

Laying of Pipes

Scope of this Work Instruction

The proper functioning of pipes is critical to achieving correct delivery of fluids, proper control of surface run-off water and the collection of groundwater from subsoil drains. They are an important factor in the performance of water reticulation, stormwater systems, waste water / sewerage systems, the pavement, its operation and safety, and the minimisation of ongoing maintenance costs.

Installation of pipes must be planned and carried out carefully, with the appropriate equipment and staff, and in accordance with safe and efficient practices, to ensure that the specified work quality is achieved; delays are avoided; and a safe site is maintained.

THIS WILL BE ACHIEVED BY:

- Training staff in the correct installation techniques and practices for laying of pipes
- Careful and thorough planning for equipment selection, methods/procedures and timetabling
- Adhering to the correct construction practices at all times
- Contingency planning for weather, traffic etc
- Attention to safety matters

Responsibilities and Actions

The Operations Manager shall review the Contract Documents to identify the specific details and requirements of the client. Where appropriate, these shall be noted on the Drain Test and Inspection Sheet or the documents issued by the client for construction and pipe laying and/or written instructions to field staff.

The Contracts Manager shall be responsible for selecting, appointing and reviewing the performance of the appropriate staff for critical aspects of the work. He shall be responsible for regularly and progressively inspecting the work to ensure it complies with the requirements, and also to authorise immediate remedial work should this be found necessary.

Standards to be Followed

The appropriate NZTA / Transit and/or Local Authority Specifications, Standards and Procedures must be followed at all times. The Contract Documents must be referred to for all specific information. Proper and legal traffic management procedures must be implemented. All staff shall be made fully aware of all of these matters by way of on site induction, training, regular instructions and supervision.

Inspection Procedures

Inspection, tests and quality reviews shall be carried out daily or for each defined section of pipe as it is completed. Details of these shall be recorded on the checklist for each defined section of pipe. Defects in the work shall be rectified immediately.

Copies of all Drain Test and Inspection Sheets shall be retained in the Job Folder by the Quality Manager.

Quality Awareness by all Personnel

All personnel shall be thoroughly conversant with the critical need to adhere to the Quality Standards. Regular briefings should be carried out.

All personnel, particularly Drainlayers, Foremen and the Contract Manager must be aware of their responsibility to be constantly checking for “substandard quality” work, and equipment. They should be particularly vigilant against the practice of “hiding mistakes” which could have catastrophic consequences for other construction staff and for the safety and performance of the completed works.

Quality and Safety Requirements

The following principal requirements should be met on a day to day basis in order to maintain the required quality and safety standards:

- Suitably trained, qualified and experienced personnel
- Full and detailed records of all inspections
- Quality Management of all aspects covered by other Work Instructions in this Quality System
- Constant vigilance in identifying and reporting defective methods and equipment
- Immediate remedial, additional or alternative work where required as a result of inspections and reviews.

Special Attention

Special attention will be paid to ensure:

- The correct pipes and accessories are used
- There are no chips, cracks, exposed reinforcing or other defects
- The correct bedding and backfilling materials are used and not contaminated
- The joint details are correct, they are clean and smooth
- The grade is as specified and downwards towards the outfall
- Trenches are narrow with vertical sides
- Construction stormwater and materials are prevented from entering the pipe as they could cause clogging
- Backfilling provides uniform support to culvert with no hard or soft spots
- Outlets are formed and maintained to ensure that there is no backup, they allow unimpeded discharge, and do not cause erosion or subsidence

Drain Testing and Inspection

Chris Gommans Contracting Ltd may be required to test pipes and drains laid to ensure that they meet the specified pressure requirements for good trade practice or are contained in the contract documents. Tests may include:

- **Visual inspections of:** Trench Base, Alignment and Grade, Bedding, Fabric, Backfill and how well it's compacted, manholes and manhole chambers.
- **Pressure Tests for:** To ensure that the pipe retains pressure for a set period and maintains the internal pressure without blowing. If a pressure test fails then any faults will be repaired and the pipe will be retested.

The following page has a copy of **XYZ Ltd** Drain Testing Inspection Checklist.

PIPE TESTING & INSPECTION

CLIENT
CONTRACT
LOCATION

Type of Drain: Stormwater Sewer Water (water main)
Type of Pipe: **Diameter:** _____ **Class:** _____
Section of Drain: _____

Visual Inspection:				Date Done:
Trench Base:	Acceptable	Yes	No	_____
Alignment & Grade:	Acceptable	Yes	No	_____
Bedding:	Acceptable	Yes	No	_____
Fabric:	Acceptable	Yes	No	_____
Backfill/compaction	Acceptable	Yes	No	_____
Manhole/chamber	Acceptable	Yes	No	_____

Witness:
Chris Gommans Contracting Ltd _____
Opus _____
GHD / MWH _____
MDC / PNCC _____
Other _____

Drain Test: **Date of Test:** _____

Type of Test:		Water	Air	Chlorination
Test Pressure:	_____			
Duration:	_____			
Result:		Passed	Failed	
		Yes	No	

Calculations attached if specified: _____

Drain Retest: **Date of Retest:** _____

Type of Test:		Water	Air
Test Pressure:	_____		
Duration:	_____		
Result:		Passed	Failed
Calculations Attached:		Yes	No

Drain Accepted: Yes No

Witness:
XYZ Ltd _____
Opus _____
GHD / MWH _____
MDC / PNCC _____
Other _____

Excavation Rules

When excavating in ground where trench sides are at risk of collapse, steps must be taken to protect those working in the trench and adjacent to it.

Precautions may include:

- Battering the trench walls.
- Use of a Safety Cage in the trench.
- Use of timber and screw jacks in the trench.
- Full timber propping where it is not possible to safely use the above methods.
- Pumping to control accumulation of ground water in the trench.
- Where conventional pumping methods are inadequate, a complete dewatering programme using a well point system.
- Backfilling as soon as possible after pipe laying.
- Stacking stand materials well back from the trench edges - at least a distance equal to one-half the trench depth.
- Prohibiting machinery, trucks and other vehicles from the immediate vicinity of the trench. Where loaders etc. must approach the trench, they should do so from as acute an angle to the line of the trench.

Monitoring Trench Walls

- Unstable trench walls can collapse rapidly and often with little advance warning.
- Collapse is often preceded by cracking alongside and back from the trench edge, by lines starting to run down the trench sides, or by undermining of the walls near the base.
- All staff must constantly monitor the excavation for these signs of impending collapse.

Escape Route

- When working in a trench have an escape route planned in the event of a trench collapse or material dropping into the trench.
- Ladders must be set up at regular intervals along the trench for quick escape.
- In the event of an emergency, get out of the trench as quickly as possible. **Do not** attempt to recover tools or material.
- **Assist** others to exit also.

Pipe Laying

- Stand well clear of pipes being lowered into trenches and from backfill material being placed into trenches.
- Never stand under pipes or other heavy objects suspended by mechanical means.
- Never stand in the trench near the end of an installed pipe as a new one is being lowered and positioned.

Lifting Equipment

- The machine lifting and lowering pipes into trenches must have the capacity to safely do so. The wheels or tracks must not be placed closer to the trench than one-half of the depth.
- Chains, shackles and straps used for lifting must be certified and must be checked for cracks, chaffing or fraying. Defective equipment shall not be used.

Staff in Trenches

- Only those staff necessary for work activities in the trench at any time shall enter the trench.
- No person shall work alone in an excavation or trench. At least one other person shall be in the immediate vicinity, on the surface, as an attendant.

Protective Clothing

Hard hats, safety footwear, combination overalls must be worn at all times. When necessary gloves must be worn.

Gases

- Gases may build up in enclosed spaces and explode without warning, e.g. in sewers and stormwater systems.
- Gas detection equipment must be used to check air quality before entering existing pipes.
- Where gases are detected or suspected, notify Supervisor immediately, ban smoking and restrain staff and public from the vicinity.

Public

- Sightseers must be kept well clear of the work site.
- Signs shall be erected if necessary.
- Children in particular can quickly become endangered - remember they do not always appreciate the dangers involved.

Flashing Lights

- All vehicles and machinery shall have traffic warning safety flashing lights.
- Check at least twice daily to ensure correct operation.

Unattended Site

When the site is left unattended (nights, weekends etc) ensure that:

- Vehicles and equipment are parked well off the roading where they do not cause an obstruction or impair visibility for drivers.
- Signs, barricades, warning lights are in place and secure against damage by wind, vehicles etc. and that batteries are sufficient for the lighting period.
- The running surface is free from unevenness, holes, unstable shoulders etc.

Trench Collapse

IN THE EVENT OF TRENCH COLLAPSE:

- Call emergency services.
- Start hand excavation to locate the victim. Use prodders carefully to assist.
- Keep all dewatering plant in operation.
- Avoid using mechanical equipment in the same trench.
- If a machine must be used, excavate a new trench alongside the cave in, then hand shovel loose material across into the new trench.
- Do not shift the victim when uncovered, clear their face, keep them warm and comfortable.
- Take precautions to prevent further collapse.