MIDCOAST
council

AUS-SPEC

Infrastructure Specifications

0243 Landscape – Water Features

0243 LANDSCAPE – WATER FEATURES

IMPORTANT: This document has been adapted from the NATSPEC suite of specification templates for use in the MidCoast Council area by both Council and industry. NATSPEC regularly updates the base templates (currently in April and October each year), and Council may incorporate changes into its version of AUS-SPEC from time to time. To assist in highlighting any changes made by Council to the NATSPEC templates, the following conventions are used.

- See ANNEXURE M at the end of this document which contains (where practical) MidCoast Council customisations (also known as 'office master' text). References to the Annexure are to also be inserted at relevant clauses in the main body of the document.
- Where content is added to the main body of the document, it is to be shown in brown text like this.
- Where content is deleted or excluded from the main body of the document, it is to be shown ~~struck through like this~~. Such clauses are to have no effect.

Where there is a conflict between main body text and MidCoast Council specific clauses, Council's specific clauses shall prevail.

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide water features, as documented.

Installation: Maintain the design intent for the pattern and flow of water.

Equipment: Maintain all equipment in full working order for the duration of the contract.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0136 General requirements (Construction).*
- ~~*0171 General requirements.*~~

1.3 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Anchor trench: A trench excavated around the perimeter of a water feature in which the edges of the geotextile and sheet membrane liner are buried and that diverts surface water runoff.
- Geotextile: A permeable synthetic fabric laid on soil, sand blinding, concrete or masonry substrates, serving to protect, separate, filter or drain.
- Membrane liner: The waterproof barrier between the water and the substrate and as follows:
  - . Seamless membrane liners: Low VOC emitting, single component, self curing liquid polymers applied directly to concrete or masonry substrates as a seamless film.
  - . Sheet membrane liners: Ultra-violet resistant, flexible sheet membranes installed on concrete, masonry or stable soil substrates and with seams lapped and sealed.
- Protective underlay and overlay: A layer of puncture resistant geotextile.
- Substrate: The surface to which a material or product is applied.
- Termination bar: A preformed strip for securing sheet membranes to wall substrates at their top termination line.
- Weir: The raised spillway of a waterfall or the opening on a skimmer inlet.

1.4 SUBMISSIONS

Products and materials

Requirement: Submit copies of product manufacturer's:

- Product technical data sheets.
- Safety data sheets (SDS).
- Installation, operating and maintenance instructions.
- Instructions and procedures for the repair of the membrane liner.
- Evidence of suitability of the membrane liner, protective underlay and overlay for the intended external application.

Type tests: Submit results, as follows:

- Seam strength.

Evidence of delivery: For supply-only (not installed) or installed concealed items, or where documented or otherwise requested by the Superintendent, submit delivery dockets as evidence of delivery,

Records

Membrane liner: Submit records of the following:

- Weather conditions during seaming and installation.
- Code number of each joint including:
  - . Name of operator.
  - . Machines used.
  - . Date and time of seaming.
  - . Ambient temperature during installation.

Samples

Requirement: Submit 300 x 300 mm samples of each type of geotextile and membrane liner.

Tests

Site tests: Submit results as follows:

- Water leakage testing of the membrane liner.

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties.**

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Hold Point: Substrate preparation completed.
- Hold Point: Membrane completed, before covering.
- Hold Point: Hydraulic and electrical services completed, before building in or covering.

2 PRODUCTS

2.1 MEMBRANE LINER

General

Membrane liner: A proprietary non-toxic, pH neutral membrane liner suitable for the intended external application.

Protective underlay and overlay: A proprietary protective underlay and overlay suitable for the intended external application.

- Geotextile: To AS 3705.

Accessories

Adhesives and sealants: Waterproof, flexible, mould-resistant and compatible with host materials.

Termination bar: Purpose made ultra-violet resistant high strength plastic or aluminium strips with a trapezoidal profile 28 mm x 3 mm and with pre-drilled holes for fixing.

2.2 WEIRS

Proprietary items
Complete proprietary assemblies: Complete assemblies of fixtures and fittings, as documented.
Customised proprietary assemblies: Customised fixtures and fittings, as documented.

2.3 FOUNTAINS AND CASCADES

Proprietary items
Complete proprietary assemblies: Complete assemblies of fixtures and fittings, as documented.
Customised proprietary assemblies: Customised fixtures and fittings, as documented.

2.4 EDGING AND PAVING

Mortar bedded units
General: Edging and paving, as documented.

2.5 ROCK WORK

General
Rock work: As documented.
Location: As documented.

2.6 ACCESSORIES

Submerged planting pots
General: Fixtures and fittings, as documented.
Location: As documented.
Submerged waterproof luminaires
General: Waterproof luminaires, as documented.
Location: As documented.

3 EXECUTION

3.1 SUBSTRATE PREPARATION

Earthworks
General: To *0222 Earthwork* worksection.
Bulk earthworks: As documented.
Site geotechnical conditions: Obtain advice from the structural engineer on subgrade bearing capacity and maximum gradients to prevent membrane liner slippage.
Subgrade: Excavate to the required contours without sudden changes in level or direction.
Subbase: Lay selected material over the subgrade and as follows:
- Compact to 150 mm minimum thickness.
- Remove all sharp objects, roots and stones over 50 mm in size.
- Finish with sand blinding 50 mm thick.

Perimeter anchor trench: Excavate a 600 x 600 mm trench at the perimeter crest of the water feature.
Ground surface and services: Complete the following before installing underlay, overlay and membrane liner layers:
- Install hydraulic and electrical services, as documented.
- Fill local depressions and remove water.

Concrete and masonry substrates
Preparation: Prepare substrates as follows:
- Chamfers and fillets:
  . Substrate external corners: 20 x 20 mm chamfered edges.
  . Substrate internal corners: 45° angled, 50 x 50 mm cement mortar fillets.
- Control joints: Prepare all substrate joints to suit the membrane liner installation.

- Fill all cracks in substrates wider than 1.5 mm with a filler compatible with the membrane liner.
- Fill voids and hollows in concrete substrates with a concrete mix not stronger than the substrate.
- Remove all projections.
- Cut mortar joints flush.
- Remove deleterious and loose material.
- Leave the surface smooth, free of contaminates, clean and dust free.

Concrete substrates: Cure for more than 28 days.

Moisture content

Requirement: Verify that the moisture content of the substrate is compatible with the water vapour transmission rate of the membrane system by testing to AS 1884 Appendix A.

Falls

Substrates, drains and sumps: > 1.5%.

3.2 SEAMLESS MEMBRANE LINER

Environmental conditions

Seamless membrane: Install to the manufacturer's recommendations including the following:

- Apply within the recommended range of ambient and surface temperatures.
- Adjust curing period for following coats to suit prevailing weather conditions.
- Protect from rain after installation.
- Protect from excessive sun exposure before water filling.

Application

Coating system: Apply the required number of coats for the selected seamless membrane liner.

Surface defects: Inspect the final surface coating when touch dry for pinholes, voids and thin spots.

Reinstatement: Repair faulty or damaged work. Replace the whole affected area if the work cannot be repaired satisfactorily.

Protective overlay: Spread geotextile layer, as follows:

- Laying: Spread evenly without wrinkles and free of tension.
- Lap widths: To the manufacturer's recommendations.

3.3 SHEET MEMBRANE LINER

Environmental conditions

Sheet membrane: Install to the manufacturer's recommendations including the following:

- Suspend laying and seaming operations in wet weather or during high winds.
- Do not leave the membrane liner uncovered overnight.

Installation

Laying: Spread protective underlay, membrane liner and protective overlay evenly without wrinkles and free of tension. Extend into the perimeter anchor trench. Avoid pulling out all slack in the lining.

Lap widths and joint types: To the manufacturer's recommendations.

Membrane liner:

- Water inlet locations: Provide a double membrane liner layer, lapped and sealed.
- Penetrations: Seal services penetrations to the membrane manufacturer's recommendations.
- Reinstatement: Repair faulty or damaged work. Replace the whole area affected, if the work cannot be repaired satisfactorily.

Perimeter anchor trench

Protective underlay and membrane liner: Insert free edges of protective underlay and membrane liner to inner wall of anchor trench and terminate at the trench floor. Make sure the top of the membrane liner is a minimum 150 mm below finished ground or paving level.

Protective overlay: Insert free edges of protective overlay in the anchor trench, covering the entire trench floor and extend up the trench outer wall and with sufficient excess for edge return.

Backfill: Provide coarse aggregate of crushed rock with a nominal size greater than 5 mm. Backfill to a minimum 150 mm below finished ground or paving level. Return edges of protective overlay to wrap over top of backfill.

Termination bar

Installation: Fix bars in the longest available lengths over the protective underlay and membrane liner as follows:

- Directly to hard, smooth wall surfaces with the narrow face of the trapezoidal bar against the wall.
- Fill the top trough on the bar with approved sealant.
- Provide a 6 mm gap between ends of adjacent bars.
- If field cutting is required, remove any burrs from the bar and progressively clean up shavings.

3.4 MEMBRANE PROTECTION

General

Soil: As documented.

Concrete: As documented.

Water filling

Requirement: Fill with water as soon as possible after installation is complete, at a rate that will not cause damage or disturbance to protective material, growing medium, or plants.

3.5 WEIRS

Structure

Retaining walls: As documented.

Masonry spillways

Materials and installation: As documented.

Metal spillways

Materials and installation: As documented.

Proprietary weirs

Installation: As documented.

3.6 FOUNTAINS AND CASCADES

Proprietary items

Installation: As documented, and to manufacturer's recommendations.

Reinstatement: Repair damage to underlay, membrane liner and overlay, caused by fountain and cascade installation, to the membrane manufacturer's recommendations.

3.7 EDGING AND PAVING

Mortar bedded units

Materials and installation: As documented.

3.8 ROCK WORK

Rock work assembly

Placement: Place rocks in water areas as follows:

- Set on a layer of geotextile and remove visible surplus material.
- Make sure there is no defacement of the natural weathered surface.

Placement pattern: Place rocks to achieve the following:

- Water movement requirement: As documented.

Rock work design: As documented.

3.9 ACCESSORIES

Submerged planting pots

Placement: Set on a layer of geotextile and remove visible surplus material.

Submerged waterproof luminaires

Placement: Secure waterproof luminaire fittings to stable rocks or pots, as documented.

3.10 TESTING

Water leakage test
General: Before the installation of any overlaying elements, carry out a water leakage test of the membrane liner.

Testing procedure: Carry out testing as follows:

- For evaporation standardisation, provide an open topped container not less than 1000 x 1000 mm in area and 300 mm deep. Place the container in the immediate vicinity of the water feature being tested. Fill the container with water to a marked depth of 200 mm. Label and protect the standardising container to prevent disturbance of the water.
- Fill the membrane liner with water to the design water depth at a rate not exceeding 100 mm depth per hour.
- Allow a minimum period of 7 calendar days to elapse.
- If the amount of water loss defeats the intent of the test, record the results, carry out repairs and repeat the test procedure.
- If there is no significant difference between the water level of the membrane liner and the standardising container, up to a maximum of 3 mm depth, the membrane liner is water retaining.

Records: Record all activities of the test and test results.

3.11 COMPLETION

Warranties
Waterproofing: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the applicator.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

4 SELECTIONS

The use of these schedules in addition to project Drawings on Council or private development works is optional, at the Superintendent's discretion.

4.1 PROPRIETARY ITEMS

Seamless membrane liner
Product: As documented.

Thickness: As documented.

Total VOC's: As documented.

Sheet membrane liner
Product: As documented.

Thickness: As documented.[complete/delete]

Membrane protection
Type: As documented.

Weir spillway
Stone: As documented.

Type: As documented.

- Product: As documented.
- Finish: As documented.
- Dimensions: As documented.

Masonry:

- Type: As documented.
- Product: As documented.
- Finish: As documented.
- Dimensions: As documented.

Metal:

- Description: As documented.
- Product: As documented.

Fountains and cascades

Complete proprietary assemblies: As documented.

Customised proprietary assemblies:

- Supplier: As documented.
- Jets (e.g. size, water pattern): As documented.
- Cascade nozzles (e.g. size, water pattern): As documented.

Pump:

- Product: As documented.

Other equipment which may include skimmer unit, filtration unit, UV steriliser, aeration pump, bottom drain:

- Product: As documented.

Edging and paving

Product: As documented.

Submerged planting pots

Product: As documented.

Supplier: As documented.

Size: As documented.

Submerged waterproof luminaires

Product: As documented.

5 REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1884 practices	2012	Floor coverings - Resilient sheet and tiles - Installation
AS 3705	2012	Geotextiles - Identification, marking, and general data

6 ANNEXURE M – MIDCOAST COUNCIL SPECIFIC CLAUSES

M1.	Variations to or non-conformances with Council's AUS-SPEC are to be evaluated with reference to the procedure in Council's *Development Engineering Handbook*. Acceptance is to be obtained in writing from: a) an authorised representative of Council's Director of Infrastructure and Engineering Services, or b) an accredited certifier where they are the Principal Certifier and hold the relevant accreditation category for the type of work.	**Variation procedure**
M2.	This specification applies in addition to any development consent (DA) conditions. If there is any inconsistency, the conditions of consent shall prevail.	**DA conditions**
M3.	Refer to the MidCoast Council *Development Engineering Handbook* for final inspection, works-as-executed and handover requirements.	**Completion**

7 AMENDMENT HISTORY

0	14/12/2020	First Published