

**DUBLIN CITY COUNCIL**  
**Comhairle Cathrach Bhaile Átha Cliath**

**ROADS & TRAFFIC DEPARTMENT**  
**AN ROINN BÓITHRE AGUS TRÁCHTA**

**ROADS MAINTENANCE SERVICES**

**CONSTRUCTION STANDARDS FOR ROADS IN  
NEW SMALL DEVELOPMENTS**

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# **CONSTRUCTION STANDARDS FOR ROADS IN NEW SMALL DEVELOPMENTS**

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## **FOREWORD**

This document was originally based on the publication “Recommendations for Site Development Works for Housing Areas” (An Foras Forbartha – 1984). This has been updated by the DOELG document of the same name, dated November 1998.

Generally, all works shall be in accordance with N.R.A. Specification for Road Works.

Where items of work are not covered by the above specification, reference is made to the appropriate specification.

Where neither of the above applies, written approval for the work(s) should be obtained.

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# **CONSTRUCTION STANDARDS FOR ROADS IN NEW SMALL DEVELOPMENTS**

## **SECTION 1 : GENERAL**

### **1.1 DEFINITIONS**

For the purpose of this document the following definitions apply:

1. Road: A way for vehicles and other type of traffic.
2. Carriageway: That part of a road constructed for use by vehicular traffic.
3. Footway: That portion of any road associated with a roadway, which is provided primarily for use by pedestrians.

### **1.2 SCOPE**

This document sets out construction standards for carriageways, footways, kerbs and channels within housing areas with the exception of: -

- (a) roads intended as the principal means of access to more than 200 houses.
- (b) roads intended for use as bus routes.
- (c) roads intended to provide a through route for vehicular traffic through a housing area.

Roads Maintenance Services shall be consulted concerning the standards to be used in the construction of roads under categories (a) to (c) or in the construction of roads serving industrial areas.

### **1.3 TECHNICAL SPECIFICATIONS**

Within this document, technical specifications are either provided directly or indirectly by reference to:

1. An Irish Standard Specification, identified by IS followed by a number and the year of publication.
2. A British Standard Specification, identified by BS followed by a number and the year of publication.
3. A Harmonized European Standard Specification, identified by IS EN followed by a number and the year of publication.
4. Other published specifications, identified by their titles.

References to Irish, British and European Norm Specifications and any other published specifications are to the latest edition. Subsequent amendments shall be deemed to apply, unless approval is obtained to the contrary.

### **1.4 MATERIALS**

All work should be carried out with proper materials. Proper material means materials which are fit for the use for which they are intended and for the conditions in which they are to be used.

The alternative materials and forms of construction given are suitable for normal situations. Where exceptional circumstances exist, the Local Authority may instruct the developer to use particular materials or forms of construction. Requirements, including a specification of workmanship, necessary for the proper completion of the works and not covered in this document, shall be subject to written approval.

### **1.5 CONSULTATION:**

Prior to finalising the design of a proposal, the Developer is advised to ascertain the name(s) of the appropriate officer(s) for consultation purposes, on matter of Planning, Roads, Traffic, Drainage, Watermains, Parks and Public Lighting.

For Roads- Road reservations, road widening lines, culs-de-sac, junction sight lines and radii, gradients, alignments, roadway type, proposed construction traffic, inspection, testing and approval requirements, etc..

## **1.6 THE DEVELOPER AND THE PUBLIC ROAD:**

The developer shall not carry out any work in the public footway/carriageway/laneway, except with the written permission of the City Council.

Any damage to the public footway/carriageway/laneway resulting from the developer's works shall be repaired by the Council at the developer's expense.

## **1.7 ACCESS:**

Access to the site should be made available to the Council's staff, for such monitoring or inspection of work as may be required during construction.

## **1.8 ROADS MAINTENANCE SERVICES: TAKING IN CHARGE PROCEDURES**

Where a Developer wishes to have roads taken in charge by Dublin City Council, or where roads have been conditioned (by planning permission or otherwise) to be constructed to a 'taking in charge' standards, the Developer should: -

1. Submit to the Roads Maintenance Services:
  - a. a dimensioned plan of the proposed roads showing all features to be taken in charge (or to be constructed to 'taking in charge' standards).
  - b. a photocopy of the appropriate "Notification of Decision to grant (Planning) Permission".
2. Notify Roads Maintenance Services when works are about to commence.
3. Afford access to the site for Local Authority staff for the inspection of the works during construction.
4. Give advance notice to the Area Inspector (Roads Maintenance) of the works programme.

5. Allow the Area Inspector to inspect the following stages of the works:
  - a. the exposed formation
  - b. the compacted sub-base prior to the laying of base materials (carriageway) – the compacted crushed stone base prior to the placing of concrete or other surfacing (footways)
  - c. the laying of base and wearing course materials (bituminous carriageways)
  - d. the placing of concrete (concrete carriageway)
  - e. all finished surfaces.
  
6. Allow samples of materials to be taken as required.

Note that other Divisions of Dublin City Council (e.g. Drainage, Waterworks, Public Lighting, Parks) may be involved in the “taking-in-charge” procedures and the requirements of each Division will have to be independently satisfied.

On completion of the works, the Developer must submit to Roads Maintenance Services a drawing showing the layout, levels of the road, the exact location of all services including service ducts crossing the carriageway, clearly identified by dimensioning from some clearly visible surface feature, e.g. kerblines, road gully, manhole cover.

## **1.9 LEGAL REQUIREMENTS:**

Compliance with these recommendations shall not confer immunity on the developer from any legal requirements and shall not remove the necessity for the developer to comply with the requirements of the Planning Acts, the Building Regulations and Safety, Health and Welfare at Work Act.

## SECTION 2 : ROADS

### 2.1 LAYOUT:

Road Planning Division should be consulted prior to any planning application concerning the road layout.

In general, where houses are on both sides of the road, the minimum width should be 6.5 metres with two 1.8 metre footways. Where houses are on one side only, the minimum width of carriageway should be 5.5 metres with a 1.8 metre footway on the side next to the houses and a footway or rubbing kerb (0.5 metre wide) on the opposite side, depending on likely pedestrian usage. Roads in housing areas which are likely for use as bus routes should be 7.5 metres wide with 2.5 metre footways.

Where appropriate, measures for traffic-calming should be included in the design of all new housing estates.

A 1.8 metre footway should be provided where large open spaces abut roadways, in the interest of safety.

### 2.2 Road Gradient:

Longitudinal gradients shall lie between 1/200 and 1/20 except for clay pavers and precast concrete pavers where the minimum recommended gradient shall be 1/100 and 1/80 respectively. Steeper gradients may be allowed in difficult circumstances. At junctions, the gradient of the side road should not be greater than 2% for a distance of 7m from the junction.

### 2.3 Camber and Crossfall:

Normal camber/crossfall shall be as follows: -

Concrete and Macadam Finish	- 1/40
Rolled asphalt wearing course	- 1/50 to 1/40
Modular Pavement	- 1/33
Maximum crossfall allowed	- 1/25



## **2.4 Services:**

Services shall be laid underground under the proposed footway in the traditional order i.e. Gas, Water, E.S.B., Sewers, Telecom and Public Lighting –see drawing at the end of the booklet. The laying of services in other locations shall be subject to approval. The public area, including the footway (if any) beside the roadway, should be of sufficient width to accommodate the services required. Services should only be laid under the carriageway where there is a requirement to cross the roadway. In such cases, services should be laid at right angles.

Gullies shall be placed at a maximum spacing of 37 metres. Provide additional gullies at junctions. At sag curves, provide two gullies side by side at the lowest point.

## **2.5 Clearance from Carriageway:**

The normal minimum lateral distance of fixed objects from the carriageway edge should be one metre. The absolute minimum distance from the carriageway edge to obstructions such as trees, shall be 450mm. Lamp standards should be placed at the back of footway, where possible.

## **2.6 Carriageway Construction:**

The carriageway construction comprises the pavement layers and the pavement foundation. The foundation comprises the sub-base and capping layer, if required, laid over the subgrade soil.

In-situ concrete or flexible carriageways are the general forms of construction.

Modular pavements may be appropriate, subject to approval.

## 2.7 Horizontal Alignments and Surface Levels of Pavement Courses.

### Horizontal Alignments:

1. Horizontal alignments shall be determined from one edge of the carriageway pavement surface as shown on the Drawings. The edge of the carriageway pavement surface as constructed and all other parallel alignments shall be correct within a tolerance of  $\pm 25\text{mm}$  therefrom, except for kerbs, channel blocks and edge line which shall be laid with a smooth alignment within a tolerance of  $\pm 13\text{mm}$ .

### Surface Levels of Pavement Courses:

2. The levels of pavement courses shall be determined from the true finished road surface calculated from the vertical profile and crossfalls as shown on the Drawings. The vertical depth below the true pavement surface of any point on the constructed surface of the formation or pavement courses shall be within the following tolerances: -

Road Surface	$\pm 6\text{mm}$
Basecourse (Binder)	$\pm 6\text{mm}$
Roadbase (Base)	$\pm 15\text{mm}$
Sub-base	+10mm - 30mm
Formation	+ 20mm - 30mm

3. The surface level of the pavement at any point shall not deviate vertically from the true finished road surface by more than  $\pm 6\text{mm}$ . However the combination of permitted tolerances in different pavement levels shall not result in a reduction of the wearing course thickness by more than 5mm from that specified for a flexible road nor a reduction in the thickness of the whole pavement, excluding the sub-base, by more than 15mm from the specified thickness.

## 2.8 Sub-grade Strength:

Sub-grade strength shall be established by means of the California Bearing Ratio (CBR) Test in accordance with BS 1377. Samples shall be taken at the rate of 1 per 100m of road or more frequently where significant variations in soil type are anticipated. Extra samples will be required where the difference in strength between two adjacent samples indicates a significant variation in soil type. In preparing the test specimen the method of compaction shall be the Static Compaction Method 2 as given in BS 1377.

The moisture content and density conditions used in the test shall reproduce as closely as possible the conditions likely to apply under the road after construction. To estimate the appropriate density condition a preliminary test may be carried out using the vibrating hammer method of compaction given in BS 1377 but with the soil at the expected average moisture content after construction. The C.B.R. specimen shall then be compacted to a density corresponding to 95% of the value obtained in the preliminary test,

In establishing subgrade strength, due account should be taken at the likely impact of the construction phase of the characteristics of the subgrade material. They may be critical, particularly in a site with a relatively high water table or poor drainage parameters. In such cases, the in-service long term strength of the subgrade may be considerably less than that of the same soil in an undisturbed condition. For subgrade with CBR of less than 2%, a geotextile separator should be used and specialist advice sought regarding minimum thicknesses.

## **2.9 Sub-base Material:**

Sub-base material should comprise Type B granular material, in accordance with Clause 804 and compacted in compliance with Clause 802.

## **2.10 Carriageway Base Material:**

Carriageway base material shall comprise lean concrete or dense roadbase bitumen macadam.

1. ***Cement Bound Materials Category 3 (Lean Concrete):*** Cement Bound Materials Category 3 shall be made and constructed in accordance with the requirements of the Specification for Road Works to a compacted minimum thickness of 150mm.
2. ***Dense Base (Roadbase) Bitumen Macadam:*** Where dense roadbase bitumen macadam is used, it shall consist of 28mm nominal size complying with BS 4987 to a compacted minimum thickness of 80mm.
3. **Other materials may be used subject to written approval.**

## 2.11 Concrete Carriageway:

1. **Construction:** Where concrete carriageways are used they may be unreinforced and shall be constructed generally as shown on Drawing No. 2.1 and to the minimum construction thickness shown on Table 2.1. The concrete shall be grade C40 concrete. The concrete surface shall be brush or groove finished and cured with an approved aluminised curing compound to Clause 1027, S.R.W., or other approved method. A separation membrane shall be used between the concrete and the sub-base. The membrane shall be impermeable plastic sheeting 125 microns thick laid flat without creases. Where an overlap of sheets is necessary, this shall be at least 300mm.

**Table 2.1 Unreinforced Concrete Carriageways  
- Minimum Construction Thicknesses**

Sub-grade CBR (%)	Minimum Thickness (mm)	
	Sub-base	Slab
Under 2*	300*	210
2-15	200*	180

\* The minimum thickness of sub-base is only applicable when construction traffic will not be operating on it.

The sub-base may be used by construction traffic provided it is strengthened as follows: -  
For sub-grades with a C.B.R. of 4% or less, the minimum thickness of sub-base in Table 2.1 shall be increased by 150mm. For sub-grades with a C.B.R. greater than 4% and less than 15% an increase of 80mm shall be sufficient.  
Damage caused by construction traffic shall be remedied as approved before construction of the concrete slab.

2. Joints: Maximum transverse joint spacings shall be as in Table 2.2.

Table 2.2 Unreinforced Concrete Carriageway  
- Maximum Joint Spacing

Slab Thickness	Construction Joint Spacing	Expansion Joint Spacing
180 - 200mm	4.5m	40m
201 - 250mm	5.0m	60m

Expansion joints may, when approved, be replaced by contraction joints in the summer months (between 21<sup>st</sup> April and 21<sup>st</sup> October).

Expansion joints shall also be used when forming small slabs around all manhole covers, gullies and surface boxes occurring on the carriageway. The slabs shall be at least as large as the external dimensions of the relevant chambers.

End of day joints shall be at construction or expansion joints.

Carriageways wider than 4m shall have a central longitudinal joint.

Longitudinal, contraction and expansion joints shall be constructed as shown on Drawing No. 2.2.

Expansion joint filler shall be knot free softwood or softboard and shall be 25mm thick, for the full depth of the concrete. The top of the filler board shall be routed out later to a depth of 25mm, in order to receive the joint sealant.

Sawing of joint grooves should be undertaken as soon as possible after the concrete has hardened sufficiently to enable a sharp edged groove to be produced, without disturbing the concrete and before random cracks develop in the slab. This would usually be between 6 and 24 hours after the concrete is poured. The grooves should be between 1/4 and 1/3 the depth of the slab and of any convenient width not less than 3mm. The groove can be widened by sawing at this stage, or later to accommodate the joint sealant.

The combined depth of fillet and groove in contraction and longitudinal joints shall be between one quarter and one third of the depth of the slab. Where a construction joint occurs at a contraction or longitudinal joint a fillet is not necessary.

Contraction and expansion joints shall have sliding dowel bars at 300mm centres. The dowel bars for expansion joints shall be 20mm diameter and 550mm long and those for contraction joints shall be 12mm diameter and 400mm long. Two-thirds the length of the bars shall be coated with bitumen complying with BS 4147 or calcium-base grease complying with BS 3223 or plastic sheath to reduce bond. The bars in expansion joints only shall be provided with a sleeve at the debonded end, containing a thickness of 25mm of compressible material. Longitudinal joints shall have tie bars 12mm in diameter and 1m long at 600mm centres for mild steel and 0.75m long for High Yield deformed steel. Dowel bars and tie bars shall be hot rolled plain mild steel or high yield deformed steel complying with BS 4449 and shall be free of loose mill scale, loose rust, oil, paint and grease. The sliding ends of dowel bars shall be sawn.

Joints shall be provided with a groove to accommodate a sealing material. The sealing material shall be hot applied joint-sealing compound complying with BS 2499, Type N2 and the finished surface of the joint sealing compound shall be  $5 \pm 2$ mm below the surface level of the concrete. Dimensions of joint groove and seal shall be as in Table 2.3.

**Table 2.3 Dimensions of Grooves for Joints and Sealing Material.**

	Minimum width of groove (mm)	Minimum depth of groove (mm)	Depth of seal (mm)
Contraction Joint	12	25	20
Expansion Joint	25	25	20
Longitudinal Joint	10	20	15

Other joint filler and sealing materials may be used subject to written approval.

## 2.12 Flexible Carriageway:

Where flexible carriageways are used they shall be constructed generally as shown on drawing No. 2.4. The minimum sub-base thickness shall be shown in Table 2.4.

Table 2.4 Flexible Carriageway –  
Minimum Sub-base Thicknesses (mm).

C.B.R. of Sub-grade %	Minimum Thickness of Sub-base (mm)
Less than 2*	550
2	400
3	300
4	240
5 and over	200

\* For sub-grades with a C.B.R. of less than 2%, a geotextile separator should be used and specialist advice sought regarding minimum thicknesses.

The required minimum construction thickness of the carriageway proper shall be as follows: -

Base (Roadbase)	D.B.M.	80mm
Surface (Wearing) Course	Rolled Asphalt	<u>50mm</u>
	Total	130mm

The carriageway base may be used by construction traffic provided it is increased in thickness by 50mm and surface dressed in accordance with Clause 2.13. Damage caused by construction traffic shall be remedied as approved before laying of the surface course.

Should the material become contaminated, the contractor shall make good by cleaning it and if this proves impracticable, by removing the layer and replacing it.

## 2.13 Surface Dressing:

Surface dressing shall be carried out in accordance with the booklet titled “Surface Dressing” published by the Department of the Environment. The binder shall be cationic bitumen emulsion complying with the specifications issued by the Department of the Environment.

Cationic bitumen emulsion shall have a nominal bitumen content of 70%. The binder

shall be spread at the appropriate rate recommended in the manual. Chippings shall be 6mm nominal size complying with Table 4 of the manual unless otherwise approved.

#### **2.14 Flexible Composite Carriageway:**

This is a pavement, see Drawing No. 2.5, in which the roadbase is cement bound, generally category 3 (CBM3).

The minimum sub-base thickness shall be as shown in Table 2.4.

Where local weak areas of sub-grade strength exist, increased construction thickness, as approved, shall be used. Roadbase cement bound material shall be to Clause 1038, S.R.W. and laid in accordance with the requirements of Clause 1035, S.R.W. and compacted to a compacted minimum thickness of 150mm. Curing of the surface shall be by bituminous spraying in compliance with Clause 920. The cement bound base may be used by construction traffic provided it is increased in thickness by 50mm and is surface dressed in accordance with Clause 2.13.

Should the material become contaminated, the contractor shall make good by cleaning it and if this proves impracticable by removing the layer and replacing it.

The surface (wearing) course shall be for flexible carriageway in Section 2.12

#### **2.15 Modular Carriageway:**

When a modular carriageway is to be constructed, the layout, laying pattern and structural design in accordance with BS 7533, shall be submitted to Road Design Division for written approval.

Clay pavers shall comply with BS 6677: Part 1, Type PB with chamfers. Generally use 200mm by 100mm by 65mm pavers. Concrete block pavers shall comply with BS 6717: Part 1, Type R. Generally use 200mm by 100mm by 80mm pavers.

Both precast concrete paving blocks and clay pavers shall be laid in accordance with BS 7533: Part 3.

Laying course sand and jointing sand shall comply with grading C and F in table 5 of IS5 respectively.



Traditional stone setts shall comply with the requirements of BS 435 and BS EN 1342. The overall depth of sett and bedding shall be 200mm.

Stone setts shall be bedded on a 3:1 sand cement semi-dry (plastic) mortar- minimum depth 25mm.

The joints between stone setts, 12mm  $\pm$  3mm, shall be filled and rammed with 3:1 sand cement semi-dry (plastic) mortar in two equal layers to within 35mm of the finished surface. Each layer upon placement shall be thoroughly compacted and then watered so as to allow complete hydration of the cement mix. The second layer shall be placed immediately following the completion of the first. The joints shall then be left for a minimum of 12 hours before topping with 50 pen bitumen to BS 3690 Part 1 to within 2-3mm of the surface level. No vehicle, including construction vehicles, shall be allowed to pass over the completed setts for a period of 5 days after the completion of the jointing.

## **2.16 Footways:**

Where footways are provided, the desirable minimum footpath width shall be 2m.

Where isolated obstructions occur on footways, the minimum clear width at the obstruction shall be 1.2m (1.8m on access and/or bus routes). Footways shall have a standard crossfall of 1 in 33. Where in-situ concrete footways are used, joints shall be formed in straight lines at a maximum spacing of 3m and each joint shall include a double layer of bituminous roofing felt complying with IS 36 or other approved material for the full depth of the joint. Alternatively, the joint, may be formed by sawing a groove which should be undertaken as soon as possible after the concrete has hardened sufficiently to enable a sharp edged groove to be produced, without disturbing the concrete and before random cracks develop in the slab.

### **Laying Tolerances:**

The surface level shall not differ from the design level by more than  $\pm$  3mm but for clay pavers and concrete blocks, the values are  $\pm$  6mm.

Concrete bays shall be flush with adjacent surfaces.

The difference in level between adjacent flags or pavers shall not exceed 2mm.

Footways shall be laid true to line and level and any unit deviating more than 3mm in 3m from level shall be made good.

The maximum deviation under a 3m straight edge placed in any position for clay or concrete block pavers is 5mm.

Footway Construction shall be as in Table 2.7

Table 2.7 Footway Construction.

Type of Footway	Minimum Thickness	
	Generally	At Vehicular Access
1. Single Course In-situ concrete.	100mm	200mm
2. Precast concrete paving Slabs to BS 7263.	Standard flag is 600mm by 600mm by 63mm flags on 25mm thickness of sand: cement mortar bedding.	80mm block on 30mm sand bed on 150mm lean concrete.
3. Granite flags to BS EN 1341	Ditto (other approved sizes [ 63mm deep] are permitted)	Granite flags on 25mm mortar bedding or 65mm pavers on 30mm sand bed (either) on 150mm lean concrete.
4. Clay pavers to BS 6677: (Type PB)	50mm pavers on a 50mm thick bed of sand.	65mm pavers on 30mm: sand bed on 150mm lean concrete.
5. Precast concrete paving blocks to BS 6717	60mm blocks on a 50mm thick bed of sand.	80mm block on 30mm sand bed on 150mm lean concrete.

Notes on:

1. In-situ concrete footways shall have a 100mm minimum thickness sub-base to Clause 804, S.R.W.. The concrete shall be grade C30 and have an approved finish. Curing of the footways shall be carried out in accordance with Clause 1027, S.R.W.
2. Precast concrete flags shall be laid to an approved pattern, have 3mm wide joints, be bedded on 25mm thick mortar bed and the joints be filled with 3:1 sand cement mortar – the sand is to comply with grade F in Table 5 of IS5.
3. Granite flags shall be bedded similarly but will generally have 6/10mm wide joints, thoroughly grouted with 1:3 cement sand mortar and finished slightly

round – the sand shall comply with grade M or F in Table 5 of IS5.

4. & 5. Clay pavers and concrete block pavers shall be laid by hand to an approved pattern with joint widths 2mm to 5mm. Joints should be filled with sand to grade F in Table 5 of IS5.
4. & 5. Provide edge restraints along the perimeter of the paved area – it may be provided by existing permanent features such as walls, foundations, concrete slabs or purpose- made brick or concrete kerb details.  
Alternative form of construction for footways shall be subject to approval.

### **2.17 Kerbs:**

At carriageways edges, kerbs shall show between 100mm and 150mm (standard 125mm) above the channel except at vehicular accesses where they shall be reduced over a transitional length to 25mm over channel and at wheelchair and pram access where an upstand of 10mm should be provided.

Cast in-situ kerbs shall generally be 300mm deep by 225mm wide and be made of grade C45 concrete. They shall be neatly scribed with a line parallel to the face at a distance of 225mm from the face. Joints at 3 metre centres are to correspond with adjoining channel/road joints. Where cast in-situ concrete kerbs adjoin a cast in-situ concrete footway, they shall be cast with the footway and scribed with a line parallel to the face at a distance of 225mm from the face. Curing of the kerbs shall be carried out by treating all exposed surfaces in accordance with Clause 1027, S.R.W.

Where granite kerbs are used, they shall be bedded on a well compacted semi-dry concrete grade C30 with 100mm minimum underneath. The concrete backing shall be at least 150mm wide. Use 6mm wide joints, thoroughly filled with 1:3 cement, sand, mortar and have a rubbed joint finish.

Alternative kerb types at carriageway edges shall be subject to written approval.

### **2.18 Channels:**

Where cast in-situ concrete channels are used, they shall be 200mm deep by 450mm wide (see drawing No. 2.9). They shall be made of grade C40 concrete. Joints shall be provided at 9m intervals corresponding with joints in the adjoining footways. Curing of the channel shall be carried out by treating all exposed surfaces in accordance with Clause 1027, S.R.W. Laying channels should be considered when the longitudinal gradient is less than one percent.

## 2.19 Materials:

- (a) **Cement** : Normal Portland cement shall comply with IS 1.
- (b) **Aggregates for Concrete**: Coarse and fine aggregates from natural sources for concrete shall comply with I.S. 5.
- (c) **Granular Material Type B – Clause 804. S.R.W.**: Sub-base material shall be crushed rock. The material shall be well graded and lie within the following limits: -

BS Sieve Size	Range of Grading Percentage by mass Passing
75mm	100
37.5mm	85 – 100
10mm	40 – 70
5mm	25 – 45
600µm	10 – 22
75µm	0 – 8

The particle size shall be determined by the washing and sieving method of BS 812:Part 103.

The material should have a ten per cent fines value of 130kn or more when tested in accordance with BS 812.

- (d) **Cement Bound Material Category 3: CBM3** shall be made from aggregate as in sub-clause 1001.6 SRW and their grading shall lie within the following limits: -

### Material for CBM (3)– Range of Aggregate Grading

BS Sieve Size	Percentage By Mass Passing	
	Nominal	maximum Size
	40mm	
75mm	100	
37.5mm	95 – 100	
20mm	45 – 80	
5mm	25 – 50	
600µm	8 – 30	
150µm	0 – 8*	
75µm	0 – 5	

The particle size shall be determined by the washing and sieving method of BS 812: Part 103.

\* 0-10 for crushed rock fines.

The ratio by mass of cement to aggregate shall be sufficient to produce average 7 day cube compressive strength of 10N/mm<sup>2</sup>.

- (e) ***Asphalt:*** rolled asphalt surface (wearing) course shall comply with the requirements of Clause 910, S.R.W. and BS 594. It shall be laid and compacted to Clause 901.
  
- (f) ***Dense Bitumen Macadam:***  
Dense bitumen macadam base (roadbase) shall comply with the requirements of Clause 903, S.R.W. and with BS 4987. It shall be laid and compacted to Clause 901.

## References

### National Standards Authority of Ireland.

#### Irish Standards:

IS	1	Portland Cement
IS	5	Aggregates for concrete
IS	36	Bituminous roofing felt
IS	261	Cast iron road furniture
IS EN	124	Gully Tops and Manhole Tops for Vehicular and Pedestrian areas.

### Department of the Environment.

“Surface Dressing” - 1981

National Roads Authority - 2000

- Specification for Road Works.

### British Standards Institution.

#### British Standards

BS	594	Rolled asphalt (hot process) for road and other paved areas.
BS	812	Testing Aggregates.
BS	1377	Methods of testing soils for civil engineering purposes.
BS	1881	Methods of testing concrete.
BS	2499	Hot applied joint sealants for concrete pavements.
BS	3223	Calcium-base grease.
BS	3690	Bitumens for Building and Civil Engineering.
BS	4147	Hot applied bitumen based coatings for ferrous products.
BS	4449	Specification for hot rolled steel bars for the reinforcement of concrete.
BS	4483	Steel fabric for the reinforcement of concrete.
BS	4987	Coated macadam for roads and other paved surfaces.
BS	6100	Glossary of building and civil engineering terms.
BS	6677	Clay and calcium silicate pavers for flexible pavements.
BS	6717	Precast concrete paving blocks.
BS	7263	Precast concrete flags, kerbs, channels, edgings and quadrants.
BS	7533	Structural design of pavements constructed with clay or concrete block pavers.

## **Addresses and Telephone Numbers.**

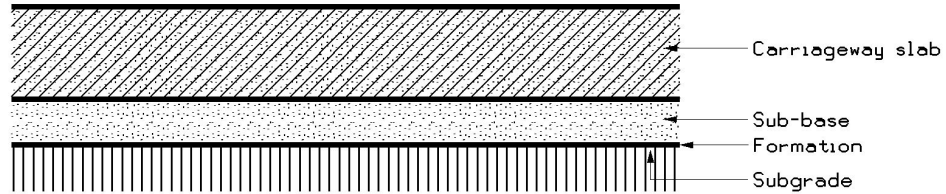
Here is the list of addresses of other City Council Departments and Divisions that a developer/builder may have to contact: -

<b>Parks Section</b>	}	<b>Civic Offices,</b>
<b>Planning Department</b>		<b>Wood Quay,</b>
<b>Road Planning Division</b>		<b>Dublin 8.</b>
<b>Main Drainage Division</b>		<b>Tel: 2222222</b>

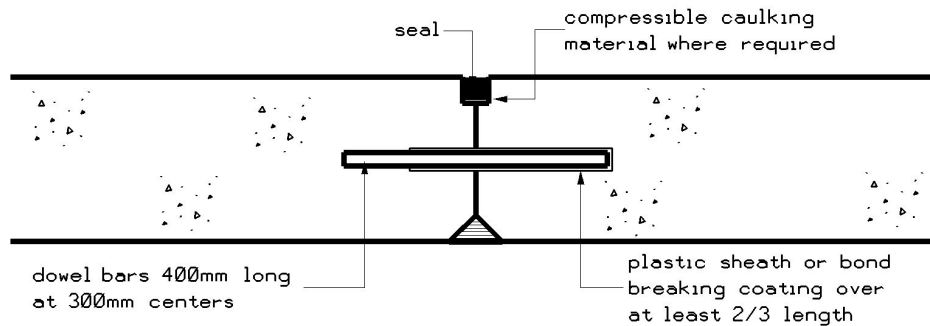
**Public Lighting Division - 61-64 Marrowbone Lane, Dublin 8.**  
**Tel: 2224400.**

**Waterworks Division - Marrowbone Lane, Dublin 8.**  
**Tel: 2224300.**

# CONCRETE CARRIAGEWAYS (see Clauses 2.8,2.10)



## CONCRETE CARRIAGEWAY CONSTRUCTION DRAWING No.2.1

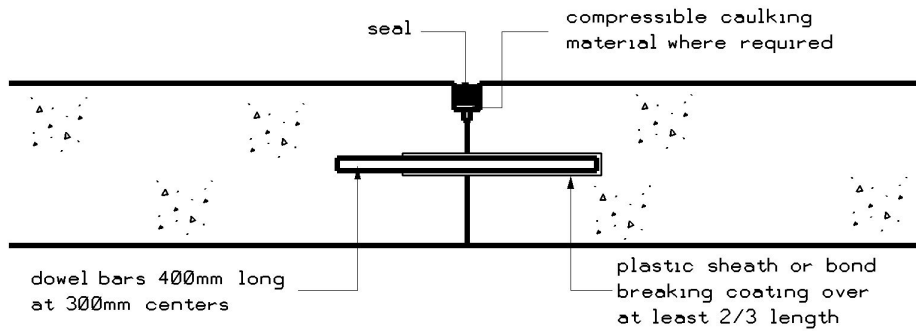


Note: Combined depth of top groove and bottom crack inducer should be between  $\frac{1}{3}$  and  $\frac{1}{4}$  slab depth (a) with surface groove and bottom crack inducer.

### CONTRACTION JOINT

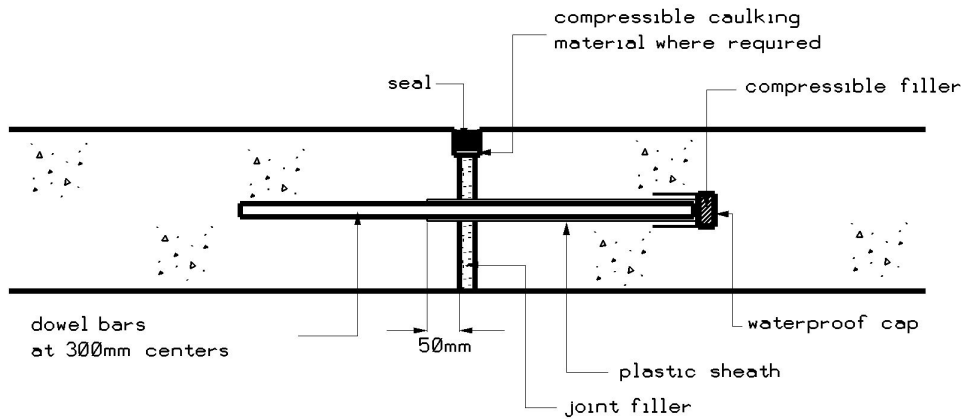
## JOINTS CONCRETE CARRIAGEWAYS DRAWING No.2.2 ( Sheet 1 )





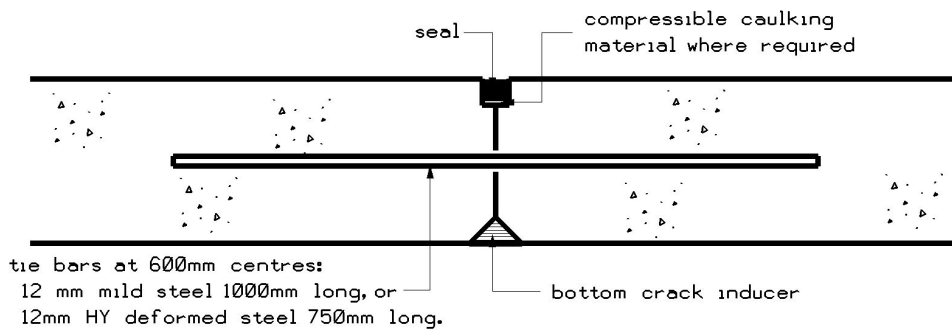
Note: Combined depth of top groove and bottom crack inducer should be between  $\frac{1}{3}$  and  $\frac{1}{4}$  slab depth (a deep surface groove (this detail applies to all sawn grooves and also to summer work wet-formed grooves)

### CONTRACTION JOINT



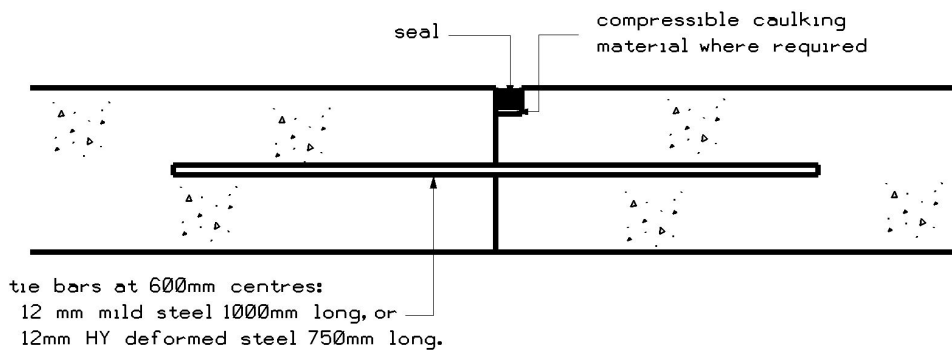
### EXPANSION JOINT

## JOINTS CONCRETE CARRIAGEWAYS DRAWING No.2.2 ( Sheet 2 )



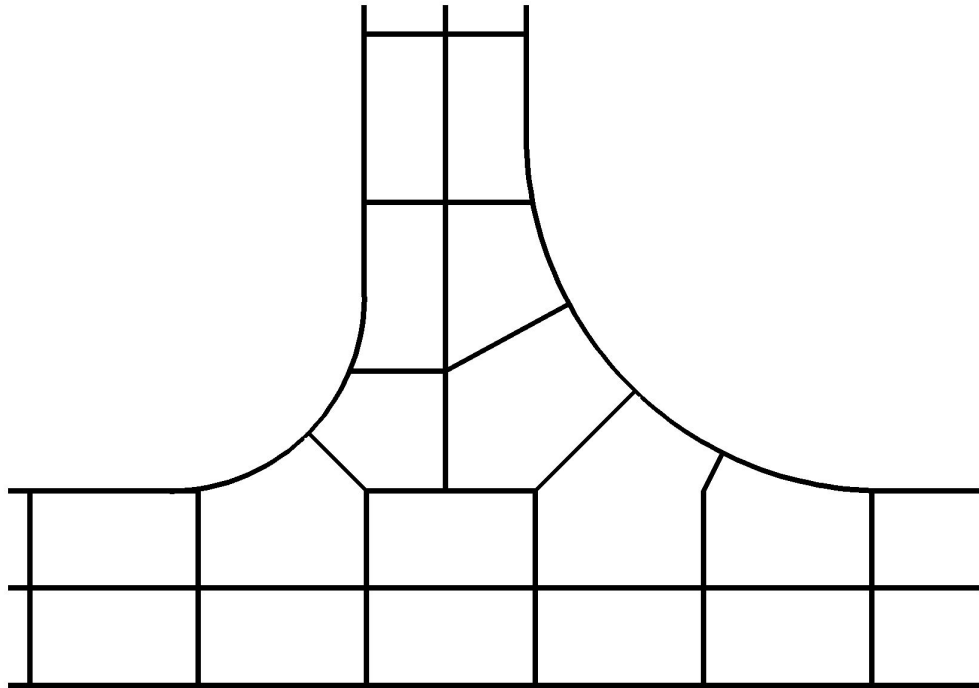
Note: Combined depth of top groove and bottom crack inducer should be between  $\frac{1}{3}$  and  $\frac{1}{4}$  slab depth

### LONGITUDINAL JOINT WITHIN THE CONSTRUCTION WIDTH

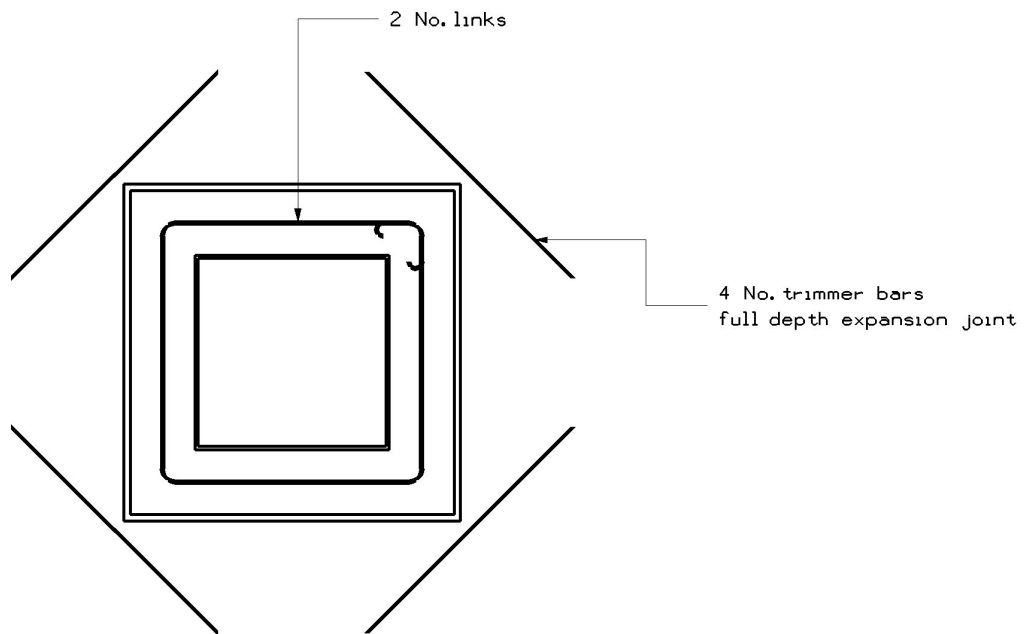


### LONGITUDINAL JOINT AT ABUTTING SLAB INTERFACES

## JOINTS CONCRETE CARRIAGEWAYS DRAWING No.2.2 ( Sheet 3 )



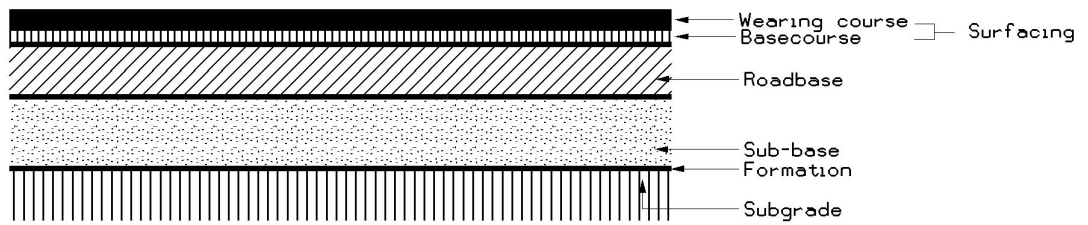
SLAB JOINTS AT ROAD JUNCTION



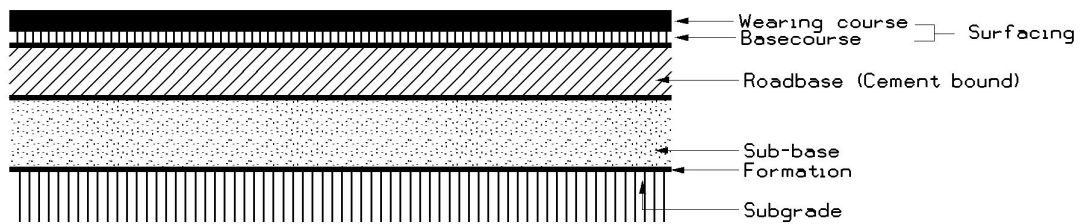
TYPICAL DETAIL AT MANHOLE

JUNCTION BAY LAYOUT  
DRAWING 2.3

# FLEXIBLE CARRIAGEWAYS (see Clauses 2.8,2.9 and 2.11)

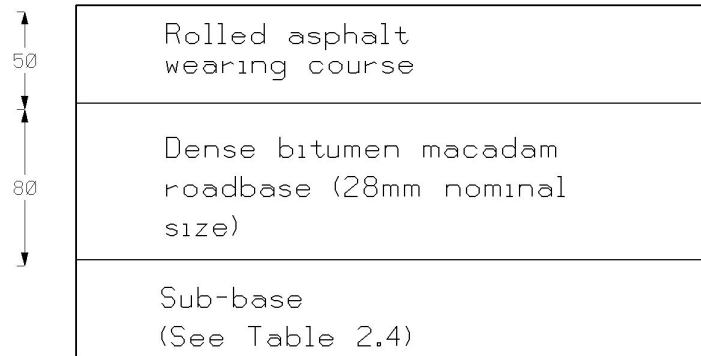


FLEXIBLE CARRIAGEWAY CONSTRUCTION  
DRAWING No.2.4

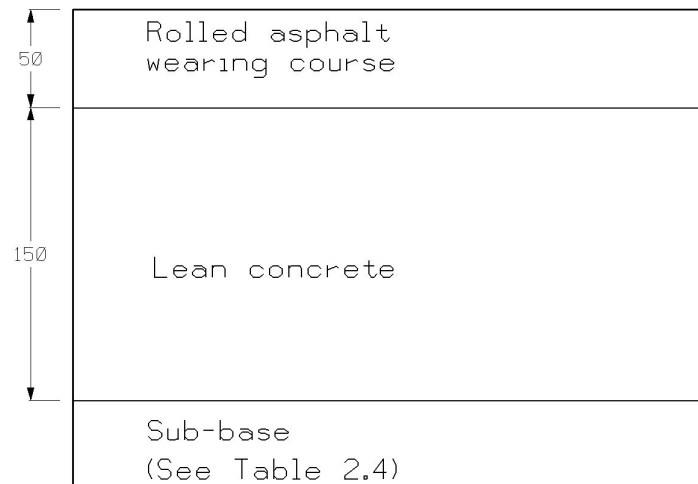


FLEXIBLE COMPOSITE CARRIAGEWAY CONSTRUCTION  
DRAWING No.2.5

### OPTION 1



### OPTION 2

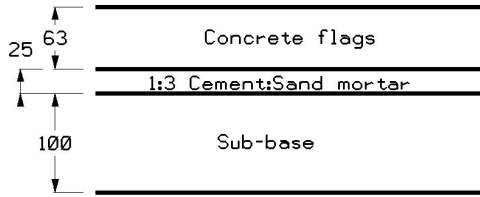


## CONSTRUCTION OPTION FOR FLEXIBLE & FLEXIBLE COMPOSITE CARRIAGEWAYS DRAWING 2.6

RM21071a

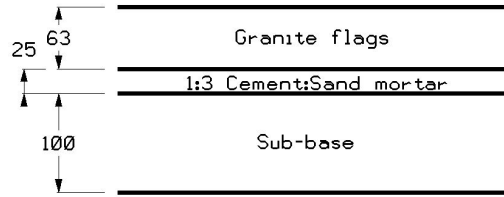
# FOOTWAYS (see Clauses 2.8,2.9 and 2.15)

Nominal width 3mm joints grouted with 1:3 Cement:sand mortar



(a) PRECAST CONCRETE FLAGGED FOOTWAYS

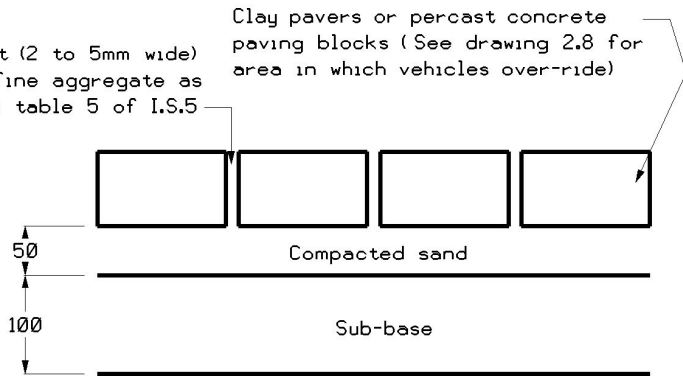
Joints (max. with 10mm) grouted with 1:3 cement:sand mortar and pointed



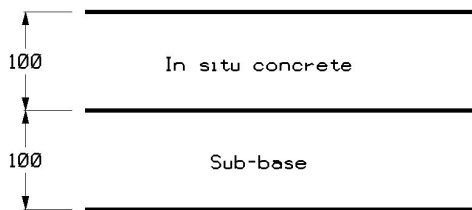
(b) GRANITE FLAGGED FOOTWAYS

Joints hand tight (2 to 5mm wide) and filled with fine aggregate as per grading F in table 5 of I.S.5

Clay pavers or precast concrete paving blocks (See drawing 2.8 for area in which vehicles over-ride)



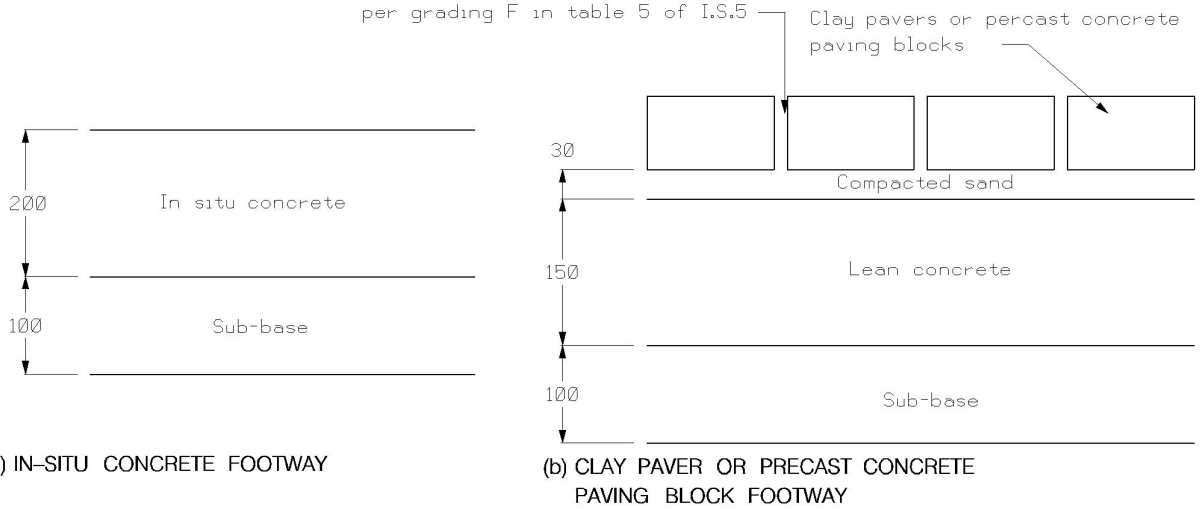
(d) CLAY PAVER OR PRECAST CONCRETE PAVING BLOCK FOOTWAY



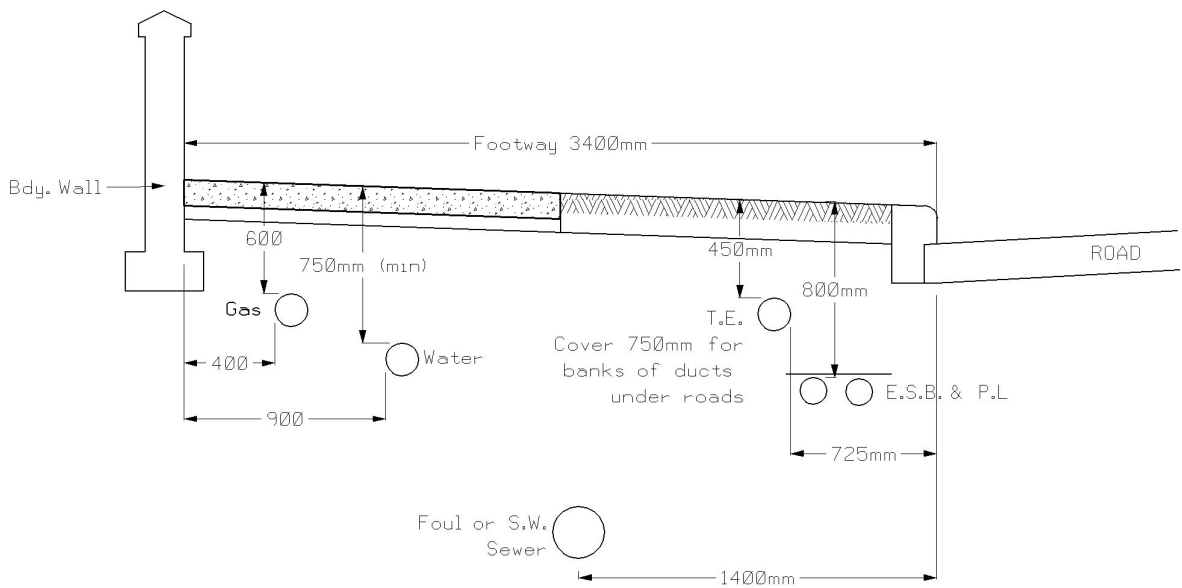
(c) IN-SITU CONCRETE FOOTWAY

## FOOTWAYS AT GENERAL LOCATIONS Drawing No.2.7

Joints hand tight (2 to 5mm wide)  
and filled with fine aggregate as  
per grading F in table 5 of I.S.5



### FOOTWAYS AT VEHICULAR CROSSINGS OR ON WHICH VEHICLES ARE LIKELY TO BE PARKED Drawing No.2.8

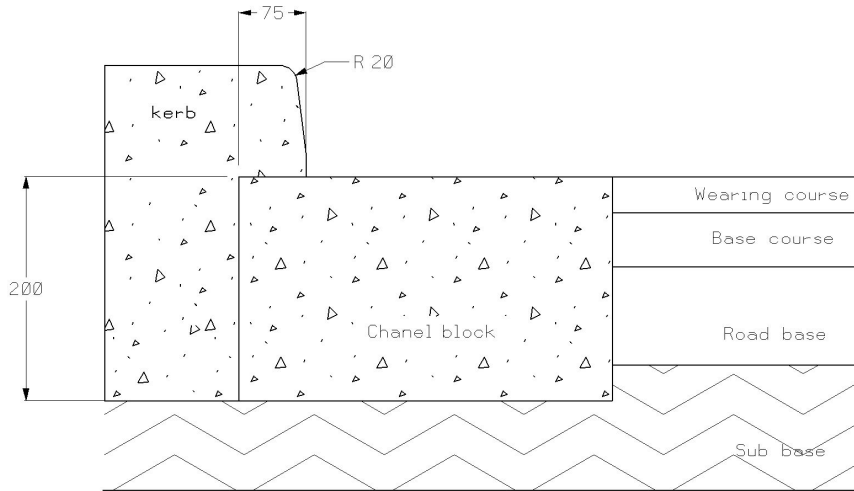


Gas cover in c/w -750mm min

Lateral or radial spacing between  
H.T.-E.S.B. and T.E. cable to be 650mm and  
L.T.-E.S.B. and T.E. cable to be 450mm

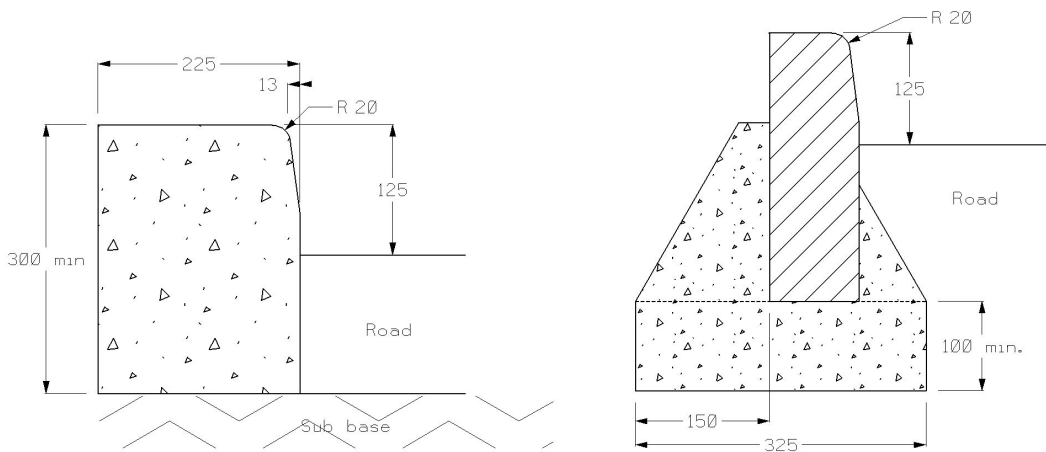
### LAYOUT SHOWING SERVICES IN FOOTWAYS

# KERBS (see Clauses 2.16)



IN-SITU CONCRETE KERBS

NOTE: Expansion and construction joints in kerb to match joints in roads and footways



IN-SITU CONCRETE KERBS

GRANITE KERB ON PERPARED FOUNDATION

## KERBS Drawing No.2.9

RM21071a