

| Drawing No. | CAD No.     | Description  |
|-------------|-------------|--|
| WW 1        | 2010070.002 | General construction notes   |
| WW 2        | 2010070.001 | Typical trench reinstatements details for wastewater                   |
| WW 3        | 2010070.005 | Bedding details  |
| WW 4        | 2010070.003 | Drainage plan format for design  |
| WW 5        | 2010070.010 | Manhole general details and layout. For manholes up to 1.8m deep       |
| WW 6        | 2010070.029 | Typical manhole throat and cover details                               |
| WW 7        | 2010070.033 | Angled manhole access details  |
| WW 8        | 2010070.009 | Terminating manhole detail 675mm nominal diameter                      |
| WW 9        | 2010070.012 | Manholes > 1.8m deep   |
| WW 10       | 2010070.013 | Manhole connection and starter detail                                  |
| WW 11       | 2010070.028 | Standard concrete manhole HDPE sliding joint                           |
| WW 12       | 2010070.054 | Standard concrete manhole restraint PE joint                           |
| WW 13       | 2010070.018 | Internal manhole plunge-drop pipe                                      |
| WW 14       | 2010070.036 | Saddle connections to gravity public wastewater                        |
| WW 15       | 2010070.038 | In-line service connections to public gravity wastewater               |
| WW 16       | 2010070.049 | Bulkheads for steep grades   |
| WW 17       | 2010070.037 | Private connection minimum floor level to soffit of wastewater         |
| WW 18       | 2010070.043 | Private rising main connection   |
| WW 19       | 2010070.041 | Pressure sewer outlet to gravity public                                |
| WW 20       | 2010070.055 | Pressure wastewater flush-out / scour                                  |
| WW 21       | 2010070.056 | Boundary pressure wastewater connection                                |
| WW 22       | 2010070.057 | Boundary multi-connection for pressure wastewater                      |
| WW 23       | 2010070.058 | Pressure wastewater vent and air valve                                 |
| WW 24       | 2010070.053 | Anchor block details. Reducers and vertical bends for pressure systems |
| WW 25       | 2010070.052 | Flange connection detail. PE main to other for pressure systems        |
| WW 26       | 2010070.044 | Pipe and manhole construction clearance                                |
| WW 27       | 2010070.045 | Building close to, or over local network wastewater                    |
| WW 28       | 2010070.051 | Guideline for building close to, or over transmission wastewater       |

# GENERAL CONSTRUCTION NOTES

## STANDARDS RELATING TO WORKS

Works shall to be carried out to the requirements of the Health & Safety at work in Employment Act 2015

Works shall be completed to Watercare Construction Standards.

## MANUFACTURERS SPECIFICATIONS

Materials shall be installed to the Manufacturers requirements unless otherwise specified.

## WELDING & FIXINGS

All steelwork shall be be workshop fabricated.

Steelwork and fixings shall be hot-dip galvanised to AS/NZS 4680 unless otherwise stated.

A Nickel anti-seize free of copper , lead , sulphides , chlorides & carbons ( graphite ) shall be used on bolts.

## REINFORCING STEEL

Reinforcing shall be centrally placed with the specified minimum cover.

Bends shall be cold formed.

## JOINT SEALS

Flanges : Per WSL Material Standard.

Manhole Joints : Concrete manhole with flexible joint seal such as rubber or butyl.

All joints must be externally wrapped with an accepted tape wrapped system.

Alternative materials to suppliers' specifications.

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## GENERAL CONSTRUCTION NOTES

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 13-07-2018   |
| DWG No.       | 2010070.002D |
| REFERENCE No. | <b>WW 1</b>  |

**Grass**  
 Sow with grass seed mix  
 15% Chewings Fescue  
 7.5% Brown Top  
 7.5% Crested Dogstail  
 70% Perennial Ryegrass  
 ( by weight )  
 Clean topsoil compacted  
 depth 100mm

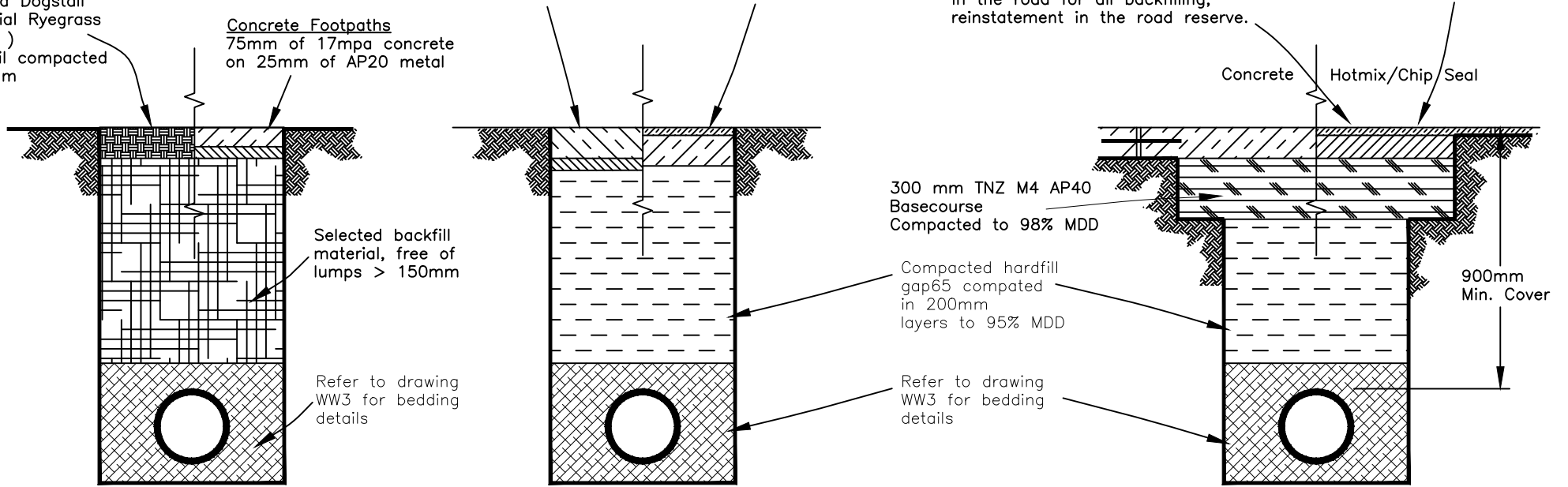
**Concrete**  
 150mm of 17.5mpa concrete  
 on 50mm of TNZ M/4 AP20  
 metal. Minimum width of  
 surface reinstatement 1m.

**Hotmix**  
 25mm of mix10 AC on  
 125mm of AP40 basecourse.

Refer Auckland Transport –  
 Code of Practice for working  
 in the road for all backfilling,  
 reinstatement in the road reserve.

**Hotmix – Footpaths**  
 For existing red chip footpaths  
 dress with 4.75mm Red Chip  
 footpath aggregate if required  
 by Council

**Concrete Footpaths**  
 75mm of 17mpa concrete  
 on 25mm of AP20 metal



GRASS AREA & FOOTPATH  
 ( Not in Road reserve )  
 REINSTATEMENT

DRIVEWAY REINSTATEMENT  
 (Not in Road Reserve)

FOOTPATH/VEHICLE CROSSING,  
 CARRIAGEWAY REINSTATEMENT

**NOTES**

- All trench surface reinstatement within the road reserve shall comply with Auckland Transport requirements. The details shown are typical expectations for reinstatements.
- Backfill shall be compacted in 200mm layers to obtain maximum density as described in Watercare's Construction Standards.
- Where concrete or other stabilized layers exist in the roadway, the trench shall be reinstated with similar material or as directed by the roading engineer.

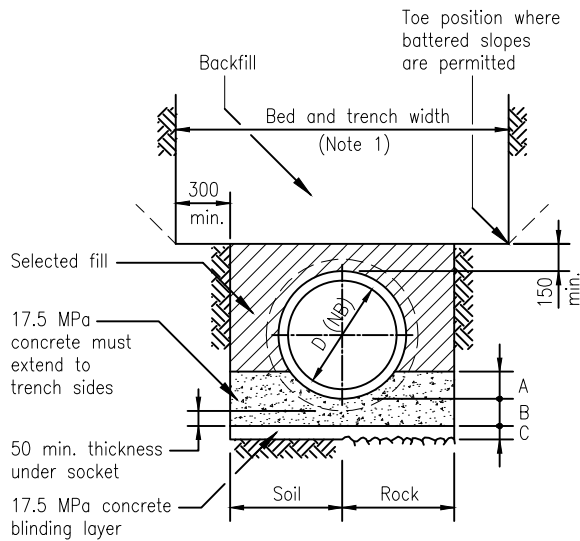
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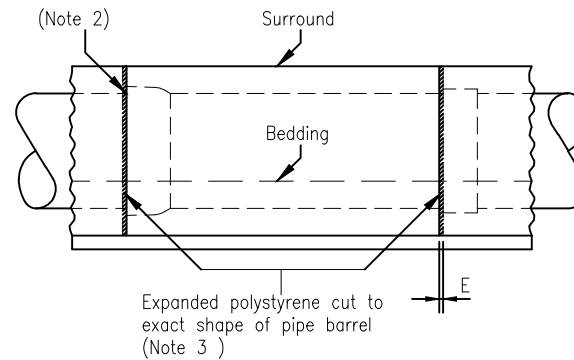
TYPICAL TRENCH REINSTATEMENT  
 DETAILS FOR WASTEWATER

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 06-03-2017   |
| DWG No.       | 2010070.001C |
| REFERENCE No. | WW 2         |

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CONCRETE BEDDING

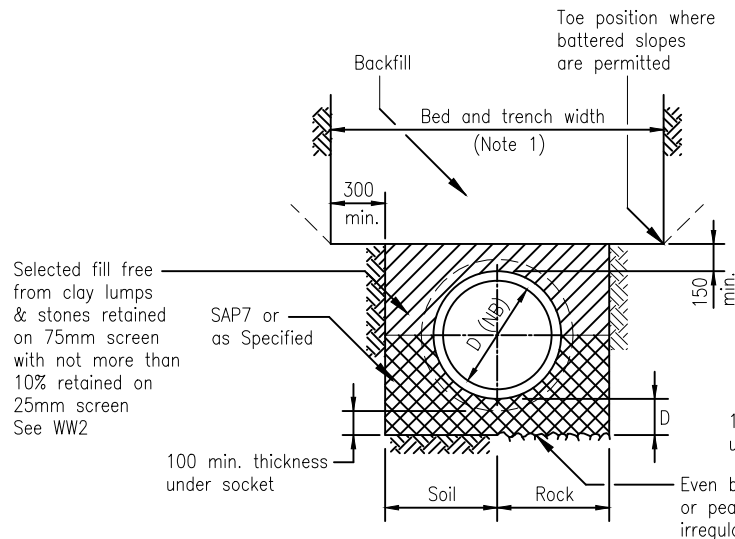


CONCRETE BEDDING AND SURROUND

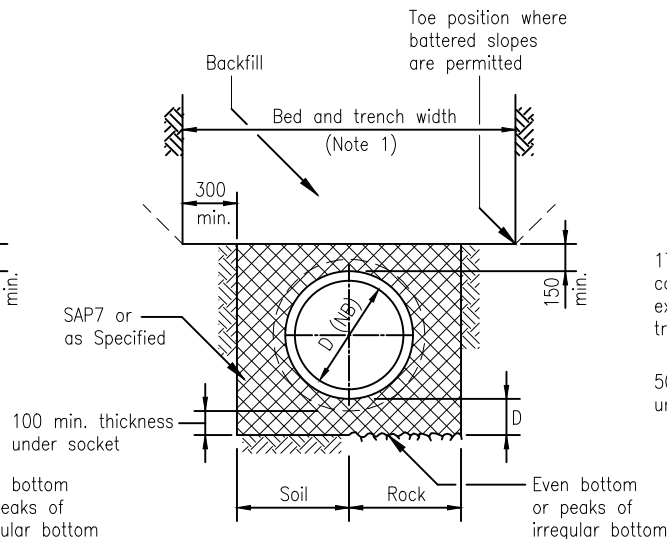
- NOTES :
1. Concrete bedding O.A. Width =  $D+200\text{mm}$   
Concrete Surround O.A. Width =  $D+D/2$  with Min 50mm concrete either side.  
Granular bedding Min. 300mm either side of the pipe.
  2. Wrap joint gap outside the rubber ring with an acceptable system.
  3. Expanded polystyrene shall extend the full cross-section of concrete.
  4. Bedding and backfill shall be well compacted in layers not exceeding 200mm depth to AS/NZS 2566.2

| DIMENSION TABLE |              |           |
|-----------------|--------------|-----------|
|                 | $D \leq 250$ | $D = 300$ |
| A               | $0.5D$       | 150       |
| B               | 100          | 150       |
| C               | 50           | 50        |
| D               | 150          | 150       |
| E*              | 25           | 25        |
| E**             | 25           | 25        |

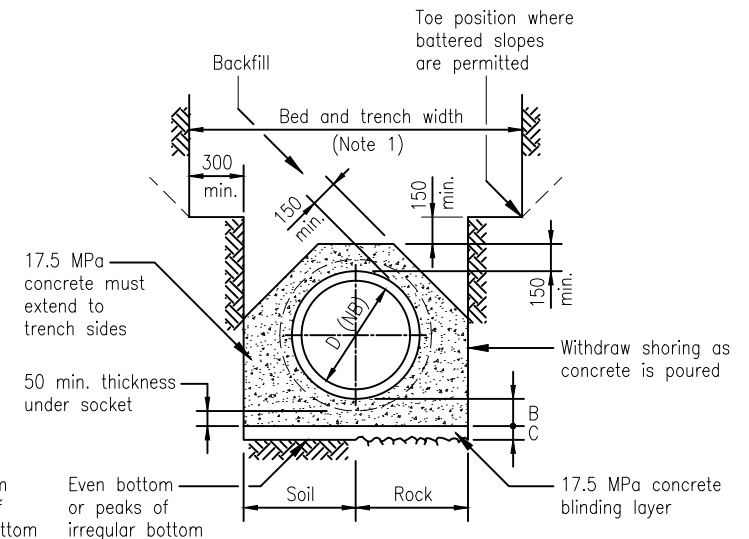
E\*=E for concrete surround  
E\*\*=E for concrete bedding



GRANULAR BEDDING



GRANULAR SURROUND



CONCRETE SURROUND

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 23-01-2017   |
| DWG No.       | 2010070.005C |
| REFERENCE No. | WW 3         |

BEDDING DETAILS

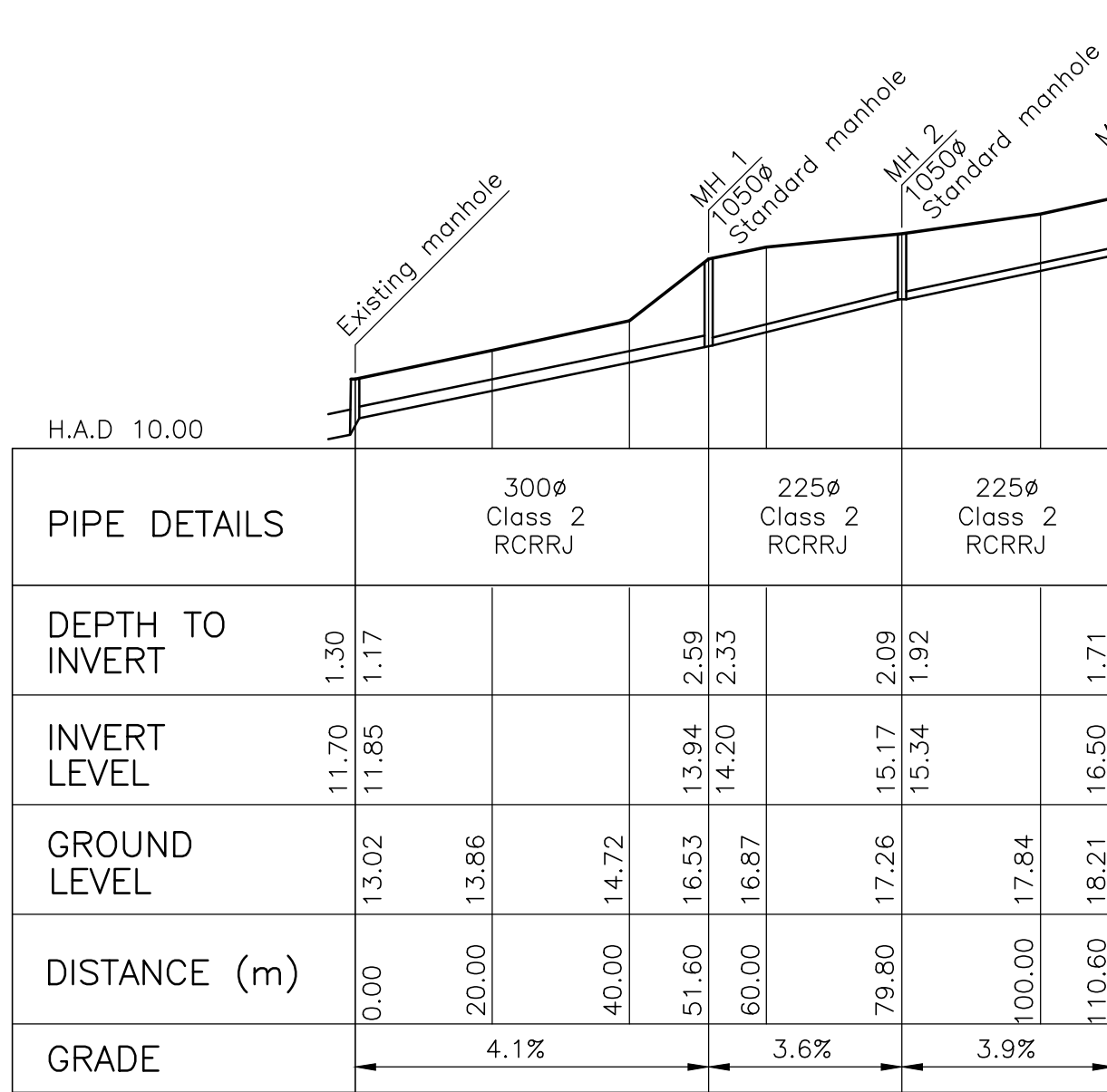


**NOTES**

- 1/ Show all underground services on plan and longitudinal sections.
- 2/ Calculation of grades are based on the distances between manhole centrelines minus the average diameter of the two manholes.

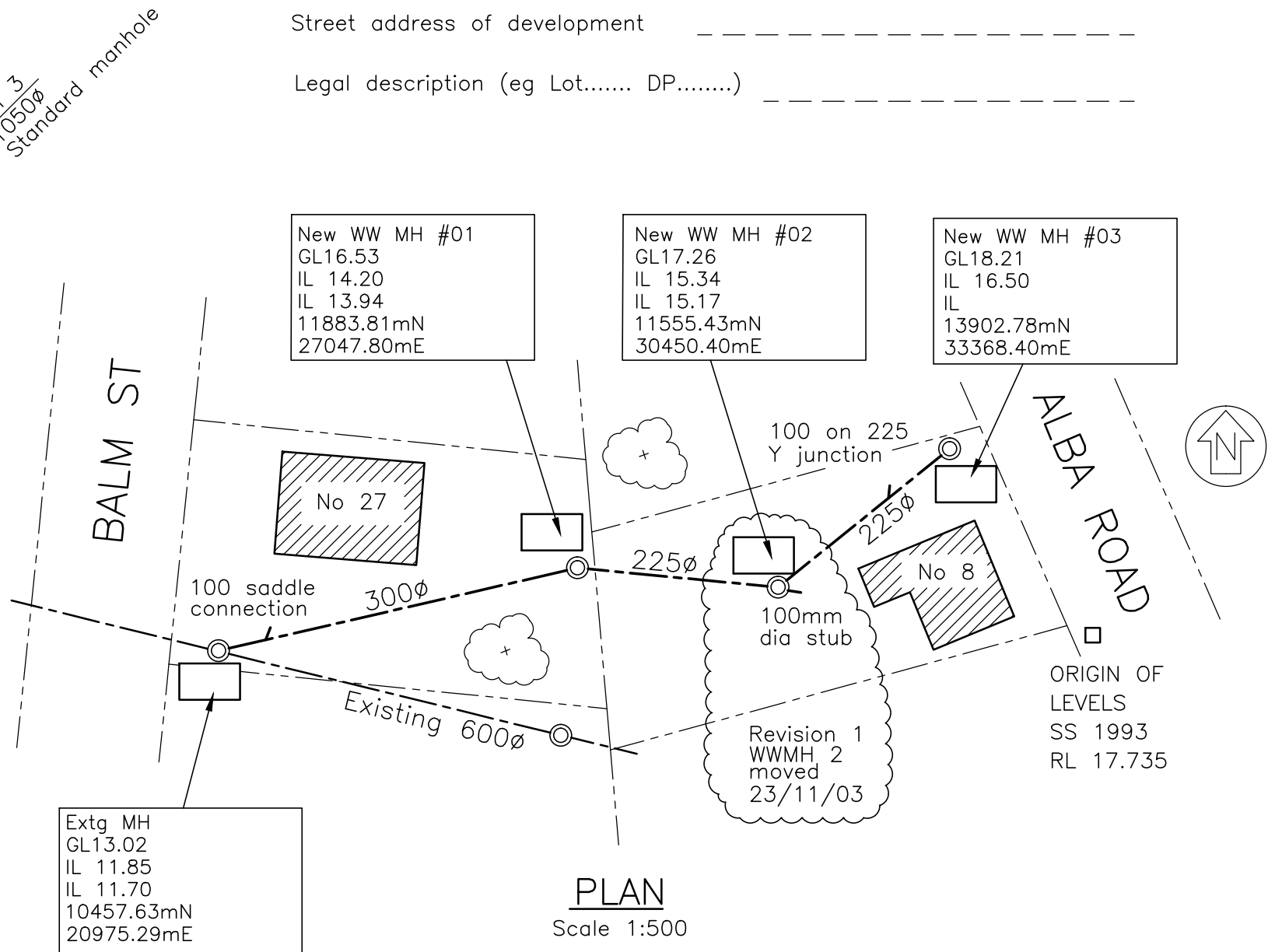
**LIST OF STRUCTURES PROPOSED TO BE PUBLIC**

| From     | To      | Being                           |
|----------|---------|---------------------------------|
| Exist MH | New MH3 | 110m WW<br>(600mm to 225mm dia) |



**LONGITUDINAL SECTION**

Scale Horiz. 1:500  
Vert. 1:100



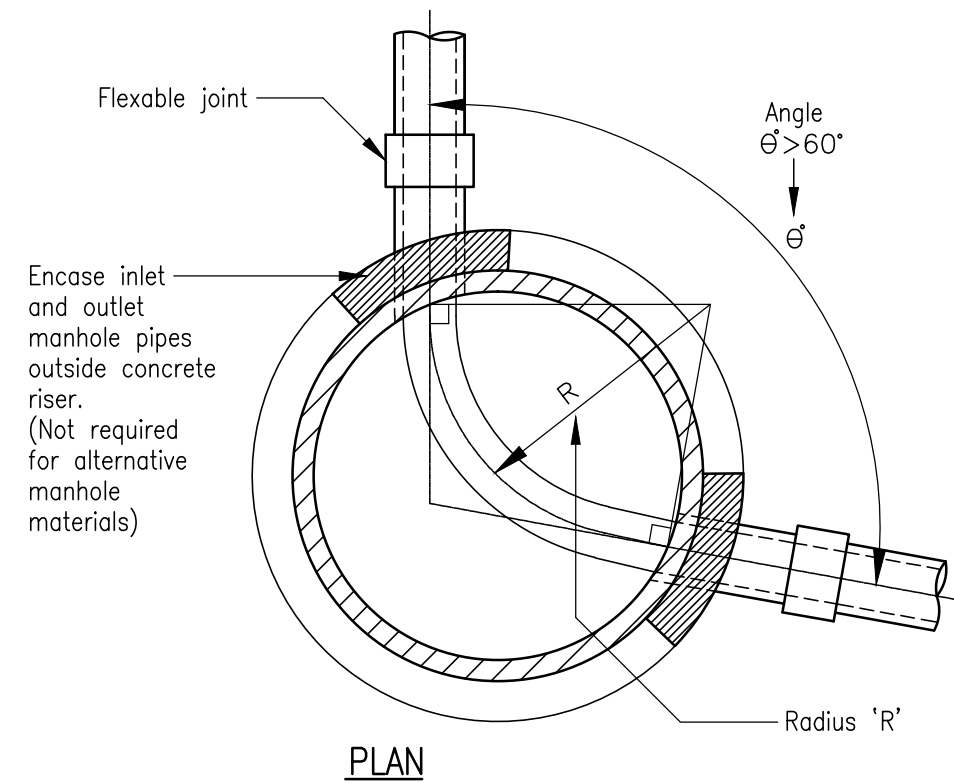
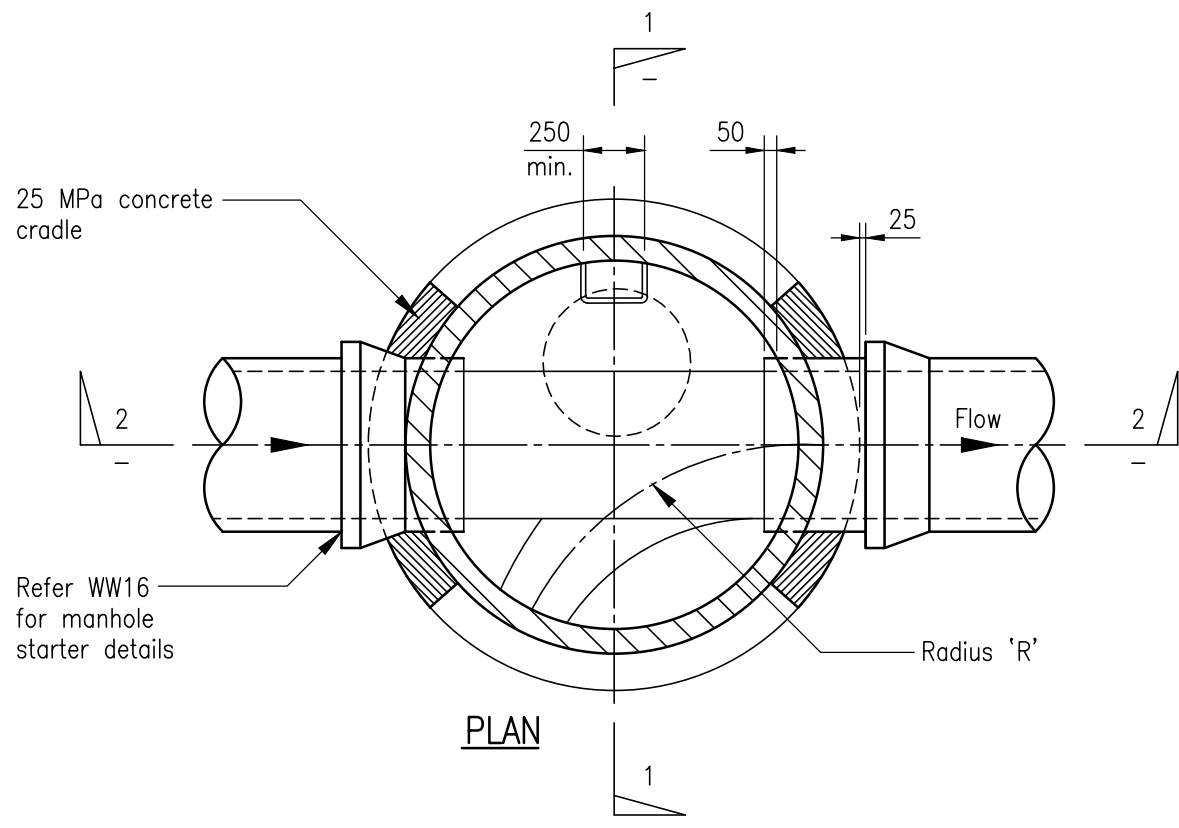
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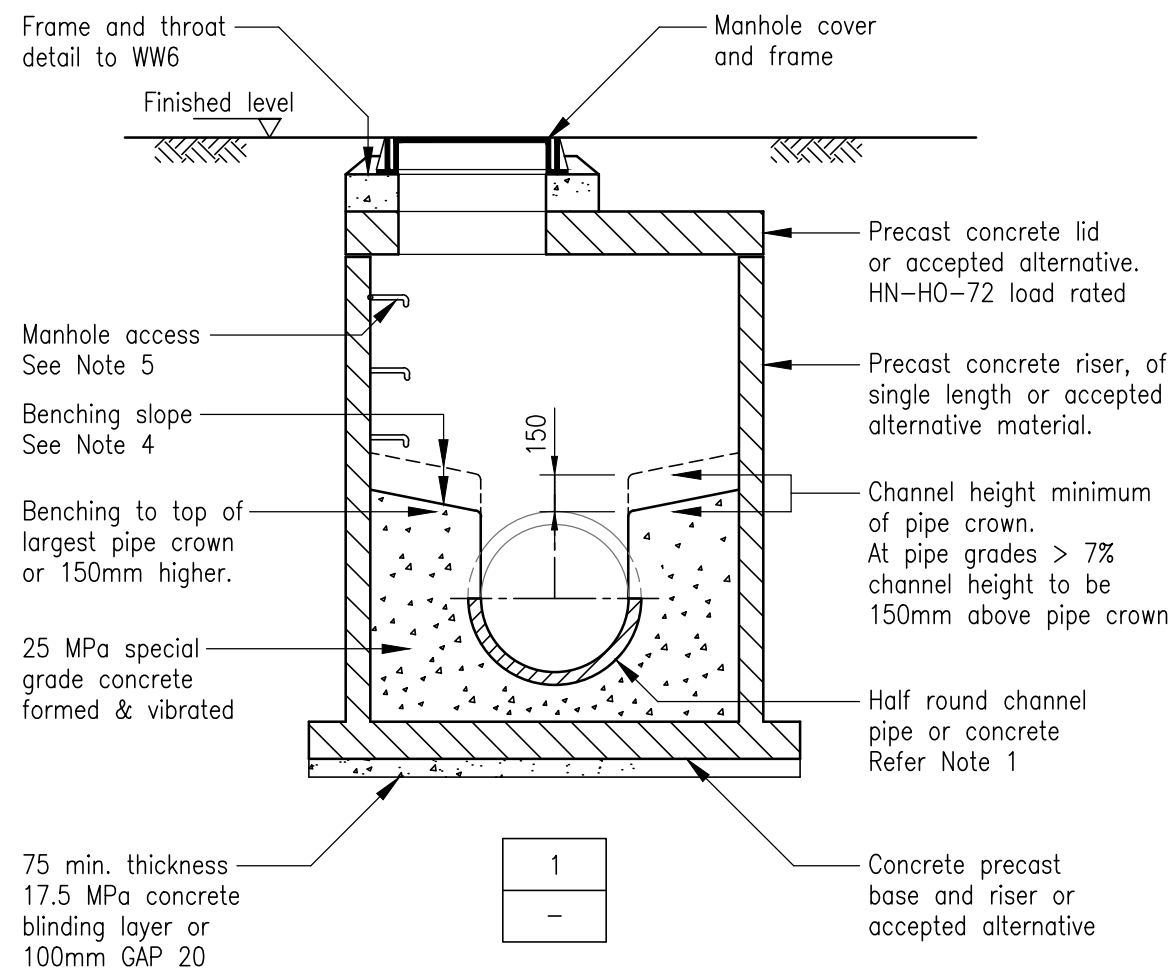
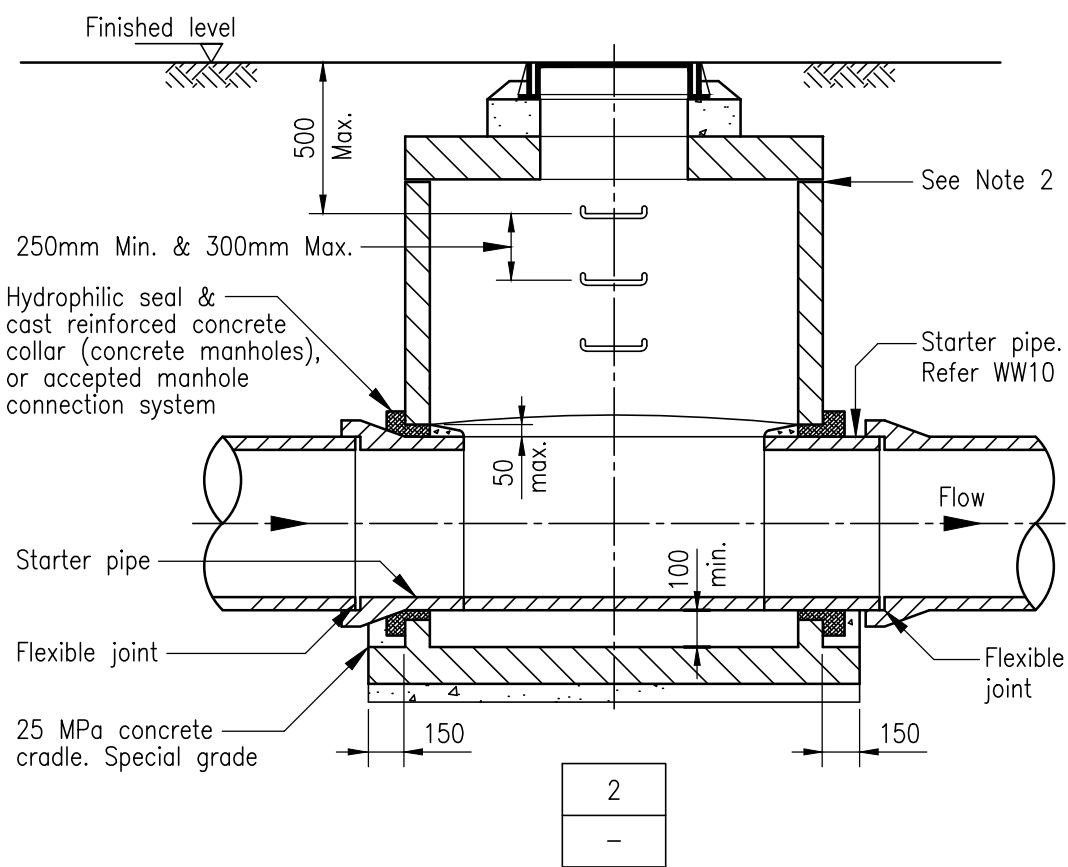
**DRAINAGE PLAN FORMAT FOR DESIGN**

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 13-07-2018   |
| DWG No.       | 2010070.003B |
| REFERENCE No. | WW 4         |



| MANHOLE RISER DIAMETERS |                             |      |      |
|-------------------------|-----------------------------|------|------|
| MAX. PIPE DIA.          | NO. OF INCOMING PIPES **    |      |      |
|                         | 1                           | 2*   | 3*** |
| ≤250                    | 1050                        | 1050 | 1050 |
| 300                     | 1500                        | 1500 | 1500 |
| >300                    | Refer to transmission dwgs. |      |      |

\* Based on Max. 120 Deg deflection through manhole.  
 \*\* To be determined with due regard for future potential connections.  
 \*\*\* Based on Min. 60 Deg between pipes & ≤ 180 Deg between pipe 1 & pipe 3  
 [ Outside these criteria requires specific design ]



**NOTES:**

- Half round channels shall be pre-formed from a corrosion, prohibitive material.
- Joint seals shall be an acceptable flexible seal. The joint shall be closed with an epoxy mortar ( if concrete ) & externally wrapped with an acceptable wrapping system.
- Refer WW6 for manhole throat and cover details.
- Concrete benching shall have a minimum slope of 1 in 12, proprietary benching products with a smooth surface ( such as Polyethylene ) shall not be less than 1 in 20. Refer to Watercare material supply standard.
- Refer to the material supply standard for step-rung and ladder policy.
- For manholes deeper than 1.8m Refer to WW9
- Abbreviations :  
 Min. = Minimum  
 I.D. = Internal diameter  
 'R' = Min. Radius ( 3 x I.D. ).

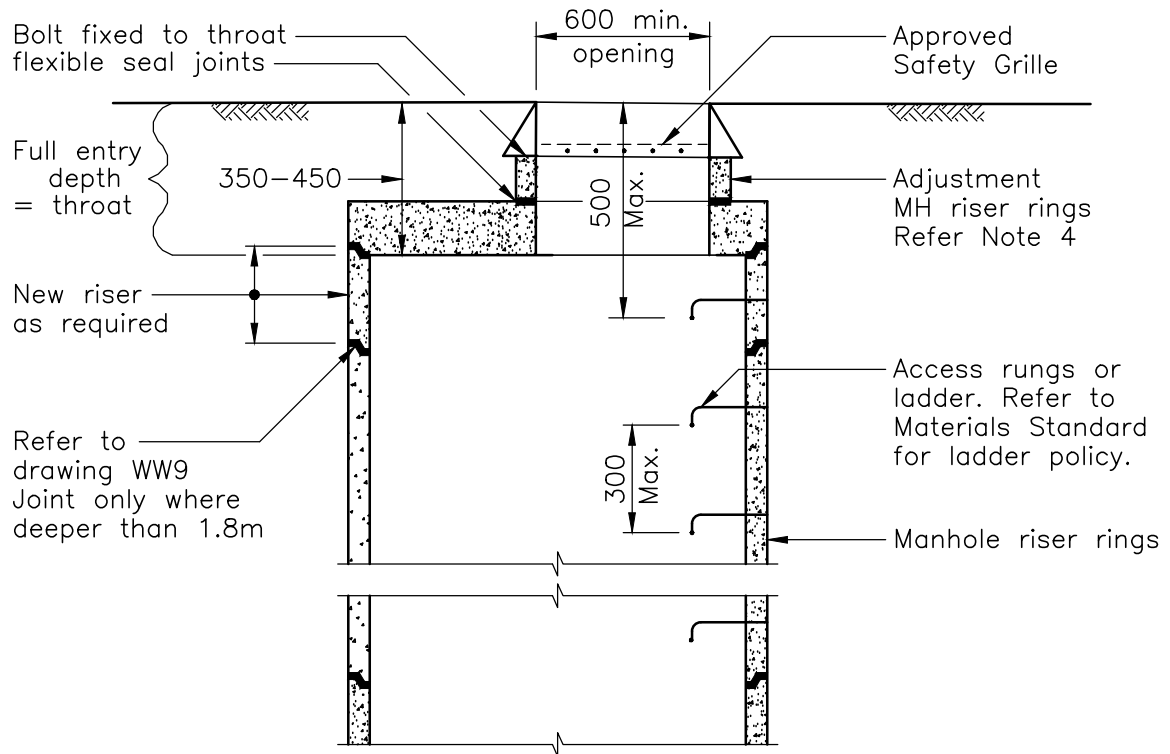
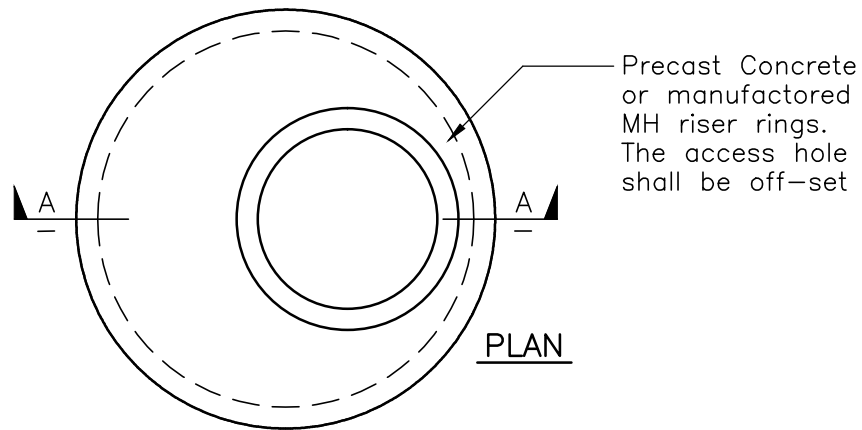
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**MANHOLE GENERAL DETAILS AND LAYOUT FOR MANHOLES UP TO 1.8m DEEP**

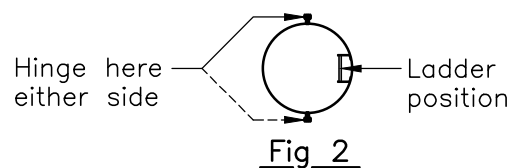
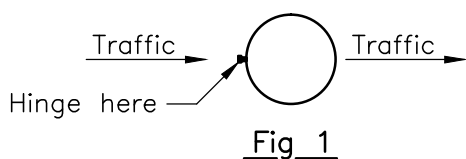
|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 13-07-2018   |
| DWG No.       | 2010070.010D |
| REFERENCE No. | WW 5         |



**TYPICAL SECTION A-A  
THROUGH MANHOLE**

**NOTES:**

1. Lid supplied to HN-HO-72 loading and compliance certified.
2. When the throat depth is greater than 450mm, a new manhole riser is required with a new adjustment ring.
3. Refer drawing WW9 for manholes deeper than 1.8m
4. Refer drawing WW7 for sloping ground.
5. Refer drawing WW5 for manhole details.
6. Approved Safety Grille below access manhole cover.
7. Manhole covers in the road shall be constructed so that the cover hinge is facing the oncoming traffic. ( Refer Fig 1 )
8. For all other covers the orientation should be so that the cover hinge is at 90 degrees from the ladder, Either side. ( Refer Fig 2 )



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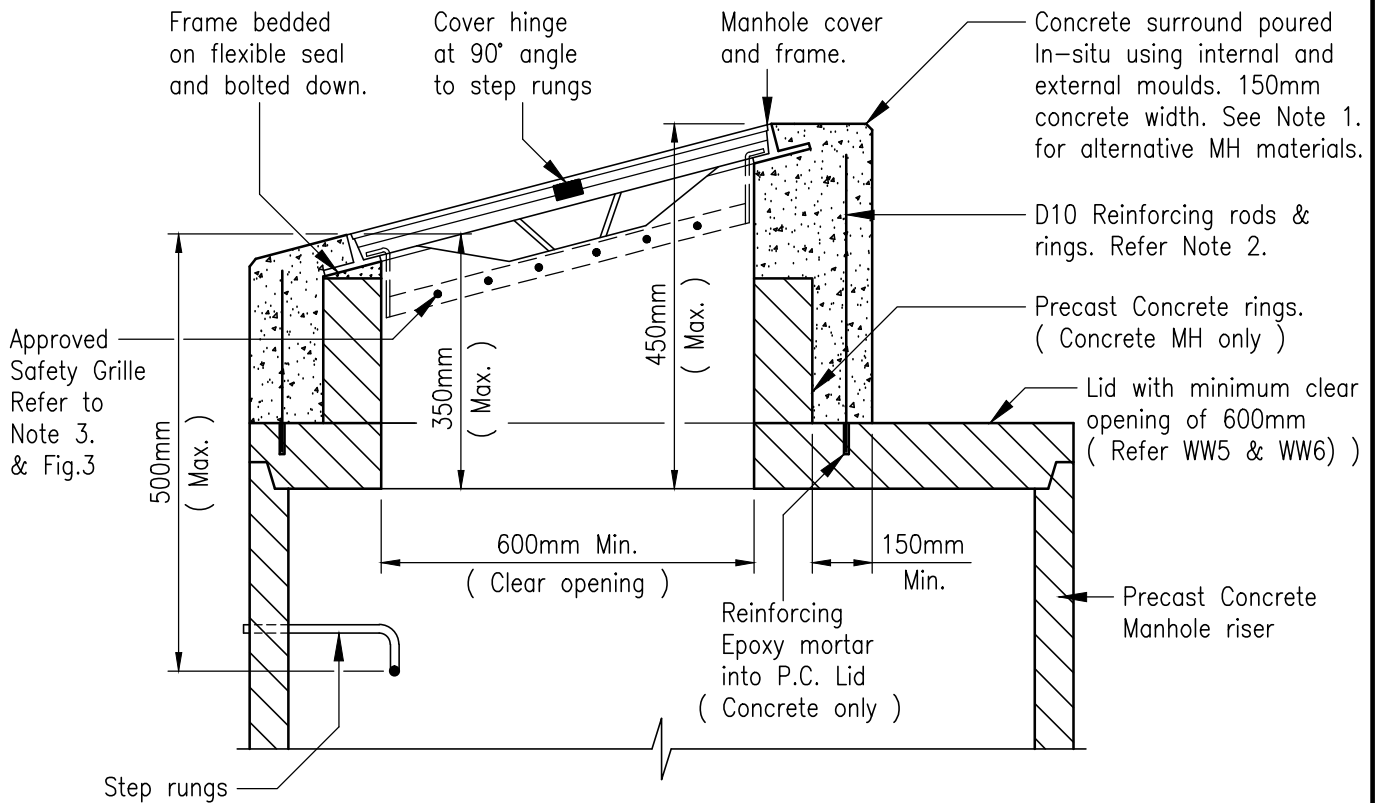
**TYPICAL MANHOLE THROAT  
AND COVER DETAILS**

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 13-07-2018   |
| DWG No.       | 2010070.029C |
| REFERENCE No. | <b>WW 6</b>  |





Fig.3



ANGLED MANHOLE ACCESS

NOTES :

1. MH material other than concrete cut to suit on-site.
2. D10 vertical reinf. rods & horizontal rings to be spaced at 300mm max. crs.
3. Approved Safety Grille below access manhole cover.
4. Manhole covers in road shall be constructed so that the cover hinge is facing the oncoming traffic. ( Refer Fig.1 )
5. For all other covers the orientation shall be so that the cover hinge is at 90 degrees from the ladder, either side. ( Refer Fig.2 )
6. See Fig.3 for safety grilles. Type and position must be considered for angled installation.

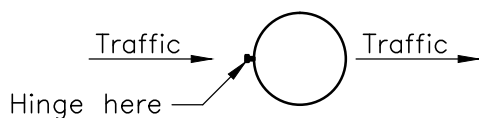


Fig.1

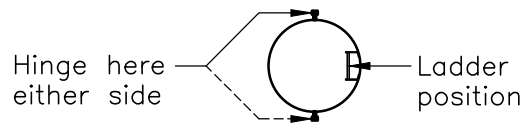


Fig.2

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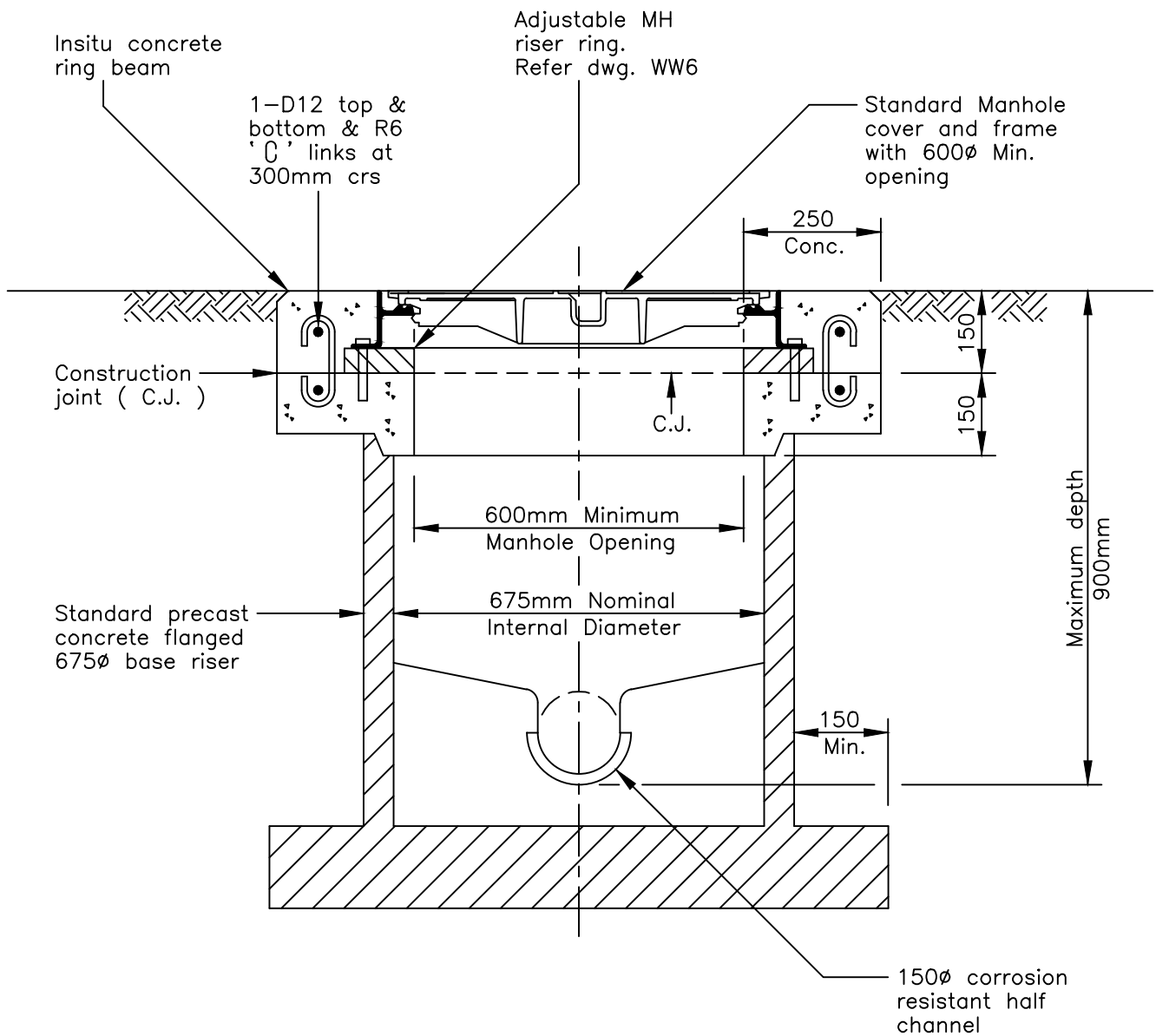


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**ANGLED MANHOLE ACCESS DETAILS**

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 13-07-2018   |
| DWG No.       | 2010070.033D |
| REFERENCE No. | <b>WW 7</b>  |





### Notes:

1. Only to be used as terminating manhole on level Residential sites with more than two 100 $\phi$  House connections.
2. This drawing to be read with WW5 and WW6

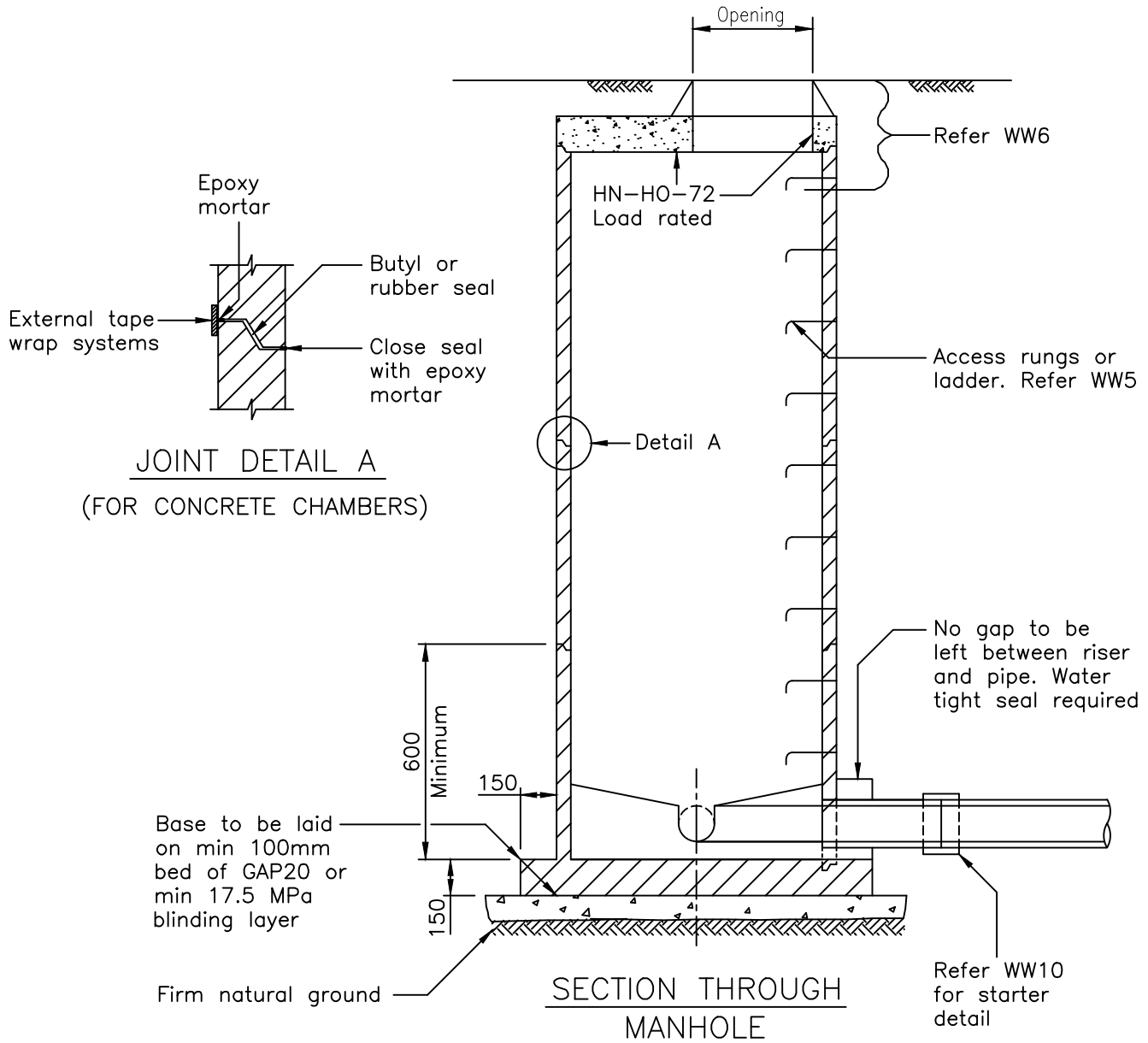
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## TERMINATING MANHOLE DETAIL 675mm NOMINAL DIAMETER

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 06-03-2017   |
| DWG No.       | 2010070.009C |
| REFERENCE No. | WW 8         |



JOINT DETAIL A  
(FOR CONCRETE CHAMBERS)

Notes:

1. Refer to WW5 for general details.
2. Channel through manhole to be lined.
3. All manhole openings must be cut.
4. For droppers refer to WW13
5. The manhole diameter shall be increased to minimum internal 1200mm for all manholes greater than 3.0 metres deep.
6. For manholes > 6.0 metres deep the minimum internal diameter shall be 1500mm.
7. Refer WW6 for manhole throat and cover details.
8. Manholes greater than 6m deep must be installed with landing platforms. Refer drawing in ( Transmission drawing set )

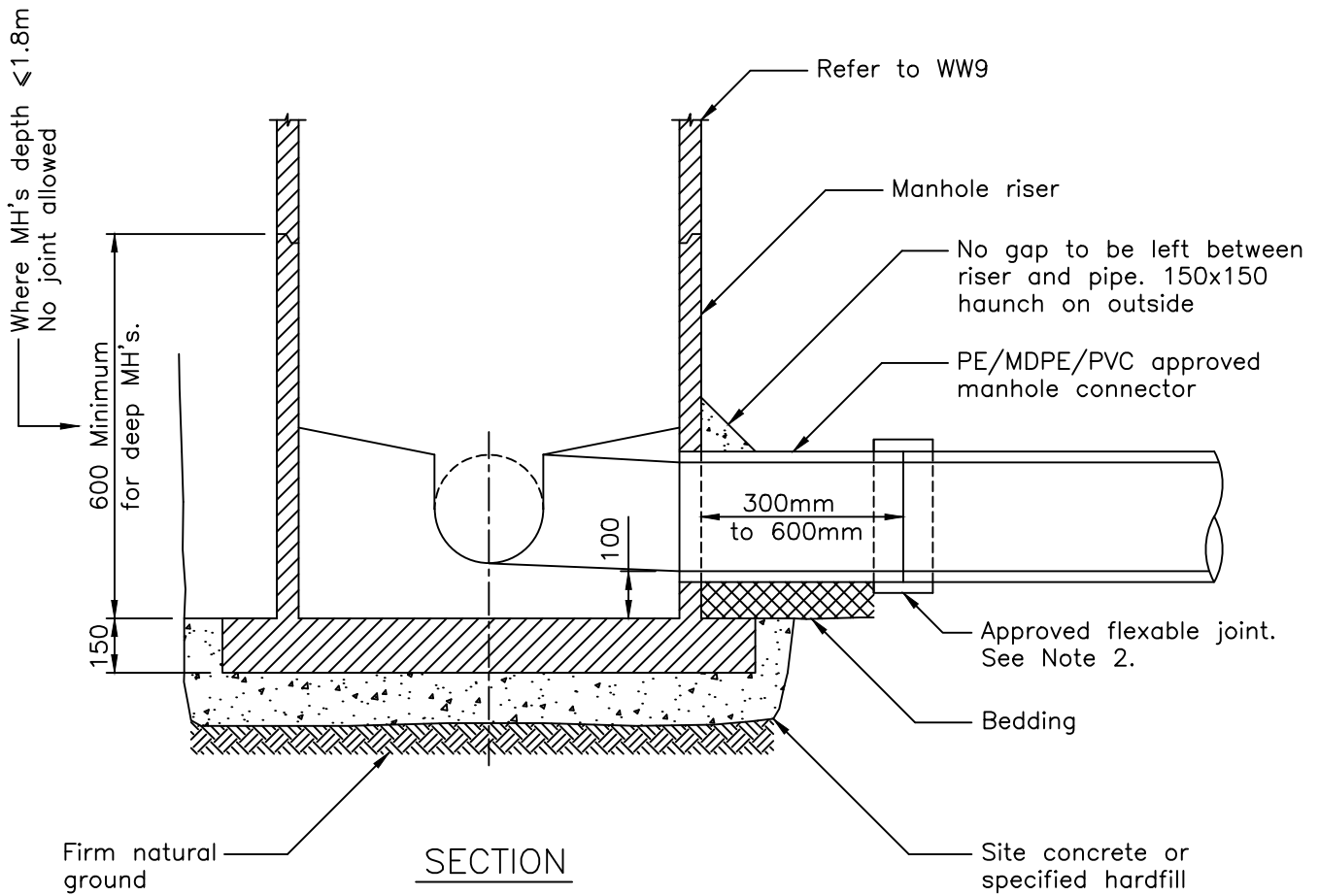
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MANHOLES > 1.8m DEEP

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 13-03-2017   |
| DWG No.       | 2010070.012D |
| REFERENCE No. | WW 9         |



Notes:

1. This drawing shall be read with WW5.
2. For PE pipe connections to a concrete manhole refer to WW11 and WW12 for acceptable solutions.
3. Detail may differ for accepted proprietary manhole systems other than concrete.

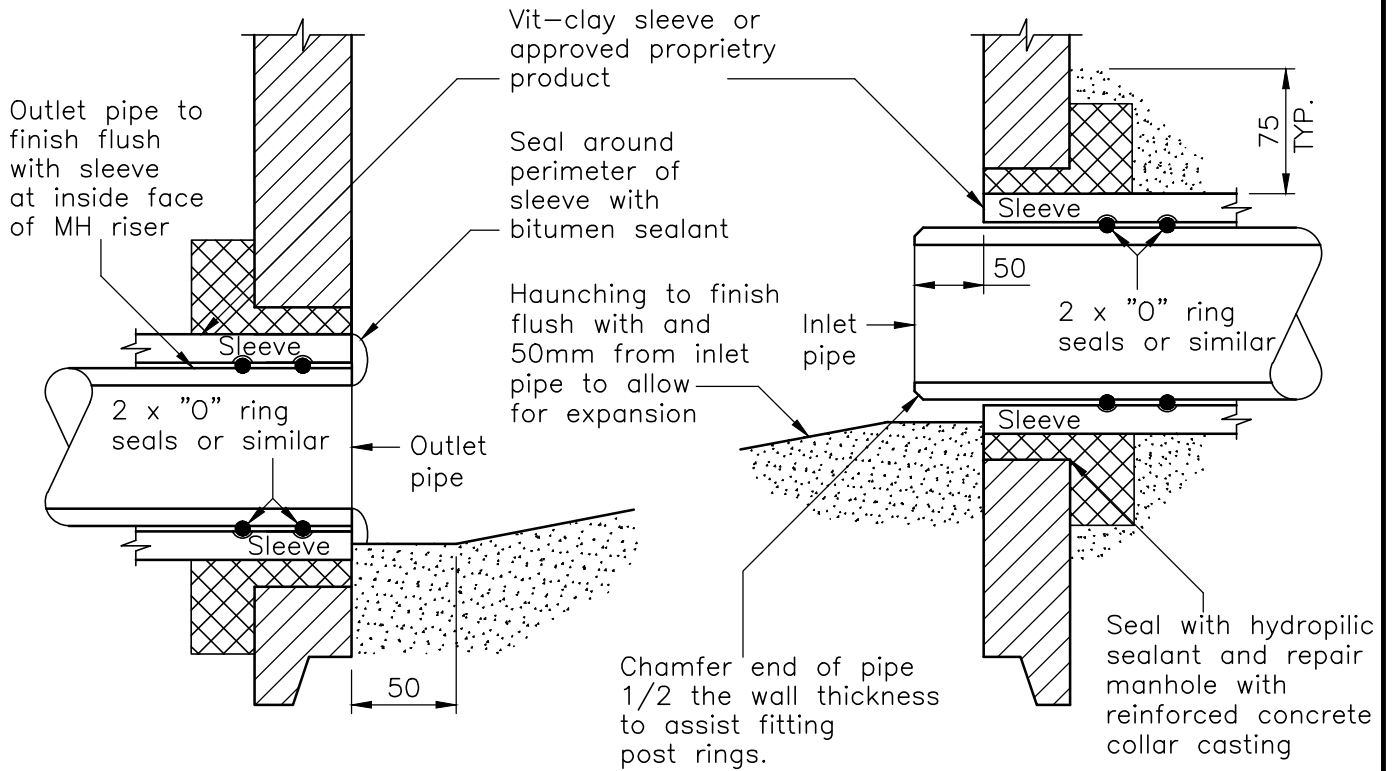
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MANHOLE CONNECTION  
& STARTER DETAIL

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 06-03-2017   |
| DWG No.       | 2010070.013D |
| REFERENCE No. | WW 10        |

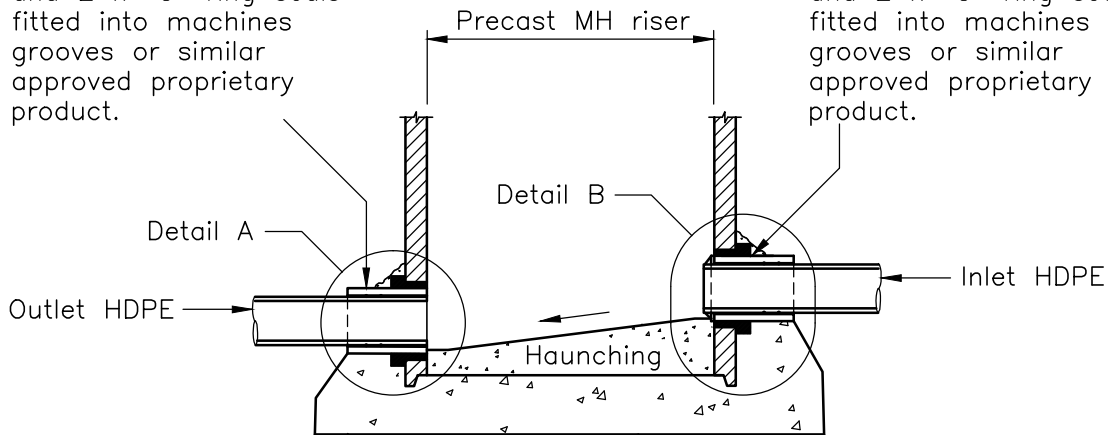


**DETAIL A**

**DETAIL B**

Sleeve with end flange and 2 x "O" ring seals fitted into machines grooves or similar approved proprietary product.

Sleeve with end flange and 2 x "O" ring seals fitted into machines grooves or similar approved proprietary product.



**DETAIL OF SLIDING JOINT AT MANHOLE**

**NOTES:**

1. This detail applies to connecting pipes of < 7% grade. Refer to WW12 for steeper grades with a non sliding joint.
2. Haunching shall be formed to enable the pipe to expand and contract.



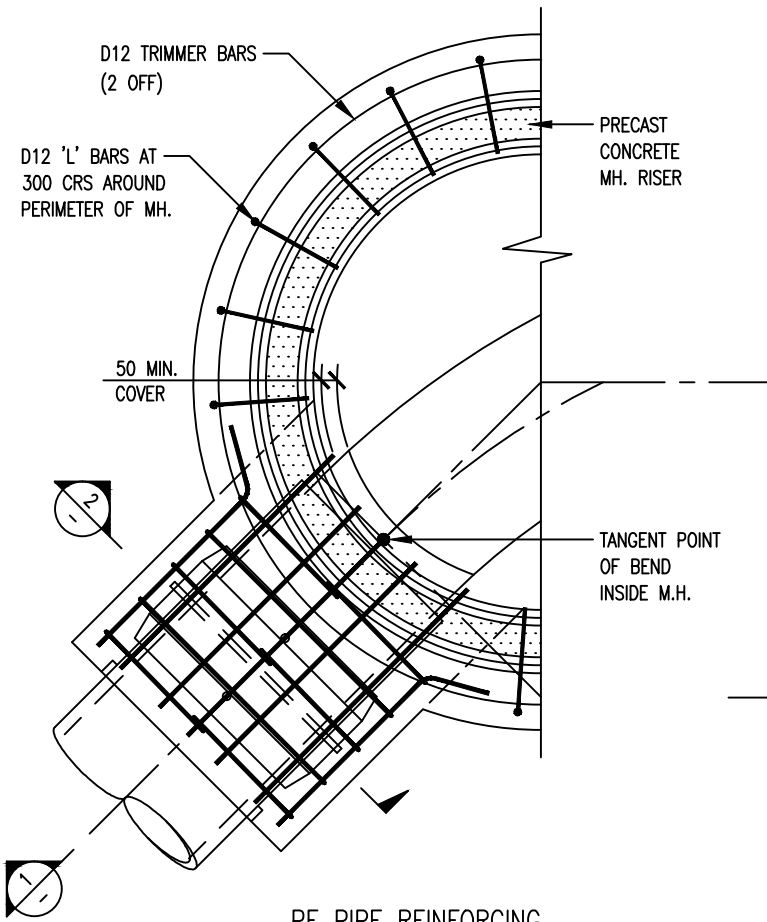
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**STANDARD CONCRETE MANHOLE  
HDPE  
SLIDING JOINT**

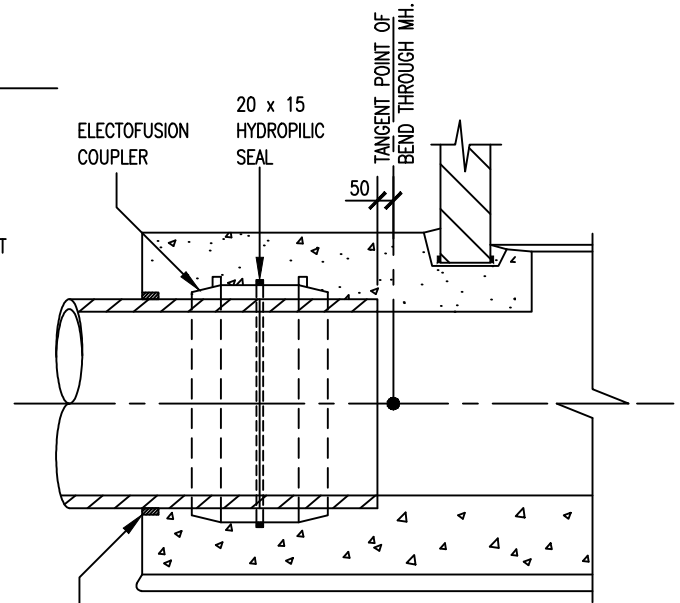
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|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 13-07-2018   |
| DWG No.       | 2010070.028C |
| REFERENCE No. | WW 11        |

**GENERAL NOTES :**

1. APPLICATION WHERE PIPE GRADE IS > 7%
2. ALL REINFORCEMENT TO BE DEFORMED MILD STEEL.
3. ALL CONCRETE TO HAVE A 28 DAY STRENGTH OF 30 MPa.
4. PROVIDE 50mm MIN. COVER TO ALL REINFORCEMENT.

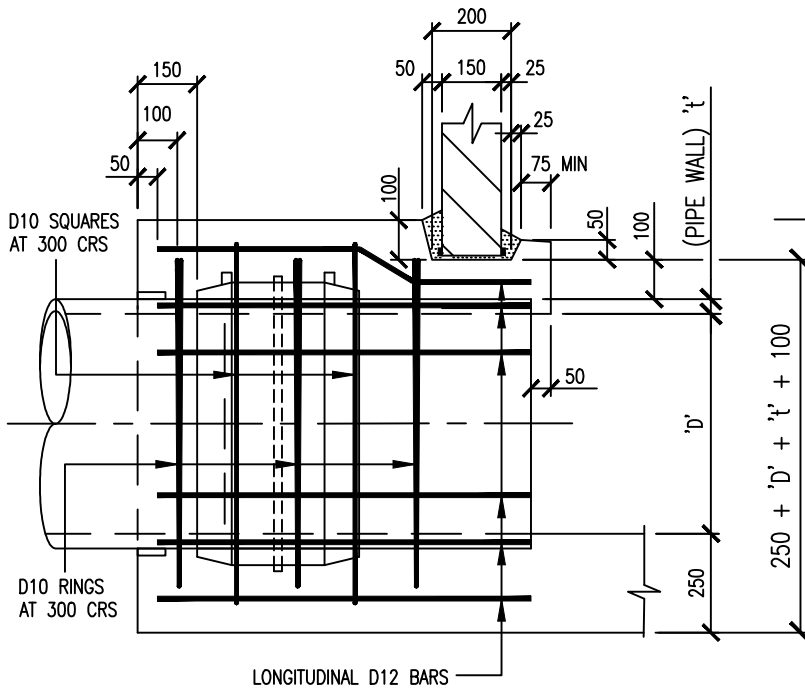


**PE PIPE REINFORCING**  
SCALE. 1:25

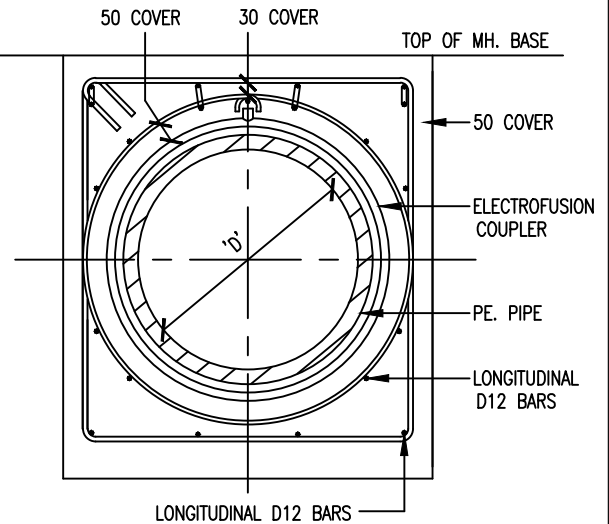


**SECTION 1** REINFORCING NOT SHOWN FOR CLARITY  
SCALE. 1:25

20 x 50 PLAIN RUBBER INSERT (NON HYDROPHILIC)



**SECTION 1** REINFORCING FOR BASE EXTENSION  
SCALE. 1:20



**SECTION 2**  
SCALE. 1:20

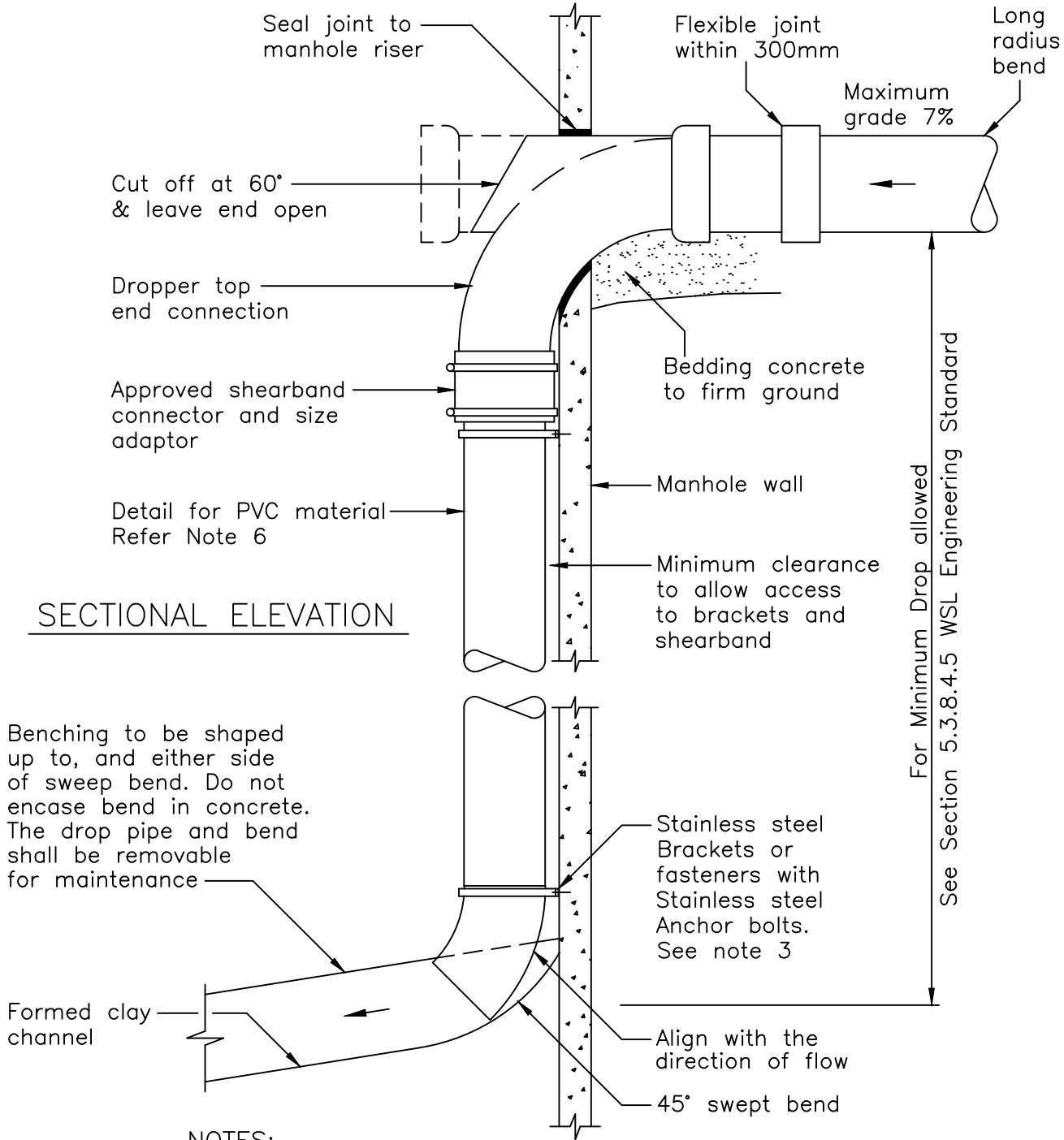
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**STANDARD CONCRETE MANHOLE RESTRAINT PE JOINT**

|               |              |
|---------------|--------------|
| SCALE:        | AS SHOWN     |
| ISSUE DATE:   | 23-01-2017   |
| DWG No.       | 2010070.054A |
| REFERENCE No. | WW 12        |



**NOTES:**

1. Specific approval is required from Watercare for all internal drop connections to existing manholes. Considerations include space available in the existing manhole and number of existing internal drop connections.
2. Internal drop shall be clear of Manhole rungs/ladders.
3. 100Ø to 300Ø PVC drop pipe held in place by Stainless steel brackets or fasteners with M10 Stainless steel anchor bolts every 600 mm.
4. Specific design is required where the incoming grade exceeds 7%, high velocity or where deep manholes make plunge-droppers unsuitable.
5. The minimum clear diameter in the manhole shall be 1m. Vertical droppers are not allowed in manholes under 1200mm diameter.
6. This detail is suitable for GRP. For PE, joints shall be butt-welded. The PE top end connections shall be fabricated to fit over the incoming pipe with an O-ring seal.

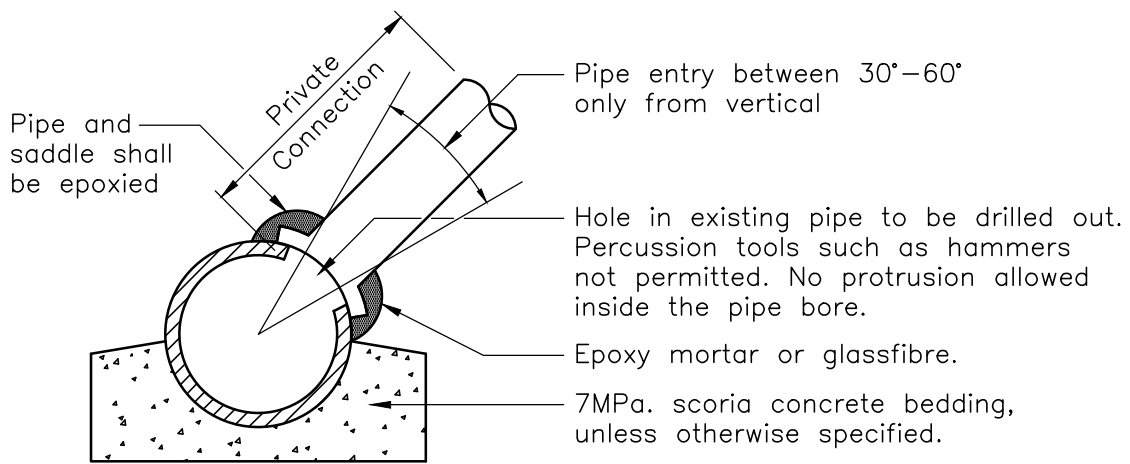
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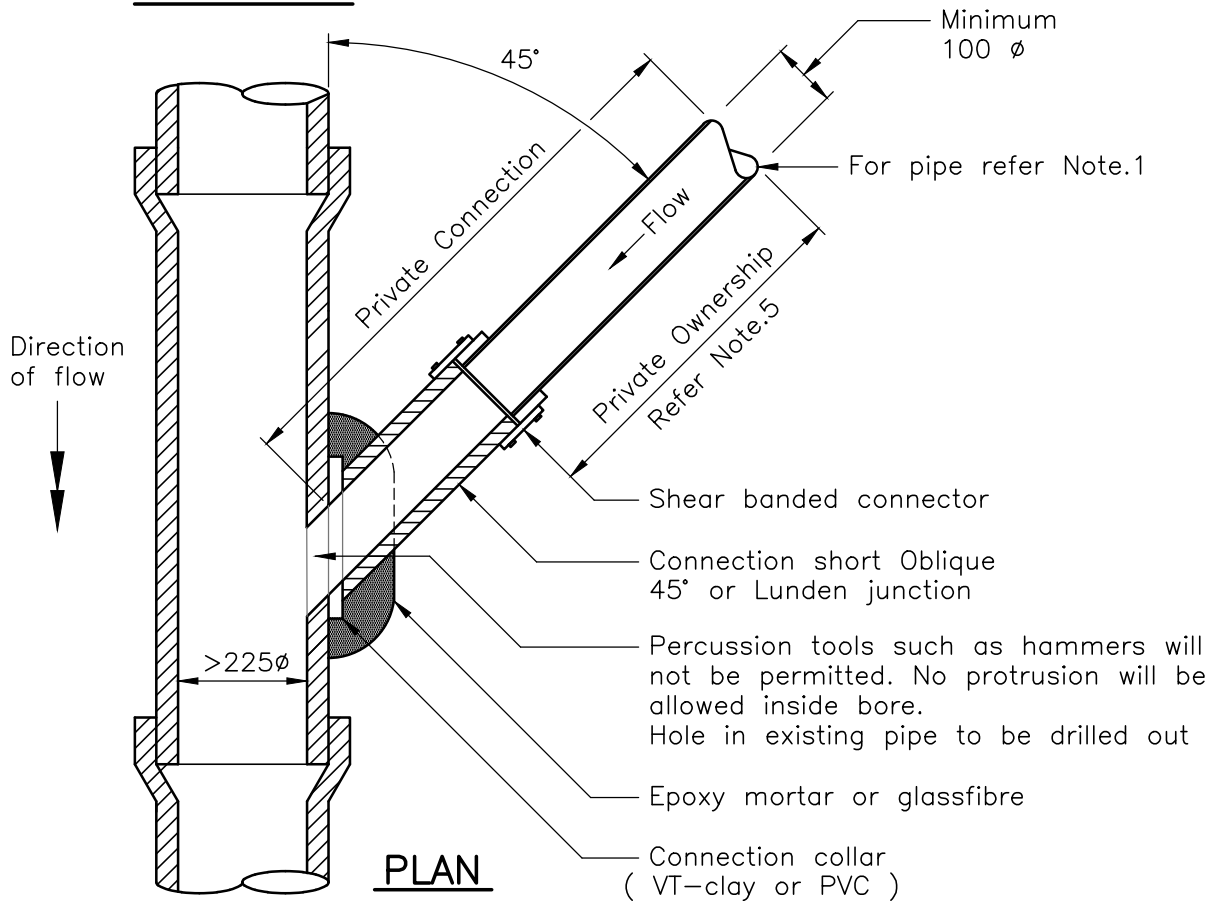
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INTERNAL MANHOLE  
PLUNGE-DROP PIPE

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 06-03-2017   |
| DWG No.       | 2010070.018C |
| REFERENCE No. | WW 13        |



**ELEVATION**



**PLAN**

**NOTES:**

1. Applies to concrete, VT-clay, or PVC pipe saddle connections only. For other materials refer WW15.
2. The maximum lateral pipe size shall be less than half of the main.
3. For pipe lateral to main ratio outside the above parameters, refer to WW15, or a manhole shall be constructed where approved.
4. If the existing sewer pipe has PE or CIPP liner, specific design & approval required from Watercare.
5. Refer to Watercare Point-of-Supply Policy.

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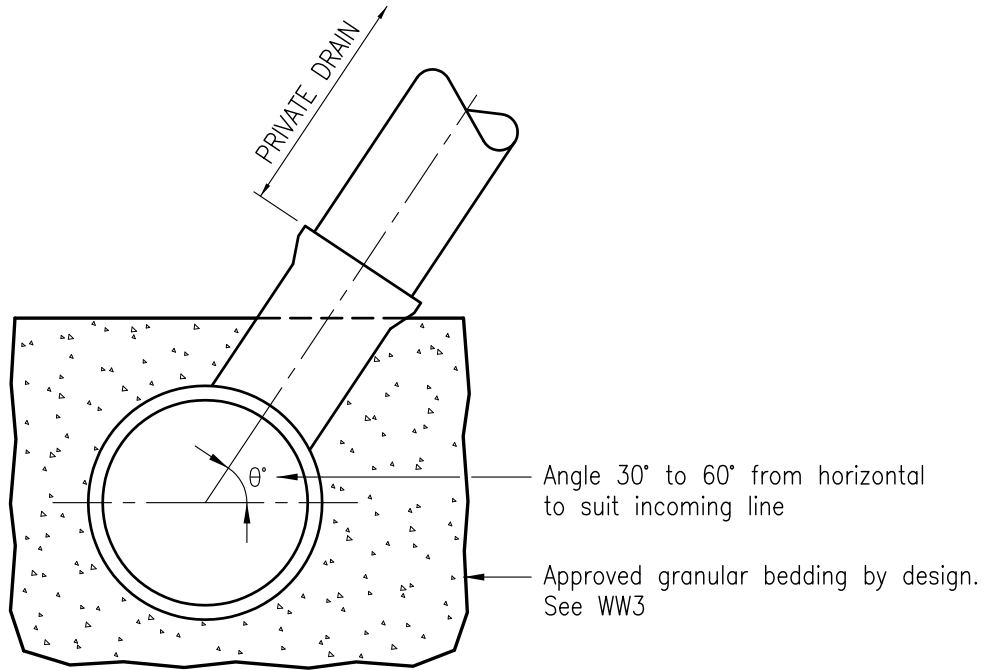


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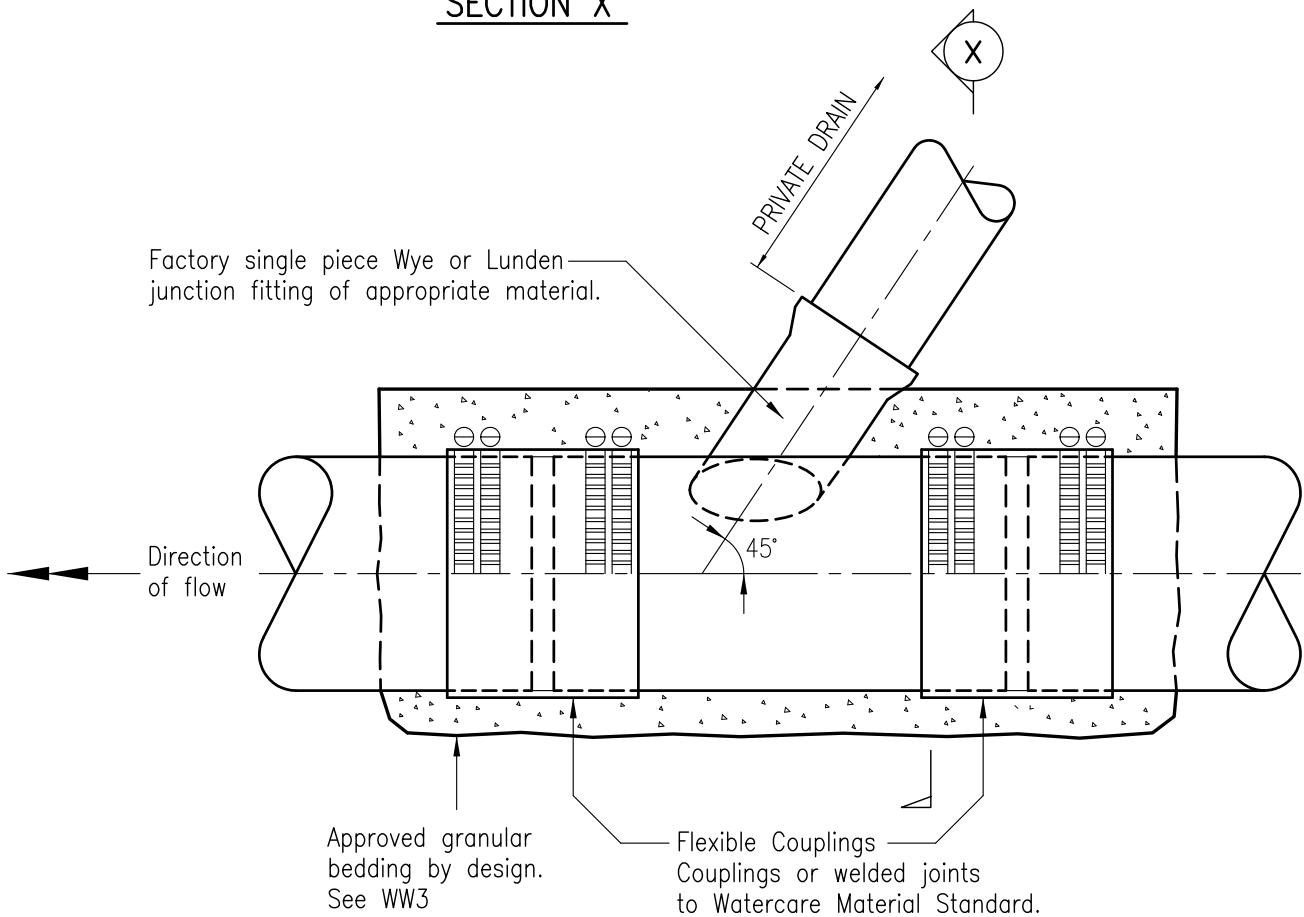
**SADDLE CONNECTIONS TO GRAVITY  
PUBLIC WASTEWATER**

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 13-07-2018   |
| DWG No.       | 2010070.036C |
| REFERENCE No. | <b>WW 14</b> |





**SECTION X**



**NOTES:**

1. For saddle connections refer WW14
2. Refer to Watercare Point-of-Supply policy

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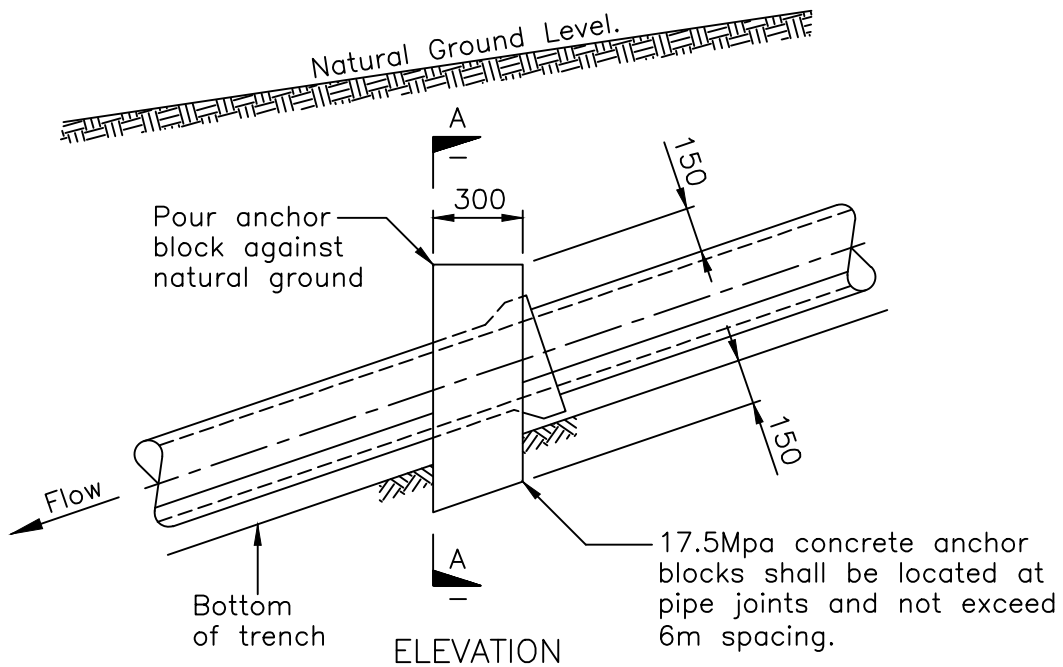
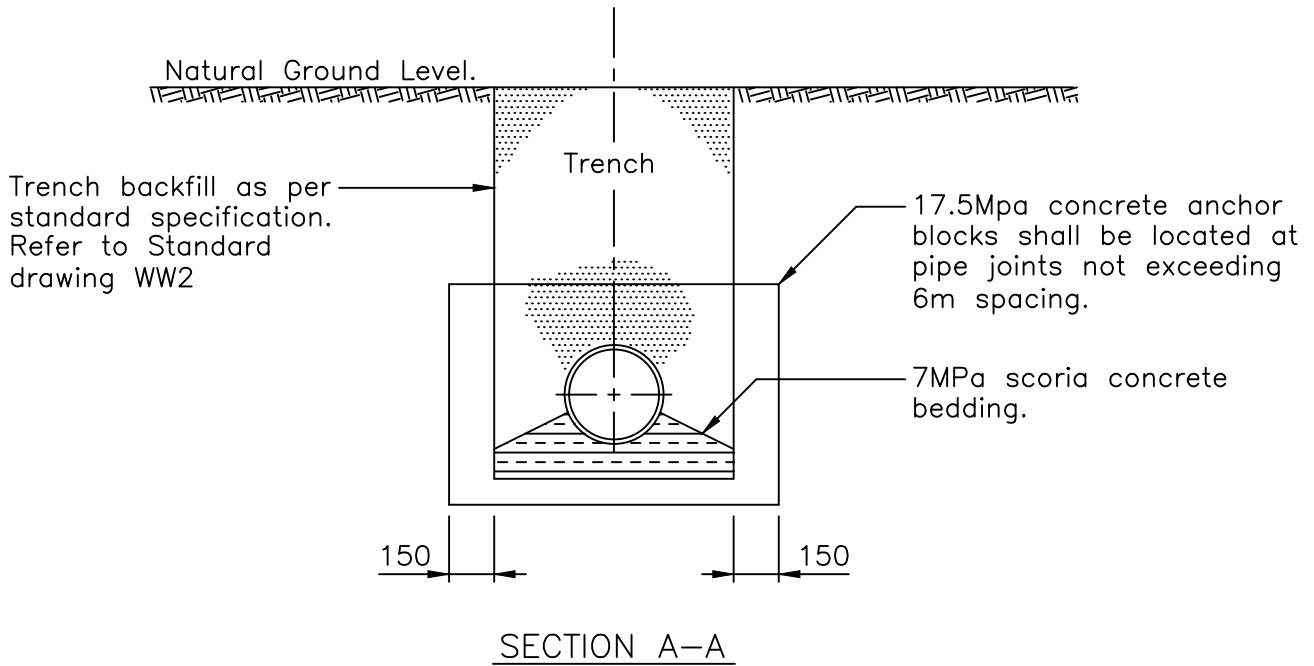
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**IN-LINE SERVICES CONNECTIONS  
TO PUBLIC GRAVITY  
WASTEWATER**

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 17-11-2017   |
| DWG No.       | 2010070.038A |
| REFERENCE No. | WW 15        |

NOTE:

For wastewater lines laid at grades steeper than 10% ( including service connections ) the bedding and surround material shall be of a low-grade ( 7MPa ) scoria concrete. For lines exceeding a grade of 20% anchor blocks shall be located at pipe joints, and not exceed 6m spacing.



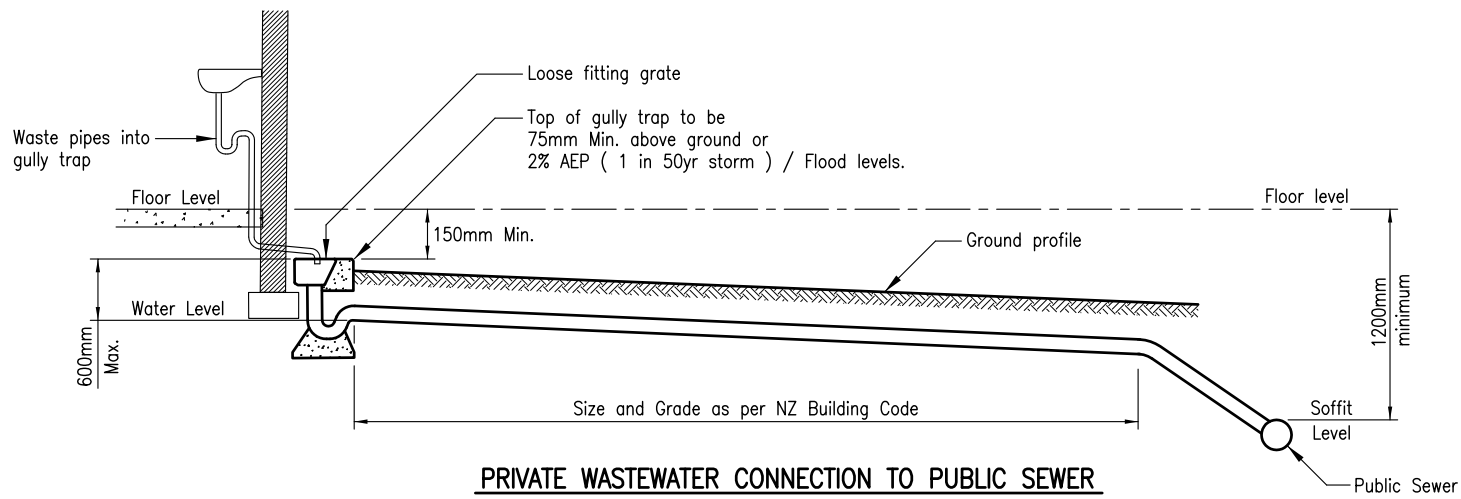
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BULKHEADS FOR STEEP GRADES

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 01-03-2017   |
| DWG No.       | 2010070.049A |
| REFERENCE No. | WW 16        |



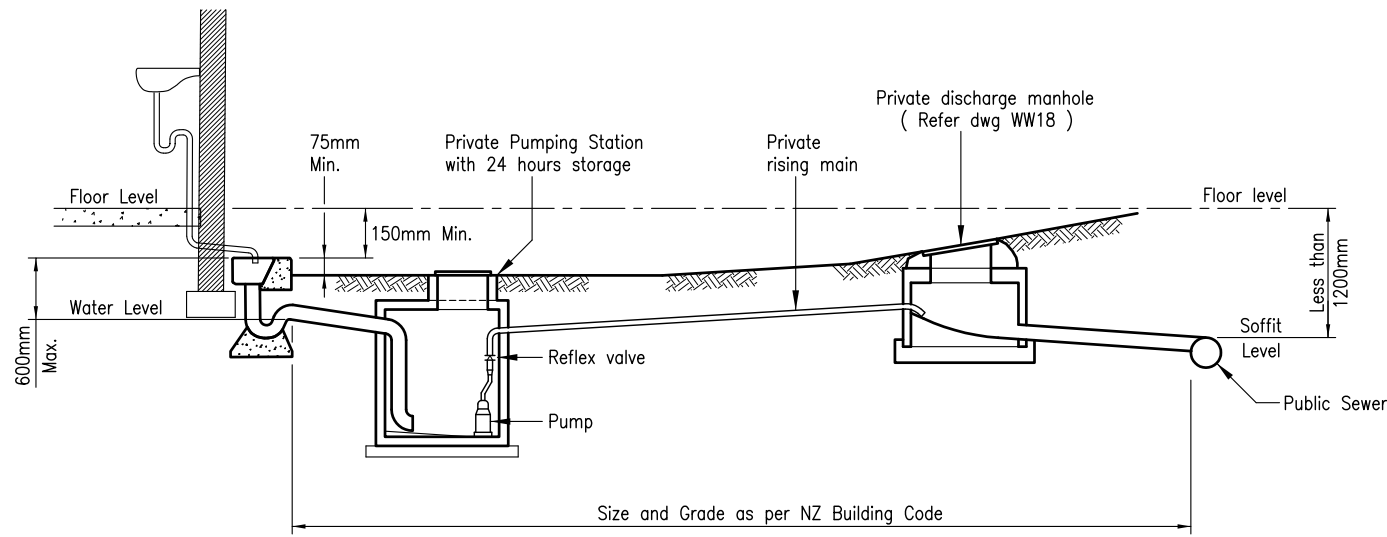
**PRIVATE WASTEWATER CONNECTION TO PUBLIC SEWER**

( Floor level to soffit 1200mm minimum unless approved by Watercare )

**NOTE:**

EXAMPLE OF HOUSE SERVICE CONNECTION TO A PUBLIC SEWER

1. Minimum requirements are satisfied when the floor level is at least 1200mm above the soffit of the receiving sewer.
2. Where the receiving sewer is less than 1200mm a private pumping station and discharge manhole shall be installed.
3. Ground around gully trap shall be at least 75mm below the gully trap or 2% of the AEP ( Annual exceedance probability ) – Rain fall flood levels.
4. Building floor shall be at least 150mm above the gully trap. Gully traps shall not be placed in over land flow paths.



**PRIVATE WASTEWATER PUMPING STATION CONNECTION TO PUBLIC SEWER**

( Floor level to soffit less than 1200mm )

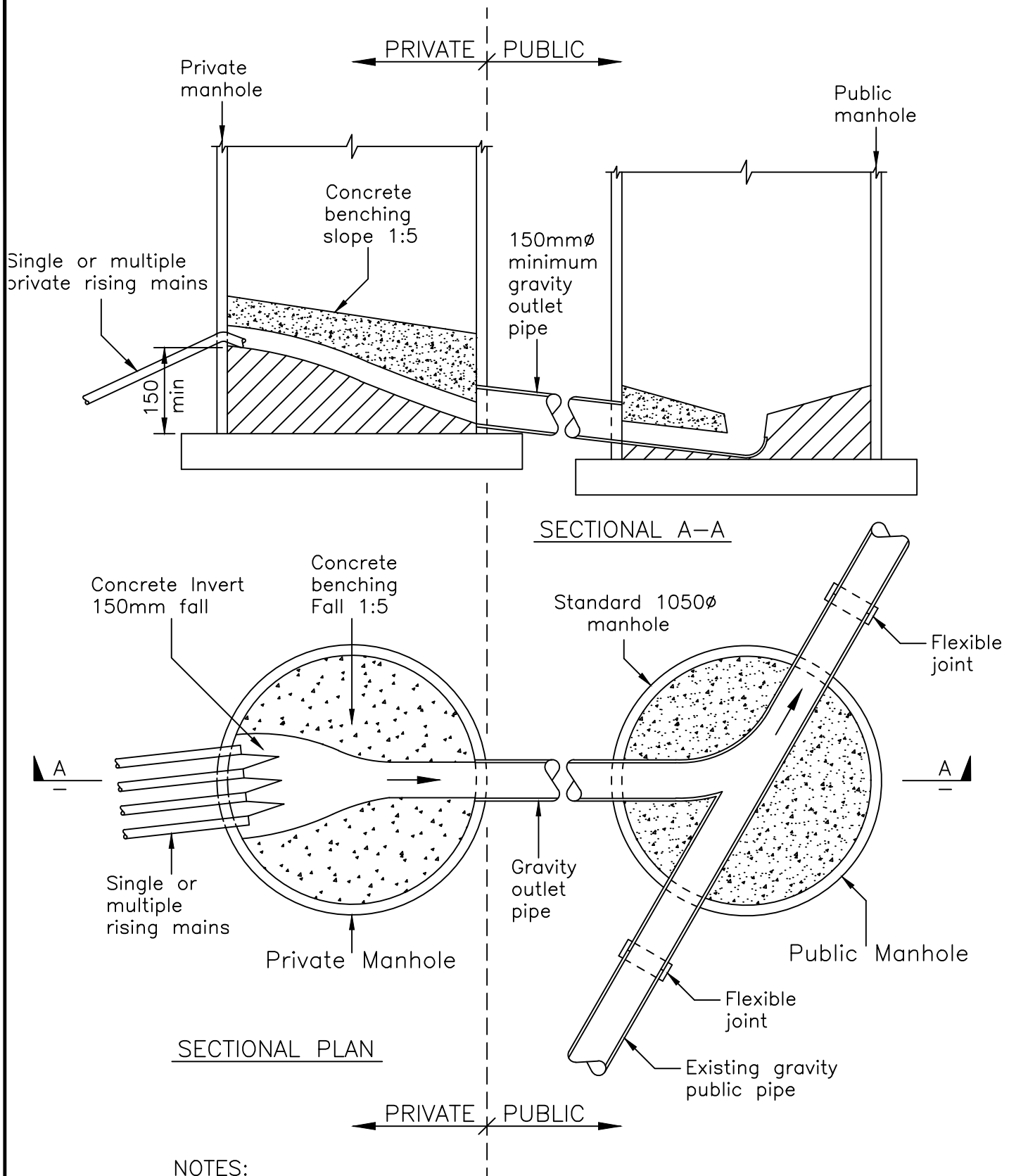
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**PRIVATE CONNECTIONS  
MINIMUM FLOOR LEVEL TO SOFFIT OF WASTEWATER**

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 02-08-2018   |
| DWG No.       | 2010070.037B |
| REFERENCE No. | WW 17        |



**NOTES:**

1. Read with WW5 and WW7
2. For pressure main outlet detail refer to drawing WW19
3. Private main connection to the public wastewater shall be made via a private shallow manhole with a public 150mm min. gravity pipe feed to public wastewater or manhole.

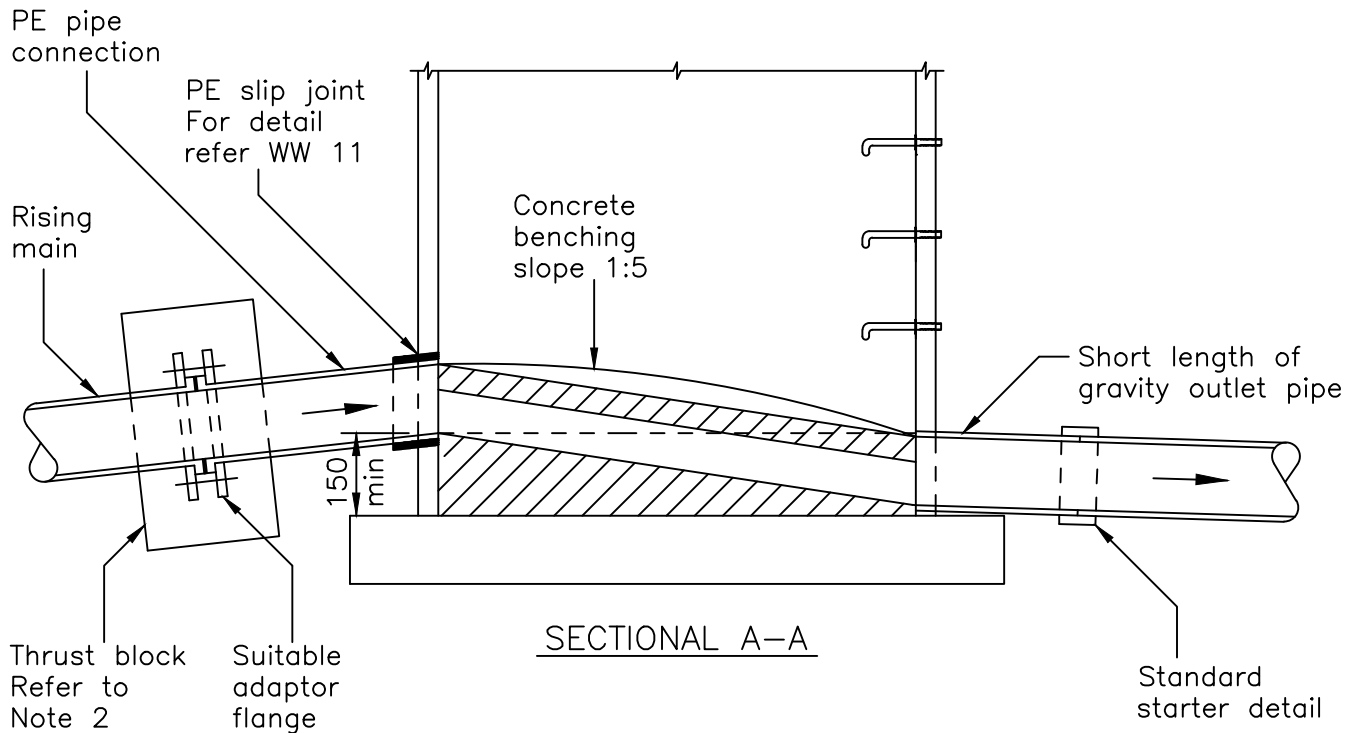
0:\---\ EGCADFI \ 2017 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.043A .DWG



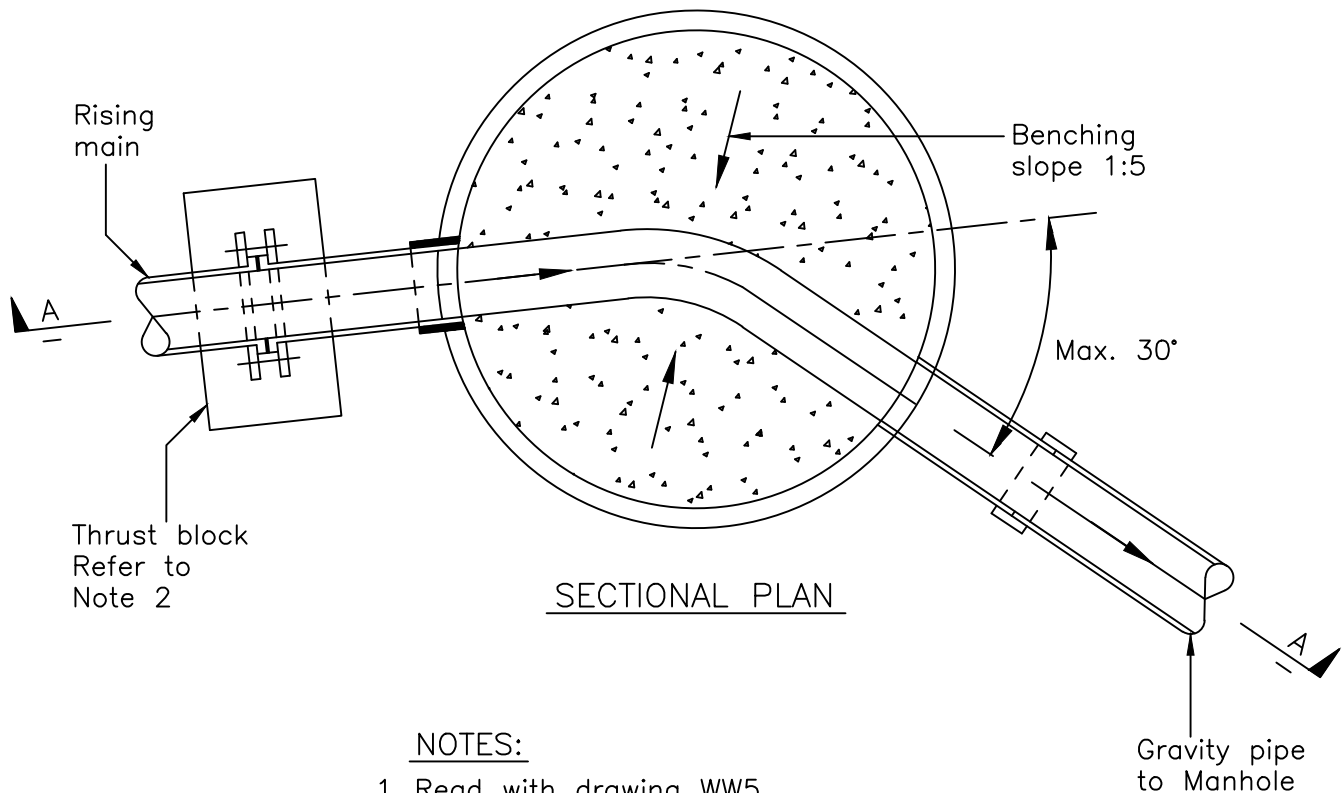
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**PRIVATE RISING MAIN CONNECTION**

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 06-03-2017   |
| DWG No.       | 2010070.043A |
| REFERENCE No. | WW 18        |



SECTIONAL A-A



SECTIONAL PLAN

NOTES:

1. Read with drawing WW5
2. Thrust blocks to be constructed on rising main inlet and will be cast against firm ground. For thrust block details refer to drawing WW24
3. For private rising main connections refer to drawing WW18

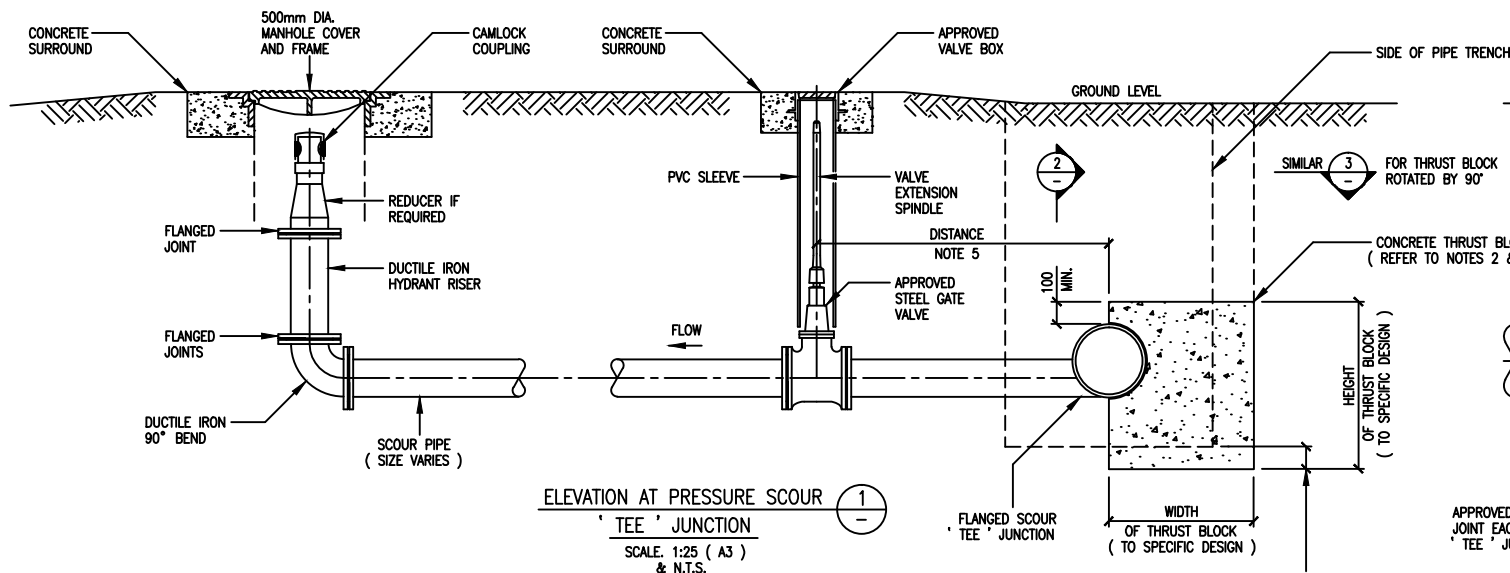
0:\---\ EGCADFI \ 2017 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.041A .DWG



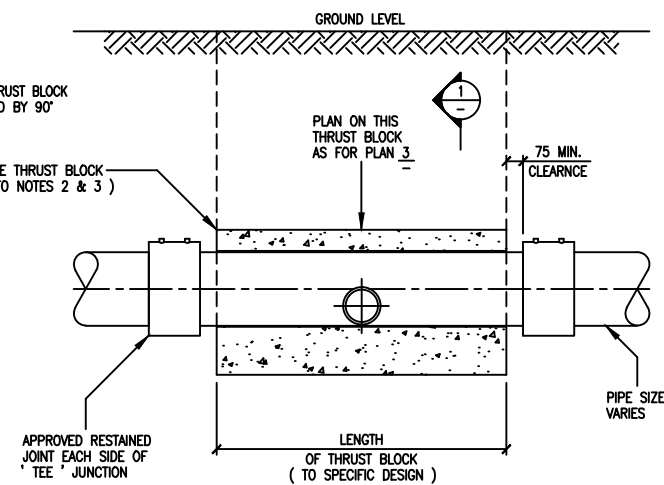
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PRESSURE SEWER OUTLET  
TO GRAVITY PUBLIC

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 06-03-2017   |
| DWG No.       | 2010070.041A |
| REFERENCE No. | WW 19        |



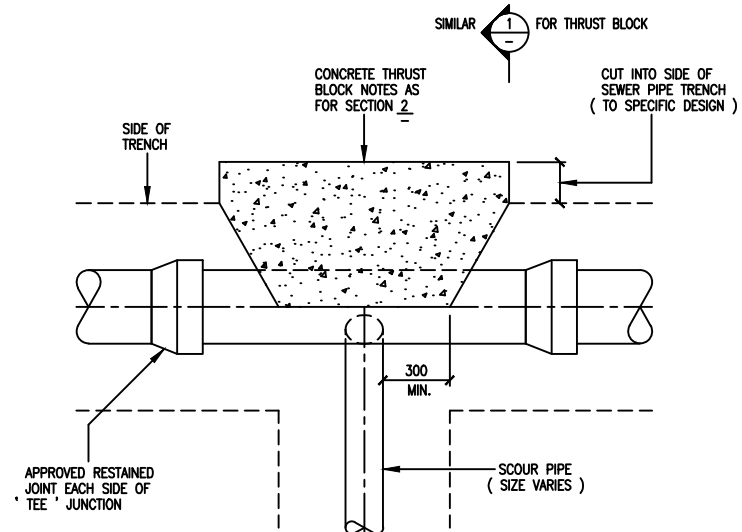
ELEVATION AT PRESSURE SCOUR  
'TEE' JUNCTION  
SCALE: 1:25 (A3)  
& N.T.S.



SECTION AT PRESSURE SCOUR  
'TEE' JUNCTION  
SCALE: 1:25 (A3)  
& N.T.S.

Anchor block size based on 100kPa. soil bearing stress

| PIPE DIA. | LENGTH | DEPTH | WIDTH |
|-----------|--------|-------|-------|
| 100mm     | 500    | 250   | 250   |
| 150mm     | 900    | 300   | 450   |
| 200mm     | 1100   | 450   | 550   |



PLAN AT GRAVITY SCOUR  
'TEE' JUNCTION  
SCALE: 1:25 (A3)  
& N.T.S.

- NOTES**
1. DETAILS ON THIS DRAWING ARE DIAGRAMMATIC. PIPE SIZES AND PIPE DEPTHS VARY.
  2. THRUST BLOCKS SHALL BE SIZED FOR THE SPECIFIC SOIL BEARING CAPACITY TAKING INTO ACCOUNT THE MAXIMUM PUMPING PRESSURE AND FLOW VELOCITY.
  3. THRUST BLOCKS SHALL BE CAST AGAINST THE UNDISTURBED CUT FACE OF THE EXCAVATION.
  4. WHERE THE PIPE COMES IN CONTACT WITH THE THRUST BLOCK THE PIPE SHALL BE WRAPPED IN A PROTECTIVE MEMBRANE TO PREVENT ABRASION BETWEEN THE CONCRETE AND THE PIPE.
  5. DISTANCE TO ISOLATION VALVE TO BE AS SHORT AS POSSIBLE TO PREVENT SEPTICITY.

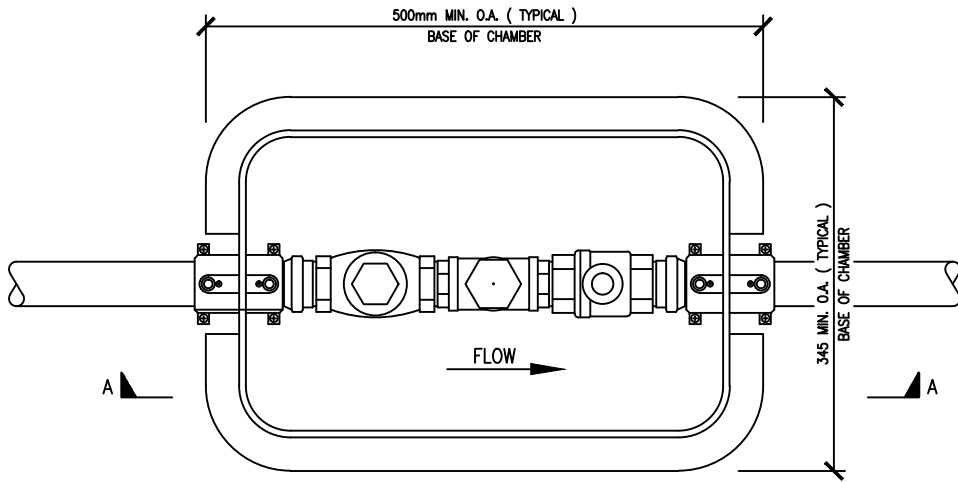
**KEY**  
N.T.S. = NOT TO SCALE  
MIN. = MINIMUM



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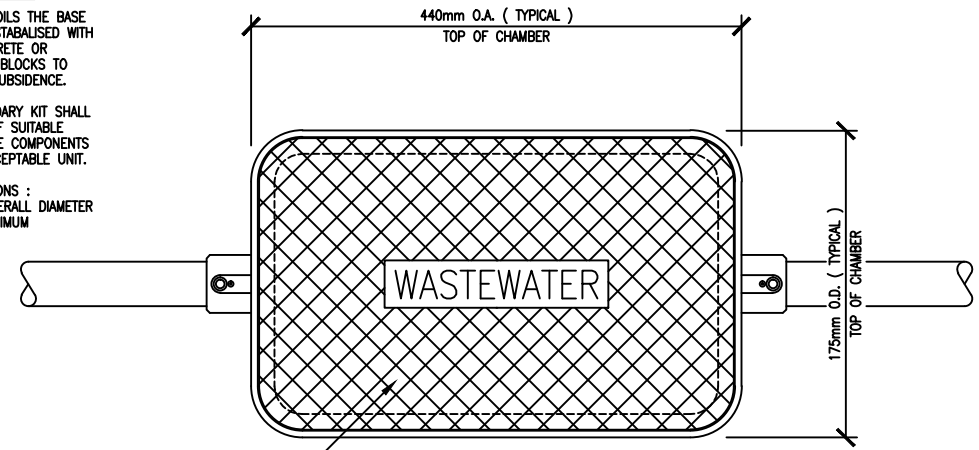
PRESSURE WASTEWATER  
FLUSH-OUT / SCOUR

|               |             |
|---------------|-------------|
| SCALE:        | AS SHOWN    |
| ISSUE DATE:   | 21-03-2017  |
| DWG No.       | 2010070.055 |
| REFERENCE No. | WW 20       |

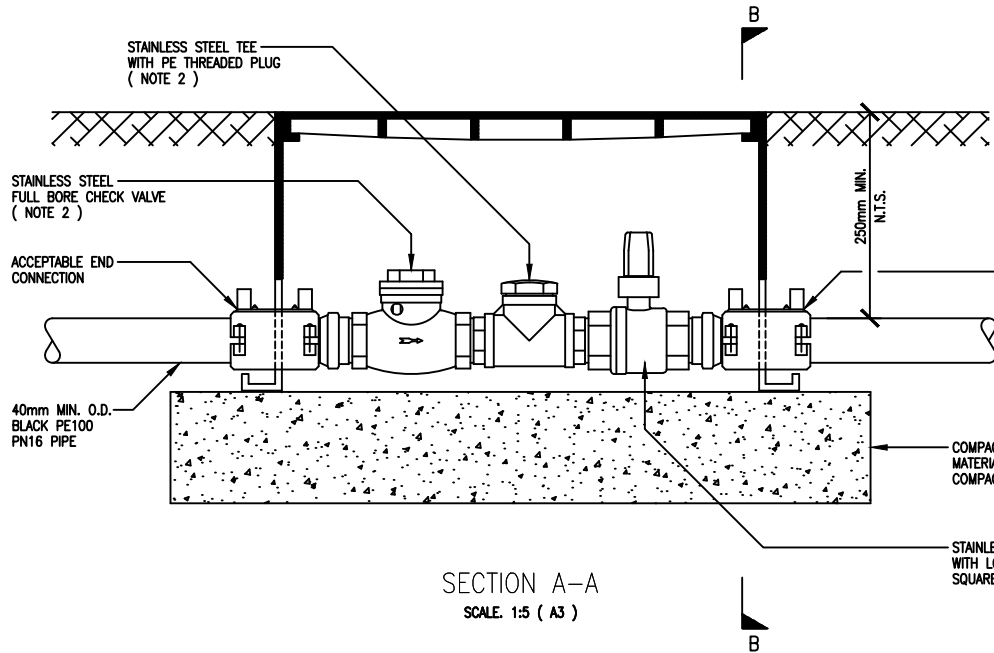


SECTIONAL PLAN  
SCALE: 1:5 ( A3 )

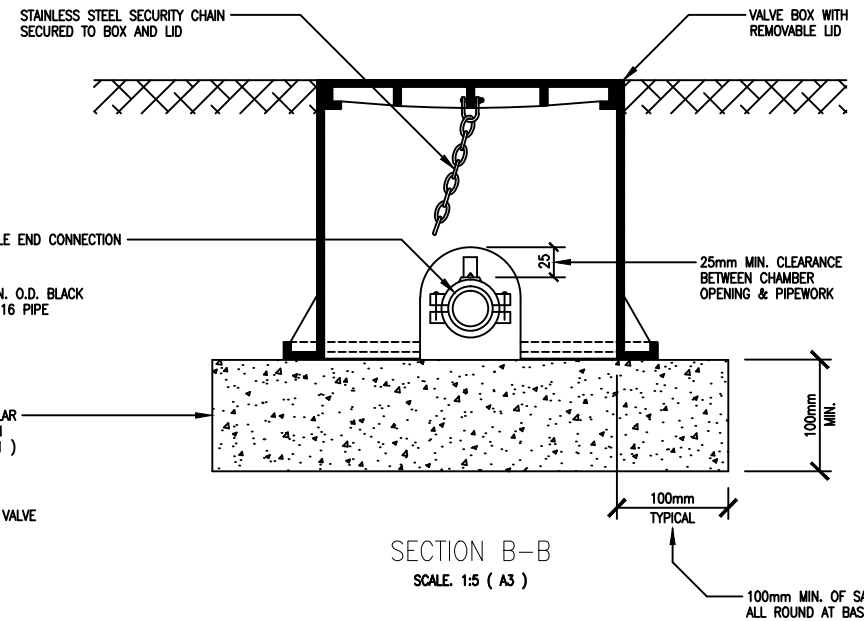
- NOTES
1. IN SOFT SOILS THE BASE MUST BE STABILISED WITH SITE CONCRETE OR CONCRETE BLOCKS TO PREVENT SUBSIDENCE.
  2. THE BOUNDARY KIT SHALL CONSIST OF SUITABLE ACCEPTABLE COMPONENTS OR AN ACCEPTABLE UNIT.
  3. ABBREVIATIONS :  
O.D. = OVERALL DIAMETER  
MIN. = MINIMUM



PLAN ON LID  
SCALE: 1:5 ( A3 )



SECTION A-A  
SCALE: 1:5 ( A3 )



SECTION B-B  
SCALE: 1:5 ( A3 )

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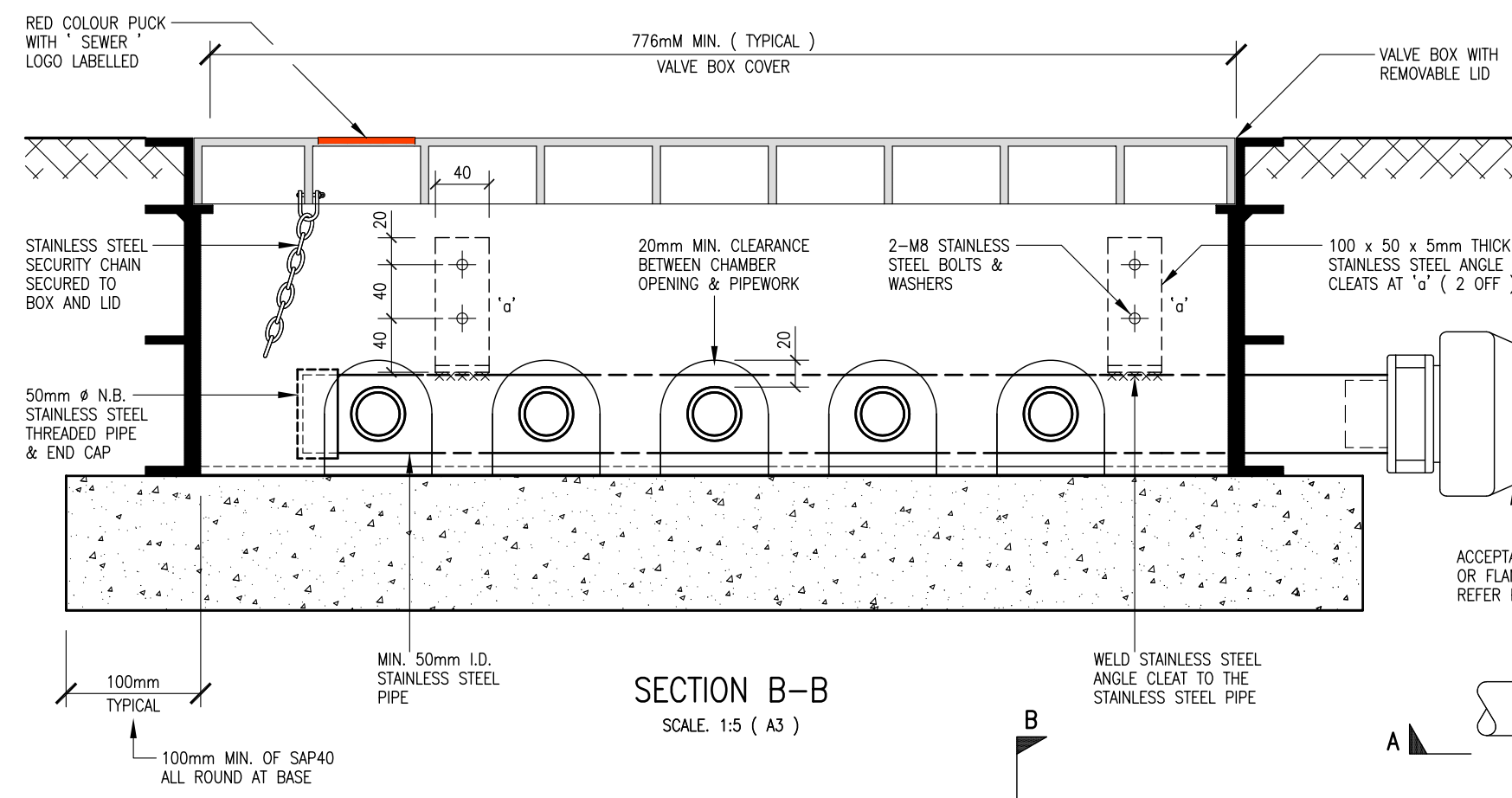


BOUNDARY PRESSURE  
WASTEWATER CONNECTION

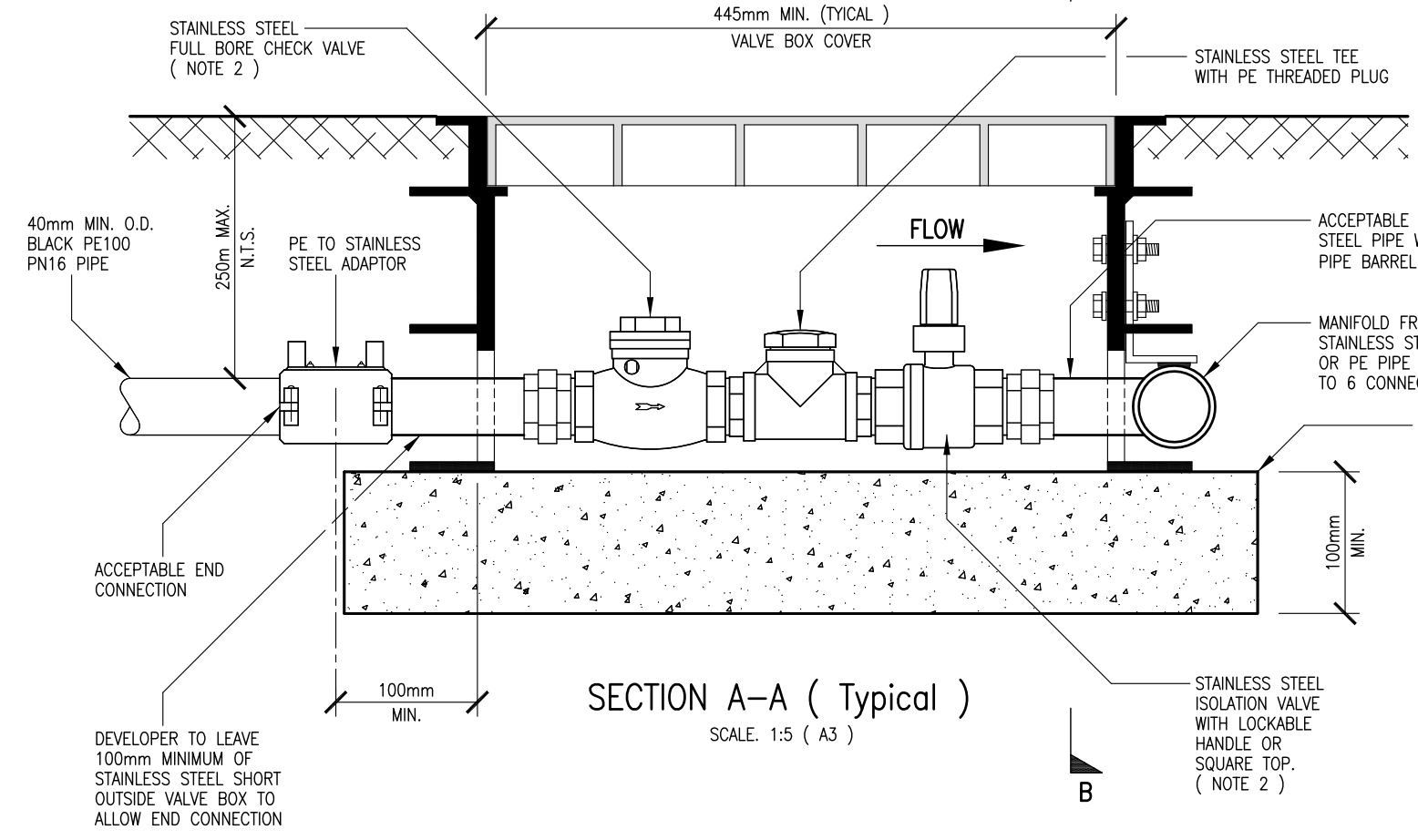
|               |             |
|---------------|-------------|
| SCALE:        | 1:5 (A3)    |
| ISSUE DATE:   | 23-01-2017  |
| DWG No.       | 2010070.056 |
| REFERENCE No. | WW 21       |

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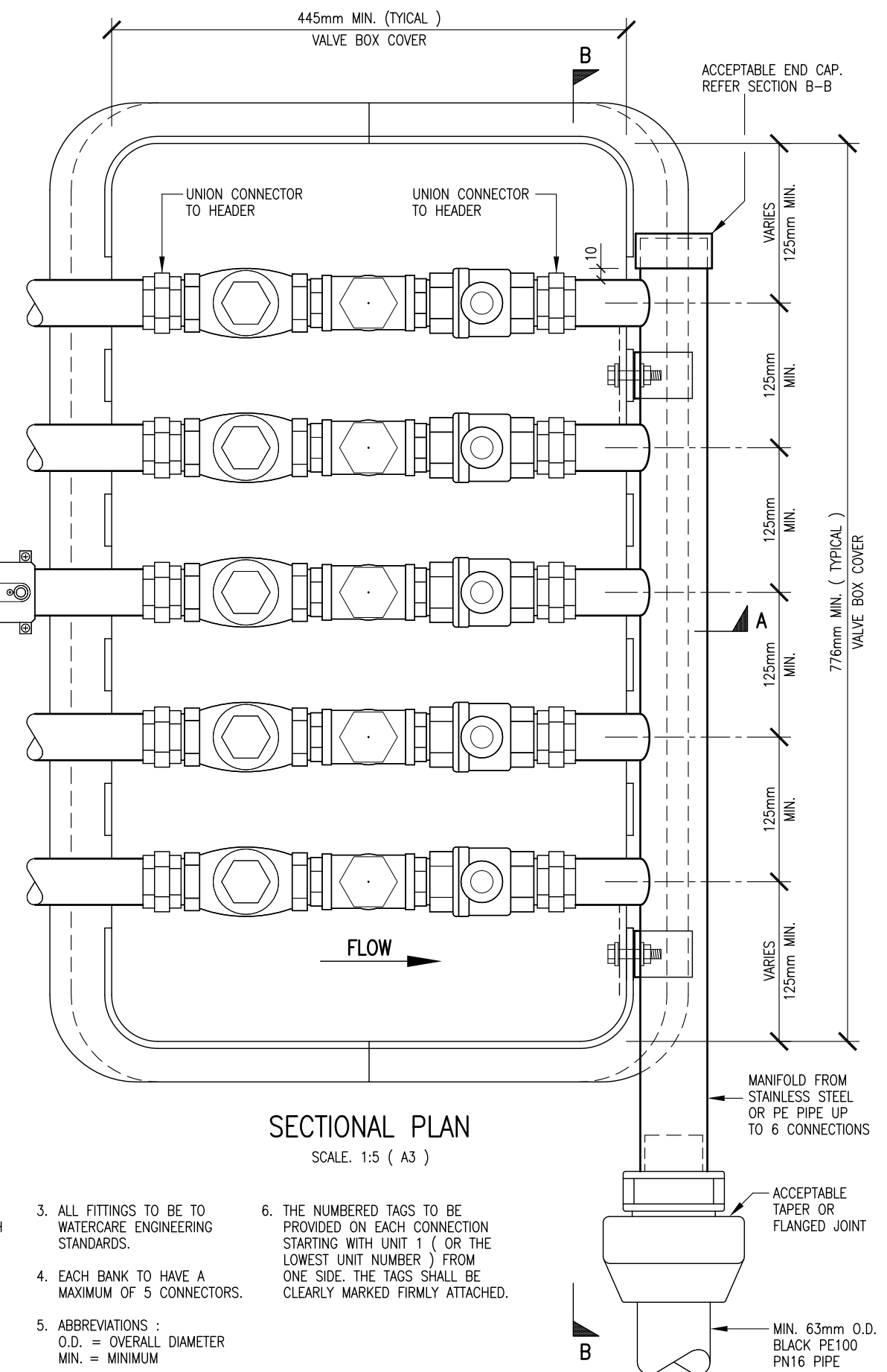




SECTION B-B  
SCALE: 1:5 ( A3 )



SECTION A-A ( Typical )  
SCALE: 1:5 ( A3 )



SECTIONAL PLAN  
SCALE: 1:5 ( A3 )

**NOTES**

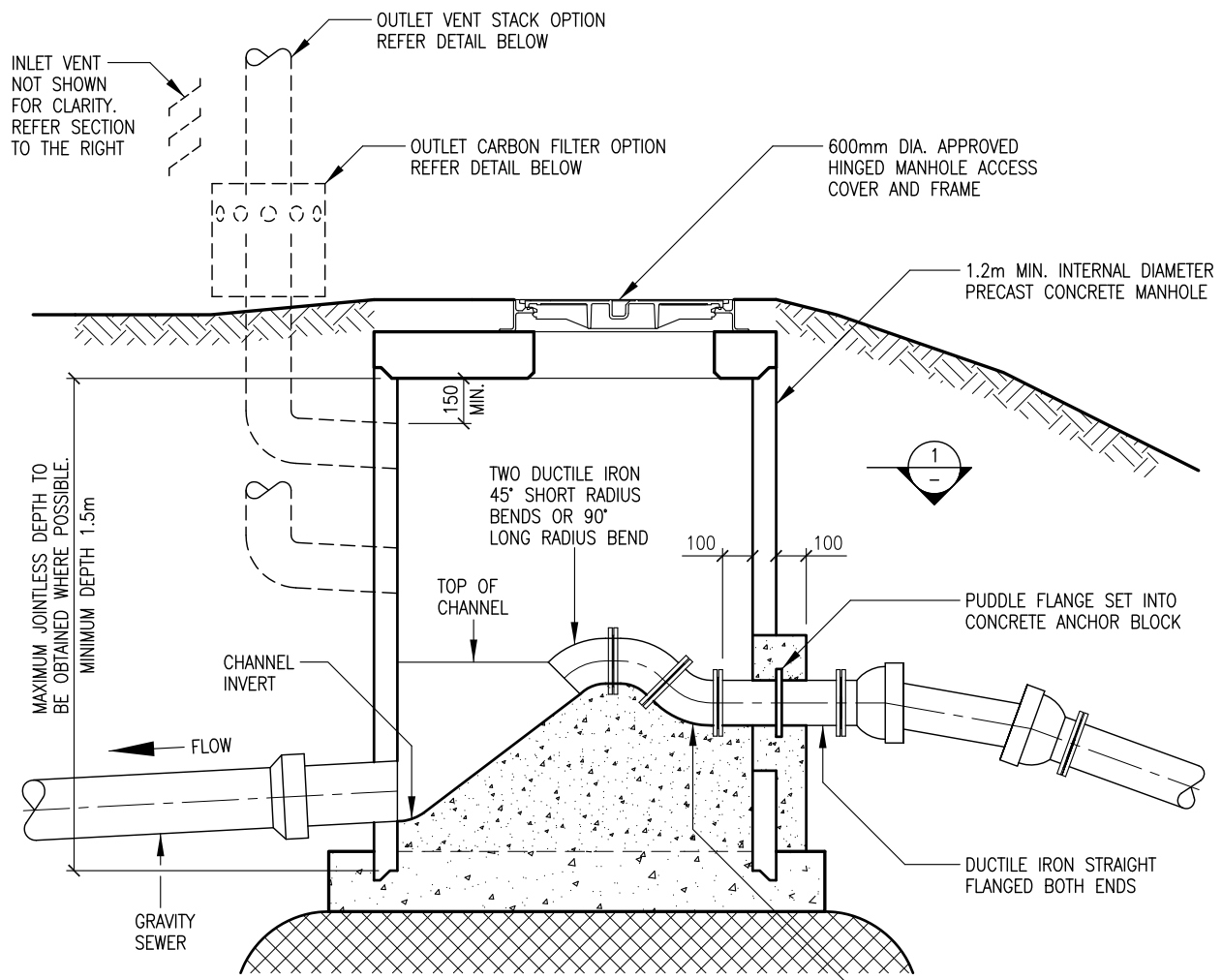
1. IN SOFT SOILS THE BASE MUST BE STABILISED WITH SITE CONCRETE OR CONCRETE BLOCKS TO PREVENT SUBSIDENCE.
2. THE BOUNDARY KIT SHALL CONSIST OF SUITABLE ACCEPTABLE COMPONENTS OR AN ACCEPTABLE UNIT.
3. ALL FITTINGS TO BE TO WATERCARE ENGINEERING STANDARDS.
4. EACH BANK TO HAVE A MAXIMUM OF 5 CONNECTORS.
5. ABBREVIATIONS :  
O.D. = OVERALL DIAMETER  
MIN. = MINIMUM
6. THE NUMBERED TAGS TO BE PROVIDED ON EACH CONNECTION STARTING WITH UNIT 1 ( OR THE LOWEST UNIT NUMBER ) FROM ONE SIDE. THE TAGS SHALL BE CLEARLY MARKED FIRMLY ATTACHED.

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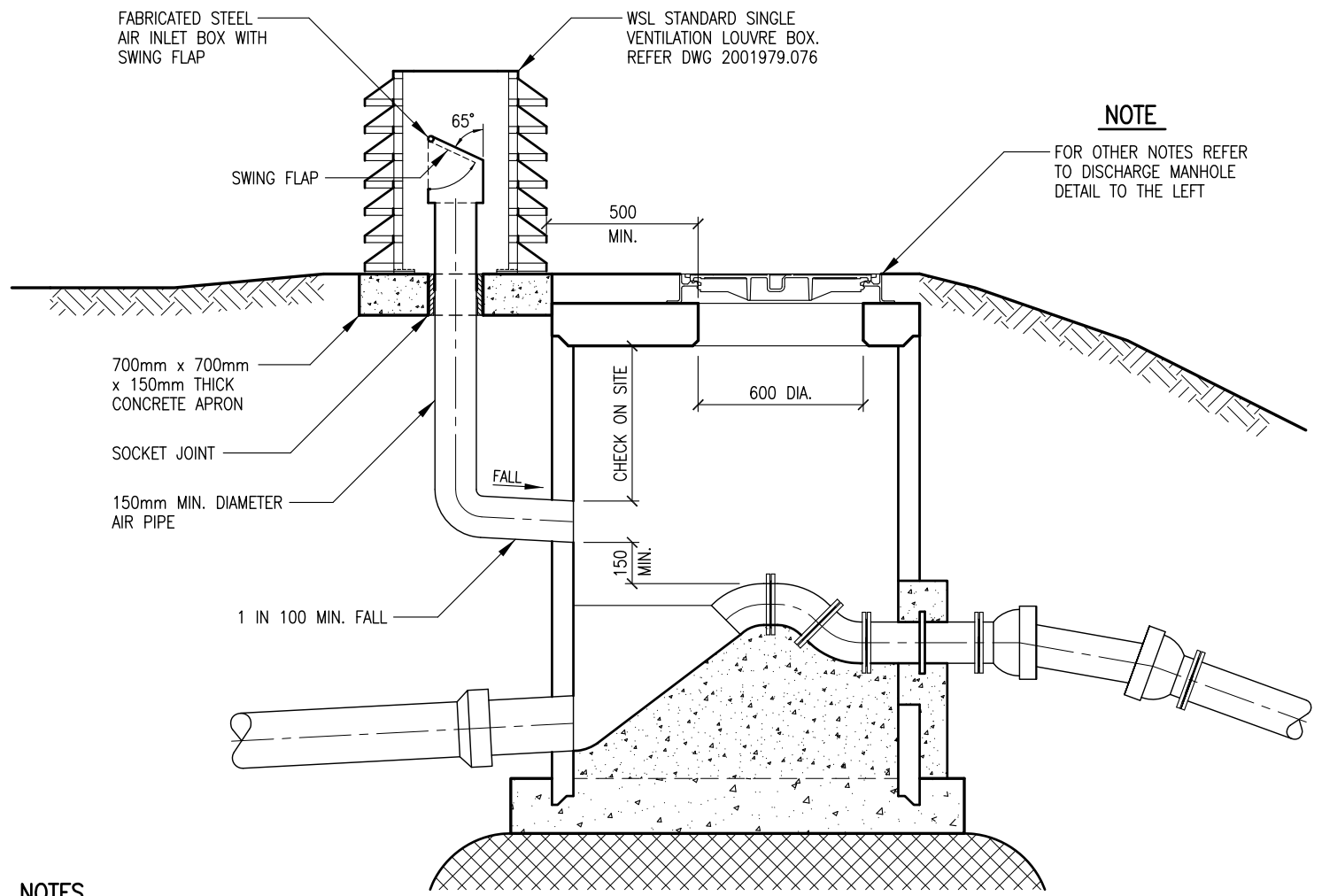
BOUNDARY MULTI-CONNECTION  
FOR PRESSURE WASTEWATER

|               |                   |
|---------------|-------------------|
| SCALE:        | 1:5 & N.T.S. (A3) |
| ISSUE DATE:   | 13-07-2018        |
| DWG No.       | 2010070.057A      |
| REFERENCE No. | WW 22             |



**SECTION AT DISCHARGE M.H.**

SCALE: 1:25 ( A3 )  
& N.T.S.



**INLET VENT AT DISCHARGE M.H.**

SCALE: 1:25 ( A3 )  
& N.T.S.

**KEY**

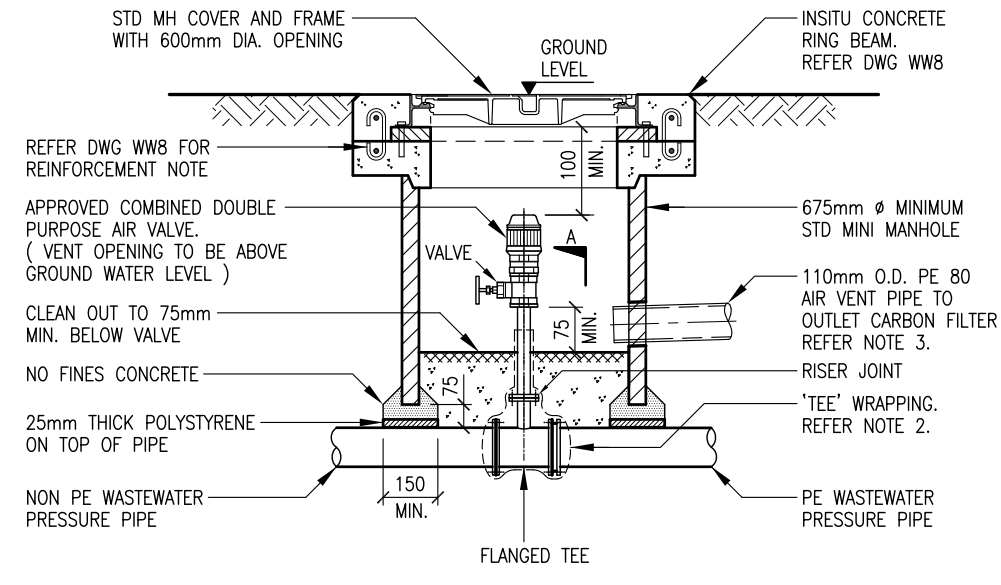
N.T.S. = NOT TO SCALE  
MIN. = MINIMUM

**NOTE**

FOR OTHER NOTES REFER TO DISCHARGE MANHOLE DETAIL TO THE LEFT

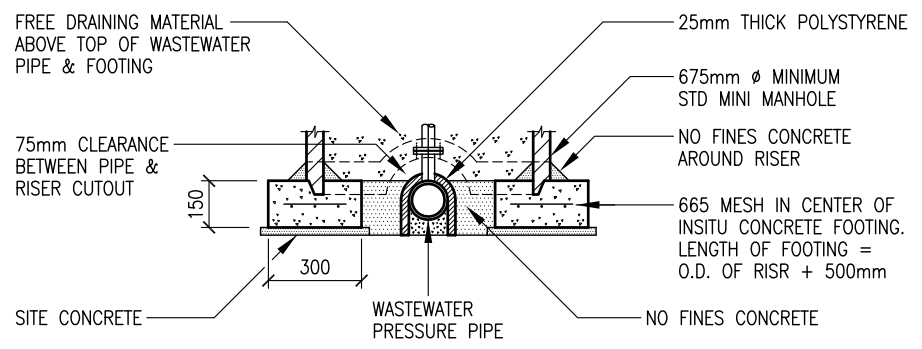
**NOTES**

1. DETAILS ON THIS DRAWING ARE DIAGRAMMATIC. PIPES VARY.
2. NON PLASTIC 'TEES' SHALL BE WRAPPED WITH A SUITABLE WRAPPING SYSTEM.
3. VENT STACKS IN LIEU OF FILTERS MUST BE DESIGNED FOR HEIGHT AND LOCATION.



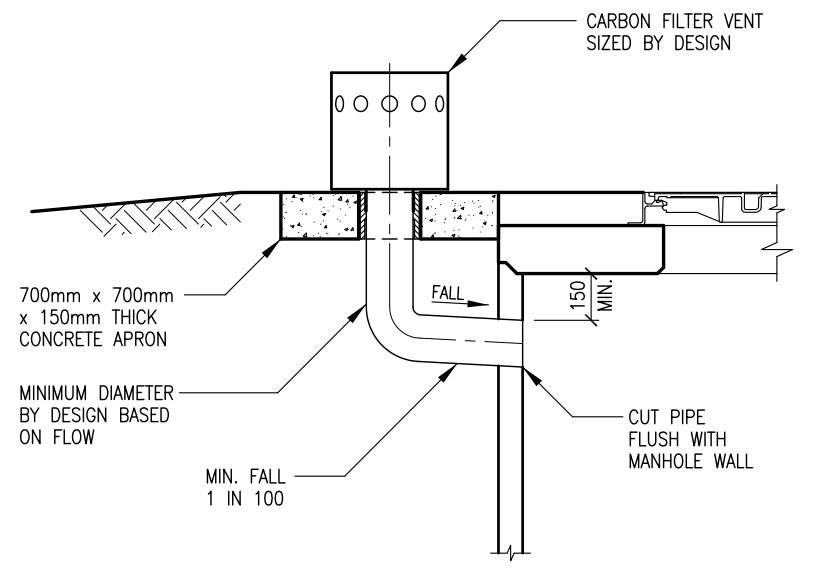
**STANDARD AIR RELEASE VALVE & CHAMBER DETAIL**

SCALE: 1:25 ( A3 )  
& N.T.S.



**SECTION A**

SCALE: 1:25 ( A3 )  
& N.T.S.



**OUTLET CARBON FILTER VENT OPTION**

SCALE: 1:25 ( A3 )  
& N.T.S.

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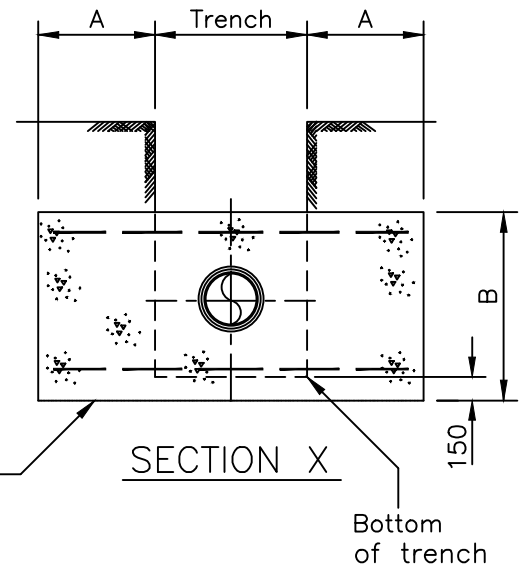
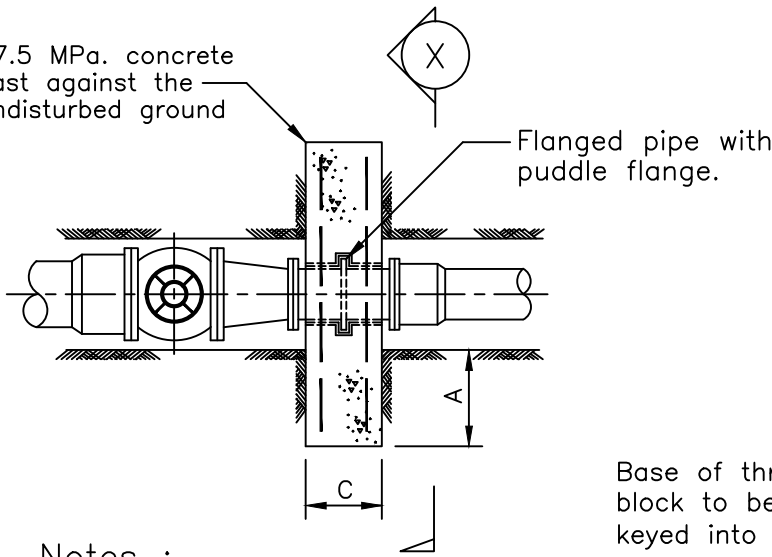


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**PRESSURE WASTEWATER VENT AND AIR VALVE**

|               |              |
|---------------|--------------|
| SCALE:        | AS SHOWN     |
| ISSUE DATE:   | 13-07-2018   |
| DWG No.       | 2010070.058A |
| REFERENCE No. | WW 23        |

17.5 MPa. concrete cast against the undisturbed ground



Base of thrust block to be keyed into base of trench.

Notes :

1. Concrete thrust block dimensions for firm soil conditions.
2. The dimensions to be increased or decreased for variation in soil conditions.
3. Allowable bearing stress used - 100kPa.
4. Internal pipe test pressure up to 1400kPa.
5. As built locations to be obtained prior to backfill.
6. Protective membrane ( Polythene ) between concrete and pipe.
7. 75mm clearance between fittings/flanges and concrete casting.
8. All fittings to be wrapped with a suitable wrapping system.

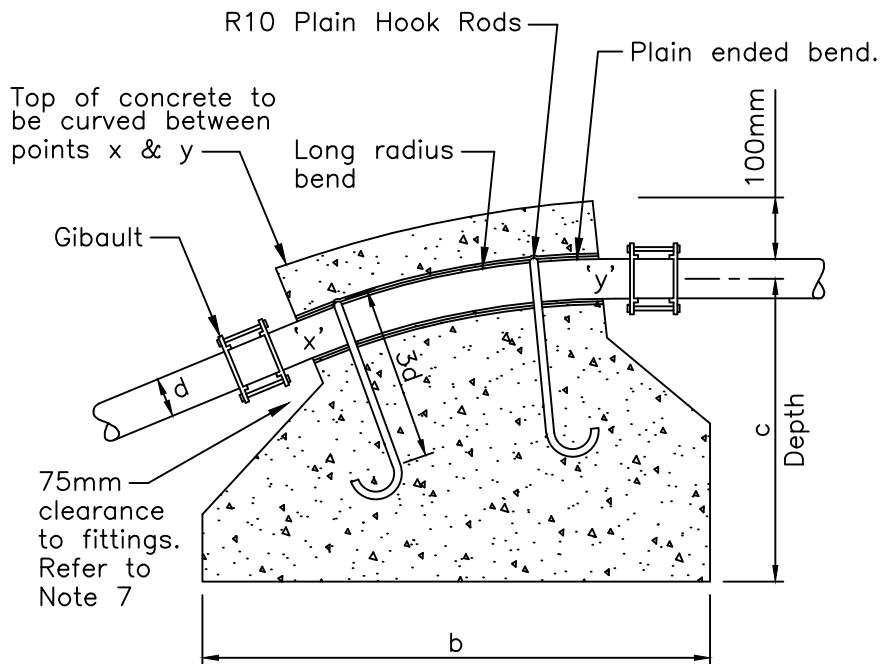
| Reducer mm | Reducers |     |     |
|------------|----------|-----|-----|
|            | A        | B   | C   |
| 100-150    | 250      | 350 | 300 |
| 100-200    | 500      | 350 | 300 |
| 150-200    | 250      | 500 | 300 |
| 150-250    | 500      | 500 | 300 |
| 200-250    | 250      | 600 | 300 |
| 200-300    | 400      | 700 | 300 |
| 250-300    | 300      | 800 | 300 |

ANCHOR BLOCKS AT REDUCERS

| Pipe Dia | Vertical Bends-45° |      |      |
|----------|--------------------|------|------|
|          | a                  | b    | c    |
| 100mm    | 600                | 800  | 700  |
| 150mm    | 800                | 1000 | 800  |
| 200mm    | 1000               | 1200 | 800  |
| 250mm    | 1000               | 1600 | 1000 |
| 300mm    | 1000               | 2000 | 1200 |

| Pipe Dia | Vertical Bends-22.5° |      |      |
|----------|----------------------|------|------|
|          | a                    | b    | c    |
| 100mm    | 500                  | 500  | 500  |
| 150mm    | 500                  | 800  | 800  |
| 200mm    | 700                  | 1000 | 800  |
| 250mm    | 800                  | 1200 | 900  |
| 300mm    | 900                  | 1500 | 1000 |

| Pipe Dia | Vertical Bends-11.25° |      |     |
|----------|-----------------------|------|-----|
|          | a                     | b    | c   |
| 100mm    | 400                   | 500  | 500 |
| 150mm    | 500                   | 600  | 600 |
| 200mm    | 500                   | 800  | 800 |
| 250mm    | 700                   | 1000 | 800 |
| 300mm    | 800                   | 1200 | 900 |



a = Width of Anchor Block

VERTICAL SECTION

ANCHOR BLOCKS AT BENDS IN VERTICAL PLANE

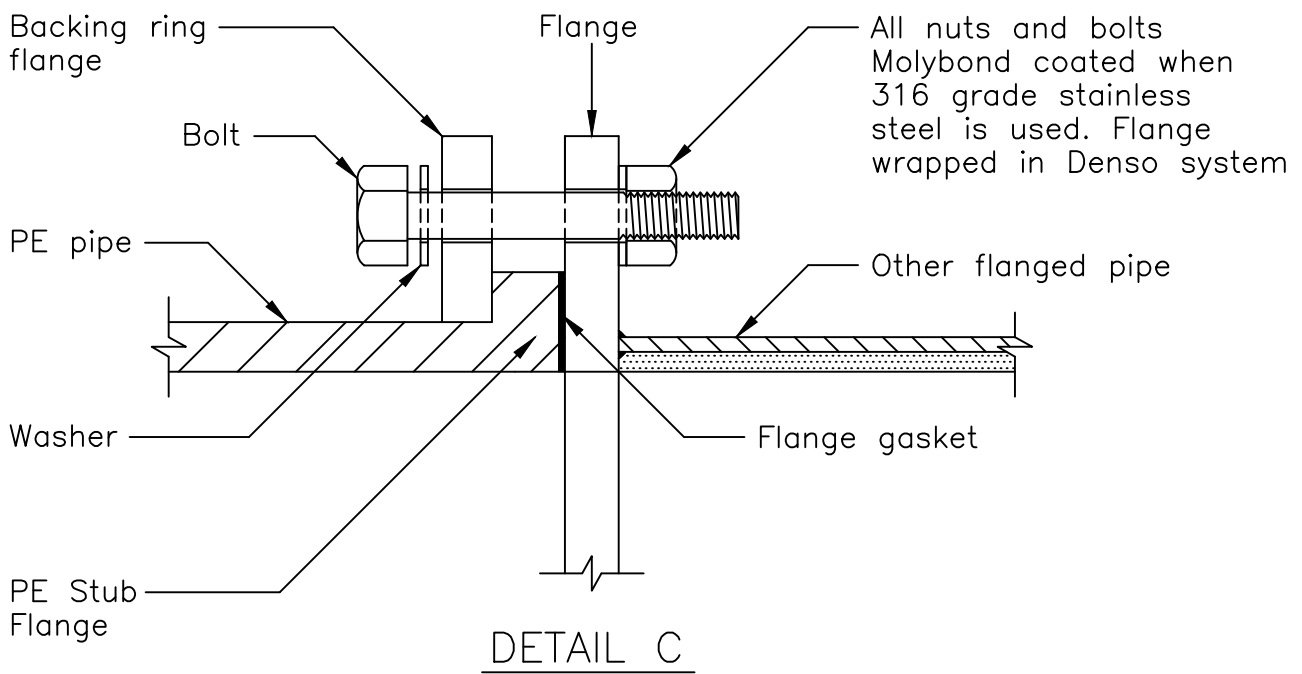
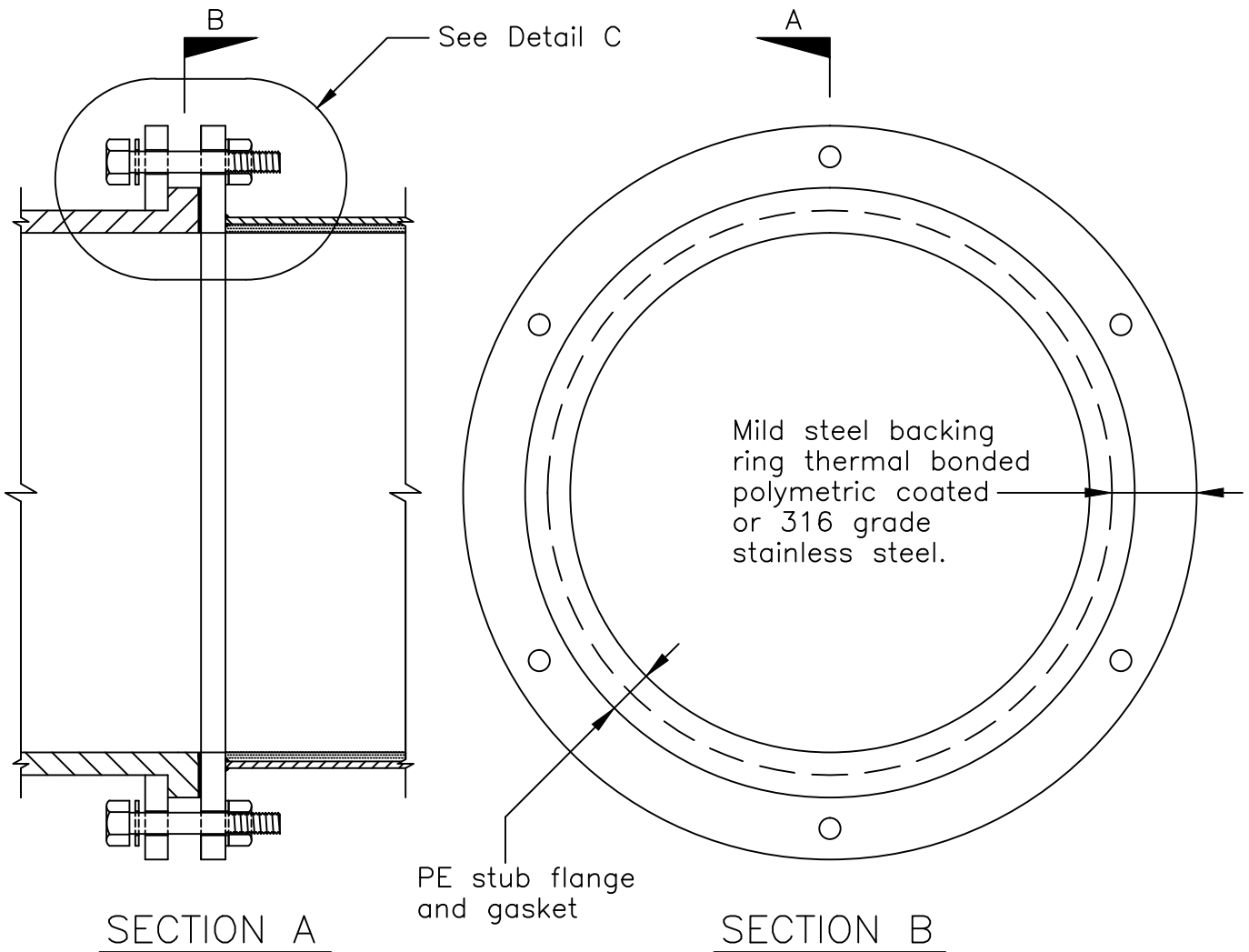
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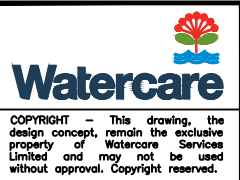
ANCHOR BLOCK DETAILS  
REDUCERS AND VERTICAL BENDS  
FOR PRESSURE SYSTEMS

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 06-03-2017   |
| DWG No.       | 2010070.053B |
| REFERENCE No. | WW 24        |



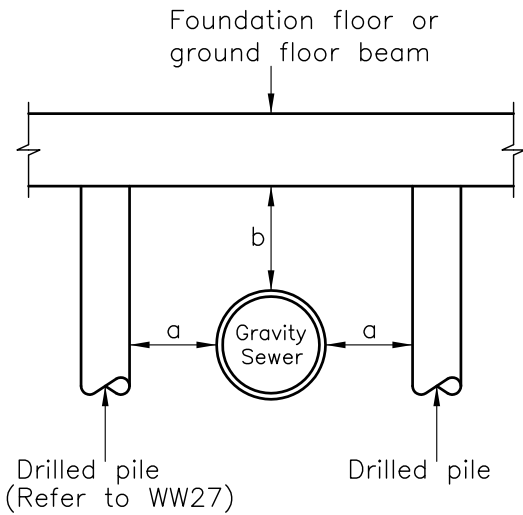
Note:  
 Where stub flange reduced to fit, calculations should show Max. allowable operating pressure is met.

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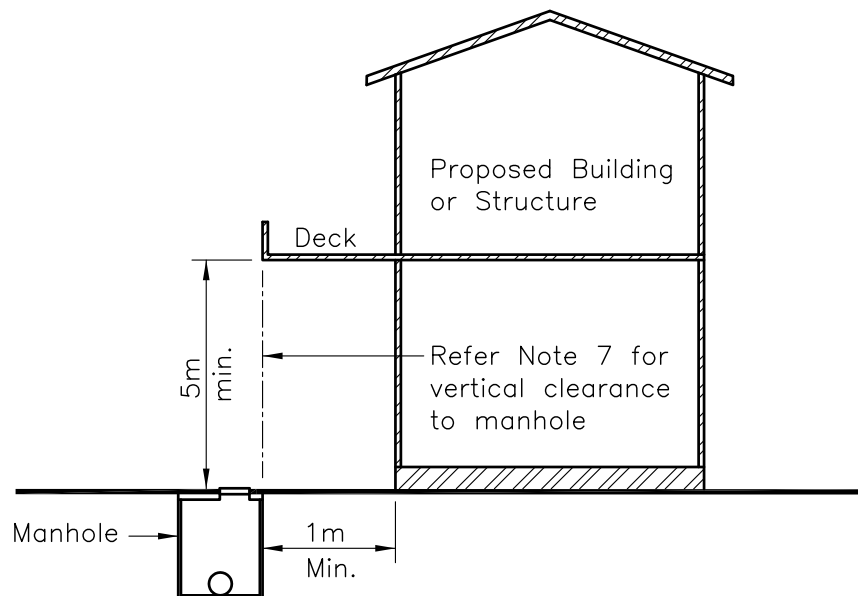
FLANGE CONNECTION DETAIL  
 PE MAIN TO OTHER  
 FOR PRESSURE SYSTEMS

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 13-03-2017   |
| DWG No.       | 2010070.052B |
| REFERENCE No. | WW 25        |



| Minimum Pile Clearances    |                  |      |                   |      |                 |      |
|----------------------------|------------------|------|-------------------|------|-----------------|------|
| Type of Sewer              | Sewer Depth < 3m |      | Sewer Depth 3m–5m |      | Sewer Depth >5m |      |
|                            | a                | b    | a                 | b    | a               | b    |
| Local Wastewater Network   | 1m               | 0.6m | 1m                | 0.6m | 1.5m            | 0.6m |
| Transmission (Trunk) Sewer | 1m               | 1m   | 2m                | 1m   | 3m              | 1.5m |

### PIPE CONSTRUCTION CLEARANCE FOR BRIDGING OPTIONS



### MANHOLE CONSTRUCTION CLEARANCE

#### NOTES:

1. Locate sewer to survey accuracy or by hand piloting.
2. No driven piles within 5m of a sewer or 10m of brick sewer.
3. All manholes shall have 24 hrs unobstructed access.
4. No construction shall occur above a manhole or within tolerances 'a' or 'b' in table above.
5. Pressure mains shall not be built over.
6. Brick or poor condition wastewater pipe shall not be built over. Bridging options must be approved.
7. Vertical clearance from the top of the chamber shall be 5m Min. over the full width of the chamber.

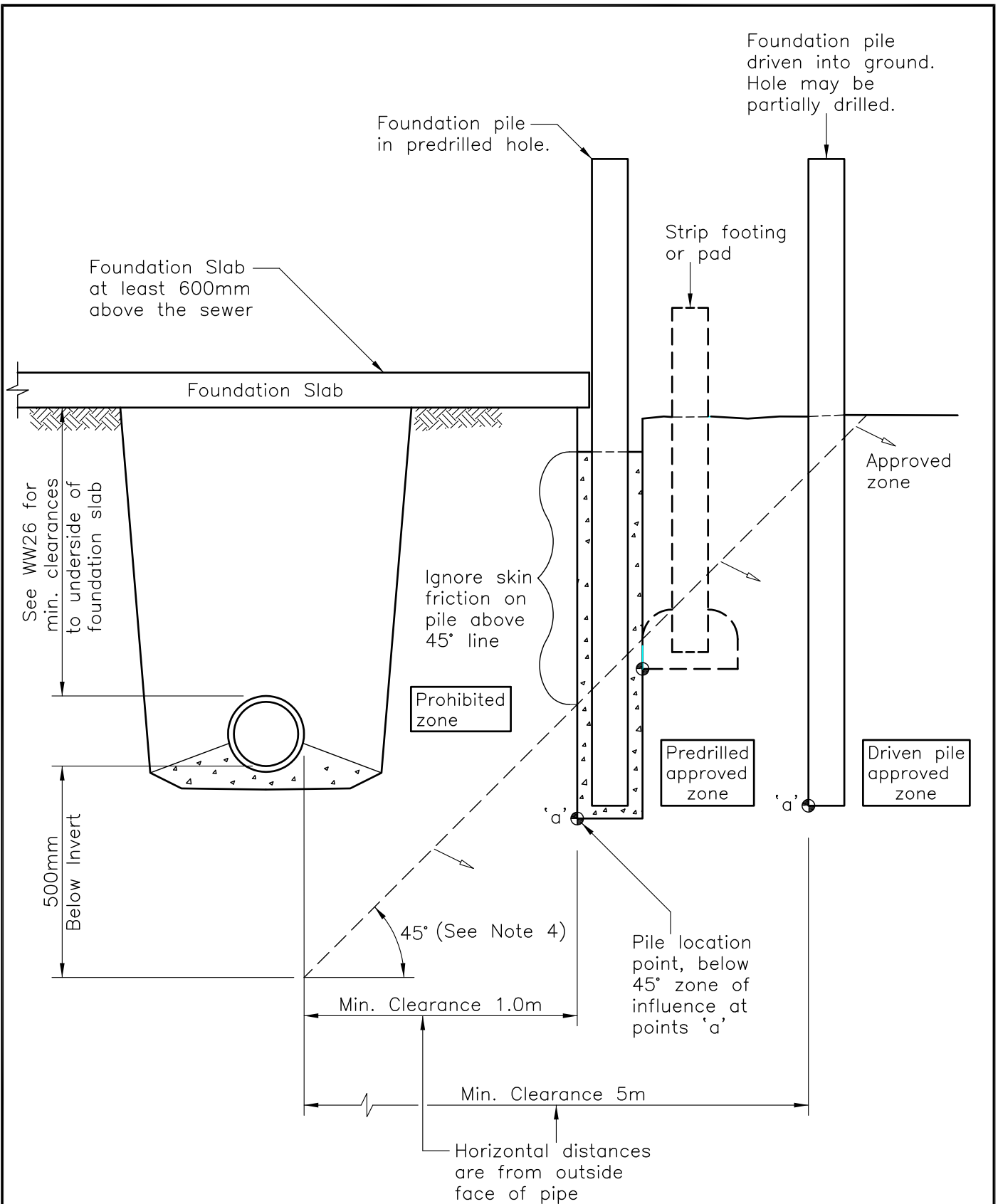
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## PIPE AND MANHOLE CONSTRUCTION CLEARANCE

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 04-12-2017   |
| DWG No.       | 2010070.044D |
| REFERENCE No. | WW 26        |



**NOTES:**

1. No driven piles are permitted within 10m of brick Sewers, or within 5m of all other sewers.
2. Piles that are required to resist horizontal forces will require specific design.
3. Pile/Footing location point must be below 45° zone of influence.
4. Zone of influence typically 45° or angle determined by a structural engineer.

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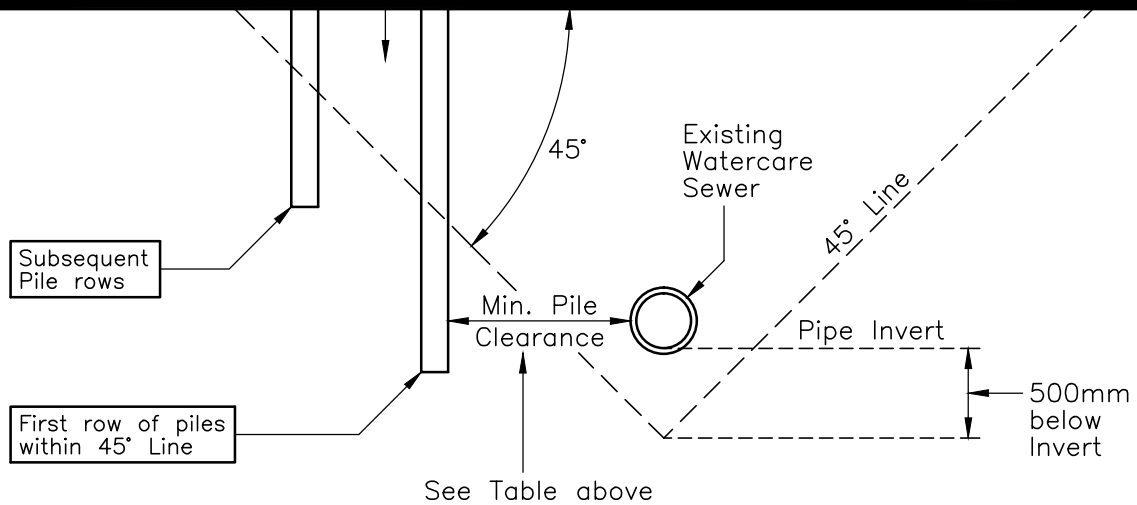
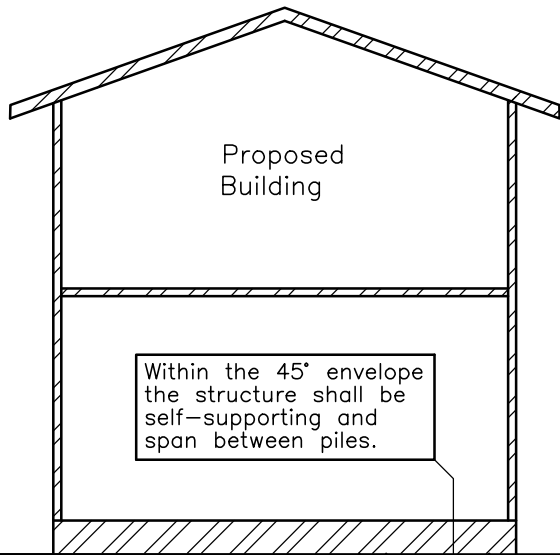
**BUILDING CLOSE TO OR OVER LOCAL NETWORK WASTEWATER**

|               |              |
|---------------|--------------|
| SCALE:        | N.T.S.       |
| ISSUE DATE:   | 04-12-2017   |
| DWG No.       | 2010070.045B |
| REFERENCE No. | WW 27        |



## GUIDELINE ONLY

| SEWER DEPTH | MIN. PILE CLEARANCES |
|-------------|----------------------|
| < 3.0m      | 1.0m                 |
| 3m-5m       | 2.0m                 |
| > 5.0m      | 3.0m                 |



### SECTION THROUGH BUILDING AND TRANSMISSION SEWER

#### NOTES:

1. This detail shall be used as a guideline only. All applications will be assessed on individual basis and conditions imposed could be more specific than these shown.
2. No structural loads are to be placed on public sewer lines.
3. All structural loads on piles shall be absorbed outside the 45° envelope and below the pipe invert level for the first row of piles.
4. Where raft foundations or strip footings are proposed within the 45° envelope, statement from a structural engineer is required to confirm that the foundation design complies with Clause 2.
5. Driven piles are not permitted within 10 metres of a brick sewer or 5 metres of any other sewers.
6. Closed Circuit Television ( CCTV ) inspections of Transmission sewer only on approval from Watercare Services Ltd.
7. Manholes shall be minimum 1m clear from buildings as per drawing WW20 and building eaves shall be completely clear.
8. Drawings of the proposed works must accurately identify the location of the sewer/s affected and the distances with cross-section details for all structures. Watercare approved registered surveyor must be engaged to carry out the mark out.

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## GUIDELINE FOR BUILDING CLOSE TO OR OVER TRANSMISSION WASTEWATER

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|---------------|--------------|
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