

TABLE 300-A: SUMMARY OF STRUCTURES

ID	SITUATION	STRUCTURE					KEY REFERENCES
		MAIN	IS	MS	MC	MH	
A	PROPERTY CONNECTS TO THE NETWORK	✓	✓	✓	✓	✓	TABLE 104-A, MRWA-S-300 to 306
B	TWO DN150 SEWER MAIN INFLOWS INTERSECT	NA		✓	✓	✓	TABLE 300-C
C	TWO DN225 SEWER MAIN INFLOWS INTERSECT	NA		✓	✓	✓	TABLE 300-C
D	TWO ≥DN300 SEWER MAIN INFLOWS INTERSECT	NA		✓	✓	✓	TABLE 300-C
E	DROP OF A SEWER ≥DN225	✓				✓	STANDARD MRWA-S-104B
F	DROP OF A SEWER ≥DN300					✓	TABLE 307-C & D
G	CHANGE IN GRADE OF SEWER MAIN ≤DN225	✓		✓	✓	✓	TABLE 104-C, FIGURE 307-A
H	CHANGE IN GRADE OF SEWER MAIN DN300			✓	✓	✓	TABLE 104-C, FIGURE 307-A
I	CHANGE IN GRADE OF SEWER MAIN ≥DN375			✓	✓	✓	FIGURE 307-A
J	CHANGE IN DIRECTION OF A SEWER MAIN	✓		✓	✓	✓	TABLE 104-C
K	TWO SEWERS OF DIFFERENT MATERIAL INTERSECT			✓	✓	✓	
L	DISCHARGE POINT OF WATER AGENCY PRESSURE MAIN					✓	DRAWING SPS-1405
M	DISCHARGE OF PRESSURE PROPERTY CONNECTION					✓	
N	BOTH SIDES OF A MAJOR CROSSING			✓	✓	✓	MRWA-S-207
O	TEMPORARY DEAD END			✓	✓	✓	
P	PERMANENT DEAD END		✓	✓	✓	✓	TABLE 105-C, MRWA-302 to 304

- **Limitations** apply in each case. Refer to Table 300-C and the standard for each structure for details.
- IS refers to inspection shafts.
- MS refers to maintenance shafts.
- MC refers to maintenance chambers.
- MH refers to maintenance holes.
- All of them are collectively referred to as maintenance structures.
- * These structures may be used where there are base connections or larger shaft connections (as per Table 104-A) into a permanent dead end.

TABLE 300-B: MAINTENANCE STRUCTURE MAX SPACING

UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	LAND TYPE / SEWER TYPE	MAX SPACING
IS	MS, MC or MH	PRIVATE PROPERTY	80m
IS	MS, MC or MH	PUBLIC LAND	100m
MS or MC	MS, MC or MH	PRIVATE PROPERTY	100m
MS or MC	MS, MC or MH	PUBLIC LAND	150m
MH	MS or MC	PRIVATE PROPERTY	100m
MH	MS or MC	PUBLIC LAND	150m
IS or MH	MH (+INTERMEDIATE STRUCTURES)	≤DN300 SEWERS	300m
MH	MH	≥DN375 SEWERS	300m

MHs are not allowed in private property for CWW or YVW

Maintenance Structure Location And Selection Guide:

When selecting the location and type of maintenance structures, utilize the following process:

- Select all the locations where a maintenance structure will be required.
- Select the **smallest possible** maintenance structure for each location in accordance with Table 300-A and C.
- Check compliance to the maximum spacing limits as per Table 300-B.
- Add in extra structures as required to meet maximum spacings. Locate to remove bends and locate centrally if practical.
- Check that there are no MHs in private property if CWW or YVW. Change the maintenance structure type or location if required.
- Alter maintenance structure type to meet the max MH spacing limit. Change structures to MHs with the following order of preference:
 - Largest number of sewer main inflows.
 - Largest number of inflows (property service or retic).
 - Larger inflow mains.
 - Deeper structures.
 - Greater inflow angles.
 - Future Retic or property connections are likely.
 - Where greater network storage might be required (rather than building SPS storage downstream).
 - Where possible, shallow structures should be MSs or MCs to avoid the need for squat or truncated maintenance holes.
 - Maintenance structures larger than the minimum (which is typically specified in the design) are allowed provided:
 - There is no interference with other assets, adequate clearances are obtained and the structure will be entirely contained within the easement or allocated space.
 - Concrete corrosion risks are assessed and covered by the designer (where concrete maintenance holes are to be used) as per MRWA-S-401 and Table 307-E.

TABLE 300-C MAINTENANCE STRUCTURE LIMITATIONS

PARAMETER	INSPECTION SHAFT	MAINTENANCE SHAFTS	MAINTENANCE CHAMBER	PLASTIC M.HOLE	CONCRETE M.HOLE	CONCRETE M.HOLE	CONCRETE M.HOLE
RELEVANT DRAWINGS	MRWA-S-301 TO 304	MRWA-S-305	MRWA-S-306	NA	MRWA-S-307 TO 314	MRWA-S-307 TO 314	MRWA-S-307 TO 314
SHAFT SIZE	150 OR 225	300 TO 450	>450 & <1000	≥1000	~1050	1200	1500
MAX DEPTH TO LOWEST IL	6m	3m	6m	6m ^f	UNLIMITED ^g	UNLIMITED ^g	UNLIMITED ^g
MAX SIZE OUTFLOW PIPE	DN150 OR DN225 ^h	DN225	DN300	DN300	DN300	DN450	DN750
MAX NO. TOTAL INFLOWS	2	3	5	3	3	3	3
MAX NO. SHAFT INFLOWS	DN100	2 ^a	2 ^b	3	3	3 ^d	3 ^d
	DN150	2 ^a	NOT ALLOWED	NOT ALLOWED	(MAX OF 2 x DN150 + 1 x DN225)	(MAX OF 1 x DN150 + 2 x DN225)	(MAX OF 1 x DN225 + 2 x DN300)
	DN225	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	(MAX OF 2 x DN375 + 1 x DN450)
	DN300	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
MAX NO. BASE INFLOWS	DN100	NOT ALLOWED	3 (MAX OF 1 x DN100 + 2 x DN150)	3	3	3	3
	DN150	NOT ALLOWED	1 (STRAIGHT THRU ONLY)	1 (STRAIGHT THRU ONLY)	1	1	1
	DN225	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
	DN300	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
	DN375	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
	DN400 / DN450	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	1
	DN500 / DN525	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
	DN600	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
DN700 / DN750	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED	1 (STRAIGHT THRU ONLY)

NOTES Regarding Table 300-C:

- Only property service connections may connect into the shafts of ISs.
- There is a risk that shaft inflows may deposit solids on to the base that will not be removed by base inflows (which will eventually block the sewer). Shaft inflows shall therefore only be installed where there is a base inflow with ≥3 equivalent lots connected.
- No two adjoining MSs or MCs shall **both** contain internal bends ≥60° (as the line in between would not be able to be CCTV'd). Instead, install a straight base MS / MC at one of the MS/MCs and fix to it an external long radius bend.
- External drop inflows are considered to be base inflows.
- All listed structures may be installed in trafficable and non trafficable locations. The limits of maintenance holes of different sizes has been estimated on the basis of common scenarios. The size of a maintenance hole required for a situation may need to be confirmed through a detailed design as per MRWA-S-308.
- Depth limitations apply to prefabricated MHs. Refer manufacture's installation instructions for details.
- Maintenance holes have a minimum depth, refer to Table 313-A.
- DN225 inspection shafts are only to be used at end of line in industrial commercial areas.

Connections to Existing Maintenance Structures

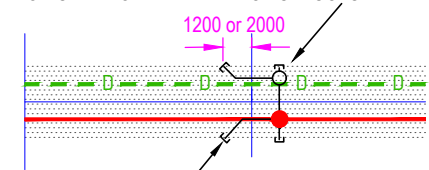
- Where a reticulation connection is to be made to an existing MS, MC or plastic MH, the designer must verify by as-constructed records that the base arrangement is able to receive a connection. Where as-constructed details are unavailable, the structure must be inspected as part of the design to confirm its suitability. Instructions for connection must be shown on the design drawings.
- If the base arrangement of an existing MS, MC or plastic MH does not allow for a new connection, the structure must be replaced or the connection must be made at a different point along the sewer.
- Refer to MRWA-S-308 for connections to existing concrete MHs.

Property Connections to Maintenance Structures:

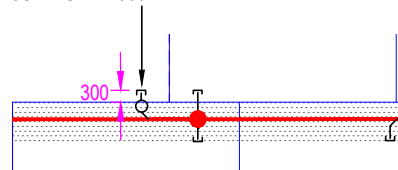
- Maximise the number of properties connected to maintenance structures, especially where property connection jump ups (the section of riser pipe) would be > 2m tall.
- Typically, Maintenance Structures will connect to at least one property.
- "where practicable" in the following means that it can be done without the sewer main having to be lowered.
- Where a maintenance structure is within a lot or adjacent to a lot, that lot shall connect to the Maintenance Structure where practicable.
- Where a lot is within 5m of a Maintenance Structure, the vertical clearance between the property connection pipe and sewer main > 2000 and where practicable, the lot shall connect to the Maintenance Structure. Refer Figures 300-A1 and A3.
- Otherwise, the lot may connect to the sewer main. Refer Figures 300-A2, A4 and A5.
- Where the property connection pipework is located above the sewerage main, compacted granular backfill / FCR may be used between the two mains. Embedment is not required around the upper property connection.
- Both ends of property connections shall be located outside of driveways where practicable.
- Locate maintenance structures outside of the driveway where practicable, otherwise, locate in the center of the driveway.
- Locate on the side of the driveway which minimises the angle of any road crossing sewerage pipe (where a road crossing is required).

FIGURE 300-A: MAINTENANCE STRUCTURE CONNECTION ARRANGEMENTS

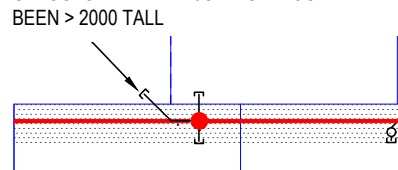
TYPE S OR B JUMP UP CONNECTIONS TO BASE OR SHAFT OF MAINTENANCE STRUCTURE



PROPERTY CONNECTION TO SEWER WHERE JUMP UP < 2000 TALL



PROPERTY CONNECTION TO MAINTENANCE STRUCTURE WHERE JUMP UP WOULD HAVE BEEN > 2000 TALL



PROPERTY CONNECTION TO MAINTENANCE STRUCTURE WHERE JUMP UP WOULD HAVE BEEN > 2000 TALL

FIGURE 300-A1: ALIGNED BACKYARD LOTS WITH DRAIN CROSSING

FIGURE 300-A2: STAGGERED BACKYARD LOTS WITH SHALLOWER CONNECTIONS

FIGURE 300-A3: STAGGERED BACKYARD LOTS WITH DEEPER CONNECTIONS

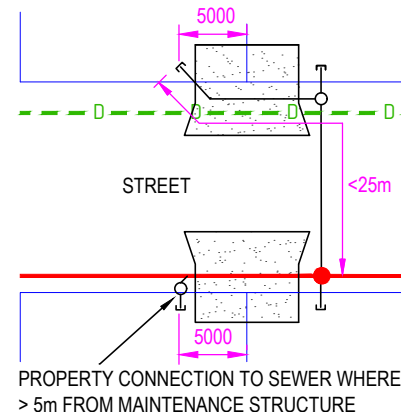


FIGURE 300-A4: LOTS ALIGNED ACROSS STREET WITH SPUR BRANCH CONNECTION INTO BASE

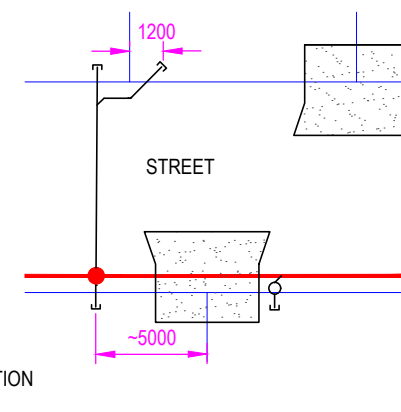


FIGURE 300-A5: LOTS STAGGERED ACROSS STREET WITH SPUR BRANCH CONNECTION INTO SHAFT

LEGEND

- ≥DN150 SEWERAGE PIPE
- MAINTENANCE STRUCTURE
- PROPERTY CONNECTION RISER ("JUMP UP")- BURIED.
- PROPERTY CONNECTION PIPE
- OBSTRUCTION
- ▨ EASEMENT AREA

ALL DIMENSIONS IN mm UNLESS STATED OTHERWISE				DESIGNED: R. JAGGER		DATE: 1 JULY 2015			
				DRAWN: R. JAGGER		DATE: 1 JULY 2015			
				CHECKED: NAME	DATE	APPROVED: NAME	DATE		
3	DISALLOW DN150 SHAFT CONNECTION TO MC	01/07/16	RJ / CP / JT	☑ CWW	D. MOORE	01/09/15	☑ CWW	R. CARRUTHERS	01/09/15
2	PUBLISHED FIRST ISSUE	01/10/15	CP / JT / KD / RJ	☑ SEW	C. PAXMAN	01/09/15	☑ SEW	D. O'DONOVAN	01/09/15
1	PRE-PUBLISHED DRAFT	01/03/15	CP / JT / KD / RJ	☑ YVW	K. DAWSON	01/09/15	☑ YVW	J. TOMASI	01/09/15
REV	DESCRIPTION	DATE	APPROVED	ISSUED 2015		VERSION 1			

MELBOURNE RETAIL WATER AGENCIES

MRWA SEWERAGE STANDARDS

MAINTENANCE STRUCTURE SELECTION, PLACEMENT AND CONNECTION TO PROPERTIES

NOT TO SCALE

MRWA-S-300

Planning	Design	Construction
✓	✓	✓