4. GEOTECHNICAL and EARTHWORKS

4.1 Geotechnical Investigations

Ardill Payne & Partners (APP) completed a broad scale geotechnical investigation of the site in 2002 and 2003. The investigation was based on seventeen test pits sunk around the site and Ardill Payne and Partners experience in the investigation for and design of many of the residential and commercial buildings in Lennox Head. Attached Figure 4.1 shows soil unit types and test locations.

From the seventeen test pits sunk across the site, three types of soil profiles were encountered. These are described in the report and are summarised below:

- Soil Unit 1

  Found in the lower level of the subdivision between the southern and northern ridges and in the playing field areas. Profile consists of soft wet clays overlying loose to medium dense sands. These soils will generally have fill placed over them and may suffer from some degree of consolidation due to the 1.5 metre (nominal) thickness of soft wet clays.

- Soil Unit 2

  Found in the lower slopes of the surrounding ridges comprising stiff to very stiff silty red clays overlying alluvial clays and clayey gravel. Ideal founding material for house construction.

- Soil Unit 3

  Found in the upper slopes and tops of surrounding ridges consists of stiff to very stiff silty sandy clay overlying clayey gravel. Ideal founding material for house construction

The Geotechnical Investigation found that conventional building construction systems were applicable for the site. There was one area on the eastern section of the site that is very steep and not suited to conventional construction. However this area has been excluded from this proposal. The central portion of the site to be filled will require some consolidation of soft clays prior to house construction.

Subject to satisfactory consolidation and treatment of the type 1 soils in the central portion of the site, the APP report advises that conventional footing designs to Class M standard under AS 2870-1996 "Residential Slabs and Footings" Code would be suitable. However, AS 2870 classifications will still be required for all lots following completion of earthworks on the site.

4.2 Site Filling

The central portion of the site and areas around Hutley Drive are to be filled under an existing DA approval for reasons of flood proofing and to provide adequate drainage. This work is included as part of Stage 1. The central area will be overfilled to allow for expected consolidation of the soils in this area. Elsewhere there is no requirement for over placing fill. Material for filling is to be won from excavations around the surrounding hills but predominately from work on the northern ridge and slopes of Stoneyhurst Road. See attached Figure 4.2 for locations of bulk excavations and filling. Details of management controls for earthworks are provided in the Stage 1 Construction Management Plan.

Filling in the central area will generally be between 1.2 and 2.0 metres deep depending on location. Some sections close to the watercourse will require greater depths depending upon final stormwater design details. Current quantities analysis indicates 150,000 cubic metres of cutting and filling will be required across the site.

This central area also was found to have low level Potential Acid Sulfate Soils (PASS). These soils will be generally between 1 and 1.5 metres below ground level after filling. It is proposed to use the Environmental Management Plan prepared for the more reactive soils encountered in the WQCP site to address any effects the construction and operation of the subdivision has on the PASS. PASS mapping is provided on Figure 4.7.

The attached Figures 4.2, 4.3 and 4.4 show the location of the cut and filling as well as site contour plans before and after the filling in Stage 1. An Erosion and Sediment Control Plan is also provided for the work. Details are provided on Figure 4.5 and Figure 4.6 for the Stage 1 works.