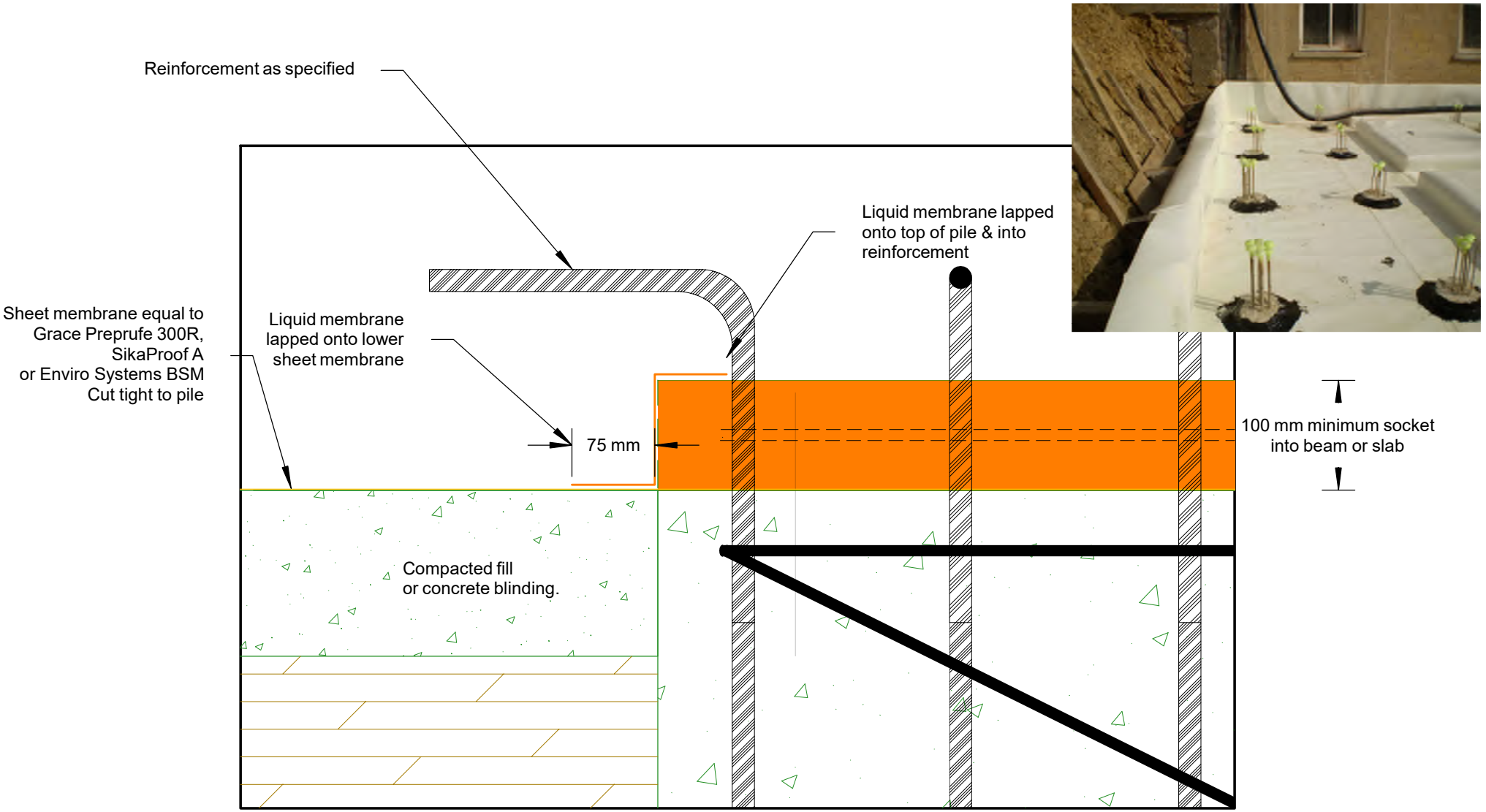
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Waterproofing Grade 3 - Pile Cap Details - Plan	October 2017	17618	B



NOTE: MANUFACTURER'S DETAILS SHALL PREVAIL OVER ANY DETAIL SHOWN HEREIN.
LIQUID MEMBRANE TO BE AS SPECIFIED BY THE MANUFACTURER

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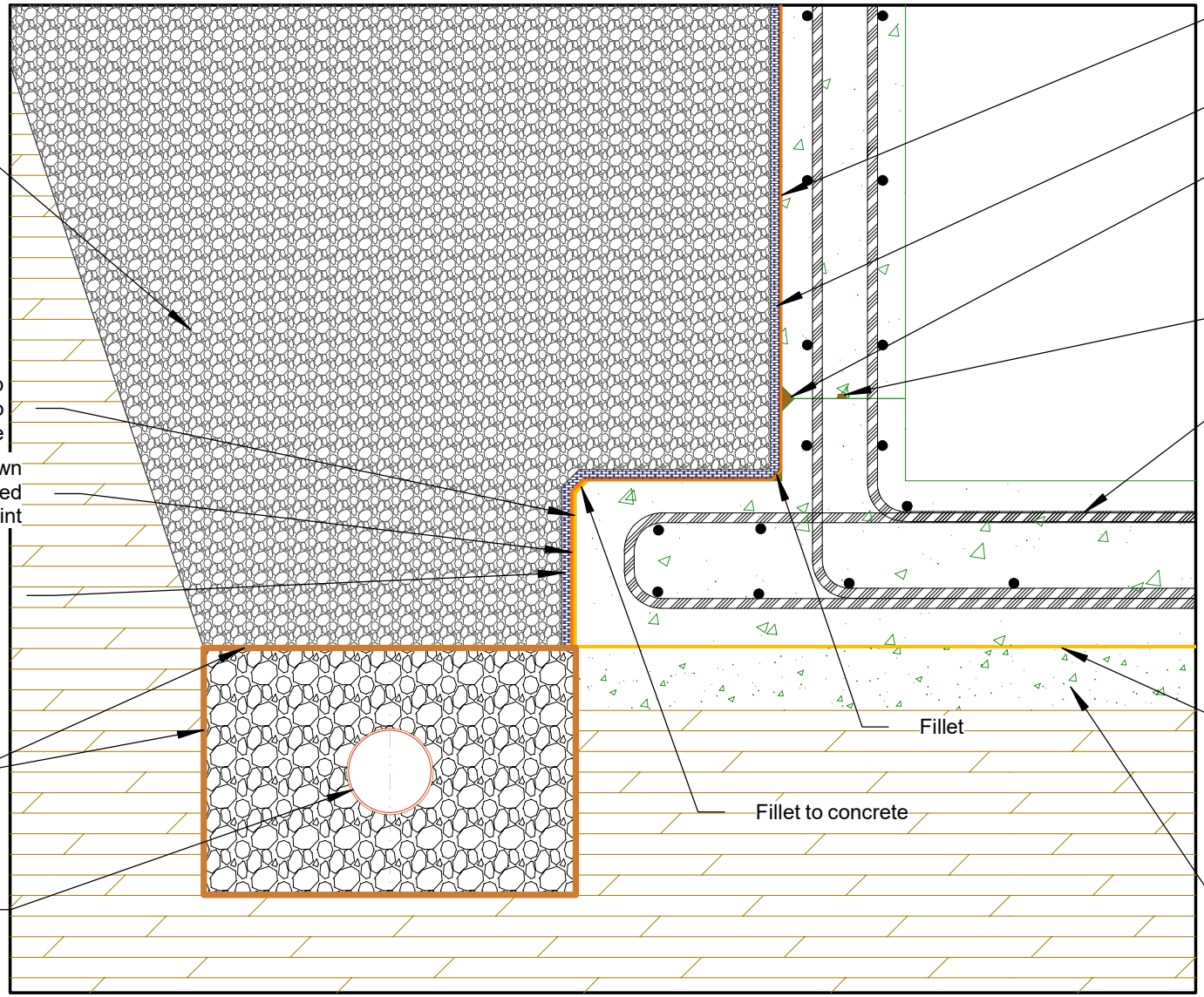
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Waterproofing Grade 3 - Pile Cap Details - Part Section	October 2017	17619	B



NOTE: MANUFACTURER'S DETAILS SHALL PREVAIL OVER ANY DETAIL SHOWN HEREIN.

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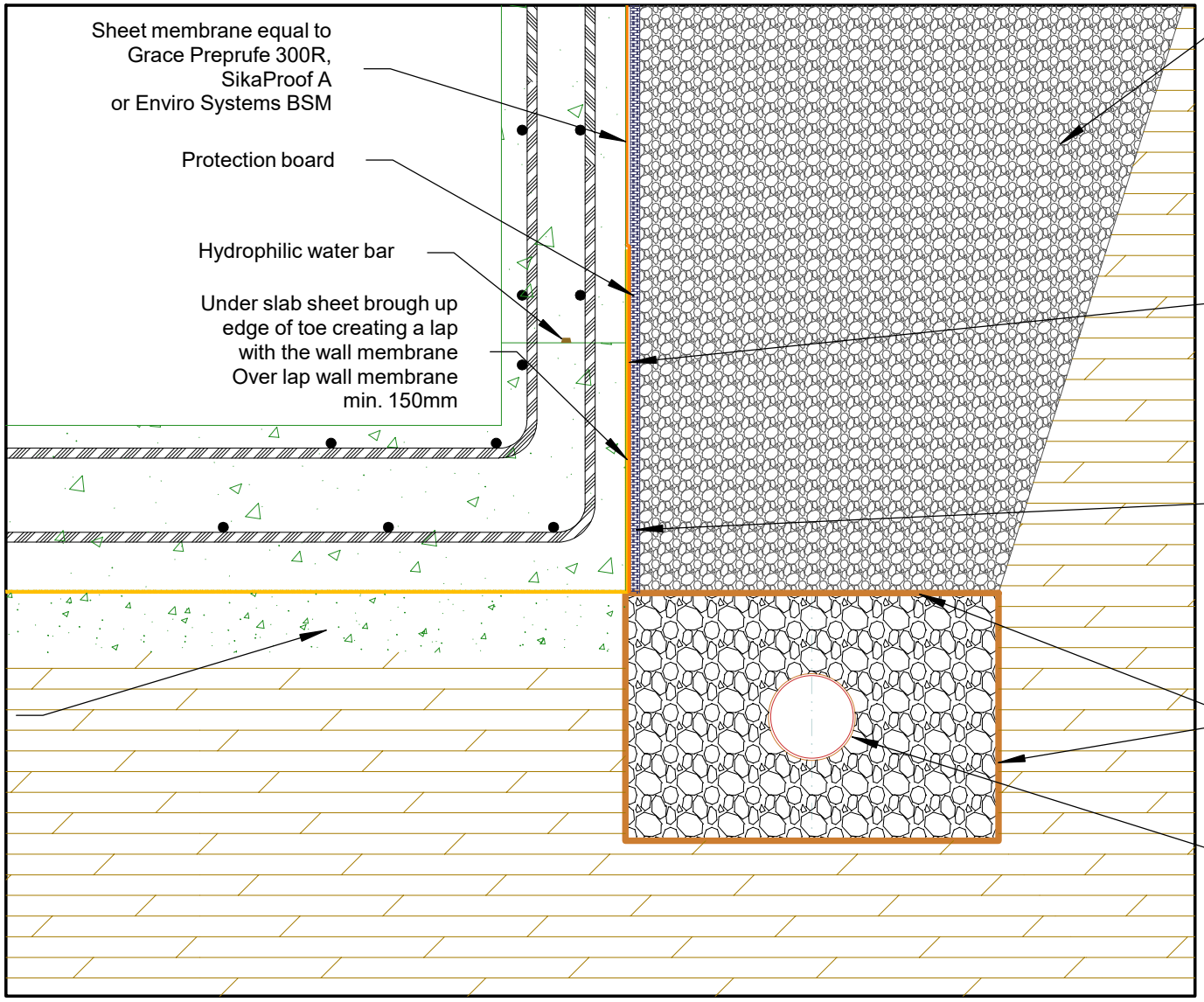
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Waterproofing Grade 3 - Section at Base of Lift Pit - Option 1	October 2017	17620	B



NOTE: MANUFACTURER'S DETAILS SHALL PREVAIL OVER ANY DETAIL SHOWN HEREIN.

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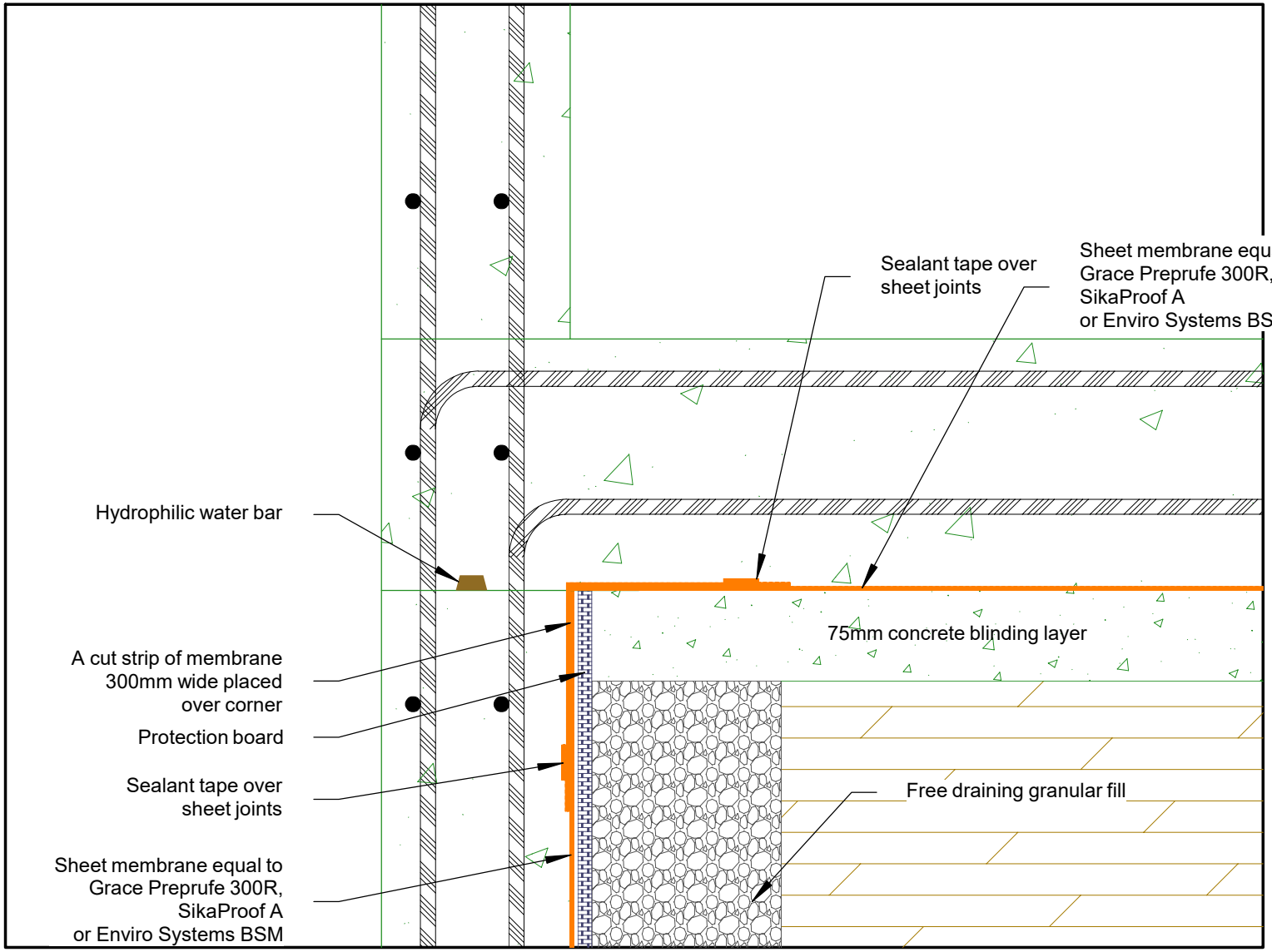
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Waterproofing Grade 3 - Section at Base of Stair Shaft or Similar - Option 2	October 2017	17621	A



NOTE: MANUFACTURER'S DETAILS SHALL PREVAIL OVER ANY DETAIL SHOWN HEREIN.

MULTIPLEX
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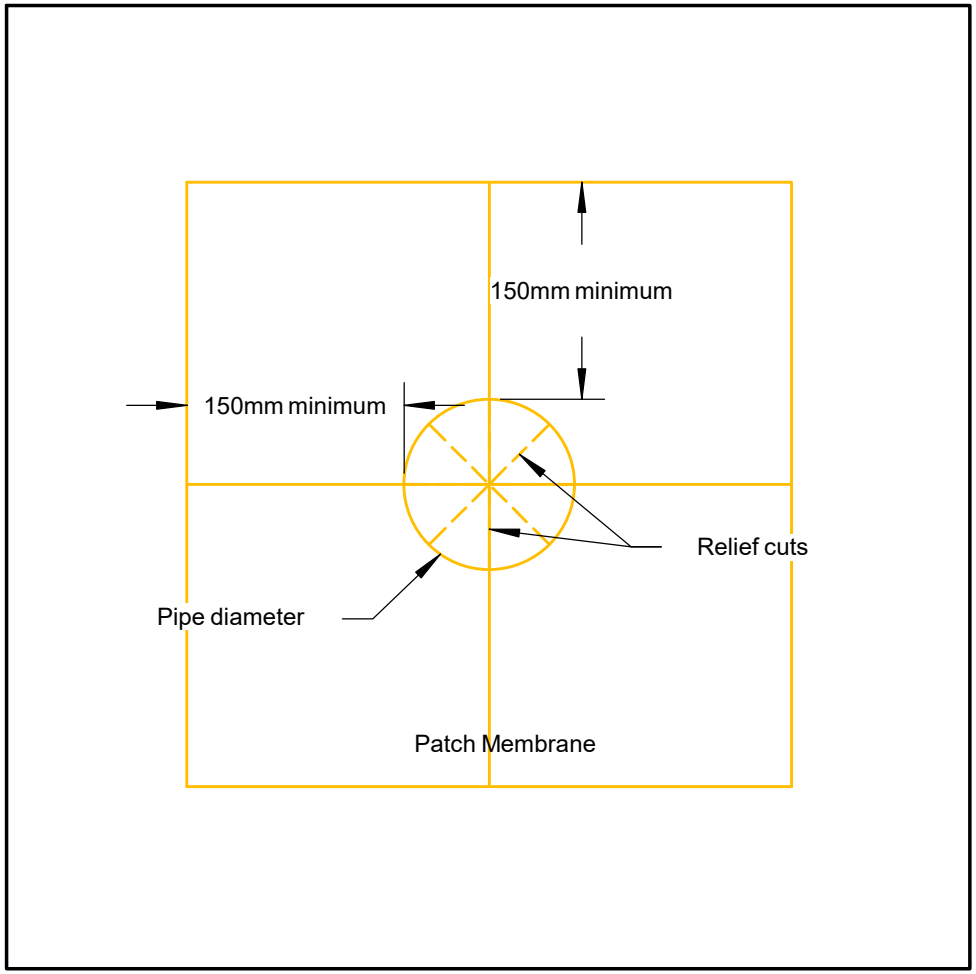
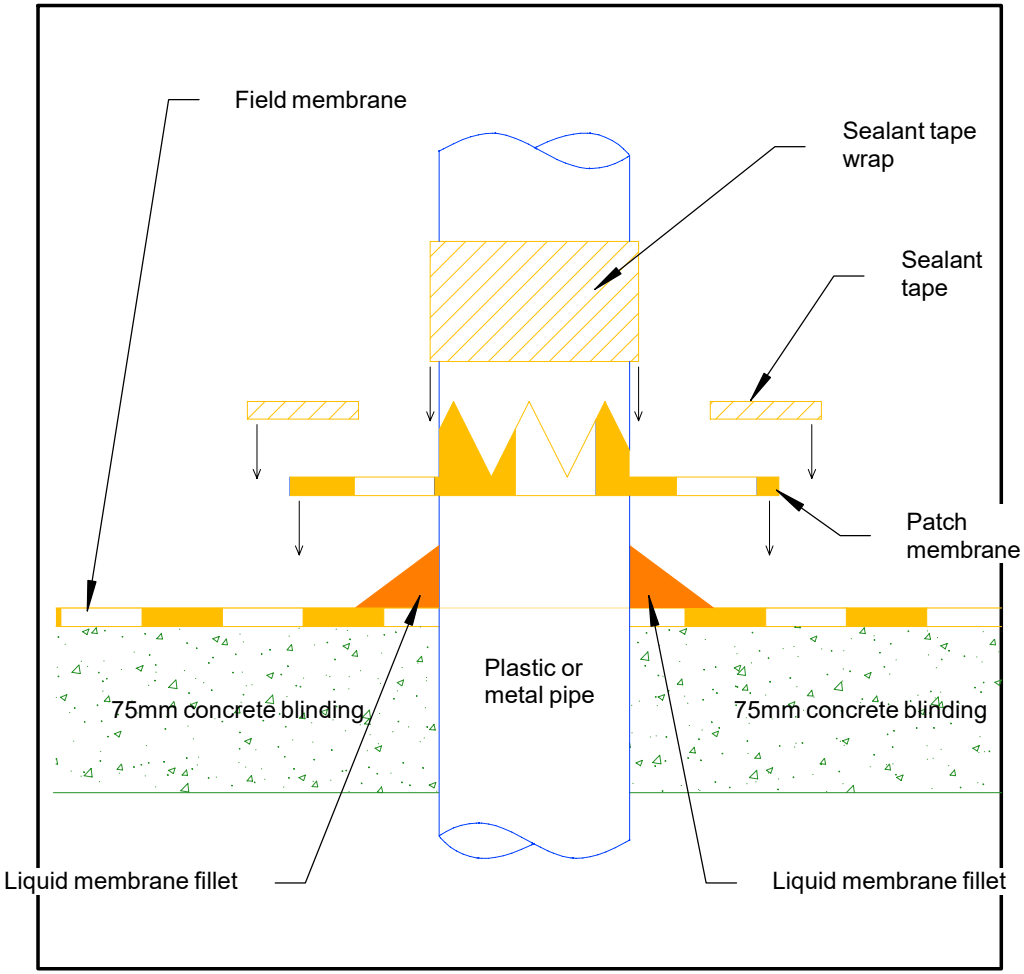
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Waterproofing Grade 3 - Plan at Intermediate Slab on Ground	October 2017	17622	A





1. All penetrations must be firmly secured and stable. Grout around all penetrations that are not stable. Clean loose dust or dirt from the penetration surface using a clean, dry cloth or brush.
2. Cut the field membrane tight to the penetration and remove release liner. If membrane is not within 12 mm of penetration and not more than 50 mm from penetration, apply sealant tape to cover the gap. Roll firmly into place and remove release liner. If the membrane is greater than 50 mm from penetration, install more membrane to cover the gap repeating these instructions until Membrane/Tape is within 12 mm.
3. Apply Liquid Membrane around the penetration. Liquid Membrane should be placed to form a minimum 25 mm continuous fillet between the sheet Membrane/Tape and the base of the penetration. Cut “star” within trace of penetration to allow for patch membrane to slide over the penetration.
4. Cut a patch of sheet Membrane that is a minimum of 300 mm larger than the diameter or width of the penetration so that the patch extends 150 mm beyond the penetration in all directions. Remove the release liner and centre the patch over penetration and trace/draw the penetration profile onto the patch. Using sheers or utility knife, make relief cuts through the membrane. Refer to relief cut figures on right. Triangles formed by making a relief cut is not to exceed 50 mm in height when placed over penetration, i.e. penetration diameters or widths greater than 100 mm need to be trimmed. Remove and discard release liner.
5. Slide the patch over penetration and press into the partially cured Liquid Membrane. Ensure that the patch is pressed firmly into the Liquid Membrane and is positioned directly onto the Field Membrane/Tape below. Using a trowel, smooth out any Liquid Membrane that has flowed out of the relief cut.
6. Apply sealant Tape centred over the edges of the patch and roll firmly to form a tight seal to the sheet Field Membrane. Remove release liner from tape and discard.
7. Wrap the penetration with sealant Tape, positioning the tape at the base of the patch. Remove enough release liner to overlap Tape on to itself and roll/press firmly into place. Remove remaining release liner and discard. Repair small fish mouths by pressing firmly against penetration and repair large fish mouths by patching with sealant Tape.

NOTE: MANUFACTURER'S DETAILS SHALL PREVAIL OVER ANY DETAIL SHOWN HEREIN.

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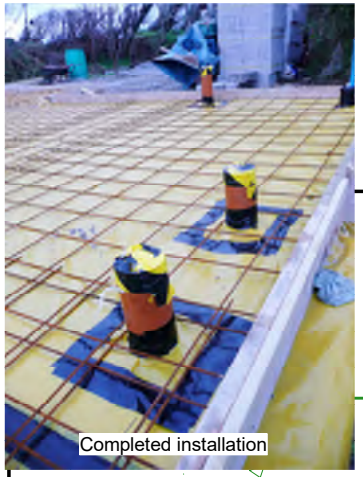
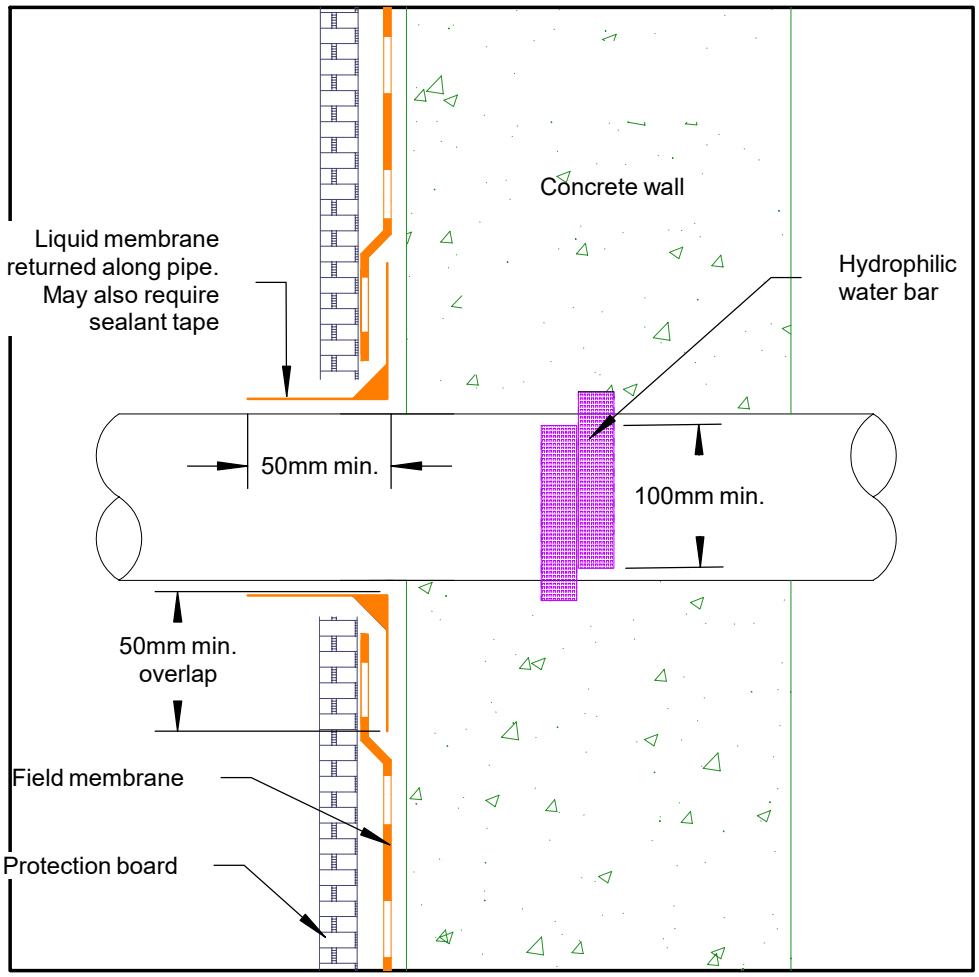
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Waterproofing Grade 3 - Pipe Penetration Installation Details	October 2017	17623	A


Completed installation

COMPLETED PENETRATION THROUGH A SLAB



COMPLETED PENETRATION THROUGH A WALL

NOTE: MANUFACTURER'S DETAILS SHALL PREVAIL OVER ANY DETAIL SHOWN HEREIN.

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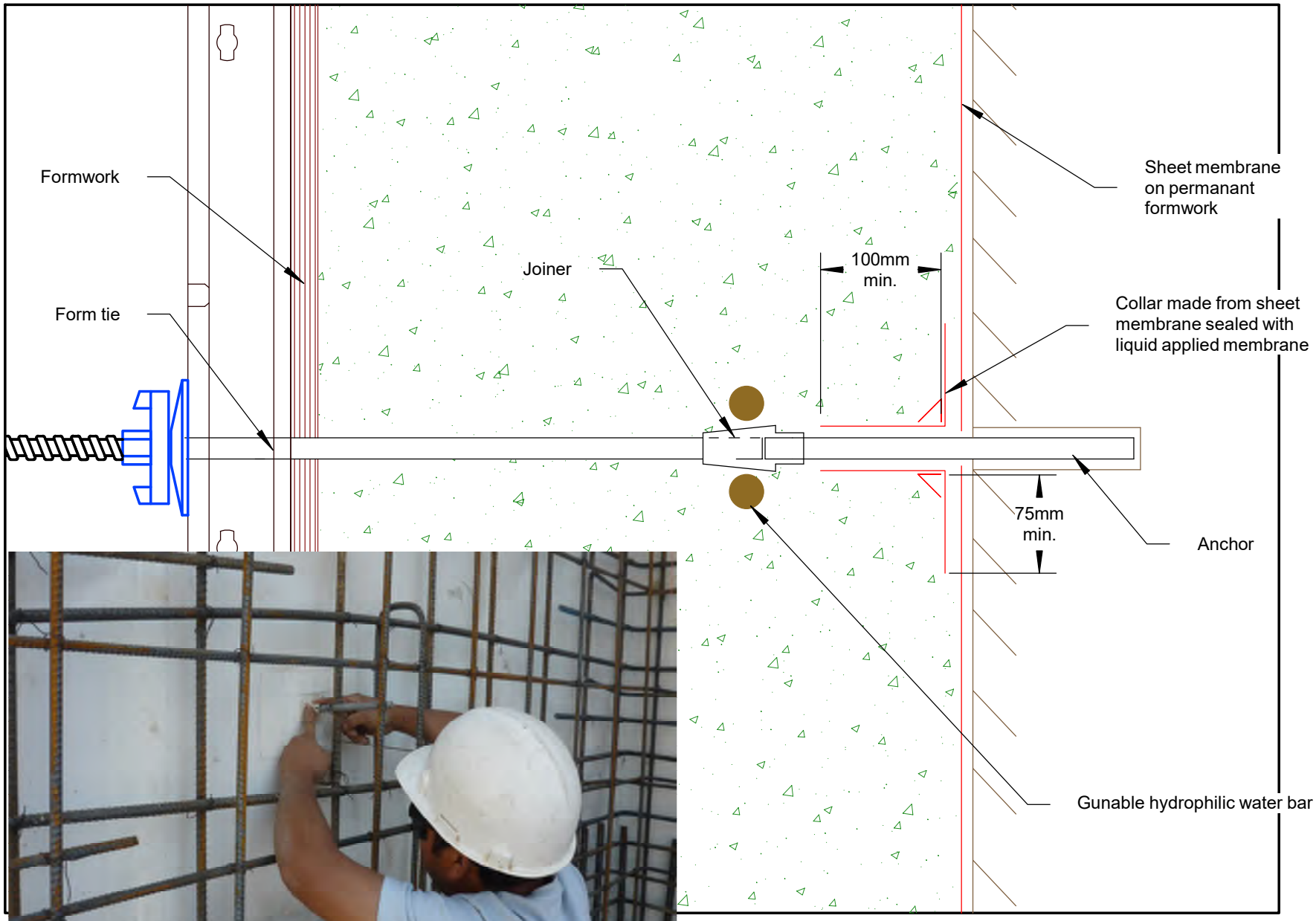
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Waterproofing Grade 3 - Completed Pipe Penetration Details	October 2017	17624	A



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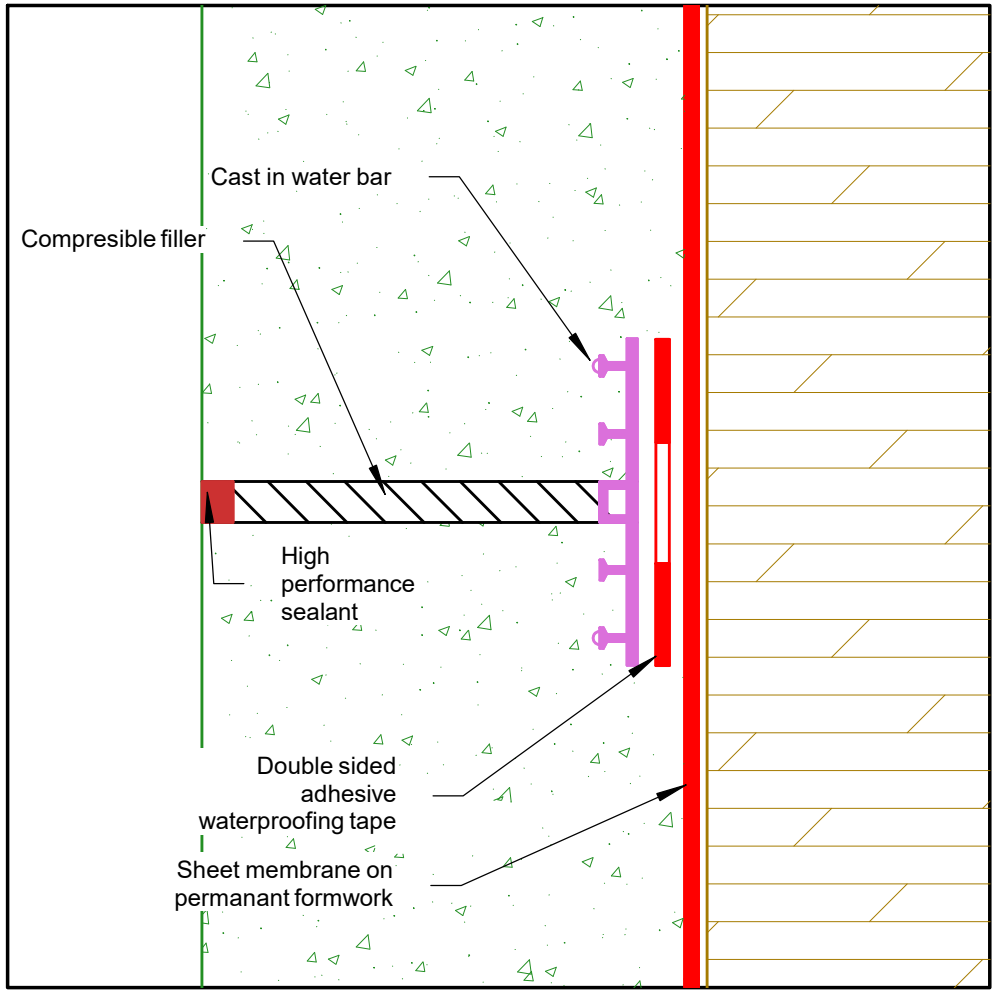
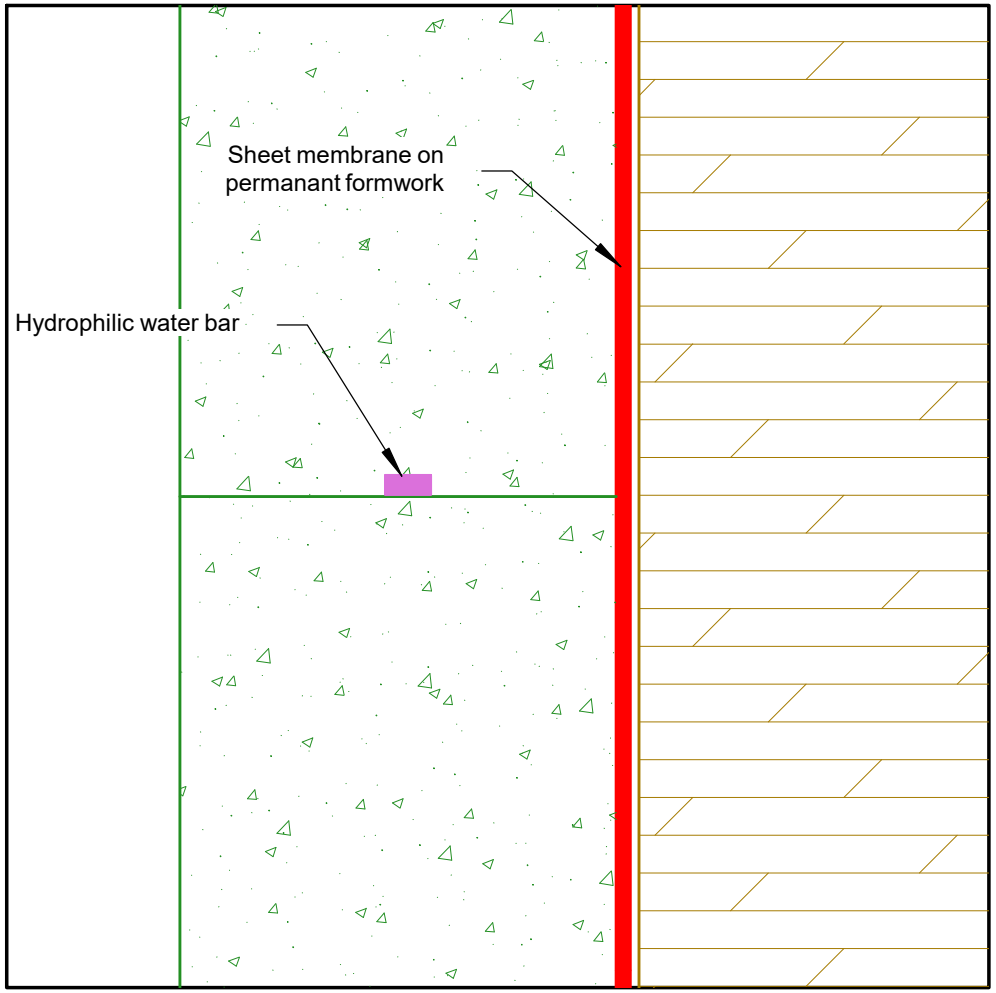
project
Multiplex Standard Details -
Below Grade Waterproofing

title
Basement Details - Waterproofing Grade 3 -
Formwork Tie Details

date	drawing no.	issue
October 2017	17625	A



1 DETAIL 1 - EXPANSION JOINT



2 DETAIL 2 - COLD JOINT

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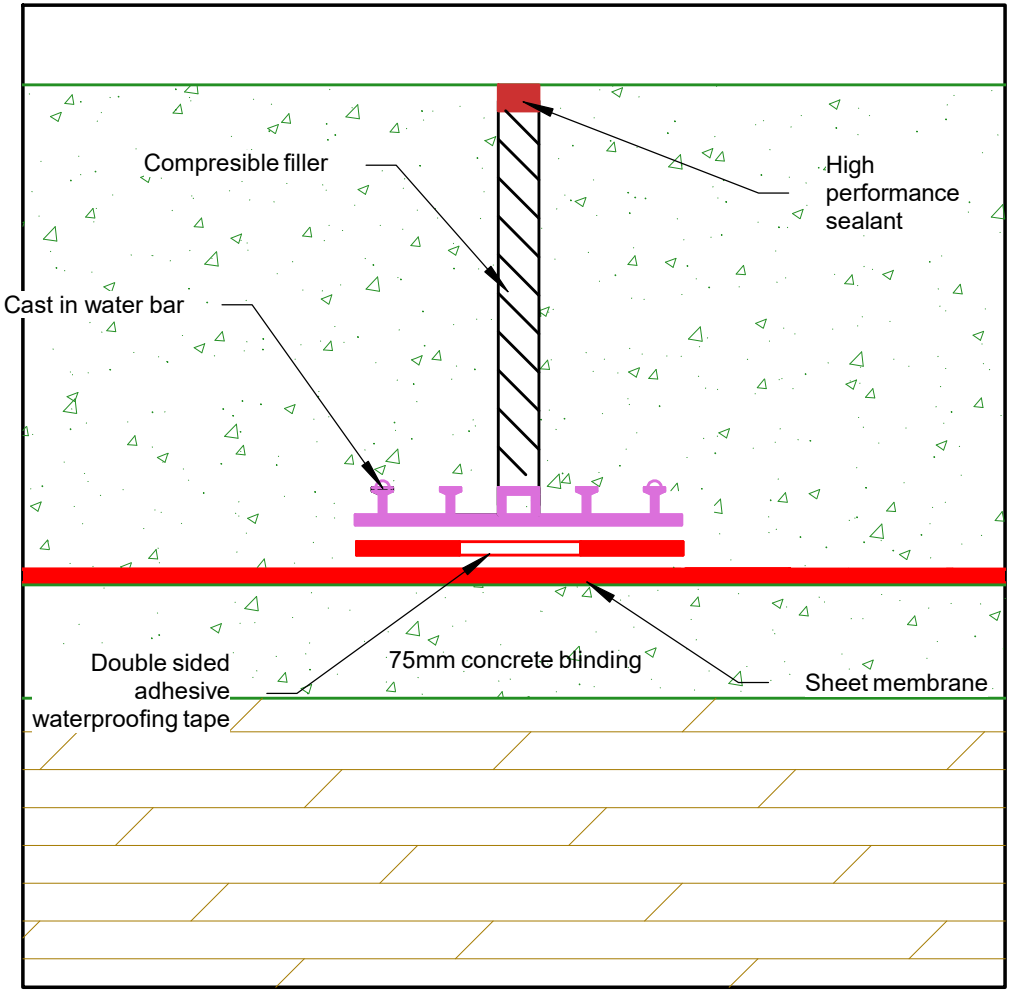
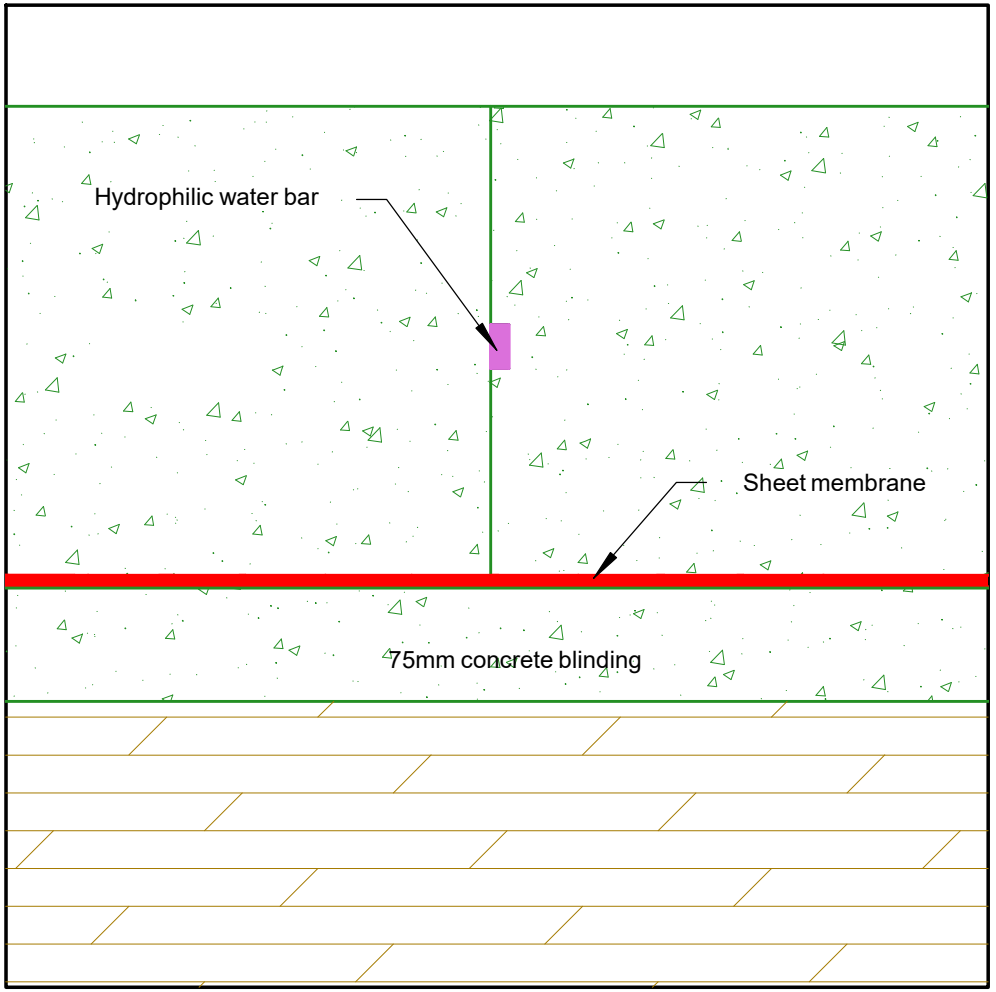
project	title	date	drawing no.	issue
Multiplex Standard Details - Below Grade Waterproofing	Basement Details - Waterproofing Grade 3 - Wall Joints	October 2017	17626	A



EXPANSION JOINT



COLD JOINT

MULTIPLEX
Built to outperform.

project: Multiplex Standard Details - Below Grade Waterproofing

title: Basement Details - Waterproofing Grade 3 - Floor Joints

date	drawing no.	issue
October 2017	17627	A