

TRANSPORT FOR NSW (TfNSW)
QA SPECIFICATION R15
KERBS AND CHANNELS (GUTTERS)

NOTICE

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REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 4/Rev 0	Various Foreword 1.2 5 Annexure R178/1	Text revised to direct imperative style. "Superintendent" replaced by "Principal"; "shall" replaced by "must". Reformatting and minor editing. Minor editorial changes. New clause after the Table of Contents. New clause, references transferred to Annexure R15/M. Transferred to Annexure R15/B. Renumbered Annexure R15/L.	GM, RNIC	05.10.05
Ed 4/Rev 1	"Notice" Foreword Global 1.2	RTA PO Box and Fax numbers updated. Copyright clause added. Reformatting, minor editorial changes, corrections of minor errors. Sub-clauses 1.2.1, 1.2.2 and 1.2.3 renumbered.	GM, IC	12.05.09
Ed 4/Rev 2	2	Words "Where directed by Principal" added to requirement to provide a broomed finish to top of kerb.	GM, IC Bernie Chellingworth	15.01.10
Ed 4/Rev 3	Guide Notes 2	Technical Ref Notes, Clause 2, Joints – Statement on provision of regular expansion joints alongside flexible pavements deleted. Table 1, Joints – requirements for expansion joints/isolation joints clarified.	MCQ	11.07.19
Ed 4/Rev 4	Global	References to "Roads and Maritime Services" or "RMS" changed to "Transport for NSW" or "TfNSW" respectively.	DCS	22.06.20

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 5/Rev 0	Global	Specification title changed. Term “gutter” replaced by “channel” in text.	EDCS	21.08.20
	Guide Notes	Guide Notes revised.		
	1.1	Scope expanded to cover profile transitions, vehicular crossings, kerb ramps, and no fines concrete pad. Work not in scope added.		
	1.3	New clause added for definitions and acronyms.		
	2	New clause on material requirements for granular material, concrete and steel reinforcement, no fines concrete and geotextile, modular drainage product, preformed joint filler, and joint sealant.		
	2.5	Only approved modular drainage products are to be used. MDPs may be proposed for use where not shown on the Drawings.		
	3	Previously clauses 2, 3 and 4 combined and rewritten for clarity. Previously Table R15.1 replaced by detailed requirements under this clause. Headings added to form lower tier clauses.		
	3.1	General construction requirements added.		
	3.2	New clause on removal of existing elements added.		
	3.3.2	New sub-clause on no fines concrete pad beneath the K&C.		
	3.4	Excavation of extra width of cutting may be proposed to enable K&C construction.		
	3.5	New clause on steel reinforcement added.		
	3.6	New clause on profiles and dimensions added.		
	3.7	Hold Point in TfNSW R53 for concrete placing referenced.		
	3.8.1	New sub-clause on general requirements for joints added. Reference to AS 2876 for forming and preparing joints added.		
	3.8.2 (a), Annex A1	Reference to project specific requirements for longitudinal joint with flexible pavement added.		
	3.8.2 (b)	Longitudinal joint with rigid pavement base to be corrugated only where shown on Drawings.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 5/Rev 0 (cont'd)	3.8.4 (b)	Tolerance of 15 mm at intersection point of joints in base and K&C deleted. Alignment of joint in K&C reworded, to accord with Standard Drawings.		
	3.8.5, Annex A2	Reference to project specific requirements for additional expansion joints added.		
	3.9	Broomed finish and its direction specified for vehicular crossings and kerb ramps. Protection of concrete from rain until final set added.		
	3.10	New clause on modular drainage product type drains added.		
	4	New clause on conformity added. Headings added to form lower tier clauses.		
	4.1	Reference to AS 2876 for tolerances added.		
	Annex A	New annexure on job specific requirements added.		
	Annex B	Existing Pay Item revised, and new Pay Items added. Clarified that profile transitions include transitions to lintels.		
	Annex D	New annexure on planning documents added.		
	Annex L	Table reformatted and content reworded.		
Annex M	Referenced documents updated.			

GUIDE NOTES
(Not Part of Contract Document)

USING SPECIFICATION R15

1. Removal of Existing Elements

Refer Clause 3.2 and Annexure R15/B.

Existing kerb and channel (K&C) and other elements to be removed must be clearly shown on the Drawings.

The Project Manager should determine the various types of elements required to be removed for the project and delete or populate pay items as appropriate, e.g. assign pay items to each of the different element types in Annexure R15/B.

2. Kerb and Channel in Relation to Pavement

K&C may be constructed in conjunction with rigid (concrete) pavement or flexible pavement. These elements may be constructed either alongside, or on top of, the pavement, and either before or after construction of the pavement.

Where K&C is to be constructed alongside an existing flexible pavement, the Project Manager should enter any applicable project specific requirements in relation to this in Annexure R15/A. Further guidance notes are given in Annexure R15/A.

3. Expansion Joints

Refer Clause 3.8.5.

The Project Manager should ensure that all the project specific requirements on expansion joints are specified either on the Drawings or in Annexure R15/A.

Expansion joints must be provided in K&C at all locations where K&C abuts rigid structures, and also where vehicular crossings and kerb ramps abut K&C or concrete pavement.

Where other circumstances require the provision of additional expansion joints, e.g. construction of K&C in winter, the Project Manager should specify these additional joints in Annexure R15/A2.



KERBS AND CHANNELS (GUTTERS)

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VERSION FOR: DATE:

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FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW R15 Edition 4 Revision 4.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes are indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

TfNSW QA SPECIFICATION R15

KERBS AND CHANNELS (GUTTERS)

1 GENERAL

1.1 SCOPE

This Specification sets out the requirements for construction of concrete kerbs and channels (K&C), including profile transitions, vehicular crossings and kerb ramps.

It also includes the no fines concrete pad beneath the K&C where shown on the Drawings.

The requirements for construction of stormwater drainage systems, including the requirements for supply of manufactured drainage products are set out in Specification TfNSW R11.

1.2 STRUCTURE OF SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.2.1 Project Specific Requirements

Project specific details of work are shown in Annexure R15/A.

1.2.2 Measurement and Payment

The method of measurement and payment is detailed in Annexure R15/B.

1.2.3 Planning Documents

The PROJECT QUALITY PLAN must include each of the documents and requirements listed in Annexure R15/D and must be implemented.

1.2.4 Frequency of Testing

The Inspection and Test Plan must nominate the proposed frequency of testing to verify conformity of the item, which must not be less than the frequency specified in Annexure R15/L. Where a minimum frequency is not specified, nominate an appropriate frequency. Frequency of testing must conform to the requirements of Specification TfNSW Q.

You may propose to the Principal a reduced minimum frequency of testing. The proposal must be supported by a statistical analysis verifying consistent process capability and product characteristics. The Principal may vary or restore the specified minimum frequency of testing, either provisionally or permanently, at any time.

1.2.5 Referenced Documents

Unless otherwise specified, the applicable issue of a referenced document, other than a TfNSW Specification, is the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1234). For convenience, the full titles are given in Annexure R15/M.

1.3 DEFINITIONS AND ACRONYMS

1.3.1 Definitions

The terms “you” and “your” mean “the Contractor” and “the Contractor’s” respectively.

The following definitions apply to this Specification:

Profile transition A length of K&C with a varying profile (i.e. cross-sectional shape), connecting K&C of different profiles at each end.

1.3.2 Acronyms

K&C Kerb and channel

MDP Modular drainage product

2 MATERIALS

2.1 GRANULAR MATERIAL

Granular materials must be as shown on the Drawings, and conform to the applicable specifications.

2.2 CONCRETE AND STEEL REINFORCEMENT

Concrete and steel reinforcement must conform to Specification TfNSW R53.

2.3 NO FINES CONCRETE AND GEOTEXTILE

No fines concrete must be Grade NFC SD conforming to Specification TfNSW 3222.

Geotextile must conform to Specification TfNSW R63.

2.4 MODULAR DRAINAGE PRODUCTS

Modular drainage products (MDP), where shown on the Drawings, must be TfNSW approved products.

Details of TfNSW approved MDP can be found at:

<https://www.rms.nsw.gov.au/business-industry/partners-suppliers/approved-products-materials/drainage-products/modular-drainage.html>

2.5 PREFORMED JOINT FILLER

Prefomed joint fillers must comply with Specification TfNSW 3204.

2.6 JOINT SEALANT

Joint sealant must be silicone sealant conforming to Specification TfNSW R83.

3 CONSTRUCTION

3.1 GENERAL

Construct K&C, profile transitions (including transitions to lintels), vehicular crossings and kerb ramps at the locations, and to the levels and dimensions, shown on the Drawings within the tolerances specified.

Align kerb ramps with the desired direction of pedestrian travel, unless shown otherwise on the Drawings.

3.2 REMOVAL OF EXISTING ELEMENTS

Remove existing kerbs, channels, profile transitions, vehicular crossings and kerb ramps where specified or shown on the Drawings. Sawcut where necessary to provide a neat surface at the joint. When removing these elements, do not cause damage to adjacent elements which are to be left intact.

Re-use the removed elements in the Works, recycle or dispose of them off Site in accordance with Specification TfNSW G36.

Backfill the void remaining after removal of existing elements with sound material to prevent the infiltration and ponding of water, unless specified otherwise. Compact the backfill material to at least the relative compaction of the existing material in the adjacent ground.

3.3 SUPPORTING LAYER PREPARATION AND NO FINES CONCRETE PAD

3.3.1 Supporting Layer Preparation

Compact subgrade, unbound granular subbase and base layers supporting the K&C to the standard specified for these layers.

3.3.2 No Fines Concrete Pad

Construct the no fines concrete pad (beneath the K&C), including installing a geotextile around the pad, where shown on the Drawings.

Implement measures during placing to prevent segregation and formation of a slurry layer at the surface of the concrete.

3.4 KERB AND CHANNEL AT TOE OF CUTTING

Do not undercut the batters of cuttings to allow the construction of K&C, unless authorised by the Principal.

Where necessary, you may propose for the Principal's approval to locate the toe of batters further from the pavement, by excavating an extra width within the cutting, but the Principal is not bound to accept your proposal.

Include in your proposal the extra width required and any changes in batter slope to accommodate the depth of the K&C, the thickness of the subbase or other bedding material and/or the clearance required by the concrete placing plant.

3.5 STEEL REINFORCEMENT

Provide steel reinforcement such as tiebars, to the K&C as shown on the Drawings.

Provide a minimum cover for the steel reinforcement in accordance with TfNSW R53, unless shown otherwise on the Drawings.

Provide kerbs which are placed on top of a concrete base with ties as shown on the Drawings.

3.6 PROFILES AND DIMENSIONS

Construct K&C to the profiles and dimensions as shown on the Drawings.

Construct profile transitions at the locations shown on the Drawings.

Where the K&C is placed first before the concrete base is placed alongside, and the lip is to be level with the upper surface of the base, the radius of the lip of the channel adjacent to the base must not exceed 5 mm, notwithstanding any larger radius shown on the Drawings. This requirement does not apply when the lip is to be above the upper surface of the base to allow for an asphalt wearing course.

3.7 CONCRETE PLACING

Unless otherwise specified, supply, place, compact, finish and cure concrete K&C in conformity with TfNSW R53. The Hold Point in TfNSW R53 for placing of concrete applies.

You may construct K&C either by manual placing using fixed forms, or by machine-placing either by extrusion (dry mix and ramming) or slipforming (wet mix and vibration), unless otherwise specified. Do not place by extrusion K&C which are located alongside, and tied to, a concrete base.

Where the K&C is to be constructed integrally with a concrete base, construct the K&C to the same requirements as that specified for the base.

3.8 JOINTS

3.8.1 General

Form and prepare joints in conformity to AS 2876.

Provide joints in K&C of the type and at the locations shown on the Drawings or as specified in Annexure R15/A, except that where the concrete base alongside has untied transverse joints, such untied transverse joints in the concrete base must continue across into the K&C alongside in the same joint type. Tied transverse joints in the concrete base do not need to continue across into the K&C.

(Untied transverse joints in the concrete base are contraction joints, while tied transverse joints in the concrete base are construction joints.)

Seal the joints in the K&C with the sealant specified in Clause 2.6.

3.8.2 Longitudinal Joint With Base

(a) With Flexible Pavement Base

Where K&C is to be constructed alongside an existing flexible pavement, conform to the requirements shown on the Drawings or specified in Annexure R15/A1.

(b) With Rigid Pavement Base

Where the K&C is not placed integrally with the concrete base, the longitudinal joint between K&C and the concrete base must be continuous over the full length without steps or offsets and must not deviate from a 3 m straightedge by more than 20 mm after due allowance for planned curvature.

The longitudinal joint must be tied, and corrugated only where shown as such on the Drawings.

3.8.3 Sealing of Transverse Joints in Concrete Base

Where the K&C is constructed after the concrete base (whether constructed on top of or alongside the base), complete the sealing of transverse joints in the base prior to placing the K&C, to prevent the ingress of mortar into joints.

In the latter case, where the K&C is constructed alongside the base, when sealing the transverse joint in the base, extend the sealant all the way down the joint at the exposed vertical face of longitudinal joint (between the K&C and base), including the crack beneath the sawcut groove if the crack width exceeds 1 mm.

3.8.4 Location and Alignment of Transverse Joints in Kerb and Channel

(a) Kerb on Top of Concrete Base

Where the kerb is placed on top of a concrete base, align each transverse joint in the K&C exactly (i.e. coincident) with the joint in the underlying base.

(b) Kerb and Channel Alongside Concrete Base

Where the K&C is placed alongside a concrete base, locate the transverse joint in the K&C such that it meets the transverse joint in the base at the common longitudinal joint.

Align the transverse joints in the K&C at right angles to the longitudinal alignment of the K&C, as shown on Standard Drawing DS2012/001191 Sheet No 14.

3.8.5 Expansion Joints

Provide expansion joints in K&C at all locations where the K&C abuts structures such as drainage pits, retaining walls and bridges, and where shown on the Drawings or specified in Annexure R15/A2.

Provide expansion joints at the locations where vehicular crossings and kerb ramps adjoin kerbs, channels and concrete paving to the full depth of vehicular crossings and kerb ramps, unless otherwise approved by the Principal.

Install a preformed joint filler conforming to Clause 2.6 within the expansion joint.

3.9 SURFACE FINISH

Unless shown otherwise on the Drawings, provide a steel float finish to channel inverts and faces of kerbs and a broomed finish to vehicular crossings and kerb ramps. Where directed by the Principal, provide a broomed finish to the tops of kerbs.

Direction of brooming must be transverse to the direction of travel on these elements.

Protect the concrete surface from rain during and after surface finishing and until final set.

3.10 MODULAR DRAINAGE PRODUCT TYPE DRAINS

Install MDP type drains at the locations shown on the Drawings.

You may submit for approval by the Principal the use of MDP where they are not shown on the Drawings, but the Principal is not bound to accept your proposal.

Include in your proposal evidence that all other options for drainage have been considered, implications on flow if grated drains are not to be installed and verification that the proposed system is fit for purpose.

4 CONFORMITY

4.1 TOLERANCES

All finished surfaces must conform to the lines, levels, grades, thicknesses and cross sections shown on the Drawings within the specified tolerances.

The tolerances stated in AS 2876 for irregularities in the bedding layer, level of the bedding layer, horizontal alignment, level, deviation from a 3 m straightedge, deviation on vertical curves, and profile dimensions also apply, except that the level of the constructed channel lip must not vary by more than 0 mm above or 10 mm below the adjoining pavement surface at any point.

4.2 FREQUENCY OF TESTING

The minimum frequency of testing must be in accordance with Annexure R15/L.

ANNEXURE R15/A – PROJECT SPECIFIC INFORMATION

Refer to Clause 1.2.1.

A1 LONGITUDINAL JOINT WITH EXISTING FLEXIBLE PAVEMENT

NOTES TO TENDER DOCUMENTER: (Delete this boxed text after completing Annexure R15/A1)

Insert in Table R15/A1 below any additional requirements when a K&C is to be constructed alongside an existing flexible pavement, such as requirements for preparation of the longitudinal joint.

If no K&C is to be constructed alongside an existing flexible pavement, delete this clause in its entirety and replace the heading with “(Not Used)”.

Table R15/A1 - Additional Requirements for Longitudinal Joint with Existing Flexible Pavement

Location	Requirements

A2 ADDITIONAL EXPANSION JOINTS

NOTES TO TENDER DOCUMENTER: (Delete this boxed text after completing Annexure R15/A2)

Insert in Table R15/A2 any additional expansion joints which may be required to:

- prevent damage that may be caused by restraining structures;*
- accommodate expansion in K&C adjoining flexible pavement in inland areas with large difference between annual maximum and minimum temperatures;*
- accommodate expansion where kerb construction is expected to be carried out during the cooler part of the year.*

Under “Location” insert description of where every additional expansion joint must be created.

Under “Requirements” insert dimensions and number/frequency of expansion joints.

If additional expansion joints are not required, delete this clause in its entirety and replace the heading with “(Not Used)”.

Table R15/A2 - Additional Expansion Joints

Location	Requirements

ANNEXURE R15/B – MEASUREMENT AND PAYMENT

Refer to Clause 1.2.2.

Payment will be made for all costs associated with completing the work detailed in this Specification in accordance with the following Pay Items.

Where no specific pay items are provided for a particular item of work, the costs associated with that item of work are deemed to be included in the rates and prices generally for the Work Under the Contract.

Unless specified otherwise, a lump sum price for these items will not be accepted.

Pay Item R15P1 - Kerbs and Channels

The unit of measurement is the “lineal metre” measured along the length of the K&C, but excluding profile transitions, vehicular crossings and kerb ramps, and drainage pit lintels. Payment for drainage pit lintels will be made under Specification TfNSW R11.

The rate covers all costs associated with construction of K&C, including excavation, supporting layers preparation, forming, materials supply and placement, joint construction, finishing, and backfilling and compaction adjacent to the completed K&C.

Provide a separate rate for each type of K&C shown on the Drawings.

Pay Item R15P2 – Profile Transition

The unit of measurement is the “lineal metre” measured along the length of the profile transition.

The rate covers all costs associated with construction of profile transitions, including excavation, supporting layers preparation, forming, materials supply and placement, joint construction, finishing, and backfilling and compaction adjacent to the completed profile transition.

Provide a separate rate for each type of profile transition shown on the Drawings. The profile transitions include transitions to lintels but exclude the lintels.

Pay Item R15P3 – Vehicular Crossings

The rate covers all costs associated with construction of vehicular crossings, including excavation, supporting layers preparation, forming, materials supply and placement, joint construction, and finishing.

Pay Item R15P3.1 – Residential Vehicular Crossing

The unit of measurement is “each” residential vehicular crossing.

Provide a separate rate for each type of residential vehicular crossing specified on the Drawings.

Pay Item R15P3.2 – Commercial Vehicular Crossing

The unit of measurement is “each” commercial vehicular crossing.

Provide a separate rate for each type of commercial vehicular crossing specified on the Drawings.

Pay Item R15P4 – Kerbs Ramps

The unit of measurement is “each” kerb ramp.

The rate covers all costs associated with construction of kerb ramps, including excavation, supporting layers preparation, forming, materials supply and placement, joint construction, and finishing.

Provide a separate rate for each type of kerb ramp specified on the Drawings.

Pay Item R15P5 – Modular Drainage Products Type Drains

The unit of measurement is the “lineal metre”, measured along the centreline of the drain as the actual length laid.

The rate covers all costs associated with the construction of MDP type drains, including excavation, supporting layer preparation, materials supply and placement, joint construction, finishing and any connections, fittings and markers where necessary.

Provide a separate rate for each type of modular drainage product specified on the Drawings.

Pay Item R15P6 – No Fines Concrete Pad (Beneath Kerb and Channel)

Pay Item R15P6.1 – No Fines Concrete

The unit of measurement is the compacted “cubic metre”, computed from the length, width and depth of the pad, as shown on the Drawings.

The rate covers all costs associated with construction of no fines concrete pad, including excavation, forming, materials supply and placement, and finishing.

Pay Item R15P6.2 – Geotextile

The unit of measurement is the “square metre”, computed using the length, and cross sectional width and depth (including any overlaps), as shown on the Drawings.

The rate covers all costs associated with the supply and installation of the geotextile.

Pay Item R15P7 – Removal of Existing Elements

The rate covers all costs associated with the removal (including any sawcutting required) and re-use, recycling or lawful disposal of the K&C outside the Site and costs of applicable licences and tipping fees and backfilling of the remaining void.

Pay Item R15P7.1 – Kerbs and Channels

The unit of measurement is the “lineal metre”, measured along the length of K&C removed, but excluding profile transitions, kerb ramps and vehicular crossings.

Provide a separate rate for each type of K&C to be removed.

Pay Item R15P7.2 – Profile Transitions

The unit of measurement is the “lineal metre”, measured along the length of profile transition removed.

Provide a separate rate for each type of profile transition to be removed.

Pay Item R15P7.3 – Vehicular Crossings

The unit of measurement is “each” vehicular crossing removed.

Pay Item R15P7.4 – Kerb Ramps

The unit of measurement is “each” kerb ramp removed.

ANNEXURE R15/C – (NOT USED)

ANNEXURE R15/D – PLANNING DOCUMENTS

Refer to Clause 1.2.3.

The following documents are a summary of documents that must be included in the PROJECT QUALITY PLAN. Review the requirements of this Specification and other contract documents to determine any additional documentation requirements.

Clause	Description of Document
3.7	Details of equipment and methods for placing and finishing K&C and other elements.
3.9	Details of measures to protect plastic concrete if rain does occur.

ANNEXURES R15/E TO R15/K – (NOT USED)

ANNEXURE R15/L – MINIMUM FREQUENCY OF TESTING

Refer to Clause 1.2.4.

Clause	Characteristic Analysed	Test Method	Minimum Frequency of Testing
3.3, 4.1	Bedding layer:	AS 2876, Survey	Every 10 m
	Surface irregularities		
	Level		
3.6, 4.1	Profile dimensions:	AS 2876	
	Using fixed forms		Every 10 m
	Machine placed		Once for each batch of concrete delivered
4.1	Finished K&C:	AS 2876, Survey	Every 10 m
	Horizontal alignment		
	Level		
	Deviation from 3 m straightedge		
	Deviation on vertical curve		

ANNEXURE R15/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.5.

TfNSW Specifications

TfNSW G36	Environmental Protection
TfNSW Q	Quality Management System
TfNSW R11	Stormwater Drainage
TfNSW R53	Concrete for General Works
TfNSW R83	Concrete Pavement Base
TfNSW 3204	Preformed Joint Fillers for Concrete Road Pavements and Structures
TfNSW 3222	No Fines Concrete (for Subsurface Drainage)

Australian Standards

AS 2876	Concrete kerbs and channels (gutters) – Manually or machine placed
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