

10. BACKFILLING

10.1 General

Materials and compaction used are to be such that no discernible settlement occurs.

No cement, lime, or backfill materials containing them, may be used in backfilling work unless specifically required by this code or unless necessary around poles for stability purposes.

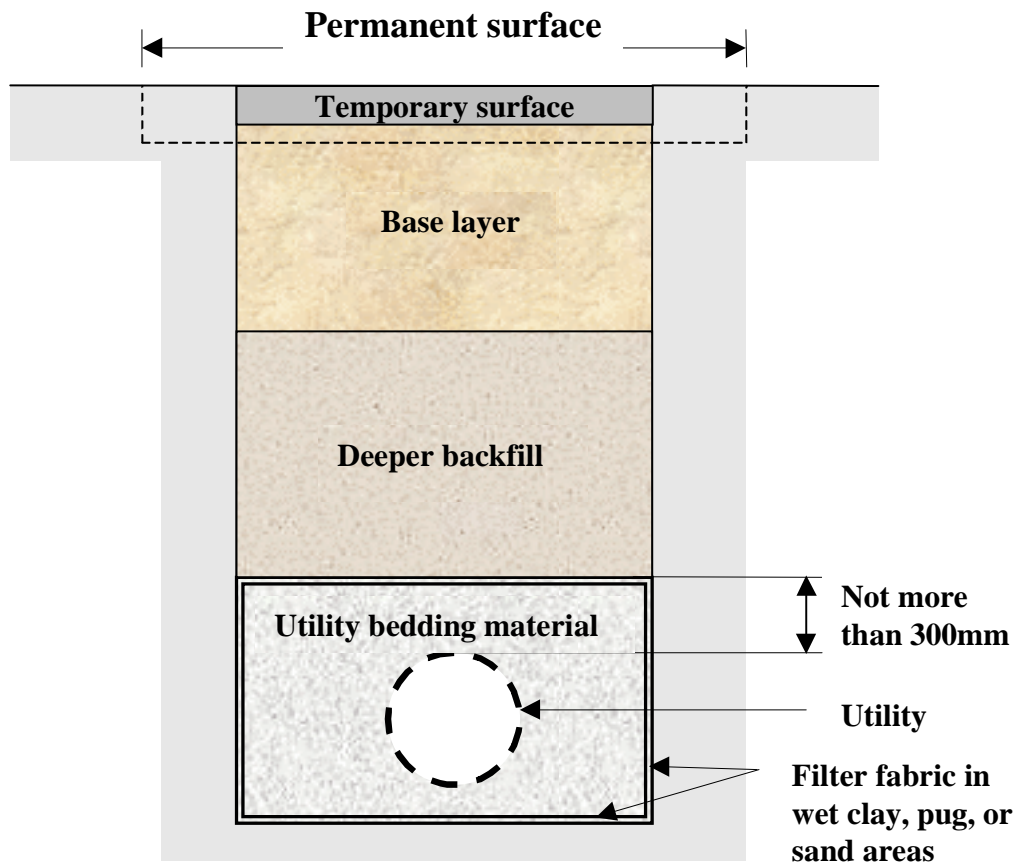


Figure 7 - Typical cross-section of a backfilled excavation

10.2 Removal of poles and bases of structures

Poles no longer required for overhead services and bases no longer required for structures must be removed to a depth of at least 300mm and the surface reinstated.

10.3 Bedding material

Bedding material must be to the Principal's specification and be placed in a thoroughly compacted form. An appropriate filter fabric material must be placed around the bedding material if the bedding material is an open graded material and the adjoining ground is either sand or soft clay and likely to experience ground water (Refer to figure 7). This is to prevent migration of adjoining finer material into the bedding material.

Bedding material must not extend more than 300 mm above the utility.

10.4 Backfill material

10.4.1 Deeper backfill material

Cheaper backfill materials, including insitu materials, may be used at depths greater than 400mm as long as it is an 'All Passing 40 mm sieve size, AP40, and compaction requirements are met. Examples of materials which may achieve this, if they have the right moisture content, are domestic basecourse and some clay materials.

10.4.2 Base layer

10.4.2.1 Basecourse

Good quality basecourse complying with the TNZ M5 (Wellington) AP40 specification must be used to a minimum depth of:

- 400mm - Carriageways
- 100mm - Footpaths and Driveways

The surface of the base layer may have a dressing not deeper than 40 mm of AP20 top course material.

10.4.2.2 Concrete

Where concrete exists in the carriageway pavement, concrete must be replaced. This will require the following measures:

- The cut faces to be drilled and 500mm R20 dowels, or equivalent, grouted in as shown in figure 8
- 665 mesh reinforcing extending between the edges of the excavation (where there is reinforcing in the adjoining concrete)
- Concrete, with a slump not less than 50mm, poured and vibrated to a depth equivalent to the adjoining depth but not less than 250mm
- The concrete must have a strength of not less than a 20 MPa at 28 days

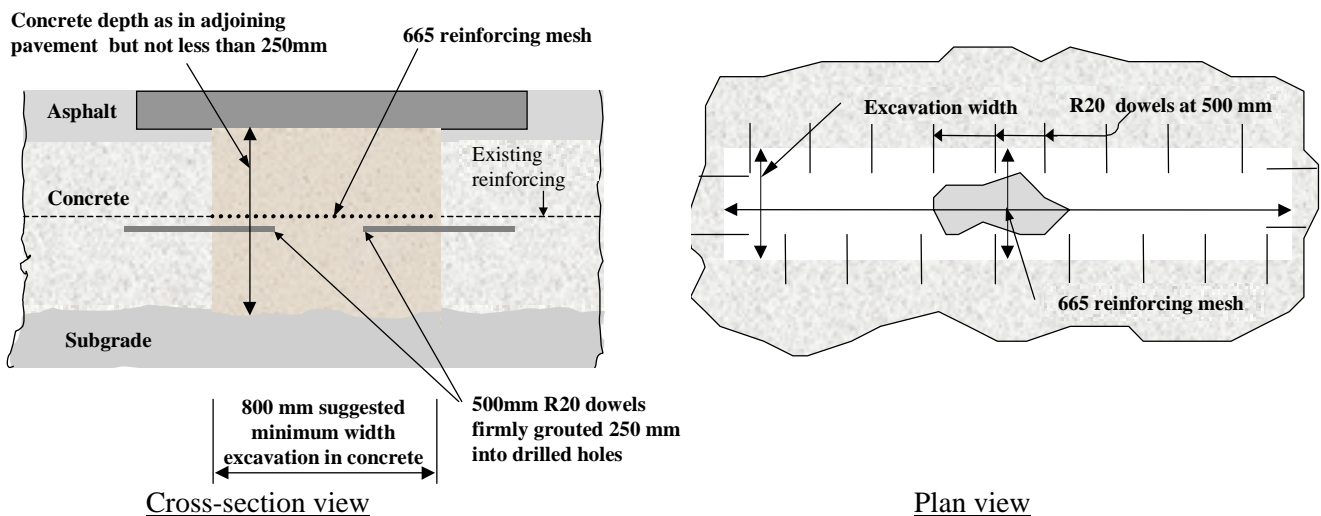


Figure 8 - Reinstatement of Concrete in carriageways

10.4.3. Under kerb and channels

Where an excavation extends under a concrete channel or kerb and the channel has not subsided, cracked or been damaged, then it may remain. In those situations, a minimum 200 mm deep concrete foundation must be placed as shown on figure 9 to support the channel. The concrete must have a strength of not less than a 20 MPa at 28 days.

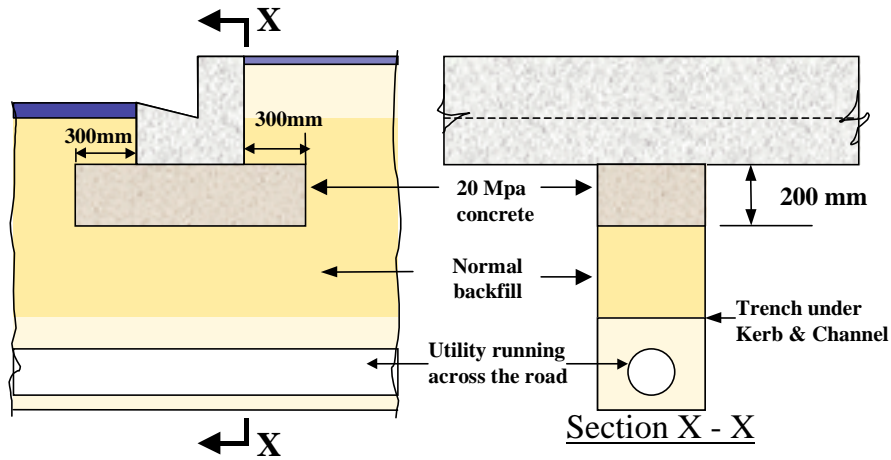


Figure 9 - Concrete and backfill foundation under a concrete water channel or kerb

10.4.4 Around poles

Concrete may be used as backfill at any depth around poles except the surface material must be as required in Section 13.3 to match the surrounding surface.

10.5 Compaction

10.5.1 General

As a guide all material should be placed and compacted in layers not exceeding 200mm in loose depth. Compaction must be not less than that necessary to achieve the following at all depths of any backfill.

Location in road	Scala penetrometer (blows per 50 mm of penetration)	Clegg Hammer (Measured on the 4 th blow)
Carriageways	7	35
Footpaths	4	25
Berms	2	10

Please note that Clegg hammer tests only indicate the compaction of the top layer of any backfill. These compaction tests would need to be carried out on every layer to be assured of proper compaction.

In the case of sand a lesser compaction requirement may be approved by the Road Controller if it can be clearly shown that the compaction is at least as much as the undisturbed sand in the adjoining ground.

10.5.2 Testing

The Contractor must carry out compaction tests at not less than 5 metre distances in any backfill work. The results of tests taken must be recorded and made available to the Road Controller if requested. Sample Penetrometer and Clegg Hammer test forms are included in Appendices I and J.