

TRANSPORT FOR NSW (TfNSW)

QA SPECIFICATION R38

EDGE DRAINS

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REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 3/Rev 0	Various Foreword 1.2 5 3, 4, R38/1, R38/2 R38/3	Text revised to direct imperative style "Superintendent" replaced by "Principal" "Shall" replaced by "must" References updated Reformatting and minor editing New clause after the Table of Contents New clause, references transferred to Annexure R38/M Transferred to Annexure R38/B Renumbered 4, 5, R38/E respectively Renumbered R38/L, R38/C respectively	GM, RNIC	14.10.05
Ed 3/Rev 1	4.3	Clause revised	GM, RNIC	18.05.06
Ed 3/Rev 2	"Notice" 5 Annex M	RTA PO Box and Fax numbers updated "ceramic pavement markers" replaced by "Type B (non-retroreflective) pavement markers complying with AS 1906.3". "a suitable epoxy adhesive" replaced by "an adhesive complying with AS 1906.3". Referenced documents updated.	GM, IC	31.03.09
Ed 3/Rev 3	Global 1.3	Clauses reworded to improve clarity. New clause: - Definitions of "you" and "your" included. - Definition of "pipe" moved to this clause from under "Scope".	GM, IC	14.01.10
Ed 3/Rev 4	4.5 Pay item R38P1	Clause on "Disposal of Surplus Excavated Material" added. Subsequent clauses renumbered as 4.6 and 4.7. Scope clarified to include backfilling of verge material and disposal of surplus excavated material.	GM, IC	28.05.10

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 3/Rev 4 (cont'd)	Annex E	Drawing numbers, clause references and Pay Item numbers updated.		
	Annex M	Referenced documents updated.		
Ed 4/Rev 0		Previous clause 1.2.4 "Drawings", clause 2.1 "Filter Material", clause 2.2 "Drainage Pipe", clause 2.3 "Geotextile", clause 3 "(Not Used)", clause 4.3 "Placement of the Geocomposite Plastic Strip Filter", clause 4.5 "Disposal of Surplus Excavated Material", clause 4.6 "Cleanouts" and Annex E deleted. Some clauses rearranged and renumbered.	GM, IC	16.05.11
	1.1	Reference to spec R33 for trench drains requirements added.		
	2	Graded macadam base deleted as a material for use.		
	3.1	Previous clause 4.1 retitled "Excavation" and requirements expanded.		
	3.2	New clause titled "Geotextile Installation" added.		
	3.3	Previous clause 4.2. Circumstance for omission of edge drain pipe added. Hold Point from previous Clause 4.4 "Backfilling" relocated here.		
	3.4	Previous clause 4.4. Rewritten. Method of placing no fines concrete to be detailed in Project Quality Plan. Hold Point relocated to Clause 3.3.		
	4	Previous Clause 4.7. Clause expanded with all clauses relating to batter outlets collated under sub-clause 4.2.		
	5	Physical marking replaced by GPS coordinates.		
	Annex B	Pay item numbers changed. Measurement and Payment description of excavation and backfill volumes changed. Pay items for "Plastic Strip Filter" changed to ""Rigid Strip Filter", Pay item for selected material backfill added, connection to trench drain outlet, cleanouts, aggregate filter material and graded macadam base deleted.		
	Annex C	Updated.		
	Annex D	New annexure for "Planning Documents" added.		
Annex L	Requirements changed.			
Annex M	Reference documents updated.			

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 4/Rev 1	5	Clarification of requirement to mark drains physically on site.	GM, IC	17.06.11
Ed 4/Rev 2	5	Clause reworded to improve clarity.	GM, CPS	24.09.13
Ed 4/Rev 3	2 Annex B	Headings added to form new (sub-)clauses 2.1 to 2.4. Pay Item P1 - Clarification added that no further payment will be made under R44 for excavation and backfilling work. Pay Item P2 – Scope of rate clarified. Pay Item P6 – word “batter” added.	MCQ	28.06.19
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



EDGE DRAINS

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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 R38 Edition 4 Revision 3.

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 R38

EDGE DRAINS

1 GENERAL

1.1 SCOPE

This Specification sets out the requirements for the supply and installation of all materials associated with the provision of edge drains.

The purpose of edge drains is to remove water in rigid pavements from the interface between the base and subbase. Edge drains may be used in combination with trench drains to reduce the total number of outlets for subsurface drains and/or to provide a greater flow capacity.

The requirements for trench drains are set out in Specification TfNSW R33.

1.2 STRUCTURE OF THE SPECIFICATION

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

1.2.1 Measurement and Payment

The method of measurement and payment is detailed in Annexure R38/B.

1.2.2 Schedules of HOLD POINTS and Identified Records

The schedules in Annexure R38/C list the **HOLD POINTS** that must be observed. Refer to Specification TfNSW Q for the definition of **HOLD POINTS**.

The records listed in Annexure R38/C are **Identified Records** for the purposes of TfNSW Q Annexure Q/E.

1.2.3 Planning Documents

The PROJECT QUALITY PLAN must include each of the documents and requirements shown in Annexure R38/D and must be implemented.

1.2.4 Minimum Frequency of Testing

The Inspection and Test Plan must nominate the proposed testing frequency to verify conformity of the item, which must not be less than the frequency specified in Annexure R38/L. Where a minimum frequency is not specified, nominate an appropriate frequency.

1.2.5 Referenced Documents

Unless specified otherwise or is specifically supplied by the Principal, the applicable issue of a referenced document, 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. TfNSW T166). For convenience, the full titles are given in Annexure R38/M.

1.3 DEFINITIONS

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

The term “pipe” in this specification must also apply to rigid strip filters where relevant.

2 MATERIALS

For each type of material, submit to the Principal the brand, the name of the supplier and compliance records at least seven (7) days prior to use.

2.1 CORRUGATED DRAINAGE PIPE AND STRIP FILTER DRAIN

Corrugated plastic drainage pipe (both perforated and non-perforated) must comply with Specification TfNSW 3552. Caps and other fittings must be in accordance with the manufacturer’s recommendations.

Rigid strip filter drains must comply with Specification TfNSW 3556.

2.2 GEOTEXTILE

Geotextile must comply with Specification TfNSW R63.

2.3 NO FINES CONCRETE

No fines concrete must be Grade NFC SD complying with Specification TfNSW 3222.

2.4 SELECTED MATERIAL

Selected Material at batter outlets must meet the requirements of Specification TfNSW R44 and must, in addition, have a maximum particle size not exceeding 50 mm.

3 INSTALLATION OF EDGE DRAINS

3.1 EXCAVATION

Excavate for the edge drain to the required line, grade, width and depth as shown on the Drawings or as directed by the Principal.

Where the edge drain is constructed in combination with a trench drain, excavate for the trench drain first to the required line, grade, width and depth in accordance with Specification TfNSW R33.

Construct the edge drain directly above and to the same width as the trench drain.

Unless otherwise specified, the bottom of the trench must be at the same grade as the roadway. Where the longitudinal grade of the roadway is less than 0.5%, provide a minimum grade of 0.5% by increasing the depth of the trench. Prevent any localised ponding of water from occurring in the trench. Compact the floor of the trench and remove any loose material.

Excavated material must be stockpiled and incorporated in the works or disposed of in accordance with the requirements of Specification TfNSW R44.

3.2 GEOTEXTILE INSTALLATION

Provide a geotextile at the locations shown on the Drawings. Provide overlaps of at least 100 mm or as shown on the Drawings.

Clean the face of the pavement base and subbase of any verge or other earth material before placing the protective geotextile against the base and subbase layers. When installing geotextile, do not allow loose material from trench walls or outside the trench to enter the excavation or drain.

Keep all geotextiles clean and secure the geotextiles to ensure that they are located as shown on the Drawings on completion of backfilling and placing of adjacent materials.

3.3 LAYING OF PIPE

Lay the pipe in the centre of the trench on a bed of no fines concrete 50 mm in thickness or as shown on the Drawings to the required line and grade.

Keep the number of joints to a minimum and connect the pipes with couplings complying with the manufacturer's recommendations.

Where the edge drain is combined with a trench drain, omit the edge drain pipe.

HOLD POINT

Process Held:	Covering of corrugated perforated plastic drainage pipe or perforated rigid strip filter drains with filter material.
Submission Details:	Verification that pipe laying and jointing are complete and conforming.
Release of Hold Point:	The Principal may inspect the drainage pipe in place for compliance with the Specification, prior to authorising the release of the Hold Point.

3.4 BACKFILLING

Backfill edge drains with no fines concrete grade NFC SD.

Compact the no fines concrete in the trench to its full depth and ensure that the pipe is not damaged or disturbed during compaction.

Detail in the PROJECT QUALITY PLAN your method of placing the no fines concrete to prevent segregation during placing and the formation of a slurry layer at the surface of the concrete which may prevent the passage of water into the filter material. The no fines concrete as placed must allow the free flow of water through it.

When placing and compacting verge material, do not damage or disturb the drain and drainage pipe.

4 OUTLETS

4.1 GENERAL

Provide outlets at the intervals as shown on the Drawings.

Where edge drains are not connected to adjacent trench drains, connect them directly to stormwater pits if stormwater pits are available.

Where it is not possible to connect edge drains to adjacent trench drains or stormwater pits, extend the edge drains through fill batters to discharge at batter outlets.

4.2 BATTER OUTLETS

Where the edge drain connects to batter outlets, the section of pipe outside the edge of the pavement through the fill batters must be the same type and size as those upstream but must be non-perforated.

For the non-perforated pipe in the fill batter, lay the pipe at the base of the trench. Taper the height above the base of the trench of the connecting section of perforated pipe, from zero to 100 mm, over a 2 m length.

Backfill the trench along this section of pipe with Selected Material compacted to a relative compaction of 95% as determined by Test Method TfNSW T166.

Construct a batter outlet structure at the discharge end in accordance with the Drawings. Locate the outlet so that erosion of the adjacent area does not occur, or protect it by placing selected stone in the splash zone.

5 MARKING OF DRAINS

During construction, physically mark out on site the inlets (or upstream ends where there are no distinct inlets) and outlets of all subsurface drains, to avoid damage to them during construction. Detail in the PROJECT QUALITY PLAN the method of marking these locations.

Mark on the work-as-executed drawings of the completed drainage system the GPS coordinates of the “start” and “finish” positions of the subsurface drains on relevant extracts of half-size drawings for the Works and submit them to the Principal within 28 days of completion of the subsurface drainage work. The GPS coordinates must be in WGS 84 format.

ANNEXURE R38/A – (NOT USED)

ANNEXURE R38/B – MEASUREMENT AND PAYMENT

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

The measurement of quantities excludes the work measured and paid for under TfNSW R33.

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

Pay Item R38P1 – Excavation

The unit of measurement is the “cubic metre”, measured as bank volume of excavation in all types of material.

The volume of excavation is computed from the length, depth and width of the trench, as shown on the Drawings or as directed by the Principal.

No payment will be made for any work as a result of over-excavation.

The rate covers all costs associated with excavation, handling, stockpiling and incorporation into the Works or disposal off site of the excavated material in accordance with the requirements of TfNSW R44. No further payment will be made for this work under TfNSW R44.

Pay Item R38P2 – Drainage Pipe

Pay Item R38P2.1 - 65 mm dia Corrugated Perforated Plastic Drainage Pipe

Pay Item R38P2.2 - 65 mm dia Corrugated Non-perforated Plastic Drainage Pipe

Pay item R38P2.3 - Perforated Rigid Strip Filter Drains

Pay Item R38P2.4 - Non-perforated Rigid Strip Filter Drains

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

The rate covers all costs associated with the supply and laying of the corrugated pipe or strip filter drains including any connections, fittings, geotextile wrapping (around the strip filter drain) and markers where necessary.

Geotextile wrapping around the filter material is paid under Pay Item R38P4.

Pay Item R38P3 – Filter Material - No Fines Concrete

The unit of measurement is the compacted “cubic metre”.

The volume is computed from the length, depth and width of no fines concrete filter material as shown on the Drawings or as directed by the Principal.

The rate covers all costs associated with the supply, placement and compaction of the no fines concrete filter material.

Pay Item R38P4 – Supply and Installation of Geotextile

The unit of measurement is the “square metre”, measured using the theoretical cross section shown on the Drawings and the length installed in place.

Measurement includes the areas of laps where shown on the Drawings except for the areas of laps required to provide a continuous length or width of geotextile.

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

Pay Item R38P5 – Selected Material Backfill at Outlets

The unit of measurement is the compacted “cubic metre”.

The volume is computed from the length, depth and width of Selected Material backfill as shown on the Drawings or as directed by the Principal.

The rate covers all costs associated with the supply, placement and compaction of the Selected Material.

Pay Item R38P6 – Batter Outlets

Pay Item R38P6.1 - Steep Batter Outlet

Pay Item R38P6.2 - Flat Batter Outlet

Steep batters are defined in Model Drawing MD.R33.A04 as steeper than 4(H):1(V).

The unit of measurement is “each” batter outlet provided in accordance with this Specification. The rate includes concrete, reinforcing bar and galvanized mesh cover.

Measurement for this work excludes those batter outlets for trench drains which are paid for under TfNSW R33.

ANNEXURE R38/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS

Refer to Clause 1.2.2.

C1 SCHEDULE OF HOLD POINTS

Clause	Description
3.3	Covering of corrugated perforated drainage pipe or rigid strip filter drains with filter material.

C2 SCHEDULE OF IDENTIFIED RECORDS

The records listed below are Identified Records for the purposes of TfNSW Q Annexure Q/E.

Clause	Description of Identified Record
2	Brand, supplier and compliance records for each type of material.
3.3	Verification that pipe laying and jointing are complete and conforming.

ANNEXURE R38/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. The requirements of this Specification and others included in the Contract must be reviewed to determine additional documentation requirements.

Clause	Description
3.4	Method of compacting no fines concrete filter material
5	Method of marking trench drains

ANNEXURES R38/E TO R38/K – (NOT USED)

ANNEXURE R38/L – MINIMUM FREQUENCY OF TESTING

Clause	Characteristic Tested	Test Method	Minimum Frequency of Testing
2	Material properties	As per relevant materials specifications	As per relevant materials specifications
4	Relative compaction of Selected Material adjacent to batter outlets	TfNSW T166	One per 15 batter outlets or part thereof

ANNEXURE R38/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.5.

TfNSW Specifications

TfNSW Q	Quality Management System
TfNSW R33	Trench Drains
TfNSW R44	Earthworks
TfNSW R63	Geotextiles (Separation and Filtration)
TfNSW 3222	No Fines Concrete (for Subsurface Drainage)
TfNSW 3552	Subsurface Drainage Pipe (Corrugated Perforated and Non-perforated Plastic)
TfNSW 3556	Rigid Strip Filter Drains

TfNSW Test Methods

TfNSW T166	Relative Compaction of Road Construction Materials
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