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Hunter Water Corporation A.B.N. 46 228 513 446  
Standard Technical Specification for:

**REPLACEMENT OF SEWERMAINS BY PIPE  
BURSTING**

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**AMENDMENTS FROM THE PREVIOUS EDITION - OCTOBER 2001**

Clause	Amendment
All	General formatting, rewording and referencing changes to improve clarity but no change to technical requirements

## **1. GENERAL**

### **1.1 Scope**

This Standard Technical Specification details requirements for the replacement of existing sewer mains by the process commonly known as Pipe Bursting whereby apparatus travels along the existing sewer pipeline destroying the pipeline as it goes while drawing a replacement pipe into the space with minimal excavation.

### **1.2 Interpretation**

Unless specifically stated otherwise, replacement of sewer mains includes ALL functions described in this Standard Technical Specification and the provision of any minor materials or services which are not described but are reasonably necessary to produce a fully functional sewer system.

Headings are for the convenience of the reader and shall not be used in the interpretation of this Standard Technical Specification.

Unless the context requires otherwise any expression such as "give notice", "submit", "approval", or "directed" means give notice to, submit to, approval by, or directed by the Superintendent of the Contract or other person nominated by the Principal.

## **2. GENERAL CONSTRUCTION**

Generally the pipe bursting process will result in the replacement pipe following the line and grade of the existing pipeline. When selecting launch pit locations or other essential excavations, take into account any evidence that movement of the existing pipeline has occurred leading to a reversal of the grade. Where practicable, select locations which will allow correction of such reversals of grade to achieve a pipeline which falls from upstream to downstream.

## **3. MATERIALS**

### **3.1 General**

Obtain all materials necessary for construction of the Works from approved sources. Comply with all recommendations of the manufacturers regarding the storage and handling of the materials. Undertake all handling, transport and storage such that no damage occurs to the materials including coatings and linings.

### **3.2 On-site Stockpiles**

Only store sufficient materials on site as are necessary to allow timely and efficient progress of the work. Locate stockpiles of excavated or imported material where they cause no interference to the public, drainage routes or vehicular or pedestrian traffic. Clear lines of sight for drivers must not be obstructed. Do not stack materials against structures, fences, trees or other property improvements. Leave a clear path at least 600mm wide between the edge of any excavation and the inner toe of any stockpile or spoil banks.

### **3.3 Sands and Coarse Aggregate**

Supply bedding sand, high grade compaction sand and coarse aggregate embedment material in accordance with Standard Technical Specification STS101.

### **3.4 Select Fill**

For select fill use excavated material, free from organic matter and having a particle size no larger than 20mm. The material shall be suitable to allow compaction as specified without

causing damage to the pipeline. If material excavated during excavation does not comply, import non-cohesive material.

### 3.5 Trench Fill

Where the trench is not subject to traffic loading use excavated material for fill in the trench fill zone provided it has a particle size no greater than 75mm across the largest dimension, is free from organic matter and can be placed into a dense mass free of voids and cavities.

For trafficable areas use:

- cement stabilised trench fill for all existing roads; or
- crushed rock dust in accordance with Standard Technical Specification STS101; or
- crushed rock in accordance with Standard Technical Specification STS102; or
- as directed by the authority responsible for the trafficable area.

### 3.6 Cement Stabilised Trench Fill

Cement stabilised trench fill shall comprise a 14:1 sand:cement mix.

### 3.7 Polyethylene Pipes and Fittings

The replacement pipe shall be polyethylene pipe chosen to comply with all relevant requirements of AS2566.1 and manufactured in compliance with Section SP6 of the Water Services Specification (WS-Spec) and as indicated for Hunter Water Corporation in the Table of Water Agency Practices. WS-Spec is available from Standards Australia.

#### Hold Point

Before delivery of any materials to site, submit calculation's demonstrating compliance with all sections of AS2566.1.

### 3.8 PVC Sewer Pipes and Fittings

If required to renew property service line connections, supply PVC sewer pipes and fittings manufactured in compliance with Section SP4 of the Water Services Specification (WS-Spec) and as indicated for Hunter Water Corporation in the Table of Water Agency Practices. WS-Spec is available from Standards Australia. Use flexible jointed pipes and fittings to Class SEH.

### 3.9 Joint Seals

Supply elastomeric seals manufactured in compliance with Section SP15 of the Water Services Specification (WS-Spec) and as indicated for Hunter Water Corporation in the Table of Water Agency Practices. WS-Spec is available from Standards Australia. Use seals of either ethyl propylene-diene (EPDM) or nitrile-butadiene rubber (NBR).

### 3.10 Geotextile Filter Fabric

Geotextile filter fabric shall be approved inert material, BIDIM A14, manufactured by Geofabric Australia Pty Limited.

## 4. PHOTOGRAPHIC RECORDS

### 4.1 General

Prepare a detailed photographic record of all areas that will be affected by the work under the contract including stockpile areas, storage areas and access tracks. Detail is to include but not be limited to buildings, roads, pavements, reserves, kerb and gutter, drains, pits etc. Special attention is to be given to all improvements within 5 metres of the pipeline routes, especially gutters and driveways.

Provide a record of damage and defects to improvements in the vicinity of the works prior to all work under the contract. This record will be used in the resolution of disputes between property owners and the Contractor or Principal and accordingly should be comprehensive in its coverage of the areas affected by construction activities.

#### 4.2 Format

Present the photographs as 150mm x 100mm prints or as “jpeg” digital files.

Display the date on which the photo was taken on the photograph.

For each photograph identify the site by house number and provide comments on any pre-existing defects, particularly where they are not obviously visible in the photographs.

<b>Hold Point</b>
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Submit photographic records before commencing work (other than establishment) on site.
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#### 4.3 Updating of Records

Add to the photographic record as work proceeds if additional areas will be affected by the work under the contract and the condition has not been previously recorded or if site conditions change.

### 5. INITIAL CCTV INSPECTION

Undertake a closed circuit television inspection of the full length of the pipeline prior to commencement of the replacement work to provide an up to date assessment of the condition of the pipeline. Notify the Superintendent if a latent condition exists or the proposed method of work is no longer viable.

Submit a colour video recording of the inspection made in accordance with Standard Technical Specification STS901.

### 6. STOPPING AND DIVERSION OF SEWER FLOWS

Plug off mains and property service lines as required to prevent flow of sewage in the length of pipeline being replaced. Pump flow around the length of main to be replaced. Flow from property service lines need not be pumped if there is sufficient storage capacity in the lines for the duration of the isolation. Do not allow sewage to enter excavations or seep into the surrounding soil.

<b>Hold Point</b>
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Submit details of the bypass system capacity prior to installing the system.
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Monitor the lines that have been plugged and ensure surcharging does not occur. If the bypass system equipment fails bring the sewer pipeline back into normal operation as quickly as possible.

Give written notice two days in advance if shut down of upstream pumping stations is required.

Ensure that the line and Access Chambers are clear of material before removing the plugs and ceasing any bypass pumping. Remove the plugs at the earliest possible time.

### 7. SURCHARGE

Take all care to prevent surcharging during all stages of the work but if surcharging occurs immediately notify the Superintendent and thoroughly clean up the affected area to the Superintendent's satisfaction.

## **8. CLEARING**

Remove obstructions as necessary to provide access for the execution of the works. Do not destroy, remove or clear vegetation or surface improvements to an extent greater than necessary for the execution of works.

Obtain the approval of the Council for the removal of any trees. Take any steps necessary to prevent damage to trees that are not to be removed.

Dispose of all rubbish and surplus material within 24 hours of clearing.

## **9. EXCAVATION**

Prior to the commencement of any excavation, determine the location of any services in the vicinity of the proposed excavation. Take all actions and provide all things necessary to protect and maintain existing services to the satisfaction of the relevant authority or owner. This may include arranging or performing relocation, temporary diversion or support of the service. In the event of a service being damaged, immediately contact the relevant authority or owner and arrange repairs to their satisfaction. Obtain from the authority or owner a certificate stating that the repair has been carried out to their satisfaction.

Do not commence any excavation until all materials necessary to make the excavation safe are on site and available for use. This includes any necessary fencing and barriers as well as trench support systems.

Keep the extent of excavation to the minimum possible to allow efficient execution of the work.

If excavation of bitumen, asphalt or concrete surfaces is involved, saw cut neat straight lines at the outer limits of the excavation.

Remove pavers, blocks or brick pavements by hand, clean them and set them aside for later replacement.

Meet Local Council requirements for any excavation in roadways, footpaths, or other lands under the control of Local Council.

Ensure that adjacent structures and services are not subject to disturbance by any trench support system.

Make all excavations secure at the completion of daily works by covering with steel plates and/or temporary fencing.

Promptly remove and dispose of excavated material which is not required for reuse.

## **10. DEWATERING AND DRAINAGE**

Keep excavations free of water. Provide, maintain and operate intercepting works to prevent surface water from entering the excavations; and, if necessary, supply, install and operate an adequate ground water dewatering system so as to provide a dry working platform at the base of all excavations during the work.

Discharge water pumped from excavations without erosion, sedimentation or other damage to the Works.

Lowering of the water table by well points or other external dewatering methods may only be used if no damage is likely to be caused to adjacent structures and services.

In residential areas and other areas where noise must be minimised, use only electrically powered dewatering equipment with hard-wired electrical supply. Comply with the local power authority's requirements.

## 11. PROPERTY SERVICE CONNECTIONS

Reinstate all live property service connections by use of electrofusion welded connectors or saddle clamps.

### Witness Point

Before covering any plumbing work up (backfilling), the contractor shall notify the Superintendent's Representative that the work is complete so that HWC may inspect.

## 12. ACCESS CHAMBER CONNECTIONS

Seal around the replacement pipe where it passes through each Access Chamber wall using cement mortar to achieve a watertight seal. Make good any damage to the chamber benching and channels using a 2:1 sand:cement render.

## 13. BACKFILLING

### 13.1 General

### Hold Point

Prior to backfilling any excavation on a road, submit a methodology conforming to this clause and the Code of Practice for Street Openings (where applicable) showing:

Material to be used;

Compactive method (tools & thickness of each layer);

Compaction testing;

Asphalt grade, thickness, and underlying waterproof membrane.

Backfill containing boulders, large rocks, logs, stumps, tree loppings, builders refuse, broken concrete and other like material is expressly forbidden.

Keep all dewatering systems operating during backfilling so that no fill material is placed or compacted under water. At all times ensure that the pipes are not damaged or moved during placement and compaction of fill.

Place and compact pipe embedment in layers not greater than 150mm thick and trench fill in layers not greater than 300mm thick, except in roadways use layers not greater than 100mm thick.

Compact to:-

PIPE EMBEDMENT MINIMUM COMPACTION			
Pipe Embedment	Non Traffic		Traffic
	VC & RC	Other	
Granular Density Index	60%	70%	80%
Non-Granular (Select Fill only) Dry Density Ratio	90%	N/A	98%

TRENCH FILL MINIMUM COMPACTION		
Trench Fill	Non Traffic	Traffic
Granular Density Index	70%	85%
Non-Granular (Select Fill only) Dry Density Ratio	95%	100%

Where;

- for granular fill - the density index is determined in accordance with AS 1289.E6.1 based on the field dry density determined in accordance with AS 1289.E3.1 or AS 1289.E3.5 and the maximum and minimum dry densities in accordance with AS 1289.E5.1; and
- for non-granular fill - the dry density ratio is determined in accordance with AS 1289.E4.1 based on the field dry density in accordance with AS 1289.E3.1 and the maximum dry density in accordance with AS 1289.E1.1.

Compact fill material by manual or mechanical tampers. Compact non-granular fill at a moisture content within plus or minus 2% of optimum and granular fill at a moisture content within plus or minus 3% of optimum. Flooding of the fill is not permitted.

When removing, raising or withdrawing supports, exercise every precaution necessary to prevent slips or falls and ensure that no damage, disturbance or displacement occurs to the sewer. Backfill simultaneously with the raising or withdrawal of supports. Ensure that compaction of backfill material occurs below such trench support and against native ground.

### 13.2 Compaction and Density Testing

Undertake testing of fill compaction and/or density in accordance with AS 1289 Part E. Engage an approved body registered by NATA for the particular tests to be undertaken. Submit test results.

The minimum number of tests shall be:

TRENCH LOCATION	ZONE	MAIN SIZE	TESTS
In roadways	Pipe embedment	Up to and including DN150	One test for every 50m but not less than two tests.
		Over DN150	Two tests for every 50m but not less than two tests.
	Trench fill	All	One test for each 900mm depth of trench fill every 50m but not less than two tests.
Not in roadways	Pipe embedment	Up to and including DN150	One test for every 100m but not less than one tests.
		Over DN150	Two tests for every 100m but not less than two tests.
	Trench fill	All	One test for each 900mm depth of trench fill every 100m but not less than one test.

## 14. RESTORATION

### 14.1 General

Restore as near as practicable to their pre-existing condition, all surfaces, services and/or improvements disturbed, destroyed, removed or damaged during the work under the contract. Improvements shall be deemed to include trees and shrubs, mulched areas, gardens, paving, flagging, proprietary finished areas such as 'pebble crete' and the like, retaining walls, fences and all other structures.

When necessary for the restoration of surfaces, stockpile existing topsoil separately and replace it over the areas where it was previously located when completing backfilling operations. Where there is a shortfall of existing topsoil use approved imported topsoil.

### 14.2 Timing of restoration

Undertake restoration to surfaces, services and improvements progressively as the work proceeds. At all times ensure that services are maintained. Complete restoration and repair work

within five calendar days after completion of backfilling of each section of the Works unless specifically stated otherwise elsewhere.

Undertake any maintenance of the restoration within two calendar days of the need for such maintenance becoming apparent.

### **14.3 Pavements**

Immediately after backfilling of a trench excavated through a pavement, temporarily restore the surface and maintain it in a trafficable condition until final restoration is completed. Where the original pavement was bitumen or asphalt use a pre-mixed asphaltic material for the temporary restoration. Otherwise use crushed metal or gravel. Complete final restoration of pavements within one month of temporary restoration.

### **14.4 Turf**

Restore areas of established well maintained lawns to the full limits of the disturbed area with approved imported turf. Restoration using sods removed prior to construction will only be approved if the sods are of equivalent standard to imported turf. Also use turf to restore areas where there is significant risk of erosion such as on steep or long slopes.

Following backfilling and initial settlement spread and grade topsoil to achieve a smooth surface free from lumps, stones or other debris and blending into the levels and shapes of the adjoining undisturbed ground allowing for the turf. Mix an approved fertiliser of N:P:K ratio of 10:4:6 (equivalent to "Mulitgro") into the topsoil at a rate of 40g/m<sup>2</sup>.

Lay the turf without gaps on the prepared topsoil surface and lightly top dress and compact. Water regularly until regrowth is established.

### **14.5 Trees**

Where Council or private landowners require replacement trees to be planted, provide trees suitable for planting adjacent to the sewer as detailed in Hunter Water Corporation's publication entitled "Tree Roots".

### **14.6 Provision for Settlement**

Make good any settlement of the trench during the Defects Liability Period by placing additional approved fill such that the finished surface level conforms with the adjacent surface.

For trenches through other than pavements, turf areas, grassed areas or other improved surfaces, backfill may be placed sufficiently high to compensate for expected settlement unless it would create a hazard or inconvenience to the public. At the end of the Defects Liability Period, trim back such excess material to conform with the adjacent surface and dispose of the surplus.

### **14.7 Tunnelling**

Where tunnelling has been used in lieu of trenching to avoid improved surfaces, backfill such as to restore full support to the surface. Repair any damage to the improved surface which occurs at anytime due to subsidence of the backfill.

### **14.8 Maintenance of Restored Surfaces**

Maintain all restored surfaces and improvements in a satisfactory condition until expiry of the Defects Liability period notwithstanding that any deterioration, and the need for their maintenance, may or may not be due to defects which become apparent or arise from events which occur during that period.

### **14.9 Certification**

Submit certificates issued by the relevant public authorities certifying that all roads, footpaths and surfaces in public places under their control have been satisfactorily restored. Notwithstanding any other provision, the Defects Liability Period shall not be completed until such certification is submitted unless it is agreed that the public authority has unreasonably

withheld issue of the certificate. The issue of such certificates shall not relieve the Contractor of any responsibility for any defect.

## **15. FINAL CCTV INSPECTION**

Submit a colour video recording of the full length of the replacement pipeline in accordance with Standard Technical Specification STS901.

**[END OF STS700]**