



ENGINEERING DESIGN CODE
SPECIFICATION D6

SITE REGRADING

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DESIGN SPECIFICATION D6 SITE REGRADING

GENERAL

D6.01 SCOPE

1. This design specification sets out requirements for the site regrading involved in land development and subdivision. Conceptual requirements are presented as necessary considerations when preparing designs for site regrading.

2. The scope of this specification assumes that the Designer is familiar with requirements cited in the various construction specifications within the Armidale Regional Council suite of specifications, specifically those related to earthworks, clearing and grubbing and erosion and sediment control. Additionally the Designer needs to make reference to the associated design specifications related to drainage design, geometric road design and stormwater management and erosion control design.

Familiarity with other Specifications Required

D6.02 OBJECTIVES

1. This specification aims to assist the Designer in achieving:

- efficient and economical design
- enhancement of the environmental character of the site whilst maintaining the natural features of the site
- provision of safe conditions for construction commensurate with the proposed purpose of the development
- equality of building conditions for residential development
- a minimal impact on adjoining properties and developments.

Efficient

Environmentally Sound

Safe for Construction

Impact on Adjoining Properties

D6.03 REFERENCE AND SOURCE DOCUMENTS

(a) Council Specifications

Armidale Regional Council Construction Specifications

- | | | |
|------|---|--------------------------------------|
| C211 | - | Control of Erosion and Sedimentation |
| C212 | - | Clearing and Grubbing |
| C213 | - | Earthworks |

Armidale Regional Council Design Specifications

- | | | |
|----|---|--|
| D1 | - | Geometric Road Design |
| D5 | - | Stormwater Drain Design |
| D7 | - | Stormwater Management and Erosion Design |

Relevant Specifications

(b) Australian Standards

- | | | |
|-----------|---|--|
| AS 3798 | - | Guidelines on earthworks for commercial and residential developments |
| AS 2870.1 | - | Residential slabs and footings. |

Relevant Australian Standards

D6.04 SITE REGRADING CONCEPT

1. Areas of a site proposed for building or recreational purposes may not be suitable in their natural state for their intended function without improvement works to:

- a) Alleviate flooding of low-lying ground
- b) Fill gullies or create emergency flow paths after underground stormwater piping has been installed
- c) Allow improved runoff from flat ground
- d) Regrade excessively steep slopes that would preclude economical construction of dwelling foundations
- e) Allow effective recreational use or give reasonable access

*Suitable
Preparation of
Ground*

The Consultant shall review the natural surface contours and where necessary shall design finished surface levels that ensure the land is suitably prepared

2. Where practical, areas should be regraded to minimise the necessity for underground drainage systems with surface inlet pits, and allow surface water to flow naturally to roads or drainage reserves without excessive concentration.

Drainage

3. The Consultant shall consider the implications of site regrading in relation to the existing natural environment. Generally site regrading shall be minimised in heavily treed areas.

*Natural
Environment*

4. Care shall be taken to provide depressions for overland flow from low points and over major drainage lines, to direct stormwater for storms up to a 100 year average recurrence interval.

*Overland Flow
100 year ARI*

5. The design of site regrading areas in conjunction with the design of roadworks shall be considered with the objective of balancing cut to fill and achieving both an economical development and minimising haulage of imported fill or spoil to and from the development site. Bulk haulage should always be considered an adverse effect on adjacent development, and infrastructure.

*Minimal Road
Haulage*

D6.05 SPECIAL TREATMENT OF PARTICULAR AREAS

1. Areas abutting the 100 year ARI flood levels shall be site regraded to a minimum level of 0.5 metres above the 100 year ARI flood levels (Planning Flood Level). In doing so, the Designer shall ensure that other areas are then not affected by flooding. The site shall be identified on the Drawings with appropriate notation of site specific requirements.

Flooding

2. In the event that an area is known to be affected by or inundated by local stormwater flows, the Designer shall investigate the existing conditions as they relate to the proposed development and advise the Developer in the preliminary design report on all data obtained in the investigation and recommend appropriate contour adjustments. The report should normally be accompanied by detailed plans to clarify any actions proposed.

*Inundation
Areas*

3. Site constraints either natural or otherwise may be required to be identified as a burden on developed property. It is recommended that the designer take this into account when preparing the design. The property may ultimately be affected by a "restriction as to user", which may be controlled by a Section 88B Instrument (Conveyancing Act 1919) placed on title to the land and/or by a Section 149 Certificate (Planning and Environment Act 1979) advising prospective purchasers of any restrictions affecting the land.

*Restrictions on
Land Use*

4. The finished surface of filled areas shall be designed to levels allowing an adequate cover depth over the pipeline (if piped) and permitting surface stormwater flow to be guided to inlet pits if depressions are retained in the finished surface contouring.

*Piped Gullies
or Depressions*

5. The location of such features shall be clearly defined on the site regrading plans and defined by distance to corner boundaries, monuments, etc for purposes of relocation at the geotechnical testing stage for work as executed plans. A geotechnical report specifying the site specific preparation and compaction requirements will be required to be incorporated with the site regrading plan. A description of the minimum acceptable quality of the fill shall also be specified on the plans, supported by geotechnical recommendations. All documentation necessary from various authorities to support the filling of dams and watercourses shall be supplied with the design plans.

Dams and Water Courses

Geotechnical Requirements

6. The finished level of any building area shall be designed to ensure a desirable surface grading of 1.5% (1% minimum) oriented in the direction of the drainage system designed to cater for its catchment.

Surface Grading

7. Building areas containing natural ground slopes of an excessively steep nature, i.e. greater than 15% shall be brought to the attention of a Geotechnical Engineer or professional engineer experienced in geotechnical matters, for investigation of compatibility with dwelling types proposed. Specific requirements shall be noted on the design plans.

Steep Slopes

8. In known salt affected areas, or areas found to be salt affected by the geotechnical investigations, the Designer shall evaluate the existing conditions as they relate to the proposed development. The Designer shall also take advice from the relevant land and water resource authority and advise the Developer, in the preliminary design report, of areas requiring action to prevent salinity development. Appropriate regrading strategies aimed at lowering the groundwater table should also be included in the preliminary design report together with primary measures to prevent extension of salinity problems

Salinity Prevention

9. In various locations within the Armidale Regional Council boundary, there has been historical and current mining activity. This includes underground mines and open pits for the extraction of minerals, metals and gravel. The consultant/developer should enquire with the NSW Department of Industry Resources and Energy if such activity has occurred on the land and should form part of the geotechnical investigation of the site. Potential impact on the site as a result of mining activity should be considered and assessed.

Mining Activity

D6.06 GENERAL STANDARD OF LOT PREPARATION

1. Special requirements will apply where necessary but generally lots are to be cleared of low scrub, fallen timber, debris, stumps, large rocks and any trees which in the opinion of Council are approaching the end of their functional life or are dangerous or will be hazardous to normal use of the development. Prior consultation with Council Staff is necessary. Such requirements shall be shown on the design plans for the development.

Clearing

2. All timber and other materials cleared from lots shall be removed from the site. All roots, loose timber, etc which may contribute to drain blockage shall be removed. Such requirements shall be shown on the design plans for the development.

Disposal

3. Selected trees shall be preserved by approved means to prevent destruction normally caused by placement of conventional filling or other action within the tree drip zone. Council staff shall be consulted for advice and all specific requirements noted on the design plans for the development.

Preservation of Trees

D6.07 STANDARD OF FILL FOR LOTS

1. The following notations are to be incorporated in the design plans. "Filling is to be of sound clean material and free from large rock, stumps, organic matter and other debris." "Placing of filling on the prepared areas shall not commence until the authority to do so has been obtained from the Council".

Notations

2. All work shall be in accordance with AS 3798. Fill is to be placed in layers not exceeding 150mm compacted thickness. All fill is to be compacted to 95% standard maximum dry density. Maximum particle size shall be 2/3 of the layer thickness. Level 1 testing shall be required on all earthworks for commercial and residential developments for all lot fill and in accordance with the requirements of AS 2870.1 for depth of fill in excess of 400mm.

Fill Quality

Level 1 Testing

3. Non cohesive subgrade (sandy soil) shall be compacted to 65% density index and cohesive materials to 95 % standard compaction.

*Non Cohesive
& Cohesive
Subgrade*

4. Fill comprising natural sands or industrial wastes or by-products may only be used after the material type and location for its use is approved by Council and will be subject to specific requirements determined by prevailing conditions.

Prior Approval

5. All areas where filling has been placed are to be dressed with clean arable topsoil, fertilised and sown with suitable grasses. This work shall be carried out in accordance with the Construction Specification for LANDSCAPING.

Top Dressing

6. All areas where fill has been placed and over which a subdivisional road is to be constructed shall be select fill with a minimum CBR of 20% compacted to 95% standard maximum dry density. Maximum particle size shall be 2/3 (67%) of the layer thickness and Level 1 testing shall be required.

*Fill Under
Roads*

CBR 20%

D6.08 TEMPORARY DIVERSION DRAINS

1. Where temporary drains are required to divert surface flows away from the site regrading area, the location and silt/erosion control treatment shall be clearly identified on the engineering plans. The scale of such works shall reflect the volume of water to be diverted.

Erosion

The objective will be to ensure minimal soil disturbances and material loss off the site and the prevention of the transport of fine soil materials into the natural water cycle.

Control measures shall include, but shall not be limited to:

- a) Provision of trench stops every 30m along a trench, with provision for overtopping to be directed to the kerb.
- b) Placement of "blue metal"/ sand bags along kerb and gutter at maximum 30m spacing.
- c) Placement of "blue metal"/ sand bags around downstream drainage pits.

The requirements identified in Council's Specification D7 should be addressed for any additional requirements.

D6.09 CONCURRENCE WITH THE ENVIRONMENTAL PROTECTION AUTHORITY (EPA)

1. It is recommended that the Consultant refer to the EPA with regard to any items requiring specific consideration when preparing a site regrading plan. This is particularly relevant when imported material is used and there is a possibility of cross contamination of land. Such plans may need to incorporate sediment/siltation/erosion/salinity control devices with specific reference to the stage at which these are to be provided. The responsibility shall rest with the Consultant/ Developer to make enquiries with EPA and subsequently obtain Council approval to proposed measures.

EPA Liaison

D6.10 WORK AS EXECUTED PLANS

1. The Consultant shall annotate on the design plan/ site regrading plan, the site specific detail to be shown on the Work-as-Executed plans. Such detail shall include geotechnical report certifying the works to be suitable for the intended purpose and any other certifications, testing and survey data, as required in this specification.

*Certifications
to be placed on
Plans*

D6.11 CARTAGE OF SOIL

1. The Consultant shall refer to Council for acceptable haul roads with applicable load limits. This detail shall be required to be shown on the site regrading plan. The payment of a bond may be required by the Developer/Contractor where Council has some concern about the ability of a haul road to sustain the loads without undue damage or maintenance requirements.

Possible Bond Requirement

2. Unless specific application is made to Council and approval obtained, the plans will be annotated as follows:

Topsoil

"All topsoil shall be retained on the development site and utilised effectively to encourage appropriate revegetation."

D6.12 EFFECT ON ADJOINING PROPERTIES

1. Where it is proposed to divert or direct piped stormwater into adjoining properties, drainage easement rights are to be created over the adjoining lots in accordance with D5 the Specification for **STORMWATER DRAINAGE DESIGN**.

Stormwater Easement

2. A written agreement shall also be sought to carry out construction work on adjoining properties and all such agreements are to be submitted to Council.

Construction Agreement

SPECIAL REQUIREMENTS**D6.13 AREAS OF SPRING ACTIVITY**

1. Some locations within Armidale Regional Council area are subject to high groundwater levels and spring activity which can be breached during site regrading and construction activities. Large volumes of water can be discharged from such breaches in the water table causing difficulties in the compaction of earthworks and the stabilisation of building foundations.

Water Table Breaches

2. It is recommended that Consultants engaged in site regrading, earthworks and building foundation works take due diligence in determining the risk of encountering problem water tables and spring activity. Information may be obtained from DPI water and Council's GIS but such information is indicative only and should be backed up by detailed site investigation.

Due Diligence

D6.14 LAND SLIP AREAS

1. Care shall be exercised in areas where possible land slip could occur such as in steep mountainous country or steep cut and fill batters. Some indicators of possible land slip can be:

Land Slip Indicators

- Rock rubble at the base of batters;
- Evidence of earth slugs on the landscape;
- Weathered basalt subsoil;
- Seepage through batters;
- Leaning poles and trees;
- Depressions in roads near the edge of fill batters.

D6.15 RESERVED

ATTACHMENT A – GENERAL INFORMATION ON RE-USE AND DISPOSAL OF SPOIL

When excavating soil, clay, gravel, sand or rock fines certain regulations under Protection of the Environment Operations Act 1997 (POEO Act) must be met. Armidale Dumaresq Council Waste Services is aware that there is confusion within the community as to how excavated material should be classified and then reused or disposed of such appropriately.

Waste Services has seen a large influx in the amount of excavated material being presented at the Armidale Waste Management Facility. This attachment provides information to assist generators of excavated materials to legally supply fill materials for building or construction activities.

Traditionally excavated materials such as stripped topsoil could be taken to any location accepting 'clean fill'. However, due to public health and environmental concerns relating to contaminated soil the NSW Environment Protection Authority (EPA) enforces new regulations to control the movement of such materials. Individuals or companies undertaking excavation works that result in the need to dispose or reuse excavated materials can take either of the following two (2) actions:

- a) Pre-classify excavated material as *Virgin Excavated Natural Material (VENM)* by using the EPA's VENM Certificate. This is a declaration by the generator of the waste that the excavated material is not contaminated so that they can legally supply excavated materials to any receiver wanting materials for engineering fill or earthworks. The VENM declaration can only be used if the stipulated criteria are met concerning previous land use activities where the excavation is being undertaken. More information can be found at the EPA's website using the link:

<http://www.epa.nsw.gov.au/waste/virgin-material.htm>

- b) Comply with EPA's Excavated Natural Material (ENM) Order & Exemption 2014. By undertaking sampling and subsequent testing at a NATA certified laboratory the generator can legally supply excavated materials to any receiver wanting materials for engineering fill or earthworks. More information can be found at the EPA's website using the link:

<http://www.epa.nsw.gov.au/wasteregulation/orders-exemptions.htm>

If the generator of the excavated material does not nominate a reuse option the spoil can be disposed of at the Armidale Waste Management Facility. The gatehouse operator must be provided with either the VENM Certificate with a completed declaration, or a copy of the laboratory results that shows that the ENM Exemption and order has been complied with. The 2016/17 disposal charge for VENM or ENM will be \$17/Tonne. If excavated material is presented without the above documentation the disposal charge will be \$105/Tonne provided that no other rubbish is mixed in. Any excavated material presented with rubbish mixed in will be charged at \$210/Tonne.

An up to date list of waste disposal charges can be found in the Armidale Dumaresq Council's Fees & Charges which are available at:

<http://www.armidale.nsw.gov.au/council/financial-statements-reports/2013-2028-integrated-planning-and-reporting-documents-including>

ATTACHMENT B – WASTE FACT SHEET 1 FOR VIRGIN EXCAVATED NATURAL MATERIAL (VENM)



Transport
Roads & Maritime
Services

Waste Fact Sheet 1

Virgin Excavated Natural Material (VENM)

Definition

VENM is natural material:

- That has been excavated or quarried from areas that are not contaminated with manufactured chemicals or process residues, as a result of industrial, commercial, mining or agricultural activities
- That does not contain sulphidic ores or soils.

For more information, refer to the EPA's VENM web page located at <http://www.epa.nsw.gov.au/waste/virgin-material.htm>

Waste classification

General solid waste (non-putrescible).

Do I need an Environment Protection Licence to re-use VENM?

- **Onsite re-use:** No
- **Offsite re-use:** No

Do I need to take samples and have the material tested for contaminants?

No. If you meet the above definition for VENM it can be reused on or offsite without prior testing.

However: If you are in doubt as to whether the material is VENM, you should sample and test the material as per the excavated natural material resource recovery exemption to confirm that the material is free of contaminants (see Waste Fact Sheet 2).

Do I need to obtain a Section 143 from the landholder if I dispose of VENM offsite (for example, as fill material)?

Yes. When disposing of VENM offsite to a private or publically owned site, you must issue the landholder with a copy of the proforma Roads and Maritime Services letter and a Section 143 Notice.

The landholder must complete, sign and return the 143 Notice to Roads and Maritime prior to the waste being transported to the landholder's site.

Further information about Section 143 notice requirements, including the Roads and Maritime letter template and Section 143 notice is provided in [Environmental Direction No: 20](#).

Important note: The landholder must attach written evidence that legal consent has been granted from the local council or planning consent authority showing that the material can legally be accepted onto the landholder's site.

If I need to dispose of the material, what type of waste facility can I take the material to?

Every effort must be made to re-use VENM on or off-site before considering disposal. If disposal is the only option, the material can be taken to a waste facility, such as a council tip, licensed by the EPA to accept VENM.

Prior to transporting the material to a waste facility, you should ask for a copy of the facility's environment protection licence or check the EPA's public licence register to ensure that the facility's licence states that it can accept VENM.

The EPA's public register is located at <http://www.epa.nsw.gov.au/prpoeoapp/>.

Are there any legal waste transporter or waste tracking requirements?

No, but as a minimum and for due diligence reasons, you should keep records of the:

- Amount and the type of waste generated, stored, treated or disposed of
- Amount and the type of waste transported
- Name of the transporter and transporter's vehicle registration number
- Date of transportation
- Name and location of the waste facility that is receiving the waste.

Re-use opportunities

VENM by its nature can be re-used easily. Weed free topsoil may be stockpiled and reused on batters or in landscaping and revegetation works.

VENM may be sent offsite to a site that can legally accept this material for reuse or reprocessing.

To facilitate future re-use, VENM should not be mixed with any other types of waste.

Further information

If you require further advice on Roads and Maritime waste issues, please contact your regional environment staff or the Senior Environmental Specialist (Sustainability) in the Environment Branch on 02 8588 5752.

Level 17, 101 Miller Street, North Sydney NSW 2060
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ATTACHMENT C – WASTE FACT SHEET 2 FOR EXCAVATED NATURAL MATERIAL (ENM)



Transport
Roads & Maritime
Services

Waste Fact Sheet 2

Excavated Natural Material (ENM)

Definition

Excavated Natural Material (ENM) is naturally occurring rock and soil (including materials such as sandstone, shale, clay and soil) that has:

- a) Been excavated from the ground
- b) Contains at least 98 per cent (by weight) natural material
- c) Does not meet the definition of Virgin Excavated Natural Material (VENM).

ENM does not include material that has been processed or contains acid sulphate soils or potential acid sulphate soils.

An example of the difference between VENM and ENM: A noise mound that was originally formed using VENM and is demolished many years later is now considered ENM. The reason is that in the intervening period there is a risk that the noise mound may have been contaminated with other materials such as oils, dumped asbestos etc. and needs to be tested before re-use.

Waste classification

General solid waste (non-putrescible).

Do I need an Environment Protection Licence to re-use ENM?

- **Onsite re-use:** No
- **Offsite re-use:** No. Provided the conditions of the resource recovery order and exemption for ENM are met (see below).

Is ENM covered by a resource recovery order and exemption?

Yes. ENM can be re-used offsite provided all conditions attached to the EPA's resource recovery order and exemption are complied with.

Generator responsibilities are specified in the *Excavated natural materials order 2014*. They include that prior to re-use of ENM off-site the generator certify that the ENM complies with the relevant conditions of the ENM order and provide the off-site consumer with:

- A written statement of compliance, certifying that the excavated natural material complies with the conditions of the *excavated natural material order 2014*
- Copies of all test results (see below)
- A copy of the *excavated natural material exemption 2014*, or a link to the EPA website where the ENM exemption can be found.

The generator must keep a written record of the quantity of ENM supplied, and the name and address of each person to whom the processor supplied the ENM. Records must be kept for six years.

Consumer responsibilities are specified in the *Excavated natural material exemption 2014*. They include ensuring that the ENM:

- Meets all chemical and other material requirements as per the excavated natural material order
- Is only applied to land as engineering fill or for use in earthworks
- Is applied to land within a reasonable period of time after its receipt

A consumer must keep records of the quantity of ENM received and the suppliers' name and address. These records must be kept for six years.

A copy of the ENM order and exemption can be found here:

<http://www.epa.nsw.gov.au/wasteregulation/orders-exemptions.htm>

Do I need to take samples and perform any tests for contaminants?

Yes. ENM must be sampled, tested and contain contaminant levels less than the criteria listed in the ENM order before the material is transported to receiving site. To assist, refer to Waste Fact Sheet 6 on waste sampling and testing to ensure that samples are collected correctly.

Additional testing (beyond the ENM criteria) is only required if there is evidence that potentially contaminating activities previously took place on the excavation site (for example, former service station site, cattle tick dip site, banana plantation). If this is the case, specialist advice should be obtained from Environment Branch on additional test requirements.

Written records of all test reports must be kept for a period of six years.

Do I need to obtain a Section 143 Notice from the landholder for the offsite disposal of ENM (for example, as fill material)?

Yes. When disposing of ENM off-site to a private or publically owned site you must issue the landholder with a copy of the proforma letter and Section 143 Notice as per [Environmental Direction No: 20](#).

The landholder must complete, sign and return the 143 Notice to Roads and Maritime Services prior to the waste being transported to the landholder's site.

Important note: The landholder must attach written evidence that legal consent has been granted from the local council or planning consent authority showing that the material can legally be accepted onto the landholder's site.

If I need to dispose of the material, what type of waste facility can I take the material to?

Any waste facility, such as a council tip, licensed to accept ENM.

Prior to transporting the material to a waste facility, you should ask for a copy of the facility's environment protection licence or check the EPA's public licence register to ensure that the facility's licence states that it can accept ENM.

The EPA's public register is located at: <http://www.epa.nsw.gov.au/prpoeoapp/>.

Are there any legal waste transporter or waste tracking requirements?

No, but as a minimum and for due diligence reasons, you should keep records of the:

- Amount and the type of waste generated, stored, treated or disposed of
- Amount and the type of waste transported

- Name of the transporter and transporter's vehicle registration number
- Date of transportation
- Name and location of the waste facility that is receiving the waste.

Re-use opportunities

ENM by its nature can be re-used easily. Weed free topsoil may be stockpiled and reused on batters or in landscaping and revegetation works.

ENM may be sent offsite to a place that can legally accept this material for reuse or reprocessing.

To facilitate future re-use, ENM should not be mixed with any other types of waste.

Further information

If you require further advice on Roads and Maritime waste issues, please contact your regional environment staff or the Senior Environmental Specialist (Sustainability) in the Environment Branch on 02 8588 5752.

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