Aitken Rowe
GEOTECHNICAL ENGINEERING

Geotechnical Engineering
Environmental Consultancy
Soil Concrete Aggregate Testing
NATA Accredited Laboratories

ABN 53 058 315 138 ACN 058 315 138

7 October 2020 Reg. No.: GS20-120

Atlus Group
Level 12, 1 Market Street
Sydney, NSW 2000

Attention: Margaret Culloty – Senior Project Manager, Project Management

Dear Margaret,

GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN – PROPOSED WEST END SPORTS COMPLEX, 85-119 MERRIGAL STREET, GRIFFITH, NSW

Further to your request in response to our quotation, Q20-326 dated 15 July 2020, the geotechnical field investigation was carried out across the site of the proposed sports complex at the above site between 20 and 24 July 2020.

It is noted that the proposed development includes the construction of a 3200sqm basketball stadium including the following;

- 7 x indoor basketball courts (currently only 2 courts)
- Seating for 1,000+ people, 1000sqm change rooms, offices, meeting rooms and kiosks
- 7 x all-weather netball courts including new lighting
- 1 x all-weather outdoor basketball half-court
- New synthetic, all-weather athletics track including new lighting
- New synthetic turf hockey pitch
- New grandstand incl kiosk, toilets/change rooms & maintenance/storage facilities
- New parking areas, landscaping and green space

The purpose of the investigation was to determine the nature of the subsurface soil and groundwater conditions by augering, sampling and testing across the proposed subject site of the proposed development. Based upon the information obtained, comments and recommendations for the proposed development including pavement design options are to be made.

1.0 Site Description

The site for the proposed development is located approximately 1.0km east of central business district of Griffith, NSW at Lot 1, DP 758476, No. 85-119 Merrigal Street on the western side of the street. The site is bound by the Merrigal Street to the west, Yarrabee to the east and Merrowie Street with residential properties surrounding the subject site. The site has been completely developed as a sporting precinct, which included the following;

- 2 -court basketball stadium (including toilets, change rooms and kiosk) t
- Grassed athletics field
- Grassed hockey pitch
- Grassed cricket oval
- Children's playground
- Toilet facilities
- Outdoor canteen building
- Griffith City Parks & Depot comprising buildings and bitumen sealed and gravel pavement areas

The subject site is generally flat and covered with buildings, gravel and bitumen sealed pavement areas and turf as noted at the time of the investigation. It is noted the existing buildings are to be removed across the site prior to the construction of the proposed development however the existing stadium is to remain and form part of the new stadium. It should also be noted medium to large sized trees were witnessed across the site at the proposed new stadium and grandstand areas at the time of the investigation.

2.0 Investigation Procedure

2.1 Fieldwork

The fieldwork was carried out between 20 and 24 July 2020 by the Senior Geotechnical personnel of Aitken Rowe Testing Laboratories Pty Ltd from Wagga Wagga and Griffith, NSW, who nominated the sampling and testing and prepared engineering logs of the boreholes.

The fieldwork for the investigation consisted of the logging and sampling of fourteen (14) boreholes (BH1 to BH14) and excavation of two (2) test pits (TP1 & TP2) across the subject site to the borehole termination depths ranging from 1.5m to 6.0m and test pit termination depths of 1.5m at the proposed locations of the Stadium (BH1, BH2 & BH6), proposed Grandstand (BH5), proposed function room and canteen (BH7), proposed new athletics track (TP1 & TP2), proposed athletics track light towers (BH3 & BH4), proposed synthetic turf hockey pitch (BH13 & BH14), proposed netball courts (BH8, BH9 & BH10) and proposed car park pavement area (BH11 & BH12) across the subject site and they were augered with our trailer and truck mounted drilling rigs and backhoe at the locations as shown in the attached borehole, test pit and DCP test location plan.

The boreholes were advanced through the soil profile using solid flight augers with Dynamic Cone Penetrometer testing (DCP) carried out at each borehole and test pit location from the existing surface to assess the strength and consistency of the subsoil materials. The boreholes were augmented by carrying out Standard Penetrometer testing (SPT) at the location of BH1 to BH5, which was carried out at depths ranging from 1.5m to 5.5m in depth from the existing surface level to assess the strength of the subsurface profile. Disturbed & undisturbed (U50) samples were recovered from the boreholes and test pits for relevant laboratory testing. The borehole, test pit and DCP test locations are shown in the attached borehole, test pit and DCP test location plan.

The detailed borehole logs and materials schedule and logs incorporating SPT test results in respect to strength and consistency across the proposed sports precinct site with explanatory note are herewith attached. The DCP test reports are also herewith attached. The descriptions in all borehole logs and materials schedule and logs are provided in accordance with "AS 1726 –2017 Geotechnical site investigations".

It should also be noted a slotted piezometer was installed in BH2 to the depth of 6.0m with seepage encountered at 3.8m to 4.4m measured from the existing surface level at the time of the investigation. The standing water within the slotted piezometer was measured at a depth of 3.0m measured from the existing surface level approximately 24hrs after the installation of the slotted piezometer.

2.2 Laboratory Testing

To confirm and evaluate the results of the fieldwork, laboratory tests were carried out on the representative samples of the subsoil obtained from the boreholes and test pits. The relevant laboratory testing included Particle Size Distribution (PSD) test, Atterberg Limit test, Field Moisture Content (FMC) determination test, Linear Shrinkage (LS) test, Shrink Swell (Iss), Standard Maximum Dry Density (SMDD), Permeability test and California Bearing Ratio (CBR) test on the recovered samples, which were undertaken at our NATA accredited testing laboratory in Griffith and Wagga Wagga, NSW.

The samples for permeability tests were compacted at 90% of SMDD to reflect the in-situ condition and at nearest 100% of Standard Optimum Moisture Content (SOMC) and CBR tests were compacted at 95% of SMDD and at nearest 100% of SOMC. The Iss tests were carried out on four (4) U50 undisturbed samples.

The laboratory test reports for Particle Size Distribution, Atteberg Limit, LS, Iss, FMC, SMDD, SOMC, Emerson Class, Permeability and CBR tests are herewith attached. The test results for FMC, CBR, SOMC, LS and Iss test results are incorporated in the respective borehole logs and materials schedule and logs.

The pH, Electrical Conductivity (EC), chloride and sulphate content and resistivity tests were carried out on three (3) disturbed samples recovered from the boreholes at the NATA accredited Sydney

Environmental and Soil Laboratory (SESL) in Sydney, NSW. The test reports as received from SESL and are herewith attached.

Contamination analysis was also carried out on recovered samples at the site. The samples were analysed for the following by EnviroLab Services, a NATA accredited laboratory in Sydney, NSW and Analytical Laboratories (EAL), Charles Sturt University (CSU), Wagga Wagga, NSW;

- Metals – Mercury, Cadmium, Lead, Arsenic, Chromium (total), Copper Nickel and Zinc
- Total Polycyclic Aromatic Hydrocarbons (PAH)
- Benzo(a)pyrene
- Benzene
- Toluene
- Ethyl-benzene
- Xylene
- Total Recoverable Hydrocarbons C_{10}-C_{36} (TRH)
- Asbestos

The test reports as received from EnviroLab and EAL are herewith attached. It should be noted as requested by the client comments on these test results have not been provided.,

3.0 Site Geology

The general topography of the area is flat, gently undulating low tablelands. The subject site area in Griffith is underlain by the Quaternary alluvium sediments (floodplain sediments) comprising unconsolidated clay, silt, sand and gravel in accordance with 1:250,000 Scale “Metallogenic Series Sheet SI/55-10 for Narrandera”.

4.0 Subsurface Condition

4.1 Proposed Basketball Stadium

BH1, BH2 and BH6 represents the general area of the proposed basketball stadium at the subject site. The boreholes drilled revealed that the site is underlain by fill comprising topsoil (in BH1 only) to 0.1m in BH1, fine to coarse grained sandy gravel (in BH2 & BH6 only) to 0.3m in BH2 and 0.2m in BH6 and low plasticity sandy silty clay (in BH2 only) to 0.6m in BH2 overlying natural alluvial material comprising low and low to medium plasticity sandy silty clay, low plasticity clayey silt and sandy clayey silt and medium, medium to high and high plasticity clay, extending to the borehole termination depth of 6.0m in BH1 & BH2 and 4.0m in BH6. The fill material encountered across the site appeared to have been placed “uncontrolled” and “poorly to moderately compacted in BH1 & BH2 and moderately to well compacted in BH6”.

The moisture condition of the underlying fill material was generally dry and less than or equal to plastic limit throughout the fill depth and the underlying natural alluvial material was generally varied

from less than plastic limit to greater than plastic limit throughout the soil profile in BH1, BH2 and BH6 at the time of the investigation.

Seepage was encountered and measured at depths of 4.2m to 5.5m in BH1 and 3.8m to 4.4m in BH2 from the existing surface level during the course of the drilling at the time of the investigation however no seepage was encountered in BH6 and the borehole was found dry on completion of the drilling at the time of the investigation. It should be noted that variations to the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP and SPT test results and the visual observation of the resistance by auger TC bit, the underlying natural alluvial material (below topsoil and fill) is assessed to be generally stiff consistency in the upper profile then increasing to very stiff consistency with depth throughout the investigation depth in BH1, stiff to very stiff consistency in the upper profile then increasing to very stiff to hard consistency with depth throughout the investigation depth in BH2 and stiff to very stiff consistency in the upper profile then increasing to very stiff and very stiff to hard consistency with depth throughout the investigation depth in BH6 at the time of the investigation (refer to attached borehole logs).

The borehole logs incorporating SPT results with explanatory note and DCP test reports are herewith attached.

4.2 Proposed Grandstand

BH5 represents the general area of the proposed grandstand at the subject site. The borehole drilled revealed that the site is underlain by topsoil to 0.2m overlying natural alluvial material comprising low plasticity sandy silty clay and sandy clayey silt and medium to high and high plasticity clay, extending to the borehole termination depth of 6.0m in BH5.

The moisture condition of the underlying natural alluvial material was generally greater than plastic limit throughout the soil profile in BH5 at the time of the investigation. No groundwater or seepage was encountered during the drilling in the boreholes drilled and the boreholes were found dry on completion of the drilling at the time of the investigation. It should however be noted that variations to the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP and SPT test results and the visual observation of the resistance by auger TC bit, the underlying natural alluvial material (below topsoil) is assessed to be generally firm consistency in the upper profile to 0.6m then increasing to stiff to very stiff, very stiff and very stiff to hard consistency with depth throughout the investigation depth in BH5 at the time of the investigation (refer to attached borehole log).

The borehole log incorporating SPT results with explanatory note and DCP test report are herewith attached.

4.3 Proposed Function Room & Canteen

BH7 represents the general area of the proposed function room and canteen at the subject site. The borehole drilled revealed that the site is underlain by fill comprising fine to coarse grained sandy gravel to 0.15m overlying natural alluvial material comprising low plasticity sandy silty clay, medium plasticity sandy clay and medium to high and high plasticity clay, extending to the borehole termination depth of 4.0m in BH7. The fill material encountered across the site appeared to have been placed “uncontrolled” and “moderately to well compacted”.

The moisture condition of the underlying fill material was generally dry throughout the fill depth and the underlying natural alluvial material was generally greater than plastic limit throughout the soil profile in BH7 at the time of the investigation. No groundwater or seepage was encountered during the drilling in the boreholes drilled and the boreholes were found dry on completion of the drilling at the time of the investigation. It should however be noted that variations to the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP test results and the visual observation of the resistance by auger TC bit, the underlying natural alluvial material (below fill) is assessed to be generally firm to stiff consistency in the upper profile to 0.7m then increasing to very stiff and very stiff to hard consistency with depth throughout the investigation depth in BH7 at the time of the investigation (refer to attached borehole log).

The borehole log with explanatory note and DCP test report are herewith attached.

4.4 Proposed Athletics Track Light Towers

BH3 and BH4 represents the general area of the proposed athletics track light towers at the subject site. The boreholes drilled revealed that the site is underlain by fill comprising topsoil to 0.1m in BH3 and 0.25m in BH4 overlying natural alluvial material comprising low plasticity sandy silty clay, clayey silt and sandy clayey silt and medium to high and high plasticity clay, extending to the borehole termination depth of 6.0m in BH3 and BH4. The fill material encountered across the site appeared to have been placed “uncontrolled” and “moderately compacted”.

The moisture condition of the underlying natural alluvial material was generally varied from less than plastic limit to greater than plastic limit throughout the soil profile in BH3 and BH4 at the time of the investigation. Seepage was encountered and measured at depths of 4.2m to 5.1m in BH3 from the existing surface level during the course of the drilling at the time of the investigation however no seepage was encountered in BH4 and the borehole was found dry on completion of the drilling at the time of the investigation. It should be noted that variations to the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP and SPT test results and the visual observation of the resistance by auger TC bit, the underlying natural alluvial material (below topsoil and fill) is assessed to be generally stiff to very stiff consistency in the upper profile then increasing to very stiff, very stiff to hard and hard consistency

with depth throughout the investigation depth in BH3 and stiff consistency in the upper profile then increasing to very stiff, very stiff to hard and hard consistency with depth throughout the investigation depth in BH4 at the time of the investigation (refer to attached borehole logs).

The borehole logs incorporating SPT results with explanatory note and DCP test reports are herewith attached.

4.5 Proposed Synthetic Turf Hockey Pitch

BH13 and BH14 represents the general area of the proposed synthetic turf hockey pitch at the subject site. The boreholes drilled revealed that the site is underlain by natural topsoil material to 0.25m in BH13 and 0.2m in BH14 overlying natural alluvial material comprising medium plasticity sandy clay and clay and low plasticity sandy clayey silt, extending to the borehole termination depth of 1.5m in BH13 and BH14.

The moisture condition of the underlying natural alluvial soil material was noted to be generally greater than plastic limit throughout the profile at the time of the investigation. No groundwater or seepage was encountered during the drilling in the boreholes drilled and the boreholes were found dry on completion of the drilling at the time of the investigation. It should however be noted that variations to the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP test results and the visual observation of the resistance by auger TC bit, the underlying natural alluvial material (below topsoil) is assessed to be generally firm to stiff and firm consistency in the upper profile to 0.5m then increasing to very stiff consistency throughout the investigation depth in BH13 and stiff to very stiff consistency in the upper profile then increasing to very stiff consistency throughout the investigation depth in BH14 at the time of the investigation (refer to attached borehole materials schedule and logs).

The borehole materials schedule and log with explanatory note and DCP test reports are herewith attached.

4.6 Proposed Netball Courts

BH8 to BH10 represents the general area of the proposed netball courts at the subject site. The boreholes drilled revealed that the site is underlain by fill comprising a 20mm thick bitumen seal (in BH9 only), fine to coarse grained sandy gravel (in BH8 & BH9 only) to 0.19m in BH8 and 0.07m in BH9, medium to high plasticity sandy clay (in BH9 only) to 0.19m in BH9 and topsoil (in BH10 only) to 0.13m in BH10 overlying natural alluvial material comprising low plasticity sandy silty clay, clayey silt and sandy clayey silt and medium plasticity sandy clay and clay, extending to the borehole termination depth of 4.0m in BH8 and 1.5m in BH9 and BH10. The fill material encountered in BH8 and BH9 appeared to have been placed “uncontrolled” and “moderately to well” compacted and the fill material encountered in BH10 appeared to have been placed “uncontrolled” and “moderately” compacted.

The moisture condition of the underlying natural alluvial material was generally greater than plastic limit throughout the soil profile in BH8, BH9 and BH10 at the time of the investigation. No groundwater or seepage was encountered during the drilling in the boreholes drilled and the boreholes were found dry on completion of the drilling at the time of the investigation. It should however be noted that variations to the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP test results and the visual observation of the resistance by auger TC bit, the underlying natural alluvial material (below topsoil and fill) is assessed to be generally stiff to very stiff consistency in the upper profile then increasing to very stiff to hard consistency throughout the investigation depth in BH8, stiff consistency in the upper profile then increasing to very stiff consistency throughout the investigation depth in BH9 and firm to stiff consistency in the upper profile to 0.55m then increasing to very stiff consistency throughout the investigation depth in BH10 at the time of the investigation (refer to attached borehole materials schedule and logs).

The borehole materials schedule and log with explanatory note and DCP test reports are herewith attached.

4.7 Proposed Car Par Pavement Area

BH11 and BH12 represents the general area of the proposed car park area at the subject site. The boreholes drilled revealed that the site is underlain by fill comprising fine to coarse grained sandy gravel (in BH11 only) to 0.03m in BH11 and topsoil (in BH12 only) to 0.15m and medium plasticity gravelly sandy clay (in BH12 only) to 0.25m overlying natural alluvial material comprising low plasticity sandy silty clay and sandy clayey silt and medium plasticity clay, extending to the borehole termination depth of 1.5m in BH11 and BH12. The fill material encountered in BH11 and BH12 appeared to have been placed “uncontrolled” and “moderately” compacted.

The moisture condition of the underlying natural alluvial material was generally greater than plastic limit throughout the soil profile in BH11 and BH12 at the time of the investigation. No groundwater or seepage was encountered during the drilling in the boreholes drilled and the boreholes were found dry on completion of the drilling at the time of the investigation. It should however be noted that variations to the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP test results and the visual observation of the resistance by auger TC bit, the underlying natural alluvial material (below topsoil and fill) is assessed to be generally firm consistency in the upper profile to 0.4m then increasing to very stiff consistency throughout the investigation depth in BH11 and firm to stiff consistency in the upper profile to 0.6m then increasing to very stiff consistency throughout the investigation depth in BH12 at the time of the investigation (refer to attached borehole materials schedule and logs).

The borehole materials schedule and log with explanatory note and DCP test reports are herewith attached.

4.8 Proposed All-Weather Athletics Track

TP1 and TP2 represents the general area of the proposed all-weather athletics track at the subject site. The test pits excavated revealed that the site is underlain by natural topsoil material to 0.25m in TP1 & TP2 overlying natural alluvial material comprising low plasticity sandy silty clay and sandy clayey silt, extending to the test pit termination depth of 1.5m in TP1 and medium & medium to high plasticity clay, extending to the test pit termination depth of 1.5m in TP2.

The moisture condition of the underlying natural alluvial soil material was noted to be generally greater than plastic limit throughout the profile at the time of the investigation. No groundwater or seepage was encountered during the drilling in the boreholes drilled and the boreholes were found dry on completion of the drilling at the time of the investigation. It should however be noted that variations to the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP test results and the visual observation of the resistance by auger TC bit, the underlying natural alluvial material (below topsoil) is assessed to be generally firm consistency in the upper profile to 0.55m then increasing to very stiff to hard consistency throughout the investigation depth in TP1 and firm to stiff consistency in the upper profile to 0.55m then increasing to stiff and very stiff consistency with depth throughout the investigation depth in TP2 at the time of the investigation (refer to attached borehole materials schedule and logs).

The borehole materials schedule and log with explanatory note and DCP test reports are herewith attached.

5.0 Discussion & Comment

5.1 Site Preparation and Earthworks

The fill material encountered across the subject site appeared to have been placed “uncontrolled” and therefore considered “not suitable” to use as subgrade or foundation of any structure in its current state unless it is proven to be “controlled fill” and “well” compacted throughout. We therefore recommend excavation of this material and replace and re-compact with approved fill material in such a way that it achieves a minimum of 98% of Standard Maximum Dry Density (SMDD) in every 150mm thick compacted layers if the fill is to be used as subgrade and foundation for the proposed constructions.

It should be noted that if a deep footing system, such as deep pad or pile footing system is to be adopted and the proposed building structures are to be fully suspended on the footing system, then the removal of the existing fill material may not be required.

In general, if the **proposed structures are not to be fully suspended**, the following site preparation is recommended once existing buildings, pavement areas, trees, fill and unsuitable material, if any, are removed and cuts as required are undertaken for the proposed developments.

- Remove topsoil, fill and unsuitable material, if any, and stockpile for later use as appropriate. An average stripping depth of 0.1 to 0.25m is anticipated for topsoil and 0.15 to 0.6m for fill across the subject site (refer to attached borehole logs and materials schedule and logs). It should be noted the depth of fill below the existing buildings to be removed may extend deeper at these locations.
- The exposed natural material should then be scarified to a depth of about 200mm; moisture conditioned to within -2 to 0% of Standard Optimum Moisture Content (SOMC) and compacted to a minimum of 98% of Standard Maximum Dry Density (SMDD) or 80% Density Index. **It should be noted that the underlying silt-based material may become "unsuitable" and difficult to compact once exposed and subjected to moisture ingress due to its silt and fine sand characteristics. Care shall therefore be exercised during the process of the preparation.**
- Proof roll the exposed natural subgrade using a minimum of 10 passes of 12 tonne dead weight roller to detect any soft, loose or heaving areas. **It should be noted the natural alluvial silt-based and clay-based material was noted to be firm and firm to stiff consistency in the upper profile to a depth of 0.6m in BH5, 0.7m in BH7, 0.5m in BH10, TP1 and TP2, 0.4m in BH11 and 0.5m in BH13 drilled at the time of the investigation (refer to borehole logs and materials schedule and logs). It should be noted that surface movement on the firm and firm to stiff consistency subgrade material may be experienced during construction. This material should be removed and treated as required prior to the placement of any fill material during the site preparation.**
- Any soft, loose or heave areas, if detected, should be excavated down and backfilled with appropriate approved materials, compacted in 150mm thick layers to the equivalent density of minimum 98% of SMDD or 75% Density Index. **It should also be noted that the depth of affected material may be varied across the site depending on the climatic condition at the time of the construction.**
- Any area of exposed subgrade, which exhibits shrinkage cracking and does not require recompaction, should be watered and rolled until the shrinkage cracks do not reappear. During this undertaking, care should be exercised to ensure the surface does not become soft.

Subsequent to the above subgrade preparation, clean approved fill preferably granular materials can be placed as required and compacted to the compaction requirements as given above. The degree of compaction of any fill placement should be verified by a NATA accredited testing authority to ensure that it achieves the specified density. If the fill is laid on the silt and clay-based formation, the compaction shall be carried out with minimum amount of water required to achieve the required density. The boundaries of the fill areas should be sloped to a maximum batter of 1.0 Vertical to 2.0 Horizontal as required or retained with a properly designed retaining wall.

The structural fill supporting any structural element of the structures shall be prepared in such a way that it achieves a minimum of 98% of Standard Maximum Dry Density in every 150mm thick compacted layers and certified by a relevant NATA accredited testing laboratory for which a safe allowable bearing pressure of 100kPa may be adopted, provided proper drainage measures are incorporated in the design, during and after the construction.

It is highly recommended to undertake the construction of fill pads under Level 1 supervision in accordance with "AS3798 – 2007 – Guidelines on earthworks for commercial and residential developments" if fill pads are to be used for the foundation of any structure.

If the subgrade is to be stabilized then the exposed natural clay-based and silt-based subgrade should be stabilized with lime or slag-lime additive as required. It is anticipated that mixing of 3% of appropriate additive to the soil material should provide required strength for the subgrade. We however strongly recommend laboratory trial test to ensure specified strength is achieved through stabilization.

It would be essential to maintain drainage of the site area during any earthworks to prevent rainfall from adversely affecting the materials such that they become unsuitable for direct re-use.

5.2 Excavation & Support and Retaining Wall

It is noted that some excavations and cuts may be involved for the construction of the new development with proposed basement. Based upon the subsurface conditions encountered in the boreholes, it is expected that the materials to be excavated will comprise layers of fill, topsoil and natural alluvial clay and silt depending on the extent of the proposed cut. It is therefore anticipated that all the required earthworks within soil material should be capable of being performed by conventional earthmoving plant such as scrapers, dozers, rollers and backhoes or excavator.

It would be essential to maintain drainage of the site area during any earthworks to prevent rainfall from adversely affecting the materials such that they become unsuitable for direct re-use. It should be noted that trafficability in the silt/clay-based materials for wheeled vehicles can be expected to be difficult during and following rainfall.

The temporary batter slopes of 1(V): 1(H) is recommended for unsupported cuts of up to 3.0m depth within natural material. The followings are recommended for permanent batter slopes for unsupported cuts of up to 3.0m depth in the natural materials:

- Alluvial soils 1(V): 2(H)

The permanent batter slope of the unsupported structural fill of up to 3.0m height should not exceed 1(V): 2(H).

If vertical cut with equivalent retaining wall design option is to be adopted, the characteristic earth pressure coefficients and subsoil parameters given in Table 1 may be adopted for the design of the wall.

Table 1 Design Parameters – Retaining Wall

Design Parameters	Controlled Fill & Natural Soil
Bulk Unit Weight	18.0 kN/m^3
Active Earth Pressure Coefficient, K_a	0.4
At rest Earth Pressure Coefficient, K_o	0.5
Passive Earth Pressure Coefficient, K_p	2.4
Effective cohesion, c'	0.0
Effective Friction Angle, ϕ'	24•

Appropriate factor of safety should be applied in the design of the walls. The walls should be designed to withstand full hydrostatic pressure unless special measures are taken to introduce complete and permanent drainage of the ground behind the wall. It should be noted that similar design parameters may be used for the fill embankment provided similar quality material is used for the fill and the fill placement is placed under Level 1 supervision in accordance with "AS3798-2007 Guidelines on earthworks for commercial and residential developments" as specified above.

Any excavation depth exceeding 1.5m should have benches of at least 1.0m wide at 1.5m height intervals. It should be noted that surcharge loadings should not be placed within a distance equivalent to the excavation depth form the crest of a batter cut or fill.

Care would be required to ensure excavation bases are cleaned of loosened and remoulded debris as it may be exposed to silt subgrade. The exposed subgrade base should be proof rolled to detect any soft, loose or heaving areas. Any soft, loose or heave areas should be removed. The excavation base should not be left exposed for prolonged periods as deterioration of bases may occur when subjected to wetting and drying processes. Care should be exercised during construction to ensure water ponding does not occur in the excavations since this may lead to subsequent softening of the founding materials, particularly for clay foundation.

Seepage should be expected into the excavation base particularly if excavation is carried out after periods of prolonged extreme rainfall. Any such seepage should be readily controllable by conventional sump and pump dewatering systems installed and sealed at the base of the excavation.

The excavated clay-based material may be used as common fill provided moisture is conditioned accordingly.

It should be noted that, no matter what method of excavation support is used, some ground displacement will occur within and immediately surrounding the excavation. We recommend that the risk of structural damage to nearby buried services or structures as a result of such excavation-

induced movements, be carefully evaluated. We believe it is unlikely that excavation induced movements will significantly affect structures situated back from the excavation perimeter a distance greater than the excavation depth.

It should be noted that side collapse within "uncontrolled" fill and natural firm consistency natural subgrade material, if any, may be experienced during excavation and therefore care and caution shall be exercised throughout the construction. Care and caution should also be exercised with any personnel entering the excavation greater than 1.5m in depth.

5.3 Foundation of Proposed Structures

5.3.1 Proposed Basketball Stadium

It is assessed that the "uncontrolled" fill material encountered at the basketball stadium site is considered "unsuitable" for any structural element of the footing system in its current state due to the "uncontrolled" fill depth exceeding 0.4m at the location of BH2. Therefore, based on the available data, the site shall be classified as **"Class P – Problem"** site in accordance with Australian Standard AS 2870 -2011 "Residential Slab and Footings".

However, if the "uncontrolled" fill material is removed and replaced with approved fill and re-compacted in such a way that it can be established as "controlled fill" or all the footings (i.e. edge beams internal beams and load support thickenings) are founded on the stiff consistency alluvial natural ground, then **"Class "H1-D" - Highly reactive deep drying"** classification may be adopted, **provided the subgrade and fill is prepared as specified in Section 5.1.**

It should also be noted that the proposed removal of the existing building, structures and trees will significantly modify the soil moisture conditions under the footprint of the footing system of the proposed basketball stadium area. Therefore, the site may have **"abnormal moisture conditions"** immediately after the removal of the existing building, structures and trees and the site shall therefore be classified as **"P-Problem site"** in accordance with the Australian Standard AS 2870 -2011 "Residential Slab and Footings".

We recommend that all the footings shall be designed similar to those as recommend in the Standard for "Class P" and the footing shall be designed by engineering principles. However, when the foundation material achieves equilibrium moisture condition throughout the soil profile after the removal of part of the existing dwelling , then the site may be deemed **"normal site"** and **"Class 'H1-D' - Highly reactive deep drying"** classification may be adopted (the calculated characteristic surface movement (y_s) values noted to be above 40 and below 50mm) **provided the subgrade is prepared as specified in Section 5.1.**

The shallow footings such as deep edge beam or pad and strip footings may be adopted and they may be proportioned for a maximum allowable bearing pressure of 100kPa and a subgrade reaction modulus (k) of 20kPa/mm founded on the natural stiff consistency alluvial material below at or below

0.2m to 0.65m from the existing site level (refer to borehole logs) or on the prepared subgrade as specified in Section 5.1, provided proper drainage measures are incorporated during and after the construction.

The deep pad, bored and cast-in-place pile footing system, if adopted, should be taken into the stiff consistency or better alluvial material. The design parameters given in Table 2 below may be adopted for the design of the deep footing system. It should be noted that the geotechnical design parameters given in Table 2 were estimated from the DCP and SPT test results, visual observation of the soil cuttings from the boreholes and laboratory test results.

Table 2 Geotechnical Design Parameters

Location	Depth (m)	Material Description	UBP (kPa)	USF (C) (kPa)	USF (U) (kPa)	USS (kPa)	Density (kN/m^3)	Modulus of subgrade reaction (kN/m^3)**
BH1	0.3-1.6	Clay	250*	25*	12.5*	30	16.0	10,000.00
	1.6-2.1	Sandy Clayey Silt	500	50	25	60	17.0	20,000.00
	2.1-6.0#	Clay	625	62.5	31	75	17.5	25,000.00
BH2	0.6-1.1	Sandy Silty Clay/Clayey Silt	250*	25*	12.5*	30	16.0	10,000.00
	1.1-2.3	Clayey Silt	500	50	25	60	17.0	20,000.00
	2.3-6.0#	Sandy Silty Clay/Clay	750	75	37.5	90	18.0	30,000.00
BH6	0.3-0.6	Sandy Silty Clay/Clay	250*	25*	12.5*	30	16.0	10,000.00
	0.6-1.3	Clay	375*	37.5*	18.75	45	16.5	15,000.00
	1.3-2.5	Clay	500	50	25	60	17.0	20,000.00
	2.5-4.0#	Clay	750	75	37.5	90	18.0	30,000.00

Note:

UBP - Ultimate Base Pressure
USF (C) - Ultimate Skin Friction (Compression)
USF (U) - Ultimate Skin Friction (Uplift)
USS - Undrained Shear Strength
Density - Density (at in-situ moisture)
\# - The borehole termination depth.
\+ - The borehole refusal depth.
* - The side adhesion within the top 1.0m depth of natural soil shall be ignored.
** - **Factor of safety of 2.5 is adopted in estimating the Modulus of Subgrade Reaction.**

The laboratory 10 day-soaked CBR test results (as requested by the client) indicated the CBR value of 3% on high plasticity clay, 5% on low plasticity clayey silt and 4.5% on low plasticity sandy clayey silt materials, which were compacted at 95% of SMDD and nearest 100% of SOMC.

5.3.2 Proposed Grandstand

It should be noted that the proposed removal of the existing building and trees will significantly modify the soil moisture conditions under the footprint of the footing system of the proposed grandstand area. Therefore, the site may have **"abnormal moisture conditions"** immediately after the removal of the existing building, structures and trees and the site shall therefore be classified as **"P-Problem site"** in accordance with the Australian Standard AS 2870 -2011 "Residential Slab and Footings".

We recommend that all the footings shall be designed similar to those as recommend in the Standard for "Class P" and the footing shall be designed by engineering principles. However, when the foundation material achieves equilibrium moisture condition throughout the soil profile after the removal of part of the existing buildings, then the site may be deemed **"normal site"** and **"Class 'H1-D' - Highly reactive deep drying"** classification may be adopted (the calculated characteristic surface movement (y_s) values noted to be above 40 and below 50mm) **provided the subgrade is prepared as specified in Section 5.1.**

The shallow footings such as deep edge beam or pad and strip footings may be adopted and they may be proportioned for a maximum allowable bearing pressure of 100kPa and a subgrade reaction modulus (k) of 20kPa/mm founded on the natural stiff consistency alluvial material below at or below 0.6m from the existing site level (refer to borehole log) or on the prepared subgrade as specified in Section 5.1, provided proper drainage measures are incorporated during and after the construction.

The deep pad, bored and cast-in-place pile footing system, if adopted, should be taken into the stiff consistency or better alluvial material. The design parameters given in Table 3 below may be adopted for the design of the deep footing system. It should be noted that the geotechnical design parameters given in Table 3 were estimated from the DCP and SPT test results, visual observation of the soil cuttings from the borehole.

Table 3 Geotechnical Design Parameters

Location	Depth (m)	Material Description	UBP (kPa)	USF (C) (kPa)	USF (U) (kPa)	USS (kPa)	Density (kN/m^3)	Modulus of subgrade reaction (kN/m^3)**
BH5	0.6-1.1	Clay	375*	37.5*	18.75	45	16.5	15,000.00
	1.1-4.4	Clay	500	50	25	60	17.0	20,000.00
	4.4-6.0#	Sandy clayey Silt/Clay	750	75	37.5	90	18.0	30,000.00

Note:

UBP - Ultimate Base Pressure
USF (C) - Ultimate Skin Friction (Compression)
USF (U) - Ultimate Skin Friction (Uplift)
USS - Undrained Shear Strength

Density - Density (at in-situ moisture)
- The borehole termination depth.
+ - The borehole refusal depth.
* - The side adhesion within the top 1.0m depth of natural soil shall be ignored.
** - **Factor of safety of 2.5 is adopted in estimating the Modulus of Subgrade Reaction.**

The laboratory 10 day-soaked CBR test result (as requested by the client) indicated the CBR value of 2% on high plasticity clay material, which was compacted at 95% of SMDD and nearest 100% of SOMC.

5.3.3 Proposed Function Room & Canteen

It should be noted that the proposed removal of the existing trees will significantly modify the soil moisture conditions under the footprint of the footing system of the proposed function room and canteen area. Therefore, the site may have **"abnormal moisture conditions"** immediately after the removal of the existing trees and the site shall therefore be classified as **"P-Problem site"** in accordance with the Australian Standard AS 2870 -2011 "Residential Slab and Footings".

We recommend that all the footings shall be designed similar to those as recommend in the Standard for "Class P" and the footing shall be designed by engineering principles. However, when the foundation material achieves equilibrium moisture condition throughout the soil profile after the removal of part of the existing dwelling , then the site may be deemed **"normal site"** and **"Class 'H1-D' - Highly reactive deep drying"** classification may be adopted (the calculated characteristic surface movement (y_s) values noted to be above 40 and below 50mm) **provided the subgrade is prepared as specified in Section 5.1.**

The shallow footings such as deep edge beam or pad and strip footings may be adopted and they may be proportioned for a maximum allowable bearing pressure of 100kPa and a subgrade reaction modulus (k) of 20kPa/mm founded on the natural stiff consistency alluvial material below at or below 0.5m from the existing site level (refer to borehole log) or on the prepared subgrade as specified in Section 5.1, provided proper drainage measures are incorporated during and after the construction.

The deep pad, bored and cast-in-place pile footing system, if adopted, should be taken into the stiff consistency or better alluvial material. The design parameters given in Table 4 below may be adopted for the design of the deep footing system. It should be noted that the geotechnical design parameters given in Table 4 were estimated from the DCP test results, visual observation of the soil cuttings from the borehole.

Table 4 Geotechnical Design Parameters

Location	Depth (m)	Material Description	UBP (kPa)	USF (C) (kPa)	USF (U) (kPa)	USS (kPa)	Density (kN/m^3)	Modulus of subgrade reaction (kN/m^3)**
BH7	0.5-.7	Clay	250*	25*	12.5*	30	16.0	10,000.00
	0.7-2.3	Clay/Sandy Clay	500	50	25	60	17.0	20,000.00
	2.3-4.0#	Clay	750	75	37.5	90	18.0	30,000.00

Note:

UBP - Ultimate Base Pressure
USF (C) - Ultimate Skin Friction (Compression)
USF (U) - Ultimate Skin Friction (Uplift)
USS - Undrained Shear Strength
Density - Density (at in-situ moisture)
- The borehole termination depth.
+ - The borehole refusal depth.
* - The side adhesion within the top 1.0m depth of natural soil shall be ignored.
** - **Factor of safety of 2.5 is adopted in estimating the Modulus of Subgrade Reaction.**

The laboratory 10 day-soaked CBR test result (as requested by the client) indicated the CBR value of 3.0% on medium to high plasticity clay material, which was compacted at 95% of SMDD and nearest 100% of SOMC.

5.3.4 Proposed Athletics Track Light Towers

The deep pad, bored and cast-in-place pile footing system, if adopted, should be taken into the stiff consistency or better alluvial material. The design parameters given in Table 5 below may be adopted for the design of the deep footing system. It should be noted that the geotechnical design parameters given in Table 5 were estimated from the DCP and SPT test results, visual observation of the soil cuttings from the boreholes.

Table 5 Geotechnical Design Parameters

Location	Depth (m)	Material Description	UBP (kPa)	USF (C) (kPa)	USF (U) (kPa)	USS (kPa)	Density (kN/m^3)	Modulus of subgrade reaction (kN/m^3)**
BH3	0.2-0.6	Sandy Silty Clay	250*	25*	12.5*	30	16.0	10,000.00
	0.6-2.0	Clay/Clayey Silt	500*	50*	25*	60	17.0	20,000.00
	2.0-3.4	Clayey Silt	625	62.5	31	75	17.5	25,000.00
	3.4-6.0#	Sandy Silty Clay	875	87.5	43.75	100	18.5	35,000.00
BH4	0.3-0.6	Sandy Silty Clay/Clay	250*	25*	12.5*	30	16.0	10,000.00
	0.6-2.5	Clay/Clayey Silt	500	50	25	60	17.0	20,000.00
	2.5-6.0#	Sandy Clayey Silt	750	75	37.5	90	18.0	30,000.00

Note:

UBP	- Ultimate Base Pressure
USF (C)	- Ultimate Skin Friction (Compression)
USF (U)	- Ultimate Skin Friction (Uplift)
USS	- Undrained Shear Strength
Density	- Density (at in-situ moisture)
#	- The borehole termination depth.
+	- The borehole refusal depth.
*	- The side adhesion within the top 1.0m depth of natural soil shall be ignored.
**	- **Factor of safety of 2.5 is adopted in estimating the Modulus of Subgrade Reaction.**

The laboratory 10 day-soaked CBR test results (as requested by the client) indicated the CBR values of 2.5% on high plasticity clay materials, which were compacted at 95% of SMDD and nearest 100% of SOMC.

5.3.5 Footing Design and Foundation – General Comments

If uplift forces are to be assessed, the allowable side resistance on the footing system may be taken as equivalent to 50% of the allowable side adhesion values given above. It should be noted that a factor of safety (FOS) 2.5 was adopted for the bearing pressure and skin friction values given in Table 2 to 5 for the above material.

If Pad/Column footing system is to be adopted, then footing size and depth shall be designed in such a way that it withstands lateral forces and overturning moments. Care shall be exercised in adopting the recommended design parameters given above in respect to the influenced zone of footing system.

It is anticipated that equilibrium moisture conditions may be achieved within a minimum period of 6 to 12 months following the removal of part of the existing building, dwelling, structures and trees provided abnormal moisture ingress does not affect the underlying foundation material during this period. It is highly recommended to undertake additional drilling and field moisture content determination tests at or after the minimum 6 to 12 month period following the removal of part of the existing building, dwelling, structures and trees.

As noted, part of the existing buildings, structures and trees are to be demolished and removed prior to the new constructions. It is therefore highly recommended to completely remove the entire footing system of the removed building areas and entire trees and tree root system of the trees, allow the ground to achieve equilibrium moisture condition throughout the soil profile after the removal and then backfill in a controlled manner that it can be used as “structural fill” as required.

If fill placement is required across the site, it is highly recommended to place granular fill comprising mainly sand and well graded gravel, but caution shall be exercised not to select a ‘raw’ or non-plastic material that may induce erosion. It should be noted that the clay soils are subject to saturation and

shrink/swell problems. The fill shall be placed in accordance with clause 6.4.1 & 6.4.2 of AS2870, or otherwise the site classification shall be reviewed.

It is noted that medium to large sized trees are located adjacent to the subject site therefore any buildings or structures should be sited away from the trees at a distance equivalent to at least 100% of the mature height of the trees. If any trees are to be removed, it is highly recommended to remove the entire tree including root system and allow the ground to achieve equilibrium moisture condition prior to the construction. If any trees are to be retained and any buildings or structures are to be built within the distance equivalent to 100% of the mature height of the trees, then the footing system shall be designed similar to those for "Class P – Problem site" classification as stated in AS2870.

The bases of the pile shafts and footings must be clean and free of soft and loose material and the sides of bored pile holes where side adhesion is adopted must be free of smear prior to concreting. To achieve this, bases of bored pile holes should be cleaned using a cleaning bucket and the sides of the pile holes should be roughed to remove the smear zone associated with drilling, or the side adhesion values given above should be reduced by 50%.

If uplift forces are to be assessed, the allowable side resistance on the footing system may be taken as equivalent to 50% of the allowable side adhesion values given above.

The slab panel, internal beams and load support thickening may be founded on the natural ground or prepared fill subgrade as specified in Section 5.1 as required. The ground slab may either be suspended on the footing system or by ground bearing slab if required. For the latter, we recommend that the structure be supported on a stiffened raft placed on the natural ground or prepared fill subgrade, comprising a grid of reinforced beam cast integrally with the floor slab, with load bearing beams thickened to extend to the clay stratum as required in order to minimise the risk of significant damage from the reactive clay foundation. The maximum edge beam pressure of the stiffened raft slab should not exceed the allowable bearing capacity of the underlying alluvial soil foundation of 100kPa.

It is recommended to place selected granular fill to a minimum thickness of 100mm across the prepared subgrade particularly on the exposed clay-based subgrade before the construction of the slab to cater surface movements, such as shrink/swell movements.

The footing excavations should not be left exposed for prolonged periods as deterioration of footing bases may occur when subjected to wetting and drying processes. Care should be exercised during construction to ensure water ponding does not occur since this may lead to subsequent softening of the founding materials. Groundwater seepage may be encountered in the footing excavation. Any such seepage should be readily controllable by conventional sump and pump dewatering systems installed at the base of the excavation as appropriate. The footing excavations shall be cleared off the debris and ponding water prior to the placement of the concrete in order to adopt the above recommended bearing pressures.

If water ponds in the base of footings or the base founding materials are affected by moisture ingress, then this material should be excavated to expose the natural subgrade, which has not been exposed to moisture, and pour the concrete immediately. If a delay in pouring the concrete is anticipated, then a blinding layer should be placed over the base of the footing to prevent softening of the footing base.

It is highly recommended to incorporate proper drainage measures around the perimeter of the structure to ensure surface run-off does not ingress into the founding material. The footing excavations shall be inspected by experienced geotechnical personnel to ensure they achieve the above recommended bearing pressures.

5.4 Individual Risk Rating (IRR)

The ultimate load capacities should be reduced by a geotechnical strength reduction factor (ϕ_g) in order to calculate the design geotechnical strength depending on the design method and verification procedures adopted in accordance with "AS2159-2009–Piling–Design and installation".

The below individual risk ratings (IRR) in Table 6 is supplied as requested by the client as per Table 4.32.(C) in AS2159-2009. A copy of Table 4.3.2(A) from AS2159-2009 is herewith attached for ease of reference.

Table 6 Weighting Factors and Individual Risk Ratings

Risk Factor	Weighting Factor (W_i)	IRR
Site		
Geological Complexity of the Site	2	3
Extent of Ground Investigation	2	3
Amount and Quality of Geotechnical Data	2	2
Design		
Method of Assessment of Geotechnical Parameters for Design	2	2

5.5 Settlement

We envisage that the total settlements should be minimal provided the design is made within the allowable design parameters recommended and the maintenance of the structures and proper drainage measures are adopted around the structures.

Shallow footings proportioned in accordance with design parameters recommended above are estimated to have load induced settlements of no greater than 0.75% of the width of the footing.

Pile foundation designed in accordance with design parameters recommended above are estimated to have load induced settlements of no greater than 0.75% of the diameter of the piles. It is

anticipated that differential settlement is likely to be less than 50% of the total settlement provided the footings are designed in accordance with the design parameters given above.

It should be noted that although the aforementioned design parameters given above are in terms of allowable limit, their use should be checked against settlement, using deformation characteristics values of the underlying clay material given in Table 7. It should be noted that differential settlement should not exceed 50% of the total settlement.

Table 7 Deformation Characteristics Values[1]

Parameters	Stiff Clay/Silt	Very Stiff Clay/Silt	Hard Clay/Silt
Bulk Density (kN/m^3)	17.0	18.0	19.0
Elastic Modulus (Undrained) (MPa) -E_u	7.0	12.0	15.0
Coefficient of Volume Compressibility - (m^2/MN) - m_v	0.07	0.07	0.07

Note: 1 - These values are estimated from the field DCP and SPT test results and visual assessment of the recovered samples.

5.6 Soil Aggression

The three (3) pH tests indicated pH values ranging from 8.1 to 8.5 on clay-based material recovered from the boreholes and therefore the underlying soil is considered “moderate alkalinity” to “strong alkalinity” respectively. EC values ranging from 0.4 to 2.73mS/cm were recorded on the same samples tested, which are assessed to be “slight salinity” to “extreme salinity” respectively. The pH values on the clay-based material are considered “non-aggressive” towards concrete due to the impermeable nature of the clay-based material and “non-corrosive” towards steel.

The sulphate content values ranging from 100 to 1050mg/kg were recorded on the same samples tested and are considered generally “low” and chloride content values ranging from 310 to 3880mg/kg recorded on the same samples tested and are also considered generally “low”. The low chloride and sulphate levels are considered “non-aggressive” towards concrete due to the impermeable nature of the clay-based material and the low chloride levels are considered “non-corrosive” towards steel.

The resistivity values ranging from 1.72 to 7.31Ω.m were recorded on the same samples tested which are assessed to be “low resistivity”. The “low resistivity” is considered to provide a “moderately aggressive” environment respectively towards unprotected steel due to the impermeable nature of the clay-based material.

The designer is therefore referred to the Cement and Concrete Association of Australia Technical Note 57 for any special precautionary measures required for buried concrete and steel elements into these materials.

5.7 Site Sub-Soil Class – Earthquake Design

The site sub-soil class in accordance with Section 4.2 of AS1170.4-2007 "Part 4: Earthquake actions in Australia", is assessed to be "Class C_e- Shallow soil site".

5.8 Subgrade for Proposed Synthetic Turf Hockey Pitch, Netball Courts, Car Park Pavement Area and All-Weather Athletics Track

5.8.1 Proposed Synthetic Turf Hockey Pitch

BH13 and BH14 represents the general area of the proposed synthetic turf hockey pitch at the subject site. The boreholes drilled revealed that the site is underlain by natural topsoil material to 0.25m in BH13 and 0.2m in BH14 overlying natural alluvial material comprising medium plasticity sandy clay and clay and low plasticity sandy clayey silt, extending to the borehole termination depth of 1.5m in BH13 and BH14.

The laboratory 10 day-soaked CBR test results (as requested by the client) indicated the CBR values of 8% on low plasticity sandy clayey silt and 4% on medium plasticity clay materials, which were compacted at 95% of SMDD and nearest 100% of SOMC. The in-situ CBR values correlated from DCP tests indicate CBR values ranging from 3 to 32% on the same natural subgrade material where measured.

It should be noted that in-situ CBR values correlated from the field tests (DCP test) are generally higher than laboratory 10 day-soaked CBR values. It should be appreciated that the CBR test results is directly related to the dry density and the water content of the materials. It is noted that the Optimum Moisture Content (OMC) at which the sample was compacted in the laboratory and the moisture content after soaking at which the sample was tested are generally higher than Field Moisture Content (FMC), which could be contributing factor in resulting high CBR values in the field.

It is noted that the Griffith area has an average rainfall of less than 1000mm and the subgrade would be prepared as discussed in Section 5.1. Based on these evaluations and assumptions, the design subgrade CBR value of 4% and a subgrade reaction modulus (k) of 30kPa/mm may be adopted for the design of any proposed road or paved area at the subject site provided drainage measures are provided and maintained around the pavement throughout the pavement life.

5.8.2 Proposed Netball Courts

BH8 to BH10 represents the general area of the proposed netball courts at the subject site. The boreholes drilled revealed that the site is underlain by fill to 0.13m to 0.19m overlying natural alluvial material comprising low plasticity sandy silty clay, clayey silt and sandy clayey silt and medium plasticity sandy clay and clay, extending to the borehole termination depth of 4.0m in BH8 and 1.5m in BH9 and BH10.

The laboratory 10 day-soaked CBR test results (as requested by the client) indicated the CBR values of 6% on low plasticity sandy clayey silt, 9% on low plasticity clayey silt and 5% on low plasticity sandy silty clay materials, which were compacted at 95% of SMDD and nearest 100% of SOMC. The in-situ CBR values correlated from DCP tests indicate CBR values ranging from 5 to 35% on the same natural subgrade material where measured.

It should be noted that in-situ CBR values correlated from the field tests (DCP test) are generally higher than laboratory 10 day-soaked CBR values. It should be appreciated that the CBR test results is directly related to the dry density and the water content of the materials. It is noted that the Optimum Moisture Content (OMC) at which the sample was compacted in the laboratory and the moisture content after soaking at which the sample was tested are generally higher than Field Moisture Content (FMC), which could be contributing factor in resulting high CBR values in the field.

It is noted that the Griffith area has an average rainfall of less than 1000mm and the subgrade would be prepared as discussed in Section 5.1. Based on these evaluations and assumptions, the design subgrade CBR value of 4% and a subgrade reaction modulus (k) of 30kPa/mm may be adopted for the design of the netball courts at the subject site provided drainage measures are provided and maintained around the pavement throughout the pavement life.

5.8.3 Proposed Car Park Pavement Area

BH11 and BH12 represents the general area of the proposed car park area at the subject site. The boreholes drilled revealed that the site is underlain by fill to 0.03m to 0.25m overlying natural alluvial material comprising low plasticity sandy silty clay and sandy clayey silt and medium plasticity clay, extending to the borehole termination depth of 1.5m in BH11 and BH12.

The laboratory 10 day-soaked CBR test results (as requested by the client) indicated the CBR values of 9% on low plasticity sandy clayey silt and 4% on medium plasticity clay materials, which were compacted at 95% of SMDD and nearest 100% of SOMC. The in-situ CBR values correlated from DCP tests indicate CBR values ranging from 3 to 28% on the same natural subgrade material where measured.

It should be noted that in-situ CBR values correlated from the field tests (DCP test) are generally higher than laboratory 10 day-soaked CBR values. It should be appreciated that the CBR test results is directly related to the dry density and the water content of the materials. It is noted that the Optimum Moisture Content (OMC) at which the sample was compacted in the laboratory and the moisture content after soaking at which the sample was tested are generally higher than Field Moisture Content (FMC), which could be contributing factor in resulting high CBR values in the field.

It is noted that the Griffith area has an average rainfall of less than 1000mm and the subgrade would be prepared as discussed in Section 5.1. Based on these evaluations and assumptions, the design subgrade CBR value of 4% and a subgrade reaction modulus (k) of 30kPa/mm may be adopted for the

design of any proposed car park area at the subject site provided drainage measures are provided and maintained around the pavement throughout the pavement life.

5.8.4 Proposed All-Weather Athletics Track

TP1 and TP2 represents the general area of the proposed all-weather athletics track at the subject site. The test pits excavated revealed that the site is underlain by natural topsoil material to 0.25m in TP1 & TP2 overlying natural alluvial material comprising low plasticity sandy silty clay and sandy clayey silt, extending to the test pit termination depth of 1.5m in TP1 and medium plasticity clay, extending to the test pit termination depth of 1.5m in TP2.

The laboratory 10 day-soaked CBR test results (as requested by the client) indicated the CBR values of 8% on low plasticity sandy clayey silt and 5% on medium to high plasticity clay materials, which were compacted at 95% of SMDD and nearest 100% of SOMC. The in-situ CBR values correlated from DCP tests indicate CBR values ranging from 3 to 20% on the same natural subgrade material where measured.

It should be noted that in-situ CBR values correlated from the field tests (DCP test) are generally higher than laboratory 10 day-soaked CBR values. It should be appreciated that the CBR test results is directly related to the dry density and the water content of the materials. It is noted that the Optimum Moisture Content (OMC) at which the sample was compacted in the laboratory and the moisture content after soaking at which the sample was tested are generally higher than Field Moisture Content (FMC), which could be contributing factor in resulting high CBR values in the field.

It is noted that the Griffith area has an average rainfall of less than 1000mm and the subgrade would be prepared as discussed in Section 5.1. Based on these evaluations and assumptions, the design subgrade CBR value of 4% and a subgrade reaction modulus (k) of 30kPa/mm may be adopted for the design of any proposed pavement area at the subject site provided drainage measures are provided and maintained around the pavement throughout the pavement life.

5.9 Pavement Design - Proposed Pavement Areas

The client representative, Mr. Mitchell Yii of Taylor Thomson Whitting Pty Ltd, Sydney and Mr. James Tomarchio of Griffith City Council advised in the emails dated 24 September 2020 to adopt the design traffic of $5x10^4$ ESA for 20 years design life.

In adopting the design subgrade CBR value of 4.0% as discussed above and the design traffic of $5x10^4$ ESA as advised above, one of the following pavement designs, as a minimum, may be adopted.

Design Option 1 – Pavement with Granular Material (Local DGS quality materials)

40mm Asphalt (AC14) – 2200Mpa
150mm Local DGS20 Quality or equivalent (Ev=200MPa)
200mm Local DGS40 Quality or equivalent (Ev=200MPa)
Subgrade CBR 4.0%

The above pavement will give a design life of 20 years, according to Circly 7.0 (16 July 2020), using the given design parameters, provided proper drainage measures are incorporated at the site. It should be noted that this does not allow any tolerance on pavement layers. **It should be noted that this option adopts local quality DGS20/40 material. It should also be noted that the surface asphalt layer is not considered as part of the structural layer of the pavement.**

Design Option 2 – Pavement with Granular Pavement (Local DGS and Select Fill material)

40mm Asphalt (AC14) – 2200Mpa
175mm Local DGS20 Quality or equivalent (Ev=200MPa)
175mm Select Fill Material * (Ev=150Mpa)
Subgrade CBR 4.0%

Note: * - (i) Select fill material should have a CBR>15% and a plasticity index (PI) <12% in its original state before addition of additive.

(ii) Select fill material should be modified with 2% hydrated lime if CBR <15% and/or PI>12%.

The above pavement will give a design life of 20 years, according to Circly 7.0 (16 July 2020), using the given design parameters, provided proper drainage measures are incorporated at the site. It should be noted that this does not allow any tolerance on pavement layers. **It should be noted that this option adopts local quality DGS20 material. It should also be noted that the surface asphalt layer is not considered as part of the structural layer of the pavement.**

Design Option 3 – Granular Pavement with Local Quality DGS material & Stabilised Subgrade

40mm Asphalt (AC14) – 2200Mpa
200mm Local DGS20 Quality or equivalent (Ev=200MPa)
250mm Stabilised Subgrade* (Ev=120Mpa)
Subgrade CBR 4.0%

Note: The subgrade material should be mixed with 3% additive as discussed above but this should be confirmed with laboratory trial test (Refer Section 5.1 above).**

The above pavement will give a design life of 20 years, according to Circly 7.0 (16 July 2020), using the given parameters, provided proper drainage measures are incorporated at the site. It should be

noted that no tolerance is allowed on pavement layers. **It should be noted that this option adopts local quality DGS20 material. It should also be noted that the surface asphalt layer is not considered as part of the structural layer of the pavement**

Design Option 4 – Concrete Pavement

150mm Plain Concrete (Jointed/Reinforced)*
150mm Crushed Rock or Gravel
Subgrade CBR 4.0%

Note: * - The concrete specified in the above design should achieve the flexural strength of 3.5Mpa for 32Mpa compressive strength.

The above design should give a design life of 40 years. The provision of sub-base layer is to assist in controlling volume changes in moderately expansive clay subgrade and to provide uniform support to the base concrete layer. The crushed rock or gravel material before addition of any additive should achieve a CBR of >15% and a PI (Plasticity Index) of <12%. Appropriate jointing layout may be prepared in accordance with the requirements of "Industrial Floors and Pavements – Guidelines for design, construction and specification" by Cement and Concrete Association of Australia (May 1999).

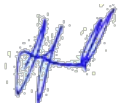
6.0 General Comment

- Occasionally, the subsurface soil conditions in the completed boreholes may be found different (or may be interpreted to be different) from those expected. This can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact us.
- The material specified as base and sub-base material as per above designs may be used provided the material meets all criteria as shown in Table 242.3 and 242.4 of AusSpec for NGS20 or local quality DGS20/40 specification. It is therefore highly recommended to use those similar quality materials and to undertake on-going quality control test to ensure that the material quality is maintained throughout the construction.
- The pavement materials shall be compacted to a minimum of 102% SMDD for base and 100% SMDD for sub-base and select fill or as per Council Specification.
- It is highly recommended that an adequate drainage system should be formed to maintain constant moisture conditions in the pavement and subgrade below the pavement. It is also highly recommended to place interface trench drain at the joints between existing and new pavement if the existing materials are found different from new materials, particularly if the existing or new pavement has a stabilised layer. The trench drain of 300x300mm shall be placed below heavily bound layer and be extended to about 300mm.
- It should be noted that site preparation may expose wet subgrade material if excavation is carried out after prolonged period of rainfall. Trafficability in the silt/clay-based materials for

wheeled vehicles can be expected to be slightly difficult during and following rainfall if it is exposed. Caution shall therefore be exercised during the construction.

Should you have any queries, please do contact us.

Yours truly,



Jarrod Gornall
Geotechnical Engineer

Tin Maung
Senior Geotechnical Engineer

Attachments:

- Addendum
- Site Location Plan
- Plan showing borehole & DCP test locations
- Borehole logs & materials schedule & logs with explanatory note
- Dynamic Cone Penetrometer test reports
- Laboratory test reports by Aitken Rowe Testing Laboratories Pty Ltd
- Laboratory test reports by Sydney Environmental & Soil Laboratory Pty Ltd
- Laboratory test report by EnviroLab Pty Ltd
- Laboratory test report by Environmental and Analytical Laboratories Charles Sturt University
- Copies of Table 4.3.2(A) & Table 4.3.2(C) of AS2159 – 2009
- Circly Design Print-outs

ADDENDUM

LIMITS OF INVESTIGATION

The recommendations made in this report are based on the assumption that the test results are representative of the overall subsurface conditions. However, it should be noted that even under optimum circumstances, actual conditions in some parts of the investigation site may differ from those said to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal all that is hidden by earth, rock and time.

The client should also be aware that our recommendations refer only to our test site locations and the ground level at the time of testing.

The recommendations in this report are based on the following: -

a) The information gained from our investigation.
b) The present "state of the art" in testing and design.
c) The site treatment conveyed to us by the client.
d) Historical Information

Should the client or their agent have omitted to supply us with the correct relevant information, or make significant changes to the scope of works, we reserve the right to make an additional charge if more testing is necessary.

Any sketch supplied should be considered as only an approximate pictorial evidence of our work.

AITKEN ROWE TESTING LABORATORIES PTY LTD

Registration Number: GS20-120

Client: ATLUS GROUP PTY LTD – SYDNEY, NSW

Project: GEOTECHNICAL INVESTIGATION
PROPOSED WEST END OVAL SPORTS PRECINCT,
MERRIGAL STREET, GRIFFITH, NSW
SITE LOCATION PLAN

Aitken Rowe Testing Laboratories Pty Ltd

Registration Number: GS20-120

Client: ATLUS GROUP PTY LTD – SYDNEY, NSW

Project: GEOTECHNICAL INVESTIGATION
PROPOSED WEST END OVAL SPORTS PRECINCT,
MERRIGAL STREET, GRIFFITH, NSW
BOREHOLE, TEST PIT & DCP TEST LOCATION PLAN

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **1**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***20/07/2020***
GPS N: ***6205942 E: 0410545***
RL: ***Approx: 123.4m***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Field. Test	Remarks & Field Records
CL	FILL/TOPSOIL: Sandy Silty CLAY; low plasticity, fine to medium sand, brown		MC<PL	F-St.				FILL: Appears poorly compacted
CL	Sandy Silty CLAY; low plasticity, fine to medium sand, red brown			St.	D	1A		NATURAL 3% <SOMC
CH	CLAY; high plasticity, with fine to coarse sand, yellow orange brown		MC>PL					
		0.5			D/U50	1B		L.S = 12.5% / lss = 2.48 FMC = 18.9% SOMC = 24.4% CBR = 3% @95% SMDD
CH	CLAY; high plasticity, with fine to coarse sand, trace gravel, yellow brown	1.0						
					D	1C		L.S = 12.5% FMC = 20.7%
		1.5					1.5	
				VSt.	D	1D	SPT 4, 11, 12 N = 23	L.S = 5.0%
ML	Sandy Clayey SILT; low plasticity, fine to medium sand, yellow brown		MC≤PL					
		2.0					1.95	
CH	CLAY; high plasticity, with fine to coarse sand, trace gravel, yellow brown		MC>PL					
		2.5			D	1E		2-3% <SOMC L.S = 15.0% Unable to obtain U50 sample
							3.0	
CH	CLAY; high plasticity, with fine to coarse sand, trace gravel, orange brown grey	3.0			D	1F	SPT 6, 12, 12 N = 24	
		3.5					3.45	
		4.0			D	1G		
								Seepage @ 4.2m
		4.5					4.5	
					D	1H	SPT 10, 9, 13 N = 22	3% <SOMC
		5.0					4.95	
		5.5						End of Seepage @ 5.5m
		6.0						

End of Borehole (BH1) @ 6.0m

Registration No.: GS20-120

Location: Geotechnical Investigation & Pavement Design - Proposed West End Sports Oval Precinct, Merrigal Street, Griffith, NSW

Client: Atlus Group - Sydney, NSW

Logged By: JP

Scale: As shown

Seepage @ 4.2m to 5.5m

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **2**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***20/07/2020***
GPS N: ***6206002 E: 0410557***
RL: ***Approx: 123.3m***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Field. Test	Remarks & Field Records
GP-GM	FILL: Sandy GRAVEL; fine to coarse grained, fine to coarse sand, with silt fines of low plasticity, pale white blue		D	L-MD				FILL: Appears poorly compacted 'Uncontrolled'
CL	FILL: Sandy Silty CLAY; low plasticty, fine to medium sand, red brown	**0.5**	MC≤PL	VSt.	D	2A		FILL: Appears moderately compacted 'Uncontrolled'
CL	Sandy Silty CLAY; low plasticity, fine to medium sand, red brown			St.-VSt.				NATURAL
ML	Clayey SILT; low plasticity, with fine to medium sand, red brown	**1.0**	MC<PL		D	2B		SOMC = 21.3% CBR = 5% @95% SMDD
ML	Clayey SILT; low plasticity, with fine to coarse sand, yellow brown	**1.5**	MC>PL	VSt.-H	D	2C	1.5 SPT 12, 20/150 N > 20	FMC = 20.5%
		2.0			D	2D	1.8	
CI	CLAY; medium plasticity, with fine to coarse sand, yellow brown	**2.5**			D	2E		2-3% <SOMC L.S = 9.5%
CL-CI	Sandy Silty CLAY; low to medium plasticity, fine to coarse sand, yellow brown grey	**3.0**			D	2F	3.0 SPT 12, 13, 18 N = 31	Water level @ 3.0m in piezo 3-4%<OMC
		3.5					3.45	
CI	CLAY; medium plasticity, with fine to coarse sand, yellow brown grey	**4.0**			D	2G		Seepage @ 3.8m 2% <SOMC
CL-CI	Sandy Silty CLAY; low to medium plasticity, fine to coarse sand, grey orange brown	**4.5**			D	2H	4.5 SPT 9, 13, 20 N = 31	End of Seepage @ 4.4m 3% <SOMC
		5.0					4.95	
		5.5						
		6.0						

End of Borehole (BH2) @ 6.0m

Registration No.: GS20-120

Location: Geotechnical Investigation & Pavement Design - Proposed West End Sports Oval Precinct, Merrigal Street, Griffith, NSW

Client: Atlus Group - Sydney, NSW

Logged By: JP

Scale: As shown

Seepage @ 3.8m to 4.4m

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **3**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***20/07/2020***
GPS N: ***6206130 E: 0410722***
RL: ***Approx: 124.3m***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Field. Test	Remarks & Field Records
CL	TOPSOIL/FILL: Sandy CLAY; low plasticity, fine to medium sand, red brown		MC≤PL	St.-VSt.				Fill: Appears moderately compacted 'Uncontrolled'
CL	Sandy Silty CLAY; low plasticity, fine to coarse sand, red brown	0.5	MC>PL		D	3A		NATURAL Large amount of root fibres to 0.5m
CH	CLAY; high plasticity, with fine to coarse sand, yellow orange brown	1.0		VSt.	D	3B		4% <SOMC FMC = 20.3% SOMC = 25.0% CBR = 2.5% @95% SMDD
ML	Clayey SILT; low plasticity, with fine to coarse sand, trace yellow brown	1.5	MC≤PL	VSt.-H	D	3C		
		2.0					2.0	
				H	D	3D	SPT 8, 15, 20 N = 35	
		2.5					2.45	
			MC>PL					
		3.0			D	3E		SOMC 1% <OMC L.S = 7.0%
CL	Sandy Silty CLAY; low plasticity, fine to coarse sand, trace gravel, orange brown grey	3.5					3.5	
					D	3F	SPT 9, 16, 18 N = 34	
		4.0					3.95	
								← Seepage @ 4.2m
		4.5			D	3G		
		5.0						← End of Seepage @ 5.1m
		5.5					5.55	
					D	3H	SPT 13, 20, 20 N = 40	
		6.0						

End of Borehole (BH3) @ 6.0m

Registration No.: GS20-120

Location: Geotechnical Investigation & Pavement Design - Proposed West End Sports Oval Precinct, Merrigal Street, Griffith, NSW

Client: Atlus Group - Sydney, NSW

Logged By: JP

Scale: As shown

Seepage @ 4.2m to 5.1m

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **4**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***20/07/2020***
GPS N: ***6205942 E: 0410692***
RL: ***Approx: 123.8m***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Field. Test	Remarks & Field Records
CL	FILL/TOPSOIL: Sandy Silty CLAY; low plasticity, with fine to medium sand, red brown		MC>PL	F St.				FILL: Appears moderately compacted "Uncontrolled"
CL	Sandy Silty CLAY; low plasticity, with fine to medium sand, red brown	**0.5**			D	4A		NATURAL - Large amount of organic matter L.S = 6.5% / FMC = 13.1%
CH	CLAY; high plasticity, with fine to coarse sand, red orange brown	**1.0**		VSt.	D/U50	4B		L.S = 12.0% / Iss = 1.74 FMC = 16.3% SOMC = 23.7% CBR = 2.5% @95% SMDD
		1.5						
CH	CLAY; high plasticity, with fine to coarse sand, yellow brown	**2.0**	MC<PL	VSt.-H	D	4C		L.S = 12.5%
ML	Clayey SILT; low plasticity, with fine to coarse sand, pale yellow brown	**2.5**			D	4D	2.5	
ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, orange brown grey	**3.0**	MC≤PL	H	D	4E	SPT 12, 18, 20 N = 38 2.95	L.S = 5.5%
ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, trace gravel, yellow orange brown	**3.5**	MC>PL		D	4F		3% <SOMC
		4.0					4.0	
ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, orange brown grey	**4.5**	MC≤PL		D	4G	SPT 11, 20, 20 N = 40 4.45	
ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, trace gravel, yellow orange brown	**5.0**	MC>PL		D	4H	5.0	3-4% <SOMC
ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, trace gravel, yellow orange brown grey	**5.5**	MC<PL		D	4I	SPT 20/130 5.13	Refusal @ 20 blows 320mm stick up
		6.0						

End of Borehole (BH4) @ 6.0m

Registration No.: GS20-120

Location: Geotechnical Investigation & Pavement Design - Proposed West End Sports Oval Precinct, Merrigal Street, Griffith, NSW

Client: Atlus Group - Sydney, NSW

Logged By: JP

Scale: As shown

Dry on completion

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **5**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***20/07/2020***
GPS N: ***620648 E: 0410655***
RL: ***Approx: 124.0m***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Field. Test SPT	Remarks & Field Records
CL	TOPSOIL: Sandy Silty CLAY; low plasticity, fine to medium sand, red brown		MC>PL	F				NATURAL
CL	Sandy Silty CLAY; low plasticity, with fine to medium sand, red brown				D	5A		Large amount of root fibres to 0.5m 1% <SOMC
CH	CLAY; high plasticity, with fine to coarse sand, red orange brown	**0.5**						1% >SOMC L.S = 13.0% / Iss 2.21 FMC = 20.4% SOMC = 24.9% CBR = 2% @95% SMDD
		1.0		St.-VSt.	U50	5B		
CH	CLAY; high plasticity, with fine to coarse sand, pale grey yellow brown			VSt.	D	5C	1.5	4% <SOMC
		1.5			D	5D	SPT 7, 9, 13 N = 22	
CH	CLAY; high plasticity, with fine to coarse sand, grey orange brown	**2.0**					1.95	
		2.5			D	5E		3-4% <SOMC L.S = 15.5%
		3.0					3.0	
					D	5F	SPT 4, 8, 8 N = 16	5% <SOMC
		3.5					3.45	
		4.0			D	5G		4% <SOMC
ML	Sandy Clayey SILT; low plasticity, with fine to coarse sand, grey orange brown	**4.5**		H			4.5	
					D	5H	SPT 7, 20/120mm	4% <SOMC
		5.0					4.77	
CI-CH	CLAY; medium to high plasticity, with fine to coarse sand, orange brown grey	**5.5**			D	5I		2-3% >SOMC
		6.0						

End of Borehole (BH5) @ 6.0m

Registration No.: GS20-120

Location: Geotechnical Investigation & Pavement Design - Proposed West End Sports Oval Precinct, Merrigal Street, Griffith, NSW

Client: Atlus Group - Sydney, NSW

Logged By: JP

Scale: As shown

Dry on completion

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **6**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***20/07/2020***
GPS N: ***6205971 E: 0410538***
RL: ***Approx: 123.4m***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Field. Test SPT	Remarks & Field Records
GP-GM	FILL: Sandy GRAVEL; fine to coarse grained, fine to coarse gravel, blue		D	MD	D	6A		FILL: Appears moderately to well compacted 'Uncontrolled'
GP-GM	FILL: Sandy GRAVEL; fine to coarse grained, fine to coarse sand, with silt fines of low plasticity, red orange brown							
ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, red brown	0.5	MC>PL	St.	D	6B		NATURAL L.S = 3.0% / FMC = 9.4% SOMC = 11.5% CBR = 4.5% @95% SMDD
CH	CLAY; high plasticity, with fine to coarse sand, orange brown	1.0		St.-VSt.	D	6C		L.S = 12.5%
CH	CLAY; high plasticity, with fine to coarse sand, yellow brown	1.5		VSt.	D	6D		
		2.0						
		2.5						
CH	CLAY; high plasticity, with fine to coarse sand, trace gravel, yellow brown	3.0		VSt.-H	D	6E		L.S = 15.5%
CH	CLAY; high plasticity, with fine to coarse sand, yellow orange brown	3.5			D	6F		1% >SOMC
		4.0						
	End of Borehole (BH6) @ 4.0m	4.5						
		5.0						
		5.5						
		6.0						

Registration No.: GS20-120

Location: Geotechnical Investigation & Pavement Design - Proposed West End Sports Oval Precinct, Merrigal Street, Griffith, NSW

Client: Atlus Group - Sydney, NSW

Logged By: JP

Scale: As shown

Dry on completion

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **7**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***20/07/2020***
GPS N: ***6205962 E: 0410604***
RL: ***Approx: 123.6m***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Field. Test SPT	Remarks & Field Records
GP-GM	FILL: Sandy GRAVEL; fine to coarse grained, fine to coarse sand, with silt fines of low plasticity, blue		D	D				FILL: Appears moderately to well compacted 'Uncontrolled'
CL	Sandy Silty CLAY; low plasticity, fine to coarse sand, red brown	0.5	MC>PL	F-St.	D	7A		NATURAL 1% <SOMC L.S = 4.5%
CH	CLAY; high plasticity, with fine to coarse sand, orange brown	1.0		VSt.	D	7B		L.S = 11.5% FMC = 16.0% SOMC = 22.6% CBR = 3.0% @95% SMDD
CH	CLAY; high plasticity, with fine to coarse sand, yellow brown	1.5			D	7C		1-2% <SOMC L.S = 11.5%
CI	Sandy CLAY; medium plasticity, fine to coarse sand, trace gravel, yellow brown	2.0			D	7D		L.S = 11.0%
CH	CLAY; high plasticity, with fine to coarse sand, trace gravel, yellow brown	2.5		VSt.-H	D	7E		SOMC L.S = 14.0%
CH	CLAY; high plasticity, trace sand, yellow brown	3.0			D	7F		1% <SOMC
CH	CLAY; high plasticity, with fine to coarse sand, yellow orange brown	3.5						1-2% >SOMC
	End of Borehole (BH7) @ 4.0m	4.0 4.5 5.0 5.5 6.0						

Registration No.: GS20-120

Location: Geotechnical Investigation & Pavement Design - Proposed West End Sports Oval Precinct, Merrigal Street, Griffith, NSW

Client: Atlus Group - Sydney, NSW

Logged By: JP

Scale: As shown

Dry on completion

Aitken Rowe Testing Laboratories Pty Ltd

17b Battista Street, Griffith NSW 2680

Geotechnical Investigation - Materials Schedule and Log

CLIENT: ATLUS GROUP - SYDNEY, NSW

PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN
PROPOSED WEST END SPORTS OVAL PRECINCT, MERRIGAL STREET, GRIFFITH, NSW

STAFF: M.S **SAMPLING METHOD :** AS1289.1.2.1 **CLAUSE :** 6.5.3

DATE: 21/07/2020

REGO. NO.: GS20-120

Borehole No. and Location	Layer Sample No.	Depth (mm)	Group Symbol	Field Description (layer, type, plasticity / particle size, colour, secondary components)	Moisture Conditions	Strength Comments	Moistures (FMC=Field MC) (OMC=Optimum MC) (FMC/OMC=Moisture Ratio)			Dynamic Cone Penetrometer (NB not equiv. to lab soaked CBR)		(CBR%)	Other Comments
							OMC	FMC	FMC/ OMC	Depth In Subgrade (mm)	Equiv. CBR %	10 day (95% Rel. Comp.)	
TP1		0-250	CL	TOPSOIL: Sandy Silty CLAY; low plasticity, fine to coase sand, red brown	MC>PL	S-F							NATURAL **RL: Approx.: 125.5m**
N: 6206081	SG1A	250-550	CL	Sandy Silty CLAY; low plasticity, fine to coarse sand, red brown	MC>PL	F							
E: 0410749	SG1B	550-1500	ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, trace gravel, orange brown	MC<PL	VSt.-H	22.6					8	
				End of Test Pit (TP1) @ 1.5m									
TP2		0-250	CI	TOPSOIL: CLAY; medium plasticity, with fine to coarse sand, red brown	MC>PL	S-F							NATURAL **RL: Approx.: 123.9m**
N: 6205974	SG2A	250-550	CI	CLAY; medium plasticity, fine to coarse sand, red brown	MC>PL	F-St.							
E: 0410661	SG2B	550-1100	CI-CH	CLAY; medium to high plasticity, with fine to coarse sand, orange brown	MC>PL	St.	23.1	20.6	0.89			5	
		1100-1500	CI	CLAY; medium plasticity, with fine to coarse sand, yellow brown	MC>PL	VSt.							
				End of Test Pit (TP2) @ 1.5m									

Aitken Rowe Testing Laboratories Pty Ltd

17b Battista Street, Griffith NSW 2680

Geotechnical Investigation - Materials Schedule and Log

CLIENT: ATLUS GROUP - SYDNEY, NSW

PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN
PROPOSED WEST END SPORTS OVAL PRECINCT, MERRIGAL STREET, GRIFFITH, NSW

STAFF: M.S **SAMPLING METHOD :** AS1289.1.2.1 **CLAUSE :** 6.5.3

PAGE: 2 OF 3

DATE: 21/07/2020

REGO. NO.: GS20-120

Borehole No. and Location	Layer Sample No.	Depth (mm)	Group Symbol	Field Description (layer, type, plasticity / particle size, colour, secondary components)	Moisture Conditions	Strength Comments	Moistures (FMC=Field MC) (OMC=Optimum MC) (FMC/OMC=Moisture Ratio)			Dynamic Cone Penetrometer (NB not equiv. to lab soaked CBR)		(CBR%)	Other Comments
							OMC	FMC	FMC/ OMC	Depth In Subgrade (mm)	Equiv. CBR %	10 day (95% Rel. Comp.)	
BH8	B8A	0-190	GM-GP	FILL: Sandy GRAVEL; fine to coarse grained, fine to coarse sand, with silt fines of	D	D							FILL: Appears moderately to well compacted
N: 6206073				low plasticity, yellow brown									'Uncontrolled', **RL: Approx.:123.5m**
E: 0410600	SG8A	190-500	ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, red brown	MC>PL	St.-VSt.	13.1	9.9	0.75			6	NATURAL
	SG8B	500-1300	ML	Clayey SILT; low plasticity, with fine to coarse sand, orange brown	MC>PL	VSt.-H							Slightly cemented
	SG8C	1300-2300	CL	CLAY; medium plasticity, with fine to coarse sand, yellow brown	MC>PL	VSt.-H							
	SG8D	2300-4000	CI	Sandy CLAY; medium plasticity, fine to coarse sand, trace gravel, yellow brown	MC>PL	VSt.-H							
				End of Test Pit (BH8) @ 4.0m									
BH9		0-20		Bitumen Seal									Poor condition, **RL: Approx.:123.5m**
N: 6206022	B9A	20-70	GM-GP	FILL: Sandy GRAVEL; fine to coarse grained, fine to coarse sand, with silt fines of	D	D							FILL: Appears moderately to well compacted
E: 0410616				low plasticity, yellow brown									'Uncontrolled'
	F9A	70-190	CI-CH	FILL: Sandy CLAY; medium to high plasticity, fine to coarse sand, trace gravel,	MC>PL	St.-VSt.							FILL: Appears moderately to well compacted
				yellow brown									'Uncontrolled'
	SG9A	190-500	CL	Sandy Silty CLAY; low plasticity, with fine to coarse sand, red brown	MC>PL	St.	14.2	12.6	0.88			5	NATURAL
	SG9B	500-1100	ML	Clayey SILT; low plasticity, with fine to coarse sand, orange brown	MC>PL	VSt.							
	SG9C	1100-1500	ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, with fine to medium gravel,	MC>PL	VSt.							
				yellow orange brown									
				End of Test Pit (BH9) @ 1.5m									
BH10		0-130	CL	FILL/TOPSOIL: Sandy Silty CLAY; low plasticity, fine to coarse sand, trace gravel,	MC>PL	F							FILL: Appears moderately compacted
N: 6206050				yellow brown									'Uncontrolled' **RL: Approx.: 123.2m**
E: 0410574		130-550	CL	Sandy Silty CLAY; low plasticity, with fine to coarse sand, red brown	MC>PL	F-St.							NATURAL
	SG10A	550-1500	ML	Clayey SILT; low plasticity, with fine to coarse sand, orange brown	MC>PL	VSt.	21.8	17.1	0.78			9	
				End of Test Pit (BH10) @ 1.5m									

Aitken Rowe Testing Laboratories Pty Ltd

17b Battista Street, Griffith NSW 2680

Geotechnical Investigation - Materials Schedule and Log

CLIENT: ATLUS GROUP - SYDNEY, NSW

PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN
PROPOSED WEST END SPORTS OVAL PRECINCT, MERRIGAL STREET, GRIFFITH, NSW

STAFF: M.S **SAMPLING METHOD :** AS1289.1.2.1 **CLAUSE :** 6.5.3

PAGE: 3 OF 3

DATE: 21/07/2020

REGO. NO.: GS20-120

Borehole No. and Location	Layer Sample No.	Depth (mm)	Group Symbol	Field Description (layer, type, plasticity / particle size, colour, secondary components)	Moisture Conditions	Strength Comments	Moistures (FMC=Field MC) (OMC=Optimum MC) (FMC/OMC=Moisture Ratio)			Dynamic Cone Penetrometer (NB not equiv. to lab soaked CBR)		(CBR%)	Other Comments
							OMC	FMC	FMC/ OMC	Depth In Subgrade (mm)	Equiv. CBR %	10 day (95% Rel. Comp.)	
BH11		0-30	GP-GM	FILL: Sandy GRAVEL; fine to coarse grained, fine to coarse sand, with silt fines of	D	MD							FILL: Appears moderately compacted
N: 6206101				low plasticity, yellow brown									'Uncontrolled' **RL: Approx.: 123.5m**
E: 0410602	SG11A	30-400	CL	Sandy Silty CLAY; low plasticity, fine to coarse sand, red brown	MC>PL	F							NATURAL
	SG11B	400-1100	ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, orange brown	MC>PL	VSt.	22.8	20.0	0.87			9	
	SG11C	1100-1500	CI	CLAY; medium plasticity, with fine to coarse sand, trace gravel, yellow brown	MC>PL	VSt.	20.7	21.4	1.03			4	
				End of Test Pit (BH11) @ 1.5m									
BH12		0-150	CL	FILL/TOPSOIL: Sandy Silty CLAY; low plasticity, fine to coarse sand, red brown	MC>PL	S							FILL: Appears moderately compacted
N: 6206122													'Uncontrolled' **RL: Approx.: 123.7m**
E: 0410632		150-250	CL	FILL: Gravelly Sandy CLAY; medium plasticity, fine to coarse sand, fine to coarse	MC>PL	St.							FILL: Appears moderately compacted
				gravel, yellow brown									'Uncontrolled'
	SG12A	250-600	CL	Sandy Silty CLAY; low plasticity, fine to coarse sand, red brown	MC>PL	F-St.							NATURAL
	SG12B	600-1500	ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, orange brown	MC>PL	VSt.		19.6					
				End of Test Pit (BH12) @ 1.5m									
BH13		0-250	CI	TOPSOIL: CLAY; medium plasticity, with fine to coarse sand, red brown	MC>PL	F-St.							NATURAL (Lawn), **RL: Approx.: 124.0m**
N: 6206091	SG13A	250-500	CL	Sandy Silty CLAY; low plasticity, with fine to coarse sand, red brown	MC>PL	F							Possible lawn roots to 0.5m
E: 0410685	SG13B	500-1500	ML	Sandy Clayey SILT; low plasticity, fine to coarse sand, orange brown	MC>PL	VSt.	23.3	25.4	1.09			8	3% >OMC
				End of Test Pit (BH13) @ 1.5m									
BH14		0-200	CI	TOPSOIL: Sandy CLAY; medium plasticity, fine to coarse sand, red brown	MC>PL	S-F.							NATURAL (Lawn) **RL: Approx.: 124.2m**
N: 6206001	SG14A	200-500	CL	Sandy Silty CLAY; low plasticity, with fine to coarse sand, red brown	MC>PL	St.-VSt.							Possible lawn roots to 0.5m
E: 0410718	SG14B	500-1200	CI	CLAY; medium plasticity, with fine to coarse sand, trace garvel, orange brown	MC>PL	VSt.	21.2	20.9	0.99			4	U50 tube 0.5-0.9m / Iss = 1.6
		1200-1500	CI	Sandy CLAY; medium plasticity, fine to coarse sand, trace gravel, yellow brown	MC>PL	VSt.							
				End of Test Pit (BH14) @ 1.5m									

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LOG SYMBOLS

LOG COLUMN	SYMBOLS	DEFINITION
Groundwater Record	▼	Standing water level. Time delay following completion of drilling may be shown.
	▶—	Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	**D**	Small disturbed bag sample taken between the depths indicated by lines.
	B	Bulk disturbed sample taken between the depths indicated by lines.
	U	Undisturbed 50mm diameter tube sample taken between the depths indicated by lines
Field Tests	**N=17** **4, 7, 10**	Standard Penetration Test (S.P.T.) performed between depths indicated by lines. Individual figures show blows per 150mm penetration driven by SPT hammer.
	N_c **5** **7** **3**	Dynamic Cone Penetration Test performed between depths indicated by lines. Individual figures show blows per 100mm penetration for 60 degree solid cone driven by 9 Kg hammer.
Moisture Condition (Cohesive Soils) (Cohensionless Soils)	**MC>PL**	Moisture content estimated to be greater than plastic limit.
	MC=PL	Moisture content estimated to be approx. equal to plastic limit.
	MC<PL	Moisture content estimated to be less than plastic limit.
	D	DRY – runs freely through fingers.
	M	MOIST – does not run freely but no free water visible on soil surface.
	W	WET – free water visible on soil surface.
Consistency (Cohesive Soils)	**VS**	VERY SOFT – unconfined compressive strength less than 25kPa.
	S	SOFT – unconfined compressive strength 25-50 kPa.
	F	FIRM – unconfined compressive strength 50-100kPa.
	St.	STIFF – unconfined compressive strength 100-200kPa.
	VSt.	VERY STIFF – unconfined compressive strength 200 – 400kPa.
	H	HARD – unconfined compressive strength greater than 400kPa.
Relative Density (Cohensionless Soils)		**Description** / **Density Index Range % S.P.T.** / **'N' Value Range Blows/300mm**
	VL	VERY LOOSE / <15 / 0-4
	L	LOOSE / 15-35 / 4-10
	MD	MEDIUM DENSE / 35-65 / 10-30
	D	DENSE / 65-85 / 30-50
	VD	VERY DENSE / >85 / > 50
Hand Penetrometer Readings	**300** **250** **280**	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise.
Laboratory Test	**L.S. %**	Linear Shrinkage (As per RTA Method T113)
	M.C. %	Field Moisture Content (As per Australian Standard AS1289.2.1.1 or RTA Method T120)
	I_{ss}	Shrink-Swell Index (As per Australian Standard AS1289.7.1.1)
Remarks	**'V' bit**	Hardened steel 'V' shaped bit.
	'TC' bit	Tungsten Carbide wing bit.
	T^{60}	Penetration of auger string in mm under static load of rig rear axle without rotation of augers.

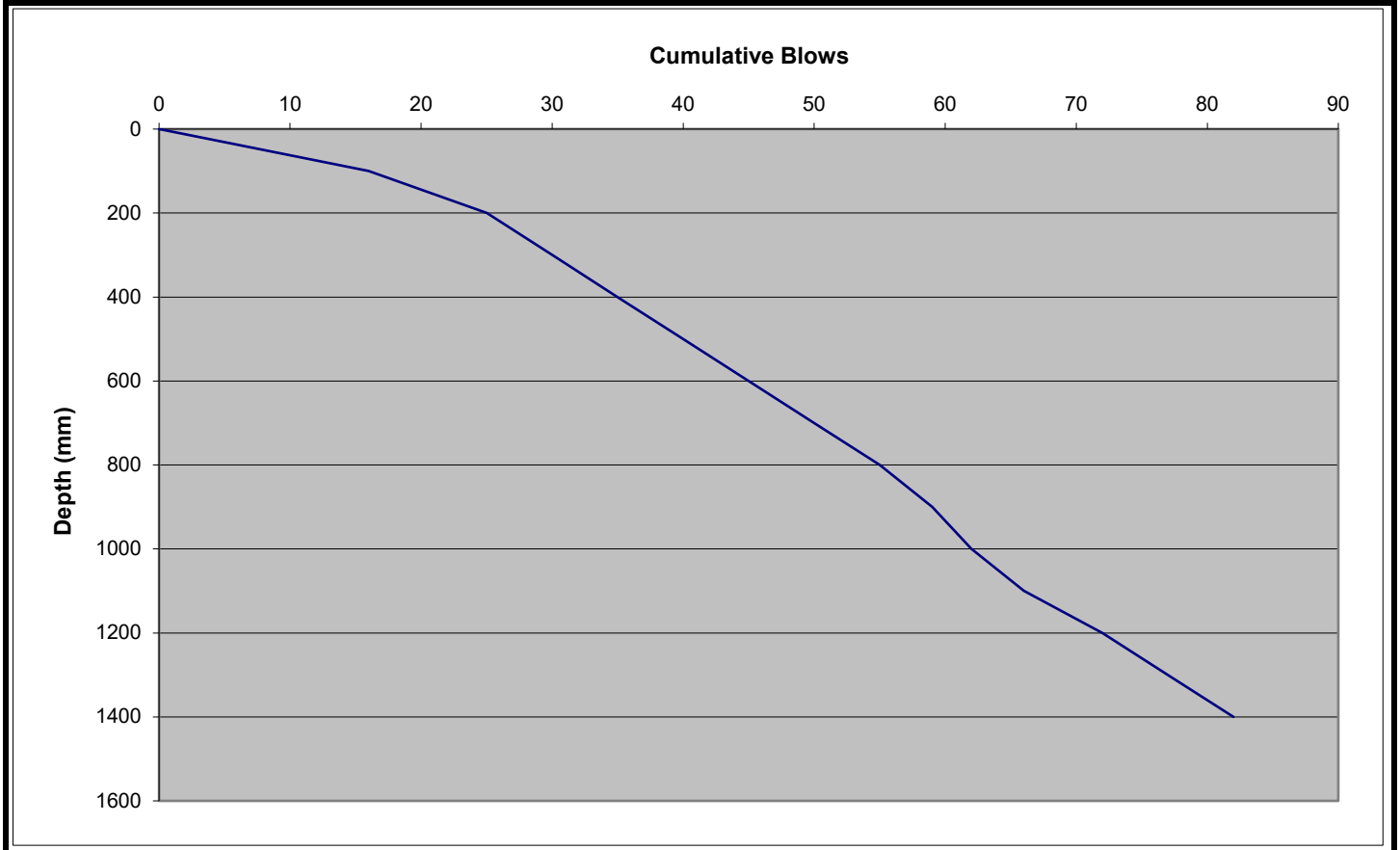
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 1 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 1 (BH1)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	16	41	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	9	20	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	5	9	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	5	9	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	5	9	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	5	9	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	5	9	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	5	9	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	4	7	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	3	5	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	4	7	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	6	12	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	5	9	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	5	9	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	END	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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REMARKS:

APPROVED SIGNATORY: .....

Jarrod Gornall

DATE: 30/07/2020

Aitken Rowe Testing Laboratories Pty Ltd

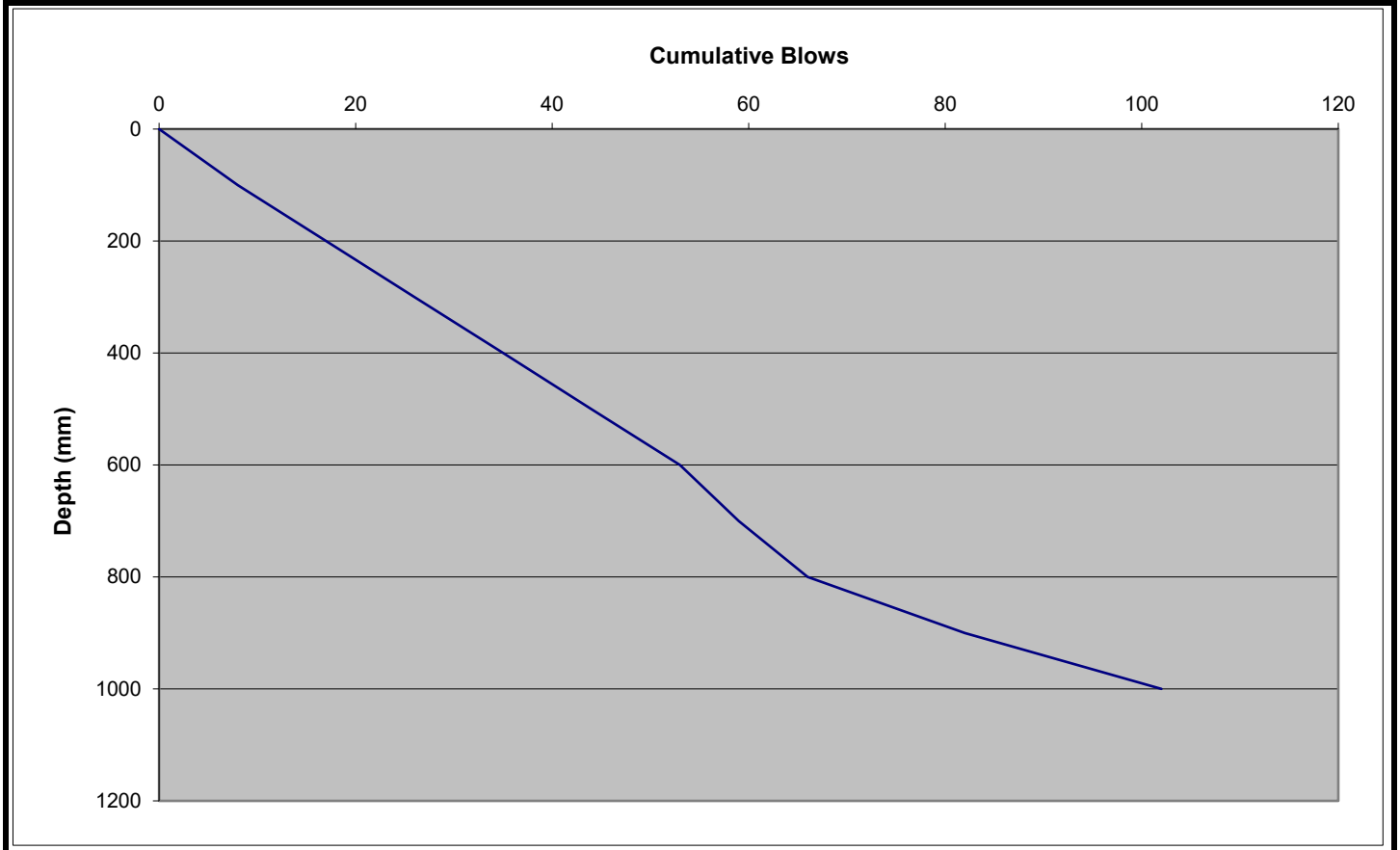
ARTL Griffith: 17b Battista Street, Griffith NSW 2680

DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN
PROPOSED WESTEND SPORTS OVAL PRECINCT
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 2 (BH2)**
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A

PAGE: 2 OF: 17
REGISTRATION NO: **GS20-120**
DATE OF TEST: 20/07/2020
DEPTH BELOW FSL (mm): 300
MOISTURE CONDITION: REFER TO LOGS
TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	8	17	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	9	20	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	9	20	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	9	20	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	9	20	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	9	20	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	6	12	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	7	14	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	16	41	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	20	55	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	END	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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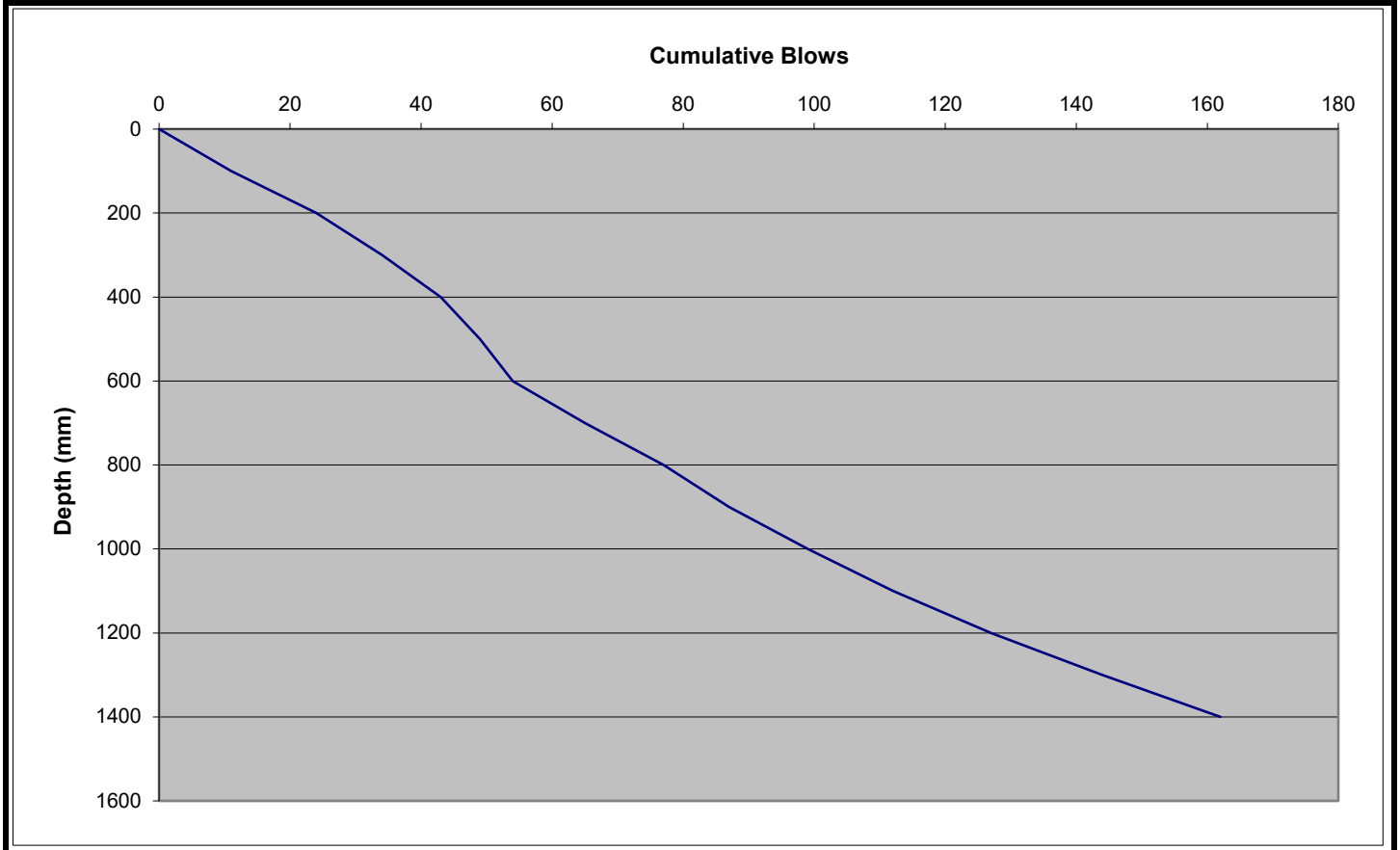
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 3 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN PROPOSED WESTEND SPORTS OVAL PRECINCT	REGISTRATION NO: **GS20-120** DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 3 (BH3)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	11	25	1.5 - 1.6	END	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	13	32	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	10	23	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	9	20	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	6	12	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	5	9	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	11	25	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	12	28	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	10	23	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	12	28	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	13	32	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	15	38	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	17	44	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	18	48	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	18	48	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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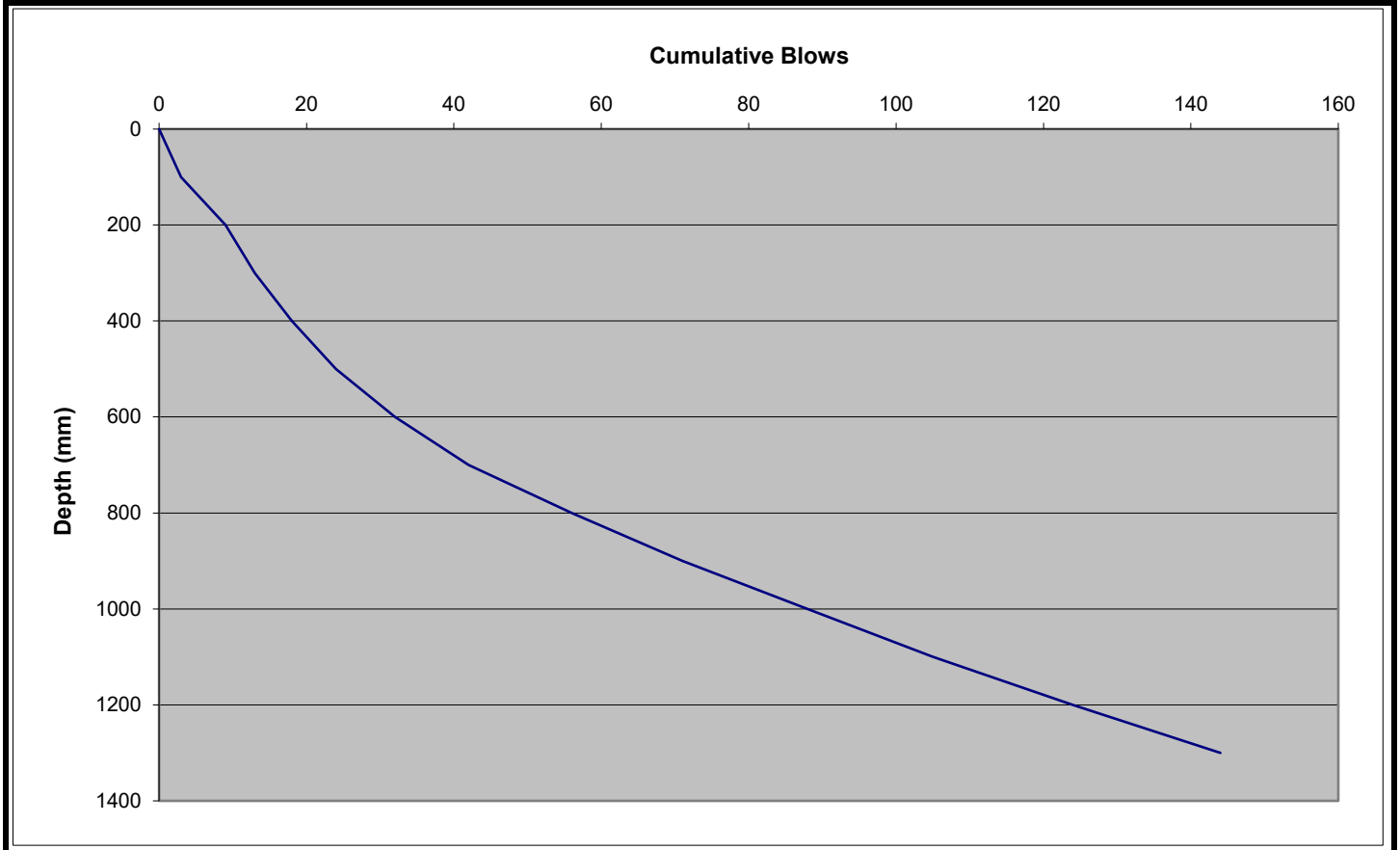
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 4 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 4 (BH4)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	3	5	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	6	12	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	4	7	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	5	9	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	6	12	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	8	17	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	10	23	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	14	35	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	15	38	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	17	44	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	17	44	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	19	51	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	20	55	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	END	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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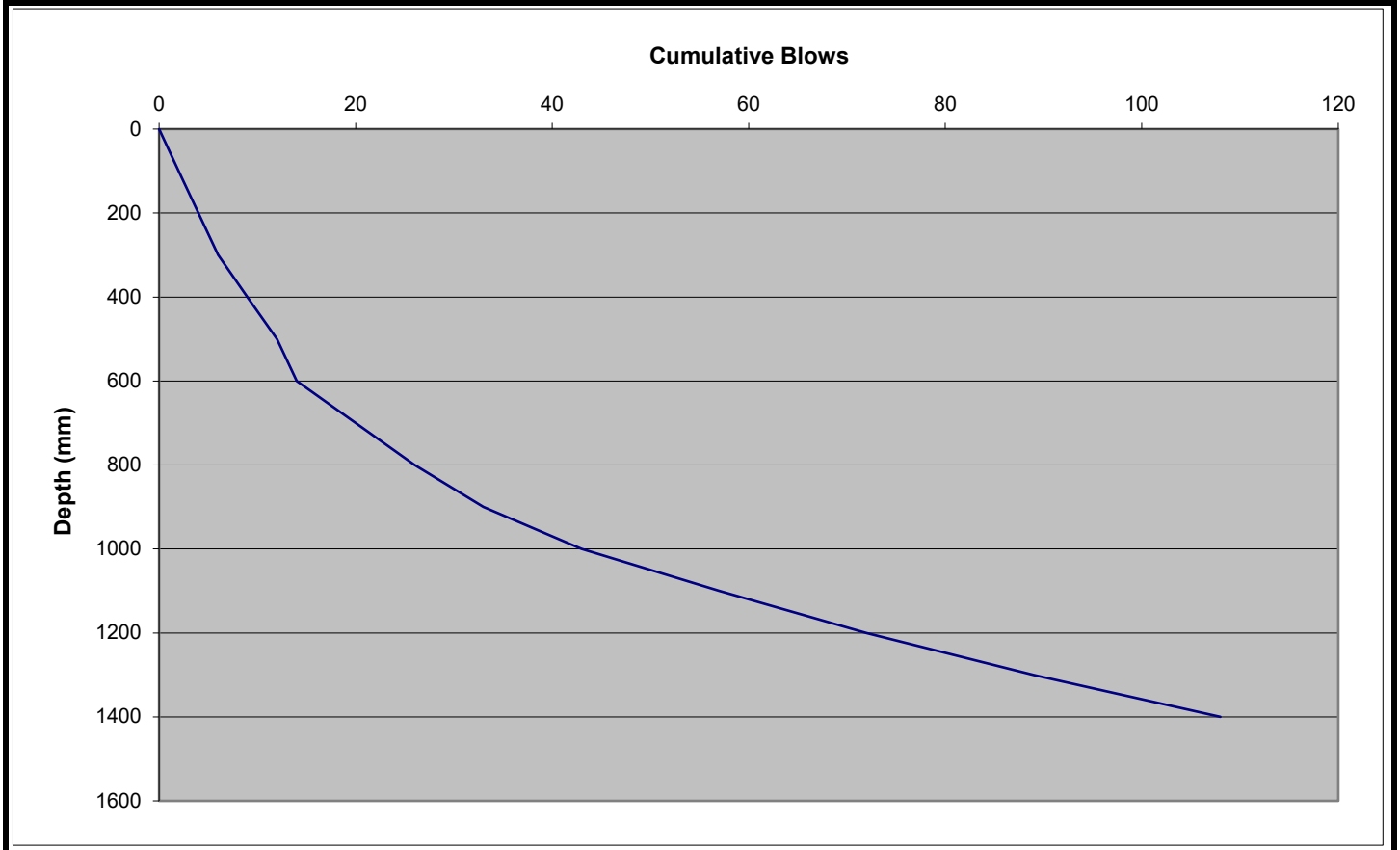
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 5 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 5 (BH5)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	2	3	1.5 - 1.6	END	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	2	3	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	2	3	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	3	5	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	3	5	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	2	3	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	6	12	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	6	12	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	7	14	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	10	23	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	14	35	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	15	38	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	17	44	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	19	51	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	20	55	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: .....

Jarrod Gornall

DATE: 30/07/2020

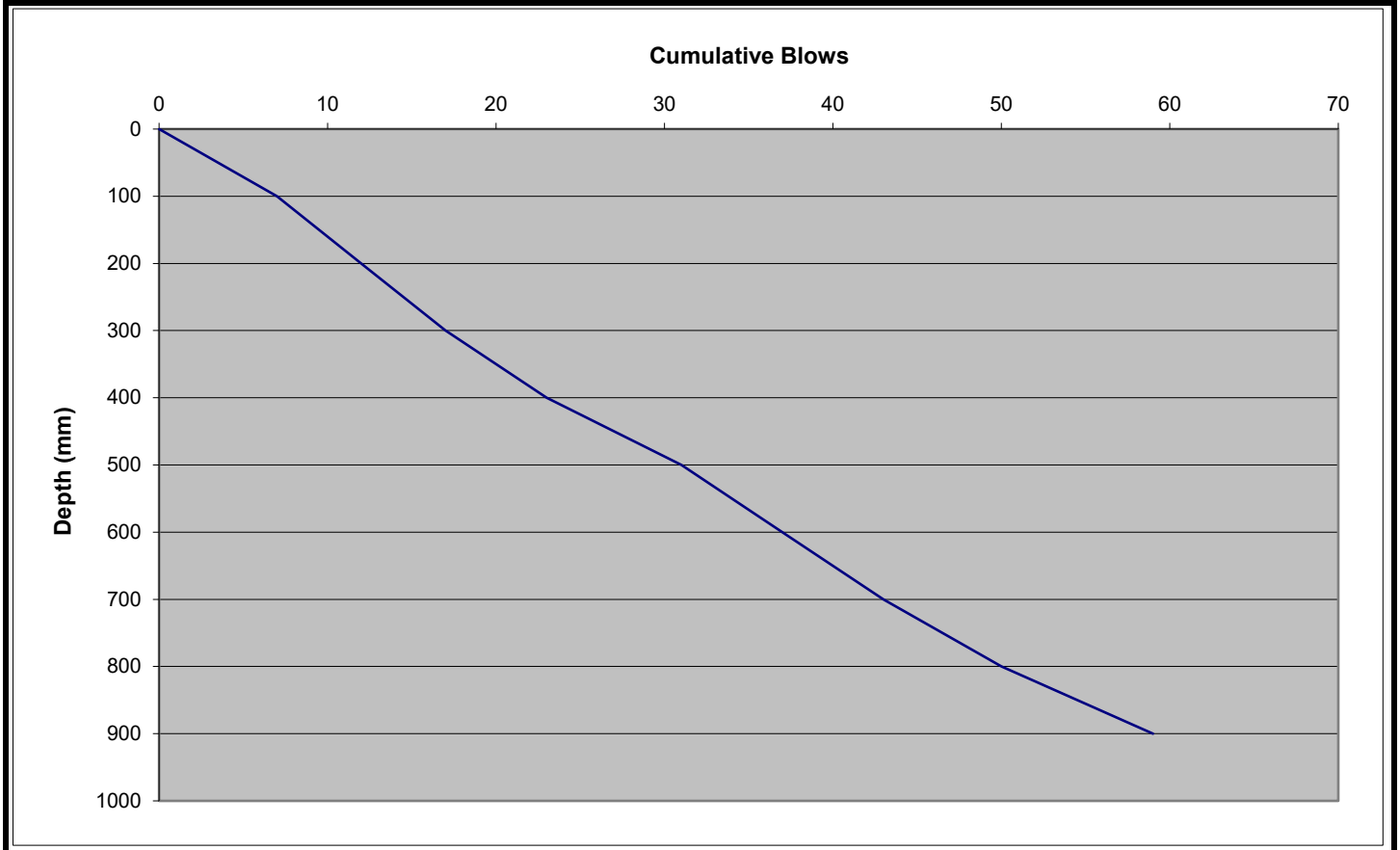
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 6 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 6 (BH6)**	DEPTH BELOW FSL (mm): 200
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	7	14	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	5	9	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	5	9	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	6	12	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	8	17	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	6	12	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	6	12	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	7	14	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	9	20	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	END	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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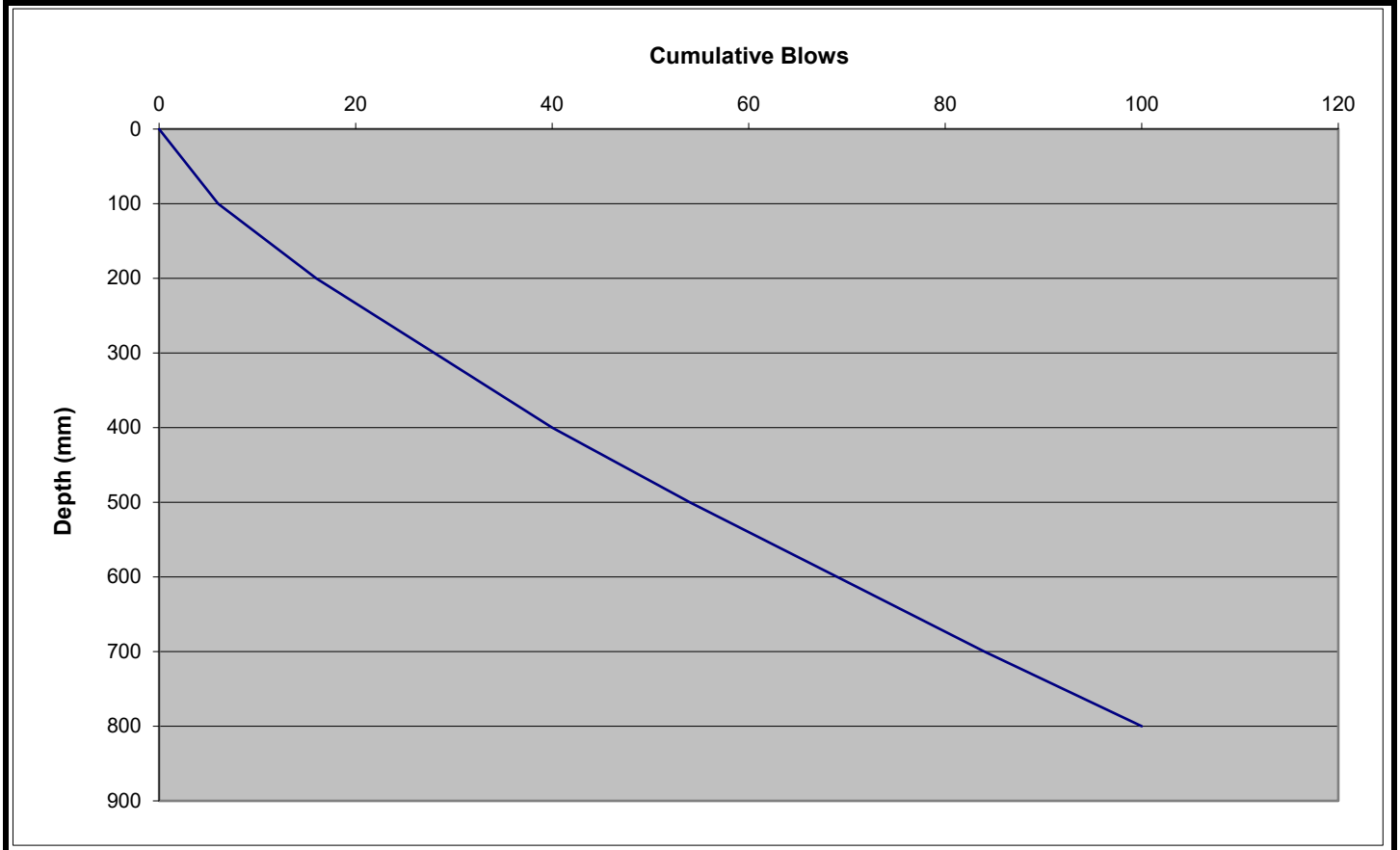
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 7 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 7 (BH6)**	DEPTH BELOW FSL (mm): 2000
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	6	12	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	10	23	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	12	28	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	12	28	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	14	35	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	15	38	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	15	38	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	16	41	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	END	*	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	*	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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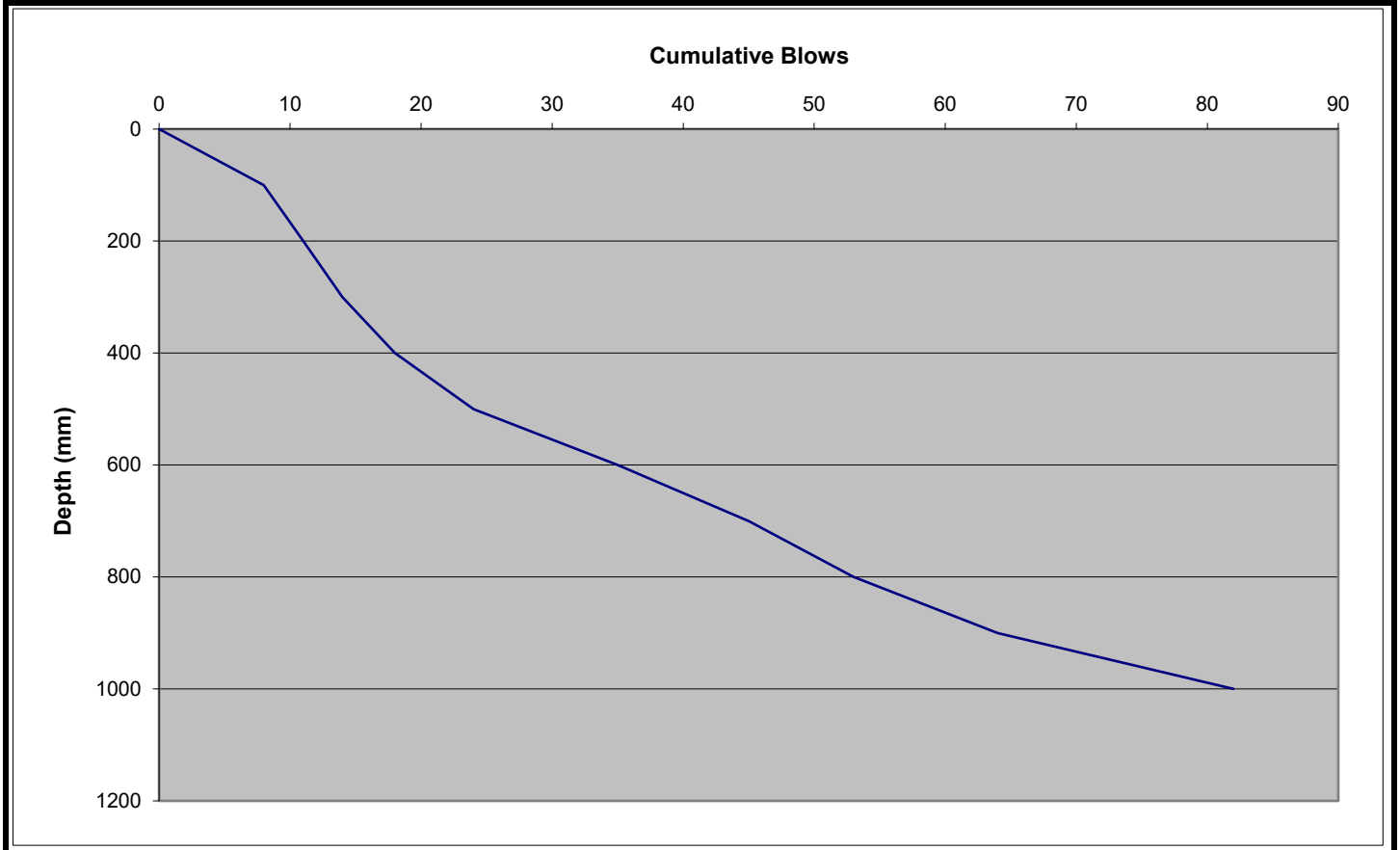
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 8 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 8 (BH7)**	DEPTH BELOW FSL (mm): 200
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	8	17	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	3	5	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	3	5	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	4	7	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	6	12	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	11	25	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	10	23	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	8	17	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	11	25	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	18	48	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	END	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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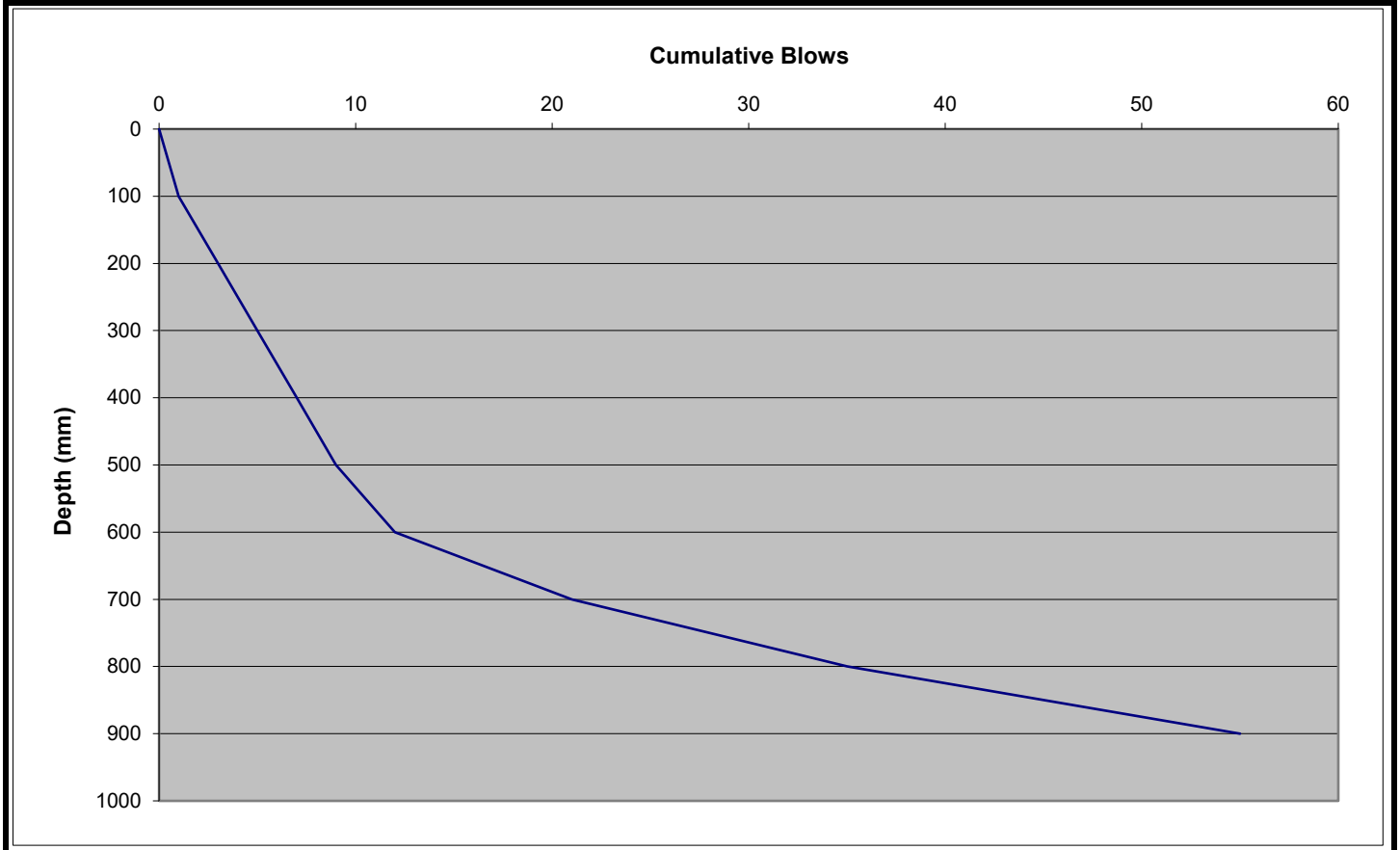
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 9 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 9 (TP1)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	1	1	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	2	3	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	2	3	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	2	3	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	2	3	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	3	5	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	9	20	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	14	35	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	20	55	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	END	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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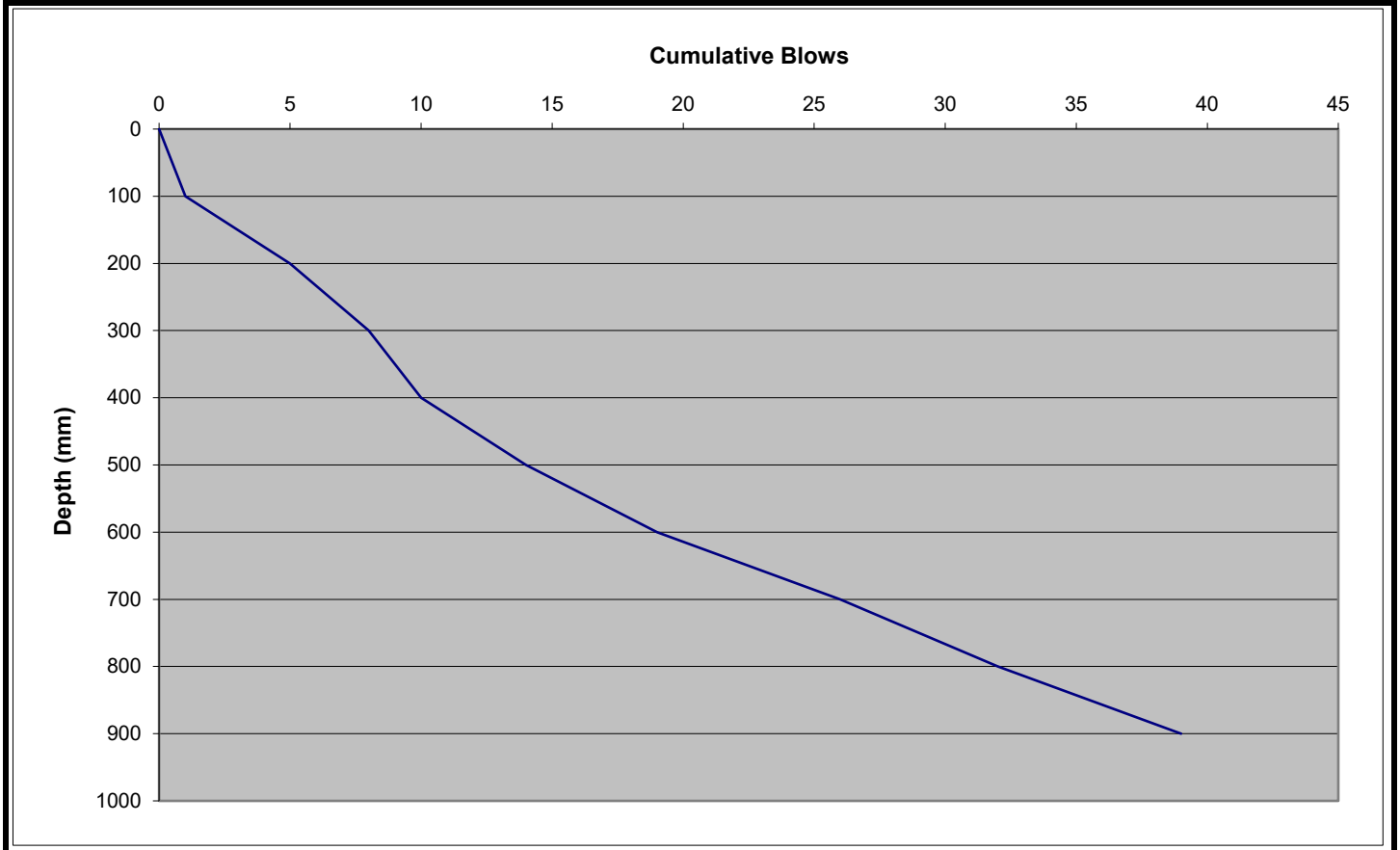
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 10 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 10 (TP2)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	1	1	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	4	7	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	3	5	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	2	3	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	4	7	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	5	9	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	7	14	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	6	12	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	7	14	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	END	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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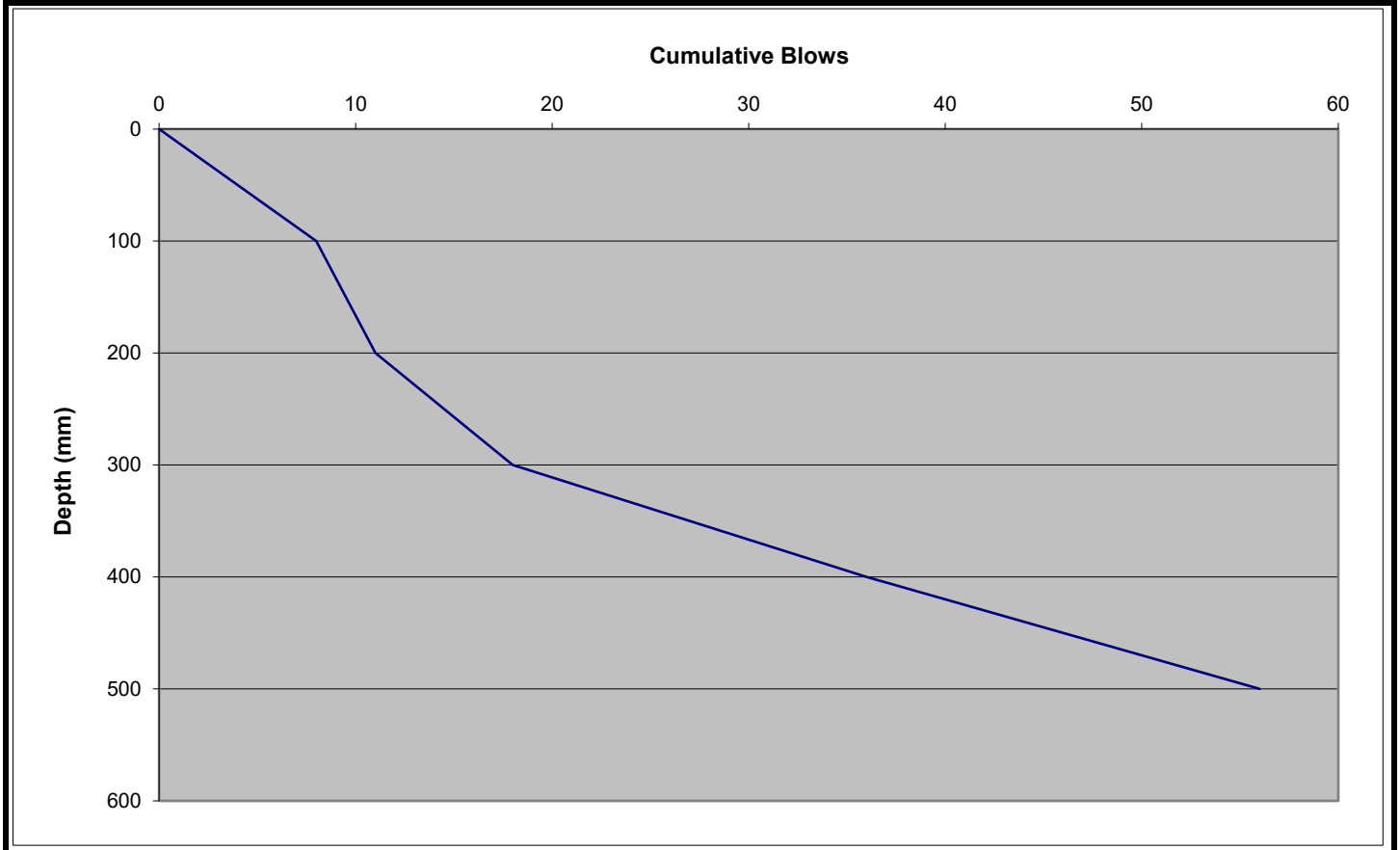
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 11 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 11 (BH8)**	DEPTH BELOW FSL (mm): 200
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	8	17	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	3	5	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	7	14	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	18	48	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	20	55	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	END	*	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	*	*	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	*	*	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	*	*	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	*	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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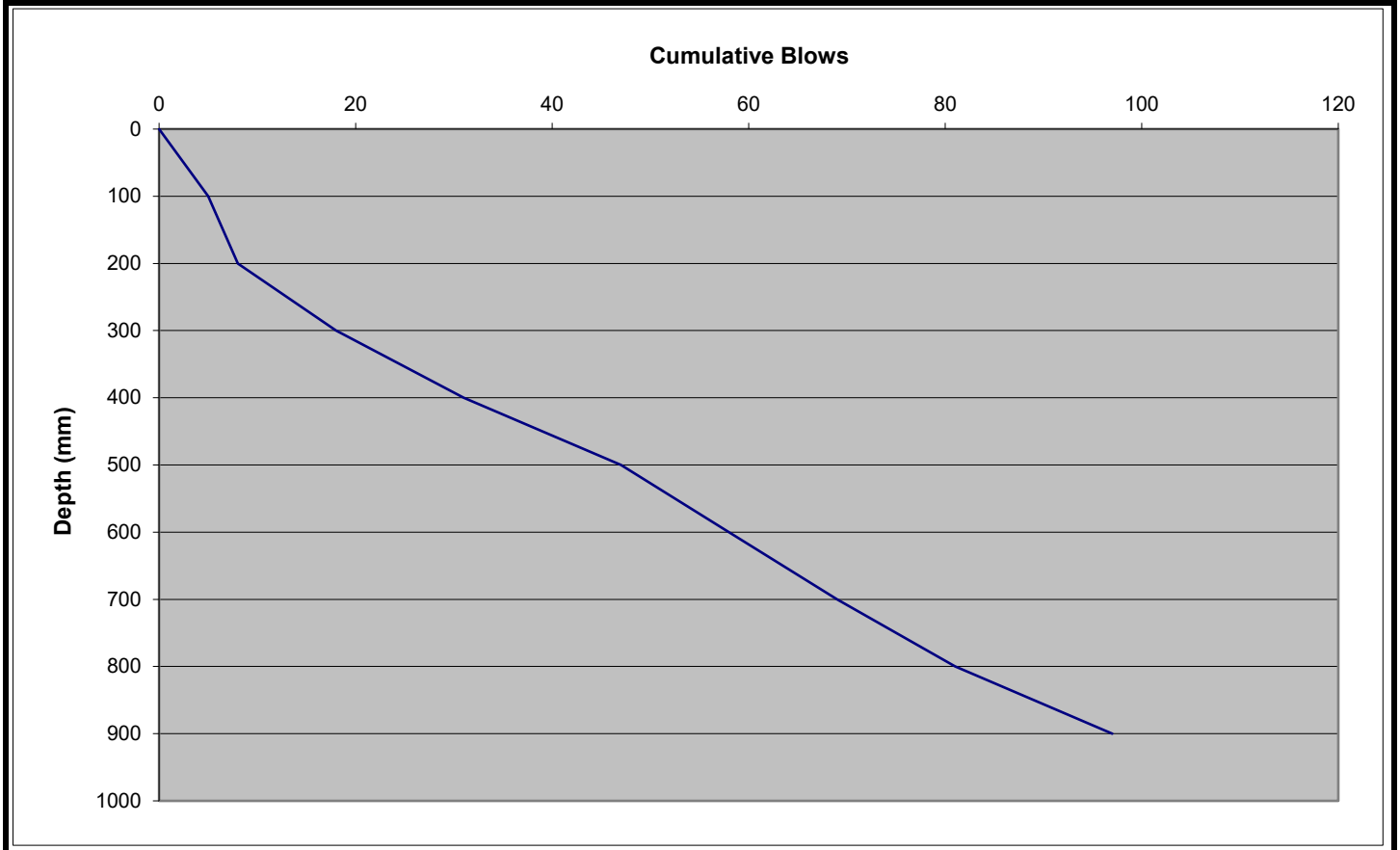
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 12 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 12 (BH9)**	DEPTH BELOW FSL (mm): 200
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	5	9	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	3	5	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	10	23	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	13	32	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	16	41	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	11	25	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	11	25	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	12	28	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	16	41	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	END	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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REMARKS:

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Jarrod Gornall

DATE: 30/07/2020

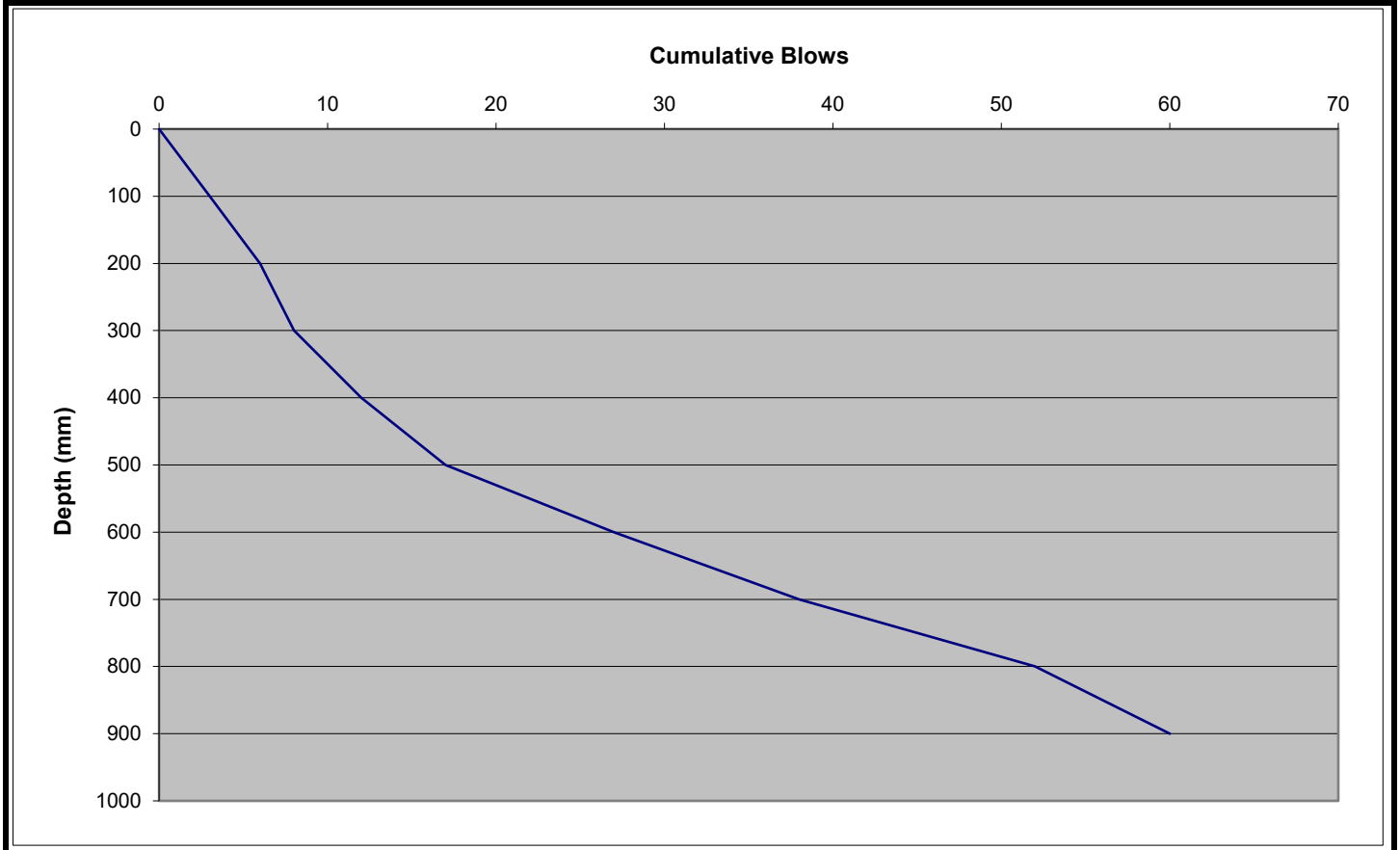
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 13 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 13 (BH10)**	DEPTH BELOW FSL (mm): 100
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	3	5	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	3	5	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	2	3	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	4	7	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	5	9	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	10	23	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	11	25	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	14	35	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	8	17	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	END	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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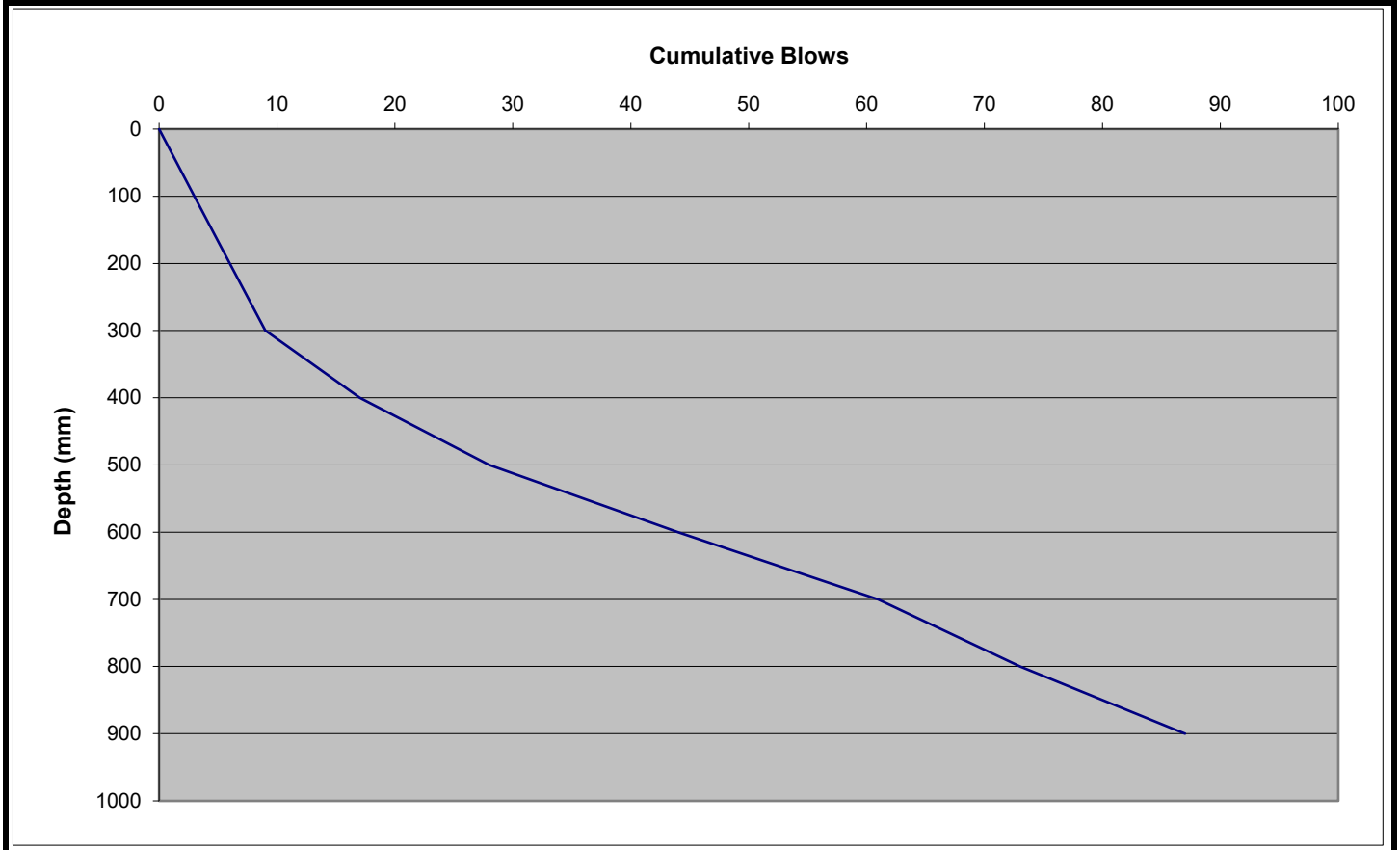
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 14 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN PROPOSED WESTEND SPORTS OVAL PRECINCT	REGISTRATION NO: **GS20-120**
	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 14 (BH11)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	3	5	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	3	5	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	3	5	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	8	17	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	11	25	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	16	41	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	17	44	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	12	28	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	14	35	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	END	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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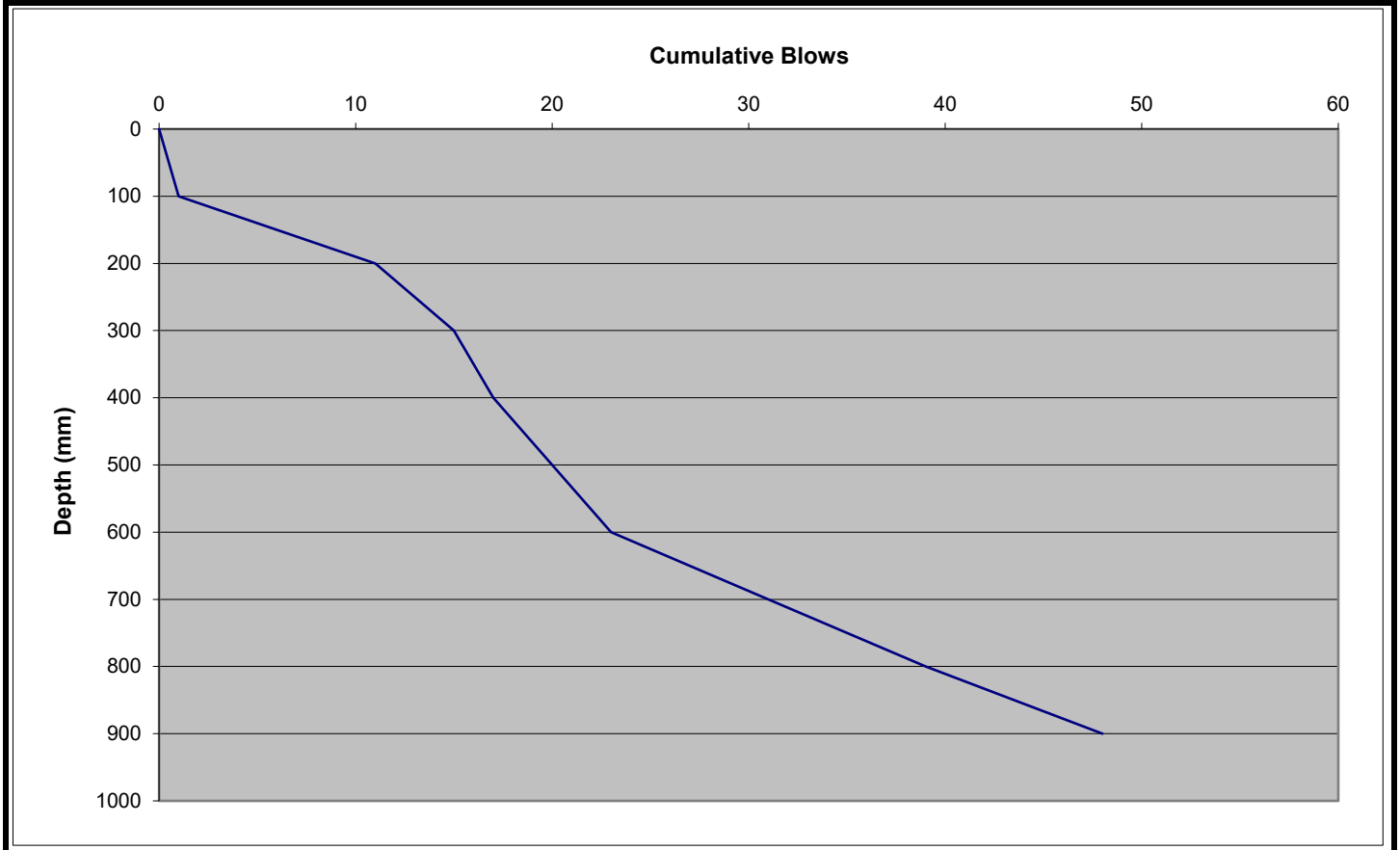
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 15 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 15 (BH12)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	1	1	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	10	23	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	4	7	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	2	3	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	3	5	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	3	5	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	8	17	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	8	17	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	9	20	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	END	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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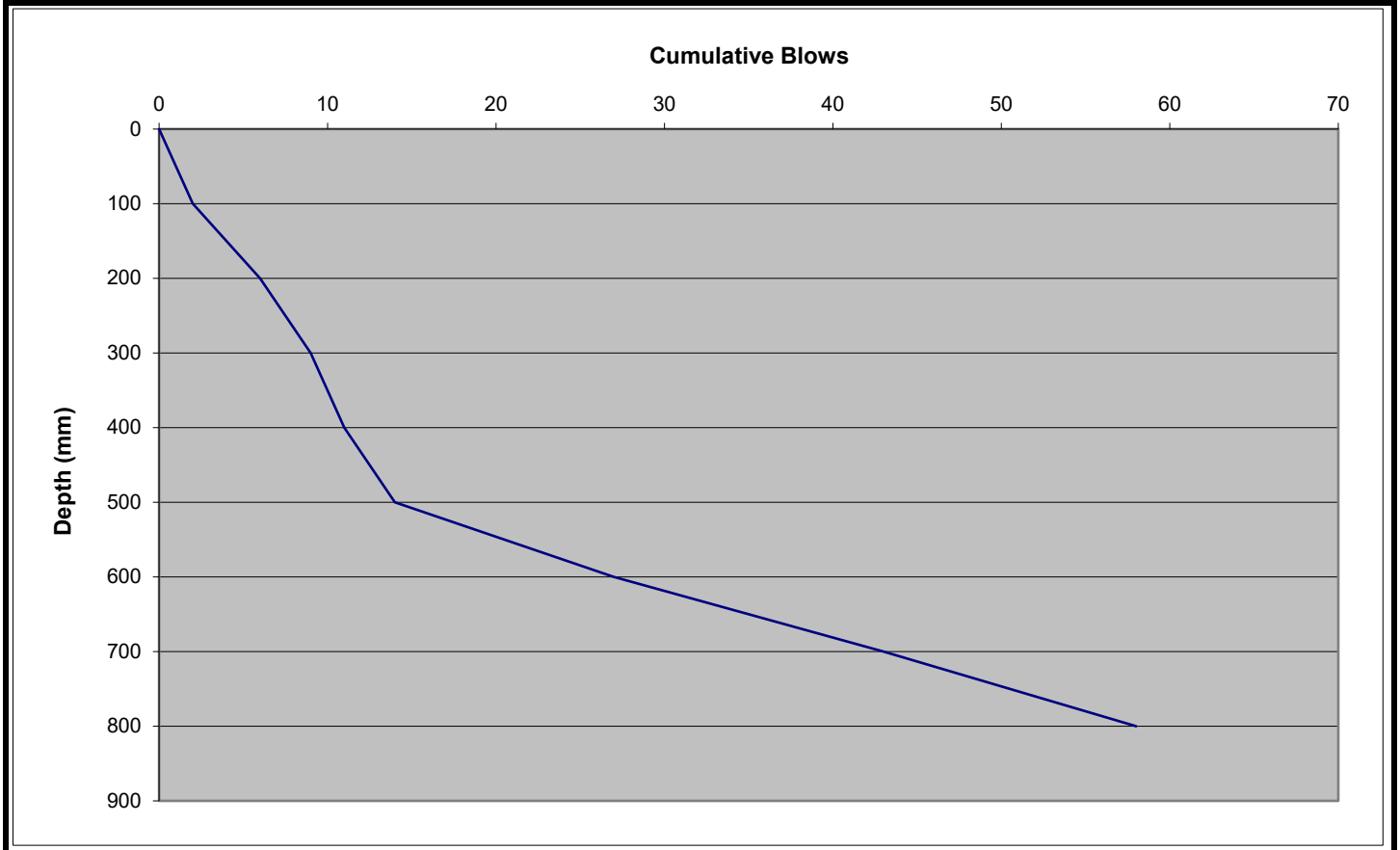
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 16 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 16 (BH13)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	2	3	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	4	7	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	3	5	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	2	3	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	3	5	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	13	32	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	16	41	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	15	38	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	END	*	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	*	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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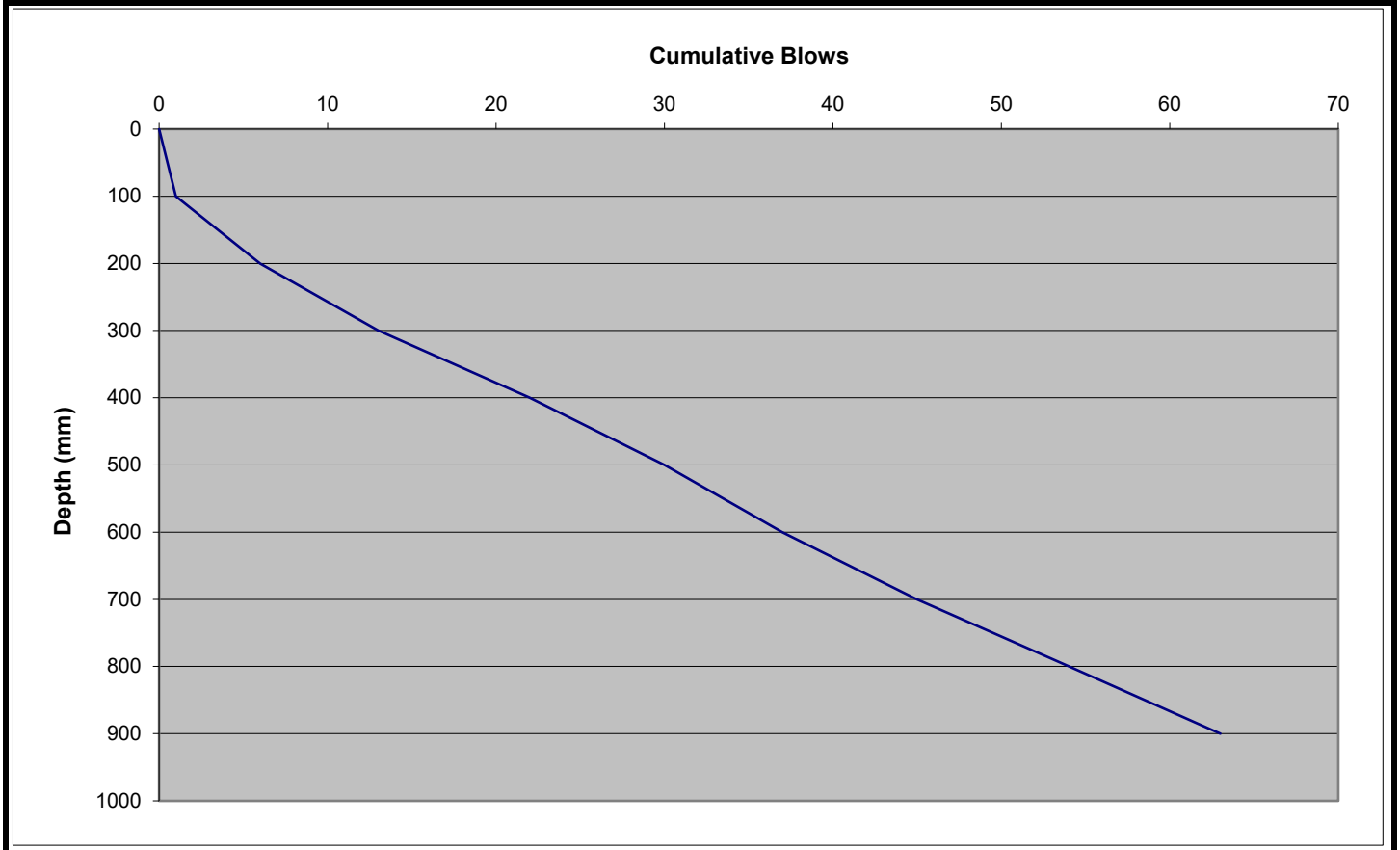
DYNAMIC CONE PENETROMETER REPORT

CLIENT: ATLUS GROUP - SYDNEY, NSW	PAGE: 17 OF: 17
PROJECT: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN	REGISTRATION NO: **GS20-120**
PROPOSED WESTEND SPORTS OVAL PRECINCT	DATE OF TEST: 20/07/2020
LOCATION: MERRIGAL STREET, GRIFFITH, NSW **DCP: 17 (BH14)**	DEPTH BELOW FSL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	1	1	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	5	9	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	7	14	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	9	20	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	8	17	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	7	14	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	8	17	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	9	20	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	9	20	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	END	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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DATE: 30/07/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

*

TEST REPORT: GEOTECHNICAL INVESTIGATION - SOIL ANALYSIS

CLIENT : ATLUS GROUP PTY LTD - SYDNEY, NSW
JOB DESCRIPTION : GEOTECHNICAL INVESTIGATION
PROPOSED WESTEND SPORTS OVAL PRECINCT,
No. 14 MERROWIE STREET, GRIFFITH, NSW

SAMPLED BY: ARTL
DATE SAMPLED: 20-24/07/2020
DATE SUBMITTED: 24/07/2020
SAMPLING METHOD: AS1289.1.2.1
SAMPLING CLAUSE: 6.5.3/6.5.4
DATES TESTED: 31/07/20-15/08/20
ORDER No.: *

MATERIAL SOURCE : IN-SITU BOREHOLES
MATERIAL TYPE : REFER TO BOREHOLE LOGS
PROPOSED USE : DESIGN

REGISTRATION No : R28 **GS20-120**

		SAMPLE NUMBER :	1B	1C	1D	1E	2B	2D
		SAMPLING LOCATION :	BH1	BH1	BH1	BH1	BH2	BH2
		DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm) :	400-900	1000-1300	1500-1950	2300-2600	800-1100	1500-2000
TESTS	TEST ELEMENT		*	*	*	*	*	*
T106		PASS 75.0mm SIEVE %	*	*	*	*	*	*
		PASS 53.0mm SIEVE %	*	*	*	*	*	*
		PASS 37.5mm SIEVE %	*	*	*	*	*	*
		PASS 26.5mm SIEVE %	*	*	*	*	*	*
		PASS 19.0mm SIEVE %	*	*	*	*	*	*
		PASS 13.2mm SIEVE %	*	*	*	*	*	*
		PASS 9.50mm SIEVE %	*	*	*	*	*	*
		PASS 6.70mm SIEVE %	*	*	*	*	*	*
		PASS 4.75mm SIEVE %	*	*	*	*	*	*
		PASS 2.36mm SIEVE %	100	*	*	*	*	100
T107	WHOLE SAMPLE	PASS 425 µm SIEVE %	95	*	*	*	*	95
		PASS 75 µm SIEVE %	82	*	*	*	*	75
		LESS THAN 13.5 µm %	66	*	*	*	*	39
T107	-2.36mm	PASS 425 µm SIEVE %	95	*	*	*	*	95
		PASS 75 µm SIEVE %	82	*	*	*	*	75
		LESS THAN 13.5 µm %	66	*	*	*	*	39
		OBSERVATIONS	*	*	*	*	*	*
RATIOS	A-	PASS 425 µm %	95	*	*	*	*	95
	B-	PASS 75/425 µm %	86	*	*	*	*	78
	C-	BELOW 13.5/75 µm %	81	*	*	*	*	53
AS1289.3.1.2		LIQUID LIMIT %	50	*	*	*	*	40
AS1289.3.2.1		PLASTIC LIMIT %	13	*	*	*	*	15
AS1289.3.3.1		PLASTICITY INDEX	37	*	*	*	*	25
		PREPARATION METHOD	AS1289.1.1-5.3	*	*	*	*	AS1289.1.1-5.3
T111		STANDARD MAX. DRY DENSITY (1L MLD, A.1ii) t/m^3	1.53	*	*	*	1.60	*
		OPTIMUM MOISTURE CONTENT %	24.4	*	*	*	21.3	*
T113		LINEAR SHRINKAGE %	12.5	12.5	5.0	15.0	*	*
AS1289.2.1.1		FIELD MOISTURE CONTENT %	18.9	20.7	*	*	*	20.5
AS1289.3.8.1		EMERSON CLASS	*	*	*	*	*	*
(AIR DRIED)		TYPE OF WATER	*	*	*	*	*	*

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ACCREDITATION NUMBER 4679

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APPROVED SIGNATORY : .....
Jarrod Gornall

DATE: 21/8/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

*

TEST REPORT: GEOTECHNICAL INVESTIGATION - SOIL ANALYSIS

CLIENT : ATLUS GROUP PTY LTD - SYDNEY, NSW
JOB DESCRIPTION : GEOTECHNICAL INVESTIGATION
PROPOSED WESTEND SPORTS OVAL PRECINCT,
No. 14 MERROWIE STREET, GRIFFITH, NSW

SAMPLED BY: ARTL
DATE SAMPLED: 20-24/07/2020
DATE SUBMITTED: 24/07/2020
SAMPLING METHOD: AS1289.1.2.1
SAMPLING CLAUSE: 6.5.3/6.5.4
DATES TESTED: 31/07/20-15/08/20
ORDER No.: *

MATERIAL SOURCE : IN-SITU BOREHOLES
MATERIAL TYPE : REFER TO BOREHOLE LOGS
PROPOSED USE : DESIGN

REGISTRATION No : R28 **GS20-120**

		SAMPLE NUMBER :	2E	3B	3E	4A	4B	4C
		SAMPLING LOCATION :	BH2	BH3	BH3	BH4	BH4	BH4
		DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm) :	2500-2800	600-1000	3000-3400	200-500	900-1400	1700-2200
TESTS	TEST ELEMENT		*	*	*	*	*	*
T106		PASS 75.0mm SIEVE %	*	*	*	*	*	*
		PASS 53.0mm SIEVE %	*	*	*	*	*	*
		PASS 37.5mm SIEVE %	*	*	*	*	*	*
		PASS 26.5mm SIEVE %	*	*	*	*	*	*
		PASS 19.0mm SIEVE %	*	*	*	*	*	*
		PASS 13.2mm SIEVE %	*	*	*	*	*	*
		PASS 9.50mm SIEVE %	*	*	*	*	100	*
		PASS 6.70mm SIEVE %	*	100	*	*	99	*
		PASS 4.75mm SIEVE %	*	99	*	*	99	*
		PASS 2.36mm SIEVE %	*	99	*	*	99	*
T107	WHOLE SAMPLE	PASS 425 µm SIEVE %	*	94	*	*	95	*
		PASS 75 µm SIEVE %	*	72	*	*	74	*
		LESS THAN 13.5 µm %	*	53	*	*	58	*
T107	-2.36mm	PASS 425 µm SIEVE %	*	95	*	*	95	*
		PASS 75 µm SIEVE %	*	73	*	*	74	*
		LESS THAN 13.5 µm %	*	54	*	*	59	*
		OBSERVATIONS	*	*	*	*	*	*
RATIOS	A-	PASS 425 µm %	*	95	*	*	95	*
	B-	PASS 75/425 µm %	*	77	*	*	78	*
	C-	BELOW 13.5/75 µm %	*	74	*	*	79	*
AS1289.3.1.2		LIQUID LIMIT %	*	46	*	*	51	*
AS1289.3.2.1		PLASTIC LIMIT %	*	14	*	*	13	*
AS1289.3.3.1		PLASTICITY INDEX	*	32	*	*	38	*
		PREPARATION METHOD	*	AS1289.1.1-5.3	*	*	AS1289.1.1-5.3	*
T111		STANDARD MAX. DRY DENSITY (1L MLD, A.1ii) t/m^3	*	1.54	*	*	1.58	*
		OPTIMUM MOISTURE CONTENT %	*	25.0	*	*	23.7	*
T113		LINEAR SHRINKAGE %	9.5	*	7.0	6.5	12.0	12.5
AS1289.2.1.1		FIELD MOISTURE CONTENT %	*	20.3	*	13.1	16.3	*
AS1289.3.8.1		EMERSON CLASS	*	*	*	*	*	*
(AIR DRIED)		TYPE OF WATER	*	*	*	*	*	*

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APPROVED SIGNATORY : .....
Jarrod Gornall

DATE: 21/8/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

*

TEST REPORT: GEOTECHNICAL INVESTIGATION - SOIL ANALYSIS

CLIENT : ATLUS GROUP PTY LTD - SYDNEY, NSW
JOB DESCRIPTION : GEOTECHNICAL INVESTIGATION
PROPOSED WESTEND SPORTS OVAL PRECINCT,
No. 14 MERROWIE STREET, GRIFFITH, NSW

SAMPLED BY: ARTL
DATE SAMPLED: 20-24/07/2020
DATE SUBMITTED: 24/07/2020
SAMPLING METHOD: AS1289.1.2.1
SAMPLING CLAUSE: 6.5.3/6.5.4
DATES TESTED: 31/07/20-15/08/20
ORDER No.: *

MATERIAL SOURCE : IN-SITU BOREHOLES
MATERIAL TYPE : REFER TO BOREHOLE LOGS
PROPOSED USE : DESIGN

REGISTRATION No : R28 **GS20-120**

		SAMPLE NUMBER :	4E	5B	5E	6B	6C	6E
		SAMPLING LOCATION :	BH4	BH5	BH5	BH6	BH6	BH6
		DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm) :	2500-2950	500-1000	2500-2900	200-500	600-1000	2500-3000
TESTS	TEST ELEMENT		*	*	*	*	*	*
T106		PASS 75.0mm SIEVE %	*	*	*	*	*	*
		PASS 53.0mm SIEVE %	*	*	*	*	*	*
		PASS 37.5mm SIEVE %	*	*	*	*	*	*
		PASS 26.5mm SIEVE %	*	*	*	*	*	*
		PASS 19.0mm SIEVE %	*	*	*	*	*	*
		PASS 13.2mm SIEVE %	*	*	*	*	*	*
		PASS 9.50mm SIEVE %	*	*	*	100	*	*
		PASS 6.70mm SIEVE %	*	*	*	99	*	*
		PASS 4.75mm SIEVE %	*	*	*	99	*	*
		PASS 2.36mm SIEVE %	*	100	*	98	*	*
T107	WHOLE SAMPLE	PASS 425 µm SIEVE %	*	96	*	83	*	*
		PASS 75 µm SIEVE %	*	83	*	48	*	*
		LESS THAN 13.5 µm %	*	67	*	27	*	*
T107	-2.36mm	PASS 425 µm SIEVE %	*	96	*	85	*	*
		PASS 75 µm SIEVE %	*	83	*	49	*	*
		LESS THAN 13.5 µm %	*	67	*	28	*	*
		OBSERVATIONS	*	*	*	*	*	*
RATIOS	A-	PASS 425 µm %	*	96	*	85	*	*
	B-	PASS 75/425 µm %	*	86	*	57	*	*
	C-	BELOW 13.5/75 µm %	*	81	*	57	*	*
AS1289.3.1.2		LIQUID LIMIT %	*	52	*	22	*	*
AS1289.3.2.1		PLASTIC LIMIT %	*	13	*	17	*	*
AS1289.3.3.1		PLASTICITY INDEX	*	39	*	5	*	*
		PREPARATION METHOD	*	AS1289.1.1-5.3	*	AS1289.1.1-5.3	*	*
T111		STANDARD MAX. DRY DENSITY (1L MLD, A.1ii) t/m^3	*	1.55	*	1.90	*	*
		OPTIMUM MOISTURE CONTENT %	*	24.9	*	11.5	*	*
T113		LINEAR SHRINKAGE %	5.5	13.0	15.5	3.0	12.5	15.5
AS1289.2.1.1		FIELD MOISTURE CONTENT %	*	20.4	*	9.4	*	*
AS1289.3.8.1		EMERSON CLASS	*	*	*	*	*	*
(AIR DRIED)		TYPE OF WATER	*	*	*	*	*	*

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APPROVED SIGNATORY : .....
Jarrod Gornall

DATE: 21/8/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

*

TEST REPORT: GEOTECHNICAL INVESTIGATION - SOIL ANALYSIS

CLIENT : ATLUS GROUP PTY LTD - SYDNEY, NSW
JOB DESCRIPTION : GEOTECHNICAL INVESTIGATION
PROPOSED WESTEND SPORTS OVAL PRECINCT,
No. 14 MERROWIE STREET, GRIFFITH, NSW

SAMPLED BY: ARTL
DATE SAMPLED: 20-24/07/2020
DATE SUBMITTED: 24/07/2020
SAMPLING METHOD: AS1289.1.2.1
SAMPLING CLAUSE: 6.5.3/6.5.4
DATES TESTED: 31/07/20-15/08/20
ORDER No.: *

MATERIAL SOURCE : IN-SITU BOREHOLES
MATERIAL TYPE : REFER TO BOREHOLE LOGS
PROPOSED USE : DESIGN

REGISTRATION No : R28 **GS20-120**

		SAMPLE NUMBER :	7A	7B	7C	7D	7E	SG1B
		SAMPLING LOCATION :	BH7	BH7	BH7	BH7	BH7	TP1
		DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm) :	200-500	500-1000	1400-1900	2000-2300	2500-2900	550-1500
TESTS	TEST ELEMENT		*	*	*	*	*	*
T106		PASS 75.0mm SIEVE %	*	*	*	*	*	*
		PASS 53.0mm SIEVE %	*	*	*	*	*	*
		PASS 37.5mm SIEVE %	*	*	*	*	*	*
		PASS 26.5mm SIEVE %	*	*	*	*	*	*
		PASS 19.0mm SIEVE %	*	*	*	*	*	*
		PASS 13.2mm SIEVE %	*	*	*	*	*	*
		PASS 9.50mm SIEVE %	*	*	*	*	*	*
		PASS 6.70mm SIEVE %	*	*	*	*	*	*
		PASS 4.75mm SIEVE %	*	100	*	*	*	*
		PASS 2.36mm SIEVE %	*	99	*	*	*	*
T107	WHOLE SAMPLE	PASS 425 µm SIEVE %	*	94	*	*	*	*
		PASS 75 µm SIEVE %	*	77	*	*	*	*
		LESS THAN 13.5 µm %	*	62	*	*	*	*
T107	-2.36mm	PASS 425 µm SIEVE %	*	95	*	*	*	*
		PASS 75 µm SIEVE %	*	78	*	*	*	*
		LESS THAN 13.5 µm %	*	63	*	*	*	*
		OBSERVATIONS	*	*	*	*	*	*
RATIOS	A-	PASS 425 µm %	*	95	*	*	*	*
	B-	PASS 75/425 µm %	*	82	*	*	*	*
	C-	BELOW 13.5/75 µm %	*	81	*	*	*	*
AS1289.3.1.2		LIQUID LIMIT %	*	46	*	*	*	*
AS1289.3.2.1		PLASTIC LIMIT %	*	14	*	*	*	*
AS1289.3.3.1		PLASTICITY INDEX	*	32	*	*	*	*
		PREPARATION METHOD	*	AS1289.1.1-5.3	*	*	*	*
T111		STANDARD MAX. DRY DENSITY (1L MLD, A.1ii) t/m^3	*	1.59	*	*	*	1.51
		OPTIMUM MOISTURE CONTENT %	*	22.6	*	*	*	22.6
T113		LINEAR SHRINKAGE %	4.5	11.5	11.5	11.0	14.0	*
AS1289.2.1.1		FIELD MOISTURE CONTENT %	*	16.0	*	*	*	*
AS1289.3.8.1		EMERSON CLASS	*	*	*	*	*	*
(AIR DRIED)		TYPE OF WATER	*	*	*	*	*	*

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APPROVED SIGNATORY : .....

Jarrod Gornall

DATE: 21/8/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

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SAMPLED BY: ARTL
DATE SAMPLED: 20-24/07/2020
DATE SUBMITTED: 24/07/2020
SAMPLING METHOD: AS1289.1.2.1
SAMPLING CLAUSE: 6.5.3/6.5.4
DATES TESTED: 31/07/20-15/08/20
ORDER No.: *

TEST REPORT: GEOTECHNICAL INVESTIGATION - SOIL ANALYSIS

CLIENT : ATLUS GROUP PTY LTD - SYDNEY, NSW
JOB DESCRIPTION : GEOTECHNICAL INVESTIGATION
PROPOSED WESTEND SPORTS OVAL PRECINCT,
No. 14 MERROWIE STREET, GRIFFITH, NSW

MATERIAL SOURCE : IN-SITU BOREHOLES
MATERIAL TYPE : REFER TO BOREHOLE LOGS
PROPOSED USE : DESIGN

REGISTRATION No : R28 **GS20-120**

		SAMPLE NUMBER :	SG2B	SG8A	SG8B	SG8C	SG8D	SG9A
		SAMPLING LOCATION :	TP2	BH8	BH8	BH8	BH8	BH9
		DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm) :	550-1100	190-500	500-1300	1300-2300	2300-4000	190-500
TESTS	TEST ELEMENT		*	*	*	*	*	*
T106		PASS 75.0mm SIEVE %	*	*	*	*	*	*
		PASS 53.0mm SIEVE %	*	*	*	*	*	*
		PASS 37.5mm SIEVE %	*	*	*	*	*	*
		PASS 26.5mm SIEVE %	*	*	*	*	*	*
		PASS 19.0mm SIEVE %	*	*	*	*	*	*
		PASS 13.2mm SIEVE %	*	*	*	*	*	*
		PASS 9.50mm SIEVE %	*	*	*	*	*	*
		PASS 6.70mm SIEVE %	*	*	*	*	*	*
		PASS 4.75mm SIEVE %	*	*	*	*	*	100
		PASS 2.36mm SIEVE %	100	*	*	*	*	99
T107	WHOLE SAMPLE	PASS 425 µm SIEVE %	95	*	*	*	*	92
		PASS 75 µm SIEVE %	78	*	*	*	*	67
		LESS THAN 13.5 µm %	61	*	*	*	*	45
T107	-2.36mm	PASS 425 µm SIEVE %	95	*	*	*	*	93
		PASS 75 µm SIEVE %	79	*	*	*	*	68
		LESS THAN 13.5 µm %	61	*	*	*	*	46
		OBSERVATIONS	*	*	*	*	*	*
RATIOS	A-	PASS 425 µm %	95	*	*	*	*	93
	B-	PASS 75/425 µm %	83	*	*	*	*	73
	C-	BELOW 13.5/75 µm %	78	*	*	*	*	67
AS1289.3.1.2		LIQUID LIMIT %	47	*	*	*	*	27
AS1289.3.2.1		PLASTIC LIMIT %	13	*	*	*	*	16
AS1289.3.3.1		PLASTICITY INDEX	34	*	*	*	*	11
		PREPARATION METHOD	AS1289.1.1-5.3	*	*	*	*	AS1289.1.1-5.3
T111		STANDARD MAX. DRY DENSITY (1L MLD, A.1ii) t/m^3	1.58	1.86	*	*	*	1.84
		OPTIMUM MOISTURE CONTENT %	23.1	13.1	*	*	*	14.2
T113		LINEAR SHRINKAGE %	*	3.5	3.0	8.0	11.0	*
AS1289.2.1.1		FIELD MOISTURE CONTENT %	20.6	9.9	*	*	*	12.6
AS1289.3.8.1		EMERSON CLASS	*	*	*	*	*	*
(AIR DRIED)		TYPE OF WATER	*	*	*	*	*	*

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DATE: 21/8/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

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TEST REPORT: GEOTECHNICAL INVESTIGATION - SOIL ANALYSIS

CLIENT : ATLUS GROUP PTY LTD - SYDNEY, NSW
JOB DESCRIPTION : GEOTECHNICAL INVESTIGATION
PROPOSED WESTEND SPORTS OVAL PRECINCT,
No. 14 MERROWIE STREET, GRIFFITH, NSW

SAMPLED BY: ARTL
DATE SAMPLED: 20-24/07/2020
DATE SUBMITTED: 24/07/2020
SAMPLING METHOD: AS1289.1.2.1
SAMPLING CLAUSE: 6.5.3/6.5.4
DATES TESTED: 31/07/20-15/08/20
ORDER No.: *

MATERIAL SOURCE : IN-SITU BOREHOLES
MATERIAL TYPE : REFER TO BOREHOLE LOGS
PROPOSED USE : DESIGN

REGISTRATION No : R28 **GS20-120**

		SAMPLE NUMBER :	SG10A	SG11B	SG11C	SG12B	SG13B	SG14B
		SAMPLING LOCATION :	BH10	BH11	BH11	BH12	BH13	BH14
		DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm) :	550-1500	400-1100	1100-1500	600-1500	500-1500	500-1200
TESTS	TEST ELEMENT		*	*	*	*	*	*
T106		PASS 75.0mm SIEVE %	*	*	*	*	*	*
		PASS 53.0mm SIEVE %	*	*	*	*	*	*
		PASS 37.5mm SIEVE %	*	*	*	*	*	*
		PASS 26.5mm SIEVE %	*	*	*	*	*	*
		PASS 19.0mm SIEVE %	*	*	100	*	*	*
		PASS 13.2mm SIEVE %	*	*	99	*	*	*
		PASS 9.50mm SIEVE %	100	*	98	*	*	*
		PASS 6.70mm SIEVE %	99	*	95	*	*	*
		PASS 4.75mm SIEVE %	99	100	95	*	*	*
		PASS 2.36mm SIEVE %	99	99	93	*	*	*
T107	WHOLE SAMPLE	PASS 425 µm SIEVE %	94	94	88	*	*	*
		PASS 75 µm SIEVE %	72	69	75	*	*	*
		LESS THAN 13.5 µm %	44	42	56	*	*	*
T107	-2.36mm	PASS 425 µm SIEVE %	95	95	95	*	*	*
		PASS 75 µm SIEVE %	73	69	82	*	*	*
		LESS THAN 13.5 µm %	45	42	60	*	*	*
		OBSERVATIONS	*	*	*	*	*	*
RATIOS	A-	PASS 425 µm %	95	95	95	*	*	*
	B-	PASS 75/425 µm %	76	73	86	*	*	*
	C-	BELOW 13.5/75 µm %	62	61	74	*	*	*
AS1289.3.1.2		LIQUID LIMIT %	36	34	41	*	*	*
AS1289.3.2.1		PLASTIC LIMIT %	15	15	14	*	*	*
AS1289.3.3.1		PLASTICITY INDEX	21	19	27	*	*	*
		PREPARATION METHOD	AS1289.1.1-5.3	AS1289.1.1-5.3	AS1289.1.1-5.3	*	*	*
T111	STANDARD MAX. DRY DENSITY (1L MLD, A.1ii) t/m^3		1.60	1.60	1.68	*	1.59	1.65
		OPTIMUM MOISTURE CONTENT %	21.8	22.8	20.7	*	23.3	21.2
T113		LINEAR SHRINKAGE %						
AS1289.2.1.1		FIELD MOISTURE CONTENT %	17.1	20.0	21.4	19.6	25.4	20.9
AS1289.3.8.1		EMERSON CLASS	*	*	*	*	*	*
(AIR DRIED)		TYPE OF WATER	*	*	*	*	*	*

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APPROVED SIGNATORY : .....
Jarrod Gornall

DATE: 21/8/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

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TEST REPORT: GEOTECHNICAL INVESTIGATION - SOIL ANALYSIS

CLIENT : ATLUS GROUP PTY LTD - SYDNEY, NSW
JOB DESCRIPTION : GEOTECHNICAL INVESTIGATION
PROPOSED WESTEND SPORTS OVAL PRECINCT,
No. 14 MERROWIE STREET, GRIFFITH, NSW

SAMPLED BY: ARTL
DATE SAMPLED: 20-24/07/2020
DATE SUBMITTED: 24/07/2020
SAMPLING METHOD: AS1289.1.2.1
SAMPLING CLAUSE: 6.5.3/6.5.4
DATES TESTED: 31/07/20-15/08/20
ORDER No.: *

MATERIAL SOURCE : IN-SITU BOREHOLES
MATERIAL TYPE : REFER TO BOREHOLE LOGS
PROPOSED USE : DESIGN

REGISTRATION No : R28 **GS20-120**

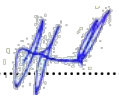
	SAMPLE NUMBER :	A1	A2	*	*	*	*
	SAMPLING LOCATION :	*	*	*	*	*	*
	DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm) :	0-150	0-150	*	*	*	*
TESTS	TEST ELEMENT	*	*	*	*	*	*
AS1289.3.6.1	PASS 100.0mm SIEVE %	*	*	*	*	*	*
	PASS 75.0mm SIEVE %	*	*	*	*	*	*
	PASS 53.0mm SIEVE %	*	*	*	*	*	*
	PASS 37.5mm SIEVE %	*	*	*	*	*	*
	PASS 26.5mm SIEVE %	*	*	*	*	*	*
	PASS 19.0mm SIEVE %	*	*	*	*	*	*
	PASS 13.2mm SIEVE %	*	*	*	*	*	*
	PASS 9.50mm SIEVE %	*	*	*	*	*	*
	PASS 6.70mm SIEVE %	*	*	*	*	*	*
	PASS 4.75mm SIEVE %	*	*	*	*	*	*
	PASS 2.36mm SIEVE %	100	100	*	*	*	*
	PASS 1.18mm SIEVE %	98	98	*	*	*	*
	PASS 600µm SIEVE %	92	94	*	*	*	*
	PASS 425µm SIEVE %	84	90	*	*	*	*
	PASS 300µm SIEVE %	75	86	*	*	*	*
	PASS 150µm SIEVE %	57	74	*	*	*	*
	PASS 75µm SIEVE %	43	62	*	*	*	*
T111	STANDARD MAX. DRY DENSITY (1L MLD, A.1ii) t/m^3	1.57	1.60	*	*	*	*
	OPTIMUM MOISTURE CONTENT %	19.9	20.3	*	*	*	*
T113	LINEAR SHRINKAGE %	*	*	*	*	*	*
AS1289.2.1.1	FIELD MOISTURE CONTENT %	*	*	*	*	*	*

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025 - Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

ACCREDITATION NUMBER 4679

*
*
*
All samples are oven dried and dry sieved during prep. unless otherwise stated

APPROVED SIGNATORY : 

Jarrod Gornall

DATE: 21/8/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

TEST REPORT

CALIFORNIA BEARING RATIO OF SOILS AND GRAVELS

CLIENT: ATLUS GROUP PTY LTD - SYDNEY, NSW

JOB DESCRIPTION: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN PROPOSED WEST END SPORTS OVAL PRECINCT, MERRIGAL STREET, GRIFFITH, NSW

SOURCE OF MATERIAL: IN-SITU BOREHOLES

PROPOSED USE: PAVEMENT DESIGN

SAMPLED BY: ARTL

DATE SAMPLED: 20-24/07/2020

DATE RECEIVED: 24/07/2020

TESTING COMMENCED: 28/07/2020

TESTING COMPLETED: 18/08/2020

TEST METHODS: T105/T111

* T117/T120

SAMPLING PROCEDURE: AS1289.1.2.1

SAMPLING CLAUSE: 6.5.3/6.5.4

LOT NO: * ORDER NO: * REGISTRATION NO : R6 **GS20-120**

SAMPLE NO:	1B	2B	3B	4B	5B
SITE OR LOCATION	BH1	BH2	BH3	BH4	BH5
DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm)	300-900	800-1100	600-1000	900-1400	500-1000
ADDITIVE IF STABILISED	*	*	*	*	*
AMOUNT OF ADDITIVE (%)	*	*	*	*	*
TYPE OF COMPACTION (Standard/modified)	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
MATERIAL RETAINED ON THE 19.0mm SIEVE (%)	0.0	0.0	0.0	0.0	0.0
OPTIMUM MOISTURE CONTENT (%)	24.4	21.3	25.0	23.7	24.9
MAXIMUM DRY DENSITY (t/m^3)	1.53	1.60	1.54	1.58	1.55
MOULDING MOISTURE CONTENT (%)	24.8	21.5	25.0	23.8	24.9
DRY DENSITY OF TEST SPECIMEN (t/m^3)	1.45	1.52	1.46	1.50	1.47
SPECIFIED LDR (%)	95	95	95	95	95
ACTUAL LDR (%)	95	95	95	95	95
MOISTURE CONTENTS : TOP 30 mm	30.3	27.9	31.1	31.5	31.5
WHOLE SAMPLE	27.5	24.1	27.7	27.0	27.8
ABSORPTION (%)	2.7	2.6	2.7	3.1	2.9
SPECIFIED LMR (%)	100	100	100	100	100
ACTUAL LMR (%)	102	101	100	101	100
NUMBER OF DAYS SOAKING	10	10	10	10	10
SWELL (%)	1.4	1.1	1.3	1.9	1.8
CBR OBTAINED FROM PENETRATION (mm)	2.5	2.5	2.5	2.5	2.5
CALIFORNIA BEARING RATIO (%)	**3**	**5**	**2.5**	**2.5**	**2**

NOTES: T117 specifications: LMR -3% to +2%, LDR ± 1%

*

COMMENTS: *

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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Number: 4679

APPROVED SIGNATORY: Jarrod Gornall

DATE: 24/08/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

TEST REPORT

CALIFORNIA BEARING RATIO OF SOILS AND GRAVELS

CLIENT: ATLUS GROUP PTY LTD - SYDNEY, NSW

JOB DESCRIPTION: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN PROPOSED WEST END SPORTS OVAL PRECINCT, MERRIGAL STREET, GRIFFITH, NSW

SOURCE OF MATERIAL: IN-SITU BOREHOLES

PROPOSED USE: PAVEMENT DESIGN

SAMPLED BY: ARTL

DATE SAMPLED: 20-24/07/2020

DATE RECEIVED: 24/07/2020

TESTING COMMENCED: 28/07/2020

TESTING COMPLETED: 18/08/2020

TEST METHODS: T105/T111

* T117/T120

SAMPLING PROCEDURE: AS1289.1.2.1

SAMPLING CLAUSE: 6.5.3/6.5.4

LOT NO: * ORDER NO: * REGISTRATION NO : R6 **GS20-120**

SAMPLE NO:	6B	7B	SG1B	SG2B	SG8A
SITE OR LOCATION	BH6	BH7	TP1	TP2	BH8
DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm)	200-500	500-1000	550-1500	550-1100	190-500
ADDITIVE IF STABILISED	*	*	*	*	*
AMOUNT OF ADDITIVE (%)	*	*	*	*	*
TYPE OF COMPACTION (Standard/modified)	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
MATERIAL RETAINED ON THE 19.0mm SIEVE (%)	0.0	0.0	0.0	0.0	0.0
OPTIMUM MOISTURE CONTENT (%)	11.5	22.6	22.6	23.1	13.1
MAXIMUM DRY DENSITY (t/m^3)	1.90	1.59	1.51	1.58	1.86
MOULDING MOISTURE CONTENT (%)	11.3	22.7	23.0	23.4	13.3
DRY DENSITY OF TEST SPECIMEN (t/m^3)	1.81	1.51	1.43	1.50	1.76
SPECIFIED LDR (%)	95	95	95	95	95
ACTUAL LDR (%)	95	95	95	95	95
MOISTURE CONTENTS : TOP 30 mm	16.1	28.6	28.4	29.5	16.8
WHOLE SAMPLE	13.4	25.5	25.5	26.2	15.1
ABSORPTION (%)	2.1	2.8	2.5	2.8	1.8
SPECIFIED LMR (%)	100	100	100	100	100
ACTUAL LMR (%)	99	101	102	101	102
NUMBER OF DAYS SOAKING	10	10	10	10	10
SWELL (%)	0.7	1.4	1.0	1.4	1.1
CBR OBTAINED FROM PENETRATION (mm)	2.5	2.5	5.0	2.5	2.5
CALIFORNIA BEARING RATIO (%)	4.5	3	8	5	6

NOTES: T117 specifications: LMR -3% to +2%, LDR ± 1%

*

COMMENTS: *

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Number: 4679

APPROVED SIGNATORY: Jarrod Gornall

DATE: 24/08/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

TEST REPORT

CALIFORNIA BEARING RATIO OF SOILS AND GRAVELS

CLIENT: ATLUS GROUP PTY LTD - SYDNEY, NSW

JOB DESCRIPTION: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN PROPOSED WEST END SPORTS OVAL PRECINCT, MERRIGAL STREET, GRIFFITH, NSW

SOURCE OF MATERIAL: IN-SITU BOREHOLES

PROPOSED USE: PAVEMENT DESIGN

SAMPLED BY: ARTL

DATE SAMPLED: 20-24/07/2020

DATE RECEIVED: 24/07/2020

TESTING COMMENCED: 28/07/2020

TESTING COMPLETED: 18/08/2020

TEST METHODS: T105/T111

* T117/T120

SAMPLING PROCEDURE: AS1289.1.2.1

SAMPLING CLAUSE: 6.5.3/6.5.4

LOT NO: * ORDER NO: * REGISTRATION NO : R6 **GS20-120**

SAMPLE NO:	SG9A	SG10A	SG11B	SG11C	SG13B
SITE OR LOCATION	TP9	TP10	TP11	TP11	TP13
DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm)	200-500	550-1500	400-1100	100-1500	500-1500
ADDITIVE IF STABILISED	*	*	*	*	*
AMOUNT OF ADDITIVE (%)	*	*	*	*	*
TYPE OF COMPACTION (Standard/modified)	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
MATERIAL RETAINED ON THE 19.0mm SIEVE (%)	0.0	0.0	0.0	0.0	0.0
OPTIMUM MOISTURE CONTENT (%)	14.2	21.8	22.8	20.7	23.3
MAXIMUM DRY DENSITY (t/m^3)	1.84	1.60	1.60	1.68	1.59
MOULDING MOISTURE CONTENT (%)	14.3	21.9	22.8	21.0	23.6
DRY DENSITY OF TEST SPECIMEN (t/m^3)	1.74	1.51	1.52	1.59	1.51
SPECIFIED LDR (%)	95	95	95	95	95
ACTUAL LDR (%)	95	95	95	95	95
MOISTURE CONTENTS : TOP 30 mm	18.2	26.1	27.2	26.0	27.4
WHOLE SAMPLE	15.9	24.0	24.6	22.6	25.6
ABSORPTION (%)	1.7	2.1	1.8	1.6	1.9
SPECIFIED LMR (%)	100	100	100	100	100
ACTUAL LMR (%)	100	100	100	102	101
NUMBER OF DAYS SOAKING	10	10	10	10	10
SWELL (%)	0.6	0.9	1.0	0.7	0.9
CBR OBTAINED FROM PENETRATION (mm)	2.5	2.5	5.0	2.5	5.0
CALIFORNIA BEARING RATIO (%)	**5**	**9**	**9**	**4**	**8**

NOTES: T117 specifications: LMR -3% to +2%, LDR ± 1%

*

COMMENTS: *

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Number: 4679

APPROVED SIGNATORY: Jarrod Gornall

DATE: 24/08/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

TEST REPORT

CALIFORNIA BEARING RATIO OF SOILS AND GRAVELS

CLIENT: ATLUS GROUP PTY LTD - SYDNEY, NSW

JOB DESCRIPTION: GEOTECHNICAL INVESTIGATION & PAVEMENT DESIGN PROPOSED WEST END SPORTS OVAL PRECINCT, MERRIGAL STREET, GRIFFITH, NSW

SOURCE OF MATERIAL: IN-SITU BOREHOLES

PROPOSED USE: PAVEMENT DESIGN

SAMPLED BY: ARTL

DATE SAMPLED: 20-24/07/2020

DATE RECEIVED: 24/07/2020

TESTING COMMENCED: 28/07/2020

TESTING COMPLETED: 18/08/2020

TEST METHODS: T105/T111

* T117/T120

SAMPLING PROCEDURE: AS1289.1.2.1

SAMPLING CLAUSE: 6.5.3/6.5.4

LOT NO: * ORDER NO: * REGISTRATION NO : R6 **GS20-120**

SAMPLE NO:	SG14B	*	*	*	*
SITE OR LOCATION	TP14	*	*	*	*
DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm)	500-1200	*	*	*	*
ADDITIVE IF STABILISED	*	*	*	*	*
AMOUNT OF ADDITIVE (%)	*	*	*	*	*
TYPE OF COMPACTION (Standard/modified)	STANDARD	*	*	*	*
MATERIAL RETAINED ON THE 19.0mm SIEVE (%)	0.0	*	*	*	*
OPTIMUM MOISTURE CONTENT (%)	21.2	*	*	*	*
MAXIMUM DRY DENSITY (t/m^3)	1.65	*	*	*	*
MOULDING MOISTURE CONTENT (%)	21.0	*	*	*	*
DRY DENSITY OF TEST SPECIMEN (t/m^3)	1.57	*	*	*	*
SPECIFIED LDR (%)	95	*	*	*	*
ACTUAL LDR (%)	95	*	*	*	*
MOISTURE CONTENTS : TOP 30 mm	25.9	*	*	*	*
WHOLE SAMPLE	23.1	*	*	*	*
ABSORPTION (%)	2.1	*	*	*	*
SPECIFIED LMR (%)	100	*	*	*	*
ACTUAL LMR (%)	99	*	*	*	*
NUMBER OF DAYS SOAKING	10	*	*	*	*
SWELL (%)	1.0	*	*	*	*
CBR OBTAINED FROM PENETRATION (mm)	2.5	*	*	*	*
CALIFORNIA BEARING RATIO (%)	4	*	*	*	*

NOTES: T117 specifications: LMR -3% to +2%, LDR ± 1%

*

COMMENTS: *

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Number: 4679

APPROVED SIGNATORY: Jarrod Gornall

DATE: 24/08/2020

Aitken Rowe Testing Laboratories Pty Ltd

ARTL Griffith: 17b Battista Street, Griffith NSW 2680

PERMEABILITY / DISPERSION REPORT

CLIENT: ATLUS GROUP PTY LTD - SYDNEY, NSW
PROJECT: GEOTECHNICAL INVESTIGATION
PROPOSED WEST END SPORTS OVAL PRECINCT,
MERRIGAL STREET, GRIFFITH, NSW

PAGE 1 OF 1
SAMPLED BY: ARTL
DATE SAMPLED: 20-24/07/20
DATE SUBMITTED: 24/07/2020
TEST DATE/S: 31/07/20-15/08/20
ORDER No.: *
TEST METHODS: T111
AS1289.6.7.2
*
*
REGISTRATION No: R23 **GS20-120**

MATERIAL TYPE: REFER TO BOREHOLE LOGS & MATERIALS SCHEDULE & LOG
SOURCE OF MATERIAL: IN-SITU BOREHOLES
PORTION OF STRUCTURE: *
SURCHARGES ADDED: *
PRESSURE APPLIED: *
% RETAINED ON NOMINAL SIEVE: *
NOMINAL SIEVE SIZE: *

SAMPLE No.	TEST PIT No.	DEPTH (m)	MAX. DRY DENSITY (t/m^3)	OPTIMUM MOISTURE (%)	DRY DENSITY OF SPECIMEN (t/m^3)	MOULDING MOISTURE (%)	ACTUAL % OF MDD	PERMEABILITY m / sec AS1289.6.7.2	EMERSON CLASS AS1289.3.8.1
A1	*	0-150	1.57	19.9	1.41	19.4	90	$9x10^{-9}$	*
A2	*	0-150	1.60	20.3	1.44	20.6	90	$2x10^{-9}$	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*

REMARKS: *

*

APPROVED SIGNATORY: .....
Jarrod Gornall

DATE: 24/8/2020

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

TEST REPORT

SOIL REACTIVITY- DETERMINATION OF THE SHRINKAGE INDEX OF A SOIL

SHRINK SWELL INDEX

SAMPLED BY: ARTL
DATE SAMPLED: 20-24/07/20
DATE SUBMITTED: 24/7/2020
DATE TESTED (from): 11/08/2020
DATE TESTED (to): 21/08/2020
No. OF SAMPLES: 4
TEST METHODS: AS1289.7.1.1
AS1289.2.1.1

CLIENT: ATLUS GROUP PTY LTD - SYDNEY, NSW
JOB DESCRIPTION GEOTECHNICAL INVESTIGATION
PROPOSED WEST END SPORTS OVAL PRECINCT,
MERRIGAL STREET, GRIFFITH, NSW

REGISTRATION NO: R26 **GS20-120**

SAMPLE No.:	1B	4B	5B
BOREHOLE No.:	BH1	BH4	BH5
DEPTH (mm):	400-900	900-1400	500-1000
NATURE OF SPECIMEN (U50/REMOULDED):	U50	U50	U50
SHRINK SWELL INDEX (ISS):	2.48	1.74	2.21
INITIAL SWELL M.C. %:	26.6	21.4	20.2
FINAL SWELL M.C. %:	27.2	28.6	25.6
DESCRIPTION OF SOIL:	CLAY	CLAY	CLAY
ESTIMATED PERCENTAGE OF INERT INCLUSIONS:	<2%	<2%	<5%
EXTENT OF SOIL CRUMBLING DURING SHRINKAGE:	N/A	N/A	N/A
EXTENT OF CRACKING OF SHRINKAGE SPECIMEN:	MINOR	MINOR	MAJOR
(WHERE REMOULDED) SPECIMEN DENSITY (t/m^3):	*	*	*
MOISTURE ADDED TO ACHIEVE OMC (%):	*	*	*
COMPACTIVE EFFORT (BLOWS/ LAYER):	*	*	*
SAMPLE No.:	SG14B	*	*
BOREHOLE No.:	BH14	*	*
DEPTH:	500-900	*	*
NATURE OF SPECIMEN (U50/REMOULDED):	U50	*	*
SHRINK SWELL INDEX (ISS):	1.59	*	*
INITIAL SWELL M.C. %:	24.5	*	*
FINAL SWELL M.C. %:	26.2	*	*
DESCRIPTION OF SOIL:	CLAY	*	*
ESTIMATED PERCENTAGE OF INERT INCLUSIONS:	<5%	*	*
EXTENT OF SOIL CRUMBLING DURING SHRINKAGE:	N/A	*	*
EXTENT OF CRACKING OF SHRINKAGE SPECIMEN:	MAJOR	*	*
(WHERE REMOULDED) SPECIMEN DENSITY (t/m^3):	*	*	*
MOISTURE ADDED TO ACHIEVE OMC (%):	*	*	*
COMPACTIVE EFFORT (BLOWS/ LAYER):	*	*	*

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025 - Testing.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

ACCREDITATION NUMBER: 4679

APPROVED SIGNATORY: _____
Jarrod Gornall
DATE: 27/8/2020

Corrosion & Scaling Assessment:

Soil Reporting Profile

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
Tel: 1300 30 40 80
Fax: 1300 64 46 89
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 57567	Sample N°: 1	Date Received: 3/8/20	Report Status: Final

Client Name:	**Aitken Rowe Testing Laboratories (ARTL) Pty Ltd**	Project Name:	**Ref: GS20-120**
		SESL Quote N°:	
Client Contact:	**Reports**	Sample Name:	**1C**
Client Order N°:		Description:	**Soil**
Address:	**PO Box 5158** **WAGGA WAGGA NSW 2650**	Test Type:	**ARTL**

TEST		RESULT	COMMENTS
pH in water (1:5)		8.2	Moderate alkalinity
EC mS/cm (1:5)		2.73	Extreme
Texture Class		-	Did not test
Soil Condition Class (Permeability)		-	Did not test
SOLUBLE ANION ANALYSIS			
Sulphate (1:5)	mgSO_4 / kg	1050	Low (non to mildly aggressive)
Chloride (1:5)	mgCl / kg	3880	Low (non-aggressive)
* Resistivity Ω.	m	1.72	Low (moderately to severely aggressive)

* Resistivity tested on a saturated sample/paste

(Note:- 10,000 mg/kg = 1%)

Recommendations

Analysed by SESL Australia Pty Ltd, NATA # 15633

For the purposes of this corrosion and scaling assessment of soils towards concrete structures with steel reinforcement, concrete and steel piles, this soil shows moderate alkalinity, extreme salinity, low sulphate, low chloride and low resistivity.

According to Australian Standard (AS) 2159-2009, the pH is considered to be non-aggressive towards concrete and non-aggressive towards steel. The sulphate levels are considered to be non to mildly aggressive towards concrete due to the lack of permeability class. The chloride levels are considered to be non-aggressive towards steel. The resistivity is considered to be moderate to severely aggressive towards steel.

Factors affecting concrete scaling are: (a) elevated sulphate, becoming mildly aggressive at >2400mg/kg SO4; and (b) low pH, becoming mildly aggressive at pH of <5-6.

Factors affecting steel corrosivity are: (a) elevated chloride, becoming mildly aggressive at >5,000mg/kg Cl; and (b) low pH, becoming mildly aggressive at pH of <4-5 and (d) low resistivity, becoming mildly aggressive with resistivity values less than 50Ω.m.

Overall, according AS2159:2009 the likelihood of aggressive corrosion is moderate to severe.

pH, EC, Soluble SO_4: Bradley et al., (1983); **Cl,** (4500-Cl- E; APHA, 1998);
Resistivity, AS1289.4.4.1:1997, **Texture** - PM0003 (Texture- "Northcote" (1992))

Date Report Generated
11/08/2020

Consultant:
Helen Liang

Authorised Signatory:
Luke Jacovides

Corrosion & Scaling Assessment:

Soil Reporting Profile

SESL AUSTRALIA
Environment & Soil Sciences

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
Tel: 1300 30 40 80
Fax: 1300 64 46 89
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 57567 | **Sample N°: 2** | **Date Received: 3/8/20** | **Report Status: Final**

Client Name: **Aitken Rowe Testing Laboratories (ARTL) Pty Ltd**
Client Contact: **Reports**
Client Order N°:
Address: **PO Box 5158, WAGGA WAGGA NSW 2650**

Project Name: **Ref: GS20-120**
SESL Quote N°:
Sample Name: **4B**
Description: **Soil**
Test Type: **ARTL**

TEST		RESULT	COMMENTS
pH in water (1:5)		8.1	Moderate alkalinity
EC mS/cm (1:5)		0.4	Slight
Texture Class		-	Did not test
Soil Condition Class (Permeability)		-	Did not test
SOLUBLE ANION ANALYSIS			
Sulphate (1:5)	mgSO_4 / kg	100	Low (non to mildly aggressive)
Chloride (1:5)	mgCl / kg	310	Low (non-aggressive)
* Resistivity Ω.	m	7.31	Low (moderately to severely aggressive)

* Resistivity tested on a saturated sample/paste

(Note:- 10,000 mg/kg = 1%)

Recommendations

Analysed by SESL Australia Pty Ltd, NATA # 15633

For the purposes of this corrosion and scaling assessment of soils towards concrete structures with steel reinforcement, concrete and steel piles, this soil shows moderate alkalinity, slight salinity, low sulphate, low chloride and low resistivity.

According to Australian Standard (AS) 2159-2009, the pH is considered to be non-aggressive towards concrete and non-aggressive towards steel. The sulphate levels are considered to be non to mildly aggressive towards concrete due to the lack of permeability class. The chloride levels are considered to be non-aggressive towards steel. The resistivity is considered to be moderate to severely aggressive towards steel due.

Factors affecting concrete scaling are: (a) elevated sulphate, becoming mildly aggressive at >2400mg/kg SO4; and (b) low pH, becoming mildly aggressive at pH of <5-6.

Factors affecting steel corrosivity are: (a) elevated chloride, becoming mildly aggressive at >5,000mg/kg Cl; and (b) low pH, becoming mildly aggressive at pH of <4-5 and (d) low resistivity, becoming mildly aggressive with resistivity values less than 50Ω.m.

Overall, according AS2159:2009 the likelihood of aggressive corrosion is moderate to severe.

pH, EC, Soluble SO_4: Bradley et al., (1983); **Cl,** (4500-Cl- E; APHA, 1998);
Resistivity, AS1289.4.4.1:1997, **Texture** - PM0003 (Texture- "Northcote" (1992))

Date Report Generated
11/08/2020

Consultant:
Helen Liang

Authorised Signatory:
Luke Jacovides

Corrosion & Scaling Assessment:

Soil Reporting Profile

SESL AUSTRALIA
Environment & Soil Sciences

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
Tel: 1300 30 40 80
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Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 57567	Sample N°: 3	Date Received: 3/8/20	Report Status: Final

Client Name:	**Aitken Rowe Testing Laboratories (ARTL) Pty Ltd**	Project Name:	**Ref: GS20-120**
		SESL Quote N°:	
Client Contact:	**Reports**	Sample Name:	**7B**
Client Order N°:		Description:	**Soil**
Address:	**PO Box 5158** **WAGGA WAGGA NSW 2650**	Test Type:	**ARTL**

TEST		RESULT	COMMENTS
pH in water (1:5)		8.5	Strong alkalinity
EC mS/cm (1:5)		0.93	High
Texture Class		-	Did not test
Soil Condition Class (Permeability)		-	Did not test
SOLUBLE ANION ANALYSIS			
Sulphate (1:5)	mgSO_4 / kg	420	Low (non to mildly aggressive)
Chloride (1:5)	mgCl / kg	920	Low (non-aggressive)
* Resistivity Ω. m		3.44	Low (moderately to severely aggressive)

* Resistivity tested on a saturated sample/paste

(Note:- 10,000 mg/kg = 1%)

Recommendations

Analysed by SESL Australia Pty Ltd, NATA # 15633

For the purposes of this corrosion and scaling assessment of soils towards concrete structures with steel reinforcement, concrete and steel piles, this soil shows strong alkalinity, high salinity, low sulphate, low chloride and low resistivity.

According to Australian Standard (AS) 2159-2009, the pH is considered to be non-aggressive towards concrete and non-aggressive towards steel. The sulphate levels are considered to be non to mildly aggressive towards concrete due to the lack of permeability class. The chloride levels are considered to be non-aggressive towards steel. The resistivity is considered to be moderate to severely aggressive towards steel.

Factors affecting concrete scaling are: (a) elevated sulphate, becoming mildly aggressive at >2400mg/kg SO4; and (b) low pH, becoming mildly aggressive at pH of <5-6.

Factors affecting steel corrosivity are: (a) elevated chloride, becoming mildly aggressive at >5,000mg/kg Cl; and (b) low pH, becoming mildly aggressive at pH of <4-5 and (d) low resistivity, becoming mildly aggressive with resistivity values less than 50Ω.m.

Overall, according AS2159:2009 the likelihood of aggressive corrosion is moderate to severe.

pH, EC, Soluble SO_4: Bradley et al., (1983); **Cl,** (4500-Cl- E; APHA, 1998);
Resistivity, AS1289.4.4.1:1997, **Texture** - PM0003 (Texture- "Northcote" (1992))

Date Report Generated
11/08/2020

Consultant:
Helen Liang

Authorised Signatory:
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CERTIFICATE OF ANALYSIS 247874

Client Details

Client	Aitken Rowe Testing Laboratories Pty Ltd
Attention	Michael Scremin
Address	4/2 RIEDELL ST, WAGGA WAGGA, NSW, 2650

Sample Details

Your Reference	**GS20-120 West End Sports Complex**
Number of Samples	16 Soil
Date samples received	28/07/2020
Date completed instructions received	28/07/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	04/08/2020
Date of Issue	31/07/2020

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Authorised by Asbestos Approved Signatory: Lucy Zhu

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Hannah Nguyen, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		247874-1	247874-2	247874-3	247874-4	247874-5
Your Reference	UNITS	GS20-120/1	GS20-120/2	GS20-120/3	GS20-120/4	GS20-120/5
Depth		100-500	400-700	100-400	100-500	0-600
Date Sampled		20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	31/07/2020	31/07/2020	31/07/2020	31/07/2020	31/07/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	92	89	108	89	101

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		247874-6	247874-7	247874-8	247874-9	247874-10
Your Reference	UNITS	GS20-120/6C	GS20-120/7A	GS20-120/B8A	GS20-120/SG9A	GS20-120/SG10A
Depth		700-1000	200-500	0-100	200-500	550-900
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	21/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	31/07/2020	31/07/2020	31/07/2020	31/07/2020	31/07/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	94	87	105	86	94

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		247874-11	247874-12	247874-13	247874-14	247874-15
Your Reference	UNITS	GS20-120/SG11A	GS20-120/SG12B	GS20-120/SG13A	GS20-120/SG14A	GS20-120/SG1A
Depth		200-400	600-900	200-500	200-400	100-400
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	31/07/2020	31/07/2020	31/07/2020	31/07/2020	31/07/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	104	98	106	105	77

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		247874-16
Your Reference	UNITS	GS20-120/SG2A
Depth		100-400
Date Sampled		20/07/2020
Type of sample		Soil
Date extracted	-	29/07/2020
Date analysed	-	31/07/2020
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	107

svTRH (C10-C40) in Soil						
Our Reference		247874-1	247874-2	247874-3	247874-4	247874-5
Your Reference	UNITS	GS20-120/1	GS20-120/2	GS20-120/3	GS20-120/4	GS20-120/5
Depth		100-500	400-700	100-400	100-500	0-600
Date Sampled		20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	70	70	81	76	81

svTRH (C10-C40) in Soil						
Our Reference		247874-6	247874-7	247874-8	247874-9	247874-10
Your Reference	UNITS	GS20-120/6C	GS20-120/7A	GS20-120/B8A	GS20-120/SG9A	GS20-120/SG10A
Depth		700-1000	200-500	0-100	200-500	550-900
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	21/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	80	80	84	69	81

svTRH (C10-C40) in Soil						
Our Reference		247874-11	247874-12	247874-13	247874-14	247874-15
Your Reference	UNITS	GS20-120/SG11A	GS20-120/SG12B	GS20-120/SG13A	GS20-120/SG14A	GS20-120/SG1A
Depth		200-400	600-900	200-500	200-400	100-400
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	79	70	70	77	76

svTRH (C10-C40) in Soil		
Our Reference		247874-16
Your Reference	UNITS	GS20-120/SG2A
Depth		100-400
Date Sampled		20/07/2020
Type of sample		Soil
Date extracted	-	29/07/2020
Date analysed	-	30/07/2020
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	80

PAHs in Soil						
Our Reference		247874-1	247874-2	247874-3	247874-4	247874-5
Your Reference	UNITS	GS20-120/1	GS20-120/2	GS20-120/3	GS20-120/4	GS20-120/5
Depth		100-500	400-700	100-400	100-500	0-600
Date Sampled		20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	110	108	101	100	103

PAHs in Soil						
Our Reference		247874-6	247874-7	247874-8	247874-9	247874-10
Your Reference	UNITS	GS20-120/6C	GS20-120/7A	GS20-120/B8A	GS20-120/SG9A	GS20-120/SG10A
Depth		700-1000	200-500	0-100	200-500	550-900
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	21/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	101	102	103	97	99

PAHs in Soil						
Our Reference		247874-11	247874-12	247874-13	247874-14	247874-15
Your Reference	UNITS	GS20-120/SG11A	GS20-120/SG12B	GS20-120/SG13A	GS20-120/SG14A	GS20-120/SG1A
Depth		200-400	600-900	200-500	200-400	100-400
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	102	110	101	110	97

PAHs in Soil		
Our Reference		247874-16
Your Reference	UNITS	GS20-120/SG2A
Depth		100-400
Date Sampled		20/07/2020
Type of sample		Soil
Date extracted	-	29/07/2020
Date analysed	-	29/07/2020
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	101

Organochlorine Pesticides in soil						
Our Reference		247874-1	247874-2	247874-3	247874-4	247874-5
Your Reference	UNITS	GS20-120/1	GS20-120/2	GS20-120/3	GS20-120/4	GS20-120/5
Depth		100-500	400-700	100-400	100-500	0-600
Date Sampled		20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	112	111	107	111	111

Organochlorine Pesticides in soil						
Our Reference		247874-6	247874-7	247874-8	247874-9	247874-10
Your Reference	UNITS	GS20-120/6C	GS20-120/7A	GS20-120/B8A	GS20-120/SG9A	GS20-120/SG10A
Depth		700-1000	200-500	0-100	200-500	550-900
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	21/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	110	106	105	106	106

Organochlorine Pesticides in soil						
Our Reference		247874-11	247874-12	247874-13	247874-14	247874-15
Your Reference	UNITS	GS20-120/SG11A	GS20-120/SG12B	GS20-120/SG13A	GS20-120/SG14A	GS20-120/SG1A
Depth		200-400	600-900	200-500	200-400	100-400
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	111	105	114	104

Organochlorine Pesticides in soil		
Our Reference		247874-16
Your Reference	UNITS	GS20-120/SG2A
Depth		100-400
Date Sampled		20/07/2020
Type of sample		Soil
Date extracted	-	29/07/2020
Date analysed	-	29/07/2020
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	109

Organophosphorus Pesticides in Soil						
Our Reference		247874-1	247874-2	247874-3	247874-4	247874-5
Your Reference	UNITS	GS20-120/1	GS20-120/2	GS20-120/3	GS20-120/4	GS20-120/5
Depth		100-500	400-700	100-400	100-500	0-600
Date Sampled		20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	112	111	107	111	111

Organophosphorus Pesticides in Soil						
Our Reference		247874-6	247874-7	247874-8	247874-9	247874-10
Your Reference	UNITS	GS20-120/6C	GS20-120/7A	GS20-120/B8A	GS20-120/SG9A	GS20-120/SG10A
Depth		700-1000	200-500	0-100	200-500	550-900
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	21/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	110	106	105	106	106

Organophosphorus Pesticides in Soil						
Our Reference		247874-11	247874-12	247874-13	247874-14	247874-15
Your Reference	UNITS	GS20-120/SG11A	GS20-120/SG12B	GS20-120/SG13A	GS20-120/SG14A	GS20-120/SG1A
Depth		200-400	600-900	200-500	200-400	100-400
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	111	105	114	104

Organophosphorus Pesticides in Soil		
Our Reference		247874-16
Your Reference	UNITS	GS20-120/SG2A
Depth		100-400
Date Sampled		20/07/2020
Type of sample		Soil
Date extracted	-	29/07/2020
Date analysed	-	29/07/2020
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Parathion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1
Surrogate TCMX	%	109

PCBs in Soil						
Our Reference		247874-1	247874-2	247874-3	247874-4	247874-5
Your Reference	UNITS	GS20-120/1	GS20-120/2	GS20-120/3	GS20-120/4	GS20-120/5
Depth		100-500	400-700	100-400	100-500	0-600
Date Sampled		20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	112	111	107	111	111

PCBs in Soil						
Our Reference		247874-6	247874-7	247874-8	247874-9	247874-10
Your Reference	UNITS	GS20-120/6C	GS20-120/7A	GS20-120/B8A	GS20-120/SG9A	GS20-120/SG10A
Depth		700-1000	200-500	0-100	200-500	550-900
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	21/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	110	106	105	106	106

PCBs in Soil						
Our Reference		247874-11	247874-12	247874-13	247874-14	247874-15
Your Reference	UNITS	GS20-120/SG11A	GS20-120/SG12B	GS20-120/SG13A	GS20-120/SG14A	GS20-120/SG1A
Depth		200-400	600-900	200-500	200-400	100-400
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	111	105	114	104

PCBs in Soil		
Our Reference		247874-16
Your Reference	UNITS	GS20-120/SG2A
Depth		100-400
Date Sampled		20/07/2020
Type of sample		Soil
Date extracted	-	29/07/2020
Date analysed	-	29/07/2020
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	109

Acid Extractable metals in soil						
Our Reference		247874-1	247874-2	247874-3	247874-4	247874-5
Your Reference	UNITS	GS20-120/1	GS20-120/2	GS20-120/3	GS20-120/4	GS20-120/5
Depth		100-500	400-700	100-400	100-500	0-600
Date Sampled		20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	22	23	29	29	32
Copper	mg/kg	10	11	10	10	14
Lead	mg/kg	10	14	12	10	10
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	14	22	14	13	22
Zinc	mg/kg	17	29	18	14	23

Acid Extractable metals in soil						
Our Reference		247874-6	247874-7	247874-8	247874-9	247874-10
Your Reference	UNITS	GS20-120/6C	GS20-120/7A	GS20-120/B8A	GS20-120/SG9A	GS20-120/SG10A
Depth		700-1000	200-500	0-100	200-500	550-900
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	21/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	29	27	37	30	21
Copper	mg/kg	12	9	16	11	9
Lead	mg/kg	10	9	12	10	7
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	19	10	94	16	14
Zinc	mg/kg	18	12	34	16	15

Acid Extractable metals in soil						
Our Reference		247874-11	247874-12	247874-13	247874-14	247874-15
Your Reference	UNITS	GS20-120/SG11A	GS20-120/SG12B	GS20-120/SG13A	GS20-120/SG14A	GS20-120/SG1A
Depth		200-400	600-900	200-500	200-400	100-400
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	27	25	25	25	27
Copper	mg/kg	9	11	10	10	9
Lead	mg/kg	10	9	10	8	9
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	14	15	15	10	9
Zinc	mg/kg	14	18	13	11	14

Acid Extractable metals in soil		
Our Reference		247874-16
Your Reference	UNITS	GS20-120/SG2A
Depth		100-400
Date Sampled		20/07/2020
Type of sample		Soil
Date prepared	-	29/07/2020
Date analysed	-	29/07/2020
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	29
Copper	mg/kg	10
Lead	mg/kg	9
Mercury	mg/kg	<0.1
Nickel	mg/kg	10
Zinc	mg/kg	17

Moisture						
Our Reference		247874-1	247874-2	247874-3	247874-4	247874-5
Your Reference	UNITS	GS20-120/1	GS20-120/2	GS20-120/3	GS20-120/4	GS20-120/5
Depth		100-500	400-700	100-400	100-500	0-600
Date Sampled		20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Moisture	%	19	15	12	17	29

Moisture						
Our Reference		247874-6	247874-7	247874-8	247874-9	247874-10
Your Reference	UNITS	GS20-120/6C	GS20-120/7A	GS20-120/B8A	GS20-120/SG9A	GS20-120/SG10A
Depth		700-1000	200-500	0-100	200-500	550-900
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	21/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Moisture	%	19	11	3.3	20	16

Moisture						
Our Reference		247874-11	247874-12	247874-13	247874-14	247874-15
Your Reference	UNITS	GS20-120/SG11A	GS20-120/SG12B	GS20-120/SG13A	GS20-120/SG14A	GS20-120/SG1A
Depth		200-400	600-900	200-500	200-400	100-400
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/07/2020	29/07/2020	29/07/2020	29/07/2020	29/07/2020
Date analysed	-	30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Moisture	%	12	18	17	12	12

Moisture		
Our Reference		247874-16
Your Reference	UNITS	GS20-120/SG2A
Depth		100-400
Date Sampled		20/07/2020
Type of sample		Soil
Date prepared	-	29/07/2020
Date analysed	-	30/07/2020
Moisture	%	14

Asbestos ID - soils						
Our Reference		247874-1	247874-2	247874-3	247874-4	247874-5
Your Reference	UNITS	GS20-120/1	GS20-120/2	GS20-120/3	GS20-120/4	GS20-120/5
Depth		100-500	400-700	100-400	100-500	0-600
Date Sampled		20/07/2020	20/07/2020	20/07/2020	20/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Sample mass tested	g	Approx. 20g	Approx. 30g	Approx. 30g	Approx. 30g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		247874-6	247874-7	247874-8	247874-9	247874-10
Your Reference	UNITS	GS20-120/6C	GS20-120/7A	GS20-120/B8A	GS20-120/SG9A	GS20-120/SG10A
Depth		700-1000	200-500	0-100	200-500	550-900
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	21/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Sample mass tested	g	Approx. 30g	Approx. 35g	Approx. 55g	Approx. 30g	Approx. 25g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		247874-11	247874-12	247874-13	247874-14	247874-15
Your Reference	UNITS	GS20-120/SG11A	GS20-120/SG12B	GS20-120/SG13A	GS20-120/SG14A	GS20-120/SG1A
Depth		200-400	600-900	200-500	200-400	100-400
Date Sampled		21/07/2020	21/07/2020	21/07/2020	21/07/2020	20/07/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/07/2020	30/07/2020	30/07/2020	30/07/2020	30/07/2020
Sample mass tested	g	Approx. 35g	Approx. 30g	Approx. 40g	Approx. 35g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils		
Our Reference		247874-16
Your Reference	UNITS	GS20-120/SG2A
Depth		100-400
Date Sampled		20/07/2020
Type of sample		Soil
Date analysed	-	30/07/2020
Sample mass tested	g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	247874-2
Date extracted	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Date analysed	-			31/07/2020	1	31/07/2020	31/07/2020		31/07/2020	31/07/2020
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	109	83
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	109	83
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	106	82
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	110	86
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	109	81
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	110	82
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	112	83
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	111	1	92	92	0	111	87

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Date analysed	-			[NT]	11	31/07/2020	31/07/2020		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	104	90	14	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	247874-2
Date extracted	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Date analysed	-			30/07/2020	1	30/07/2020	30/07/2020		30/07/2020	30/07/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	91	88
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	87	87
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	92	85
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	91	88
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	87	87
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	92	85
Surrogate o-Terphenyl	%		Org-020	111	1	70	80	13	117	120

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Date analysed	-			[NT]	11	30/07/2020	30/07/2020		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	11	79	68	15	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	247874-2
Date extracted	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Date analysed	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	102
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	90
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	100
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	102
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	88
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	70	70
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	110	102
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	100	1	110	104	6	94	104

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Date analysed	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	102	103	1	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	247874-2
Date extracted	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Date analysed	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	104
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	70	70
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	70	70
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	112
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	112
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	92
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	110
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	72	70
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	108
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	78
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	111	1	112	109	3	106	103

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Date analysed	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	111	108	3	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	247874-2
Date extracted	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Date analysed	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	130	114
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	106
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	110
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	130	128
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	116	112
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	122	116
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	118
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	111	1	112	109	3	106	103

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Date analysed	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	111	108	3	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	247874-2
Date extracted	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Date analysed	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	114	114
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	111	1	112	109	3	106	103

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Date analysed	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	11	111	108	3	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	247874-2
Date prepared	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Date analysed	-			29/07/2020	1	29/07/2020	29/07/2020		29/07/2020	29/07/2020
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	104	81
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	97	97
Chromium	mg/kg	1	Metals-020	<1	1	22	21	5	115	87
Copper	mg/kg	1	Metals-020	<1	1	10	9	11	115	87
Lead	mg/kg	1	Metals-020	<1	1	10	9	11	126	92
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	110	88
Nickel	mg/kg	1	Metals-020	<1	1	14	14	0	116	92
Zinc	mg/kg	1	Metals-020	<1	1	17	17	0	115	74

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Date analysed	-			[NT]	11	29/07/2020	29/07/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	11	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	11	27	32	17	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	11	9	10	11	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	10	14	33	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	11	14	18	25	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	11	14	18	25	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos: A portion of the supplied samples were sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples requested for asbestos testing were sub-sampled from jars provided by the client.

Charles Sturt University

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Aitken Rowe Testing Laboratories P/L

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Wagga Wagga NSW 2650

Attention: Nathan McLaren

Tuesday, August 25, 2020

NATA Accredited Laboratory Number: 9597

Accredited for compliance with ISO/IEC 17025 - Testing

LABORATORY ANALYSIS REPORT

Report Number:2007-0117
Page 1 of 2
For all enquiries related to this report please quote document number: 2007-0117

Facility:

Order # GS20-120

Sample Type
Soil

Collected By
Client

Date Received
30-July-2020

EAL ID	Client ID. / Date/Time sample taken	Test	Result (units)		Method Reference	Limit of Reporting
20Jul-0406	**Q1** 21.07.20					
		Arsenic	**<2**	mg/kg	LTM-S-019	2
		Cadmium	**<0.2**	mg/kg	LTM-S-019	0.2
		Chromium	**37.8**	mg/kg	LTM-S-019	0.2
		Copper	**13.1**	mg/kg	LTM-S-019	0.2
		Lead	**10**	mg/kg	LTM-S-019	1
		Mercury	**<3**	mg/kg	* APHA 3030 E/3120 B	3
		Nickel	**23**	mg/kg	LTM-S-019	1
		Refer to ALS Report Number:	**20-37101**		Analysis by ALS, Melbourne (acc no. 992)	
		Zinc	**24.9**	mg/kg	LTM-S-019	0.2
20Jul-0407	**Q2** 21.07.20					
		Arsenic	**<2**	mg/kg	LTM-S-019	2
		Cadmium	**<0.2**	mg/kg	LTM-S-019	0.2
		Chromium	**32.8**	mg/kg	LTM-S-019	0.2
		Copper	**11.2**	mg/kg	LTM-S-019	0.2
		Lead	**11**	mg/kg	LTM-S-019	1
		Mercury	**<3**	mg/kg	* APHA 3030 E/3120 B	3
		Nickel	**13**	mg/kg	LTM-S-019	1
		Refer to ALS Report Number:	**20-37101**		Analysis by ALS, Melbourne (acc no. 992)	
		Zinc	**21.8**	mg/kg	LTM-S-019	0.2
20Jul-0408	**A1** 21.07.20					

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Attention: Nathan McLaren

Tuesday, August 25, 2020

NATA Accredited Laboratory Number: 9597

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LABORATORY ANALYSIS REPORT

Report Number:2007-0117
Page 2 of 2
For all enquiries related to this report please quote document number: 2007-0117

Facility:

Order # GS20-120

Sample Type
Soil

Collected By
Client

Date Received
30-July-2020

EAL ID	Client ID. / Date/Time sample taken	Test	Result (units)		Method Reference	Limit of Reporting
20Jul-0408	**A1** 21.07.20					
		Conductivity (1:5 soil/water)	**118**	µS/cm	LTM-S-003	1
		pH (1:5 soil/water)	**6.9**	pH units	LTM-S-004	
20Jul-0409	**A2** 21.07.20					
		Conductivity (1:5 soil/water)	**105**	µS/cm	LTM-S-003	1
		pH (1:5 soil/water)	**6.7**	pH units	LTM-S-004	

Note:

**** NATA Accreditation does not cover the performance of this service.***

Signed ..... Michael Glazier, Laboratory Manager.

All samples analysed as received.
All soil results are reported on a dry basis.
The EAL takes no responsibility for the end use of results within this report.
This report shall not be reproduced except in full.
This report replaces any previously issued report

TABLE 4.3.2(A)

WEIGHTING FACTORS AND INDIVIDUAL RISK RATINGS FOR RISK FACTORS

Risk factor	Weighting factor (w_i)	Typical description of risk circumstances for individual risk rating (IRR)		
		1 (Very low risk)	3 (Moderate)	5 (Very high risk)
Site				
Geological complexity of site	2	Horizontal strata, well-defined soil and rock characteristics	Some variability over site, but without abrupt changes in stratigraphy	Highly variable profile or presence of karstic features or steeply dipping rock levels or faults present on site, or combinations of these
Extent of ground investigation	2	Extensive drilling investigation covering whole site to an adequate depth	Some boreholes extending at least 5 pile diameters below the base of the proposed pile foundation level	Very limited investigation with few shallow boreholes
Amount and quality of geotechnical data	2	Detailed information on strength compressibility of the main strata	CPT probes over full depth of proposed piles or boreholes confirming rock as proposed founding level for piles	Limited amount of simple in situ testing (e.g., SPT) or index tests only
Design				
Experience with similar foundations in similar geological conditions	1	Extensive	Limited	None
Method of assessment of geotechnical parameters for design	2	Based on appropriate laboratory or in situ tests or relevant existing pile load test data	Based on site-specific correlations or on conventional laboratory or in situ testing	Based on non-site-specific correlations with (for example) SPT data
Design method adopted	1	Well-established and soundly based method or methods	Simplified methods with well-established basis	Simple empirical methods or sophisticated methods that are not well established
Method of utilizing results of in situ test data and installation data	2	Design values based on minimum measured values on piles loaded to failure	Design methods based on average values	Design values based on maximum measured values on test piles loaded up only to working load, or indirect measurements used during installation, and not calibrated to static loading tests
Installation				
Level of construction control	2	Detailed with professional geotechnical supervision, construction processes that are well established and relatively straightforward	Limited degree of professional geotechnical involvement in supervision, conventional construction procedures	Very limited or no involvement by designer, construction processes that are not well established or complex
Level of performance monitoring of the supported structure during and after construction	0.5	Detailed measurements of movements and pile loads	Correlation of installed parameters with on-site static load tests carried out in accordance with this Standard	No monitoring

NOTE: The pile design shall include the risk circumstances for each individual risk category and consideration of all of the relevant site and construction factors.

CIRCLY - Version 7.0 (16 July 2020)

Job Title: GS20-120 Proposed West End Sports Oval Precint, Merrigal Street, Griffith, NSW

Design Method: Austroads 2017

NDT (cumulative heavy vehicle axle groups over design period): 1.87E+05

Traffic Load Distribution:

ID: LTR - O5
Name: Lightly-Trafficked Roads - O5 - local access with no buses
ESA/HVAG: 0.267

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/ Ref. stress	Exponent
1	ESA750-Full	ESA750-Full	Vertical Force	92.1	0.75	0.00
2	SAST53	SAST53	Vertical Force	102.4	0.80	0.00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA750-Full	1	-165.0	0.0	1.00E+00	0.00
2	ESA750-Full	1	165.0	0.0	1.00E+00	0.00
3	ESA750-Full	1	1635.0	0.0	1.00E+00	0.00
4	ESA750-Full	1	1965.0	0.0	1.00E+00	0.00
1	SAST53	1	0.0	0.0	1.00E+00	0.00
2	SAST53	1	2130.0	0.0	1.00E+00	0.00

Details of Layered System:

ID: GS20-120 Title: Carpark Area, Proposed West End Sports Oval Precinct, Griffith, NSW

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	Gran_200	Aniso.	2.00E+02	0.35	1.48E+02	1.00E+02	0.35
2	rough	Gran_200	Aniso.	2.00E+02	0.35	1.48E+02	1.00E+02	0.35
3	rough	Sub_CBR4	Aniso.	4.00E+01	0.45	2.76E+01	2.00E+01	0.45

Performance Relationships:

Layer No.	Location	Material ID	Component	Perform. Constant	Perform. Exponent	Shift Factor
3	top	Sub_CBR4	EZZ	0.009150	7.000	

Reliability Factors:
Project Reliability: Austroads 95%

Layer No.	Reliability Factor	Material Type
3	1.00	Subgrade (Austroads 2017)

Details of Layers to be sublayered:
Layer no. 1: Austroads (2004) sublayering
Layer no. 2: Austroads (2004) sublayering

Strains:

Layer No.	Thickness	Material ID	Axle	Unitless Strain
3	0.00	Sub_CBR4		
			SADT(80):	1.956E-03

Results:

Layer No.	Thickness	Material ID	Axle Group	CDF
1	150.00	Gran_200		n/a
2	200.00	Gran_200		n/a
3	0.00	Sub_CBR4	Total:	1.018E+00

CIRCLY - Version 7.0 (16 July 2020)

Job Title: GS20-120 Proposed West End Sports Oval Precint, Merrigal Street, Griffith, NSW

Design Method: Austroads 2017

NDT (cumulative heavy vehicle axle groups over design period): 1.87E+05

Traffic Load Distribution:

ID: LTR - O5
Name: Lightly-Trafficked Roads - O5 - local access with no buses
ESA/HVAG: 0.267

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/ Ref. stress	Exponent
1	ESA750-Full	ESA750-Full	Vertical Force	92.1	0.75	0.00
2	SAST53	SAST53	Vertical Force	102.4	0.80	0.00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA750-Full	1	-165.0	0.0	1.00E+00	0.00
2	ESA750-Full	1	165.0	0.0	1.00E+00	0.00
3	ESA750-Full	1	1635.0	0.0	1.00E+00	0.00
4	ESA750-Full	1	1965.0	0.0	1.00E+00	0.00
1	SAST53	1	0.0	0.0	1.00E+00	0.00
2	SAST53	1	2130.0	0.0	1.00E+00	0.00

Details of Layered System:

ID: GS20-120 Title: Carpark Area, Proposed West End Sports Oval Precinct, Griffith, NSW

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	Gran_200	Aniso.	2.00E+02	0.35	1.48E+02	1.00E+02	0.35
2	rough	Gran_150	Aniso.	1.50E+02	0.35	1.11E+02	7.50E+01	0.35
3	rough	Sub_CBR4	Aniso.	4.00E+01	0.45	2.76E+01	2.00E+01	0.45

Performance Relationships:

Layer No.	Location	Material ID	Component	Perform. Constant	Perform. Exponent	Shift Factor
3	top	Sub_CBR4	EZZ	0.009150	7.000	

Reliability Factors:
Project Reliability: Austroads 95%

Layer No.	Reliability Factor	Material Type
3	1.00	Subgrade (Austroads 2017)

Details of Layers to be sublayered:
Layer no. 1: Austroads (2004) sublayering
Layer no. 2: Austroads (2004) sublayering

Strains:

Layer No.	Thickness	Material ID	Axle	Unitless Strain
3	0.00	Sub_CBR4		
			SADT(80):	1.962E-03

Results:

Layer No.	Thickness	Material ID	Axle Group	CDF
1	175.00	Gran_200		n/a
2	175.00	Gran_150		n/a
3	0.00	Sub_CBR4	Total:	1.041E+00

CIRCLY - Version 7.0 (16 July 2020)

Job Title: GS20-120 Proposed West End Sports Oval Precint, Merrigal Street, Griffith, NSW

Design Method: Austroads 2017

NDT (cumulative heavy vehicle axle groups over design period): 1.87E+05

Traffic Load Distribution:

ID: LTR - O5
Name: Lightly-Trafficked Roads - O5 - local access with no buses
ESA/HVAG: 0.267

Details of Load Groups:

Load No.	Load ID	Load Category	Load Type	Radius	Pressure/ Ref. stress	Exponent
1	ESA750-Full	ESA750-Full	Vertical Force	92.1	0.75	0.00
2	SAST53	SAST53	Vertical Force	102.4	0.80	0.00

Load Locations:

Location No.	Load ID	Gear No.	X	Y	Scaling Factor	Theta
1	ESA750-Full	1	-165.0	0.0	1.00E+00	0.00
2	ESA750-Full	1	165.0	0.0	1.00E+00	0.00
3	ESA750-Full	1	1635.0	0.0	1.00E+00	0.00
4	ESA750-Full	1	1965.0	0.0	1.00E+00	0.00
1	SAST53	1	0.0	0.0	1.00E+00	0.00
2	SAST53	1	2130.0	0.0	1.00E+00	0.00

Details of Layered System:

ID: GS20-120 Title: Carpark Area, Proposed West End Sports Oval Precinct, Griffith, NSW

Layer No.	Lower i/face	Material ID	Isotropy	Modulus (or Ev)	P.Ratio (or vvh)	F	Eh	vh
1	rough	Gran_200	Aniso.	2.00E+02	0.35	1.48E+02	1.00E+02	0.35
2	rough	subsltCB10	Aniso.	1.00E+02	0.45	6.90E+01	5.00E+01	0.45
3	rough	Sub_CBR4	Aniso.	4.00E+01	0.45	2.76E+01	2.00E+01	0.45

Performance Relationships:

Layer No.	Location	Material ID	Component	Perform. Constant	Perform. Exponent	Shift Factor
2	top	subsltCB10	EZZ	0.009150	7.000	
3	top	Sub_CBR4	EZZ	0.009150	7.000	

Reliability Factors:
Project Reliability: Austroads 95%

Layer No.	Reliability Factor	Material Type
2	1.00	Subgrade (Selected Material) (Austroads 2017)
3	1.00	Subgrade (Austroads 2017)

Details of Layers to be sublayered:
Layer no. 1: Austroads (2004) sublayering
Layer no. 2: Austroads (2004) sublayering

Strains:

Layer No.	Thickness	Material ID	Axle	Unitless Strain
2	250.00	subsltCB10		
			SADT(80):	1.882E-03
			SAST(53):	2.318E-03
3	0.00	Sub_CBR4		
			SADT(80):	1.471E-03

Results:

Layer No.	Thickness	Material ID	Axle Group	CDF
1	200.00	Gran_200		n/a
2	250.00	subsltCB10	Total:	7.788E-01
			SAST:	0.000E+00
			SADT:	0.000E+00
			TAST:	0.000E+00
			TADT:	0.000E+00
			TRDT:	0.000E+00
			QADT:	0.000E+00
3	0.00	Sub_CBR4	Total:	1.387E-01