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Attention: Georgia Leonard

Dear Georgia,

Cessnock Hospital Redevelopment
Civil Earthworks Statement

This statement is to describe the existing conditions of the site and to provide a methodology on how to reduce the cost bulk earthworks for the project.

Site Description
The Cessnock Hospital campus is located between View and Jurd Street, on the south and north sides respectively, with main vehicle access entering from the east along Foster Street. The hospital site is bounded by residential properties and the Ambulance Station on the western side of the campus

The existing site has an undeveloped grassed area with helipad on the northern side. There is a homestead (Cessnock House) on Foster Street which is used for allied hospital services. The west side of the site is the staff carpark which is constructed from asphalt.

Site Topography
The hospital sits close to the crest of the surrounding hillock. The emergency entry and carpark are located on the higher aspect of the campus. The maximum hospital ground level is around RL85.80m and falls towards Jurd and View Streets which are lower by about 5m and 3m respectively. The main carpark in the west sits about 2m lower than the emergency department.

Subsurface Conditions
The Singleton 1:250,000 Geological Series Sheets indicate that the southern portion of the site is underlain by the Greta Coal Measures, which typically comprises sandstone, conglomerate, shale and coal seams. The northern portion of the site is mapped as being underlain by the Farley Formation which typically comprises mudstone, sandstone, shale and limestone. Reference should be made to Plate 3 below.

Plate 3 – Excerpt from Singleton 1:250,000 Geological Series Sheet (Pdf-Farley Formation, Pg-Greta Coal Measure)

The boreholes encountered a generalised subsurface profile comprising shallow to moderately deep fill over residual clay soils, with bedrock at predominately shallow to moderate depths. Groundwater was only encountered in a select few boreholes but was considered to be perched water seepage rather than the groundwater table. The more pertinent details of the materials encountered are provided below.

Pavement
The pavement consists of Asphaltic concrete (AC), concrete and brick pavers being supported by concrete.

No distinct granular base or subbase layers were observed below the AC or concrete, apart from gravel fill in some areas was encountered that could be a base or subbase layer.
Fill
Fill was encountered at variable depths ranging from 0.2m to 1.9m. There was no pattern within the site of the fill being deeper in a particular area with the depth varying. The fill predominantly comprised silty clay with varying proportions of sand, gravel, ash and slag. The clayey fill was assessed to be of low to medium plasticity. The estimated compaction of the fill generally varied between poorly to moderately compacted, with some well compacted layers.

In one area, gravel fill comprising slag was encountered below the AC and extended to a depth of 1.4m.

Residual soil
The residual soils predominantly comprised silty clay, with some silty sandy clay layers. The plasticity of the clays varied, with the clays with little or no sand inclusions of medium to high plasticity and the clays with a higher percent of sand inclusions being of low to medium plasticity. The clays also contained varying amounts of ironstone gravel. The moisture condition of the clays were generally greater than the plastic limit. The clays were generally of very stiff to hard strength, with some stiff layers and clays of firm strength.

Bedrock
The bedrock predominantly comprised sandstone, with some siltstone layers. The rock was encountered at depths ranging from 0.9m to 2.9m. On first contact the rock was generally assessed to be distinctly weathered and of low strength, increasing shortly thereafter to at least medium strength. All boreholes apart form BH10 refused within inferred high strength rock at depths ranging from 1.8m to 4.85m.
Based on the above information, the material being excavated was broken into a number of categories namely: virgin excavated material (VENM), excavated natural material (ENM) and general solid waste (GSW).

As part of the bulk earthworks design, additional boreholes were undertaken to develop a subsurface model to assist in the calculating the amount of cut and fill for each layer of material. The aim of the additional modelling was to determine the amount of GSW which needed to be excavated and replace it with clean fill to be removed from site. The GSW then could be placed in a borrow pit under the building. This methodology was used to reduce the cost on the removal of the GSW from the site.

The table below shows the cut and fill required in different areas across the site.

Bulk Earthworks Volume Across the Site

		Car Park	Landscaping	Med Gas	Building Area	Street	Total
Cut	Stripping	445	339	223	1221	322	2550
	Fill/GSW	78	1228	299	4275	131	6011
	Clay		122		867		989
	Rock				4		4
Fill		631	339	2	1052	156	2180

Borrow Pit Volume Required **6381**

Table 1: Bulk Earthworks Volumes

Proposed Geotechnical Borrow Pit

Location: Under the building Area: 720 m^2 Depth: 3 meters Slope: 1 in 1 bench cut
Volume Calculation:

- Total volume: 6,415 m^3
- Clay content: 4,476 m^3
- Rock content:1,915 m^3
- Net clean material: 6,381 m^3

Analysis:

- The proposed borrow pit can potentially supply the required clay content for the project.
- The excess material (34 m^3) can be used to supplement topsoil requirements.
- The borrow pit can be extended, if necessary, provided appropriate geotechnical stabilization is implemented.

Analysis:

- The overall project requires a net cut of 4,824 cubic meters, including 989 cubic meters of clay.
- The excess material from the borrow pit (34 m^3) can partially offset the fill requirements, but additional fill material may be needed.
- The stripping volume of 2,550 m^3 can account for approximately 40% of the borrow pit volume.

Disclaimer :
The information and data presented in this report are based on current investigations and information from various engineering disciplines. Actual conditions may vary, and it is recommended to conduct further site-specific investigations to confirm the accuracy of these estimates.

for
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