



AUS-SPEC

Infrastructure Specifications

1112 Earthworks (Road Reserve)

1112 EARTHWORKS (ROAD RESERVE)

IMPORTANT: This document has been adapted from the NATSPEC suite of specification templates for use in the Cessnock City 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) Cessnock City 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 Cessnock City Council specific clauses, Council's specific clauses shall prevail.

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide earthworks for road reserve, as documented.

1.2 CROSS REFERENCES**General**

Requirement: This worksection is not a self-contained specification. In addition to the requirements of this worksection, conform to the following:

- 0136 *General requirements (Construction)*.
- 0152 *Schedule of rates (Construction)*.
- 0161 *Quality management (Construction)*.
- 0173 *Environmental management (AUS-SPEC)*.
- 0257 *Landscape - road reserve and street trees*.
- 1101 *Traffic management*.
- 1102 *Control of erosion and sedimentation (Construction)*.
- 1111 *Clearing and grubbing*.
- 1113 *Subgrade and formation stabilisation*.
- 1171 *Subsurface drainage*.
- 1172 *Subsoil and formation drains*.
- 1351 *Stormwater drainage (Construction)*.
- 1352 *Pipe drainage*.
- 1353 *Precast box culverts*.
- 1354 *Drainage structures*.

1.3 STANDARDS**General**

Soil testing: To AS 1289 (Various).

1.4 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection the following abbreviation applies:

- CBR: California Bearing Ratio.
- **RL: Reduced Level**

Definitions

General: For the purposes of this worksection definitions given in Austroads AP-C87 (2015) apply:

- Open drains: All drains other than pipe and box culverts and include catch drains, channels (gutters) and kerbs and channels (gutters).
- **Reduced Level:** The height calculated or derived from an adopted vertical datum for an existing survey or design.
- Rock: Monolithic material with volume greater than 0.5 m³ in sites which cannot be removed until broken up by explosives, rippers or percussion tools. For support purposes material hardness on the Mohr scale not less than 3 and not deteriorate on exposure to the atmosphere.
- Selected material zone: The top part of the upper zone of formation in which material of a specified higher quality is required.
- **Shallow cutting:** Where the cutting floor is located at a depth of less than 0.5 metres below natural surface.
- Shallow embankments: Embankments less than 1.5 m depth from the top of pavement to natural surface.
- Spoil: Surplus excavated material.
- Unsuitable material: Material not suitable for support of pavement or layer of fill including:
 - . Material showing deformation, rutting, softness, yielding, distress or instability under proofrolling or the loading from construction machinery.
 - . Topsoil, peat or any organic material.
 - . Soluble material, e.g. gypsum or salt rock.
 - . Susceptible to scouring or classified as Emerson Class number 1 or 2.

1.5 TOLERANCES

General

Measurement: At right angles to the slope line.

(+): Means toward the roadway surface.

(-): Means away from the roadway surface.

Batter slopes

Excavation: Conform to the following:

- At toe of batter and level of table drain:
 - . ≤ 1:1 slopes: +0 mm, - 150 mm from the documented slope line.
 - . > 1:1 slopes: +0 mm, - 200 mm from the documented slope line.
- ≥ 2 m above table drain:
 - . ≤ 1:1 slopes: ±300 mm.
 - . > 1:1 slopes: 300 mm, -600 mm.

Embankment: Conform to the following:

- 1 m below shoulder: ±150 mm.
- > 1 m below shoulder: ±300 mm.

Median areas: Conform to the following:

- ≤ 2 m measured horizontally from edge of shoulder: ±35 mm from documented slope line, measured at right angles to the slope line within 24 hrs of compaction.
- > 2 m measured horizontally from edge of shoulder: ±75 mm from documented slope line, measured at right angles to the slope line within 24 hrs of compaction.

Floors

Floor of cutting: To **ANNEXURE - EARTHWORKS INFORMATION**.

Tops of embankments

At completion of embankment construction: Conform to the following:

- Parallel to the designed grade line.
- +10 mm or -40 mm of the levels specified.

Selected material

Completed layer: To **ANNEXURE - EARTHWORKS INFORMATION**

Selected backfill

Plasticity Index: > 2, < 12 adjacent to structures.

1.6 SUBMISSIONS**Authority approvals**

Requirement: Submit details of all authority approvals before commencing the works for which the approval is granted, including the following:

- Spoil and borrow:
 - . Planning approval.
 - . Permits for access to locations.

Calculations

General: Submit the following:

- Survey records.
- Cut and fill calculations.

Design documentation

General: Submit the following:

- Survey: Submit site survey verifying existing ground profile within 14 days of site possession.

Execution details

Survey system: Submit details of the proposed survey system for approval. within 14 days of possession of site before commencement of clearing and grubbing or earthworks.

Ground model discrepancies: If discrepancies in the model are identified, submit plans 7 days, before commencement of Works and state the maximum dimensions of the proposed stockpile.

Unsuitable material: Submit details of any areas of the foundation or layer which ruts excessively, yield or shows signs of instability.

Cuttings in rock: Submit detailed procedures to maintain accurate dimensions and uniform batters in rock.

Excavation method statement: Submit including details of excavation procedures based on geotechnical information, as documented.

Excavation beyond batter line: Submit details of alternative corrective measures.

Embankment treatment type: If either loosen and compact, bridging layer, working platform, geotextile/geogrid layer, drainage layer or other treatment is proposed, submit **details to the Superintendent and the Principal Certifier. This is a HOLD POINT.**

Contaminated material: Notify and submit details of proposed method and disposal location, 24 hours before disposal.

Records

Drawings: Work-as-executed drawings.

Tests

Results: Submit results of testing to **ANNEXURE – MAXIMUM LOT SIZE AND MINIMUM TEST FREQUENCIES.**

1.7 INSPECTIONS**Notice**

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

- Unsuitable material: Material deemed unsuitable for embankment or pavement support in its present position.
- Removal of unsuitable material: Determine that sufficient depth of unsuitable material has been removed.
- Cuttings in rock: Stability of batter.
- Ripping floors of cuttings: Ripped or loosened material.
- Compacting floors of cuttings: Completed cutting floor.
- Transition from cut to fill: Position of intersection line between cutting and embankment.
- Bridging layer treatment: Seepage water causing movement under roll test. Remove wet material to spoil or construct subsoil drainage or both based on site conditions.

- Foundations: Embankment foundation area following removal of topsoil.
- Trimming tops of embankment: Trimmed and compacted embankment.
- Selected material zone: Completed surface before placing any subsequent pavement layers over the completed select material zone surface.
- Deflection monitoring and proof rolling: Any visible deformation, rutting, yielding and or showing signs of distress or instability.

2 PRE-CONSTRUCTION PLANNING

2.1 GENERAL

Planning approval

Spoil haulage disposal: If handling of spoil is involved.

Borrow: If proposed, obtain approval and any permits required for entry on land.

Program

Timing: Program the work so that material conforming to **PLACING FILL FOR EMBANKMENT CONSTRUCTION** and **SELECTED MATERIAL ZONE** for the upper zones of the formation, is available when required.

Rock supply: Adjust working methods and program the work to obtain hard and durable rock to the documented dimensions, as required.

2.2 SURVEY

Ground models

Verification: The contractor may receive ground models before commencement of Contract, in the form of computer generated road design data files in the format of the approved software.

Verification alternative: The Contractor may verify the accuracy of the model by field surveys.

Shallow embankments: Survey and calculate the area of shallow embankments after removal of topsoil.

3 MATERIALS

3.1 MATERIAL CHARACTERISTICS

Items to be clarified on site

Quality and quantity: Confirm the following factors for determining material quality and quantity:

- Nature and types of the materials encountered in excavations.
- The bulking and compaction characteristics of materials incorporated in embankments.
- The estimated quantity for general earthworks at any cutting includes all types of materials which may be encountered in the cutting.

Embankment material

Source: Obtain the fill or borrow material for embankment construction from the cuttings within the Works conforming to **SUBMISSIONS, Execution details**, supplement by borrow in conformance with **BORROW**.

Description: Free of tree stumps and roots, clay, topsoil, steel, organic material and other contaminants and suitable for compaction to **COMPACTION AND MOISTURE REQUIREMENTS**.

Excavated material: Use for constructing embankments if it conforms to documented requirements.

Deficient embankment material: Rectify deficiency conforming to **CUTTINGS, Benching in cuttings**.

Drainage layer material properties table

Property	Requirement
Maximum dimension	125 mm
Percentage passing:	
19.0 AS sieve	0 - 15%
1.18 AS sieve	0 - 5%
75 µm AS sieve	< 0.5%
Percentage of +19.0 mm fraction with $I_s^{(50)}$ a	Maximum 10%

Property	Requirement
Wet/dry strength variation	ANNEXURE - EARTHWORKS INFORMATION
^a Is ⁽⁵⁰⁾ = Point load strength	

4 EXECUTION

4.1 ESTABLISHMENT

Protection of earthworks

General: To *0173 Environmental management (AUS-SPEC)*.

Erosion and sedimentation control: Install erosion and sedimentation control measures to *1102 Control of erosion and sedimentation (Construction)* before commencing earthworks and maintain measures for the duration of the contract.

Drainage of working areas: Maintain drainage of all working areas throughout the construction period, so that there is no ponding of runoff, except where ponding forms part of an approved erosion and sedimentation control system.

Salinity prevention: In salt affected areas, take precautions to minimise ingress of surface water into the groundwater table.

Wet weather precautions: If rain is likely or no work is proposed in a working area on the following day, take precautions to minimise ingress of excess water into earthworks material.

Loose material: Seal off ripped material remaining in cuttings and material placed on embankments by compaction to provide a smooth tight surface.

Wet material: If in situ or stockpiled material becomes excessively wet as a result of inadequate protection of earthworks, replace and/or dry out the material to minimise any subsequent delays to the operations.

Setting out of earthworks

Timing: Establish batter indicator boards and pegs before earthworks operations commence and after survey controls are in place.

Indicators: Locate indicators as follows:

- Horizontal: Generally, 25 m intervals.
- Verified interval: Not more than 5 m height.

Information on the indicator and pegs: Clearly mark the chainage/station, offset from control line and ~~slope distance~~ **design RL and + or – height** to the finished surface level.

Retention and removal of pegs: Maintain all pegs and batter indicators in their correct positions. Remove them on completion of the contract or separable part.

Additional pegs: Place additional pegs and indicators as required to suit. Do not paint these the same colours as setting out pegs and stakes.

Transitions cuttings/embankments: Mark the position and extent of all transitions from cuttings to embankments and foundations for shallow embankments with clearly labelled stakes.

4.2 REMOVAL OF TOPSOIL

Program

Timing: Remove topsoil only after implementation of erosion and sedimentation controls and completion of clearing, grubbing and disposal of materials for that section of the Works.

Extent of work

General: Remove topsoil throughout the length of the Work and stockpile separately clear of the work. Avoid contamination by other materials.

Cuttings: Remove topsoil to a depth documented in **ANNEXURE - EARTHWORKS INFORMATION**.

Embankments: Remove topsoil over the base of embankments to the depth below the natural surface documented in **ANNEXURE - EARTHWORKS INFORMATION**.

Shallow embankments: If the height of embankment from natural surface to underside of pavement is less than 2 m, remove topsoil which is deeper than the depth documented in **ANNEXURE - EARTHWORKS INFORMATION** to its full depth.

Erosion control

Stabilisation: Track roll or stabilise stockpile batters to minimise erosion.

Seeding of stockpiles: If required to encourage vegetation, conform to **SLOPES FLATTER THAN 3H TO 1V, Grassing** in *0257 Landscape - road reserve and street trees*.

4.3 UNSUITABLE MATERIAL**General**

Requirement: Identify unsuitable materials conforming to AS 3798 (2007) clause 4.3. **Identify quantities to be removed and seek approval for proposed remediation. This is a HOLD POINT.** Excavate, remove and replace unsuitable material.

Removal: Dispose of unsuitable material as permitted by local authorities.

Replacement material

Material property: Replace unsuitable material with material from cuttings, or with material borrowed in conformance with **MATERIAL CHARACTERISTICS, Embankment material** or **BORROW**.

Compaction: Before replacing material, compact the excavated surface to conform to **COMPACTION AND MOISTURE REQUIREMENTS**.

Placing: Replacement material is deemed to form part of embankment construction. Conform to **PLACING FILL FOR EMBANKMENT CONSTRUCTION** and to **COMPACTION AND MOISTURE REQUIREMENTS**.

Resultant unsuitable material: Rework or replace any unsuitable material resulting from inappropriate construction activities.

4.4 CUTTINGS**General**

Requirement: Excavate material including benching, treatment of cutting floors and transition from cut to fill, as documented.

Excavated materials: Loosen and break down material excavated from cuttings to conform to **MATERIAL CHARACTERISTICS, Embankment material**.

Cleaning: Clean cut batters in rock with slopes of 1H:1V or steeper with compressed air until loose rock and soil is removed. Do not use water jets or air-water jets.

Benching in cuttings

Benches: Bench cut batters at locations and widths, as documented, to provide drainage and erosion control to **TOLERANCES, Batter shapes**.

Bench maintenance: Remove loose stones and boulders regularly throughout the Contract period.

Variable material

Excavation methods: If material of variable quality or moisture content is found after removal of topsoil, adjust excavation methods to allow blending of the materials and to obtain material in conformance with **MATERIAL CHARACTERISTICS, Embankment material**.

Tops of cuttings

General: Neatly rounded, as documented.

Floors of cuttings

Excavation level: Excavate the floors of cuttings, parallel to the designed grade line, to a designed floor level at the underside of the selected material zone, or where there is no selected material zone, to the underside of the pavement subbase.

Trimming: Trim the floors to documented tolerance.

CBR testing: Before ripping the cutting floor, determine the CBR of the various materials which may exist in the cutting floor. **This is a WITNESS POINT.**

Approval required: If the CBR of the cutting floor subgrade material is less than the value documented in the design approved by the Principal Certifier, confirm the proposed treatment with both the Superintendent and the Principal Certifier. This is a HOLD POINT.

Ripping floors of cuttings: Rip material in the floor to a minimum depth of 150 mm below the designed floor level for the width of the selected material zone (or subbase layer, where no selected material zone).

Particles in the ripped or loosened zones: Maximum 150 mm.

Compacting floors of cuttings

Compaction: Re-compact ripped or loosened material to conform to **COMPACTION AND MOISTURE REQUIREMENTS**.

Maximum compacted material particle dimension: 200 mm.

After re-compaction: Re-trim the floors of cuttings parallel with the finished wearing surface.

Tolerances: Conform to **ANNEXURE - EARTHWORKS INFORMATION**.

Batter slopes

Profile: Construct batter slopes, as documented.

Tops of cuttings: Neatly round tops of cutting to the documented dimensions and, re-setout, remove additional material and re-trim, if required.

Batters for cuttings: Even and without undulations in the general plane of the batter except that batters may require progressive flattening at the ends of cuttings due to the presence of less stable material.

Unstable material: Clean cut faces of loose or unstable material progressively as the excavation proceeds.

Excavation beyond batter line

Minor over excavation: Minor change in the general slope of the batter, beyond slope line and the tolerance applicable may be approved, however, this does not constitute a variation for batter slopes.

Alternative corrective measures: Provide details of the material and/or methods proposed to restore the required slope and stability of the batter.

Batters steeper than 1H:1V: If any section of the batter, up to a height of 3 m above the table drain level, has been over excavated beyond the tolerance limit documented, restore batter to the average batter slope using randomly mortared stone.

Restoration material: Conform to the following:

- Stone: Similar to sound rock in the cutting.
- Mortar: Coloured to match the rock.

4.5 TRANSITION FROM CUT TO FILL**Intersection line**

Survey: After removing the topsoil and before excavating any cutting, mark the position of the intersection line between cutting and embankment occurring at the underside of the selected material zone or pavement subbase.

Terrace construction

General: Following excavation to the cutting floor, excavate a terrace for the width of the selected material zone (or subbase layer, where no selected material zone) to a depth of 900 mm below and parallel to the cutting floor, as shown in **ANNEXURE - TRANSITION FROM CUT TO FILL**.

Extent of terrace: Extend the cut to the point where the cutting floor is 900 mm below the original stripped surface, or a distance of 20 m, whichever is the lesser.

Excavated material: Incorporate the material excavated into the embankments or dispose of as permitted by local authorities.

Material placed above the terrace: Conform to **MATERIAL CHARACTERISTICS, Embankment material** and compact to **COMPACTION AND MOISTURE REQUIREMENTS**.

Free drainage: Provide 1% minimum grade towards the nearest exit of the cutting or install a subsurface drain at the lower end.

4.6 EMBANKMENTS**Foundations**

Unsuitable material: If any underlying material is determined unsuitable, remove and replace the material conforming to **UNSUITABLE MATERIAL**. **This is a HOLD POINT**.

Preparation for shallow embankments: Loosen material exposed by the removal of topsoil and unsuitable material to a depth of 150 mm, adjust moisture content of loosened material and compact to **COMPACTION AND MOISTURE REQUIREMENTS**.

Preparation for other embankments: Grade and level to general area, adjust the moisture content and compact the top 200 mm to **COMPACTION AND MOISTURE REQUIREMENTS**.

Foundation damage: Use suitable equipment and techniques to minimise surface heaving or other foundation damage.

Bridging layer treatment

Ground water seepage: A bridging layer may be used with approval, if ground water seepage is encountered in foundation area or it is demonstrated that it is impracticable to achieve compaction of the foundation to **COMPACTION AND MOISTURE REQUIREMENTS**. A bridging layer is unacceptable where the proximity of the bridging layer to the pavement is likely to affect the pavement design.

Material: Free-draining granular material with strong mechanical interlock and low sensitivity to moisture.

Method: End-dump the granular material and spread in a single layer, in sufficient depth to allow the passage of earthmoving equipment with minimal surface heaving. The compaction requirements of **COMPACTION AND MOISTURE REQUIREMENTS** do not apply to the bridging layer.

Working platform treatment

An alternative to a bridging layer: A working platform created by the chemical stabilisation of in situ material conforming to *1113 Subgrade and formation stabilisation*.

Geotextile/geogrid layer

Requirement: If approved, to **MATERIALS, GEOTEXTILE** in *1171 Subsurface drainage and EXECUTION, GEOTEXTILE* in *1172 Subsoil and formation drains*.

Drainage layer treatment

General: Install drainage layer of rock enclosed with geotextile over embankment foundations.

Drainage: Shape and trim embankment foundation to provide drainage of the embankment. After, construction, maintain a clear drainage path, especially at the outer edges of the embankment.

Hillside embankments

Requirement: If embankments are constructed on or against any natural slopes or the batters of existing embankments, and if the existing slope or batter is steeper than 10H:1V in any direction, cut horizontal terraces as follows:

- Step the existing slope or batter in successive terraces, minimum 1 m in width, and cut terraces progressively as the embankment is placed.
- Depth: Conform to the following:
 - . Minimum 300 mm at the steps.
 - . If existing slope is 4H:1V: Minimum 600 mm at the steps.
- To coincide with natural discontinuities wherever possible.
- Provide subsoil drainage, if required.
- Compact excavated material as part of the new embankment material.

Batter slopes

Design criteria: The batter slopes, as documented represent the estimated requirements for the expected types of materials.

Redetermination: Batter slopes may be changed following further assessment of the materials found on site.

Average planes of embankment batter: As documented when completed.

Slope undulations: Avoid undulations in the general plane of the batter.

Batter slope for median areas

Free draining: Grade medians so there is no ponding.

Rock facing of embankments

Requirement: Provide a facing of clean, hard, durable rock to embankment batters, including embankments at bridge abutments.

Location: As documented.

Rock placement: Exercise extreme caution whilst placing the rock facing as follows:

- Where embankment material is placed above other roads in use, place the outer rock layer to prevent movement down the batter or onto the roadway.
- Make sure that, no rock can be dislodged and roll onto any adjacent roadway or track in use.

Mechanical interlock: Build up the rock facing in layers before each layer of filling. Place rock by hand or plant so that its least dimension is vertical and mechanical interlock between the larger stones occurs.

Excess fine material: Remove excess fine material surrounding rock. Replace rocks, if required.

Graded filter: Fill space between larger batter rocks with progressively smaller rocks to form a graded filter which prevents the leaching out of fines from the fill material but does not overfill the voids between larger rocks, or cause the larger rocks to lose contact with one another. Remove fine material from the outside of the rocks on the face of the batter.

Geotextile: Use an appropriate geotextile for embankment construction to prevent the leaching out of fines from the fill material, as documented.

4.7 PLACING FILL FOR EMBANKMENT CONSTRUCTION

General

Uniformity of material: Use methods for excavation, transport, depositing and spreading of fill material so that placed material is uniformly mixed.

Embankment stability: Construct the embankment and stabilise by compaction of the fine material, embedding the large rock pieces rather than mechanical interlock of the rock pieces. Compact fine material in conformance with **COMPACTION AND MOISTURE REQUIREMENTS**.

Placing: Place fill in layers parallel to the grade line and compact in conformance with **COMPACTION AND MOISTURE REQUIREMENTS**.

Layer thickness

Requirement: Uniform, compacted layers not more than 200 mm thickness.

Large rock: If more than 25% by volume of the filling consists of rock with any dimension larger than 150 mm, seek approval to increase thickness to 300 mm. Relative compaction to conform to **COMPACTION AND MOISTURE REQUIREMENTS**.

Maximum layer thickness and material properties of rock in earth fill embankments table

Maximum layer thickness (mm)	Minimum quantity rock (by volume)	Maximum rock size (mm)	% Passing 37.5 mm AS Sieve (by mass)
300	–	200	> 60%
500	25% > 200 mm	300	> 60%

Rock pieces

Grading of fill material: Break down rock material and evenly distribute it through the fill material, and place sufficient fine material around the larger material as it is deposited to fill voids and produce a dense, compact embankment.

Insufficient fine material: If there is insufficient fine material to fill the voids, obtain additional fine material from other places in the work or change the method of winning fill material.

Stony patches: Rework stony patches having insufficient fine material, with additional fine material to achieve a dense, compact layer.

Equipment

General: Use suitable equipment and techniques to avoid surface heaving or other damage to the foundations and underlying embankment layers.

CBR value

Requirement: CBR of compacted embankment material below selected material zone (or subbase layer, where no selected material zone) to **ANNEXURE - EARTHWORKS INFORMATION**.

Trimming tops of embankments

Top of embankments: Trim parallel to the design grade line at levels equal to the finished surface level, less the thicknesses of pavement courses and the selected material zone, if applicable.

Compaction: Compact the tops of embankments in conformance with **COMPACTION AND MOISTURE REQUIREMENTS**.

4.8 SELECTED MATERIAL ZONE AND VERGES

Site won selected material

Requirement: Conform to the following:

- Stone size: Maximum 100 mm and have no less than 50% passing the 19 mm sieve.
- CBR value: To **ANNEXURE - EARTHWORKS INFORMATION**.

- Maximum Plasticity Index: 15.

Site won verge material

Requirement: Conform to the following:

- Size: Maximum 50 mm and no less than 50% passing the 19 mm sieve.
- Have a CBR value not less than specified in **ANNEXURE - EARTHWORKS INFORMATION**.
- Maximum Plasticity Index: 15.

Spill through bridge abutment fill material

Material at waterway crossings and at overbridges: Conform to the following:

- Grading: 100% passing the 53 mm AS Sieve.
- Waterway crossings:
 - CBR value: To **ANNEXURE - EARTHWORKS INFORMATION**.
 - Plasticity Index: 6 to 15.
- Overbridges:
 - . CBR value: To **ANNEXURE - EARTHWORKS INFORMATION**.
 - . Maximum Plasticity Index: 25.

Stabilisation: If chemical stabilisation is required, the requirements of this clause apply to the selected material immediately before incorporating the stabilising agent.

Winning material: Obtain the selected material from cuttings excavated under the Contract or from borrow areas in conformance with **BORROW**.

Work methods: If required, use work methods to yield material by breaking down oversize rock, including processing through a crusher so that resulting material conforms to documented requirements.

Conservation of material

Stockpiles: If the material is not placed directly in the selected material zone, stockpile it at approved locations for future use until sufficient material is reserved to complete the selected material zone over the whole work and make sure stockpiles do not exceed 4000 tonnes.

Extra material: If suitable available material has not been conserved, provide material of equivalent quality.

Placing and compaction

Layers: Place and compact in layers in conformance with **COMPACTION AND MOISTURE REQUIREMENTS**.

Compacted layer thickness: < 150 mm.

Composition of layers: Homogeneous and free from patches containing segregated stone or excess fines.

Non-conforming material: Exclude all non-complying material from all areas.

Top of the selected material zone: Compact and trim parallel with the design grade line at a level equal to the finished surface level minus the thickness of pavement layers adopted. The tolerances for the trimmed levels are given in **ANNEXURE - EARTHWORKS INFORMATION**.

4.9 FILL ADJACENT TO STRUCTURES

General

Structure types: Structures include bridges, precast and cast-in-place box culverts and retaining walls.

Fill adjacent to other culverts and drainage structures: Conform to **BEDDING AND SUPPORT MATERIAL** and **BEDDING AND BACKFILLING** in *1351 Stormwater drainage (Construction)*.

Time of placement: Do not place fill against structures, headwalls or wing walls within 21 days after placing of the concrete, unless the walls are effectively supported by struts as approved or it can be demonstrated that 85% of the design strength of the concrete has been achieved.

Treatment at weepholes

Gravel: Provide drainage adjacent to weepholes by a layer of broken stone or river gravel consisting of clean, hard, durable particles graded from 50 mm to 10 mm as follows:

- Particle dimension: < 50 mm.
- < 5 % mass to pass the 9.5 mm AS sieve.

Extent: Extend broken stone or river gravel continuously in the line of the weepholes, at least 300 mm horizontally into the fill and from 200 below to at least 450 mm vertically above the level of the weepholes.

Geotextile membrane: Alternatively, provide a geotextile membrane of equivalent drainage characteristics. Store and install to the manufacturer's recommendations.

Backfill

Location: Place backfill adjacent to structures, as documented.

Backfill material: Conform to the following:

- Granular material.
- Size: < 50 mm.
- Plasticity Index: Between 2 and 12.

Placement: Place backfill in layers, with a maximum compacted thickness of 150 mm simultaneously on both sides of box culverts and other drainage structures to avoid differential loading. Start compaction at the wall and proceed away from it, in conformance with **COMPACTION AND MOISTURE REQUIREMENTS**.

Horizontal terraces: Cut the existing embankment slope behind the structure in the form of successive horizontal terraces, minimum 1 m wide, and place backfill to **PLACING FILL FOR EMBANKMENT CONSTRUCTION**.

Spill through abutments: Do not dump rocks against columns or retaining walls, build up evenly around or against structures.

Framed structures: For embankments at both ends of the structure, bring up backfill at both ends simultaneously, keeping the difference between the levels of the embankments less than 500 mm.

Backfill width and height table

Structure type	Backfill: Width	Backfill: Height
Bridge abutments	2 m	H
Cast-in-place box culverts	H/3	H +300 mm
Corrugated steel pipes and arches	0.5 m	H +500 mm
Retaining walls	H/3	H
Note: H = Height of structure		

4.10 SPOIL

Non-contaminated materials

Embankments: If flatter batter slopes are required on embankments or if excess material is to be used in the uniform widening of embankments, shape the surface to provide a tidy appearance and effective drainage.

Surplus material: Spread and compact the surplus material in conformance with, **PLACING FILL FOR EMBANKMENT CONSTRUCTION** and **COMPACTION AND MOISTURE REQUIREMENTS** for material in embankments.

Disposal: Dispose of spoil at approved locations. Compact spoil in conformance with **COMPACTION AND MOISTURE REQUIREMENTS** for material in embankments.

Contaminated material

Requirement: Stockpile and/or remove from the site in an approved manner and location.

Method: Excavate and dispose of all contaminated material in an environmentally responsible manner including the following:

- Test material uncovered on-site before disposal. If putrescibles wastes are included, analyse leachate and landfill gases.
- Excavate material without creating off-site environmental problems.
- Seal remaining contaminated material or wastes, where only part of the tip has been excavated, tso there is no off-site effect now or in the future.
- Transport odorous wastes in covered vehicles.
- Dispose of contaminated material in a landfill licensed to take the type of contaminated material or wastes uncovered.

4.11 BORROW

General

Criteria: Unless provided by the Contract, borrow will only be authorised for the following:

- Constructing cuttings and embankments to the batter slopes.
- Providing materials of the quality specified.
- When there is an overall deficiency in either the quantity or the quality of material required to complete the works.

Wastage: Borrow will not be authorised for excess widening of embankments or wastage of quality material by the Contractor.

Material: Conform to **MATERIAL CHARACTERISTICS, Embankment material and Rock facing of embankments, or FILL ADJACENT TO STRUCTURES.**

Authorities: Conform to the requirements of the Local Council, land owners, and the State and Territory environmental planning legislation, livestock protection boards and soil conservation services, as appropriate.

Borrow sites

Location: Make sure the edges are no closer than 3 m from any fence line, road reserve boundary or edge of excavation or embankment and provide adequate clearance for the construction of catch drains.

Borrow site location: As approved.

Drainage: Provide drainage outlets, as documented.

Batter slopes: Conform to the following:

- Not steeper than 4H:1V.
- To be left in a tidy and safe condition.

Site preparation and restoration: For borrow within the defined working area for the Works, prepare site in conformance with *1111 Clearing and grubbing* and **REMOVAL OF TOPSOIL.**

Widening of cutting: If borrow material is obtained by uniformly widening a cutting, conform to **CUTTINGS, Batter slopes**, for the redetermination of batter slopes, compaction of floors of cuttings respectively and the trimming of batters.

4.12 COMPACTION AND MOISTURE REQUIREMENTS

Trimming and compaction

Requirement: Compact all layers uniformly, as documented before the next layer is commenced.

Trimming: Trim each layer of material before and during compaction to avoid bridging over low areas and to present a smooth surface at the top of each layer.

95% compaction

Requirements: Compact the following areas to provide a relative compaction, not less than 95% for standard compactive effort:

- Each layer of material replacing unsuitable material, as documented in **UNSUITABLE MATERIAL.**
- Each layer of material placed in embankments, up to 0.3 m up to the underside of the pavement.
- Fill placed adjacent to structures up to 0.3 m from the top of pavement.
- Material in unsealed verges and within medians up to the level at which topsoil is placed.
- Spoil (excluding unsuitable material).
- All other areas except those where higher relative compaction is documented.

Unsuitable material: Stockpile as documented and compact by track rolling.

97% compaction

Requirements: Compact the following areas to provide a relative compaction of not less than 97% as for modified compactive effort:

- Foundations for shallow embankments.
- The whole area on the floor of cuttings.
- Each layer of the embankment within 0.3 m up to the underside of the pavement.
- Each layer of the selected material zone, as documented in **SELECTED MATERIAL ZONE AND VERGES.**

- Any areas of material of documented quality behind kerbs and/or gutters or adjacent to rigid pavements, as documented.
- The fill material placed adjacent to structures as documented in **FILL ADJACENT TO STRUCTURES, Backfill** in each layer within 0.3 m from the top of the pavement.

Shallow cutting

Floor of shallow cutting: To **CUTTINGS, Floors of cuttings** and **TRANSITION FROM CUT TO FILL** and compact to provide a relative compaction of not less than 97% for a depth of 300 mm for modified compactive effort.

Cut-fill transition

Requirement: If shallow cutting conditions occur, the requirements of **TRANSITION FROM CUT TO FILL** may be modified so that the depth of terrace excavation at the transition from cut to fill is reduced from 900 mm to 250 mm.

Proof rolling

General: Conform to **ANNEXURE – MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES**.

Requirement: Proof roll, if required, to **ANNEXURE - EARTHWORKS INFORMATION** and where ripping or loosening of the cutting floor is not required.

Moisture content

Compaction timing: Adjust the moisture content of the material at the time of compaction to allow the required compaction to be attained, at a moisture content which is within the range set out in **ANNEXURE - EARTHWORKS INFORMATION** and as follows:

- Wet material: Do not compact material that has become wet after placement until it has dried out so that the moisture content is within this range.
- Aeration: The drying process may be assisted by aeration or by the use of hydrated or quick lime.
- Drying: Alternatively, transport the wet material to a stockpile site for drying out and later use as fill material.
- Dry material: If the material is too dry for required compaction, add water. Apply water uniformly and thoroughly, mix with the material until a homogeneous mixture is obtained.

Compaction

Extent: Compact the material to obtain the required relative compaction for the full depth of each layer in embankments and for the full width of the formation over the entire length of the work.

Rain damage: Complete compaction promptly to minimise the possibility of rain damage and conform to the following:

- If material that has achieved relative compaction becomes wet and moisture content is greater than the optimum level, determined by AS 1289.5.1.1, dry out and uniformly recompact to the required relative compaction before next layer is placed. Alternatively, remove wet layer of material to a stockpile site for future use.

Repair: Loosen, recondition and recompact rain damaged surfaces before placing another layer of material.

4.13 FURNITURE AND SERVICES

Widening of formation

General: Widen road shoulders and formation to accommodate footpaths, guard fence, streetlight plinths, emergency telephone bays and vehicle standing areas, as documented.

Testing

4.14 TESTING

Quality

Requirement: Test for all characteristics in conformance with **ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES**.

Deflection monitoring or proof rolling tests

Preparation: Present the work available in lots, to carry out deflection monitoring or proof rolling.

Minimum Lot size: 300 m continuous length of formation, or lesser length as approved, and a single carriageway width with homogeneous material and appearance.

Boundaries: Identify the boundaries of each lot with clearly labelled stakes.

Timing: Test within 3 days of compaction. Following completion of the formation to the underside of the selected material zone and completion of the selected material zone.

Compaction and moisture tests

Preparation: Prepare the area at sampling locations for required compaction and moisture tests.

Moisture content: Before testing, work the lot, make sure moisture content and compaction of all material is uniform within the lot.

Test representation: Test/s taken are considered to represent the total volume of material placed within the lot.

Further testing: Undertake further testing if the material which is present has not achieved required uniformity to **PLACING FILL FOR EMBANKMENT CONSTRUCTION**. Nominate the area to be represented by the additional testing.

Non-conforming material: If such testing confirms non-conformance, perform remedial work as necessary to achieve conformance to **COMPACTION AND MOISTURE REQUIREMENTS**.

Deflection monitoring or proof rolling test results: Conform to the following:

- If required characteristic deflection is less than 1.2 mm, make sure the standard deviation of the lot does not exceed 0.2 mm.
- If required characteristic deflection exceeds 1.2 mm, make sure the coefficient of variation of the lot does not exceed 25%.

Further proof rolling: If required, at a later date, re-condition the layer so that the moisture content conforms to **COMPACTION AND MOISTURE REQUIREMENTS**. Pass the roller no less than 8 times.

4.15 COMPLETION

Temporary works at completion

Tree enclosures: Remove temporary tree enclosures.

Tree marking: Remove temporary marks and tags.

Temporary supports: Remove temporary supports to adjacent structures.

Site restoration

Requirement: Where variation of existing ground surfaces is not required as part of the works, restore surfaces to the condition existing at the commencement of the contract or to *0257 Landscape - road reserve and street trees*.

5 ANNEXURE A

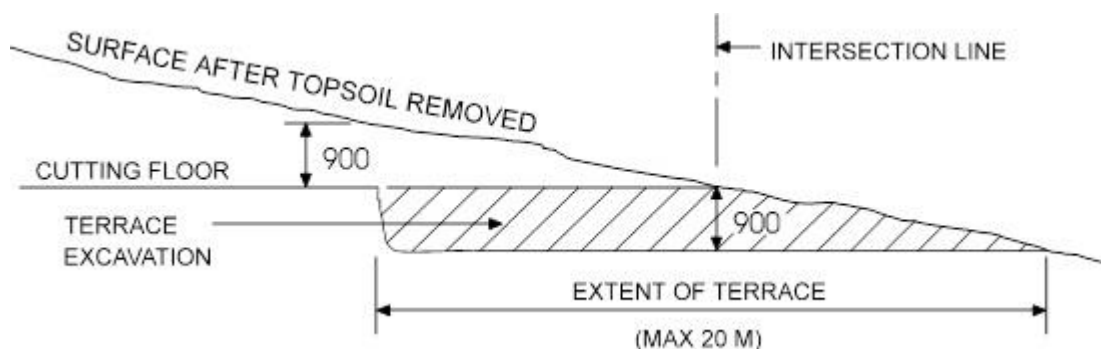
5.1 ANNEXURE - EARTHWORKS INFORMATION

This Annexure should be completed for Council or private development projects to specify earthworks parameters required in conjunction with the contract Drawings. Where there is an inconsistency between the approved Drawings and this Annexure, the approved Drawings shall prevail unless specifically noted otherwise.

Worksection clause/subclause	Description	Value		
REMOVAL OF TOPSOIL/Extent of work	The depth below natural surface up to which the removal and measurement of top soil shall apply:			
	-Cutting areas (mm)			
	-Embankment areas (mm)			
CUTTINGS/Floors of cuttings	Minimum CBR value in cutting floors used for design of pavement (%)			
CUTTINGS/Compacting floors of cuttings	Construction tolerances, of the designated grade and crossfall, for floors of cuttings after recompaction (mm)			
EMBANKMENTS/Foundations for embankments	Requirements of material in foundations for shallow embankments:			
	Moisture content range (% of optimum)			
SELECTED MATERIAL ZONE AND VERGES/Site won	Upper Zones of Formation & Selected Material Zone			
	Location	Minimum	Depth	Nominated

Worksection clause/subclause	Description	Value
material	CBR Value	
	Soaking Period (Days)	
	Selected Material Zone	<
	Material below Selected Material Zone to 1.5 m from top of pavement	<
	'Spill through' bridge abutment fill material:	<
	Waterway crossing Overbridges	
SELECTED MATERIAL ZONE AND VERGES/ Placing and compaction	Construction tolerances for Selected Material Zone are: - Designed grade and - Crossfall	
COMPACTION AND MOISTURE REQUIREMENTS/Proof rolling	Shallow cuttings:	
	- Sections of work nominated to be in shallow cutting:	
	- Ripping or loosening in shallow cutting	Required/Not required
	- Proof rolling of subgrade [is/is not] required.	Required/Not required
	- Monitor deflection at underside and top of selected material zone with Benkelman Beam	
COMPACTION AND MOISTURE REQUIREMENTS/Moisture content	Moisture content range of material placed in embankments:	
	- Material in upper zones of formation: (% of optimum)	
	- All other embankment material: (% of optimum)	

5.2 ANNEXURE - TRANSITION FROM CUT TO FILL



5.3 ANNEXURE - SUMMARY OF HOLD AND WITNESS POINTS

For private developments, certain Hold and Witness Points where specifically noted below require representatives of both the Superintendent and the Principal Certifier (e.g. Council) to authorise release.

Clause/Description	Type	Submission/Inspection	Submission/Notice details	Process held
INSPECTIONS Notice	W	Material deemed unsuitable for	3 days before replacement	Replacement of unsuitable

Clause/Description	Type	Submission/Inspection	Submission/Notice details	Process held
Unsuitable material		embankment or pavement support in its present position	of unsuitable material	material
INSPECTIONS Notice Unsuitable material	H	Determine sufficient depth of unsuitable material has been removed	3 days before backfilling with replacement material	Backfilling with replacement material
INSPECTIONS Bridging layer treatment identified by roll test.	H	Subgrade or pavement movement observed under roll test	Wet material removed and subsoil treatment applied	Subgrade or pavement layer acceptance prior to further pavement construction.
INSPECTIONS Notice Cuttings in rock	H	Stability of batter	3 days before excavation	Excavation below bench level for slopes of 1H:1V or steeper
INSPECTIONS Notice CBR testing of cutting floor subgrade material	W – Superintendent and Principal Certifier	CBR testing of cutting floor subgrade material	3 days before proceeding	Ripping and re-compaction of subgrade
SUBMISSIONS Execution details Unsuitable subgrade material	H – Superintendent and Principal Certifier	Proposed treatment for subgrade if material is unsuitable or does not meet minimum CBR (Clauses 4.3 and 4.4)	3 days before proceeding	Ripping and re-compaction of subgrade
INSPECTIONS Notice Ripping floors of cuttings	H – Superintendent and Principal Certifier	Ripped or loosened material	3 days before re-compaction	Re-compaction
CUTTINGS, Compacting floors of cuttings	H – Superintendent and Principal Certifier	Compacted cut floor	3 days before placing subsequent layers	Placing subsequent layers
INSPECTIONS Notice Transition from cut to fill	W	Position of intersection line between cutting and embankment	3 days before excavation cutting	Excavation cutting
INSPECTIONS Notice Foundations	H	Embankment foundation area following removal of topsoil	3 days before treatment of each lot of embankment foundation	Treatment of each lot of embankment foundation
SUBMISSIONS Execution details Embankment treatment type	H – Superintendent and Principal Certifier	If either loosen and compact, bridging layer, working platform, geotextile/geogrid layer, drainage layer or other treatment is proposed, submit details	3 days before additional treatments	Additional treatments; loosen and compact, bridging layer, working platform or geotextile/geogrid layer, drainage

Clause/Description	Type	Submission/Inspection	Submission/Notice details	Process held
				layer
INSPECTIONS Notice Trimming tops of embankment	H	Trimmed and compacted embankment	3 days before placing any subsequent pavement layers	Placing any subsequent pavement layers
INSPECTIONS Notice Selected material zone	H – Superintendent and Principal Certifier	Completed surface	3 days before placing any subsequent pavement layers	Placing any subsequent pavement layers
INSPECTIONS Notice Deflection monitoring and proof rolling	W – Superintendent and Principal Certifier	Any visible deformation, rutting, yielding and or showing signs of distress or instability	3 days before completion	Completion
Note: H - Hold point, W = Witness point				

5.4 ANNEXURE - MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES

Activity	Key quality verification requirements	Maximum lot size	Minimum test frequency	Test method
Stripping topsoil	Surface levels	10,000 m ²	1 cross section per 25 m	Survey
Excavation	Geometry	10,000 m ²	1 cross section per 25 m	Survey
Floor of cuttings	Cuttings and placing fill for embankment construction: CBR test	5,000 m ²	1 per 1,000 m ² ^a	AS 1289.6.1.1 (2014)
	Compaction	10,000 m ²	1 per 500 m ²	AS 1289.5.4.1 (2007)
Foundation for Embankments	Compaction	5,000 m ²	1 per 500 m ²	AS 1289.5.4.1 (2007)
Embankments General	Geometry	1 layer 10,000 m ²	1 cross section per 25 m	Survey
	Material quality: CBR	1 layer 5,000 m ²	1 per 800 m ³	AS 1289.6.1.1 (2014)
	Compaction/moisture content/optimum moisture content	1 layer 5,000 m ²	1 per 250 m ³	AS 1289.5.1.1 (2017) AS 1289.5.4.1 (2007)
Embankments Select zone	Geometry	1 layer 10,000 m ²	1 cross section per 25 m	Survey
	Material quality: Particle size distribution CBR	10,000 m ² 10,000 m ²	1 per 1,000 m ³ ^a 1 per 500 m ³ ^a	AS 1289.6.1.1 (2014)
	Compaction/moisture content/optimum moisture content	1 layer 5,000 m ²	1 per 250 m ³ ^a	AS 1289.5.1.1 (2017) AS 1289.5.4.1 (2007)

Activity	Key quality verification requirements	Maximum lot size	Minimum test frequency	Test method
Selected material zone and fill adjacent to bridges, wingwalls, retaining walls and culverts	Material quality: Particle size distribution Plasticity index	1 Structure 1 Structure	1 per 200 m ³ ^a 1 per 200 m ³ ^a	AS 1289.3.3.1 (2009)
	Compaction/moisture content	1 Structure	1 per layer	AS 1289.5.1.1 (2017) AS 1289.5.4.1 (2007)
Compaction and moisture tests	Proof rolling	1 layer 5,000 m ²	1 per lot	RMS T198 (2013)
	Deflection monitoring: Benkelman beam method	1 layer 5,000 m ²	1 per lot	TfNSW T199 (2020)
^a or part thereof, per lot. Note: Lot size: A continuous length of formation at least 300 m, or lesser length, and a single carriageway width with homogeneous material and appearance.				

5.5 ANNEXURE – PAY ITEMS

This schedule applies to Council projects. For private development works use of this schedule is optional, at the Superintendent's discretion.

Pay items	Unit of measurement	Schedule rate inclusions
1112.1 Removal and stockpiling of topsoil	m ³ measured as bank volume. The volume to be the sum of: <ul style="list-style-type: none"> - The volume removed from cuttings calculated by multiplying the area of cutting to be stripped as calculated from the plans of natural surface or accepted ground model by the depth of topsoil required to be removed plus; - The volume removed from under embankments calculated by multiplying the area to be stripped as calculated from the plans of natural surface or accepted ground model by the depth of topsoil stripping as nominated in ANNEXURE - EARTHWORKS INFORMATION plus; - The additional volume of topsoil removed from shallow embankments below the depth nominated in ANNEXURE - EARTHWORKS INFORMATION and calculated on the basis of plan area multiplied by the documented depth of excavation. 	Costs associated with all activities associated with stripping topsoil, carting and placing into stockpile, then stabilising and trimming the stockpiles.
1112.2 General earthworks	m ³ measured as bank volume. The volume of earthworks in cuttings to be determined by the surface to surface triangulation method, calculating the volume between the plans of natural surface or accepted Ground Model, the designed batter lines and the base of the excavation from which is deducted the volume of topsoil as calculated under Pay item 1112.1 . No account to be taken of the allowable batter tolerances or	The schedule rate for this Pay Item to be an average rate to cover all types of material encountered during excavation and placed in embankments or spoil stockpiles, including both earth and rock. All costs associated with all documentation, approvals, survey and all activities associated with the excavation of material and the construction of embankments,

Pay items	Unit of measurement	Schedule rate inclusions
	stepping of batters for topsoiling.	<p>stockpiling of spoil, the haulage of material and any pre-treatment such as breaking down or blending material or drying out material containing excess moisture, except that:</p> <ul style="list-style-type: none"> - removal of unsuitable material to spoil to be paid under Pay item 1112.3 - extra costs in processing selected material to be paid under Pay item 1112.4 - overhaul of spoil or borrow to be paid under Pay items 1112.5 and 1112.6 respectively. <p>Conform to CUTTINGS, Floors of cuttings. The base of the excavation to be the designed floor level and no account to be taken of level tolerances. Where unsuitable material from the foundations of shallow cuttings or material from cut to fill transitions is excavated and placed into embankments the volume to be calculated from joint surveys carried out immediately prior to, and after subsequent removal of the unsuitable material.</p>
1112.3 Unsuitable material to spoil	m ³ measured as bank volume of excavation.	<p>If the volume of excavation cannot be measured, propose a method to determine the conversion factors to be applied to the loose volumes measured in haulage units or to the measured stockpile volumes.</p> <p>All costs associated with all operations involved in the excavation, haulage, drying out, compaction or other activity required under UNSUITABLE MATERIAL for disposal as spoil in conformance with SPOIL.</p> <p>If this Pay item provides for ranges of provisional quantities, the rates are to be applied successively, but not cumulatively, as the volume of unsuitable material increases from one provisional quantity range to the next higher range.</p> <p>Apply each rate as the sole payment due for all unsuitable material removed within each quantity range, irrespective of the nature or quantity of the material removed.</p>
1112.4 Selected material	m ³ measured as embankment volume in place in the selected material zone. Determine the volume by multiplying the theoretical plan area of the top of the selected material zone with its nominated thickness.	All costs associated with extra costs involved in stockpiling, processing, placing, compaction and trimming of material, including surface preparation for deflection monitoring in the selected material zone over and above those costs allowed for under Pay item

Pay items	Unit of measurement	Schedule rate inclusions
		1112.2. The width and depth to be taken as documented. No account is to be taken of level tolerances.
1112.5 Haulage of spoil	Per bank m ³ for each km or part thereof in excess of five km. m ³ measured using a weighbridge.	Where an approved location for spoil disposal is more than 5 km by road from the point of excavation of material being spoiled, make payment for haulage at the rate nominated in ANNEXURE - EARTHWORKS INFORMATION and include all costs associated with this activity. All costs associated with disposal of contaminated material.
1112.6 Haulage of borrow	Per bank m ³ for each km or part thereof in excess of 5 km.	Where an authorised borrow site that was not nominated in the Contract is more than 5 km by road from the point of delivery of borrow material to the Works, make payment for haulage at the rate nominated in ANNEXURE - EARTHWORKS INFORMATION and include all costs associated with this activity.
Seeding and restoration of stockpile sites and borrow areas	m ²	To 0257 Landscape - road reserve and street trees.
Traffic management	Lump sum	To 1101 Traffic management.
Control measures for erosion and sedimentation	Lump sum	To 1102 Control of erosion and sedimentation (Construction).
Clearing and grubbing of stockpile sites and borrow areas	10,000 m ²	To 1111 Clearing and grubbing.
Seeding and restoration of stockpile sites and borrow areas	m ²	To 0257 Landscape - road reserve and street trees.
Working platforms created by chemical stabilisation		To 1113 Subgrade and formation stabilisation.
Fill adjacent to culverts, other than box culverts	m ³	To 1351 Stormwater drainage (Construction).
Drainage structures		To 1352 Pipe drainage.
Selected backfilling to box culverts	m ³	To 1353 Precast box culverts.

5.6 ANNEXURE - REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1289		Methods of testing soils for engineering purposes
AS 1289.3.3.1	2009	Soil classification tests - Calculation of the plasticity index of a soil
AS 1289.5.1.1	2017	Soil compaction and density tests - Determination of the dry density/moisture content relation of a soil using standard compactive effort
AS 1289.5.4.1	2007	Soil compaction and density tests - Compaction control test - Dry density ratio, moisture variation and moisture ratio
AS 1289.6.1.1	2014	Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
AS 3798	2007	Guidelines on earthworks for commercial and residential developments
Austrroads AP-C87	2015	Austrroads glossary of terms
RMS T198	2013	Proof rolling test
RMS T199	2014	Deflection monitoring test

6 ANNEXURE M – CESSNOCK CITY 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 <i>Development Engineering Handbook</i> . Acceptance is to be obtained in writing from: an authorised representative of Council's Director of Infrastructure and Engineering Services.	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 Cessnock City Council <i>Development Engineering Handbook</i> for final inspection, works-as-executed and handover requirements.	Completion

7 AMENDMENT HISTORY

0	15/01/2024	First Published
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