

General Construction Requirements:

- Tracer wire shall be used with all non-metallic pipe. Thread wire between centralisers and bring to surface at adjacent structures.
- Comply with pipe manufacturers instructions re the suitability and requirements of the pipe for the selected construction method.
- All trenchless constructed sewers shall be acceptance tested as for gravity sewers > DN300. Ovality proving testing shall be undertaken, however acceptance criteria do not apply in situations where pipe ovality is out of the control of the contractor (eg: trenchless installed pipes which are not grouted).

REQ.3-Grouting Construction Requirements:

- Any space > 30mm wide at its widest shall be grouted, whether that space be between a sleeve and bore hole, sewer and bore hole or sleeve and sewer.
- Grout may also be used where ground conditions or the proposed methodology require it.
- Minimise the overcut diameter of the bore head. It is preferred that the overcut diameter not exceed 30mm.
- Grouting should commence ASAP after pipe installation (to prevent material falling into the annulus).
- It should occur within 4 hours of completion in weak ground and within 24 hours for stable bore holes.
- Ensure grouting pressures do not exceed the buckling capability of the sleeve / pipe when empty.
- Grout from lower end of the bore.
- Address flotation. Weight pipe (with water) or make allowance for flotation so pipe floats to correct level.
- Grout shall be a high flow, low shrinkage cementitious material such as Liquifill grade PC1, Rapidfill A or equivalent. Blast furnace based slag materials shall not be used. Granular material within the grout shall conform to AS/NZS2566.2.
- Use gravity or pressure grouting.
- Achieve full penetration and complete filling of the void. Multiple grout insertion points may be required.
- Ensure sufficient air egress to avoid air pressure build up. Multiple air release holes may be required.

REQ.4- Construction Requirements for Laser Boring / Microtunneling:

- Shafts are to be prepared in close consultation with the boring contractor. Issues to address include but may not be limited to:
 - Preparation of the thrust area. How is the strength of the native ground behind the thrust block to be maintained.
 - Depth of shaft. Sufficient clearance below the invert of the sewer is required to enable the jacking frame to be correctly set (0.5m to 1.2m extra depth typically required).
 - Preparation of shaft base (type & size of concrete pad).
 - Location of props and bracing which may impede access of materials and equipment.
 - Type of shaft support (piles, shields etc).
 - Method of managing any weak ground.
 - Method of groundwater management.
- Stabilisation / sealing of the bore entry point to prevent slurry or lubricant from coming back.
- Settlement / subsidence. The contractor shall monitor and control the settlement of road and railway crossings to the satisfaction of the controlling agency.
- Intermediate Jacking Station (IJS) likely requirements:
 - One IJS for drives exceeding 150m.
 - Two IJSs for drives exceeding 250m.
 - As required to keep jacking forces within 70% capacity of the:
 - Jacking pipe, and
 - Jacking frame, and
 - Thrust block.

REQ.5- Construction Requirements for Horizontal Directional Drilling (HDD):

- Construction risks shall be adequately identified and controlled by the contractor. This assessment and control plan shall at least indicate the preventative and remedial actions for:
 - Loss of drilling fluid (frac out).
 - Loss of circulation of drilling fluid.
 - Drilling mud seepage (spillage) onto land or into a waterway.
 - Collapsed hole.
 - Washout of cavity and collapse of the surface.
 - Stuck or deflected drill stem.
 - Swelling of high plasticity clays which may partially or completely block the bore hole.
 - Lost tools.
 - Pedestrian safety.
 - Traffic hazards.
 - Damage to flora, fauna and other assets.
 - Site security.
 - Pull back force exceeding pipe tensile limit.
 - Unsatisfactory pipe jointing.
 - Damage to pipe (during pull back).
- To ensure bore hole blockage and fluid losses are detected and addressed, monitoring and reporting shall be undertaken which at least:
 - Strictly monitors drilling fluid volumes,
 - Monitors annular pressure.
 - Monitors cutting returns.
 - Monitors the ground and waterways within 400m of boring. Any loss of drilling fluid or drilling mud shall be contained and immediately reported to the Water Agency.
- The pipe shall not be bent beyond the minimum radius of the pipe (refer PIPA document POP202).
- The installed pipe shall be allowed to relax and cool for > 12 hours before it is restrained at either end.
- The location of the drill stem (& therefore pipe) shall be monitored and recorded in the As Constructed documentation (so pipe can be located in future).
- Settlement / subsidence. The contractor shall monitor and control the settlement of road and railway crossings to the satisfaction of the controlling agency.

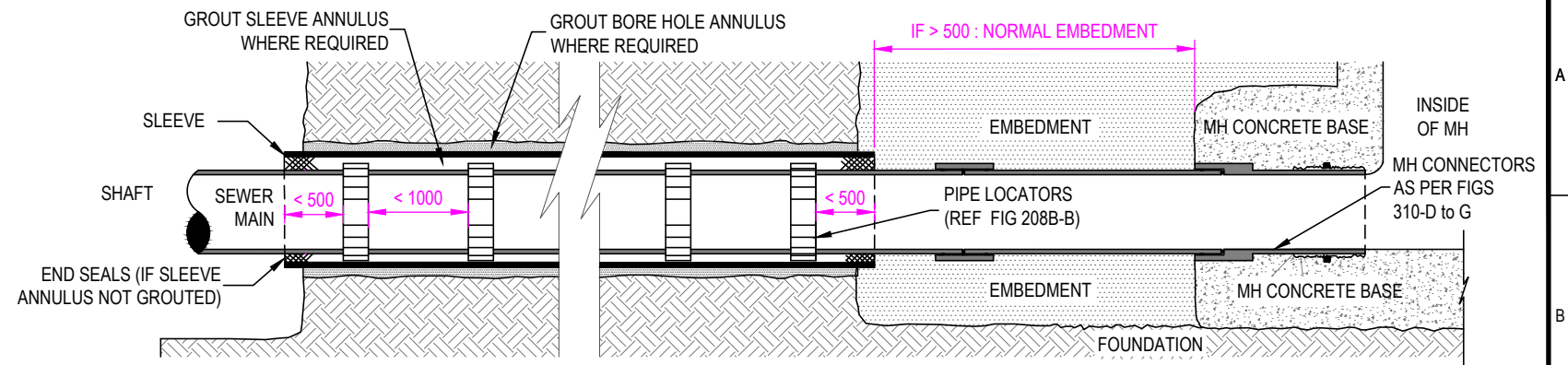


FIGURE 208B-A: TYPICAL SLEEVE INSTALLATION SHOWN WITH PIPE EMBEDMENT IN BORE SHAFT

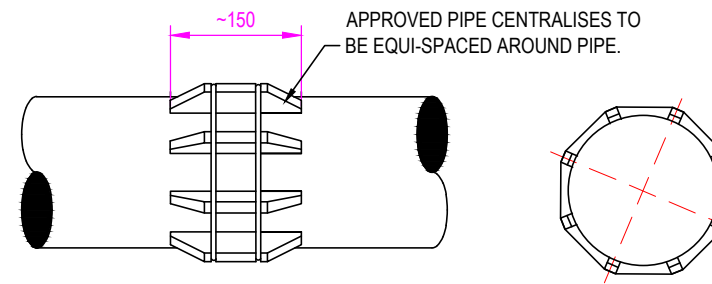


FIGURE 208B-B: PIPE LOCATOR DETAIL

NOTES Regarding Sleeves and End Seals:

- Pipes shall only be placed in sleeves when mandated by the relevant authority.
- Sleeves to consist of a high joint strength pipe (refer Table 208-B).
- Designer to specify material, diameter and class of sleeve and sewer main.
- Sewer mains shall be supported using pipe locators within sleeve. Pipe locators may be omitted if welded PE mains on Water Agency approval.
- Pipe locators (ref Fig 208B-B) shall be firmly fastened and not move once attached.
- Steel sleeves required by the relevant authority require Cathodic Protection.
- Steel sleeves used to enable construction which are not required by the relevant authority do not require Cathodic Protection.
- Where MH shaft next to bore hole is <math>< 4 \times \text{pipe } \varnothing</math> from bore hole, extend MH concrete base back to the bore hole. Otherwise install end seal at end of bore hole and embed pipe as normal.

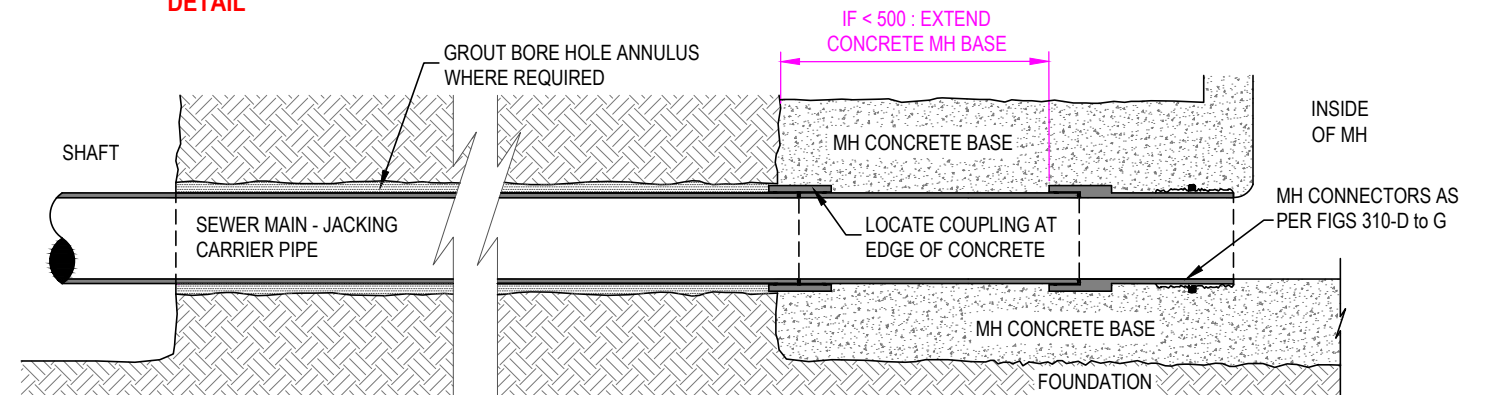


FIGURE 208B-C: TYPICAL JACKING CARRIER PIPE INSTALLATION SHOWN WITH MH CONCRETE TO EDGE OF BORE SHAFT

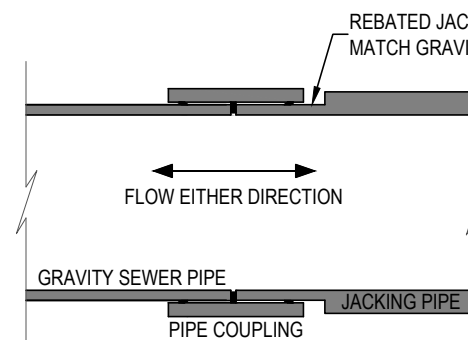


FIGURE 208B-D: FW GRP GRAVITY PIPE TO FW GRP JACKING PIPE CONNECTION DETAIL

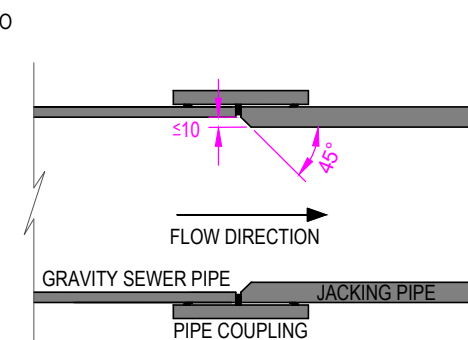


FIGURE 208B-E: CC GRP GRAVITY PIPE TO CC GRP JACKING PIPE CONNECTION DETAIL

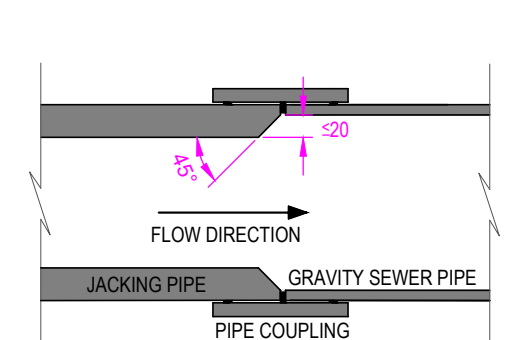


FIGURE 208B-F: CC GRP JACKING PIPE TO CC GRP GRAVITY PIPE CONNECTION DETAIL

NOTES Regarding Gravity Pipe to Jacking Pipe (same DN) Connections :

- First preference shall be to locate a maintenance structure at the junction of gravity pipe and jacking pipe, unless this would add an additional maintenance structure that would otherwise not be required.
- Figure 208B-E, if the downstream ID >20 smaller than the upstream ID, a maintenance structure shall be constructed at the junction of the gravity and jacking pipe.
- Figure 208B-F, if the downstream ID >40 larger than the upstream ID, a maintenance structure shall be constructed at the junction of the gravity and jacking pipe.
- Any change in pipe (gravity to jacking pipe) shall be described in the As Constructed information as an EP (end of pipe).

ALL DIMENSIONS IN mm UNLESS STATED OTHERWISE				DESIGNED: R. JAGGER	DATE: NOV 2019		
				DRAWN: R. JAGGER	DATE: NOV 2019		
CHECKED:		NAME	DATE	APPROVED:	NAME	DATE	
<input checked="" type="checkbox"/>	CWW	G. ANTHONSEN	SEP 20	<input checked="" type="checkbox"/>	CWW	S. TRIKHA	SEP 20
<input checked="" type="checkbox"/>	SEW	C. PAXMAN	SEP 20	<input checked="" type="checkbox"/>	SEW	D. STEWART	SEP 20
<input checked="" type="checkbox"/>	YVW	N. GERHARD	SEP 20	<input checked="" type="checkbox"/>	YVW	R. LEON	SEP 20
ISSUED 2020				VERSION 1			

MELBOURNE RETAIL WATER AGENCIES		MRWA SEWERAGE STANDARDS		NOT TO SCALE	
TRENCHLESS CONSTRUCTED PIPELINES CONSTRUCTION				MRWA-S-208B	
Planning		Design		Construction	
				✓✓	