

SPECIFICATION

**PROPOSED NEW CONCRETE FLOOR
SLAB CONSTRUCTION OVER THE
EXISTING INDOOR TENNIS COURT
SITE, LOCATED WITHIN THE
ADMINISTRATION BUILDING
AT**

Wollongong Surf Leisure Resort
Lot No. 501 - DP 730059 Thomas Dalton Park
201 Pioneer Road, TOWRADGI NSW

Civil Engineering & Construction Services
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1 GENERAL INFORMATION

The Proprietors of the Wollongong Surf Leisure Resort intend to re-develop the existing indoor tennis court site to establish a multi-purpose hall facility including a new concrete floor as part of the re-development. The existing indoor tennis court is located in the south-western area of the Administration Building, adjoins the indoor swimming pool at Lot 501 Thomas Dalton Park, Towradgi.

This proposal enables the Wollongong Leisure Resort to meet the requirements and demands of various associations seeking conference facilities together with on-site accommodation.

The demand for in-door tennis court facilities has been rapidly diminishing and the current market demand for conference facilities, together with on-site accommodation is now an expanding market. There has also been a change in the quality of facilities companies, religious groups, governments departments and career training organisations are seeking, these including various forms of accommodation, dining, leisure, sports and parking facilities.

The proposed re-development results in providing the Wollongong Surf Leisure Resort complex with the required mix of both conference facilities, combining with on-site accommodation and dining facilities.

Site Restrictions

Site access shall be limited to the area bound by the security fence line surrounding the proposed development. Access on and around the site, and use of the site for temporary works and construction plant, including working and storage area, location of sheds, and parking, is restricted to the works part of the site.

Access to areas outside the designated work site, will require approval prior to commencing any construction activities and is limited to the carrying out items of constructions that are located on the part of the site. Extreme care will be adopted in all activities located in these areas to limit the extent of disturbance. And make good all disturbance to the site as early as permissible.

Occupied Premises

Occupied premises on site during the works will require;

- Secure possession and occupancy of their premises.
- Safe access for occupants, visitors and general public.
- Safe access and car parking for occupants, their employees and clients, including the maintenance of such uninterrupted access as would reasonably be consistent with the requirement for the continued successful conduct of the area.
- Protect occupants against dust, dirt, water or other nuisance as far as possible.

For construction operations that necessitate interruption to access for the occupants, such as excavation of trenches across roadways or placing of asphalt surfacing. Adequate notice to council will be required, to enable appropriate advertised notification to be employed for the general public.

Reference Documents

Current editions: All Referenced documents used are editions, with current amendments, except where other editions or amendments are required by statutory authorities.

Protection Of Persons And Property

Temporary works: Provide and maintain required barricades, guards, fencing, shoring, temporary roadways, footpaths, signs, lighting.

Damage to services: Do not obstruct or damage roadways and footpaths, drains and other existing services in use on or adjacent to the site. Determine the location of such services. Rectify immediately any abstraction or damage to such service and provide temporary service whilst repairs are carried out.

Damage To Property: Do not interfere with or damage property which is to remain on or adjacent to the suite. Rectify immediately any interference or damage to such property.

Existing Services

General: Attend to existing services as follows:

- If the service is to be continued, repair, divert or relocate as required. If such a service crosses the line of a required trench, or will lose support when the trench is excavated, provide permanent support for the existing service.
- If the service is to be abandoned, cut and seal or disconnect, and make safe.

PLANT

Use Of Existing Services

Existing services may be used as temporary services for the performance of the project subject to minimising disturbance to occupants of the site.

The existing public toilets are not to be utilised during the construction of the project.

Electrical supply for temporary service for the performance of the project will be taken only from the supply nominated by the principle.

Temporary Services

Provide any temporary service which may be necessary for carrying out the works or enabling the continued operation of the existing occupants of the site.

ADMINISTRATION

Order Of Work

The order in which the works are to be carried out shall minimise the disturbance to the existing occupants of the site, to councils satisfaction and permit continuing operation of the area.

Site Meetings

Site meetings throughout the project as requested by council and the project manager will be attended by the contractor. At the first site meeting, names and telephone numbers of responsible persons who may be contacted after hours during the course of the project.

EXECUTION OF THE WORKS

Requirements Of Authorities

The principal shall obtain all permits and other authorisations required by Wollongong City Council relating to the Building Approval.

Notices

Appropriate notification which is required by Wollongong City Council will be given in relation to inspection of the works. No part of the works shall be covered up, where notification of inspection is to be given, without prior approval.

Surveys

Engagement of registered surveyor to set out the work on the site and provide a Surveyor's Certificate at the completion of the works, to the effect that the roadworks and project have been constructed in accordance to the levels detailed in the design plans and that the finished levels of the groundwork's are in accordance with the finished levels shown on the drawings.

Progressive Cleaning And Runoff

The works must be maintained in a tidy condition during construction progress and sediment controls to prevent runoff of sediment from the area of the works, this includes sediment or silt from soil, cement and building waste.

Safety

Undertaking of the works in accordance with the Site Occupation Health and Safety Requirements a copy of which is annexed hereto as "Annexure A".

COMPLETION

Final Cleaning

Before practical completion remove waste, surplus materials and rubbish, clean debris and silt from the whole of the site and leave the site in a clean and tidy condition. All temporary works and construction plant must be removed from site prior to practical completion.

Restoration

Clean and repair damage caused during the works and restore existing facilities used during construction to original condition and to Wollongong City Council satisfaction.

2 INSPECTION

Notice

Give sufficient notice so that inspection may be made at the following stages:

- Earthworks complete to design levels.
- Services laid in trenches and ready for backfilling.
- Bad ground in all areas of work.

Existing Services

Before commencing groundwork's, locate and mark existing underground services in the areas which will be affected by the groundwork's operations i.e. excavation and trenching.

Environmental Protection

Undertaking the works in accordance with the relevant Australian Standards and the provisions of all Statutes, By-Laws, Rules and Regulations affecting or in any way relating to the Works, including the Clean Air Act, Clean Waters Act and Noise Control Act.

Restricted working hours between the hours of 7:00 am and 5:00 pm Monday to Friday will apply to this project. Saturday and Sunday, no work shall not be carried out. Should it be necessary to work outside the allocated working times, arrangements must be made with Wollongong Surf Leisure Resort prior to any work being carried out on site.

GENERAL

All work shall be carried out to the satisfaction of Wollongong City Council and the Project Manager and where not otherwise stated, in accordance with Wollongong Council's Engineering Specifications for Sub-division and Developments and specific conditions set out in both the Development Approval and Building Approval. This requirement shall apply to all areas except where specifically varied in writing by the Project Manager.

The appropriate sections of the Development Approval, Geotechnical Report and Wollongong Council's Civil Construction Specifications are annexed hereto as "**Annexure C, D & E**".

The site preparation work shall include, but not be limited to the following:

- * Locate and verify existing on-site services and where necessary to remove, adjust or cut any existing service. Contact the appropriate authority and make adjustment where required to enable site preparation to proceed without risk of damaging the existing service.
- * Removal of existing tennis court synthetic grass materials from the site as specified.
- * Setting out, alignment and care of survey markings necessary for construction.
- * Undertaking of excavation works in accordance with the "Standard Specifications" including all temporary traffic control devices.
- * Place fill in layers and compact each layer to achieve the required density as detailed in the Geotechnical Report.
- * Trim and compact the site to the required levels following the excavation and site fill operations.
- * Construct concrete pavements at the location, line and levels, and to the Structural Engineers detail and to Wollongong City Council Construction Specifications for concrete pavements.
- * Reinstatement of work area shall be carried out as early as practical to match existing surfaces or to the standards detailed in the specifications.

GENERAL

Cross Reference

Refer to the following sections:

- ANNEXURE “D” GEOTECHNICAL REPORT
- PREAMBLE

Definitions

Bad ground: Ground unsuitable for the purposes of the works, including fill liable to subsidence, ground containing cavities, faults or fissures, ground contaminated by harmful substances and ground which is or becomes soft, wet or unstable.

Rock: Any monolithic material with volume greater than 0.5 m³ which cannot be removed until broken up by either explosives or by ripper or percussion tools.

Subgrade: The trimmed or prepared portion of the formation on which the pavement or slab is constructed.

SCOPE OF WORK

The scope of work required in this project includes the following;

Preliminaries

Due to the sensitive nature of the environment in which the proposed works are to occur, strict compliance with the approved scope of works schedule shall be maintained and details noted in the specifications for work shall implement; namely

- Erecting and Maintaining Erosion and Sedimentation Controls in accordance with the publication “Urban Erosion and Sediment Control - Field Guide” prepared by the Department of Conservation and Land Management.
- Locating and adjusting existing services as required.
- Undertake the works in accordance with the best of trade industry practice.
- Disposal of excess material to a site/sites designated by Wollongong Council.
- All construction material, synthetic grass, spoil etc. Shall be maintained within the property and removed from site to an appropriate waste management disposal centre.
- Vehicle and machinery numbers are to be limited to suite daily requirements.
- Vehicle and machinery are to be parked in designated areas when not in use.
- Servicing of vehicle and machinery will not be permitted on site.
- Reinstatement of work area to match existing surfaces or to the standards detailed in the specifications, shall be carried out as early as practical.
- Undertake work in accordance with the relevant requirements of the WorkCover Authority.

Ground Work

Ground work required to bring to the shape and level of the ground surface to the shape and levels required 250mm below the existing tennis court surface level.

Ground work shall include:

- * The adjustment of Ground levels to accommodate the build as described in Coffey's Geotechnical Investigation Report Dated 28th January 2014 .
- * The adjustment of Ground levels to prevent surface drainage water from entering the building.

DEMOLITION

The demolition work shall include, but not be limited to removal of existing synthetic grass and existing hard stand area. Material which cannot be reincorporated back as useful product must be removed from site. The dismantling of the existing structures to facilitate the works, shall be set aside in a position nominated by the Project Manager for re-establishment on completion of the works.

Under no circumstances are access paths and fences, to be removed from the site by an person employed on-site during the construction period.

SITE CLEARING

This specification provides for the clearing and removal of prescribed material from the full area of the site specified. The full area of the site specified or shown on the drawing shall be cleared of the prescribed materials, being tennis court synthetic grass surface and subsurface slag pavement and the materials to be removal off site to the nearest waste disposal station.

ALIGNMENT, SETTING OUT AND SURVEY MARKS

The finished surface levels of the concrete pavement where appropriate will be marked and recovered, by pegs or other marks as required. Survey marks shall be preserved and maintained in their true position throughout the period of this project. Should any SSM (State Survey Mark) and permanent marks be disturbed arrangements shall be made for a Registered Surveyor to rectify such disturbances.

EXCAVATION

Undertaking of excavation works in all classes of materials to the depths and dimensions shown or stated in the Geotechnical Report, or to such greater depths and dimensions, that will ensure sound, permanent foundation.

Extent - Excavate over the site to give correct levels and profiles as the basis for construction, paving filling and concrete pavement works. Make allowance for compaction or settlement.

Imported selected filling to the site for the execution of this project is to be obtained from suitable sources outside the limits of this project. All filling so provided an imported shall be approved by the project manager and shall be free from sticks, brickbats, rubbish, rocks, roots, noxious weeds, silt, humus and lumps of clay, or other unsuitable material.

Removal Of Unsuitable Material

Following excavation works and prior to filling works are commenced in any area, all deleterious material shall be removed and disposed as directed by the project manager.

Grading

Grade the ground surface to achieve the finish levels as required, Trim and dress any area of the site which, although noted as works area, have been disturbed during recent construction operations on the site and which requires reinstatement, making good, or making neat. This particular applies to the banks at the rear of the building and the eastern side of the area.

Placing Fill

Place fill in layers and compact each layer to achieve the required density. Where necessary to achieve the required density or moisture content, adjust the moisture content of the fill prior to compaction.

Cross Reference

Refer to the following sections:

- PREAMBLE
- SITE PREPARATION WORKS

General

Cross References & inspection - Refer to the following sections:

- Wollongong City Council Civil Construction Specifications
- Preamble
- Site Preparation Works

Sufficient notice shall be give so that inspections may be made at the following stages:

- Subgrade material opening, natural ground assessment.
- Preparation of subgrade, placement of subbase and base courses.
- Preparation for priming, sealing and surfacing.

Inspection Notice

Sufficient notice shall be given so that inspection may be made of work ready for testing.

Civil Work

All work shall be carried out as described in the Geotechnical Report and in accordance with the standards specified in Wollongong City Council current engineering codes and specifications.

Civil work shall include:

- * Remove existing tennis court synthetic grass surface and dispose of material offsite including payment of all tipping fees as applicable.
- * Excavation and removal 250mm of Granulated Blast Furnace Slag (very dense and cemented) material from site to and appropriate tipping facility including payment of all tipping fees.
- * Trim and compact the upper 300mm coalwash sub-grade material to a minimum density ratio of 100% of Standard Maximum Dry Density. Compaction should be achieved with a 5 tonne smooth drum roller without vibration standard.
- * The compacted sub-grade surface shall be proof rolled under the project engineer and geotechnical engineer observation. Any soft and yielding surface areas will be treated to the supervising engineer direction.
- * Supply, place and compact 100mm compacted thickness of 20mm DGS flexible pavements. Compaction should be achieved with a 5 tonne smooth drum roller without vibration standard.
- * Construction of 150mm thick 25 Mpa plain concrete pavement reinforced with two layers of SL72 fabric with 50mm cover both top and bottom.

Civil Works shall implement:

- * The provision of all necessary chainwire fencing and associated security to isolate the site from the general public, including all necessary gates, shade cloth and repairs and maintenance for the duration of the project.
- * The provision of all necessary fencing and security to render the site safe and secure on the completion of each day's activities. The provision of all necessary barricades, barriers, night lights, site lighting and road plates; The provision of all safety and warning signs, bunting, handrails and balustrades.
- * The provision of all necessary crange and the provision of necessary lifting and hoisting equipment, complete with all appropriate crane chasers.
- * All mobile and temporary scaffolding necessary for the completion of the project.
- * Undertake the works in accordance with the best of trade industry practice.
- * Removal of all waste generated by undertaking the works and which cannot be recycled. Under no circumstances shall any material be burnt on the site.
- * Management of traffic control onto and off the site.

Surface Level

The finish surface level shall be free draining and evenly graded between level points. The tolerance in the surface level of the finished level of each layer, unless over ridden by the requirements for the finished level and thickness of the surface course, shall be ± 10 mm longitudinal and transverse direction.

Subgrade Preparation

- * Subgrade shall be trimmed to an even surface free from loose material.
- * Where jointed, laminated, floating rocks or the like exist at the subgrade level, further excavation shall be undertaken to the satisfaction of the Engineer.
- * The subgrade shall be uniformly compacted to not less than 100% of the maximum dry density (standard) as determined by AS 1289, unless otherwise specified on the approved pavement design.
- * The completed subgrade will require to withstand a physical roller load test using a vehicle which will impose a 5 tonne axle load, before placement of any pavement material.

Pavements

Pavements shall be constructed on the subgrade, to a given total 100mm minimum specified thickness and complying with tolerance limits applicable to each individual pavement design.

Subbase and base course shall be constructed out of crushed rock, sand and natural gravel consisting of hard, dense, durable particles of uniform quality, free from deleterious material. The subbase course material shall satisfy the requirements for the classes of DGS20 and the standards stated in the Wollongong City Council Civil Work Specifications.

Concrete pavements

Concrete pavements shall be constructed at the location, line and level, to the current floor level, Structural Engineers detail and to Wollongong City Council Civil Construction Specifications for concrete work.

Concrete

- * All concrete shall have a slump of 80mm max and an aggregate size of 20mm.
- * Concrete 28 day compressive strength shall be 25 Mpa for slab on ground.
- * Clear concrete cover to reinforcement shall be for slab on ground - 50mm top and bottom.
- * Concrete surface shall be cured for a minimum period of 7 days commencing immediately after initial set.
- * All reinforcement is to be in accordance with AS4671-2001
- * All reinforcement is to be supported on plastic tipped steel chairs at 600mm CTS, with a minimum end and side lap to be 300mm for SL72.

All concrete work requiring certification by the Structural Engineer, will only be permitted at the direction of the Structural Engineers and to his satisfaction. All concrete work carried out without the Structural Engineer's approval will be removed and replaced by the Tradesmen at their cost.

Testing and certification required by council, is detailed in Wollongong City Council Civil Construction Specifications for pavements, and shall be made available during the completion of each layer of pavement construction. Construction of the immediate pavement layer will not be permitted without proof of conformity.

Construction of pavements shall conform to the requirements stated in Wollongong City Council Civil Work Specifications and to the satisfaction of the supervising Engineer. Also, all materials and workmanship shall be in accordance with AS 3600.

ANNEXURE A

COFFEY'S GEOTECHNICAL REPORT

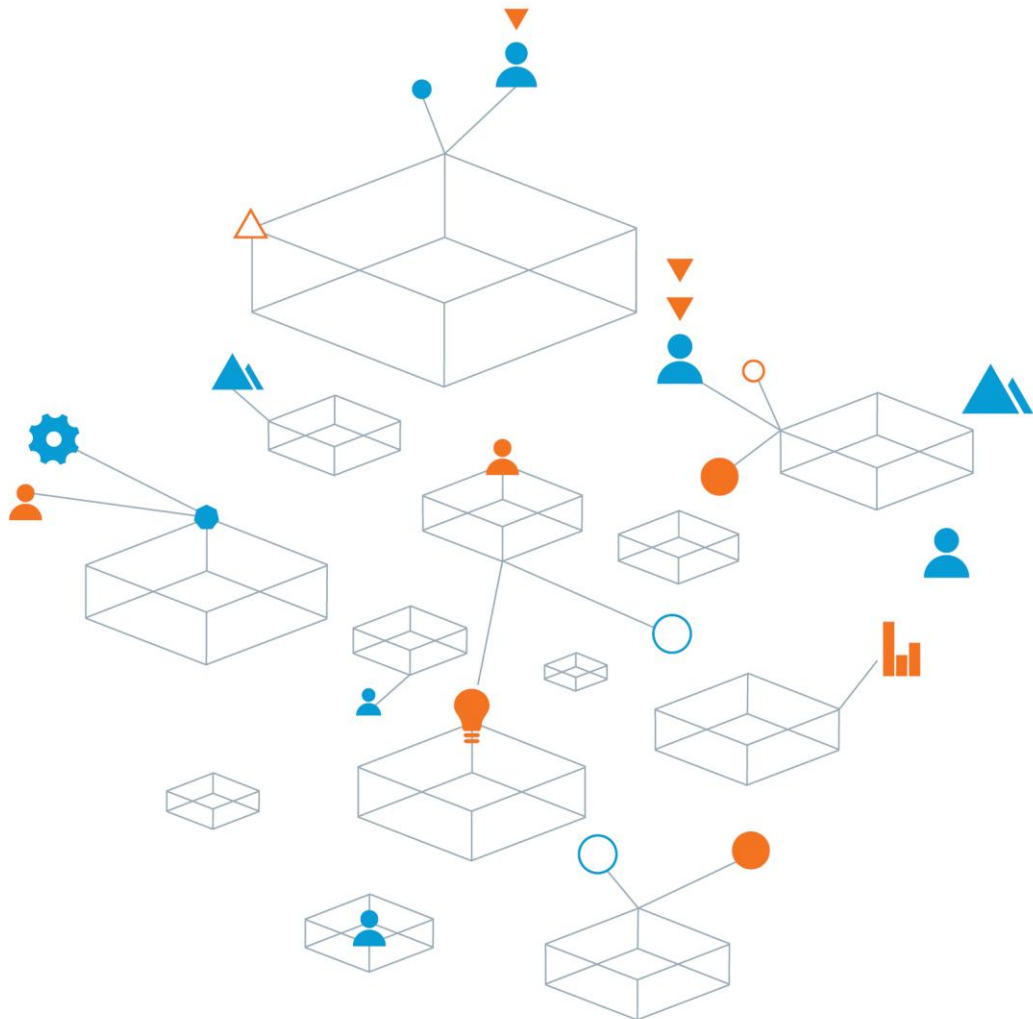
Wollongong Surf Leisure Resort

Geotechnical Investigation

Damage to Tennis Court Surface and Proposed New
Floor Slab

201 Pioneer Road, Fairy Meadow NSW

28 January 2014



Trust is the
cornerstone
of all our
projects

28 January 2014

Wollongong Surf Leisure Resort
201 Pioneer Road
Fairy Meadow NSW 2519

Attention: Con Kokiousis

Dear Con,

RE: Geotechnical Investigation

Damage to Indoor Tennis Court Surface and Proposed New Floor Slab

201 Pioneer Road, Fairy Meadow NSW

Please find enclosed our report on a geotechnical investigation of the site for a proposed new floor slab over the existing indoor tennis court site at the Wollongong Surf Leisure Resort, Fairy Meadow, NSW. The investigation was carried out in general accordance with our Coffey proposal GEOTWOLL03589AA-PAA dated 5 November 2013.

We draw your attention to the attached sheet entitled 'Important Information about Your Coffey Report' which should be read in conjunction with this report.

Should you have any questions in relation to this report please contact the undersigned in our Wollongong office.

For and on behalf of Coffey,



Dominic Trani

Senior Geotechnical Engineer
(Project Manager/Signatory)

For and on behalf of Coffey,



Jon Thompson

Principal Geotechnical Engineer
(Project Director/Authorised Reviewer)

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Important Information About Your Coffey Report

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Figure 1: Site Plan

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Appendix A Engineering Logs of Boreholes with Explanatory Notes

1 INTRODUCTION

Coffey Geotechnics (Coffey) is pleased to present the results of the geotechnical investigation carried out at an indoor tennis court within the Wollongong Surf Leisure Resort (WSLR) located at 201 Pioneer Road, Fairy Meadow, NSW. The investigation was carried out at the request of Con Kokiousis, acting on behalf of WSLR.

2 BACKGROUND INFORMATION

The site is located in a historically low lying area that was raised by filling prior to the development of the Surf Leisure Resort about 25 to 30 years ago. Based on our Principal Engineer's (Jon Thompson) local experience and recollection of filling activities, we understand that the area was filled with either coalwash or slag prior to the construction of the building that includes the indoor tennis court in the 1980s.

We understand that the existing indoor tennis court is to be re-developed as a multi-purpose hall with a new concrete floor proposed as part of the development. However the existing tennis court has experienced unusual damage in the form of numerous raised mounds over its synthetic surface which have made the surface no longer playable. The court surface overlies a bound pavement comprising a cemented slag product. We understand that within the past 5 years leakage of the roof occurred and also significant inundation of rain water into the court when the roof was being replaced. Subsequently the synthetic court surface began to lift forming numerous raised mounds.

The objectives of this investigation were as follows:

- To assess the materials underlying the pavement surface, including the pavement and the slag fill (if not cemented).
- To advise on the likely cause(s) of the damage to the tennis court;
- To advise on options for treatment of the underlying materials prior to construction of a new concrete floor slab.

3 METHOD OF INVESTIGATION

3.1 Borehole Drilling

Based on observations by a Coffey geotechnical engineer on 27 November 2013, four test locations were selected and coring of four test holes through the pavement was carried out. The test holes were evenly spread over the floor and at some locations where the raised mounds were occurring (Figure 1). Boreholes were then continued below the cored holes using a mini excavator with auger attachment and using a Tungsten Carbide (TC)-bit. The maximum borehole depth ranged from 0.8m to 1.5m.

Samples of the pavement materials and underlying fill were collected from the test locations for further visual assessment.

During the fieldwork Coffey engineers had further discussions with WSLR site manager who had a long association with the site, in particular to gather an account of the sequence of events leading to the damage of the tennis court floor.

The borehole logs are presented in Appendix A.

3.2 Dynamic Cone Penetration Testing

At each of the test holes, after coring through the pavement and prior to auger drilling, Dynamic Cone Penetrometer (DCP) tests were carried out to depths ranging from 0.4m to 2.1m.

The DCP blow counts for the DCP tests are presented within the borehole logs attached as Appendix A.

3.3 Review of Properties of Slag Materials

As the cemented slag material immediately below the synthetic surface of the tennis court was assessed to be the source of the swelling and deformation of the court surface, we conducted some research into the behaviour of these slag materials and discussed the material properties with an engineer formerly involved in slag processing at Port Kembla. This research was carried out in lieu of conducting the proposed limited suite of laboratory testing outlined in our proposal, as it was not considered that free lime content was a factor in the behaviour of the cemented slag material. Review discussions are provided in following section.

4 RESULTS OF FIELDWORK

4.1 Surface Conditions

The tennis court is situated in the south-western part of the Surf Leisure Resort complex and adjoins the indoor swimming pool and administration building. The building is a warehouse type design with high steel framed metal clad roof with brick walls. The land surrounding the building is near level and is extensively paved at the front western side. At the rear eastern side the ground surface is grass-covered and near level to the bank of a watercourse which passes the site in a general north-south direction. Photo 1 shows an internal view of the building and tennis court area.



Photograph 1: View of indoor tennis court site

As shown in Photograph 2, the synthetic surface of the tennis court surfacing has been damaged by the protrusions originating from the underlying slag material.



Photograph 2: Damaged synthetic surfacing of tennis court comprising numerous subsurface protrusions.

4.2 Interpreted Subsurface Conditions

Table 1 presents a summary of the general subsurface conditions encountered in the boreholes. Photograph 3 shows the coalwash fill material underlying the cemented slag encountered in each of the boreholes.

Table 1. Summary of general subsurface conditions encountered in the test pits

Unit	Material	Approximate Depth to Top of Unit (m)	Approximate Thickness Range of Unit (m)	Description
1	Synthetic Grass	0.0	0.005	Indoor tennis court synthetic grass
2	Cemented Base	0.005	0.10 to 0.175	Granulated blast furnace slag-very dense and cemented
3	Fill	0.10 to 0.175	1.25 ^{Note 1}	Coalwash
4	Alluvium	1.4 ^{Note 2}	Not proven	Stiff clay

Note 1: Thickness proven in BH01 only; Note 2: Top of unit proven in BH01 only; Note 3: Water table or groundwater inflows not observed.



Photograph 3: Coalwash fill below cemented slag in each of the boreholes drilled.

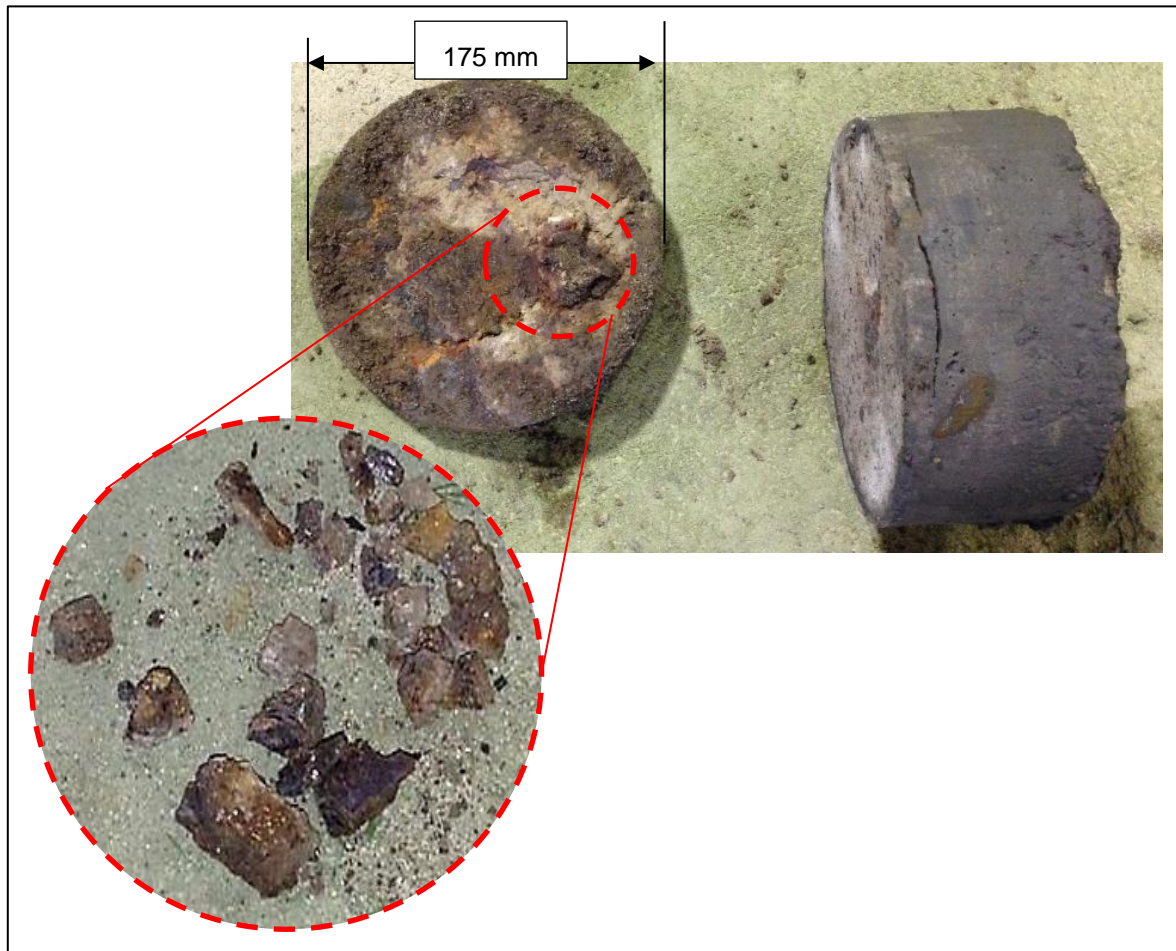
5 DISCUSSION AND RECOMMENDATIONS

5.1 Likely Cause of Damage to Tennis Court Surface

As one of many co-products of iron smelting process, granulated blast-furnace slag (also known as slag sand) is formed. The slag is dewatered, dried, and ground before being used as a cementitious material. Magnets may have been used at this time during the screening process to remove residual iron fragments (ACI 233R-95, 1995), but it is understood they were not always effective.

Based on ASA Reference Data 1 (2001), production of commercial milled slag in Australia started in early 1960s. Much of the significant uptake of iron and steel slag products in Australia occurred in the mid 1980s and is attributed to significant research and development conducted by various Australian groups focusing on the material's use in concrete.

The core samples of pavement materials encountered in the boreholes within the tennis court site at WSLR essentially comprised cemented granulated blast furnace slag with metallic inclusions. At the time when the WSLR was developed in early 1980s, research on better understanding of slag material properties was still in progress. The slag product made available at the time of developing the WSLR was likely to still contain residual metallic iron as shown in Photograph 4. At this stage we understand that removal of metallic fragments by magnets during screening of the product was either not done or was not very effective. Later processing of granulated slag or slag sand materials contained significantly less metallic material due to magnetic extraction during processing.



Photograph 4: Cored sample of cemented granulated blast furnace slag with metallic inclusions (inset).

When the cemented slag was exposed to excess moisture, about 5 years ago, corrosion of the iron fragments in the cemented granulated slag or slag sand occurred. The chemical reaction that has resulted in corrosion is expansive in behaviour and was manifested by the protrusions at the surface of the tennis court. At present, it cannot be made certain whether the corrosion reaction has ceased. Although the risk of exposure to moisture is now reduced it is likely that further expansive movement of the surface will occur and may be influenced by moisture remaining in the cemented material or the fill and natural soils beneath. Based on further visual assessment of the cored cemented slag, corrosion of the residual metallic iron at the base of the cemented slag has also taken place possibly due to the moisture that seeps through the underlying coalwash fill material.

5.2 Proposed Concrete Floor Slab

Due to the risk of further expansion of the cement layer occurring the cemented slag layer should not be covered. It is recommended that the existing cemented slag layer be removed as the risk of damage to the floor slab with the cemented material left in place would be high, and cracking would likely result.

The coalwash surface below the cemented slag will need to be prepared as follows:

- Compact the upper 300mm of the coalwash to a minimum density ratio of 100% of Standard Maximum Dry Density. Compaction should be achieved with a 5 tonne smooth drum roller without vibration;

- An experienced engineer from Coffey should observe proof rolling of the compacted coalwash surface with the smooth drum roller without vibration;
- If a subbase layer or select fill is required to raise the level of the exposed coalwash before constructing the slab, a select fill layer comprising a well graded crushed rock roadbase (DGS 20 or DGS 40) should be placed to achieve the required floor level; and
- An elastic modulus of 30 to 40 MPa may be assigned to the coalwash following compaction and proof rolling as recommended above. The 4 day soaked CBR of the coalwash is estimated to be in the range of 10% to 20%.

6 LIMITATIONS AND FUTURE WORKS

Subsurface conditions can be complex, vary over relatively short distances and over time. The inferred geotechnical model and recommendations in this report are based on limited subsurface investigations at discrete locations. The engineering logs describe subsurface conditions only at the investigation locations.

Additional investigations may be required to support detailed design due to factors such as scope limitations and changes to the nature of the project. A geotechnical engineer should be engaged to assist with detailed design and/or to review designs. During construction a geotechnical engineer should verify that conditions exposed are consistent with design assumptions.

7 REFERENCES

American Concrete Institute Committee 233R-95 (1995) – Ground Granulated Blast Furnace Slag as a Cementitious Constituent in Concrete.

Australasian (Iron & Steel) Slag Association, Reference Data Sheet 1 (2011) – Blast Furnace Slag Aggregate & Cementitious Products.

Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by

earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Important information about your **Coffey** Report

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report*

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility


Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.

Figure



Viewing west across the indoor tennis court, indicating the approximate borehole locations carried out by Coffey on 27/11/2013.

drawn	RB		client:	WOLLONGONG SURF LEISURE RESORT	
approved	DT		project:	GEOTECHNICAL INVESTIGATION WOLLONGONG SURF LEISURE RESORT 201 PIONEER ROAD, TOWRADGI	
date	28/11/2013		title:	SITE PLAN	
scale	NTS		project no:	GEOTWOLL03589AA-AA	figure no: 1
original size	A4				

Appendix A

Engineering Logs of Boreholes with Explanatory Notes

Soil Description Explanation Sheet (1 of 2)

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders		>200 mm
Cobbles		63 mm to 200 mm
Gravel	coarse	20 mm to 63 mm
	medium	6 mm to 20 mm
	fine	2.36 mm to 6 mm
Sand	coarse	600 µm to 2.36 mm
	medium	200 µm to 600 µm
	fine	75 µm to 200 µm

MOISTURE CONDITION

Dry Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.

Moist Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.

Wet As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH s_u (kPa)	FIELD GUIDE
Very Soft	<12	A finger can be pushed well into the soil with little effort.
Soft	12 - 25	A finger can be pushed into the soil to about 25mm depth.
Firm	25 - 50	The soil can be indented about 5mm with the thumb, but not penetrated.
Stiff	50 - 100	The surface of the soil can be indented with the thumb, but not penetrated.
Very Stiff	100 - 200	The surface of the soil can be marked, but not indented with thumb pressure.
Hard	>200	The surface of the soil can be marked only with the thumbnail.
Friable	–	Crumbles or powders when scraped by thumbnail.

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)
Very loose	Less than 15
Loose	15 - 35
Medium Dense	35 - 65
Dense	65 - 85
Very Dense	Greater than 85

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: <5% Fine grained soils: <15%
With some	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%

SOIL STRUCTURE

ZONING	CEMENTING
Layers Continuous across exposure or sample.	Weakly cemented Easily broken up by hand in air or water.
Lenses Discontinuous layers of lenticular shape.	Moderately cemented Effort is required to break up the soil by hand in air or water.
Pockets Irregular inclusions of different material.	

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material Structure and fabric of parent rock visible.

Residual soil Structure and fabric of parent rock not visible.

TRANSPORTED SOILS

Aeolian soil Deposited by wind.

Alluvial soil Deposited by streams and rivers.

Colluvial soil Deposited on slopes (transported downslope by gravity).

Fill Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.

Lacustrine soil Deposited by lakes.

Marine soil Deposited in ocean basins, bays, beaches and estuaries.









Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)				USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	GRAVELS More than half of coarse fraction is larger than 2.36 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.	GW	GRAVEL
			Predominantly one size or a range of sizes with more intermediate sizes missing.	GP	GRAVEL
		GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)	GM	SILTY GRAVEL
			Plastic fines (for identification procedures see CL below)	GC	CLAYEY GRAVEL
	SANDS More than half of coarse fraction is smaller than 2.36 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes	SW	SAND
			Predominantly one size or a range of sizes with some intermediate sizes missing.	SP	SAND
		SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).	SM	SILTY SAND
			Plastic fines (for identification procedures see CL below).	SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm (A 0.075 mm particle is about the smallest particle visible to the naked eye)	SILTS & CLAYS Liquid limit less than 50	IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.			
		DRY STRENGTH	DILATANCY	TOUGHNESS	
		None to Low	Quick to slow	None	ML SILT
		Medium to High	None	Medium	CL CLAY
	SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to very slow	Low	OL ORGANIC SILT
		Low to medium	Slow to very slow	Low to medium	MH SILT
		High	None	High	CH CLAY
		Medium to High	None	Low to medium	OH ORGANIC CLAY
HIGHLY ORGANIC SOILS	Readily identified by colour, odour, spongy feel and frequently by fibrous texture.			Pt	PEAT

• Low plasticity – Liquid Limit w_L less than 35%. • Medium plasticity – w_L between 35% and 50%. • High plasticity – w_L greater than 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM	TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.		SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length.		TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.		TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.		INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

Engineering Log - Borehole

client: **Wollongong Surf Leisure Resort**

principal:

project: **Indoor Tennis Court, Subsurface Investigation**

location: **201 Pioneer Road Wollongong**

Borehole ID. **BH01**

sheet: 1 of 1

project no. **GEOTWOLL03589AA**



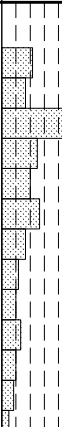

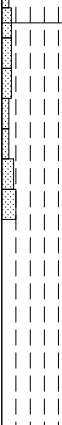

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date completed: **27 Nov 2013**

logged by: **RB**

checked by: **JPT**

position: REFER TO FIGURE 1 surface elevation : Not Specified angle from horizontal: 90°
drill model: 1.5 TONNE mounting: Excavator hole diameter : 125 mm

drilling information							material substance										
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	hand penetrometer (kPa)	DCP (blows/ 100 mm)	structure and additional observations		
AD/T N	1	2	3	Not Observed			0.5			SYNTHETIC TENNIS COURT GRASS. CEMENTED SLAG SAND: Some metallic inclusions. Sandy GRAVEL: fine to coarse grained, dark grey to black, fine to coarse grained sand, trace of silt, trace of slag gravels.	D	MD			SYNTHETIC GRASS CEMENTED BASE FILL/COALWASH		
					D		1.0			CLAY: high plasticity, grey, with some coal wash fill. Borehole BH01 terminated at 1.5 m Target depth	>Wp	St			ALLUVIAL		
					D		1.5		CH								
							2.0										
							2.5										
							3.0										
							3.5										

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing N nil penetration  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Wollongong Surf Leisure Resort**

principal:

project: **Indoor Tennis Court, Subsurface Investigation**

location: **201 Pioneer Road Wollongong**

Borehole ID. **BH02**

sheet: 1 of 1

project no. **GEOTWOLL03589AA**



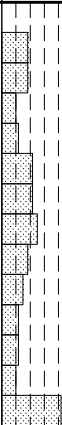
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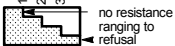
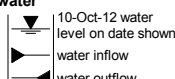
date completed: **27 Nov 2013**

logged by: **RB**

checked by: **JPT**

position: REFER TO FIGURE 1 surface elevation : Not Specified angle from horizontal: 90°
drill model: 1.5 TONNE mounting: Excavator hole diameter : 125 mm

drilling information							material substance								
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	hand penetrometer (kPa)	DCP (blows/ 100 mm)	structure and additional observations
AD/T N	1	2	3	Not Observed	D		0.5			SYNTHETIC TENNIS COURT GRASS. CEMENTED SLAG SAND: Some metallic inclusions. Sandy GRAVEL: fine to coarse grained, dark grey to black, fine to coarse grained sand, trace of silt, trace of slag gravels. 1.0m to 1.2m Band of fine to coarse dark grey sand with a trace of gravels	D	D			SYNTHETIC GRASS CEMENTED BASE FILL/COALWASH
						1.5				Borehole BH02 terminated at 1.5 m Target depth					
						2.0									
						2.5									
						3.0									
						3.5									

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing N nil penetration  water  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Wollongong Surf Leisure Resort**

principal:

project: **Indoor Tennis Court, Subsurface Investigation**

location: **201 Pioneer Road Wollongong**

Borehole ID. **BH03**

sheet: 1 of 1

project no. **GEOTWOLL03589AA**

date started: **27 Nov 2013**

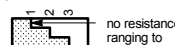
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logged by: **RB**

checked by: **JPT**

position: REFER TO FIGURE 1 surface elevation : Not Specified angle from horizontal: 90°
drill model: 1.5 TONNE mounting: Excavator hole diameter : 125 mm

drilling information				material substance									
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	hand penetrometer (kPa)	DCP (blows/100 mm)	structure and additional observations
AD/T N	1 2 3	Not Observed	D		0.5			SYNTHETIC TENNIS COURT GRASS. CEMENTED SLAG SAND: Some metallic inclusions. Sandy GRAVEL: fine to coarse grained, dark grey to black, fine to coarse grained sand, trace of silt, trace of slag gravels.	D MD / D				SYNTHETIC GRASS CEMENTED BASE FILL/COALWASH
					1.0			Borehole BH03 terminated at 0.8 m Refusal					
					1.5								
					2.0								
					2.5								
					3.0								
					3.5								

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing N nil penetration  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

client: **Wollongong Surf Leisure Resort**

principal:

project: **Indoor Tennis Court, Subsurface Investigation**

location: **201 Pioneer Road Wollongong**

Borehole ID. **BH04**

sheet: 1 of 1

project no. **GEOTWOLL03589AA**


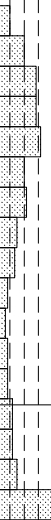
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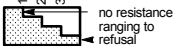
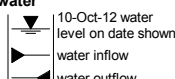
date completed: **27 Nov 2013**

logged by: **RB**

checked by: **JPT**

position: REFER TO FIGURE 1 surface elevation : Not Specified angle from horizontal: 90°
drill model: 1.5 TONNE mounting: Excavator hole diameter : 125 mm

drilling information							material substance									
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	hand penetrometer (kPa)		DCP (blows/ 100 mm)	structure and additional observations
	1	2	3										100	200		
AD/T N				Not Observed	D		0.5			SYNTHETIC TENNIS COURT GRASS. CEMENTED SLAG SAND: Some metallic inclusions. Sandy GRAVEL: fine to coarse grained, dark grey to black, fine to coarse grained sand, trace of silt, trace of slag gravels. Below 1.3m trace of clay and roots, possible interface between fill and alluvial material	D	MD				SYNTHETIC GRASS CEMENTED BASE FILL/COALWASH
					D		1.5			Borehole BH04 terminated at 1.5 m Target depth						
							2.0									
							2.5									
							3.0									
							3.5									

method AD auger drilling* AS auger screwing* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit * bit shown by suffix e.g. AD/T	support M mud C casing N nil penetration  water  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests U## undisturbed sample ##mm diameter D disturbed sample B bulk disturbed sample E environmental sample HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shearpeak/remoulded (uncorrected kPa) R refusal	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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ANNEXURE B

SCOPE OF WORKS

BILL OF QUANTITIES SCHEDULE

SCOPE OF WORKS BILL OF QUANTITIES

Job Name: **Wollongong Surf Leisure Resort - Towradgi,**

Job Description – **Concrete Pavement to Tennis Court Site.**

Nate. Although due care has been taken in the preparation of this bill It Is meant as a guide only, and no responsibility will be held for discrepancies that may occur during either tendering or construction.

All items priced are and on addition, equal the lump sum.

Any adjustments made to the quantities shall be clearly indicated on the documents.

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
1	GENERAL				
1.1	Site establishment including site facilities, site exclusion fencing and provision for maintenance of construction site.		item		\$
1.2	Provision for soil and water management control and maintenance of construction site.		item		\$
1.3	Survey for construction and location, recording and adjusting of existing onsite services as required.		item		\$
1.4	Clearing and demolishing including removal of material (synthetic grass) from site including payment of tipping fees. excess material offsite including payment of tipping fees.		item		\$
1.5	Provision for traffic, including preparation of traffic management Plan.		item		\$
1.6	Liaison with Councils Engineer and Project Coordinator.		item		\$
1.7	Clean up site on completion of works		item		\$
	GENERAL SUB-TOTAL				\$

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
2	EXCAVATION.				
2.1	Excavate 250mm over existing tennis court site and remove all material (cement slag and coal wash) off-site including tip fees,.		item		\$
2.2	Trim and consolidate the upper 300mm of the exposed surface material to a 100% standard maximum dry density using a 5 tonne smooth drum static roller.	595	sqm		\$
2.3	Provision for proof rolling of subgrade under the project engineers And geotechnical engineers observation.		item		\$
	EXCAVATION SUB-TOTAL				\$

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
3	FLEXIBLE AND CONCRETE PAVEMENT				
3.1	Construct 100mm compacted thickness DGS20 sub-base Course pavement.	595	sqm		\$
3.2	Construct 150mm thick plain 25MPa concrete reinforced with two layers of SL72 fabric, on plastic tipped steel chairs with 50mm cover both top and bottom.	595	sqm		\$
	FLEXIBLE AND CONCRETE PAVEMENT SUB-TOTAL				\$

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
4	PROVISIONAL ITEMS				
4.1	Pavement testing for conformity				
	i) Pavement subgrade compaction testing		item		\$
	ii) Sub-base course compaction testing		item		\$
	iii) Concrete strength testing		item		\$
4.2	Supply and lay subsoil drains 100 mm dia. PVC including excavation and backfill to Council Standards.	10	lnm		\$
4.3	Remove of erosion control measures as directed by the superintendent		item		\$
4.4	Excavate unsuitable subgrade material and replace with approved site material as directed by the Superintendent.	5	cum		\$
4.5	Excavate unsuitable subgrade material and replace with approved granular material as directed by the Superintendent.	5			\$
4.6	Disposal of excess material off site, including tip fees and chargers	10	cum		\$
	PROVISIONAL ITEMS SUB-TOTAL				\$

Job Name: Tennis Court Concrete Pavement – WSLR Towradgi					
	SUMMARY				
	Total Lump Sum (items 1-3 inclusive)				\$
	Total Provisional Items				\$
	Total contract sum (excluding GST)				\$
	Total contract sum (including (GST)				\$