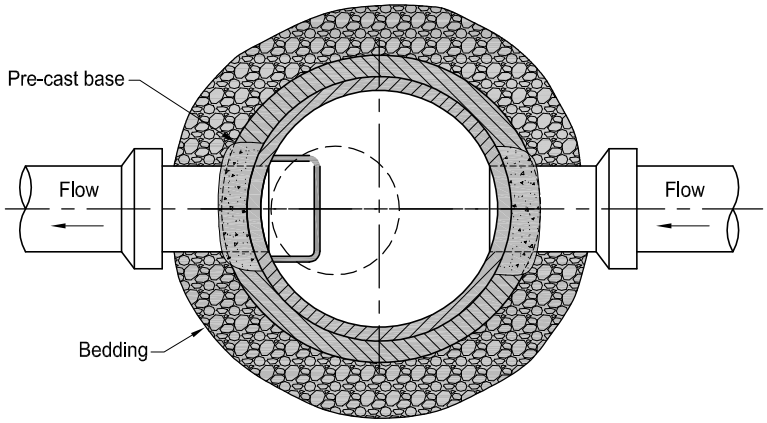
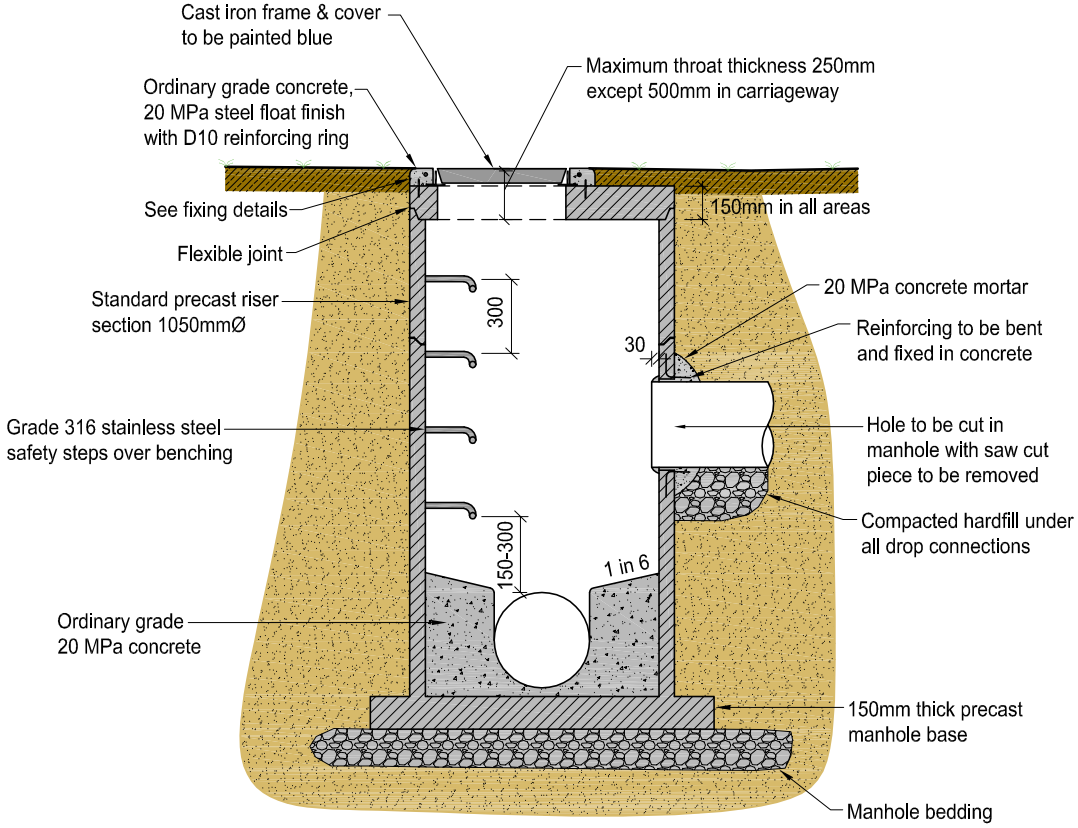
NOTES:

1. Haunching of intersection pipes to provide curved channels to ensure streamline flow.
2. Standard precast manhole components to be used unless approved otherwise.
3. Orientate lid opening and steps to put frame & cover clear of any kerblines.
4. In areas of near surface groundwater levels, manholes shall include a perforated short pipe.

EXAMPLE PHOTO



PLAN



SECTION

STRUCTURE
MANHOLE - STANDARD

W501

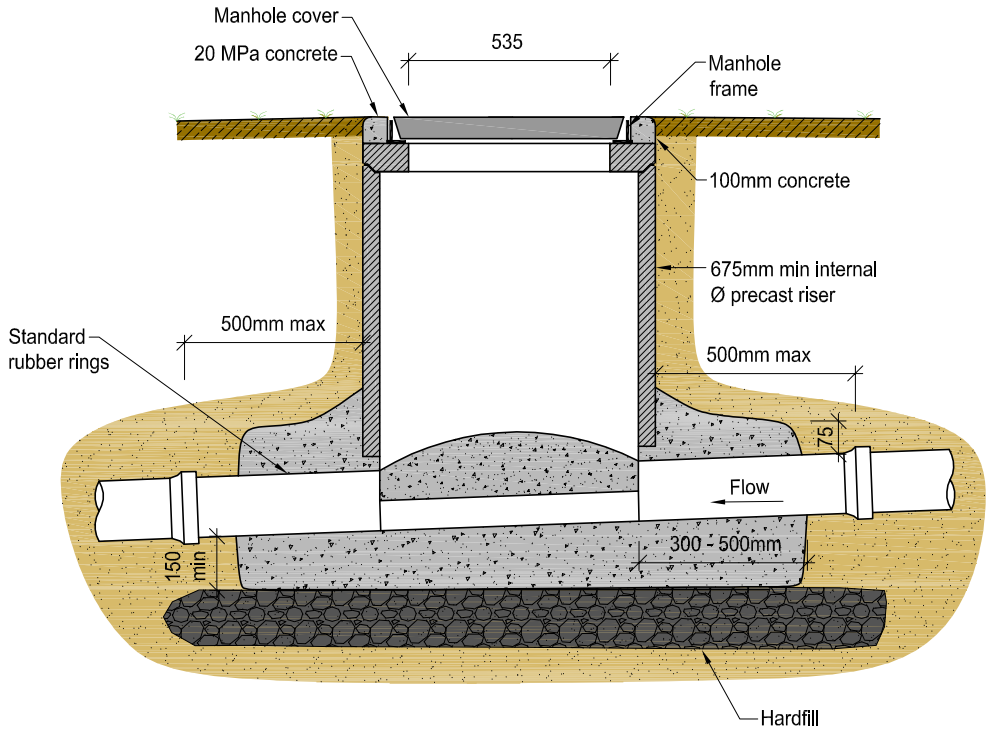
Western Bay of Plenty District Council

DEVELOPMENT CODE

VERSION 1
AUG 09

NOTES:

1. Depth not to exceed 700mm.
2. Not to be used in road.
3. Maximum pipe size connected 225mmØ.



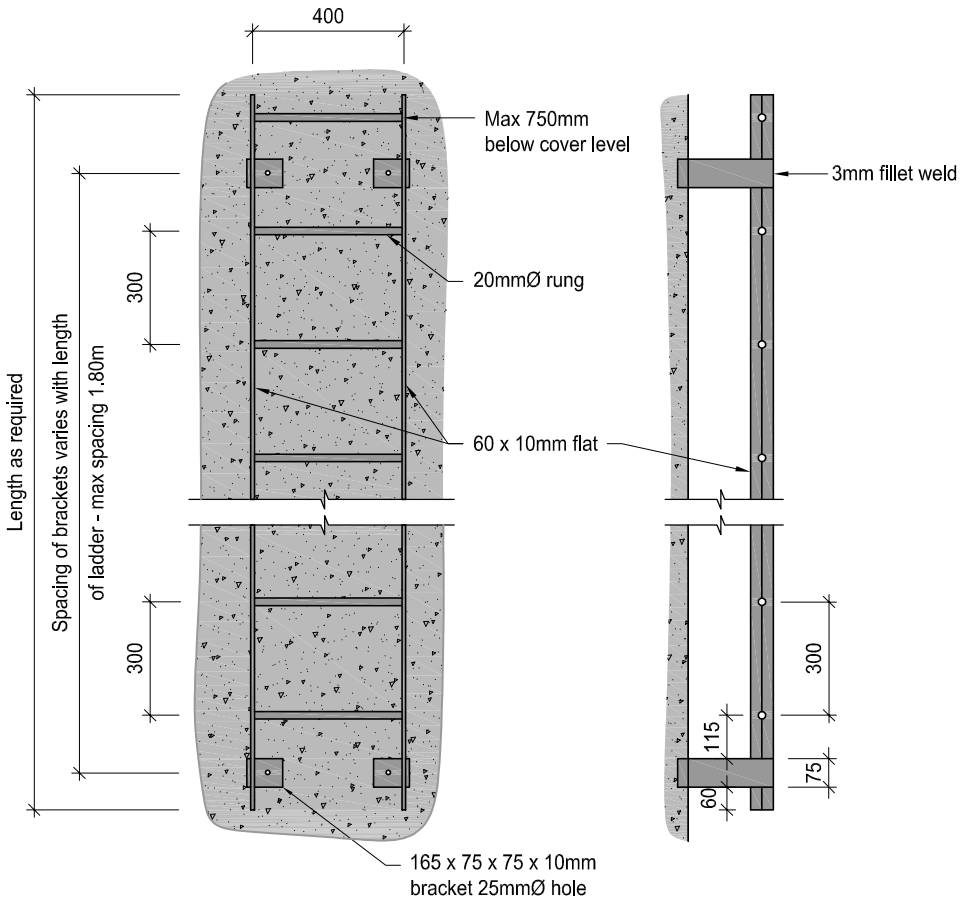
STRUCTURE

MANHOLE - SHALLOW

W502

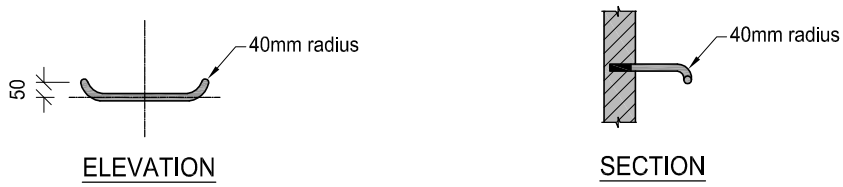
NOTES:

1. Manhole ladder to be hot dip galvanized or to be stainless steel.

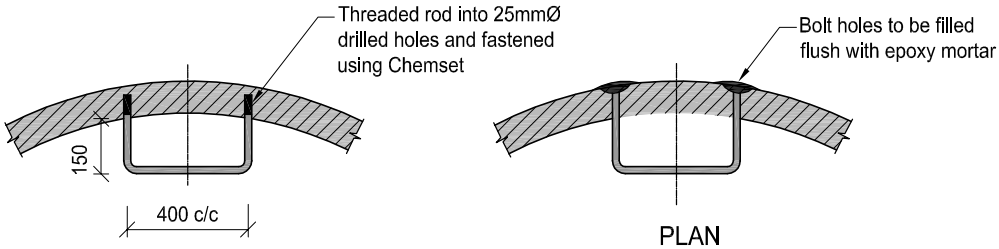


FRONT ELEVATION SIDE ELEVATION

MANHOLE LADDER



ELEVATION SECTION



PLAN PLAN

SAFETY STEP IRON DETAILS

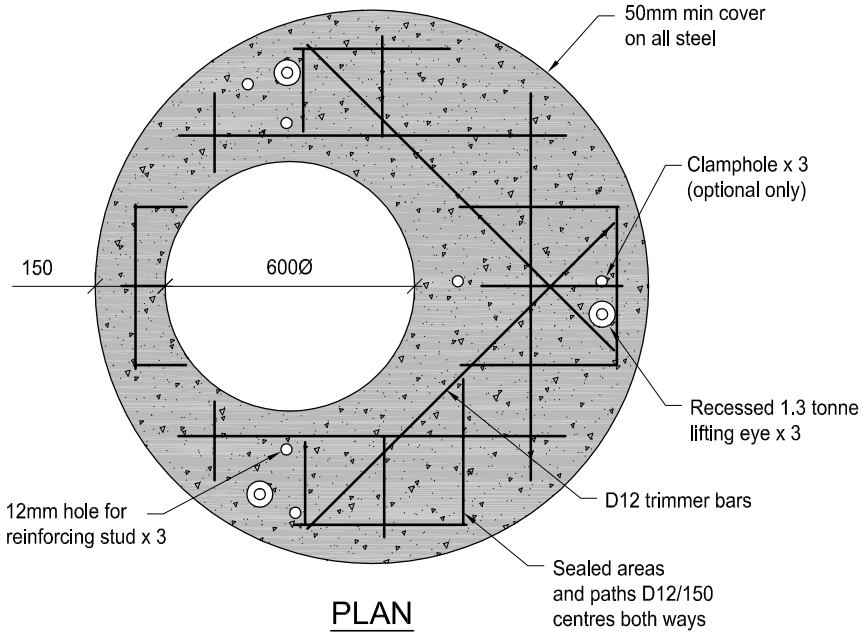
STRUCTURE

MANHOLE - LADDER & STEPS

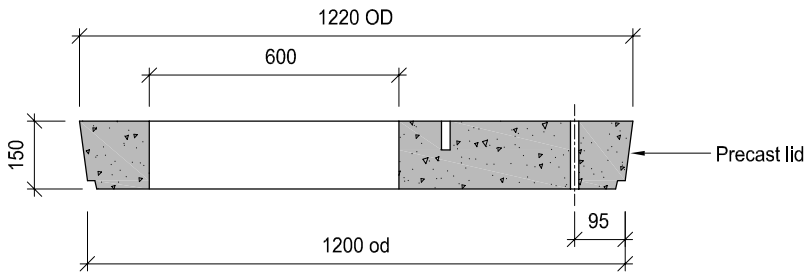
W503

NOTES:

1. Standard heavy duty lid 150mm thick except in State Highways (designed for 51kN wheel load).
2. Extra heavy duty for State Highway HN-HN-72.



PLAN



SECTION THROUGH LID

STRUCTURE

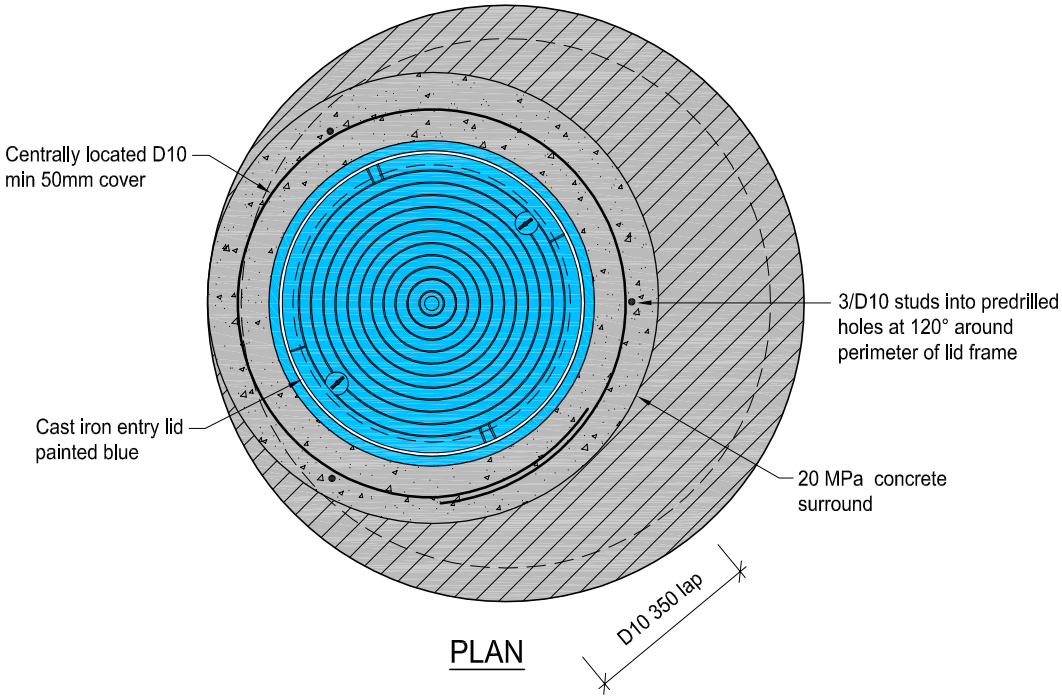
MANHOLE - PRECAST 1050mmØ LID

W504

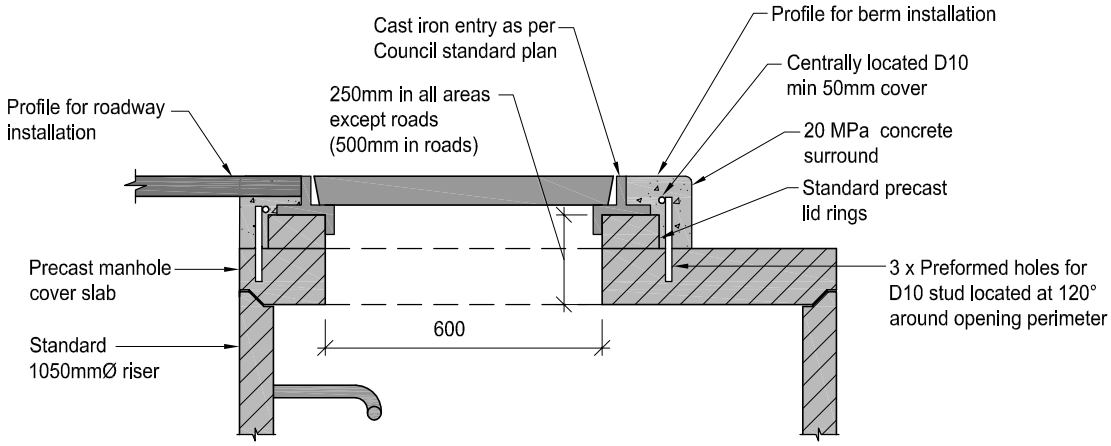
EXAMPLE PHOTO

NOTES:

1. Cast iron entry lid to be constructed to the existing ground contour as appropriate.



PLAN



SECTION

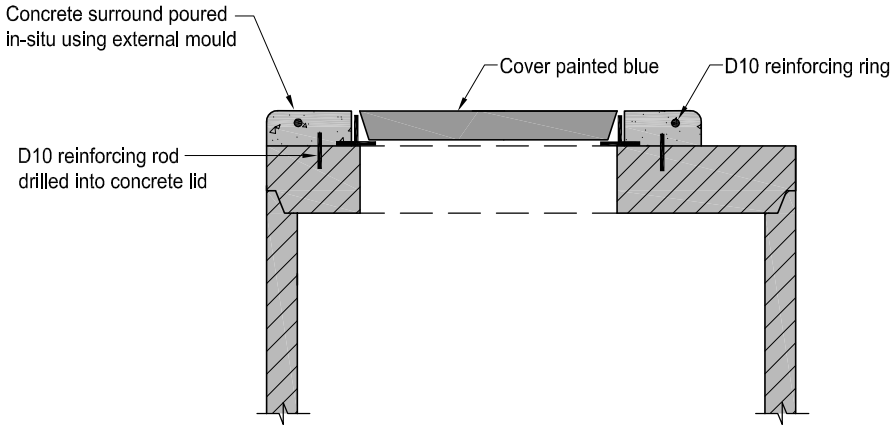
STRUCTURE

MANHOLE - ENTRY FIXING

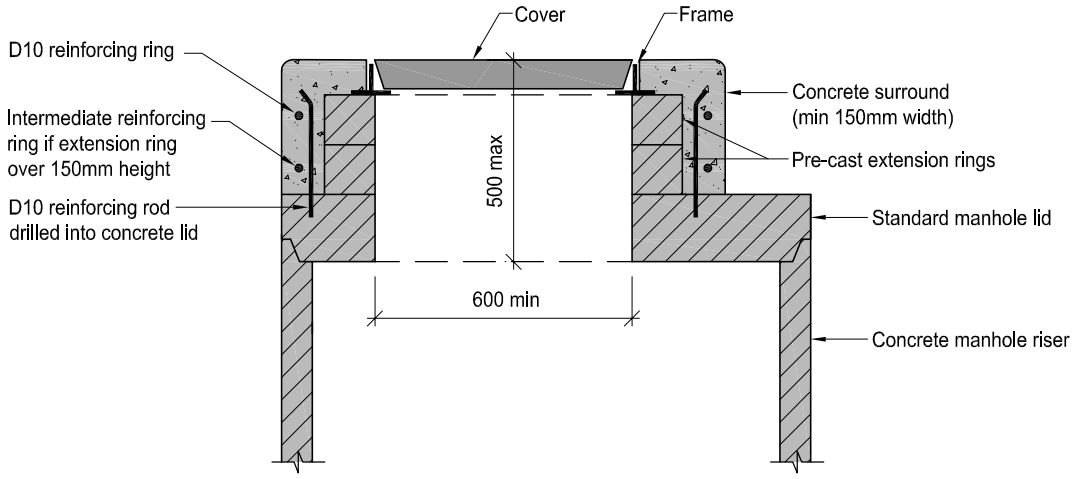
W505

NOTES:

1. Non-rock covers to be used in all road carriageways.
2. Heavy duty covers to be used in all road and recreational reserves, commercial and industrial zoned areas, and residential property driveways.
3. Standard duty covers may only be used on residential properties.

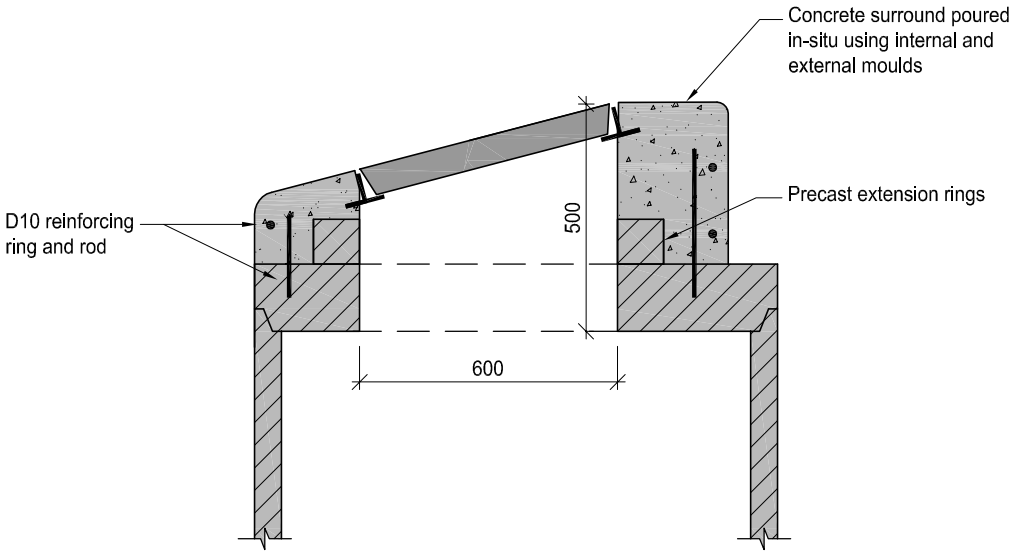


STANDARD ACCESS



RAISED ACCESS

EXAMPLE PHOTO



INCLINED ACCESS

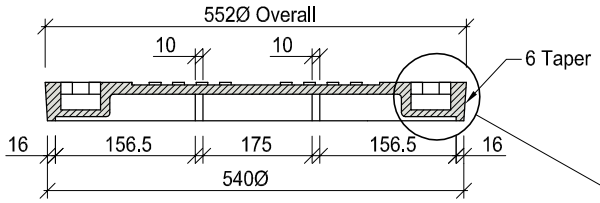
STRUCTURE

MANHOLE - INCLINED ACCESS DETAIL

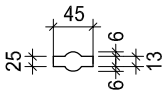
W507

NOTES:

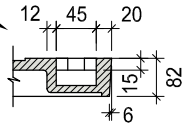
1. All casting to be of best quality grey iron bitumen coated.
2. Paint cover blue with road marking paint.



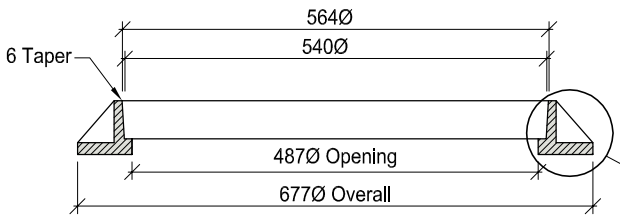
SECTION THRU COVER



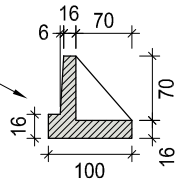
PLAN OF KEYHOLE

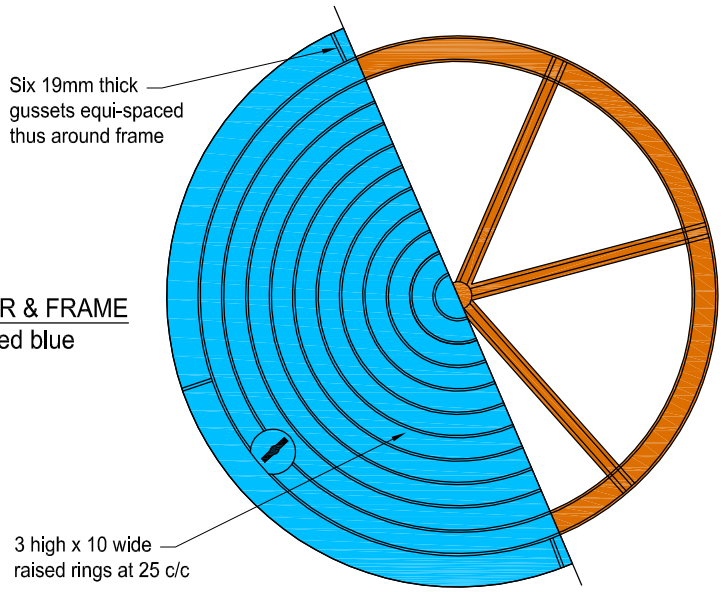


SECTION OF KEYHOLE



SECTION THRU FRAME





PLAN

COVER & FRAME
- painted blue

UNDERSIDE OF COVER

APPROX. WEIGHTS

Cover: 54kg
Frame: 52kg

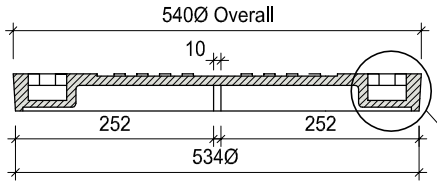
STRUCTURE

MANHOLE - STANDARD COVER AND FRAME

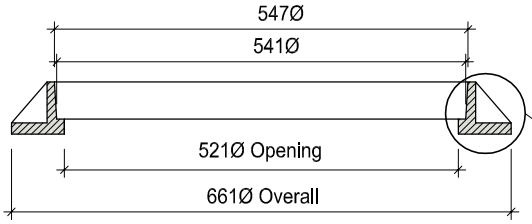
W514

NOTES:

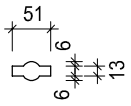
1. All casting to be of best quality grey iron bitumen coated.
2. Paint cover blue with road marking paint.
3. Light duty covers to be used only in special circumstances with the approval of the Council.



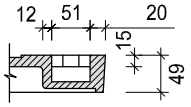
SECTION THRU COVER

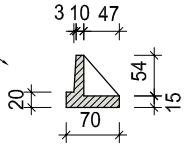


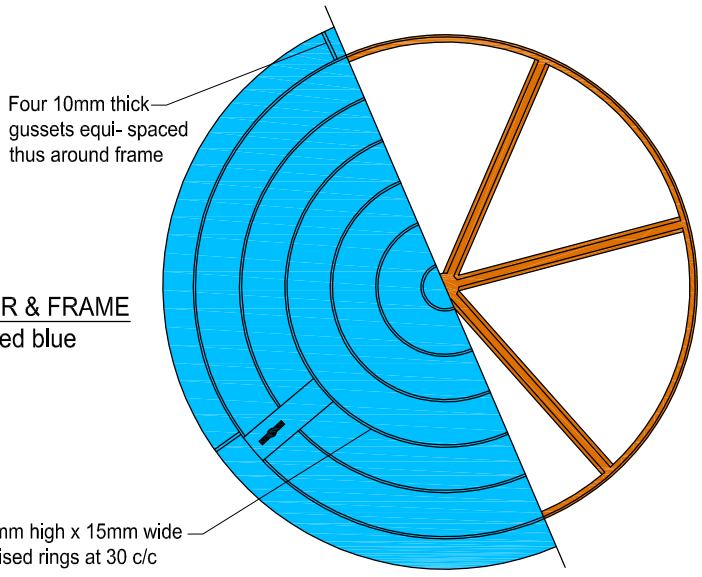
SECTION THRU FRAME



PLAN OF KEYHOLE







PLAN

UNDERSIDE OF COVER

COVER & FRAME
- painted blue

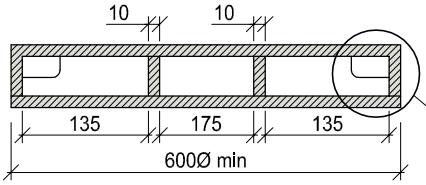
APPROX. WEIGHTS
Cover: 30kg
Frame: 25kg

STRUCTURE
MANHOLE - LIGHT COVER AND FRAME

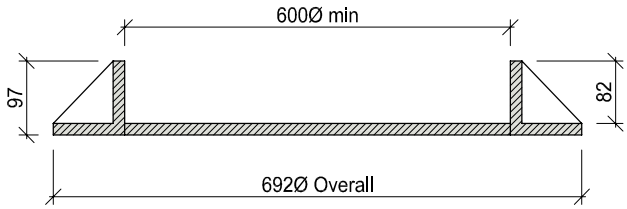
W515

NOTES:

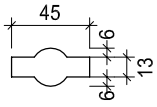
1. All casting to be of best quality grey iron bitumen coated.
2. Paint cover blue with road marking paint.



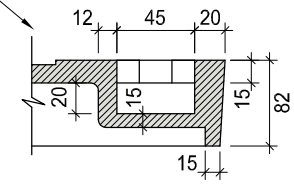
SECTION THRU COVER



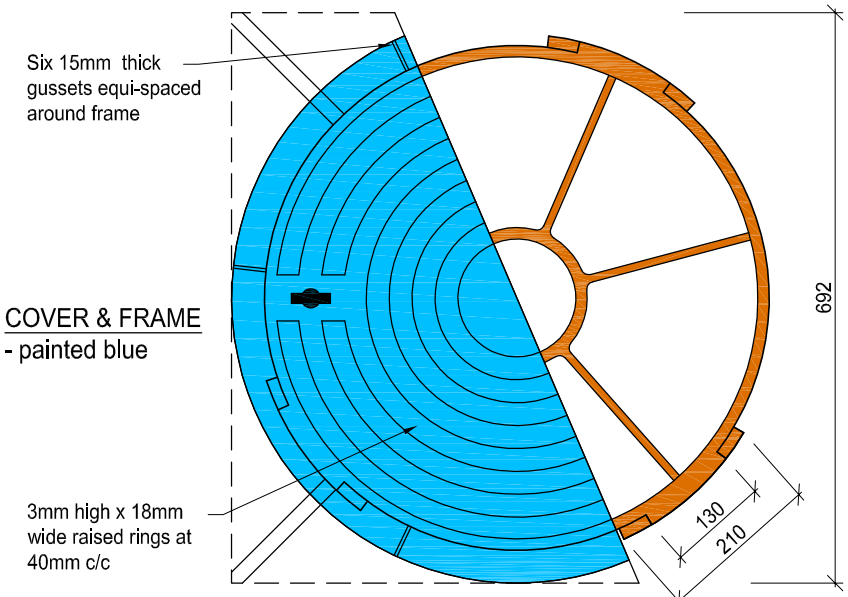
SECTION THRU FRAME



PLAN OF KEYHOLE



SECTION OF KEYHOLE



PLAN

UNDERSIDE OF COVER

APPROX. WEIGHTS

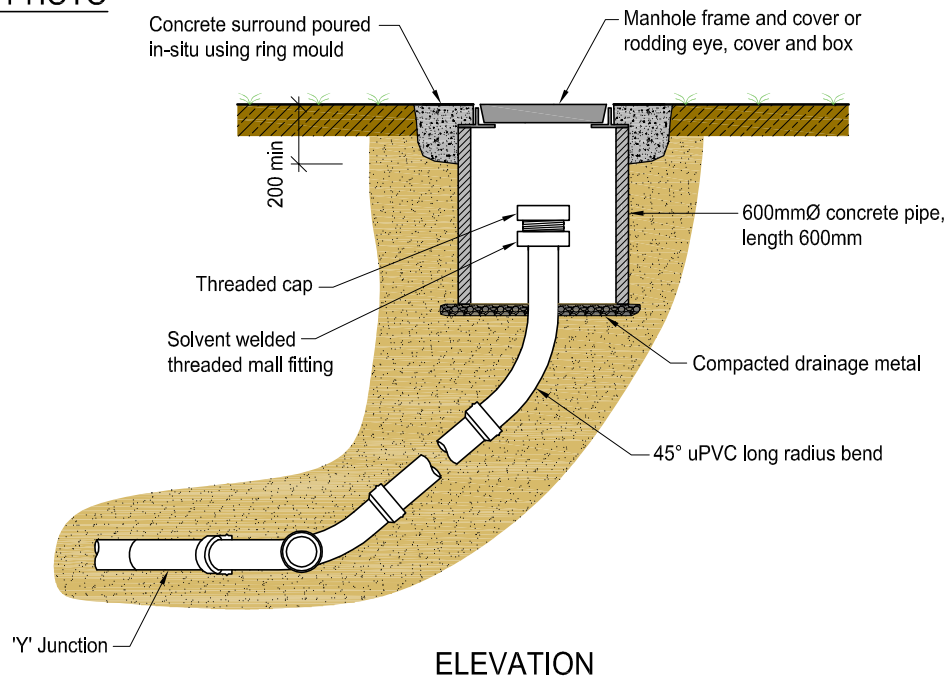
Cover: 51kg
Frame: 37kg

STRUCTURE

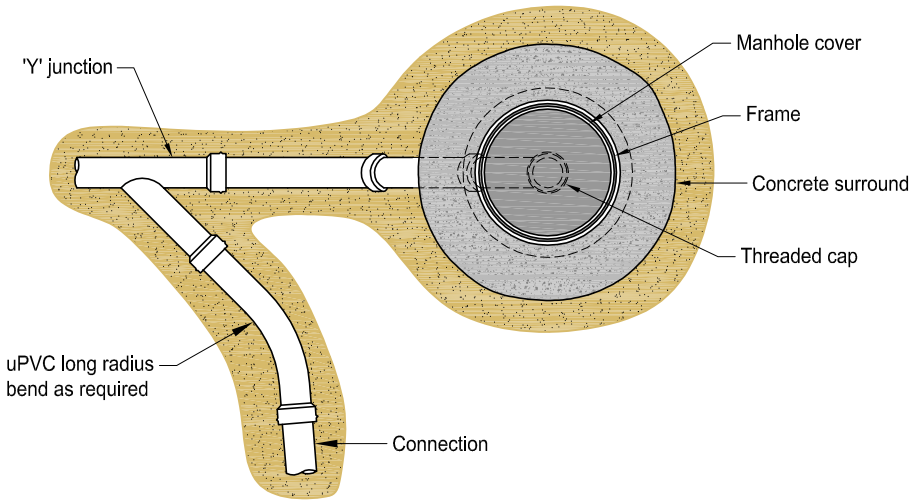
MANHOLE - HEAVY DUTY NON-ROCK TYPE COVER AND FRAME

W516

EXAMPLE PHOTO



ELEVATION



PLAN

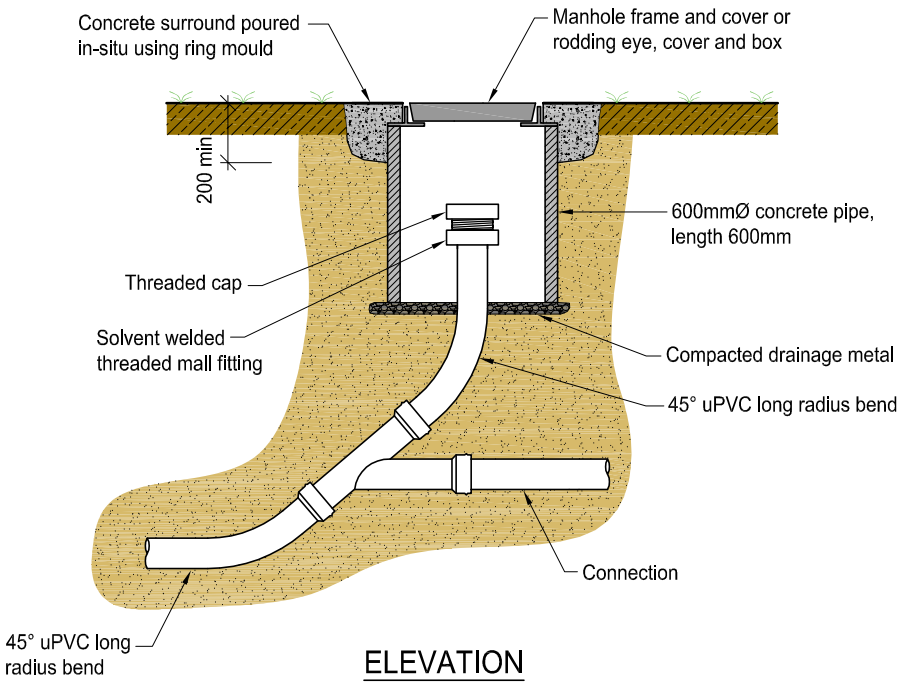
STRUCTURE

RODDING EYE - SHALLOW < 2.5m

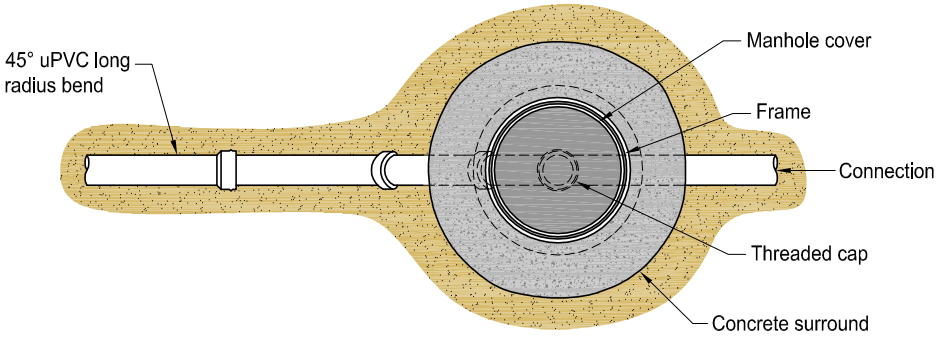
W521

NOTES:

1. Rodding eye to be same diameter as original pipe size.



ELEVATION



PLAN

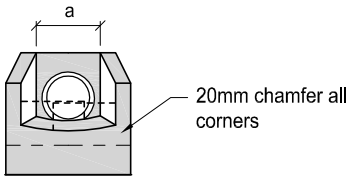
STRUCTURE

RODDING EYE - DEEP > 2.5m

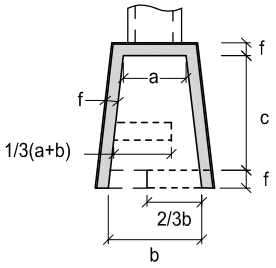
W522

NOTES:

1. Reinforce floor & walls with:
   150-375 665 mesh
   450-600 663 mesh or 10mmØ rods @ 250 crs.
   675-900 12mmØ rods @ 250 crs.
   1050-1350 12mmØ rods @ 150 crs.
2. All reinforcement shall be placed centrally in walls and floor, and shall be continuous between walls and floor.
3. Laps in structural grade bars to be 300mm min.
4. There shall be at least two bars - whether mesh or M.S. - over the top of the pipe.
5. Concrete is to be ordinary grade (20 MPa) in accordance with N.Z.S. 1900 chapter 9.3A.
6. Baffles are to be constructed as shown when outlet velocities and soil conditions dictate. In extreme cases specific design may be required by the engineer.
7. Inlet structures shall have reverse apron fall and no baffles.
8. Local conditions, both climatic and geological, vary extensively and consequently the Manager of City Development should be consulted prior to the design so that local conditions can be allowed for.
9. Rip rap may be required at outfall to prevent erosion/scour
10. Precast alternatives are acceptable.

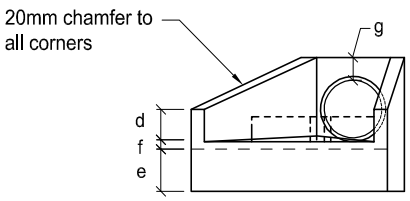


END ELEVATION

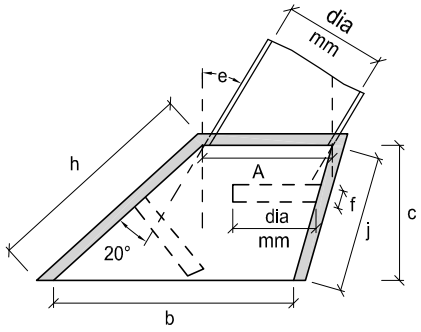


PLAN

NORMAL STRUCTURE

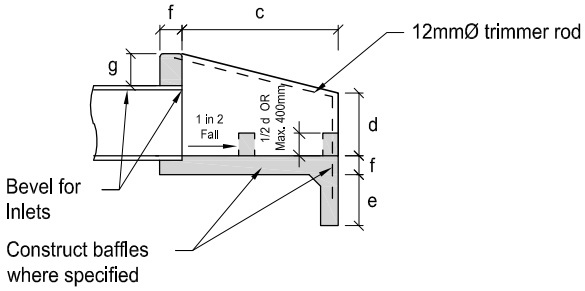


END ELEVATION



PLAN

SKEWED STRUCTURE



SECTION

PRINCIPAL DIMENSIONS (mm)

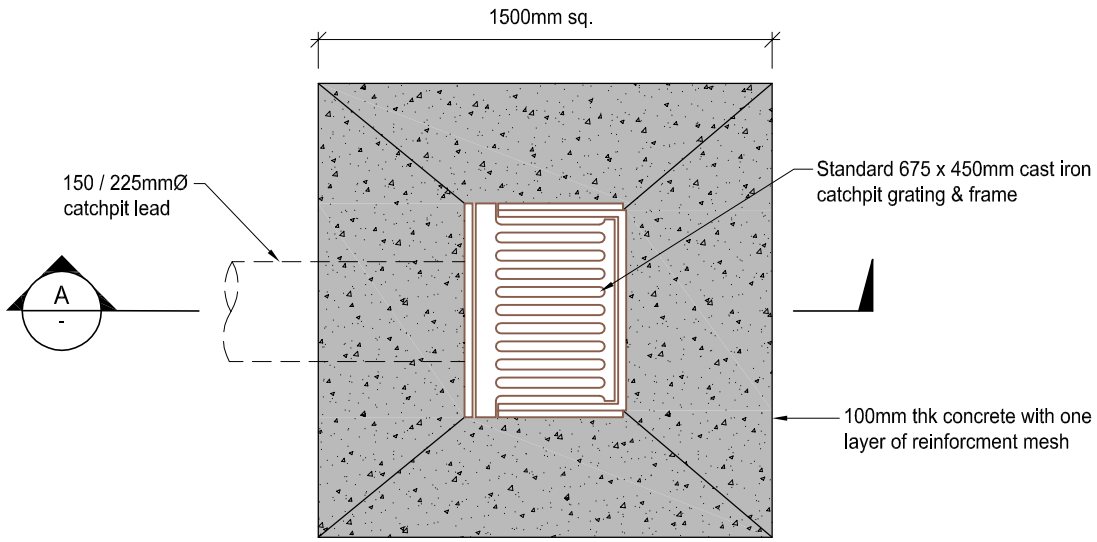
Dia. of pipe	a	b	c	d	e	f	g
150	300	450	600	200	150	100	150
230	380	600	700	250	200	100	150
300	450	750	750	300	200	100	150
375	550	900	850	350	200	100	150
450	630	1100	900	400	230	150	230
525	700	1200	1000	450	230	150	230
600	800	1400	1100	550	230	150	230
750	1000	1700	1200	600	300	150	300
900	1170	2000	1450	650	300	150	300
1050	1380	2300	1700	750	450	150	300
1200	1520	2600	2100	750	450	150	450
1350	1680	2800	2400	750	450	150	450

PRINCIPAL DIMENSIONS

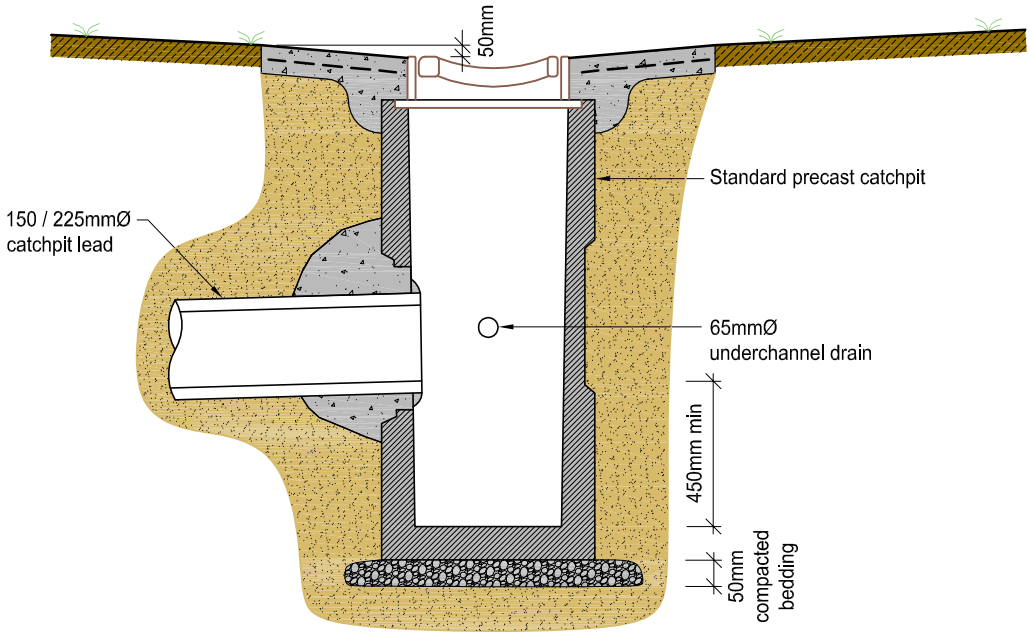
a. Sec e x (a) in the table above
b. c tan (e+20°) + (a-ctan(e-20°))
c. See (c) table above.
d. See (d) table above.
e. See (e) table above.
f. See (f) table above. g.
g. See (g) table above.
h. c x sec (e+20°).
j. c x sec (e-20°).

NOTES:

1. All concrete to be ordinary grade 20 MPa at 28 days.
2. All pipes to be finished flush with inside wall of sump.



PLAN



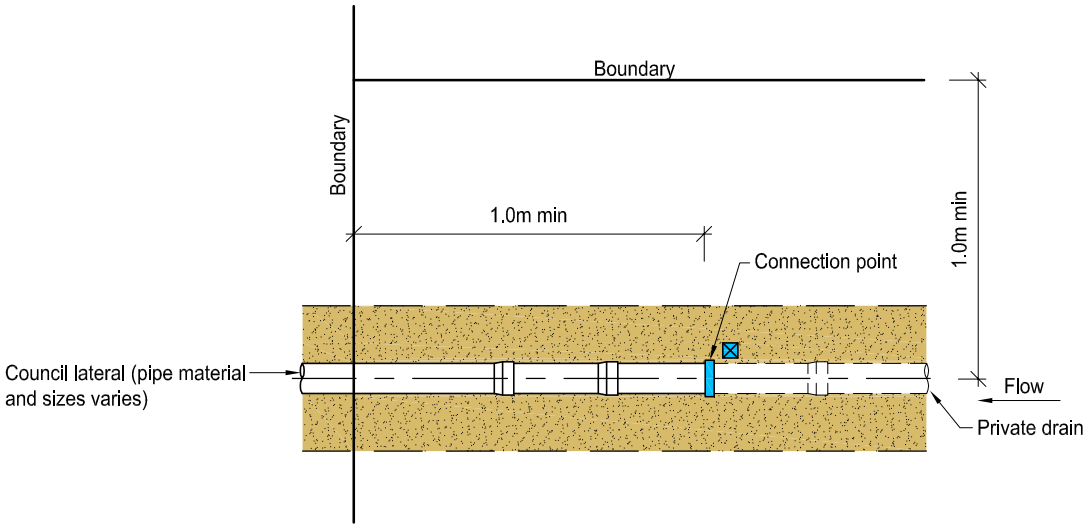
SECTION A-A

STRUCTURE
YARD SUMP

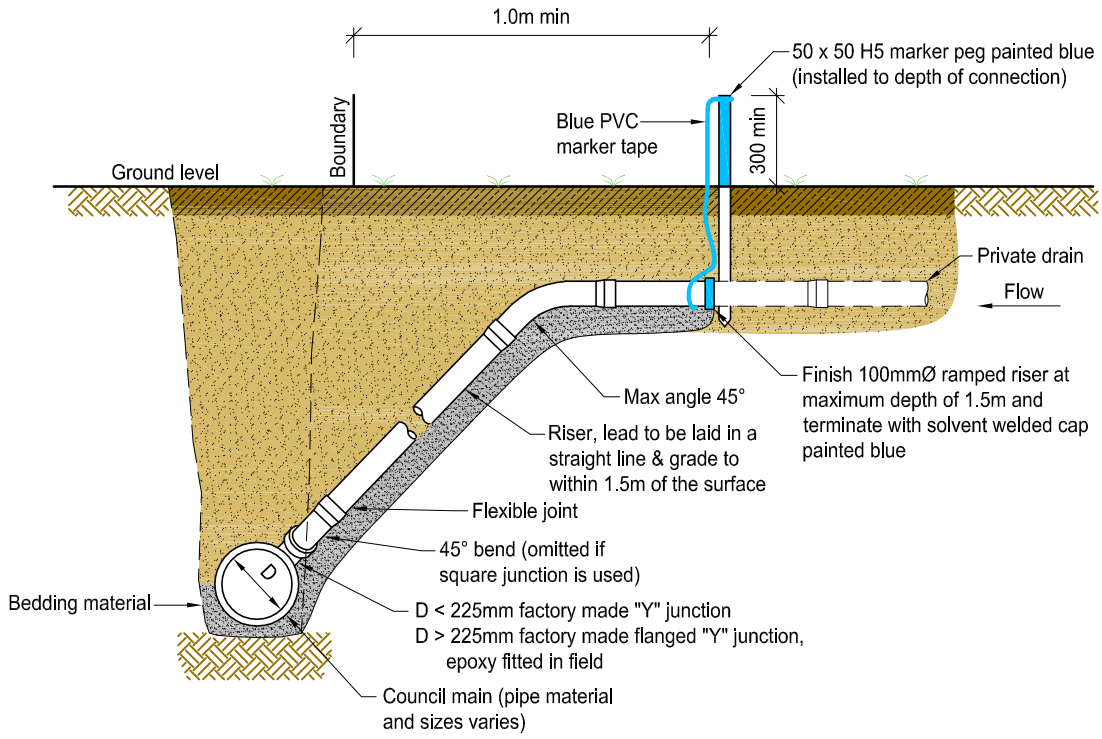
W526

NOTES:

1. Maximum gradient desirable 1:1. Steeper gradient will be permitted to maintain building area.
2. Pipe to be supported by natural ground where possible.
3. Connection to be positioned so that the entire building area can be served in accordance with the Building Act.
4. Connection types shown in this drawing are only applicable to PVC.



PLAN
PROPERTY CONNECTION



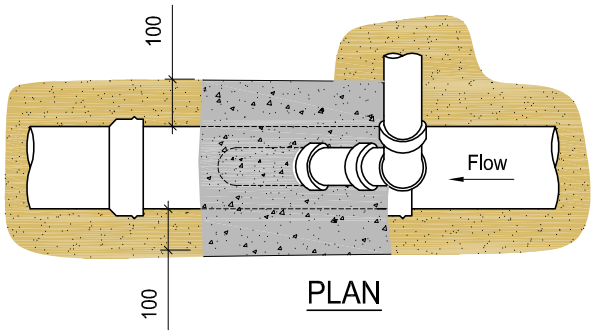
ELEVATION
'Y' (45°) JUNCTION RAMPED RISERS

PROPERTY CONNECTION
STANDARD

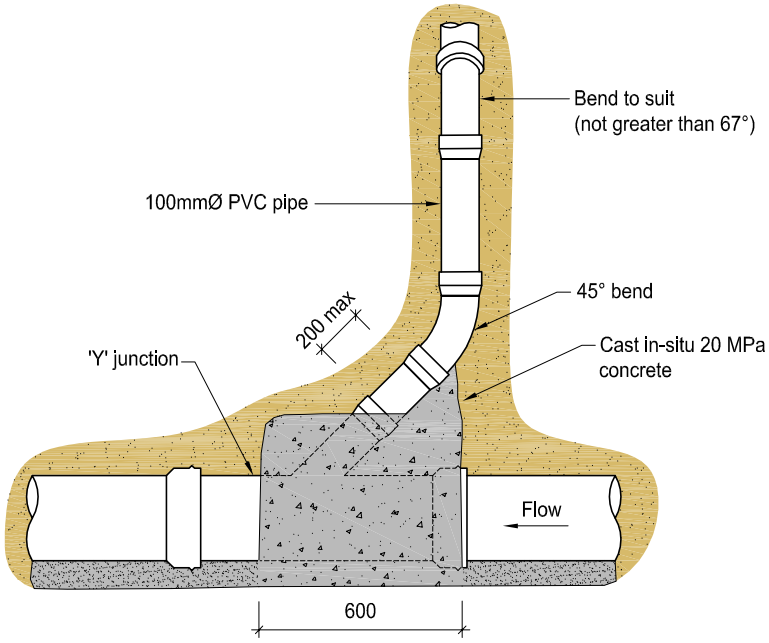
W531

NOTES:

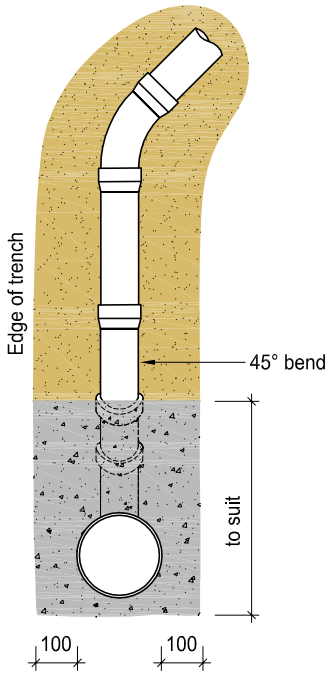
1. 90° bends will not be accepted.



PLAN



SIDE ELEVATION



END ELEVATION

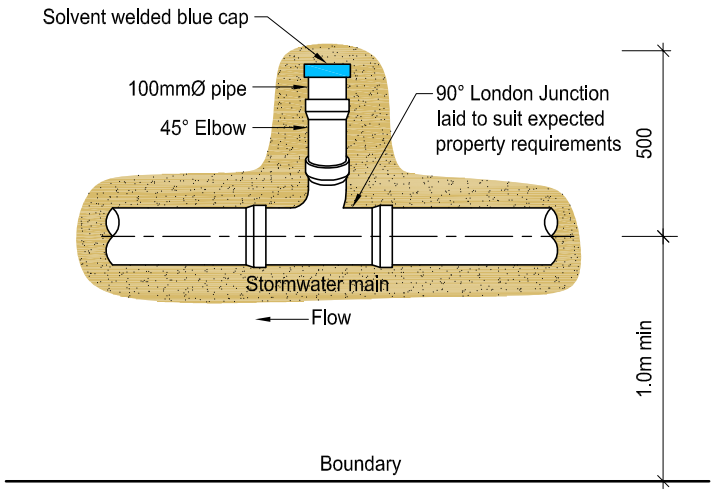
PROPERTY CONNECTION

DEPTH > 2.5m

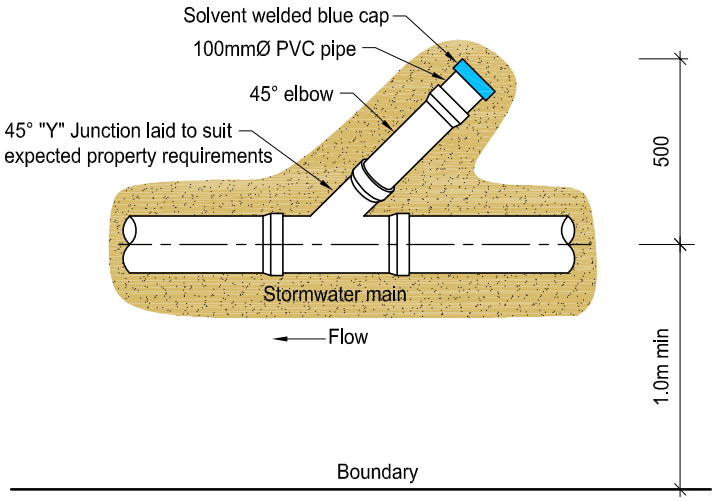
W532

NOTES:

1. Connection types shown in this drawing are only applicable to PVC.
2. Grade of property connection stormwater pipe to be not less than 1.65% (i in 60).



90° CONNECTION



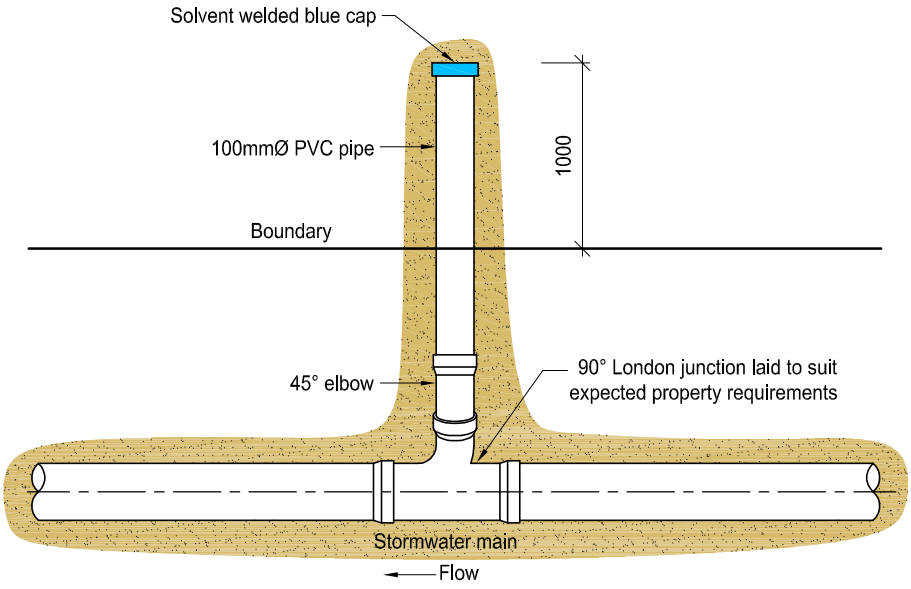
45° CONNECTION

PROPERTY CONNECTION
WITHIN PROPERTY

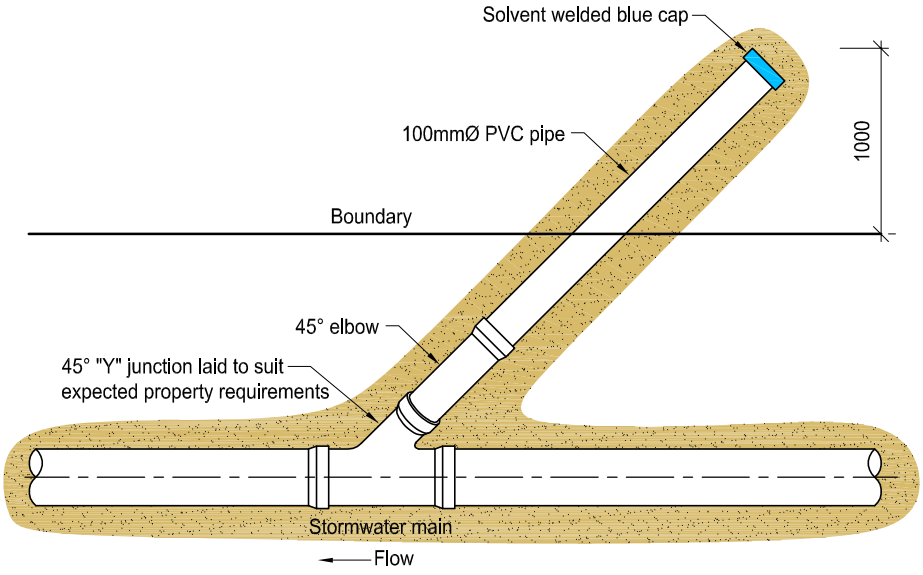
W533

NOTES:

1. Connection types shown in this drawing are only applicable to PVC.
2. Grade of property connection stormwater pipe to be not less than 1.65% (1 in 60).



90° CONNECTION



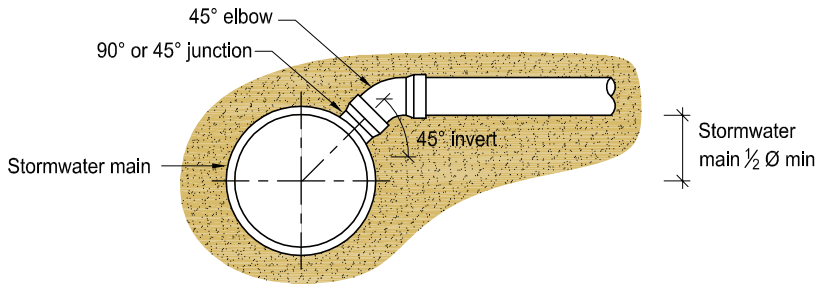
45° CONNECTION

PROPERTY CONNECTION
OUTSIDE PROPERTY

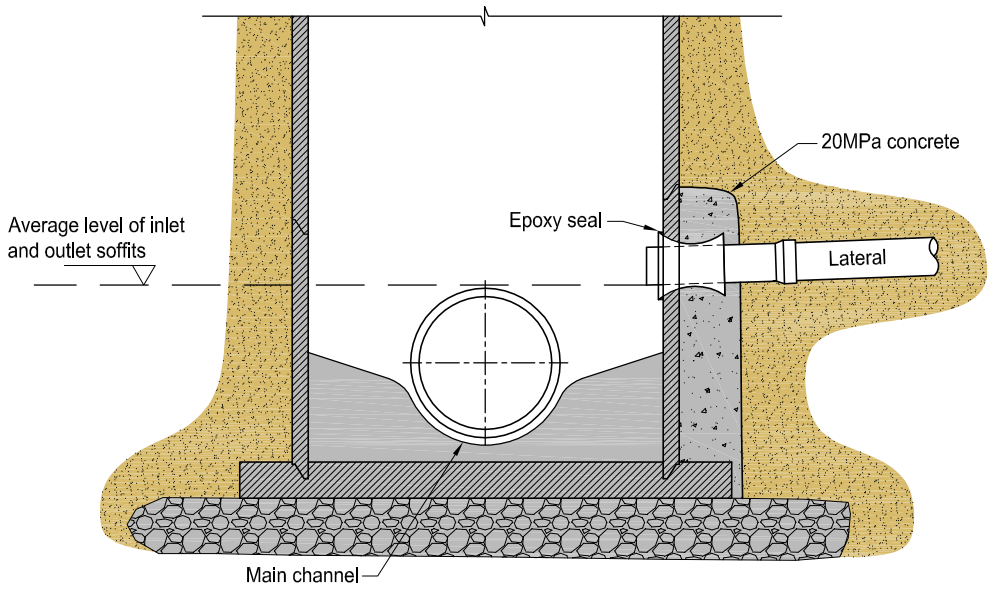
W534

NOTES:

1. Invert of lateral pipe prior to junction must be above the soffit level of the stormwater main.
2. Invert of lateral pipe at point of entry to manhole must be above the average soffit level of the inlet and outlet pipes.



LATERAL CONNECTION TO MAIN



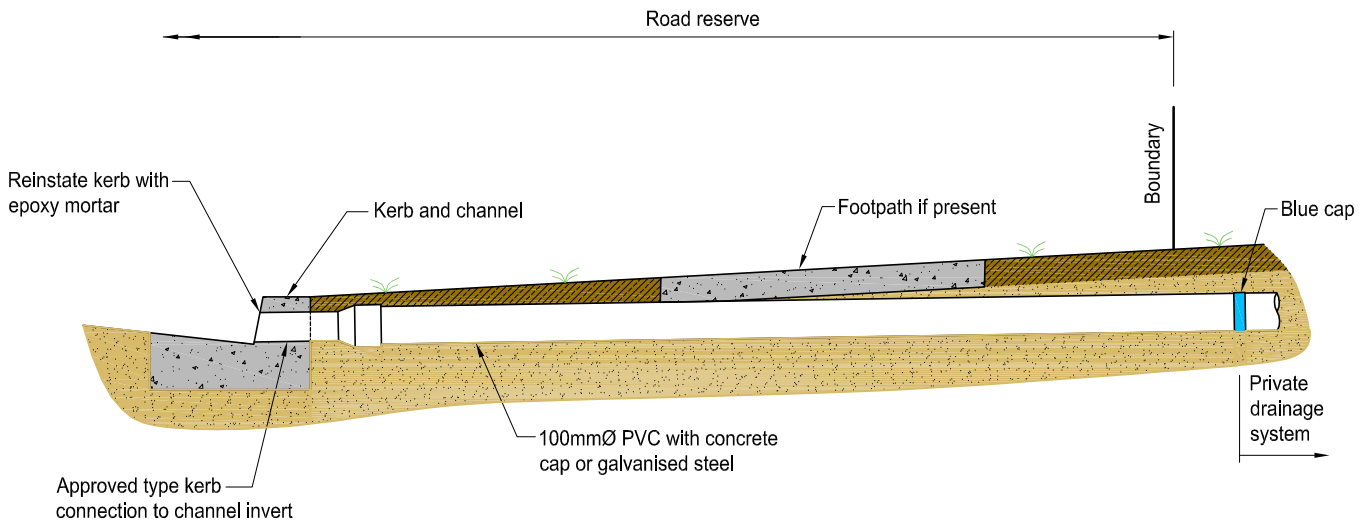
LATERAL CONNECTION TO MANHOLE

PROPERTY CONNECTION
ENTRY TO STORMWATER MAIN/MANHOLE

W535

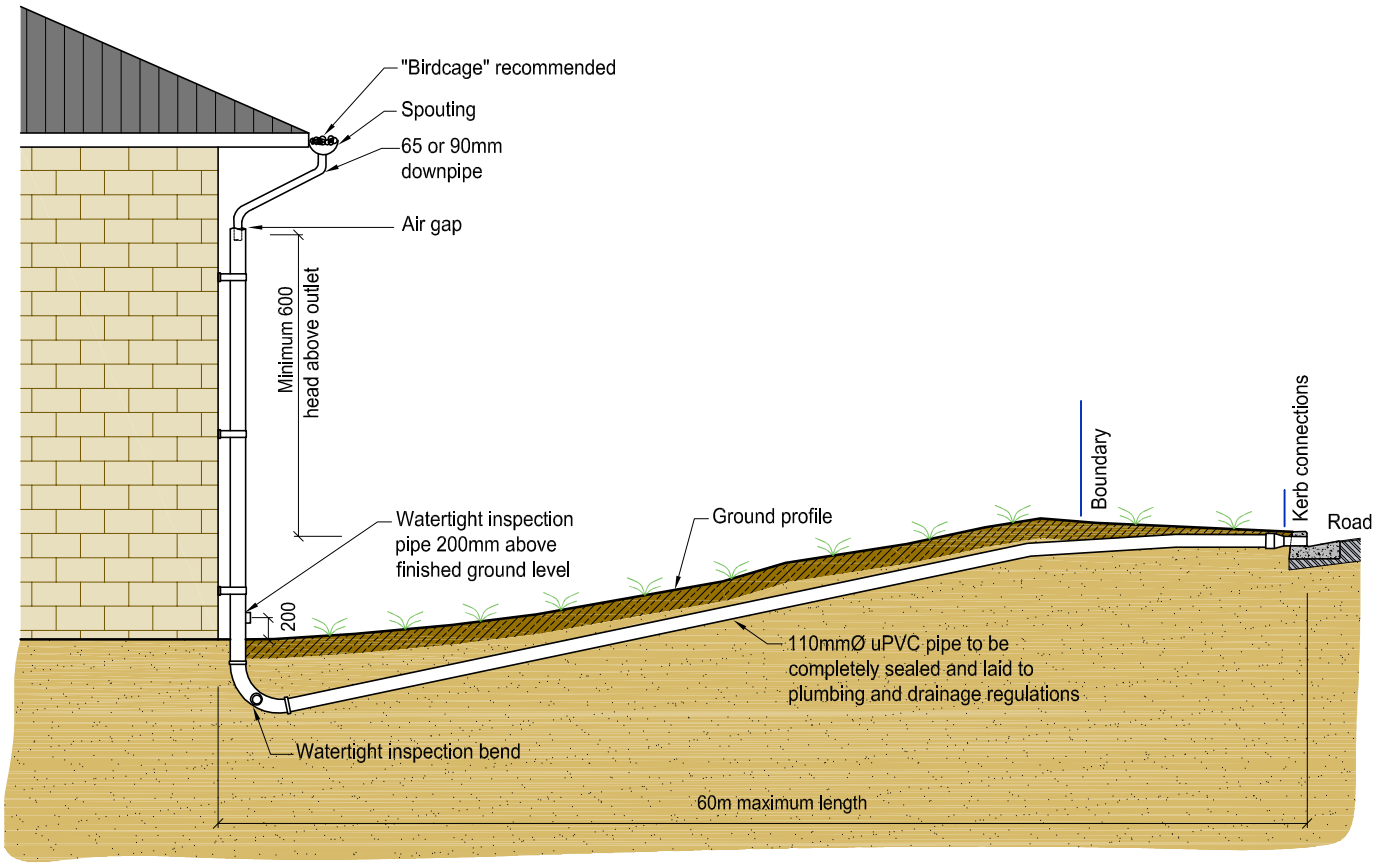
NOTES:

1. Kerb connections are not an option where mountable kerb and channel is utilised.



PROPERTY CONNECTION
KERB CONNECTION

W536

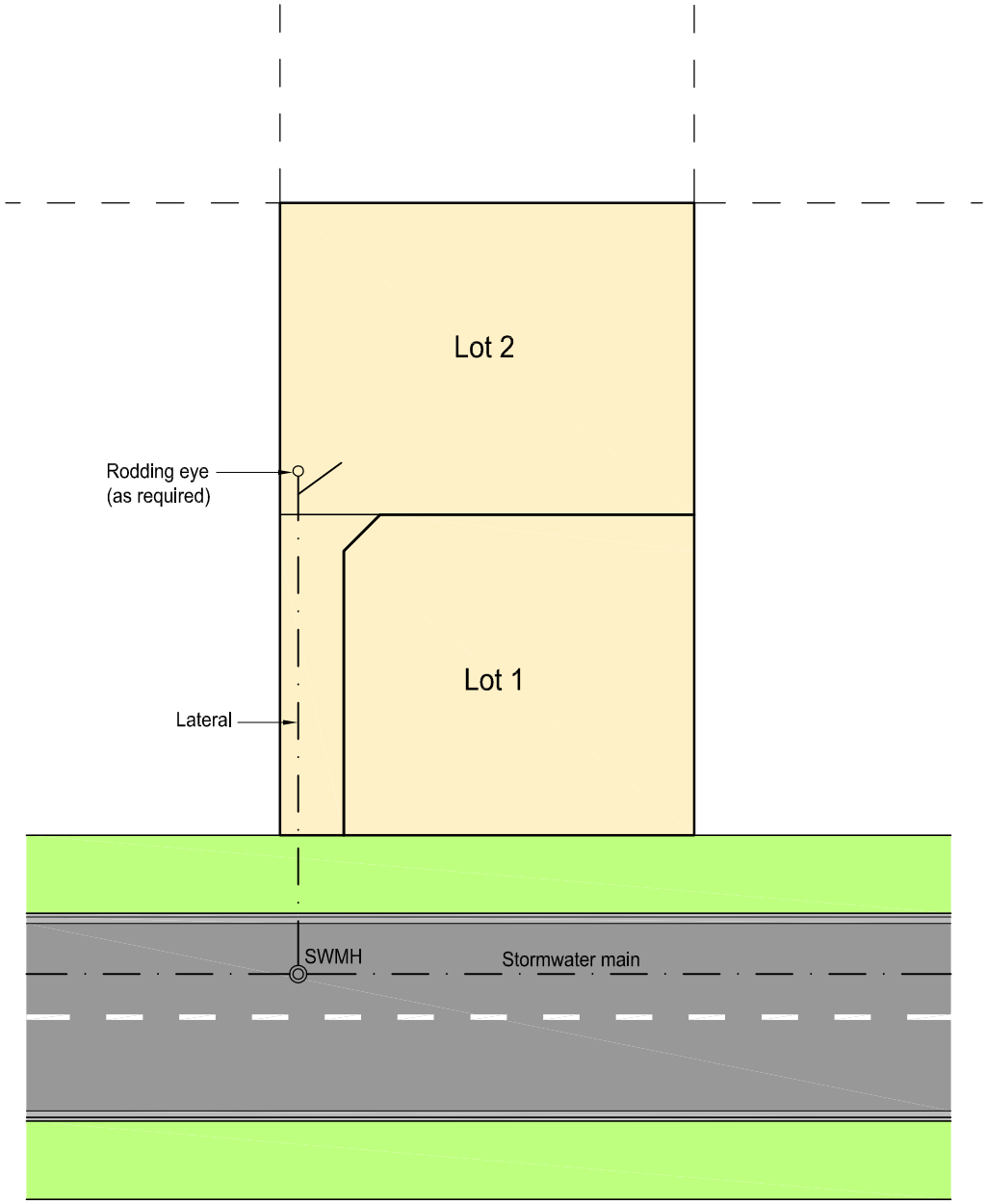


TYPICAL CROSS SECTION

PROPERTY CONNECTION

STORMWATER DOWNPIPE SYPHONS (RESIDENTIAL SITES ONLY)

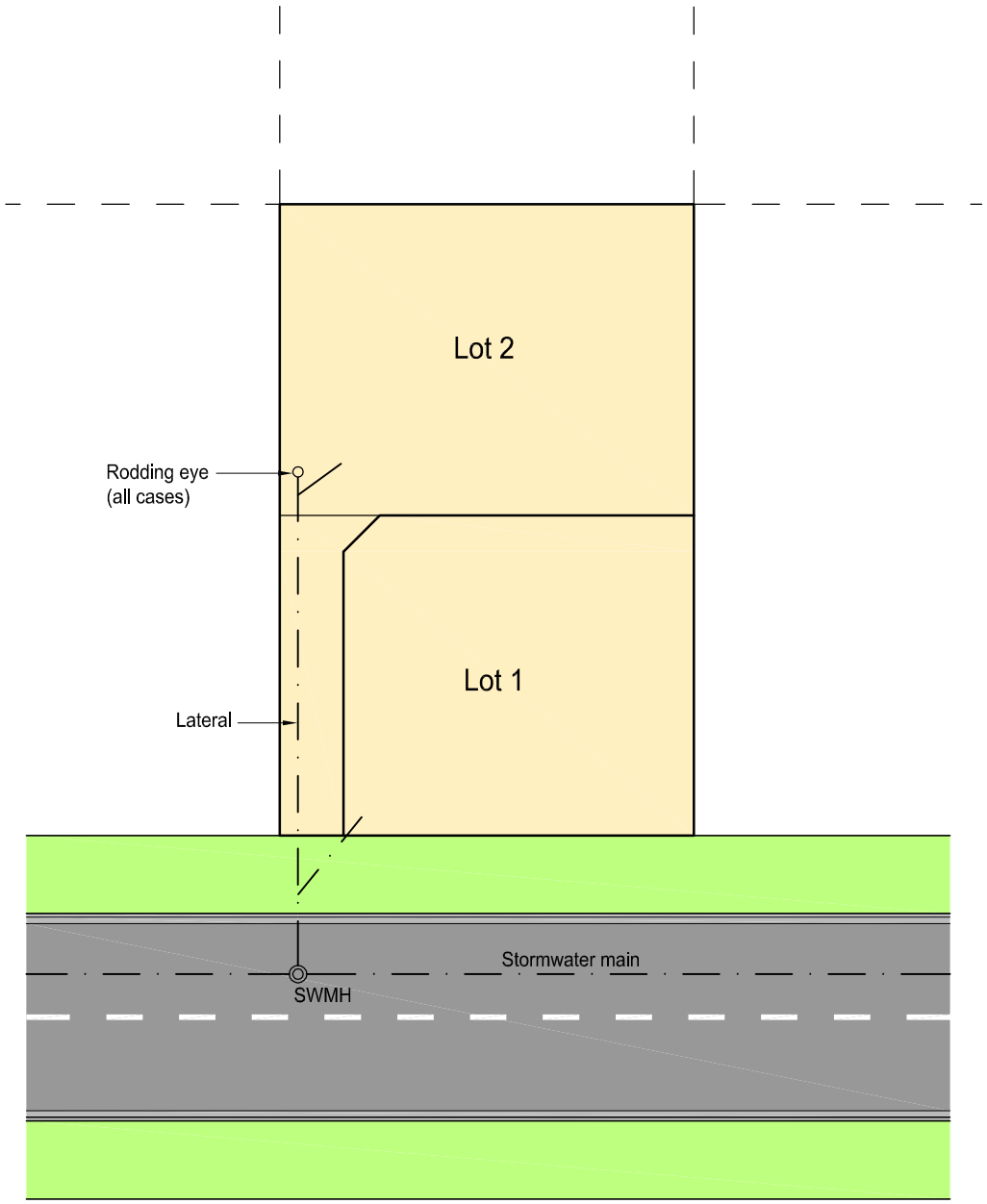
W537



LATERAL CONNECTION

SINGLE CONNECTION TO MANHOLE

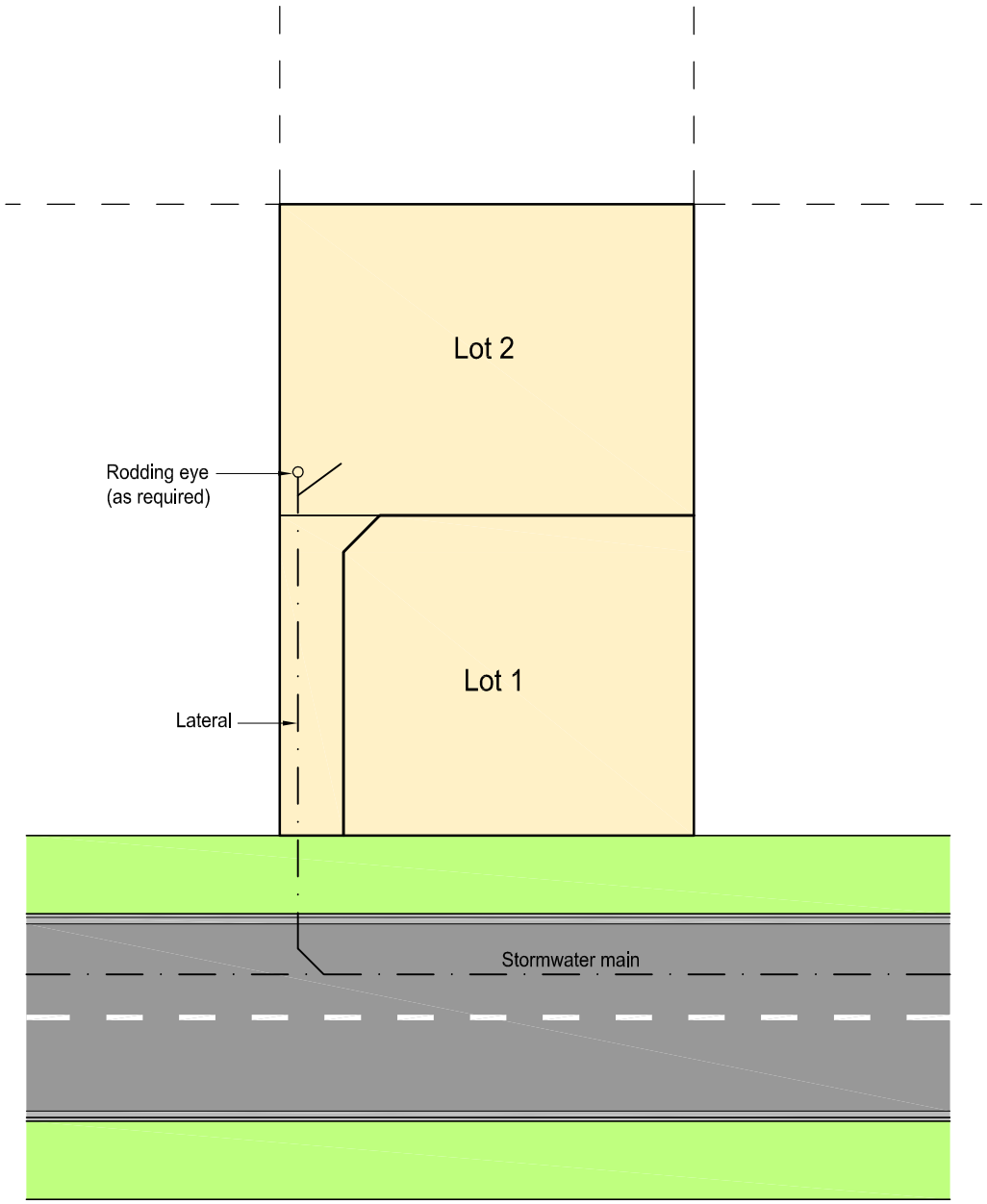
W538



LATERAL CONNECTION

2 TO 6 CONNECTIONS TO MANHOLE

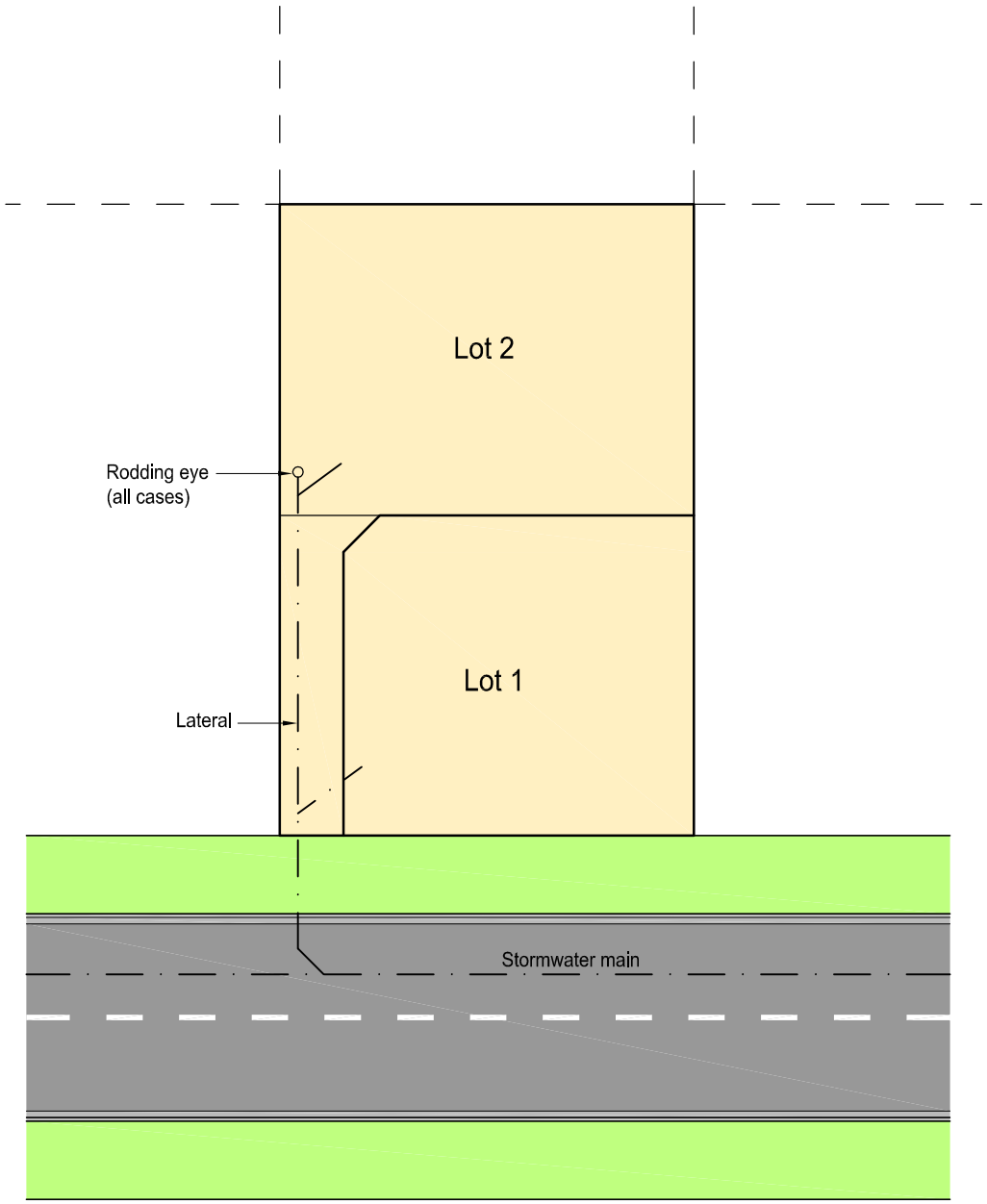
W539



LATERAL CONNECTION

SINGLE CONNECTION TO MAIN

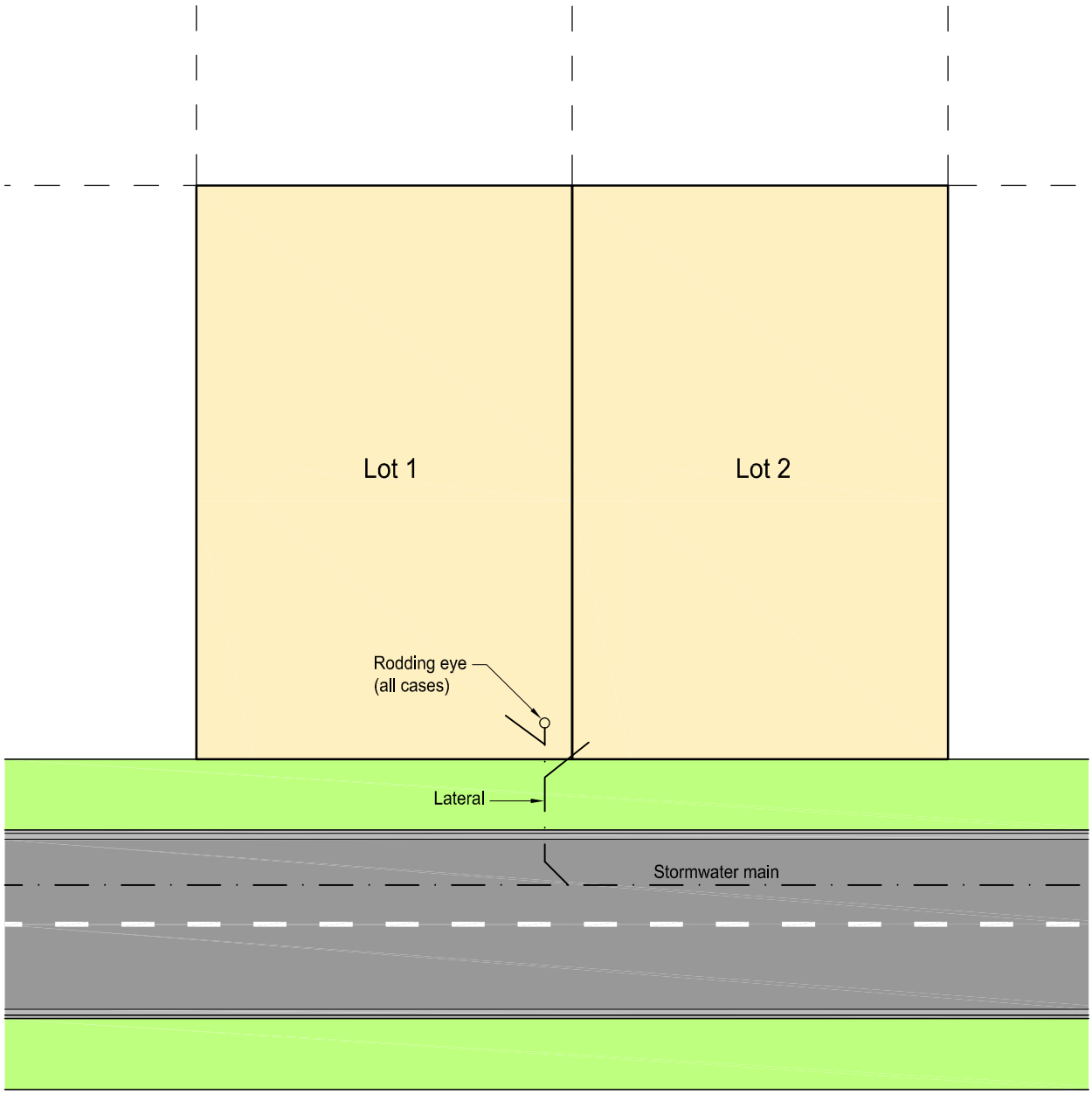
W540



LATERAL CONNECTION

TWO CONNECTIONS TO MAIN

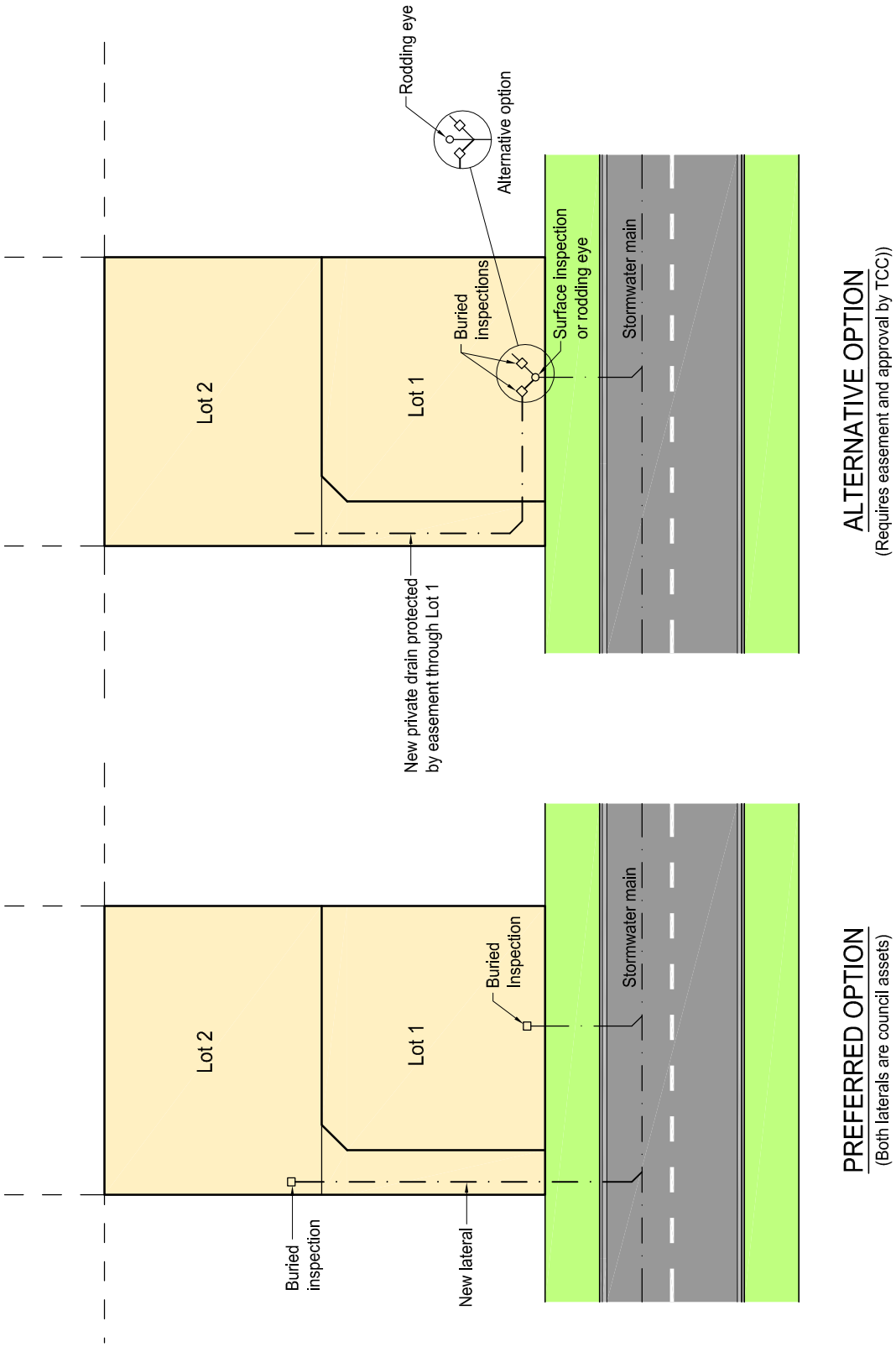
W541



LATERAL CONNECTION

TWO ADJACENT CONNECTIONS TO MAIN

W542



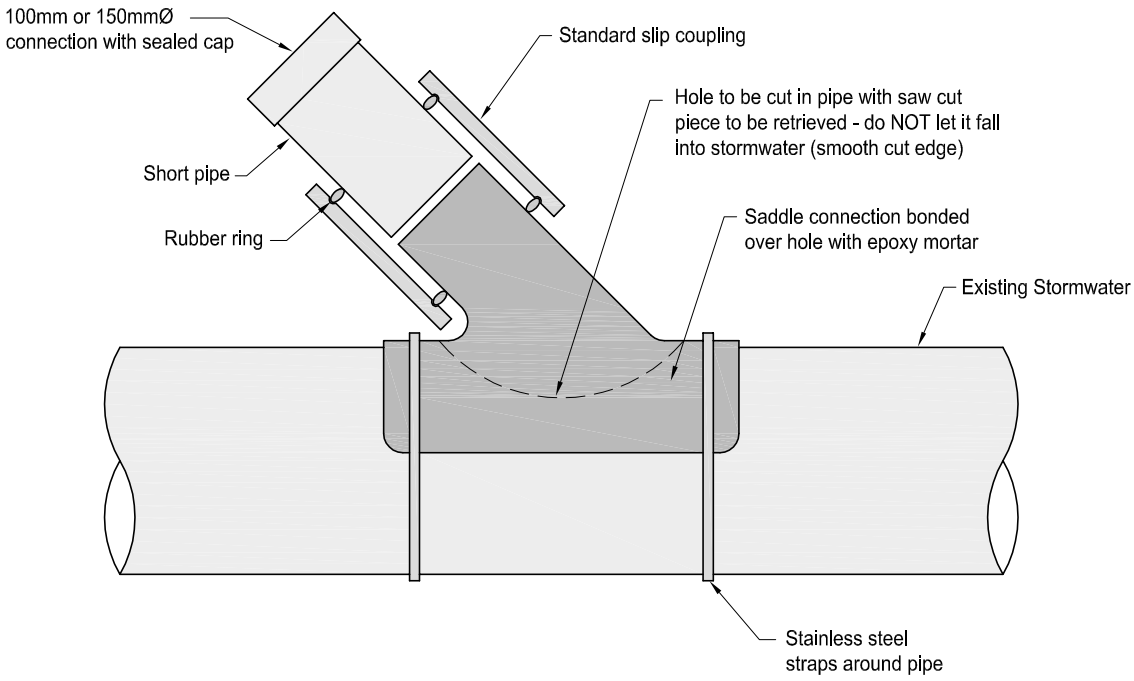
LATERAL CONNECTION

REAR LOT CONNECTION

W543

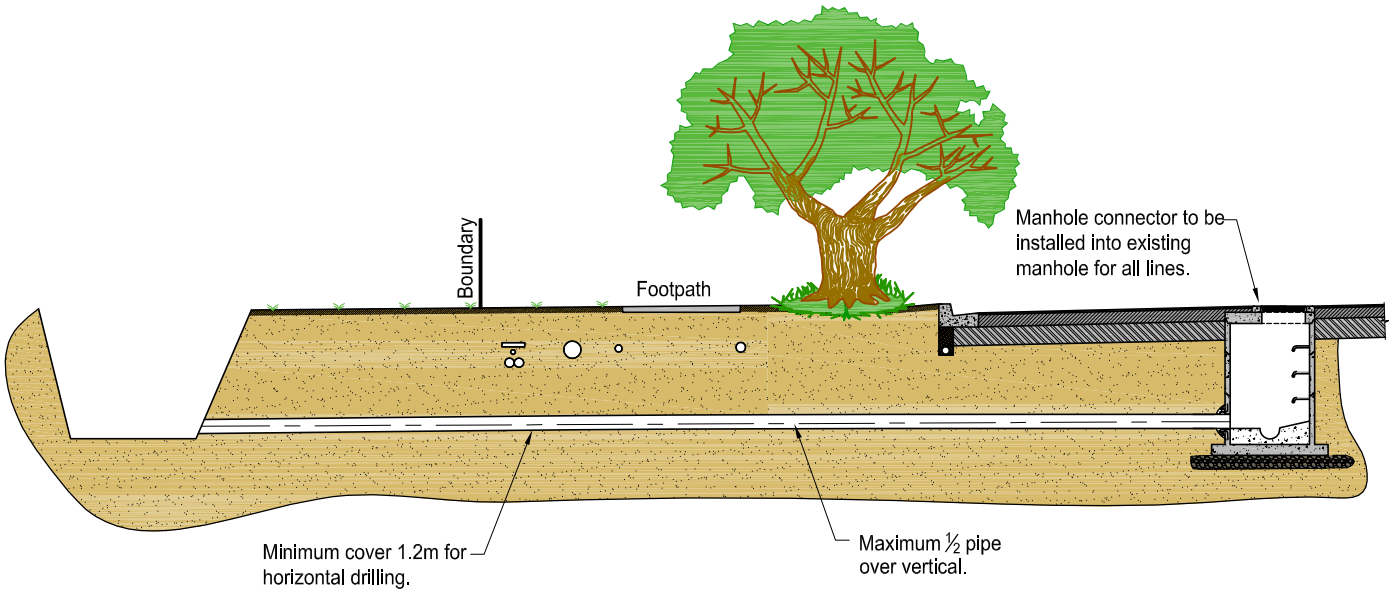
NOTES:

1. A saddle connection must only be used on a Stormwater main larger than the branch pipe.



MAINS CONNECTION
SADDLE CONNECTION

W544



DESIGN

Minimum grade of 1 in 100 & minimum of 1.2m below kerb level. For pipelines larger than 150 dia. with belled joints the void between the pipe & drilled hole is to be grouted.

ACCEPTANCE

No under vertical in pipe, maximum ½ pipe over vertical provided no ponding in the line. If not within the specified tolerance the pipe may have to be reconstructed by normal trenching techniques requiring an open excavation permit.

When direct drilled into existing manhole, all debris to be caught and removed. If the drill hole exceeds the pipe outside diameter by more than 25mm it shall be concrete grouted.

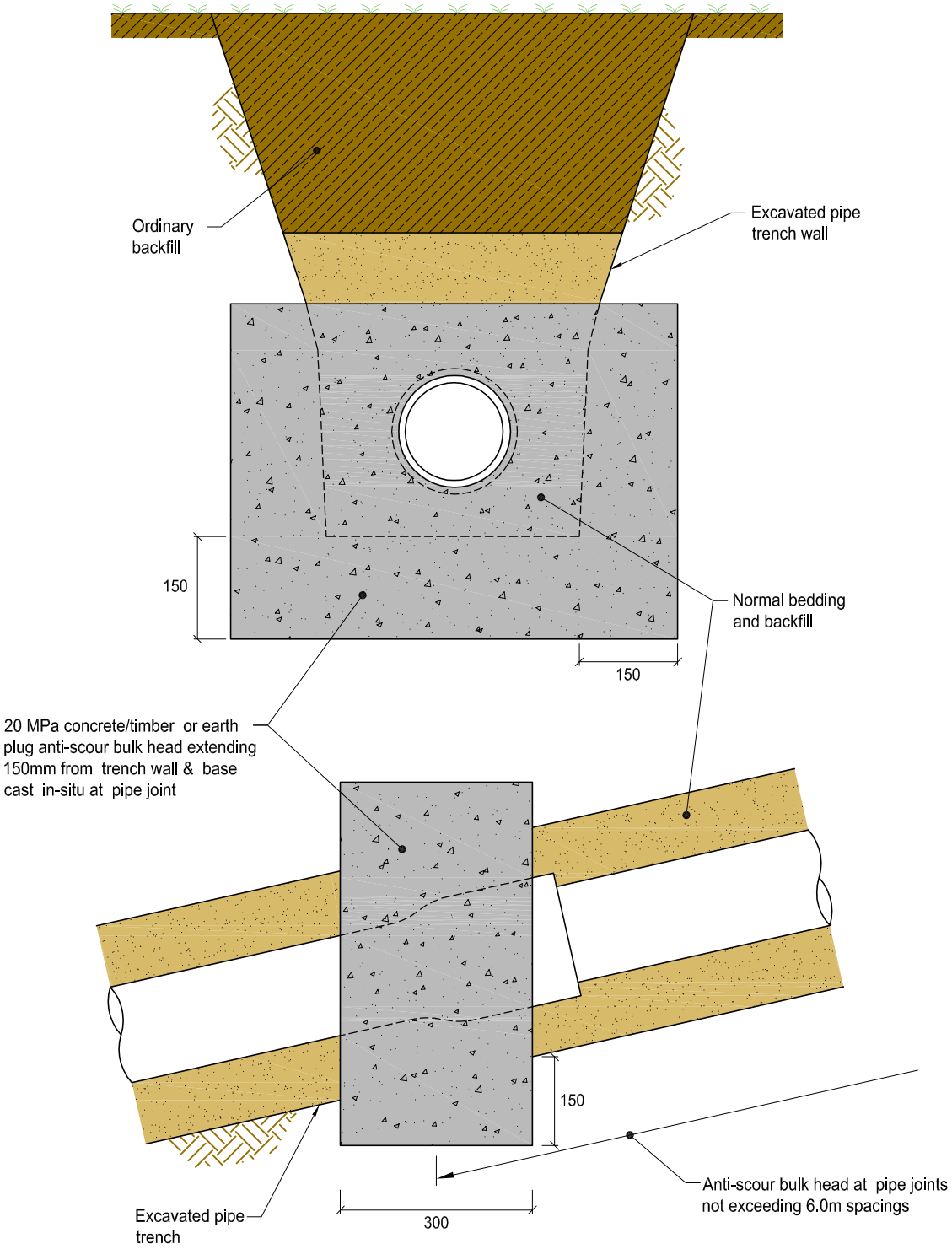
MATERIAL

All pipe materials are to comply with the approved standards. In addition, for stormwater thrusting purposes only, PVC pipe of NZS 7649 may be used with the exception that the pipes be solvent cement jointed to the following standard.

DIAMETER AND WALL THICKNESS AS FOLLOWS:

Nominal Size (ID)	Diameter (OD)	Wall
225mm	250mm	8.9mm
300mm	315mm	11.2mm
375mm	400mm	14.2mm

Connections off the above PVC line to be as detailed in the code.

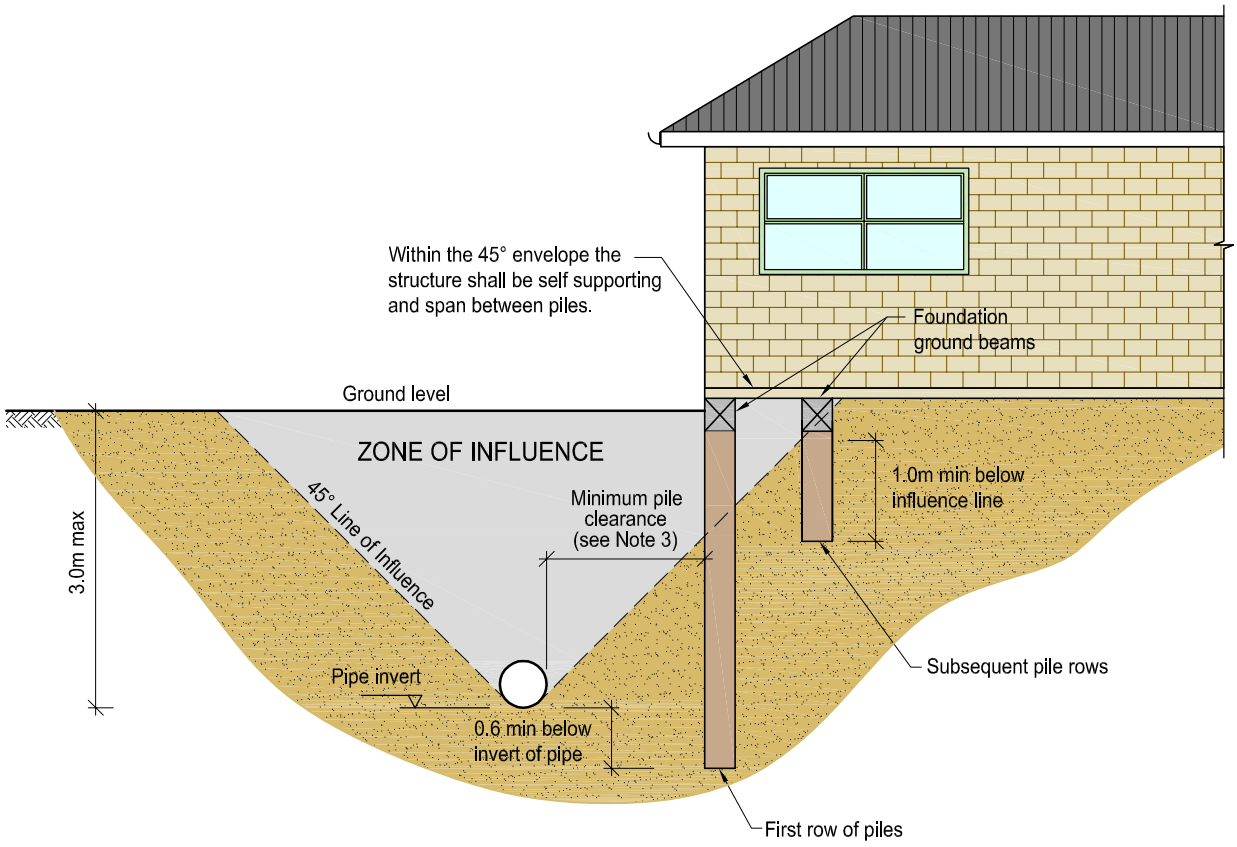


ANTI-SCOUR BLOCKS

W552

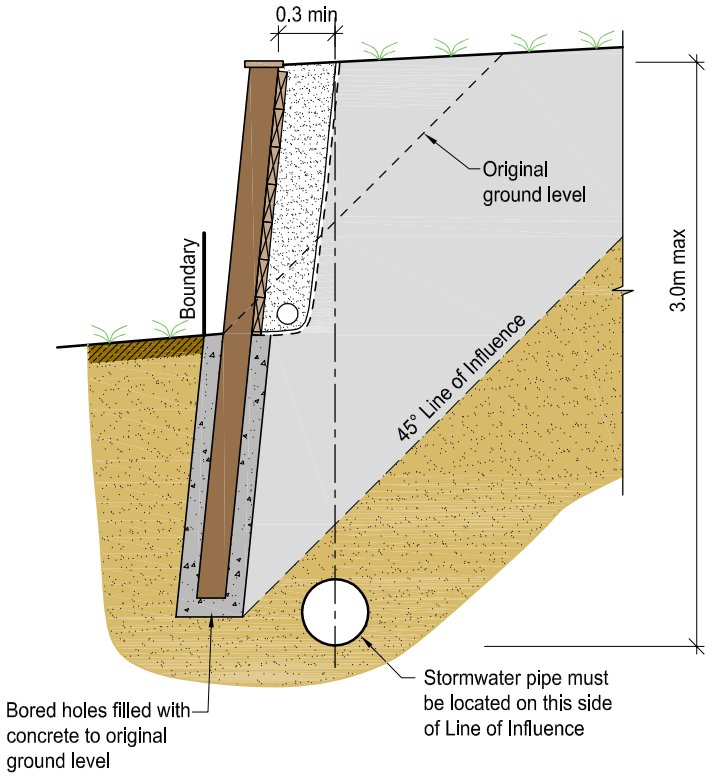
NOTES:

1. Pile spacing and ground beams are to be designed by Chartered Professional Engineer (CPEng).
2. Ground beams must be fully supported by the piles such that the ground surface is not required to support the structure within the "Line of Influence" of the sewer position.
3. Minimum pile clearance is 1000mm for 150mm diameter mains, and 1500mm for all rising mains and trunk mains (225mm diameter and larger).

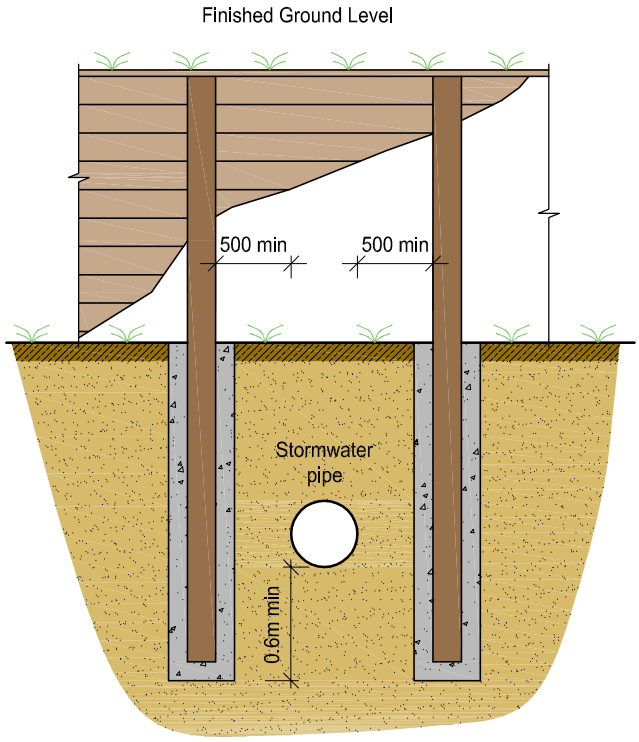


CLOSE PROXIMITY
BUILDING NEAR PUBLIC MAINS

W553



SECTION
Pipe parallel to retaining wall



SECTION
Pipe perpendicular to retaining wall

CLOSE PROXIMITY
RETAINING WALL RESTRICTIONS

W554