

# CHAPTER 3.7 GEOTECHNICAL REQUIREMENTS FOR DEVELOPMENT

## 3.7.1. INTRODUCTION

This Chapter applies to all land within the Central Coast Council Local Government Area.

### 3.7.1.1 Relationship to other Chapters and Policies

This Chapter must be read in conjunction with the relevant development provisions, environmental controls and location specific development controls of the Development Control Plan. Geotechnical requirements relating to coast processes, coastal cliff and bluffs as identified in Chapter 3.2 Coastal Hazard Management must be considered where relevant.

### 3.7.1.2 Geotechnical Requirements

The purpose of this Chapter is to provide detailed guidelines for the submission of Geotechnical Reports to support Development Applications.

#### OBJECTIVES

- To provide a management strategy for development in areas identified as having landslip potential
- To provide guidelines on the content of geotechnical reports submitted to Council

#### REQUIREMENTS

##### 3.7.1.2.1 Landslip Hazard Assessment Matrix

- a When assessing Development Applications, Council will consider the slip potential of a site through the review of any historic information held by Council or where potential geotechnical issues have been identified by reference to the following Matrices (Tables M1 & M2). Applicants are encouraged to contact Council prior to lodging development applications regarding sites that it is reasonable to consider that there may be potential landslip issues.
- b The following geotechnical abbreviations have been used to describe the geological strata in Tables M1 & M2:
  - Rh Hawkesbury Sandstone
  - Rnp Patonga Claystone
  - Qs High level Aeolian sand
  - Qd, Qhd & Qhbr Dune and Barrier Sands
  - Rnt Terrigal Formation
  - Rnt - s Terrigal Formation – sandstone sequences
  - Rnt - m Terrigal Formation – mudrock sequences
  - Qa Alluvium, swamp and estuarine deposits

CATEGORY		Category 1 Low Hazard Area	Category 2 Medium Hazard Area
GENERAL DESCRIPTION		Areas not susceptible to significant landslip hazard; instability not expected unless major site changes occur.  Often represented by low slope profiles in stratified rocks and nearly flat in alluvial deposits.	Land areas of potential landslip hazard and possible soil creep or a moderately steep soil covered slope. Instability may occur during and after extreme climatic conditions.  Represented by relatively steeper topography in stratified rocks and low slope profiles in alluvial deposits.
IMPLICATIONS FOR DEVELOPMENT		Good engineering and conventional building/development practices usually sufficient for safe development in these areas.	Restrictions on nature and extent of development [especially earthworks] may be required.
IDENTIFICATION CRITERIA	Rh	Slopes between 0° and ≤ 18° in plateau areas.  At least 25 metres from any prominent cliff line.	Slopes > 18° and ≤ 23°.  In proximity [within 25 metres] of cliff lines.
	Rnt Rnt-s Sandstone sequences.	Slopes between 0° and ≤ 12½°.  At least 100 metres from any prominent cliff line.	Slopes > 12½° and ≤ 22°  In proximity [within 25 metres] of cliff lines.
	Rnt-m Mudstone sequences.	Slopes between 0° and ≤ 10°. At least 100 metres from any prominent cliff line.	Slopes > 10° and ≤ 18°.  In proximity [within 25 metres] of prominent cliff lines.
	Rnp	Slopes > 0° and ≤ 5°.	Slope > 6° and ≤ 12°.
	Qa & Qd Qhd & Qhbr	Slopes > 0° and ≤ 5°. And <ul style="list-style-type: none"> <li>At least 50m away from a lake shore or river flat, and</li> <li>At least 60m away from a beach.</li> </ul>	Slope > 5° and ≤ 18° and where groundwater > 3m below surface. Slope > 5° and ≤ 24° and where groundwater < 3m below surface Or within 50m of lake shore/river flat.
Qs [deeper than 2 metres]	Slopes > 0° and ≤ 5° And at least 25m away from a cliff area.	Slopes > 5° and ≤ 18° and where groundwater > 3m below surface. Slope > 5° and ≤ 12° and where groundwater < 3m below surface. Or within 25m of a cliff area.	

Table M1 – Low &amp; Medium Hazard Areas

CATEGORY		Category 3 High Hazard Area	Category 4 Immediate High Hazard Area
GENERAL DESCRIPTION		<p>Land areas susceptible to soil creep, landslip and rockfalls due to steep slope profiles in stratified formations and proximity of land to cliff areas and alluvial deposits.</p> <p>Localised known areas of landslip and/or rockfalls may occur within the area. Commonly seepage problems occur in the area.</p>	<p>Land areas where there is evidence of active or past landslips, or areas where quarries, excavations/filling/erosion have created potentially unstable slopes during climate extremes, or areas of coastal and bluff instability, or rock face failures.</p> <p>Category also includes areas that are highly susceptible to landslip, rockfalls, or excavation instability to steep slope and/or geological formations which inherently give rise to instability. More than one type of hazard is also usually present.</p>
IMPLICATIONS FOR DEVELOPMENT		<p>Significant restrictions on nature and extent of development [especially earthworks and drainage] usually required.</p> <p>The risk associated with development in these areas are often higher than normal.</p>	<p>Unsuitable for development unless localised areas can be re-rated to Category 3 or better.</p> <p>Any development usually subject to substantial restriction.</p>
IDENTIFICATION CRITERIA	Rh	Slopes > 23° and ≤ 33° and in proximity [within 10 metres] of cliff lines.	Slopes > 33°. Prominent cliff areas or coastal bluff areas.
	Rnt Rnt-s Sandstone sequences	Slopes > 22° and ≤ 29°. In proximity [within 10 metres] of cliff lines.	Slopes > 29°. Prominent cliff or coastal bluff areas.
	Rnt-m Mudstone sequences	Slopes > 18° and ≤ 24° and in proximity [within 10 metres] of cliff lines.	Slopes > 24°. Prominent cliffs or coastal bluff areas.
	Rnp	Slopes > 12° and ≤ 18°	Slopes > 18° and cliff or bluff areas.
	Qa & Qd Qhd & Qhbr	Slopes > 18° and ≤ 27° and where groundwater is > 3m below surface. Slopes > 12° and ≤ 15° and where groundwater > 3m below surface And at least 60m from a beach.	Slopes > 27° and where groundwater > 3m below surface. Slopes > 15° and where groundwater < 3m below surface. Beachfront areas and within 60m of beach.
	Qs [deeper than 2 metres]	Slopes > 18° and ≤ 27° and where groundwater > 3m below surface. Slopes > 12° and ≤ 15° and where groundwater < 3m below surface. And at least 25m from a cliff area.	Slopes > 27° and where groundwater > 3m below surface. Slopes > 15° and where groundwater < 3m below surface. Or within 25m of a cliff area.

Table M2 – High &amp; Immediate High Hazard Areas

### 3.7.1.2.2 Geotechnical Reports

- a Where this assessment indicates that a lot has a Hazard Category of 2 or above, Council will require that the Development Application be supported by a geotechnical report that considers geotechnical conditions, stability and impact of development on the stability on the site (and adjoining lots).
- b Where this assessment indicates that a lot or part of a lot has a Hazard Category of 3 or above, Council will require that the Development Application be supported by a geotechnical report that considers geotechnical conditions, stability and impact of development on the stability on the site (and adjoining lots).
- c Where this assessment indicates that a lot has a Hazard Category of 4, Council will require that a Development Application be supported by a comprehensive geotechnical report that considers geotechnical conditions, stability and impact of development on the stability on the site (and adjoining lots).

HAZARD CATEGORY	LEVEL OF GEOTECHNICAL REPORT REQUIRED
<i>Category 1</i>	Not required unless the development is of extensive proportions and/or a major structure is proposed.
<i>Category 2</i>	A Class 2 [see Table R2] geotechnical report required prior to site development.
<i>Category 3</i>	A Class 1 [see Table R2] geotechnical report [i.e. detailed geotechnical investigation] prior to development. A "post development report" also required.
<i>Category 4</i>	Comprehensive geotechnical investigation and a Class 1 [see Table R2] geotechnical report is required before consideration of any development. A "post development report" also required.

- d The minimum information required in the geotechnical report is described in Table 3 below

ITEM	DESCRIPTION	REPORT	
		Class 1	Class 2
1	A description of the Assessment process adopted and the work undertaken to provide the assessment [See Note 1]	✓	✓
2	A site description, including vegetation, bedrock outcrops, site seepage & groundwater, existing development, etc.	✓	✓
3	Description of site substrata and identification of the geological formations present in accordance with standard geological practice [e.g. Terrigal Formation (Rnt) of the Narrabeen Group]	✓	✓
4	The depth to weathered bedrock over the site generally and within the building area in particular.	✓	✓
5	The site slopes observed [expressed in degrees] and maximum site slope. Delineation of site into areas of common slope and measured slope angles in the various areas.	✓	✓
6	A site plan indicating relevant geological features & location of proposed development on the land relative to those features [preferably at a scale of 1:200].	✓	
7	At least one geological section through the site and proposed development [preferably at a scale of 1:200]	✓	
8	Logs of boreholes put down to determine depth of soil/weathered rock strata. The borehole to penetrate the site strata to bedrock and at least one borehole to be within the building area of the site.	✓	
9	A "Risk Assessment" of the various parts of the land in accordance with the Australian Geomechanics Society Guidelines – March 2000 or as subsequently amended, delineation of the land into areas where different degrees of risk are determined, together with a site classification in accordance with As 2870- 1996 [or latest amended edition].	✓	✓
10	A statement of the effect of the proposed site development on the site, and adjoining land, stability.	✓	✓
11	An assessment of the stability of the land immediately surrounding and above/below the site and possible effects of instability [e.g. a rock fall] on the adjoining/nearby land on the site.	✓	✓
12	A descriptive Geotechnical Report which includes: <ul style="list-style-type: none"> <li>Sufficient detailed information and recommendations for a structural engineer and/or civil engineer to provide a design for the development to accommodate any instability, or potential instability, considered to affect the land and/or related land.</li> <li>A table providing the specific data required in items 3, 5 &amp; 9 in the format set out in Table R3.</li> <li>Any items that are required to be inspected by the Geotechnical Engineer during the course of construction together with details of any further geotechnical studies required at the site.</li> </ul>	✓	✓

Table 3

e The geotechnical data required in the geotechnical report is described in table 4 below.

Assessed by:		Assessment date:	
Lot No:	Street No:	Street:	
		Suburb:	
SITE DATA		Land Area 1*	Land Area 2*
Site Classification [AS 2870]:			
Land slope [degrees]:			
Geological abbreviation of underlying bedrock type:			
Description of surficial soil:			
Type of Stability Risk [e.g. landslip, rockfall, etc.]:			
Risk Assessment [e.g. low, moderate, etc]:			
Geotechnical Inspections required during construction? [yes/no]:			
Risks from adjoining land:			

Table 4

*Note: additional land area columns to be added where site has more than two fundamental slopes;*

### 3.7.1.6 Definitions / Glossary

**geotechnical engineer** means any geotechnical engineer and/or geotechnical geologist who is listed on the National Professional Engineers Register, Level 3 (NREP-3), or current member of the Australian Geomechanics Society and:

- a minimum of five years practice as a geotechnical engineer, or engineer geologist;
- advising on building works in regions of the Sydney Basin underlain by the Hawkesbury Sandstone and Narrabeen Group (in particular the Terrigal Formation and Patonga Claystone) geological strata, or who is able to demonstrate considerable relevant experience with similar geology;
- Covered by appropriate professional indemnity insurance with a cover of at least \$10,000,000 and provide the Council with proof of the currency of such insurance policy as and when required by Council.
- Where the geotechnical engineer is employed by a company, or other corporate entity, the signatory of the report shall be deemed to be the geotechnical engineer defined above.