Appendix D

Tailings storage facility definitive feasibility study

REGIS RESOURCES LTD

REPORT

LFB Resources NL

McPhillamys Gold Project

Blayney, NSW

Tailings Storage Facility Definitive Feasibility Study

Date: July 2019

Report Number: 113272-02R002

Document History and Status

Title:

Job Number/Extension: 113272.02

Document Number: 113272-02R002

Project Office: Brisbane

File Path: M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Reports\R02\Text\113272-02R002.docx

Author: Hubert Ayanu

Reviewer:

Job Manager: Ralph Holding

Rev.	Status	Issued to	Issue Date	Signatures	
				Author	Reviewer
A	Working Draft Issue	Rod Smith	10/08/2018	RH	
B	Working Draft Issue	Rod Smith	16/01/2019	RH	
C	Working Draft Issue	Rod Smith	28/02/2019	RH	
D	Working Draft Issue	Rod Smith	20/03/19	RH	
E	For Review	Rod Smith	20/06/19	RH	HJ
F	For Review Revised	Rod Smith	02/07/2019	RH	HJ
G	Final	Rod Smith	09/07/19	RH	HJ

This Revision distributed To:	Hard Copy	Electronic Copy
Regis Resources Ltd		☑
ATCW Brisbane Office		On network

RALPH HOLDING
Author

HENDRA JITNO
Reviewer

IMPORTANT NOTICE

Please refer to our Conditions of Investigation and Report

ATC Williams Pty Ltd
ABN 64 005 931 288
Melbourne T: +61 3 8587 0900 Perth T: +61 8 9213 1600 Brisbane T: +61 7 3352 7222
www.atcwilliams.com.au

CONSULT AUSTRALIA
Member Firm

CONDITIONS OF INVESTIGATION AND REPORT

Conditions of Report

1. This report has been prepared by us for the purposes stated herein. We do not accept responsibility for the consequences of extrapolation, extension or transference of the findings and recommendations of this report to different sites, cases or conditions.

2. This report is based in part on information which was provided to us by the client and/or others and which is not under our control. We do not warrant or guarantee the accuracy of this information.

3. We believe the conclusions and recommendations contained herein were reasonable and appropriate at the time of issue of the report. However, the user is cautioned that fundamental input assumptions upon which this report is based may change with time. It is the user's responsibility to ensure that input assumptions remain valid.

4. This report must be read in its entirety. This notice constitutes an integral part of the report, and must be reproduced with every copy.

5. This report is prepared solely for the use of the person or company to whom it is addressed. No responsibility or liability to any third party is accepted for any damages howsoever arising out of the use of this report by any third party.

6. Unless specifically agreed otherwise in the contract of engagement, ATC Williams retains Intellectual Property Rights over the contents of this report. The client is granted a licence to use the report for the purposes for which it was commissioned.

Geotechnical Investigation

7. Geotechnical site investigation necessarily involves the investigation of the subsurface conditions at a site at a few isolated locations, and the interpretation and extrapolation of those conditions to elsewhere on the site not so investigated. This procedure has been adopted at the site that is the subject of this report and due care and skill has been applied in carrying out and reporting on the work. Thus the findings, conclusions and comments contained in this report represent professional estimates and opinions and are not to be read as facts unless the context makes it clear to the contrary. In general, statements of fact are confined to statements as to what was done and/or what was observed. Other statements have been based on professional judgement.

8. The scope of the work has been planned in the absence of any fore-knowledge of the site other than that stated in the report. Unless otherwise stated we consider that the number of locations investigated and the depths to which they have been investigated are reasonable bearing in mind the scale and nature of the project, and the defined purpose for which the investigation was undertaken.

9. We do not accept any responsibility for any variance between the interpreted and extrapolated conditions and those that are revealed by any means subsequently. Specific warning is also given that many factors, either natural or artificial, may render ground conditions different from those which pertained at the time of the investigation. Should there be revealed during the construction or at any other time any apparent difference from subsurface conditions described or assessed in this report, it is strongly recommended that such differences be brought to our attention so that its significance may be assessed and appropriate advice given.

ATC Williams

TABLE OF CONTENTS

1 INTRODUCTION 1
1.1 Overview 1
1.2 Project Overview 1
1.3 Assessment Requirements 6
1.1 Scope and Report Structure 8

2 LOCALITY AND PROJECT SETTING 11

3 TSF DEVELOPMENT PROPOSAL 12
3.1 General 12
3.2 Relevant Aspects of the Mine Schedule 12
3.2.1 Tailings Production 12
3.2.2 Waste Rock Production 12
3.3 TSF Options Assessment 12
3.3.1 Tailings Disposal Options 12
3.3.2 TSF Siting Assessment Overview 13
3.3.3 TSF Siting Assessment Methodology 17
3.3.4 TSF Siting Assessment Outcomes 17
3.3.5 Preferred TSF Siting Area 22
3.3.6 Preferred TSF 24
3.4 TSF Concept Description 25
3.4.1 Proposed TSF Site Area 25
3.4.2 TSF Development Concept General Description 25
3.5 TSF Arrangement 27
3.5.1 TSF Capacity 27
3.5.2 Description of TSF Development 27
3.5.3 TSF Decant 29
3.5.4 Seepage Interception System 29
3.5.5 Earth Fill Borrow Areas 30

4 ENGINEERING CRITERIA FOR TSF DEVELOPMENT 31
4.1 Context 31
4.1.1 Standards and Guidelines 31
4.1.2 TSF Consequence Category 32
4.1.3 Operational Philosophy 33
4.2 Engineering Criteria 33
4.2.1 TSF Storage Capacity 33
4.2.2 Hydraulics and Performance Criteria 33
4.2.3 Embankment Stability 34
4.2.4 Seepage Management 35
4.2.4.1 Background 35
4.2.4.2 Alternative Approach 35
4.2.5 Construction Materials 36
4.2.5.1 Embankment Construction 36
4.2.6 Operational Criteria 37
4.2.6.1 Decant/Return Water Quality 37
4.2.6.2 Seepage Management 37

5 DESIGN BACKGROUND 39

5.1 Hydrological (Rainfall) Conditions 39
5.1.1 Hydro-meteorological Conditions 39
5.1.2 Rainfall Intensity Frequency Duration Data 40
5.1.3 Probable Maximum Precipitation (PMP) 41
5.2 Site Geology 42
5.2.1 Geological Setting 42
5.2.2 Geology and Structure 43
5.3 Subsurface Conditions within TSF Area 44
5.3.1 Site Investigation Interpretation 44
5.3.2 Geophysical Interpretation 46
5.4 Groundwater Occurrence and In-situ Permeabilities 47
5.4.1 General Description 47
5.4.2 TSF Permeability Testing 48
5.5 Geotechnical Conditions 51
5.5.1 Soil Classification Test Results 51
5.5.2 Permeability and Strength Test Results 54
5.5.3 Inferred Geotechnical Characteristics 55
5.6 Seismic Risk 56
5.6.1 Regional Context 56
5.6.2 Seismicity of TSF Site 56
5.7 Tailings Characterisation and Associated Design Implications 58
5.7.1 Physical Characteristics 58
5.7.2 Tailings Settled Densities 58
5.7.3 Beach Slopes 58
5.7.4 Permeability 58
5.7.5 Tailings Seepage Geochemistry 59

6 TSF WATER MANAGEMENT 61
6.1 Background and Strategy 61
6.2 TSF Catchment Delineation 61
6.3 Operational Freeboard Requirements 62
6.3.1 Freeboard Requirement Discussion 63
6.4 Emergency Spillway 63
6.5 Tailings Consolidation Assessment 63
6.5.1 Model Development 63
6.5.2 Results of Analysis 64

7 ENGINEERING ANALYSES 66
7.1 Seepage Controls Assessment 66
7.1.1 Preface 66
7.1.2 Seepage Control Options 66
7.1.3 Seepage Model Setup 67
7.1.4 Seepage Controls Model Results 69
7.1.5 Addressing EPA Guidelines and Seepage Controls Adopted 74
7.1.6 Conceptual TSF Seepage Response 74
7.2 TSF Seepage Rates Estimation (Transient Modelling) 76
7.2.1 Model Description 76
7.2.2 Model Results 77
7.3 TSF Embankment Design 78
7.3.1 Scope 78
7.3.2 Seepage Analysis 79
7.3.2.1 Phreatic Surface for Proposed Arrangement 79
7.3.3 TSF Embankment Stability Analyses 80

7.2 Emergency Spillway Sizing 83
7.2.1 Methodology and Contributing Catchment 83
7.2.2 Design Analysis 83
7.2.3 Spillway Analysis and Results 83
7.3 Flood Assessment 84

8 TSF CONSTRUCTION ASPECTS 85
8.1 Typical Construction Approach 85
8.1.1 Preparation Works 85
8.1.1.1 Installation of erosion and sediment control Measures 85
8.1.1.2 Decommissioning of bores within the TSF area 85
8.1.1.3 Site clearing and topsoil stripping 85
8.1.2 Foundation Works 85
8.1.2.1 General Subexcavation 85
8.1.2.1 Cut-Off Key Excavation 85
8.1.3 Earthworks 86
8.1.3.1 Clay Fill 86
8.1.3.2 Rock Fill 87
8.1.3.3 Select Rock Fill 88
8.1.4 Storage Lining 88
8.2 Construction Materials Schedule – Bill of Quantities 89
8.3 Erosion and Sediment Control Planning 90
8.3.1 Aims 90
8.3.2 Construction Activities and Sequencing 91
8.3.3 Erosion Control 92
8.3.4 Sediment Control 93
8.4 Construction Quality Assurance (QA) 93
8.4.1 Foundation Preparations 93
8.4.2 Embankment Earthworks 93

9 OPERATIONS AND CLOSURE ASPECTS 95
9.4.1 Preface 96

10 SURVEILANCE AND MONITORING OF TSF 100

REFERENCES 101

TABLES

Table 1 Technical Assessment (TSF) Related SEARs 6
Table 2 Agency Project Specific Assessment Requirements 7
Table 3 TSF Options Assessment Summary 17
Table 4 Development Schedule for LoM - TSF Development 27
Table 5 Consequence Category Assessment (reproduced from DSC3F – Table 2) 32
Table 6 Rainfall and Evaporation for the Site (Extracted from SILO Data Drill from 1970) 39
Table 7 Rainfall Intensity Frequency Duration Rainfall Depth (mm) for McPhillamys (Ref.: BOM Australia) 40
Table 8 PMP Rainfall in mm for McPhillamys Site 42
Table 9 Summary of Site Stratigraphy 46
Table 10 Summary of Field (Insitu) Permeability Test Results 50
Table 11 Summary Results of Laboratory Testwork 52
Table 12 Summary Results of CU Testing 54
Table 13 Summary Results of Borehole Testing 54
Table 14 Representative Physical Characteristics of Tailings 58
Table 15 DSC3F Operational Freeboard Requirements and Freeboard Determination 63
Table 16 Mass Balance Assessment Data 64
Table 17 Mass Balance Results 65
Table 18 Permeability Values used in Seepage Analyses 68
Table 19 Seepage Analyses 70
Table 20 Justification for Alternative Leachate Barrier EPA (2015) 76
Table 21 General Construction Material Types for TSF 79
Table 22 Material Parameters Adopted for Stability Analyses 81
Table 23 Results of Stability Analyses 81
Table 24 Emergency Spillway Sizing – Adopted Configurations 83
Table 25 Spillway Sizing – Critical Design Outcomes 84
Table 26 Construction Material Types 86
Table 27 Construction Bill of Quantities 89
Table 28 Erosion and Sediment Control Activity Sequencing 91
Table 29 Erosion Mitigation Strategies 92

PLATES

Plate 1 Project Application Area – Regional Setting 3
Plate 2 Mine Development Project Area 5
Plate 3 TSF Options Assessed 14
Plate 4 TSF Options Area 1 15
Plate 5 TSF Options Area 2 15
Plate 6 TSF Options Area 3 16
Plate 7 TSF Options Area 4 16
Plate 8 TSF Area 1 Option Single Embankment 22
Plate 9 TSF Area 1 Option Embankment Located to the North 23
Plate 10 TSF Area 1 Stepped Embankments 24
Plate 11 Proposed McPhillamys TSF 25
Plate 12 TSF Storage Curve 28
Plate 13 TSF Rate of Rise[1] 29
Plate 14 TSF Freeboard Requirements (Source DSC3F) 34
Plate 15 Average Annual Rainfall and Evaporation for McPhillamys Site 39
Plate 16 Design Rainfall Depth Graph for McPhillamys 41
Plate 17 Regional Geology Map Extract (Reference French et al 2015) 43
Plate 18 TSF Geology Map 44
Plate 19 TSF Geotechnical Investigation Plan 45
Plate 20 Regional Permeabilities (Based on Groundwater Assessment, EIS Appendix K) 48
Plate 21 TSF Soil Zone Permeability Testing Results 49
Plate 22 TSF Soil Zone Laboratory Permeability Testing Results 49
Plate 23 TSF Weathered Basement Permeability Testing 50
Plate 24 Australia 500 Year Peak Ground Acceleration Hazard Map (source: Geoscience Australia) 57
Plate 25 McPhillamys TSF – Catchment Delineation 62
Plate 26 Mass Water and Materials Balance Results 65
Plate 27 Seepage Controls Model Configuration 69
Plate 28 Seepage Management Options Assessment Results 71
Plate 29 Seepage Management Options Assessment Results TSF Stage Sensitivity 72
Plate 30 Seepage Management Options Assessment Results Basement Permeability Sensitivity 72
Plate 31 TSF Conceptual Seepage (Source EMM, 2019) 75
Plate 32 Transient Seepage Model Configuration 77
Plate 33 Transient Seepage Model Results 78
Plate 34 Seepage Results (Total Head Contours) 80
Plate 35 Stability Result (Steady State) 82
Plate 36 Stability Results (Seismic Case) 83
Plate 37 Water Elevation Above Emergency Spillway Invert 84
Plate 38 Suggested Capping Arrangement (source: Global Acid Rock Drainage Guide, INAP) 97
Plate 39 Conceptual TSF Capping Arrangement 99

DRAWINGS

Drawing 101	Site Locality Plan and Drawing List
Drawing 102	Project Layout
Drawing 103	TSF Stage 1 Layout
Drawing 104	TSF Stage 2 Layout
Drawing 105	TSF Stage 3 Layout
Drawing 106	TSF Life of Mine Layout
Drawing 107	TSF Stage 1 Layout Detail
Drawing 108	TSF Stage 1 Main Embankment Construction
Drawing 109	TSF Stage 2 Layout Detail
Drawing 110	TSF Stage 3 Layout Detail
Drawing 111	TSF Stage 3 Final Landform
Drawing 112	TSF Sections
Drawing 113	TSF Sections and Seepage Details
Drawing 114	TSF Sections and Details
Drawing 115	TSF Instrumentation Layout and Details
Drawing 116	TSF Post Closure Layout
Drawing 117	TSF Post Closure Detail

APPENDICES

Appendix A	-	TSF Geotechnical Investigation
Appendix B	-	Tailings Laboratory Testing
Appendix C	-	GeoStudio Modelling Results

1 INTRODUCTION

1.1 Overview

LFB Resources NL is seeking development consent for the construction and operation of the McPhillamys Gold Project (the project), a greenfield open cut gold mine and water supply pipeline in the Central West of New South Wales (NSW). The project application area is illustrated at a regional scale in **Plate 1**.

As shown in **Plate 1**, the McPhillamys Gold Project comprises two key components; the mine site where the ore will be extracted, processed and gold produced for distribution to the market (the mine development), and an associated water pipeline which will enable the supply of water from approximately 90 km away near Lithgow to the mine site (the pipeline development). This Tailings Storage Facility (TSF) Definitive Feasibility Study is associated with the mine development component of the McPhillamys Gold Project. References to 'the project' throughout this report are therefore referring to the mine development only.

LFB Resources NL is a 100% owned subsidiary of Regis Resources Limited (referred to from now on as Regis). The mine development project boundary (referred to from now on as the project area) is illustrated in **Plate 2**. The mine development is approximately 8 km north-east of Blayney, within the Blayney and Cabonne local government areas (LGAs). The project is in the upper reaches of the Belubula River catchment, within the greater Lachlan River catchment

This Tailings Storage Facility (TSF) Definitive Feasibility Study report forms part of the EIS. It documents the assessment methods, results and the initiatives built into the project design to avoid and minimise TSF impacts, and the additional mitigation and management measures proposed to address residual impacts which cannot be avoided.

1.2 Project Overview

A full project description is provided in Chapter 2 of the EIS (EMM 2019). The key components of the project are as follows:

- Development and operation of an open cut gold mine, comprising approximately one to two years of construction, approximately 10 years of mining and processing and a closure period (including the final rehabilitation phase) of approximately three to four years, noting there may be some overlap of these phases. The total project life for which approval is sought is 15 years.
- Development and operation of a single circular open cut mine with a diameter of approximately 1,050 metres (m) and a final depth of approximately 460 m, developed by conventional open cut mining methods encompassing drill, blast, load and haul operations. Up to 8.5 Million tonnes per annum (Mtpa) of ore will be extracted during the project life.
- Construction and use of a conventional carbon-in-leach processing facility with an approximate processing rate of 7 Mtpa to produce up to 200,000 ounces per annum of product gold. The processing facility will comprise a run-of-mine (ROM) pad and crushing, grinding, gravity, leaching, gold recovery, tailings thickening, cyanide destruction and tailings management circuits. Product gold will be taken off-site to customers via road transport.

- Placement of waste rock into a waste rock emplacement which will include encapsulation of material with the potential to produce a low pH leachate. A portion of the waste rock emplacement will be constructed and rehabilitated early in the project to act as an amenity bund.
- Construction and use of an engineered tailings storage facility (TSF) to store tailings material.
- Construction and operation of associated mine infrastructure including:
  - administration buildings and bathhouse;
  - workshop and stores facilities, including associated plant parking, laydown and hardstand areas, vehicle washdown facilities, and fuel and lubricant storage;
  - internal road network;
  - explosives magazine and ammonium nitrate emulsion storage facilities;
  - topsoil, subsoil and capping stockpiles;
  - ancillary facilities, including fences, access roads, car parking areas and communications infrastructure; and
  - on-site laboratory.
- Establishment and use of a site access road and intersection with the Mid Western Highway.
- Construction and operation of water management infrastructure, including water storages, clean water and process water diversions and sediment control infrastructure.
- A peak construction workforce of approximately 710 full-time equivalent (FTE) workers. During operations, an average workforce of around 260 FTE employees will be required, peaking at approximately 320 FTEs in around years four and five of the project.
- Construction and operation of a water supply pipeline approximately 90 km long from Centennial's Angus Place and SCSO; and EA's MPPS operations near Lithgow to the mine project area. The pipeline development will include approximately 4 pumping station facilities, a pressure reducing system and communication system. Approximately 13 ML/day (up to a maximum of 16 ML/day) will be transferred for mining and processing operations.
- Development of a water supply for use during construction.
- Environmental management and monitoring equipment.
- Progressive rehabilitation throughout the mine life. At the end of mining, mine infrastructure will be decommissioned, and disturbed areas will be rehabilitated to integrate with natural landforms as far as practicable consistent with relevant land use strategies of the relevant local government areas (LGAs).

Plate 1
Project Application Area – Regional Setting

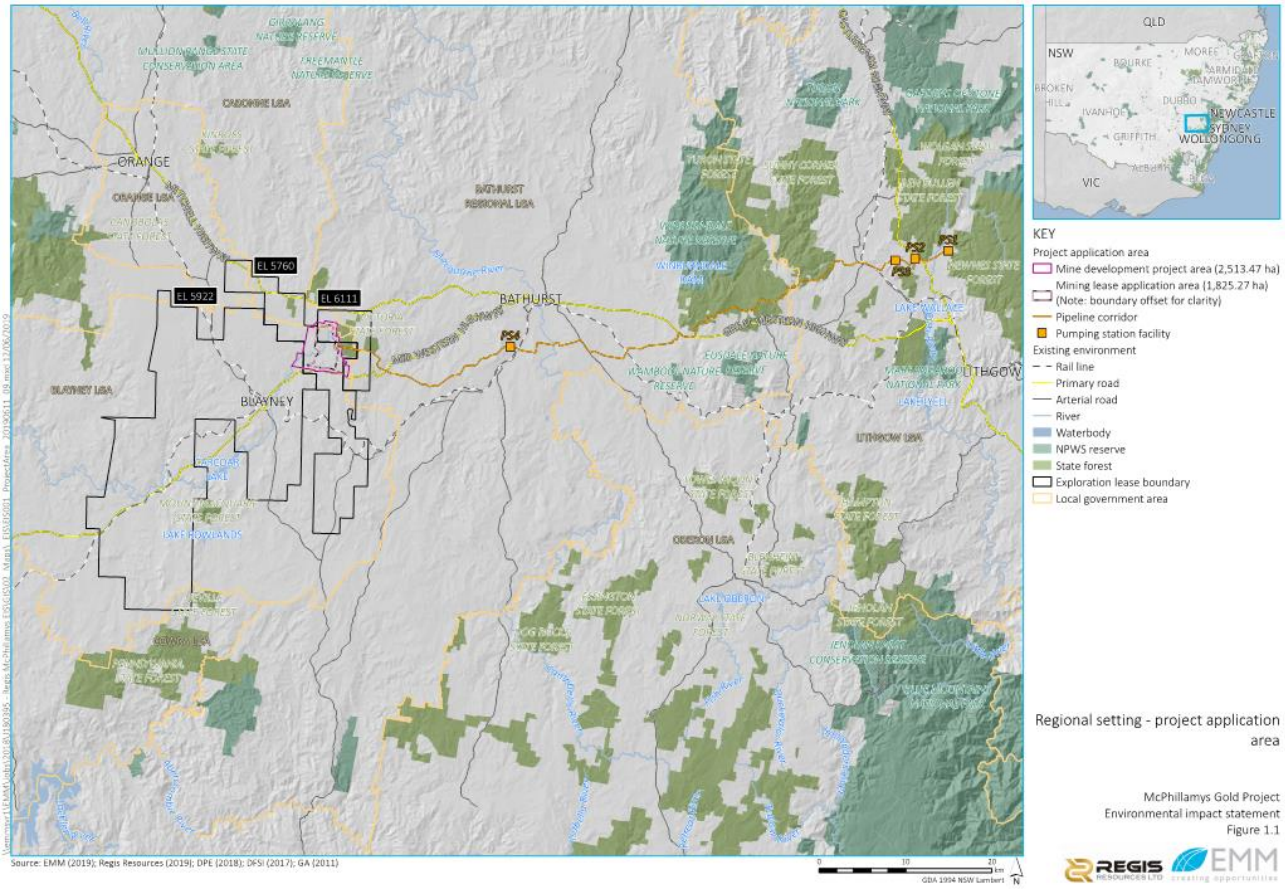
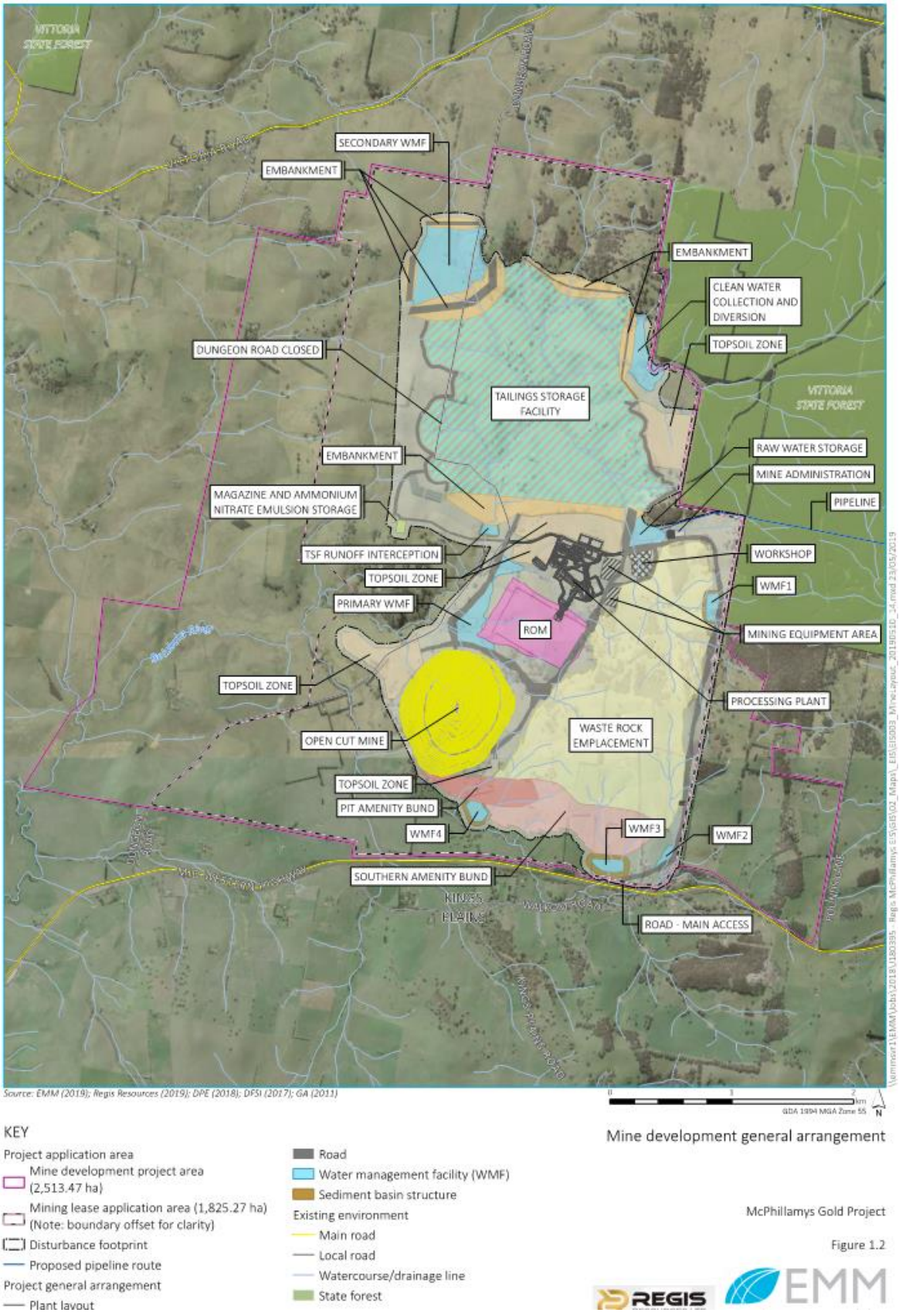


Plate 2
Mine Development Project Area



1.3 Assessment Requirements

This TSF Definitive Feasibility Study has been prepared following the appropriate guidelines, policies and industry requirements, and following consultation with stakeholders including community members and relevant government agencies.

Guidelines and policies referenced are as follows:

- DSC1B Background to DSC Risk Policy Context, NSW DSC (2010)
- DSC3A Consequence Categories for Dams, NSW DSC (2010)
- DSC3B Acceptable Flood Capacity for Dams, NSW DSC (2010)
- DSC3C Acceptable Earthquake Capacity for Dams, NSW DSC (2010)
- DSC3G General Dam Safety Considerations, NSW DSC (2010)
- DSC3G General Dam Safety Considerations, NSW DSC (2010)
- DSC3F Tailings Dams, NSW DSC (2012)
- ANCOLD Guidelines on Tailings Dams, ANCOLD (2012)
- ANCOLD Design Guidelines for Earthquakes (1998)
- ANCOLD Guidelines on Risk Assessment (2003)
- ANCOLD Guidelines on Selection of Acceptable Flood Capacity for Dams, ANCOLD (2000)
- DFAT Tailings Management Leading Practice Sustainable Development Program for the Mining Industry, Department of Foreign Affairs and Trade (2016)
- EPA Tailings Dam Liner Policy, EPA (2017)
- EPA Guideline for Solid Waste Landfills, EPA (2015)

This assessment has been prepared in accordance with requirements of the NSW Department of Planning and Environment (DPE). These were set out in DPE's Environmental Assessment Requirements (EARs) for the Project, issued on 24 July 2018 and revised on 19 December 2018. The EARs identify matters which must be addressed in the EIS and essentially form its terms of reference. Table 1.1 lists individual requirements relevant to this TSF Definitive Feasibility Study and where they are addressed in this report.

Table 1
Technical Assessment (TSF) Related SEARs

Requirement	Section Addressed
• a waste (overburden, tailings, etc.) management strategy	9.1-9.3
• A tailings risk assessment based on the tailings composition and identification, quantification and classification of the potential waste streams likely to be generated during construction and operation, including and not limited to non-production waste, reagent materials and cyanide compounds	4.1.2
• Description of the measures to be implemented to store manage, reuse, recycle and safely dispose of these materials in accordance with the *Protection of the Environment Operations (Waste) Regulation 2014*, including and not limited to operational water by-products, adequate spill detection and clean up systems, suitable locations for disposal or reuse or spoil generated during construction.	Sections 3,6,9

To inform the preparation of the EARs, DPE invited other government agencies to recommend matters to be address in the EIS. These matters were taken into account by the Secretary for DPE when preparing the EARs. Copies of the government agencies' advice to DPE were attached to the EARs.

NSW Environment Protection Authority (EPA) and Department of Industry Division of Water (DOI Water) raised matters relevant to the TSF assessment. The matters raised are listed in **Table 2**, and have been taken into account in preparing this assessment, as indicated in the table.

Table 2
Agency Project Specific Assessment Requirements

Agency Project Specific Assessment Requirement	Section Addressed
• An assessment of risk and potential impacts to downstream surface and ground water users and the environment due to the proposed location of a Tailings Storage Facility (TSF) on the headwaters of the Belubula River. The ability to effectively monitor and apply mitigation measures to potential impacts is of critical concern due to no buffer between the TSF and the watercourse and the potential for interaction with the fractured groundwater system which increases the uncertainty of flow paths. The risk assessment should clearly identify the users and the water source at risk and consider the ability to rehabilitate if seepage/TSF failure occurs and the associated time period.	3.3, 7.1 and 7.2 and EIS Appendix K
• The EPA has a Tailings Dam Liner Policy 2016 (the tailings dam policy), the tailings dam policy adopts a benchmark requirement for TSF liners to achieve a hydraulic conductivity of $1x10^{-9}$·m/s or less utilising a constructed clay liner of a least 1.0 metre or a geosynthetic liner). The tailings dam policy does permit the proponent to propose an alternative liner system to the benchmark, however this requires a robust hydrogeological investigation and impact assessment to prove the efficacy of the liner system and/or natural geology to demonstrate the prevention of water pollution. The tailings dam policy does also state that in the event the tailings pose a high risk to the water environment, a liner system that provides a higher level of protection is likely to be required. The EPA therefore expects that the proponent proposes a TSF liner system that will satisfy the tailings-dam policy.	7.1
• The PEA indicates that the tailings will be pumped to the tailings storage facility as a slurry. The Australian Government has produced a "*Tailings Management - Leading Practice Sustainable Development program for the Mining Industry*" (2016). This document provides guidance on world leading experience and expertise in mine management and planning; in particular, new and advanced methods of tailings disposal. New methods of tailings disposal include, (sic) thickened and paste disposal, dry stacking, co-disposal of coarse wastes and tailings, and integrated disposal of coarse waste and tailings along with backfilling open pits. The underlying substantial benefit to each of the above new methods produces tailings with far less moisture content. Paste or filtered tailings have the advantages of improved water and process chemical recovery, potentially reducing tailings storage volume, reduced seepage, more stable landforms, and reduced chance of overtopping. The EPA expects that the proposal utilise best management practice as detailed in the referenced document.	3.5.4

Table 2
Agency Project Specific Assessment Requirements (Cont'd)

Agency Project Specific Assessment Requirement	Section Addressed
• The EPA requests that the proponent undertake a tailings risk assessment based on the estimated tailings composition. The risk assessment should contain sufficient information to enable the EPA to carry out an independent assessment to determine if the tailings pose a high risk to the environment, as per the tailings dam policy, and therefore requiring a higher level of- protection as stated in the tailings dam policy. The risk assessment should include detailed discussion of options to dispose of, and handle tailings as described above, which are substantial improvements to the dated method of slurry disposal within valley filled tailings dams.	4.1.2 and EIS Appendix F
• With regards to the engineering and safety of any proposed TSF for the project, the PEA (Preliminary Environmental Assessment submitted on behalf of Regis in 2017) states that the design is required to be prepared to the satisfaction of the NSW Dams Safety Committee (DSC). The EPA acknowledges that the DSC is the primary state government agency with the authority and expertise to ensure the safety of dams. The EPA has a key responsibility to ensure that leakage or seepage to waters (surface/groundwaters) also does not occur by requiring that the tailings dam policy is adhered to. The EPA will therefore liaise with the DSC during assessment of the EIS to ensure both agencies requirements are communicated without leading to confusion.	4 & 7.1
• Accordingly, the EPA's policy will adopt a benchmark requirement for liners for TSF and CWS is to achieve a hydraulic conductivity of $1x10^{-9}$ m/s or less with a constructed clay liner of at least 1,000mm or a geosynthetic liner providing equivalent or better protection. If the tailings pose a low risk to the environment a liner with higher conductivity than the benchmark requirement may be accepted. This is consistent with the criteria set out in the Environmental Guidelines: Solid Waste Landfills.	7.1
• TSF and CWS (contaminated mine water storage) liner systems must be designed, constructed and operated to prevent pollution of waters (including surface and ground water) from seepage of contaminants (vertical and lateral) through the base and side walls. A risk assessment process should be used to determine a suitable liner system including appropriate hydraulic conductivity and liner thickness	7.1
• Where an alternative liner system to the benchmark requirements Is proposed and/or where the natural geology of the site Is proposed to be used as part of the liner system, a robust hydrogeological investigation and impact assessment must be undertaken by a competent entity and adequate justification must be provided to prove the efficacy of the liner system and to demonstrate the construction will be adequate to prevent the pollution of waters	7.1 and EIS Appendix K

1.1 Scope and Report Structure

The scope of the study based on this project outline is as follows:

- Develop an understanding of the proposed development, including tailings deposition/water recovery practices and proposed operational and environmental performance;

- Compile available background data as a means of characterising geological, hydrological, geotechnical and hydrogeological conditions within the site area. The focus of this input will be to provide appropriate background and substantiation for the selected concept and to effectively support the feasibility study design work;
- Compile available geotechnical data to provide understanding and characterisation of the geotechnical conditions at the site with emphasis on hydrogeological conditions and available construction materials surrounding the TSF;
- Develop a concept for the ultimate TSF development to support the project's development. The feasibility study design works would address development staging, design of embankment(s) and associated infrastructure and geotechnical/ environmental performance assessment;
- Undertake preliminary engineering design analyses for capital work items related to the TSF development and associated infrastructure; and
- Provide conceptual landform development and post closure landform.

This report has been prepared to address the above scope, with report structure as follows:

Section 2: Provides the project setting and outlines the concepts for the proposed TSF.

Section 3: Describes the development proposal for the TSF.

Section 4: Outlines the development and operational philosophy for the TSF and details the design criteria for the TSF including assessment of Consequence Category.

Section 5: Describes the physical characteristics including geotechnical conditions within the proposed TSF development site and also the physical/geotechnical characteristics of tailings to be produced.

Section 6: Describes the TSF Water Management features and operational requirements to maintain freeboard.

Section 7: Describes engineering analyses, including seepage, embankment stability modelling and general detailing for TSF.

Section 8: Outlines construction aspects associated with the development of the TSF.

Section 9: Outlines relevant operational and closure aspects of the proposed TSF, consistent with the design/performance expectations.

Section 10: Provides details on the suggested surveillance and monitoring for the TSF operations.

A series of drawings are attached that indicate the siting and layout of the proposed TSF. Related information in relation to the preparation of this report is provided in the following Appendices:

Appendix A - TSF Geotechnical Investigation

Appendix B - Tailings Laboratory Testing

Appendix C - GeoStudio Modelling Results

In addition the following reports provided as part of the EIS are also referenced:

EIS Appendix F - TSF Risk Assessment

EIS Appendix G - Tailings Geochemistry Report

EIS Appendix J - Surface Water Assessment

EIS Appendix K - Groundwater Assessment

Prior to project development, a detailed design report for the TSF and other mine structures would be required to confirm the designs presented herein and subject to additional data provided. Notwithstanding, it is considered that the overall design as presented in this report would not need to materially change.

2 LOCALITY AND PROJECT SETTING

The McPhillamys Gold Project is located approximately 27km south-west of Bathurst and 8km north-east of Blayney, NSW (**Figure 1**) in the central area of EL5760 and EL6111, and can be currently accessed by Dungeon Road off the Mid-Western Highway. The existing site is provided on **Figure 2**, with the principal features of the site comprising:

- Belubula River located along the north-western extent of the project and flowing some 150km to the south west discharging into the Lachlan River and via Carcoar Lake located some 20km downstream of Blayney;
- Existing homesteads and grazing properties covering the entire lease area and bordered to the north east by Vittoria State Forest;
- Proposed pit area has been previously moderately disturbed for the purpose of exploration of the ore body with associated drill rig pads, etc, with this area subsequently rehabilitated by reprofiling to form a stable landform and vegetated with grasses;
- TSF area is largely comprising pastoral areas with scattered trees growth occurring predominately along ephemeral drains; and
- Minor streams, draining the TSF area and discharging into the Belubula River. The minor streams are ephemeral with the Belubula River generally existing as a permanent water body at the downstream extent of the proposed TSF .
- At the downstream extent of the proposed mine development, the Belubula River confluences with a major Tributary (termed Trib A), draining the Kings Plain area to the south of the project. At this confluence, the relative catchments of the Belubula River and Tributary A are 1,750ha and 2,440ha respectively, indicating that the Trib A has the greater contributing catchment to the Belubula River downstream from the Project Area.

3 TSF DEVELOPMENT PROPOSAL

3.1 General

As part of the proposed operations, tailings storage and associated water management are required to satisfy relevant environmental approvals for the operation. The primary elements of the mine development to satisfy this requirement are as follows:

- TSF to be located to the north of the Process Plant area and shall comprise a valley-fill style storage to be formed by a primary (main) embankment and east containment embankment to manage/ divert upstream clean water; and
- TSF Runoff Interception WMF located immediately downstream of the TSF Main Embankment to manage runoff from the embankment area
- Clean water diversion system on the eastern perimeter of the TSF to manage the diversion of clean water around the TSF both during operations (pump system) and post-closure (open channel system).

3.2 Relevant Aspects of the Mine Schedule

3.2.1 Tailings Production

The McPhillamys Project comprises a total current Ore Reserve of some 60Mt with an upper estimate of 70Mt to be utilised for the purpose of this study. The proposed process throughput will be some 7Mt of ore per annum (Mtpa), giving a life-of-mine of approximately 10 years. Assuming a tailings settled density (dry density) of some 1.5t/m^3 (refer **Section 5.9**), tailings production of 70Mt would require a storage requirement of around 46,700ML (46.7 million m^3).

3.2.2 Waste Rock Production

Waste rock/overburden associated with the McPhillamys Project, is some 217Mt. Regis has indicated that the breakdown of waste material types is as follows:

- Non-Acid Forming (NAF) 130Mt
- Potentially Acid Forming (PAF) 87Mt

The NAF, being some 60% of the waste quantity have been defined by Regis as being suitable for use in engineering works, such as TSF construction and other infrastructure requirements including access roads, ROM Pad and waste encapsulation.

3.3 TSF Options Assessment

3.3.1 Tailings Disposal Options

The assessment of tailings disposal options was originally undertaken based on sound engineering design practices and minimisation of environmental impacts. This assessment was then subsequently risk assessed by Dr Peter Standish on 8 and 12 March 2019, with the details provided in Risk Mentor (2019). The risk assessment of the tailings disposal options included but was not limited to the following:

1. Cyanide detoxification options; and
2. Tailings disposal options considered.

The Cyanide Detoxification options considered included:

- Alkaline Chlorination
- Hydrogen Peroxide
- SO2/Air
- Ferrous Sulphate
- Ozonation
- Caro's Acid

The tailings disposal options considered included:

- Slurry Disposal
- Sub- Aqueous Disposal
- Paste Disposal
- Filtered Tailing (Cake)
- Co-mixing (crushed waste with filtered tailings)

Each of these tailings disposal options were then risk assessed/mapped against relevant parameters related to their potential viability and sustainability – which are:

- Water Use
- Liner/Seepage Complexity
- Cyanide Breakdown Rate
- AMD Risk (if PAF Tailings)
- Tailings Stability
- Energy Use
- Tailings Footprint
- Location Suitability
- Capital Cost
- Operating Cost

The results of the assessment indicated that the preferred approach for tailings disposal for the McPhillamys Project is to detoxify the tailings with disposal and containment system employing conventional slurry deposition methods. On this basis, TSF physical options were considered for the near surrounds to the pit as outlined below.

3.3.2 TSF Siting Assessment Overview

Siting studies for the TSF have been undertaken by ATCW as described below:

- Initial options assessment for 50Mt commissioned by Regis in 2013. This initial assessment was concentrated within the areas to the north and east of the pit area, and confined to the Belubula River Catchment.
- A second round of options assessed in 2017/2018 on the basis of an increased total tailings production of 70Mt. Options identified as part of the initial assessment noted above as well as additional options in a more regional context and considering the opportunity to locate the TSF outside all significant drainages (significant drainages described as a Stream Order 3 or higher.

The outcome of this siting assessment identified four investigation areas considered potentially viable for the containment of tailings. Within each of the main investigation areas, numerous TSF layouts were assessed, with a total of more than thirty different TSF options considered. Locations of the options considered are presented in **Plates 3 to 7**.

Plate 3
TSF Options Assessed

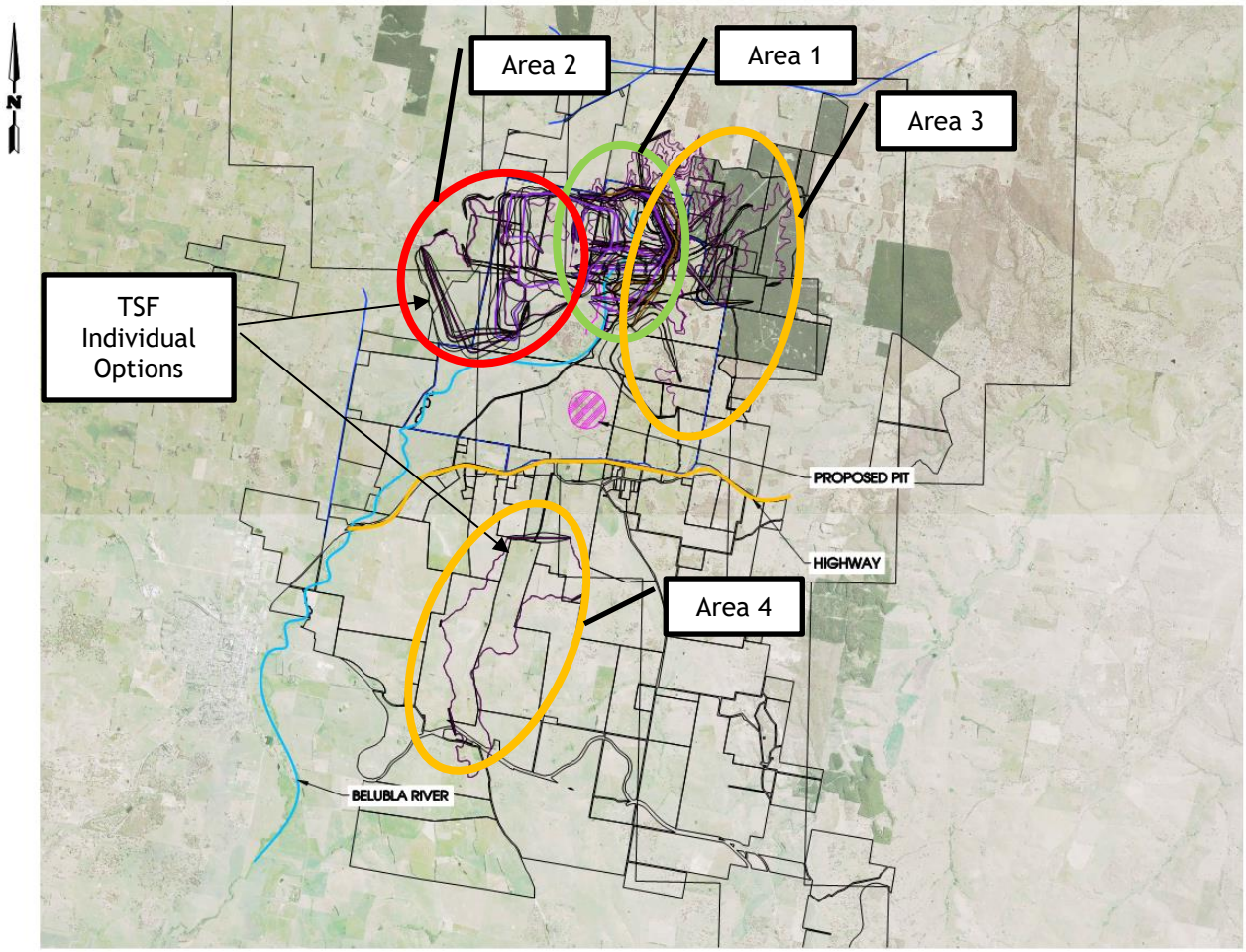


Plate 4
TSF Options Area 1

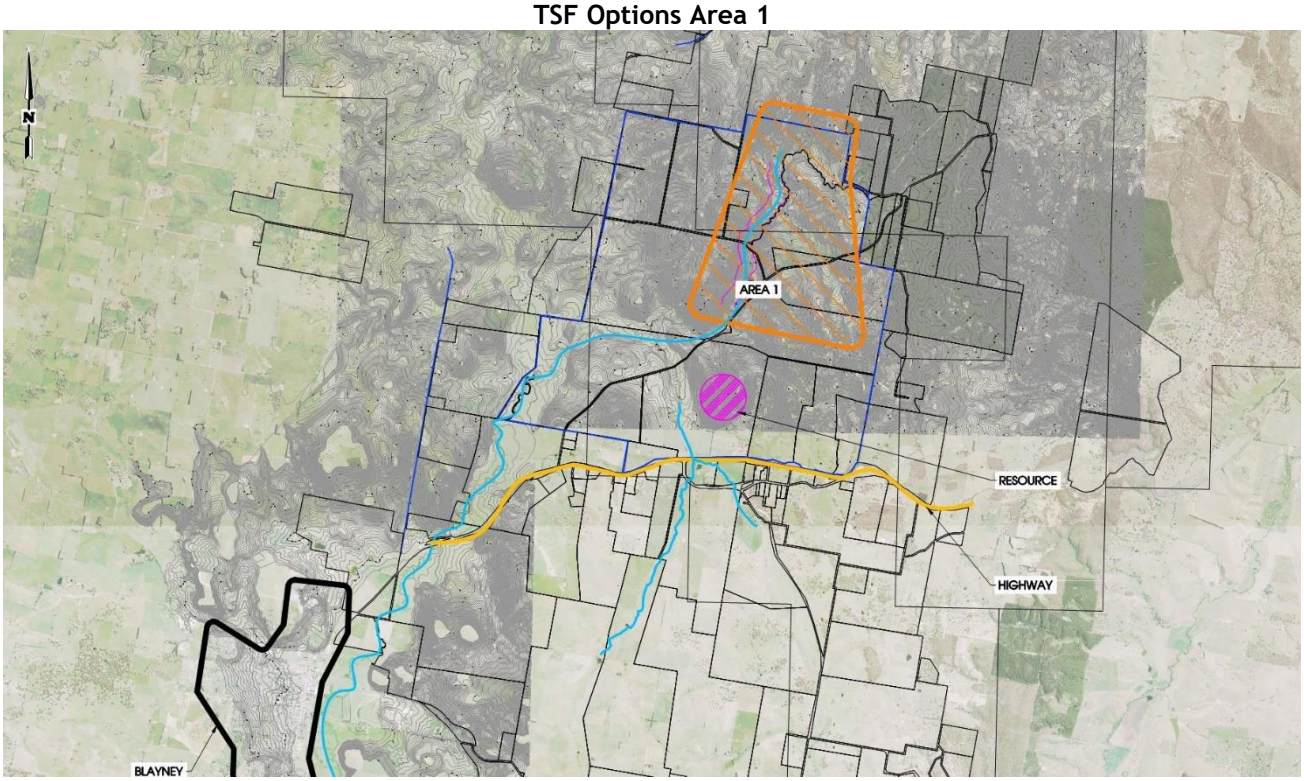


Plate 5
TSF Options Area 2

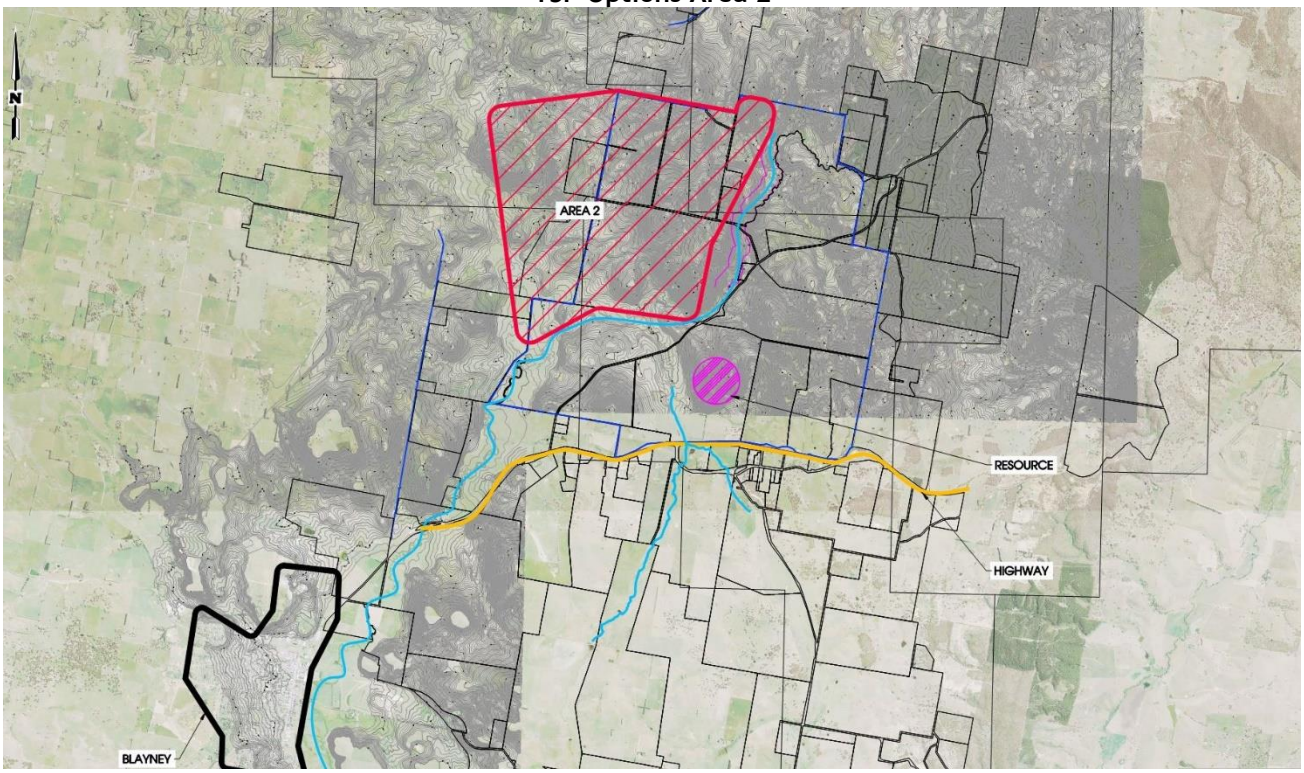


Plate 6
TSF Options Area 3

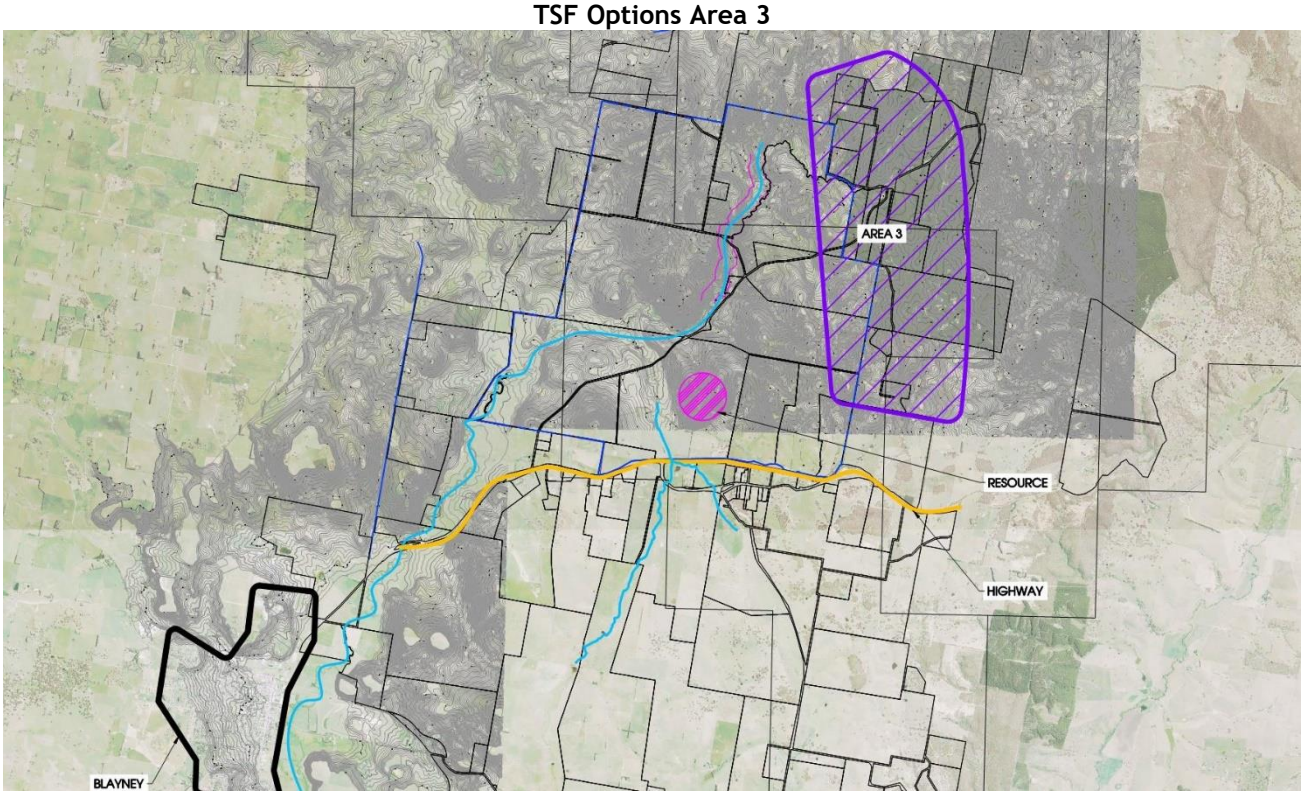
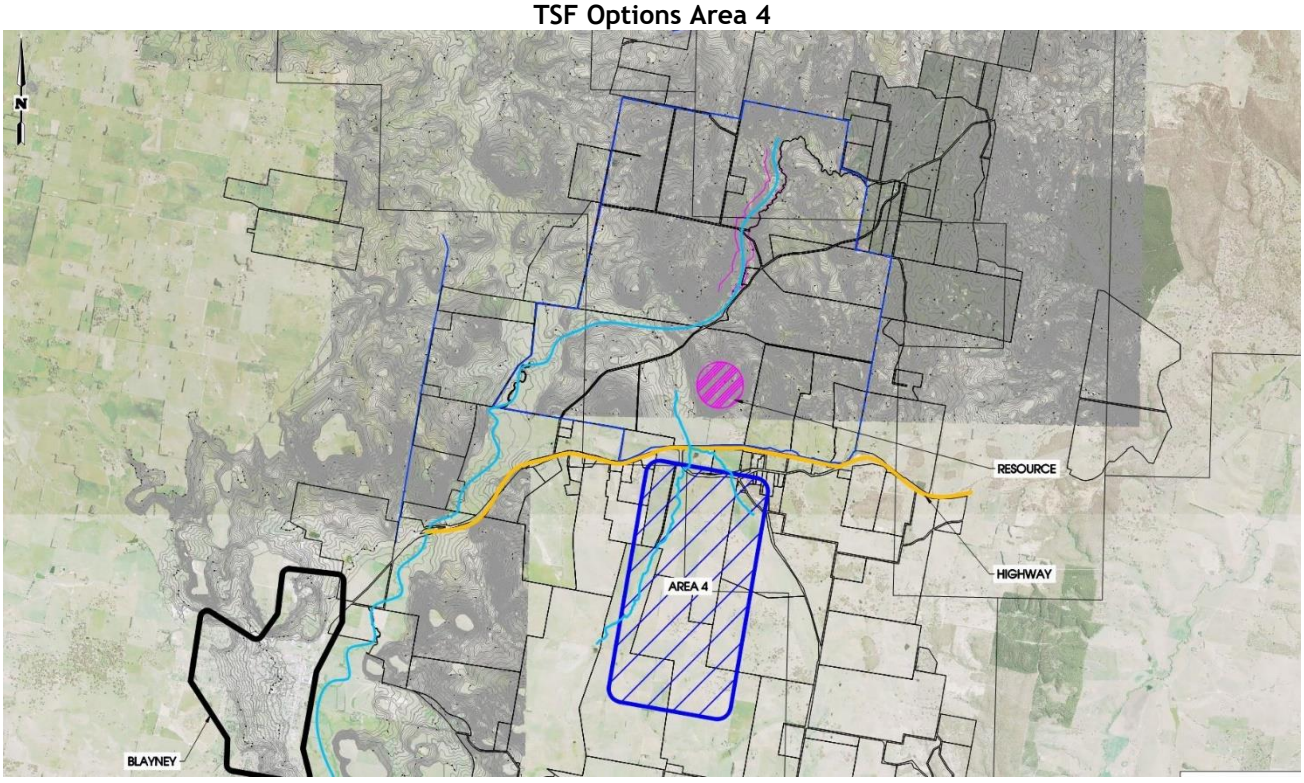


Plate 7
TSF Options Area 4



The physical siting of potential storages in each of the four areas resulted in varied storage containment methods, described as follows:

TSF Option Area	Storage Description/Type
Area 1	Valley Type Storage containment with a primary embankment on the downslope end of the valley providing the containment.
Area 2	Side-valley/ Turkey's Nest, with containment embankment extending on 3 to 4 sides of the TSF, generally located on the side slopes of a valley off the main drainage alignment of the valley
Area 3	Side-valley Top of Catchment, with containment embankment extending on 3 to 4 sides of the TSF, generally located on the upper slopes of a valley off the main drainage alignment of the valley
Area 4	Valley Type Storage containment with a primary embankment on the downslope end of the valley providing the containment.

3.3.3 TSF Siting Assessment Methodology

Each of the TSF options was assessed based on the potential impacts identified in relation to the following three main areas of interest/concerns:

- environmental impacts,
- community impacts (provided by Regis), and
- engineering suitability.

These areas of interest were subsequently broken down into detailed sub-elements and were assessed in consultation with Regis to refine the preferred options. A qualitative ranking system of 1 to 5 was used where 1 was least favourable and 5 was most favourable for each of the sub elements.

The sub-elements were also weighted in terms of the considered importance of each element within the entirety of option to be considered. It is noted that input maybe be required in terms of these weightings in relation to the Assessor/Regulator and Community by the relevant parties. Notwithstanding, the weightings as provided below were based on consultation with Regis. The results of the assessment including discussion on the positives/negatives of each option area presented in **Table 3**.

3.3.4 TSF Siting Assessment Outcomes

Table 3
TSF Options Assessment Summary

Assessed Elements	TSF OPTIONS AREA (REFER PLATE 1)			
	AREA 1	**AREA 2**	**AREA 3**	**AREA 4**
ENVIRONMENT & COMMUNITY	**3.5**	**3.5**	**3.8**	**2.5**
Impacts to Existing Creeks/Streams Beds (Class 2 and Higher)	Impacts on Class 2, 3, 4 and 5 Streams (Ranking Score: 2)	Impacts on both Class 2 and 3 Streams (Ranking Score: 4)	Impacts on both Class 2 and 3 Streams (Ranking Score: 4)	Impacts on both Class 2 and 3 Streams (Ranking Score: 4)
Impact on catchment reporting to Lake Carcoar	Catchment area loss of the order of 420ha (Ranking Score: 3)	Catchment area loss of the order of 200ha (Ranking Score: 5)	Catchment area loss of the order of 220ha (Ranking Score: 4)	Catchment area loss of the order of 1,300ha (Ranking Score: 1)
Impact on Springs outside the ML	Low as geological boundary at southern/downgradient site boundary will limit the impact. (Ranking Score: 4)	Moderate as sited on higher permeability basement sequences and adjacent to downstream users (Ranking Score: 3)	Low as sites at top of catchment and significant distance to downstream area of ML (Ranking Score: 5)	Moderate as significant upslope area above embankment impacted/cut off (Ranking Score: 2)
Visual Amenity Impacts	Low visibility as located within valley (Ranking Score: 4)	High Visibility to the west and south west (Ranking Score: 2)	Moderate visibility as isolated location within forest although elevated. (Ranking Score: 3)	High visibility as located within valley but close to Kings Plains (Ranking Score: 2)
Air Quality / Dusting (*All options proposed are a single cell and therefore can be continuously operated with a moist/wet beach*)	Low - located within valley, no near residents, large area. (Ranking Score: 4)	Moderate - partially exposed, nearer to residents. (Ranking Score: 3)	Low – partially exposed, no near residents. (Ranking Score: 3)	Moderate, located within valley, near to residents. (Ranking Score: 3)
Diversion of Clean Water	Moderate as diversions required to the north and east of the TSF. (Ranking Score: 3)	Low as minimal diversions required (Ranking Score: 4)	Low as minimal diversions required (Ranking Score: 4)	High as upstream catchment would not be easily diverted and would discharge into a separate drainage system. (Ranking Score: 2)

Table 3
TSF Options Assessment Summary (Cont'd)

Assessed Elements	TSF OPTIONS AREA (REFER PLATE 1)			
	AREA 1	AREA 2	AREA 3	AREA 4
TSF Footprint Area	Large tailings surface area - 280ha. (Ranking Score: 3)	Lesser tailings surface area - 200ha. (Ranking Score: 4)	Moderate tailings surface area - 220ha. (Ranking Score: 4)	Large tailings surface area – 250ha. (Ranking Score: 3)
Native Vegetation	Largely cleared for grazing. Minor impacts of riverine vegetation and potential impacts on CEEC Box Woodland (Ranking Score: 3)	Largely cleared for grazing. Minor impacts on remnant trees. (Ranking Score: 3)	Forestry with minimal native vegetation. (Ranking Score: 4)	Largely cleared for grazing. Minor impacts on remnant trees. (Ranking Score: 3)
Transport Infrastructure	Minor local public road inundated with closure/diversion required. (Ranking Score: 4)	Nil (Ranking Score: 5)	Nil (Ranking Score: 5)	• Railway line and local roads inundated with diversion required. • Slurry pipeline would be required to cross Mid-Western Highway (Ranking Score: 1)
Land Impacts/ Industry	Grazing Land (Ranking Score: 4)	Grazing Land (Ranking Score: 4)	Forestry (Ranking Score: 2)	Grazing Land (Ranking Score: 4)
Residents	Relatively central within the project area with a generally good buffer to residents. (Ranking Score: 4)	Residents and adjacent landholders immediately downstream (Ranking Score: 2)	No immediate downstream residents, although close to upslope residence and businesses. (Ranking Score: 4)	Residences situated immediately downstream of main embankment. (Ranking Score: 2)

Table 3
TSF Options Assessment Summary (Cont'd)

Assessed Elements	TSF OPTIONS AREA (REFER PLATE 1)			
	AREA 1	**AREA 2**	**AREA 3**	**AREA 4**
ENGINEERING DESIGN	**4.0**	**2.4**	**3.1**	**3.2**
Tailings Rate of Rise	Low – tailings would be expected to be well consolidated providing higher strengths and in-situ densities. (Ranking Score: 4)	High – tailings would likely be poorly consolidated with low in-situ densities and low strength. (Ranking Score: 2)	Moderate – tailings would like be moderately consolidated with moderate in-situ densities and strength. (Ranking Score: 3)	Low- tailings would be expected to be well consolidated providing higher strengths and in-situ densities. (Ranking Score: 4)
In-situ Groundwater Permeability (*Assessed in-situ groundwater permeability allows for the protection of downstream users on the Belubula River*)	Low permeability basement geology. Likely cover soils suitable for embankment construction works. (Ranking Score: 4)	Moderate permeability geology. Likely cover soils suitable for construction on lower slopes with limited soils on the upper slopes. (Ranking Score: 3)	Low permeability basement geology. Likely cover soils suitable for embankment construction works. (Ranking Score: 4)	Very Low permeability geology and likely cover soils suitable for embankment construction. (Ranking Score: 5)
Constructability	• Generally a single main embankment • Single seepage system. (Ranking Score: 4)	• Significant embankment extent and volumes • Multiple seepage systems would be required and/or consideration of storage lining. • Haul road will be required to cross the Belubula River. • Haul distances from the pit. (Ranking Score: 2)	• High embankment volumes. • Limited material of suitable quality for embankment volumes required • Significant haulage distance from pit (3km) • Significant clearing and grubbing. (Ranking Score: 2)	• Single main embankment • Single seepage system. • Haul road would be required to cross/bridge the Mid-Western Highway or alternatively locally source rock fill materials from the storage. (Ranking Score: 3)

Table 3
TSF Options Assessment Summary (Cont'd)

Assessed Elements	TSF OPTIONS AREA (REFER PLATE 1)			
	AREA 1	AREA 2	AREA 3	AREA 4
Operability	• Pumping – low head and close distance to Process Plant. • Low rate of rise. • Single seepage system. (Ranking Score: 4)	• Pumping – high head and moderate distance to Process Plant. • High rate of rise. • Potentially ongoing seepage management/ mitigation works. (Ranking Score: 2)	• Pumping – high head and long distance to Process Plant. • Moderate rate of rise (Ranking Score: 3)	• Pumping – low head and long distance to Process Plant. • Moderate rate of rise. • Single seepage system. (Ranking Score: 2)
Earthworks Efficiency (Storage vs Embankment Vol)	25 to 1 (Ranking Score: 5)	6 to 1 (Ranking Score: 2)	7 to 1 (Ranking Score: 2)	23 to 1 (Ranking Score: 4)
Post-Closure Seepage Impacts	Located upstream of final void within same geology unit and considered beneficial for deeper seepage to be drained to a final sink. (Ranking Score: 4)	Located parallel to a drainage line on higher permeability geology (Ranking Score: 2)	Located upstream of final void on moderate permeability geology (Ranking Score: 3)	Located on very low permeability geology but will drain off-site (Ranking Score: 3)
Post Closure Landform Stability	Low overall elevation and large area for tailings to drain and consolidate. (Ranking Score: 4)	High overall elevation and lesser area for tailings to drain and consolidate. (Ranking Score: 3)	High overall elevation and lesser area for tailings to drain and consolidate. (Ranking Score: 3)	Low overall elevation and sufficient area for tailings to drain and consolidate. (Ranking Score: 4)
Post-Closure Stream/Creek Diversions	Permanent diversions required (Ranking Score: 3)	No significant diversions required (Ranking Score: 4)	No significant diversions required (Ranking Score: 4)	Diversion (Ranking Score: 2)

Table 3
TSF Options Assessment Summary (Cont'd)

Assessed Elements	TSF OPTIONS AREA (REFER PLATE 1)			
	AREA 1	**AREA 2**	**AREA 3**	**AREA 4**
Closure Aspects	• Large tailings surface area – 260ha. • Minor Embankment batter area. • Permanent clean water diversion system will be required. • Seepage could be gravity drained to final pit void with a pipe system of some 1.5km. (Ranking Score: 4)	• Lesser tailings surface area – 200ha. • Likely additional surface stabilization works would be required due to reduced tailings beach strengths. • Minimal surface water management works would be required post-closure. • Seepage management would require a maintained pump and pipe system. (Ranking Score: 2	• Moderate tailings surface area – 220ha. • Likely additional surface stabilization works would be required due to reduced tailings beach strengths. • Seepage could be gravity drained to pit, although over a distance of some 3km. (Ranking Score: 4)	• Large tailings surface area – 250ha. • Minor Embankment batter area. • Significant distance from WRD/closure capping materials. • Significant clean water management comprising both diversion and/or management of run-on clean water. • Seepage management would require a maintained pump and pipe system. (Ranking Score: 2)
Average (50% Env/Comm & 50% Eng Design)	**3.7**	**3.0**	**3.5**	**2.8**

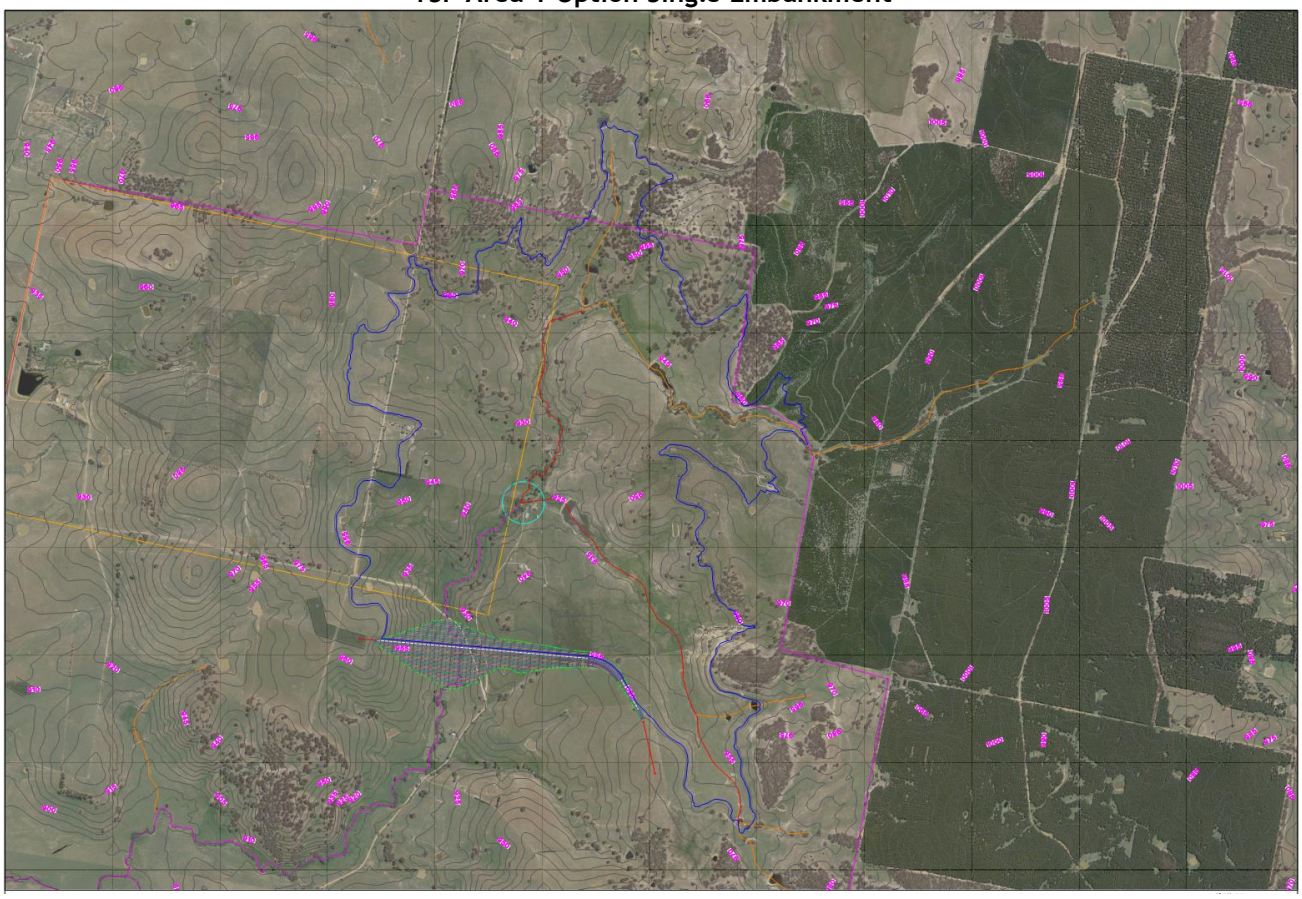
3.3.5 Preferred TSF Siting Area

Based on the above assessment, the preferred siting location for the TSF were Area 1 and Area 3. Area 3, as outlined in Plate 8 had technical restraints surrounding the required quantities of suitable wall construction material. In addition to this, legal and commercial complexities surrounding the acquisition of forestry area ruled this area out. .

Within Area 1, a number of specific sites were assessed to refine the TSF layout. This refinement focused on minimising earthworks, maximising diversion of clean water, constraining the TSF extents within Regis land holding and minimising impact to identified CEEC Box Woodland areas. TSF specific options considered for Area 1 included:

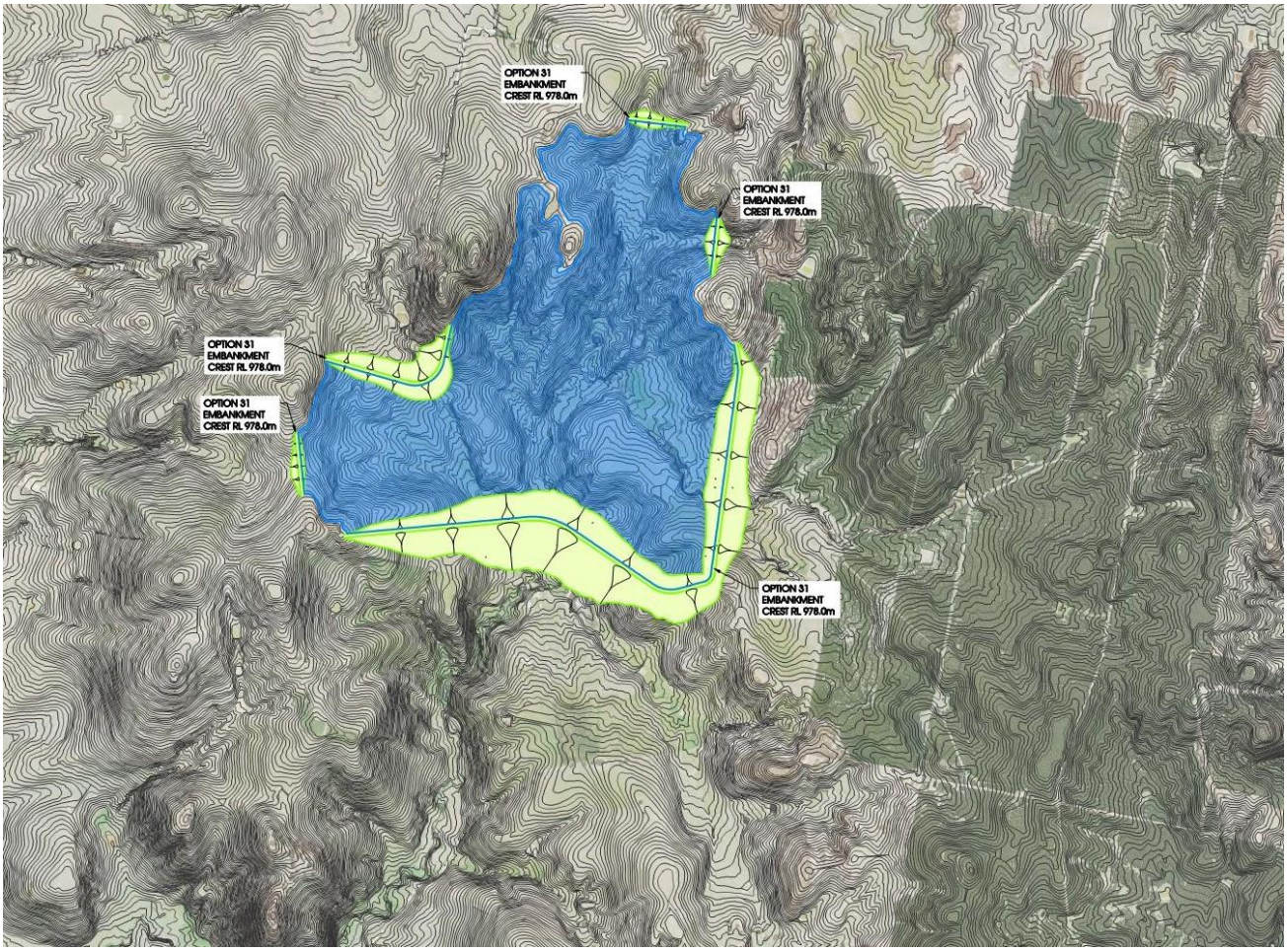
- Single Embankment TSF. Whilst the most efficient in terms of embankment efficiency, this would have resulted in impacts including significant inundation of the CEEC Box Woodland and impacts to adjacent State Forestry Land. The layout of the Single Embankment TSF option is shown in Plate 8.

Plate 8
TSF Area 1 Option Single Embankment



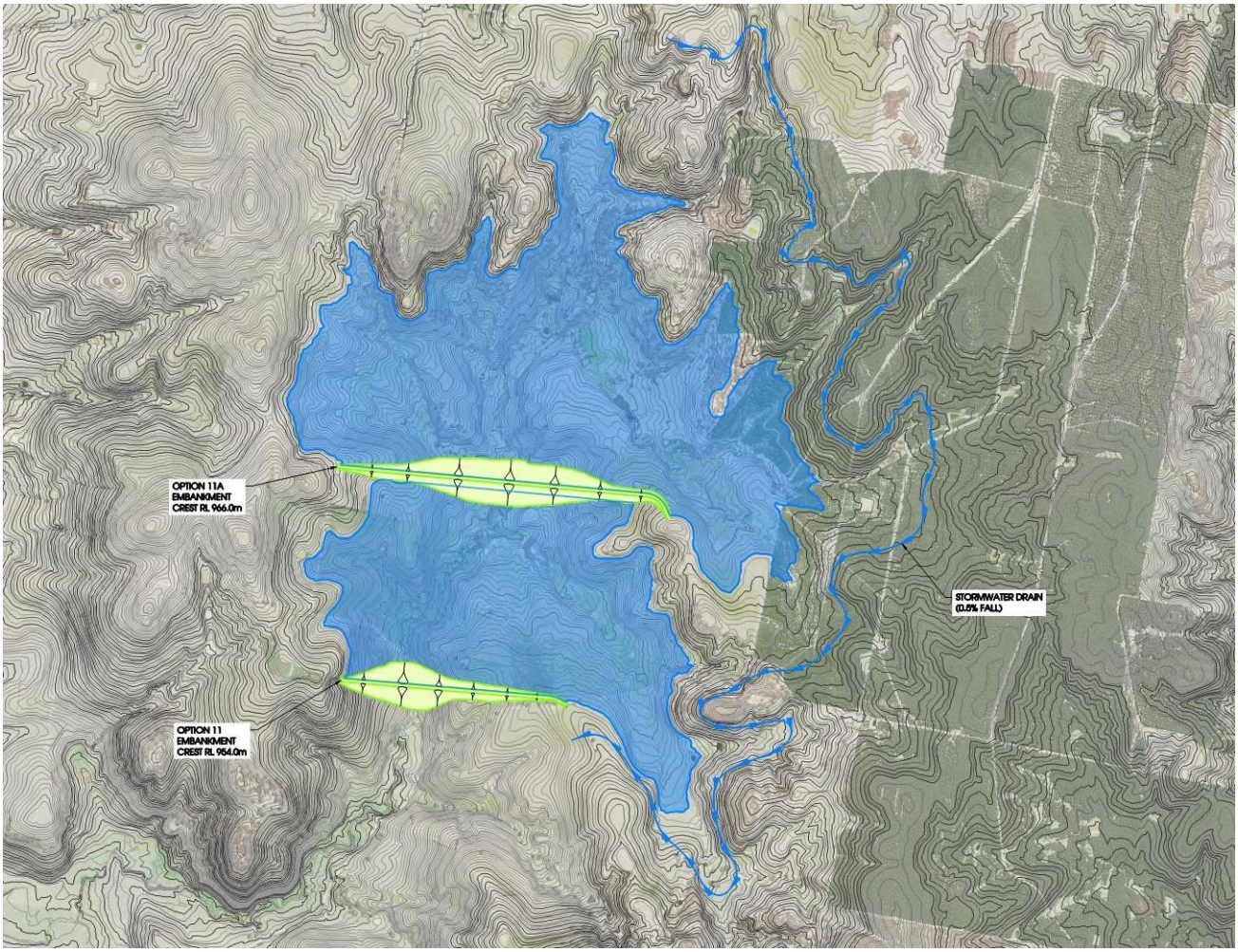
- Main embankment moved to the north to avoid the south eastern tributary and minimise the requirement for an eastern clean water diversion. This variation whilst reducing clean water diversion requirements, significantly increased embankment volumes. Refer **Plate 9**.

Plate 9
TSF Area 1 Option Embankment Located to the North



- Stepped valley storage to minimise overall height and assist in the clean water diversion. This variation significantly increased embankment volumes, required the acquisition of the northern property and did not sufficiently reduce the storage height of the southern storage and therefore no significant benefit for the eastern clean water diversion. Refer **Plate 10**.

Plate 10
TSF Area 1 Stepped Embankments

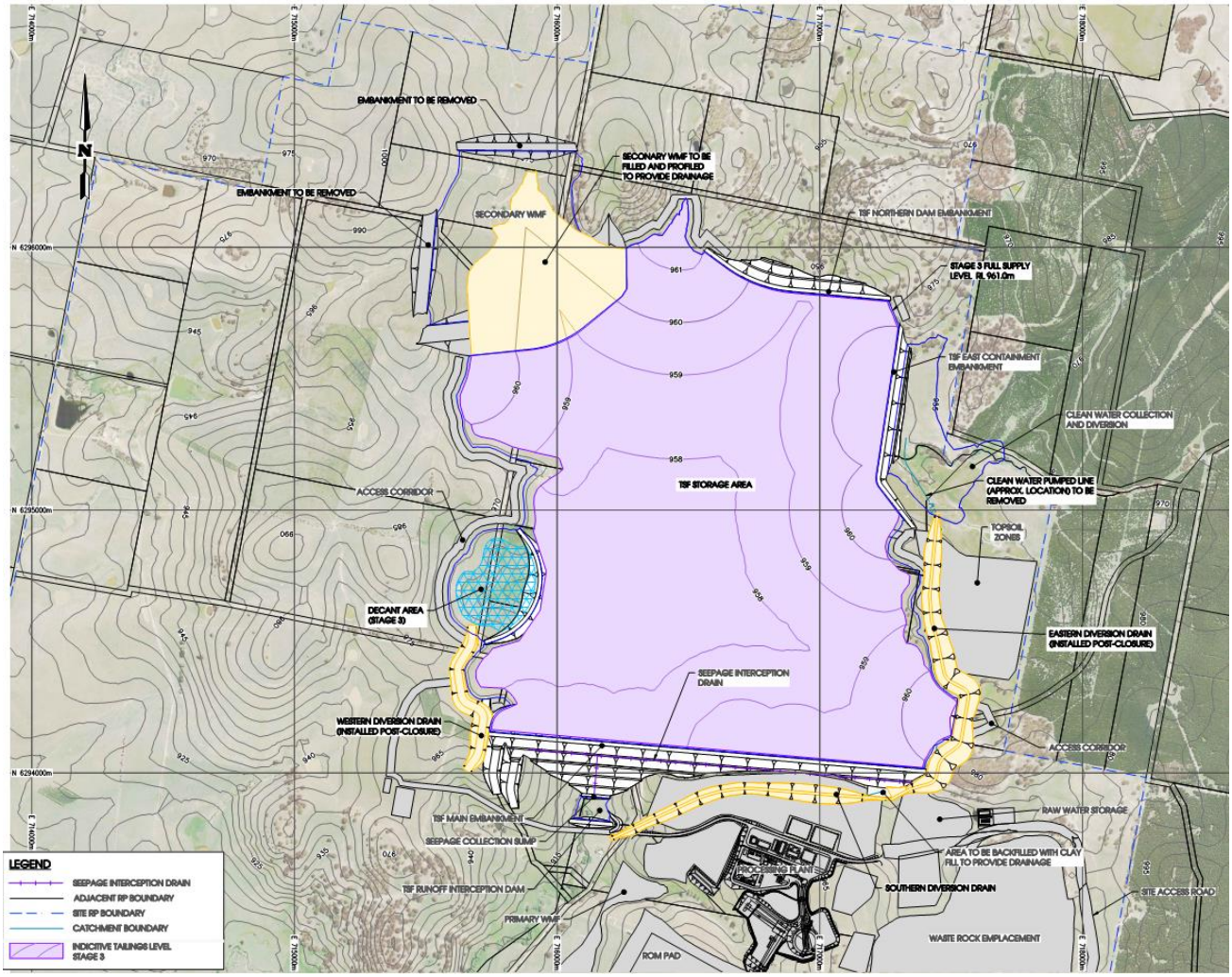


3.3.6 Preferred TSF

Ultimately, the preferred option was defined as part of this work, which is shown on **Plate 11**.

Additional features included providing confining embankments to the north to limit impact on CEEC Box Gum Woodland and facilitate clean water diversion. This variation resulted in significant additional embankment works and ponding of water which would be redirected back into the Belubula River.

Plate 11
Proposed McPhillamys TSF



A detailed description of the proposed TSF is provided below.

3.4 TSF Concept Description

3.4.1 Proposed TSF Site Area

The proposed TSF site area is located to the north of the site and located to the north of the proposed Pit and Process Plant areas as shown on **Plate 12**. The site exists as open grass land, with stands of trees/vegetation remaining within areas of clearing undertaken for grazing purposes. Topographically, the site area slopes generally from north to south, being drained by a primary drainage line, the Belubula River, and two significant tributaries existing as the upper tributaries of the Belubula River. The drainages comprise incised channels with channel grades varying from 1% to 3%.

A number of farm dams and minor springs also exist across the site and are detailed in EIS Appendix K.

3.4.2 TSF Development Concept General Description

The TSF will be developed to provide the LoM containment of tailings residue from the site processing, as well as provide sufficient freeboard to achieve an acceptable risk of spill from the

TSF to the environment. As outlined above, the TSF is proposed to be located within the Belubula River valley as it has the most optimal geology with respect to groundwater permeability to protect the downstream Belubula catchment and it provides a relatively efficient storage in terms of embankment construction, tailings rate of rise as well as benefits to controlling seepage and minimising visual and topographical impacts to the surrounding community.

It is proposed to develop the TSF in stages to minimise the extent of disturbance and to match the production of mine waste rock used for embankment construction with removal of overburden waste rock from the Pit area. Notwithstanding, based on the waste rock schedule as provided herein, it is considered that the majority of the embankment Rock Fill will be in place within 3 years following commencement of overburden stripping. For the purpose of this report, three stages of TSF development are proposed, but further sub-stages may be undertaken. The stages proposed will be as follows:

- Stage 1 (Starter) – Constructed prior to operations and available from year 0 to store the first 2 years of tailings production plus freeboard requirements.
- Stage 2 – Constructed prior to the filling of Stage 1 (approximately in year 2 of operation), the Stage 2 TSF will accommodate some 3 years of tailings production and maintaining required freeboard.
- Stage 3 – Constructed prior to the filling of Stage 2 (approximately in year 4 of operation), the Stage 3 TSF will accommodate an additional 5 years of tailings production and extend through to the LoM.

The layout and extent of the above staged development is provided in the attached **Drawings**.

Embankment construction of the TSF will comprise an upstream Clay Fill Core, internal Rock Fill Transition Zone and downstream Rock Fill shell/buttress. Seepage management is proposed to comprise a number of features including operational controls as well as physical controls constructed as part of the TSF construction works. Physical Controls for seepage management will comprise:

- Clay Fill lining of the TSF storage area, including conditioning and compaction of 300mm clay layer over the entire storage area and additional 1.0m thick clay layer over areas of exposed basement sequences, general coincident with the natural drainage features.
- Partial geomembrane lining within the storage areas as identified as having insufficient in-situ clay materials suitable for construction of a suitable liner.
- Cut-Off Key backfilled with Clay Fill. The Cut-Off Key will be located beneath the Clay Fill Core of the embankment and will extend to competent basement of low permeability.
- Seepage Recovery System constructed downstream of the Cut-Off Key intersecting the upper 4m to 6m of the basement sequences, with seepage reporting to a Seepage Interception Trench which will subsequently drain to a Seepage Collection Sump for return to the TSF.

Additional features of the TSF will include:

- Decant Structure located at the north western extent of the TSF to recover liberated process water for return to the process circuit;
- Emergency Spillway provided as a secondary safety measure to discharge flood inflows in the event of extreme rainfall sequences;
- Clean Water Diversion system to divert upstream clean water catchment around the TSF and discharge back into the Belubula River; and

- TSF Runoff Interception WMF located immediately down gradient of the TSF across the main drainage feature for the purpose of providing containment of runoff from the TSF embankment disturbance areas as well as providing secondary seepage interception.

3.5 TSF Arrangement

3.5.1 TSF Capacity

As outlined in **Section 3.1**, the proposed capacity of TSF is some 50,000ML. This capacity would accommodate LoM tailings production under the following operational scenario:

- Life-of-Mine (LoM) 10 years
- Tailings production 7 Mtpa
- Adopted tailings density 1.5t/m3
- Net tailings storage capacity 46,700ML

In addition to the disposal of tailings, small quantities of waste rock from the mining operation will be placed within the TSF to form the decant structure and facilitate access with the mining plant. The estimated volume of waste rock to be disposed would be approximately 100,000m^3 (loose cubic metres) per stage of development, equivalent to a storage volume of less than 100ML.

3.5.2 Description of TSF Development

The proposed TSF development concept to contain the life of mine tailings as well as provision for freeboard to contain process water and stormwater inputs, is shown on the attached Drawings, with the LoM TSF development schedule based on this assessment is provided in **Table 4**.

Table 4
Development Schedule for LoM - TSF Development

Development Stage	Construction Type	Maximum Embankment Lift Height (m)	Embankment Crest Level (RLm)	Incremental Storage Increase (ML)	Cumulative Storage Increase (ML)	Embankment Incremental Volume (m^3)	Storage Area (ha)	Approximate Construction Timing
1 - Starter	Starter Embankment	30	943.0	11,000	11,000	1,930,000	134	12 Months prior to Plant Commissioning
2	Downstream	39	952.0	16,000	27,000	1,870,000	227	Year 1 to 2
3	Downstream	49	962.0	28,000	55,000	990,000	282	Year 3 to 5

For each stage, an Emergency Spillway would be constructed on the southern perimeter, western abutment of the Main Embankment and will discharge into the Belubula River.

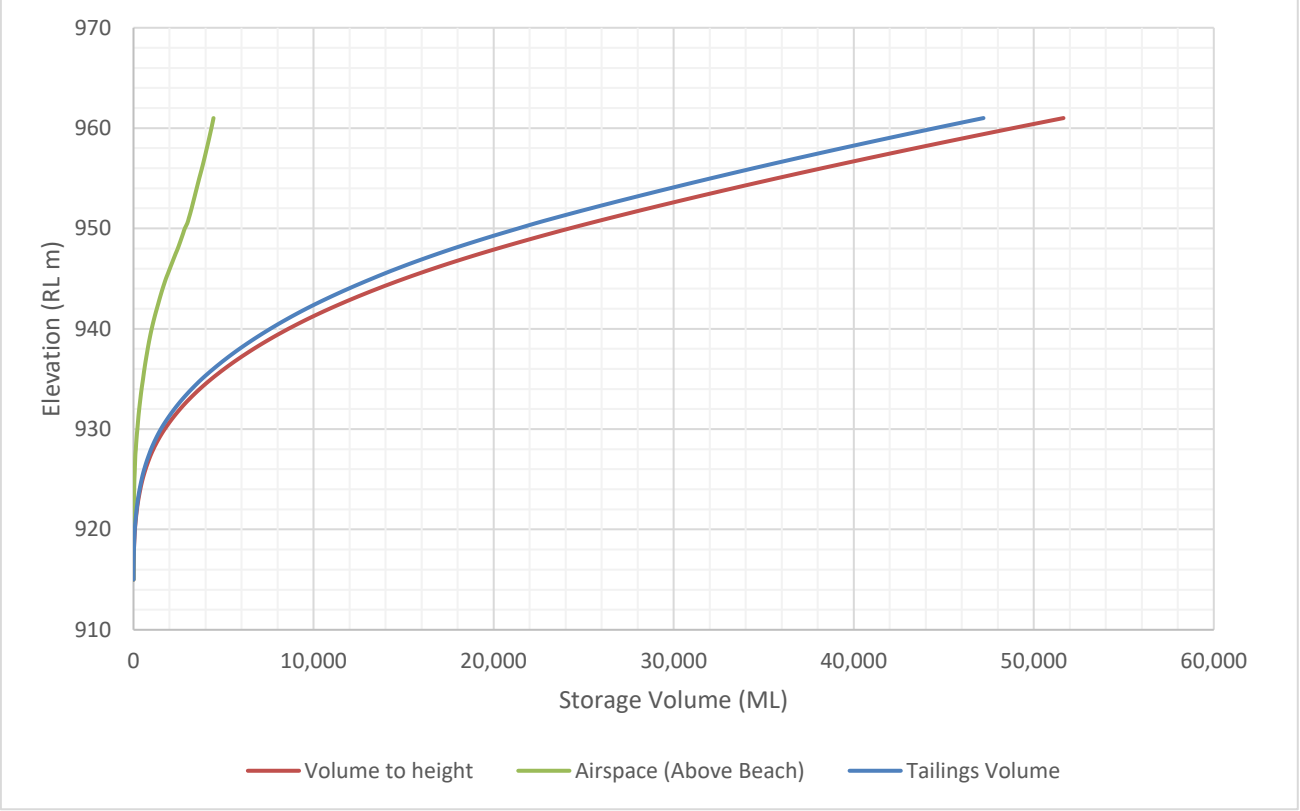
Conceptual landform of the LoM TSF development for each construction stage are provided on attached Drawings. **Drawing 112** provides a typical cross section through the final landform, indicating the configuration of the proposed stages.

The final configuration of the TSF following completion of the LoM TSF would comprise:

- Embankment crest level RL 962.0m
- Spillway invert level RL 961.0m
- Spillway base width 15.0m
- Total Embankment length 2,450m
- Maximum embankment height 49m
- Embankment crest width 15m
- Storage Area (at full supply level) 270ha
- Embankment base width (at maximum embankment height) 333m
- LoM Tailings Storage Capacity Available 49,300ML
- LoM TSF Total Storage Capacity (including freeboard) 54,700ML

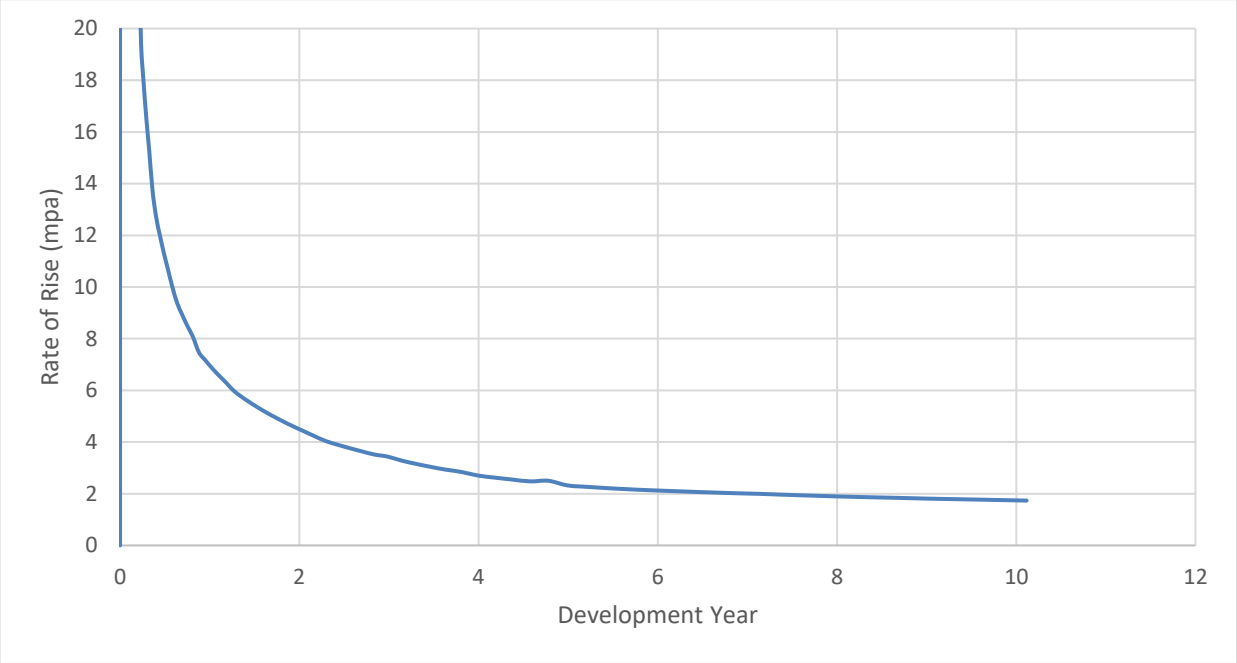
A storage curve for the proposed TSF is provided on **Plate 12.**

Plate 12
TSF Storage Curve



The plan extent of the storage allows for sufficient area to maintain an average rate of rise for Stages 2 and 3 of less than 2.5m per annum (refer **Plate 13**), which based on site climatic conditions, provides sufficient time for consolidation and associated high achieved densities and low permeabilities of the tailings mass, with details of this assessment provided in **Section 6.0**.

Plate 13
TSF Rate of Rise[1]



*Note: Rate of Rise describes the tailings beach level rise when normalised on an annual basis

3.5.3 TSF Decant

As part of the TSF development, it is proposed to develop a decant structure centrally on the north western extents of the TSF. The structure would be formed as a perimeter causeway using coarse mine waste/overburden which will allow runoff from the tailings beach to pass whilst generally retaining the tailings solids. A skid mounted centrifugal pump would be located at the decant location for return of the decant water to the Process Plant via the Secondary WMF. Towards the end of the TSF development in Stage 3, the decant would be relocated towards the south west, closer to the Emergency Spillway. This final decant area would assist in developing a final closure landform that can be drained once the surface has been rehabilitated. The approximate locations of the decant and associated details are shown on the Drawings.

3.5.4 Seepage Interception System

The general principals of seepage from a TSF is described in the following phases:

1. The tailings slurry is pumped to the TSF at which point the solids content of the slurry are allowed to settle. This process results in a percentage of the water being liberated to the surface and because the tailings beach on a slope, the liberated water flows on the beach to the low point (decant area).
2. Within the settled tailings mass, initially all the voids are filled with non-liberated water. Over time, this water will drain vertically downwards due to gravity, with a portion at the surface being evaporated. As water is drained and/or evaporated, air will be induced into the voids with air pressure at atmospheric pressure. This vadose zone above the phreatic surface will, depending on the soil moisture characteristics, either result in capillary rise and evaporation, or gravity drainage. The draining effects on the tailings mass results in the consolidation/tighter packing of the solids particles.

3. In the longer term, excluding the upper sequences of the vadose zone which may be subject to capillary rise, which would be typically of the order of 3 to 5m, the remaining water within the tailings mass will drain under gravity until such a time as a equilibrium is reached where surface infiltration maintains a phreatic surface level.

Based on the above principals of water movement within a tailings mass, the management of seepage can be provided using either a barrier layer/zone which reduces the rate of seepage, or to actively recover the seepage water to promote the drainage of the tailings mass and recover this water for reuse/treatment. It should be noted that the seepage management options do not impact on the total volume of water that is available to seep and only controls the rate of seepage loss, with the barrier effectively prolonging the duration of seepage (at a reduced seepage rate) and seepage drainage/recovery approach reducing the duration of seepage (at higher seepage rate)

The proposed seepage management for the TSF comprises a combination of the above management controls, acknowledging that the TSF barrier system will control the rate of seepage and that this seepage passing through the barrier system will be actively recovered via a seepage interception system to provide the secondary seepage management. It is proposed that the system will comprise the following details:

- Barrier System comprising a liner that achieves an equivalent performance as a 1m thick clay liner with a permeability of 1 x 10^{-9}m/s. It is recognised that this will be subject to in-situ earthen material encountered with equivalent liner alternatives detailed in **Section 7.1.1**.
- Seepage Interception System comprising:
  - Seepage Interception Trench downstream of the embankment cut-off key. The trench will extend on both the abutments of the Main Embankment across the two drainage features intersected by the embankment with the location indicated on **Drawing 112**.
  - The trench will range from 4m to 6m in depth with a slotted drainage collection pipe and backfilled with a drainage aggregate. The downgradient face of the trench will be lined to minimise transmission of seepage through the trench. Typical details of the Interception Trench is shown on **Drawing 112**.
  - The Interception trench will discharge into a Seepage Sump comprising a 1,500mm diameter lined concrete chamber. Typical details of the Seepage Sump are shown on **Drawing 112**.
  - Seepage Sump to be equipped with an automated pump recovery system sized based on a minimum pump back capacity of 5L/s (432m^3/day) as per **Section 7.1**, being subject to detailed design and operational performance.

3.5.5 Earth Fill Borrow Areas

Earth fill/clay fill materials required to form the embankment core/low permeability zone will be sourced from internal borrow areas within the storage area of the TSF. These borrows would be situated a minimum 100m from the upstream toe of the TSF embankments and shall generally be off set from the major drainage features to minimise risk of exposing geological structures conductive to groundwater/seepage flows. Borrow areas shall be developed such that at the completion of borrow development, a minimum of 1.0m of earth/clay material will be maintained in situ. In addition to this an appropriate amount of material would be subsequently conditioned in accordance with the proposed Clay Fill Lining of the TSF storage area.

4 ENGINEERING CRITERIA FOR TSF DEVELOPMENT

4.1 Context

NSW Dam Safety Regulation Dams in NSW have been regulated since 1979 under the NSW Dams Safety Committee (DSC). A description of this regulation as extracted from DSC Guidance Sheet DSC1A(2010) is as follows:

> *The DSC was constituted under the Dams Safety Act 1978 to oversight the safety of the State's dams and to prevent significant uncontrolled loss of their storages. Further, in August 2006, the NSW Government endorsed a "Risk Management Policy Framework for Dam Safety" which is being progressively implemented by the DSC (see DSC1B for details).*
>
> *The DSC's approach to dam safety is goals-based as far practicable, with its prime goal being that dams meet the DSC safety requirements set out in this and other DSC guidance sheets. Secondary goals are:*
>
> - *Risks to community interests are identified, assessed and properly managed, are reduced when necessary, and are kept under review throughout the life of a dam;*
> - *Risks to public safety meet the DSC's public safety risk guidelines [see Background to DSC Risk Policy Context - DSC1B - Section 2, under Principle D.3];*
> - *Other risks with a potential for an adverse effect on community interests meet criteria set by the owner and agreed with the DSC;*
> - *Needed safety improvements are undertaken as soon as reasonably practicable, in a way that best serves community interests;*
> - *The DSC approach will facilitate a whole of Government approach to public safety.*
>
> *It is for dam owners to determine how to achieve these goals including DSC normal requirements) and to demonstrate to the DSC they have been achieved, or will be achieved following improvement(s) in their dams or safety management practices.*

4.1.1 Standards and Guidelines

Criteria for engineering of the TSF Development are based on the following key references:

- DSC1B Background to DSC Risk Policy Context, NSW DSC (2010)
- DSC3A Consequence Categories for Dams, NSW DSC (2010)
- DSC3B Acceptable Flood Capacity for Dams, NSW DSC (2010)
- DSC3C Acceptable Earthquake Capacity for Dams, NSW DSC (2010)
- DSC3G General Dam Safety Considerations, NSW DSC (2010)
- DSC3G General Dam Safety Considerations, NSW DSC (2010)
- DSC3F Tailings Dams, NSW DSC (2012)
- ANCOLD Guidelines on Tailings Dams, ANCOLD (2012)
- ANCOLD Design Guidelines for Earthquakes (1998)
- ANCOLD Guidelines on Risk Assessment (2003)

- DFAT (2016), Tailings Management Leading Practice Sustainable Development Program for the Mining Industry, Department of Foreign Affairs and Trade (2016)

The engineering criteria relate to the following aspects:

- Hydraulic Performance
- Embankment Stability
- Seepage Management
- Construction Materials
- Emergency Spillway

4.1.2 TSF Consequence Category

A key input into selected design criteria for the storages is the assessed consequence category, which has been prescribed by the NSW DSC, in accordance with DSC3F.

Assessing the consequence category of a storage in accordance with DSC3F (DSC, 2012) requires estimation of severity of damages and loss in addition to Population at Risk (PAR). The recommended consequence category is the more significant outcome of PAR and "Severity of Damage and Loss" outcome. A dam can be classified as one of seven levels as follows:

Extreme, High A, High B, High C, Significant, Low and Very Low.

Table 5 below outlines the criteria used to determine the applicable consequence category based on PAR and severity of damage and loss, reproduced from DSC3F - Tailings Dams (DSC, 2012).

Table 5
Consequence Category Assessment (reproduced from DSC3F – Table 2)

Population at Risk-PAR *(Note 4)*	Receiving Environment	Severity of Damage or Loss			
		Minor (Benign Solid/ Liquid)	Medium (Saline Liquid/ Unsightly Solid	Major (Acid Tailings)	Catastrophic (Highly Reactive/ Toxic Tailings)
<1	Remote/ Degraded	Very Low	Low	Significant	High C
≥1-10	Rural/ Productive	Significant[2]	Significant[2]	High C	High B
>10-100	Urban/ Sensitive	High C	High C	High B	High A
>100-1000		(Note 1)	High B	High A	Extreme
>1000			(Note 1)	Extreme	Extreme

Note 1: "Minor" damage and loss would be unlikely when PAR exceeds 1000.
Note 2: Change to at least High C where the loss of non-itinerant lives is reasonably likely.
Note 3: See Sections 2.6 and 1.6 of ANCOLD Consequence Guidelines for explanation of the range of High Consequence Categories.
Note 4: The PAR is to be the total PAR.

Total infrastructure costs are based on damage to residential and commercial property as well as community infrastructure. Cost associated with replacement or repair to the dam are also included. In accordance with ANCOLD (2012a) guidelines, the worst-case severity level of damage and loss as determined is used to assign the Consequence Category.

For the purpose of this Feasibility Study to ensure a robust design, the consequence category of Extreme has been assigned, on the basis of the following:

- Population at Risk (PAR) – Numerous residents are situated in Blayney NSW with low lying areas being potentially impacted (note excludes mitigating design features), with the expected total number of PAR possible to be greater than 100 (2017 Census data estimated total population of the township of Blayney NSW as 2,963, reference ABS, 2017).
- Severity of Damage and Loss is expected to be no greater than Major (defined as between $100M and $1 billion) and that the tailings would be potentially be acid generating.

A comprehensive Consequence Category Assessment will be required as part of the detailed design and should be inclusive of a dam break study/model for the tailings run-out and flood flow impacts. Notwithstanding, it should be recognised that the conceptual designs as provided herein would not materially change should the consequence rating change to a lesser Consequence Category. Regis has also indicated that based on the concerns for the community and business risk, they would maintain the standards for an Extreme Consequence Category.

4.1.3 Operational Philosophy

The general operational philosophy with respect to TSF development is as follows:

(i) provide for the efficient storage of tailings, forming an operational and post-closure landform that is geotechnically competent/stable and not subject to excessive or uncontrolled emissions to the environment; and

(ii) provide an integral component of the total site water management system, such that releases from the system to the environment are eliminated for all but extreme conditions.

The general operational philosophy for the TSF is based on the use of subaerial techniques for tailings deposition. Such techniques involve discharge of tailings from multiple locations on the perimeter of the tailings storage area. At each discharge location, the tailings slurry produces near laminar flow over the gently sloping tailings beach to enable segregation and deposition of tailings solids. Subsequent evaporation from the exposed beach surface consolidates the tailings as a means of increasing in-situ deposited densities and beach strengths. Water liberated from the tailings through the deposition phase accumulates within a water pond at the toe of the beach. From this pond, water can be decanted and is available for reuse.

4.2 Engineering Criteria

4.2.1 TSF Storage Capacity

From **Section 3.1.1**, the minimum capacity for tailings storage under life-of-mine conditions is some 46,700ML. A nominal storage capacity, allowing some contingency for additional processing and density variation, a minimum total storage of some 49,000ML has therefore been adopted.

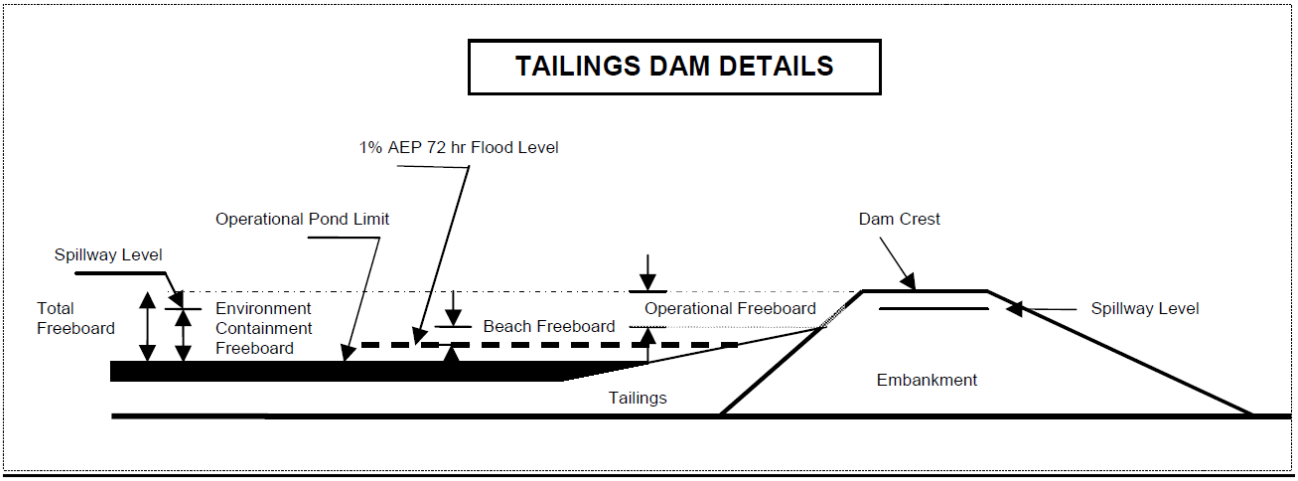
4.2.2 Hydraulics and Performance Criteria

(i) Environmental Containment Freeboard

Criteria for storm water/containment for TSF are based on DSC3F (2012), which defines storage capacity required for a TSF, as the Environmental Containment Freeboard. The Environmental Containment Freeboard is calculated based on providing for the defined AEP 72hour storm event. In addition to the Environmental Containment Freeboard, Beach

Freeboard, Operational Freeboard and Total Freeboard are also to be provided with the terminology represented pictorially in **Plate 14**.

Plate 14
TSF Freeboard Requirements (Source DSC3F)



Based on **Section 4.1.2,** the consequence category for TSF is Extreme. Environmental Containment Freeboard as outlined in DSC3F (2012), will be therefore based on a 1 in 10,000 year, 72 hour duration event.

(ii) Emergency Spillway Design

Emergency spillway for the TSF is to be designed based on criteria as outlined in DSC3F (2012) and ANCOLD (2000). The minimum criterion for emergency spillways to achieve capacities equivalent to a PMP event, applied above the operational pond limit.

4.2.3 Embankment Stability

(i) Design of Embankment Configuration

On the basis of limit equilibrium conditions, the following typical minimum factors of safety for embankment stability would apply:

Condition	Minimum Factor of Safety
End of Construction	1.3
Steady State Seepage (at maximum storage level)	1.5
Seismic Condition (Operating Base Earthquake):	1.2
Seismic Condition (Maximum Design Earthquake): (i) at maximum storage level for downstream slope, or intermediate level for upstream slope. (ii) subject to maximum anticipated seismic loading for the Maximum Design Earthquake (MDE).	1.1

(ii) Embankment Serviceability/Deformations

No specific criteria for minimum vertical and lateral movement have been adopted for this level of design. Results from investigations completed and data available for the proposed development indicates that, given the geological and geotechnical conditions of the site and the concept for the TSF embankment, the magnitude of settlement occurring within the starter and downstream lift sections should remain within acceptable limits, provided that adequate foundation preparation and construction fill compaction standards are maintained.

4.2.4 Seepage Management

4.2.4.1 Background

Based on the project EPA requirements (refer **Section 1.3**) that the TSF shall meet or exceed NSW Environmental Protection Authority Guidelines for Solid Waste Landfills, EPA (2015), which in summary terms, stipulates the following objectives:

- The landfill must have a leachate barrier system to contain leachate and prevent the contamination of surface water and groundwater over the life of the landfill.
- Pollutants with the potential to degrade the quality of groundwater must not migrate through the strata to any point beyond the boundary of the premises or beyond 150 metres from the landfill footprint, whichever is smaller. If this occurs, additional engineered controls may be required to prevent further pollutant migration. It may also be necessary to remediate the existing pollution.

Specific requirements for the barrier system as specified in EPA (2015) are as follows:

- A compacted sub-base 200 millimetres thick to provide a firm, stable, smooth surface of high bearing strength on which to install the liner.
- A compacted clay liner at least 1000 millimetres thick, with an in situ hydraulic conductivity of less than 1×10^{-9} metres/second; for landfills receiving more than 20,000 tonnes of waste per year, the liner should include a geomembrane over the compacted clay; the base liner should have gradients of greater than 1% longitudinally and 3% in transverse directions
- A leachate collection layer comprising a 300 millimetres thick gravel drainage layer including collection pipework, which slopes to a sump or other extraction point from which leachate can be conveyed from the cell; the pipes should be at least 150 millimetres in internal diameter, be placed on the floor at intervals of not more than 25 metres (running the length of the cell), and be laid at gradients of at least 1% longitudinally into the sump and 3% in transverse directions.

4.2.4.2 Alternative Approach

In addition to the above prescriptive criteria, EPA (2015) also provides a methodology for the barrier system to be assessed based on an equivalent or better performance. To undertake this alternative approach, the following criteria must be demonstrated to be achieved:

- The alternative proposal must be able to achieve the required outcomes for a leachate barrier and be compatible with achievement of the required outcomes for all other environmental issues.
- Clear reasons should be given for proposing an alternative in preference to the acceptable measure(s) in these guidelines.

- The proposal must fully describe the properties and predicted performance of the alternative leachate barrier. For each barrier layer, this includes but is not limited to thickness, hydraulic properties, strength, resistance to degradation, long-term behaviour, compatibility with adjoining layers, compatibility with the site's leachate, slope stability where relevant, and construction methods. Performance predictions should be supported by all necessary test results, calculations and modelling.
- A hydrogeological investigation must characterise the surrounding soil and groundwater and must identify any risks to water bodies and other sensitive receptors in the locality. The assessment should be done in accordance with a recognised guideline for hydrogeological assessments.
- In some cases, the EPA may require a peer review of the proposal by a suitably qualified and experienced person. Examples of these situations are when the proposal involves a major departure from the acceptable design measure(s) in this section or when the landfill is located near sensitive receptors.
- Even where these circumstances apply, there should be a minimum level of site preparation work. The top surface of the landfill floor and side walls should be reworked to at least 300 millimetres to remove any fissures, fractures or desiccated soil.

In consultation with Regis, it is proposed to provide an alternative barrier system which have a equivalent hydraulic performance to 1m thick clay liner with a permeability of 1 x 10^{-9} m/s as well as a seepage recovery system to exceed the seepage performance requirements of a barrier only system, with details of the system and documented assessment provided in **Section 7.1**.

4.2.5 Construction Materials

4.2.5.1 Embankment Construction

Based on the geotechnical investigations undertaken (refer **Section 5.0)**, embankment construction materials for TSF would comprise Clay Fill used to form upstream containment zones and Rock Fill used to form transition zones and buttress zones. Target properties of these materials are as follows:

(i) <u>Clay Fill</u>

- Clay dominant material (clay/silt fraction greater than 50% and Liquid Limits ranging from 40% to 60%).
- Undrained shear strength in excess of 50kPa after compaction.
- Achievable compacted permeability of less than 1 x 10^{-9} m/s.
- Engineerable to reduce potential "internal" erosion/piping.

The key to the above suite of properties is to create a fill layer that possesses high strength, compacts well, is stable (i.e. not subject to significant vertical settlement under load or volume instability due to variation in moisture content) and importantly, provides an appropriately low level of permeability.

This material would be sourced locally, either from the TSF storage area or within mining disturbance areas and in close proximity to the TSF.

(ii) Rock Fill

The purpose of Rock Fill within an embankment would be to enhance structural stability as well as to provide erosion protection to external portions of the embankment. General requirements for Rock Fill would be as follows:

- High load bearing capacity;
- Stable and durable (with respect to potential settlement, volume instability, erosion potential and weathering);
- High permeability relative to adjacent embankment or subgrade zones; and
- Geochemically stable (i.e. non-acid producing).

4.2.6 Operational Criteria

4.2.6.1 Decant/Return Water Quality

Appropriate practices with respect to maintaining the quality of decant/return water (to be reused within the process) are to be adopted. As a minimum, provisions to be made to limit the significant alteration of decant water quality within the TSF will include:

(i) Maintaining a sufficiently large enough decant pond to enable sufficient residence time for settlement of suspended solids prior to recovery.

(ii) Maintaining an appropriate tailings deposition regime (in terms of cycling periods) such that the tailings beach consolidation is maximised, thereby maximising tailings storage efficiency.

4.2.6.2 Seepage Management

Appropriate practices to manage the rate and quality of seepage water that may be released from the system are to be adopted. These practices are consistent with leading best practice as outlined in the Australian Government Tailings Management Leading Best Practice Guideline will be implemented to comply with regulated environmental requirements required, specifically referring to the downstream and downgradient water quality requirements.

In discussion with Regis and based on analyses in **Section 7.1**, the preferred approach for seepage management comprises construction of a low permeability clay core within the embankment and extending into the basement sequences, storage floor blanketing works to achieve a minimum 300mm of compacted clay liner with a permeability of less than 3.3×10^{-10} m/s (which is equivalent to or better than 1m at 1×10^{-9} m/s), and provision of seepage interception system beneath the Main Embankment with automated seepage recovery/pump back.

In addition to the above physical controls, seepage management shall also include a wholistic approach to minimising TSF seepage as part of operational practices to achieve equivalent or better than the above requirement.

To achieve the water quality requirements and as a minimum, provisions to be made to manage seepage migration effects will include:

(i) Maintaining an appropriate tailings deposition regime (in terms of cycling periods) to maximise consolidation of the tailings and water recovery.

(ii) Whilst maximising water recovery, as outlined above, the volumes of free water occurring within the decant pond is limited. This outcome requires an effective balance between deposition scheduling and decant water recovery rate.

(iii) Operating and maintaining a seepage interception and recovery system as outlined above.

(iv) Installing groundwater monitoring bores to assess the TSF performance in terms of seepage losses and to identify preferred flow paths/basement sequences, with the monitoring to provide a feedback trigger for implementation of additional and targeted dewatering works.

Specific details of the monitoring of surface water and groundwater quality and quantum around the TSF is addressed in the Surface Water Assessment (EIS Appendix J). For the purpose of this feasibility design and subject to implementing the above provisions, an overall seepage loss from the TSF being less than that of an equivalent TSF with a 1,000mm thick clay fill storage liner having a permeability equivalent to 1×10^{-9} m/s is considered an appropriate criteria to assess suitability of the conceptual design.

5 DESIGN BACKGROUND

5.1 Hydrological (Rainfall) Conditions

5.1.1 Hydro-meteorological Conditions

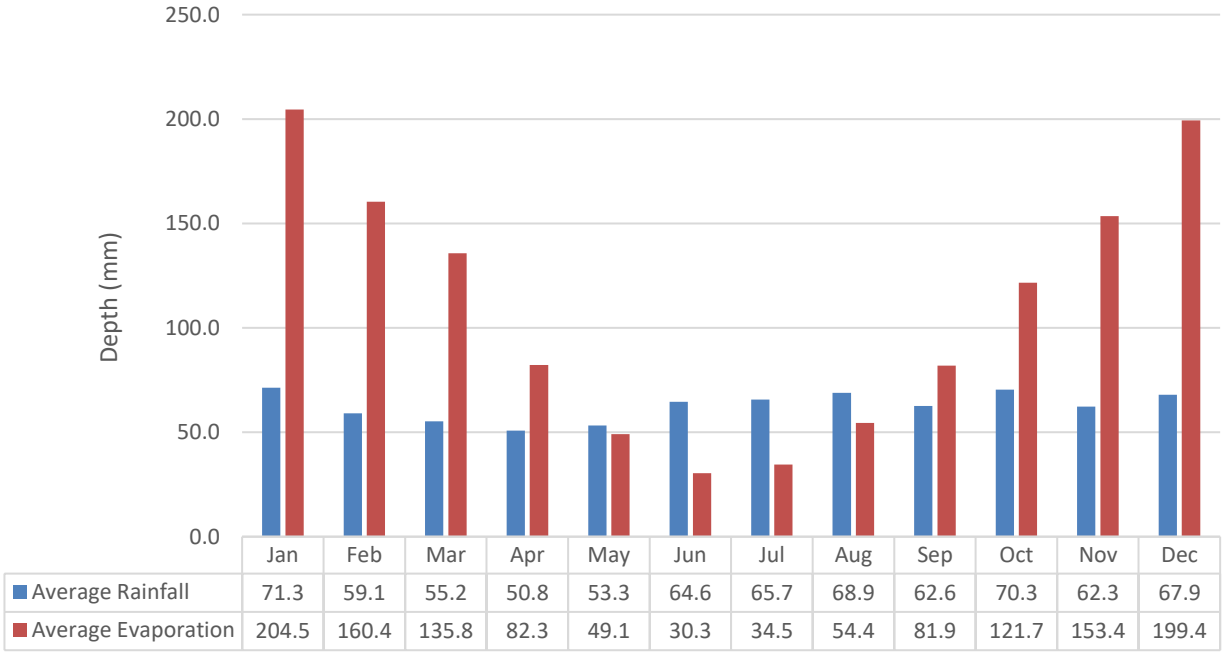
Average monthly rainfall data for McPhillamys, as derived from the daily rainfall record sourced from Bureau of Meteorology (BoM) SILO rainfall data, is provided in **Table 6**. Average monthly evaporation data has also been derived from Silo Datadrill recovered from the McPhillamys Project site location and is also provided in **Table 6** in and plotted in **Plate 15**.

Table 6
Rainfall and Evaporation for the Site (Extracted from SILO Data Drill from 1970)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Average Rainfall (mm)	71.3	59.1	55.2	50.8	53.3	64.6	65.7	68.9	62.6	70.3	62.3	67.9	751.9
Average Evaporation (mm)	204.5	160.4	135.8	82.3	49.1	30.3	34.5	54.4	81.9	121.7	153.4	199.4	1307.8

The McPhillamys region can be characterised by moderate total average rainfall (approximately 750mm). Based on this data, rainfall is generally consistent throughout the year, with a slight increase over August through to January. An excess of evaporation over rainfall (on average) exists for all months excluding May to August.

Plate 15
Average Annual Rainfall and Evaporation for McPhillamys Site



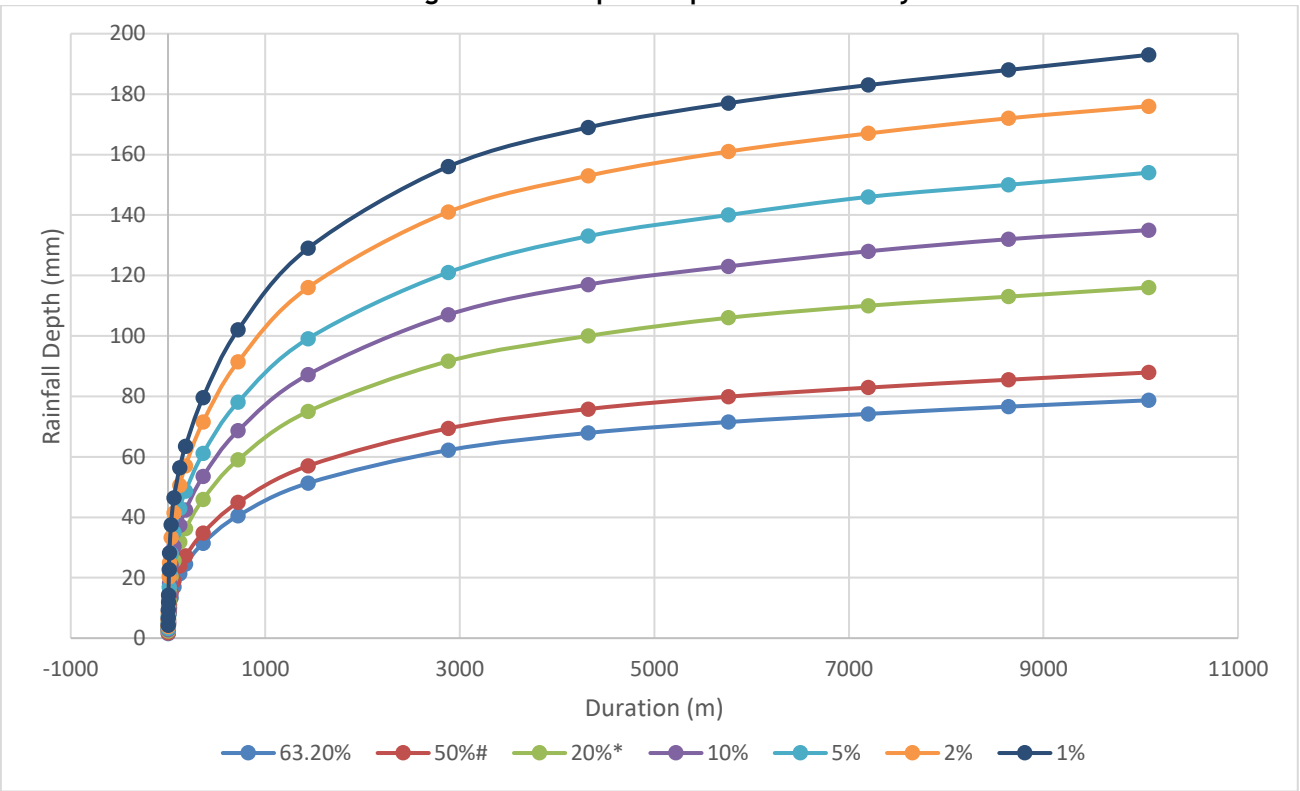
5.1.2 Rainfall Intensity Frequency Duration Data

Rainfall intensity versus duration data for the McPhillamys Project site, sourced from BoM, is provided in **Table 7** and presented graphically on **Plate 16**.

Table 7
Rainfall Intensity Frequency Duration Rainfall Depth (mm) for McPhillamys (Ref.: BOM Australia)

Duration	Duration in min	Annual Recurrence Interval						
		1 Year	2 years	5 years	10 years	20 years	50 years	100 years
1 min	1	1.53	1.71	2.32	2.75	3.18	3.78	4.25
2 min	2	2.53	2.83	3.79	4.46	5.13	6.00	6.67
3 min	3	3.51	3.92	5.26	6.20	7.15	8.38	9.35
4 min	4	4.39	4.92	6.61	7.81	9.01	10.60	11.90
5 min	5	5.18	5.80	7.82	9.25	10.70	12.60	14.20
10 min	10	8.08	9.07	12.30	14.60	16.90	20.20	22.70
15 min	15	9.97	11.20	15.20	18.10	21.00	25.00	28.20
30 min	30	13.40	15.00	20.40	24.20	28.00	33.30	37.50
1 hour	60	17.00	19.00	25.60	30.30	35.00	41.40	46.40
2 hour	120	21.30	23.80	31.80	37.30	42.90	50.50	56.40
3 hour	180	24.50	27.20	36.20	42.740	48.60	57.00	63.50
6 hour	360	31.40	34.80	45.90	53.50	61.10	71.50	79.60
12 hour	720	40.50	44.90	59.00	68.60	78.10	91.40	102.00
24 hour	1440	51.30	57.00	75.00	87.20	99.10	116.00	129.00
48 hour	2880	62.20	69.40	91.60	107.00	121.00	141.00	156.00
72 hour	4320	67.90	75.80	100.00	117.00	133.00	153.00	169.00
96 hour	5760	71.50	79.90	106.00	123.00	140.00	161.00	177.00
120 hour	7200	74.20	82.90	110.00	128.00	146.00	167.00	183.00
144 hour	8640	76.60	85.50	113.00	132.00	150.00	172.00	188.00
168 hour	10080	78.70	87.90	116.00	135.00	154.00	176.00	193.00

Plate 16
Design Rainfall Depth Graph for McPhillamys



5.1.3 Probable Maximum Precipitation (PMP)

The Generalised Short Duration Method (GSDM) and the Generalised Southeast Australia Method (GSAM) were used to determine the critical duration of the Probable Maximum Precipitation (PMP) for the TSF site.

The GSDM was used to calculate the PMP for 0.25 hr, 0.5 hr, 0.75 hr, 1.00 hr, 1.50 hr, 2.00 hr, 2.50 hr, 3.00 hr, 4.00 hr, 5.00 hr and 6.00 hr durations, while the GSAM was used to calculate the PMP for a 24 hour duration. The 12 hour rainfall depth was obtained through interpolation between the two methods.

The probable maximum precipitation (PMP) depths for the TSF catchment is provided in **Table 8**.

Table 8
PMP Rainfall in mm for McPhillamys Site

Duration	Rainfall Event, mm		
	1 in 1,000 Year AEP	1 in 10,000 Year AEP	PMP
0.25 hr	42	60 mm	150
0.50 hr	55	80 mm	220
0.75 hr	62	90 mm	280
1.00 hr	68	100 mm	320
2.00 hr	82	123 mm	480
4.00 hr	100	150 mm	660
5.00 hr	108	161 mm	730
6.00 hr	115	171 mm	770

5.2 Site Geology

5.2.1 Geological Setting

Published regional geological mapping of the site (Orange 1:100 000 Geological Series Sheet 8731, First Edition 1997) indicates the area is underlain by Silurian Aged Anson Formation of the East Lachlan Fold Belt of New South Wales, Australia belonging to the Mumbil Group consisting of carbonaceous pyritic siltstone, felsic volcanics, volcanic sandstone and limestone.

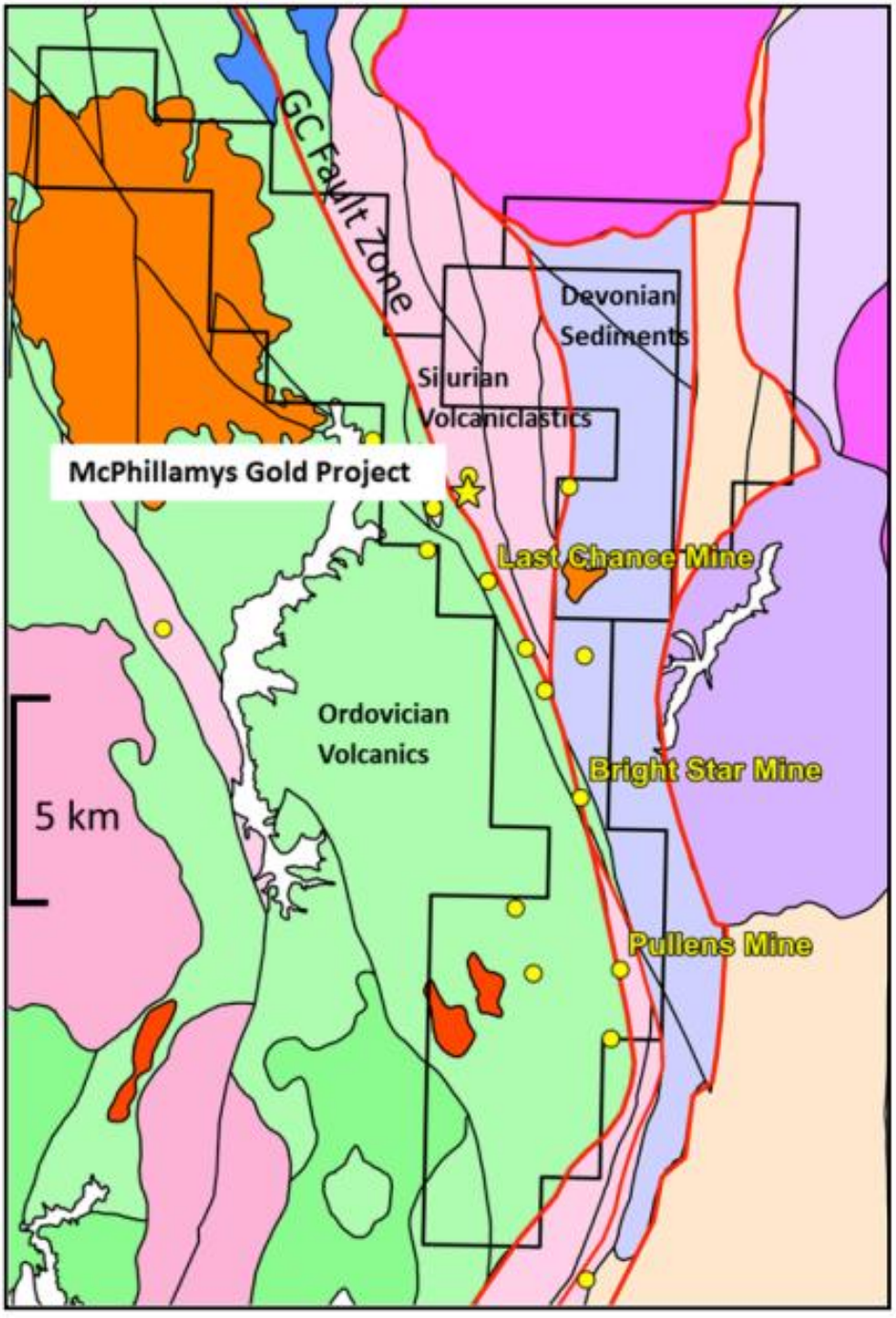
Silurian dacitic volcaniclastics vary in composition from crystal tuffs to agglomeratic matrix supported accretions. Some ungrouped Devonian formations also exists within the eastern part of the site, and consist of slate, laminated siltstone and lithic sandstone. Occurrences of the Bying Volcanics of the Ordovician Volcanics consisting of basalt and volcaniclastic sandstone are dominant west of the Godolphin Fault with minor occurrences within the headwaters of the Belubula River. Jointing / lineation's associated with this geology is reported to be approximately parallel to the Godolphin Fault. There exists a shallow east-dipping domain boundary structure separating the Ordovician Macquarie Arc in the west from the Silurian Hill End Trough in the east, trending south-east to south-west and located less than 1km west of the open pit.

Previous investigations across the site carried out as part of previous TSF options (located to the north of the site) and available exploration drilling records indicated that the bedrock is overlain mainly by clayey soils.

The drainage on which the TSF is to be formed therefore appears to be structurally controlled in alignment with jointing.

A regional geological map of the site is shown on **Plate 17**.

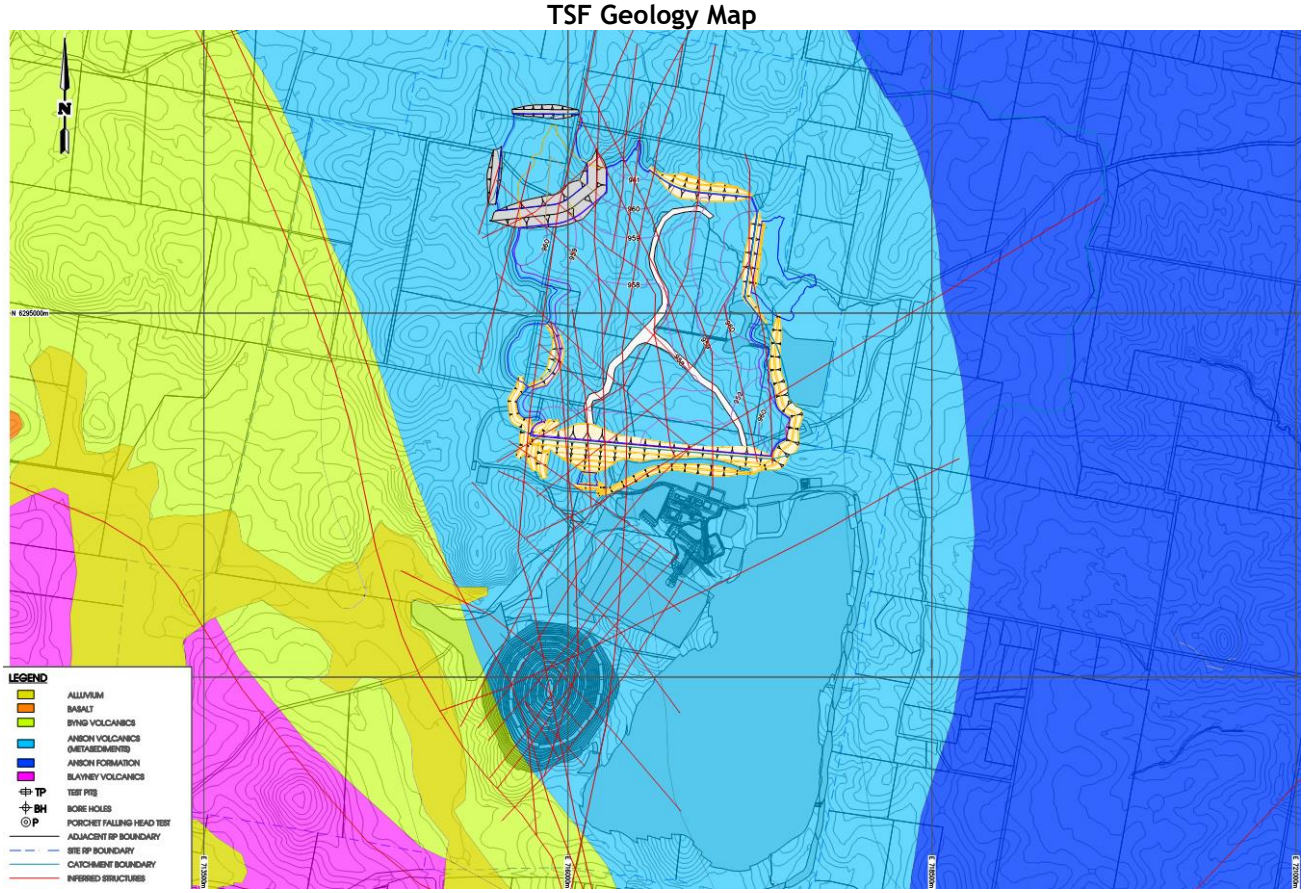
Plate 17
Regional Geology Map Extract (Reference French et al 2015)



5.2.2 Geology and Structure

The proposed TSF is sited wholly within Anson Formation, dominated by sedimentary and volcanic lithologies. Geological interpretation of the TSF site as shown on **Plate 18** indicate the main structural features of geology within the site area are the slightly trending faults and based on **Plate 18**, are run in north-south direction across the proposed TSF embankment location.

Plate 18
TSF Geology Map



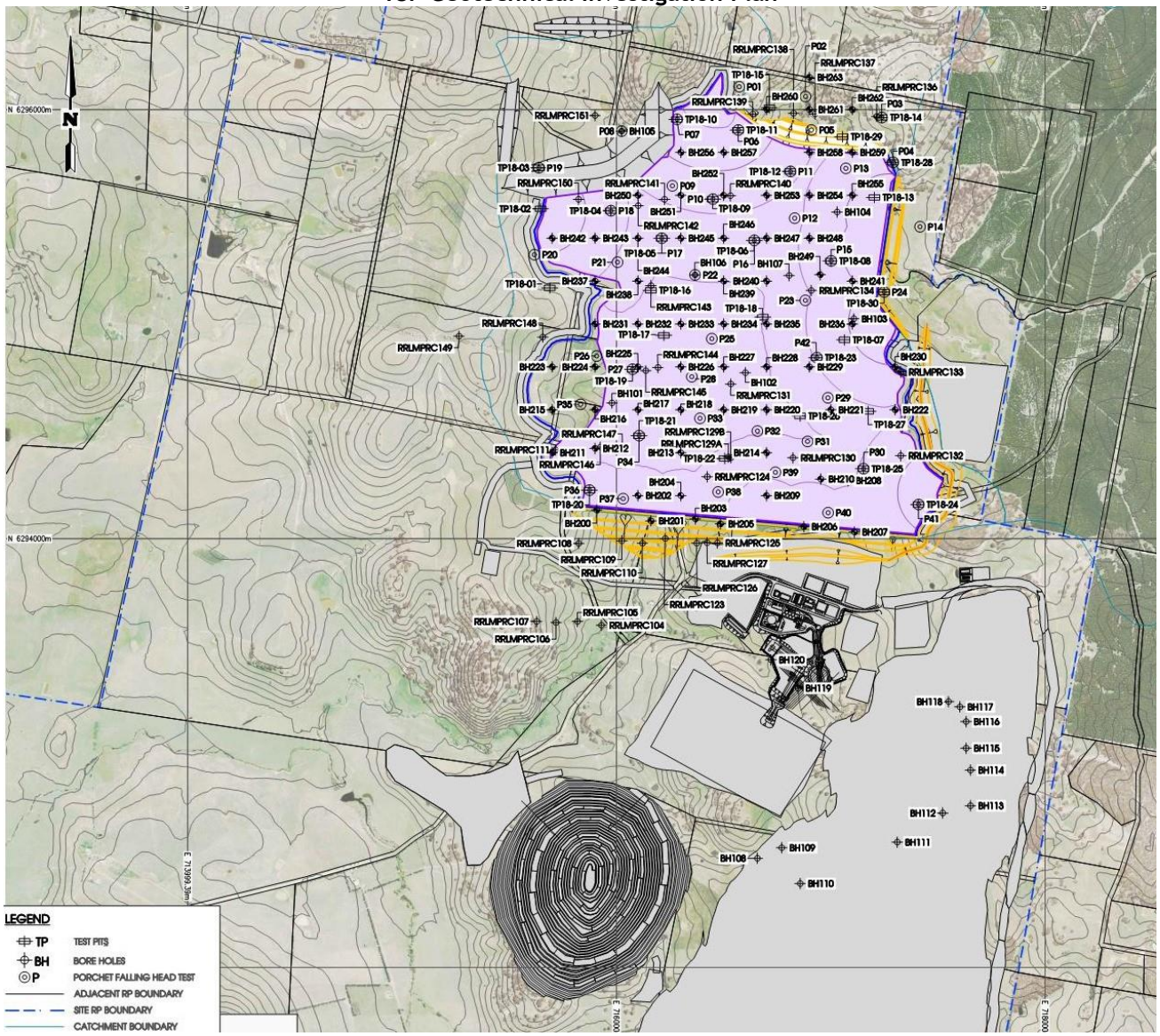
5.3 Subsurface Conditions within TSF Area

5.3.1 Site Investigation Interpretation

Test pits within the TSF storage/embankment areas intersected predominantly residual saprolitic clays (formed by weathering of the underlying sulurian volcanics). Topsoils up to 0.4m thickness consisting mainly of sandy clay/ silt overlies the residual profile, which grades into predominately low to medium plasticity clays/silts with few occurrence of high plasticity clays and gravelly clay layers. The clays in most cases overlie weathered sandstone, limestone, siltstone and occasional quartz. Test pits adjacent to creek beds and floodplains contained layers of sandy clay/clayey sand below the topsoil. Excavation refusal was encountered in a number of test pits within weathered rock.

A summary of the average test pit soil profiles across the site is provided in **Table 7** with details of test pit logs included in **Appendix B.**

Plate 19
TSF Geotechnical Investigation Plan



Main Embankment Foundation

A subsurface profile section through the proposed alignment of the main TSF embankment indicates that the foundation is underlain by 0.30m thick topsoil overlying low to medium plasticity Clays overlying weathered bedrock at depth. An approximately 0.5m thick layer of Clayey Sand / Sandy Clay was encountered in test pits within the Belubula River floodplain.

Main Storage/Borrow Area

The proposed storage / borrow areas for the main TSF embankment construction is primarily located east of the Belubula River drainage line. Test pitting results indicate the area from surface to contain an average 1.6m thick of medium plasticity Clays underlain by weathered bedrock. TP24 and TP26 located on a ridge and farthest from the TSF main embankment, have low plasticity SILT fines.

The storage / potential borrow area west of the Belubula River drainage is small, dominated by ridge slopes immediately upstream of the proposed TSF embankment, gradually sloping into flat floodplains about 500m upstream. Test pits excavated within this area yield subsurface soil profiles of 0.3m top soil overlying 1.5m average thick medium plasticity Clays followed again by distinctly weathered bedrock.

Northern Storage Area

The subsoil profile below the proposed saddleback embankment consists of an approximately 1.5m thick layer of medium plasticity CLAY within the drainage alignment which thins out up the slope to 0.5m. This is then underlain by distinctly weathered rock to depth.

Table 9
Summary of Site Stratigraphy

AREAS	STRATIGRAPHY SEQUENCE (Depths Ranges)				
	TOPSOIL	CLAY (low to medium plasticity	Sandy CLAY / Clayey SAND	Clayey GRAVEL	BEDROCK
Main Embankment	0.0 – 0.30m	0.30m – 2.5m	-	0.2m-	2.0-2.7m**
Storage Area West	0.0-1.0m	-	1.0-2.35m	3.0-3.9m*	2.35-3.0m
Storage Area East	0.0-0.25m	-	0.25-0.90m	-	0.9-1.3m

* Extent of Excavation
** Depth of excavation refusal

5.3.2 Geophysical Interpretation

Regis conducted passive seismic survey using Tromino passive seismic systems from 14 September to 3 October 2018. The purpose of the survey was to define depth to basement and determine basement structures that may impact on the TSF design and/ or construction. The data collected from the survey was subsequently processed by Core Geophysics to generate HVSR amplitude depth sections and interpretation.

Passive seismic survey involves the measurement of ambient (natural) sound waves in the ground opposed to seismic reflection or refraction survey which measures seismic waves or vibration generated by explosives or hammer blows.

The results of the survey display various features across the site, which were interpreted to represent basement structures and deeper weathering. Reconciliation of this data with the geotechnical investigation data will be required as part of detailed design, including additional geophysics. Notwithstanding, the results indicate general interpretation of the major features generally orientated in a north south direction which will facilitate targeting of these features to monitor groundwater/seepage impacts from the TSF.

5.4 Groundwater Occurrence and In-situ Permeabilities

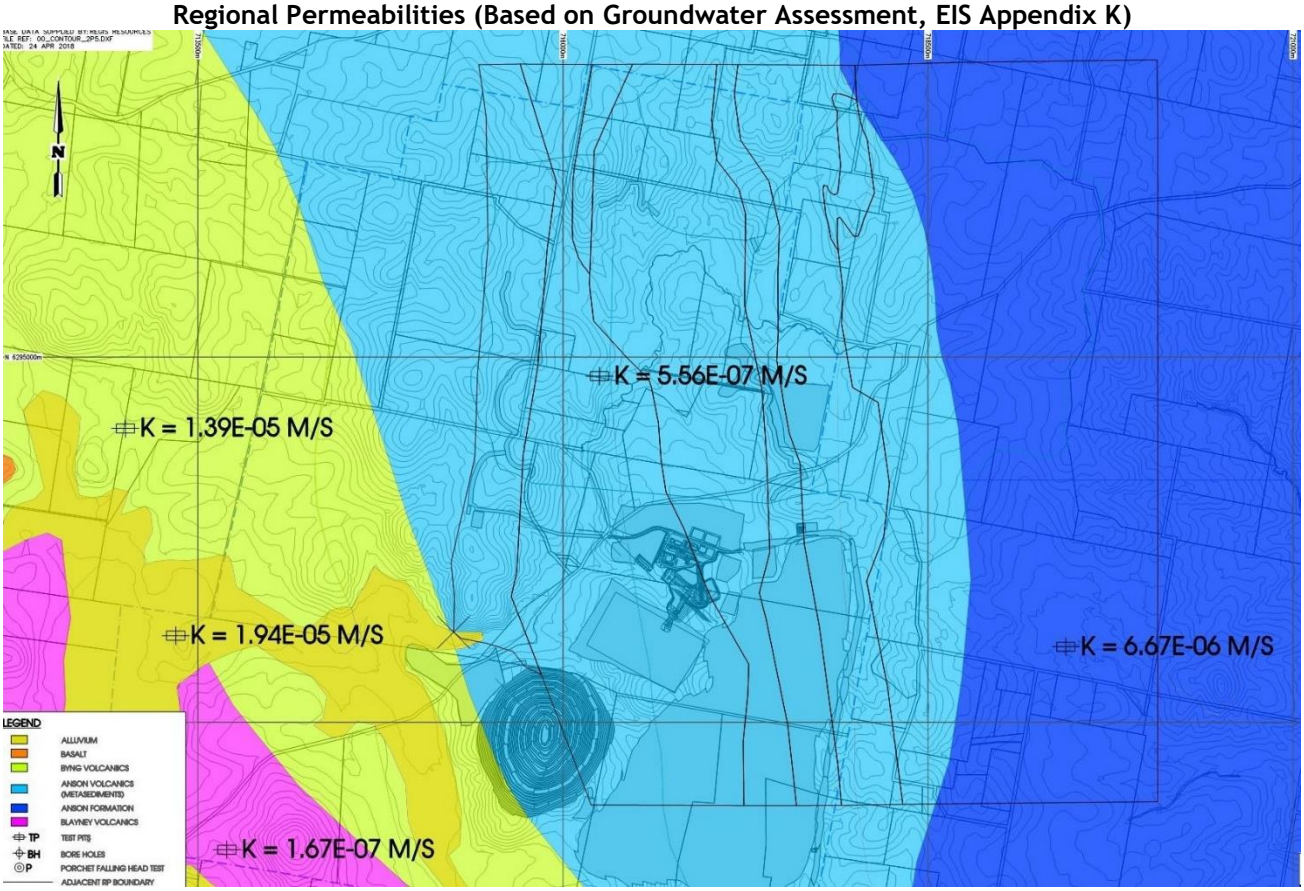
5.4.1 General Description

Hydrogeological setting for the TSF site area has been interpreted based on EIS Appendix K and TSF investigation works by ATCW.

These investigation works indicate that no permanent continuous aquifer is present within the site to depths of up to 20m below ground surface. Notwithstanding, perched groundwater is known to exist and was observed in a limited number of test pits and boreholes, predominantly reporting from the upper basement (depths less than 6m). These inflows possibly occurs through the weathered rock, which is likely recharged by direct surface infiltration of rainfall.

Based on the Groundwater Assessment (EIS Appendix K), it is considered that a regional groundwater system occurs within deeper basement sequences, the level of which would be controlled by the Belubula River to the south west and the catchment divide to the north and east. The groundwater surface profile within the TSF site and near surrounds would likely represent a subdued reflection of site topography and therefore would flow generally south west with the Belubula River. The Groundwater Assessment (EIS Appendix K) have reported that the Anson Formation at TSF location has Low horizontal and Very Low vertical permeability (K_{hor} 0.002m/day, K_{vert} 0.0001m/day). The regional permeabilities as reported in the Groundwater Assessment (EIS Appendix K) is provided in **Plate 20**.

Plate 20
Regional Permeabilities (Based on Groundwater Assessment, EIS Appendix K)



5.4.2 TSF Permeability Testing

Permeability testing carried out within the TSF areas included open hole falling head tests undertaken within 15 boreholes aligned along the embankment and within the storage area, as well as 30 constant head infiltration tests undertaken on near surface soils within the TSF storage area. This field testing is considered representative of the soil zone and weathered rock/upper basement zone with the deeper fresh rock zone permeability assessment completed as part of the hydrogeological investigation and modelling works undertaken by EMM (refer EIS Appendix K). Results of the field testing for the soil zone and the upper weathered basement are presented in **Plates 21, 22** and **23**.

Plate 21
TSF Soil Zone Permeability Testing Results

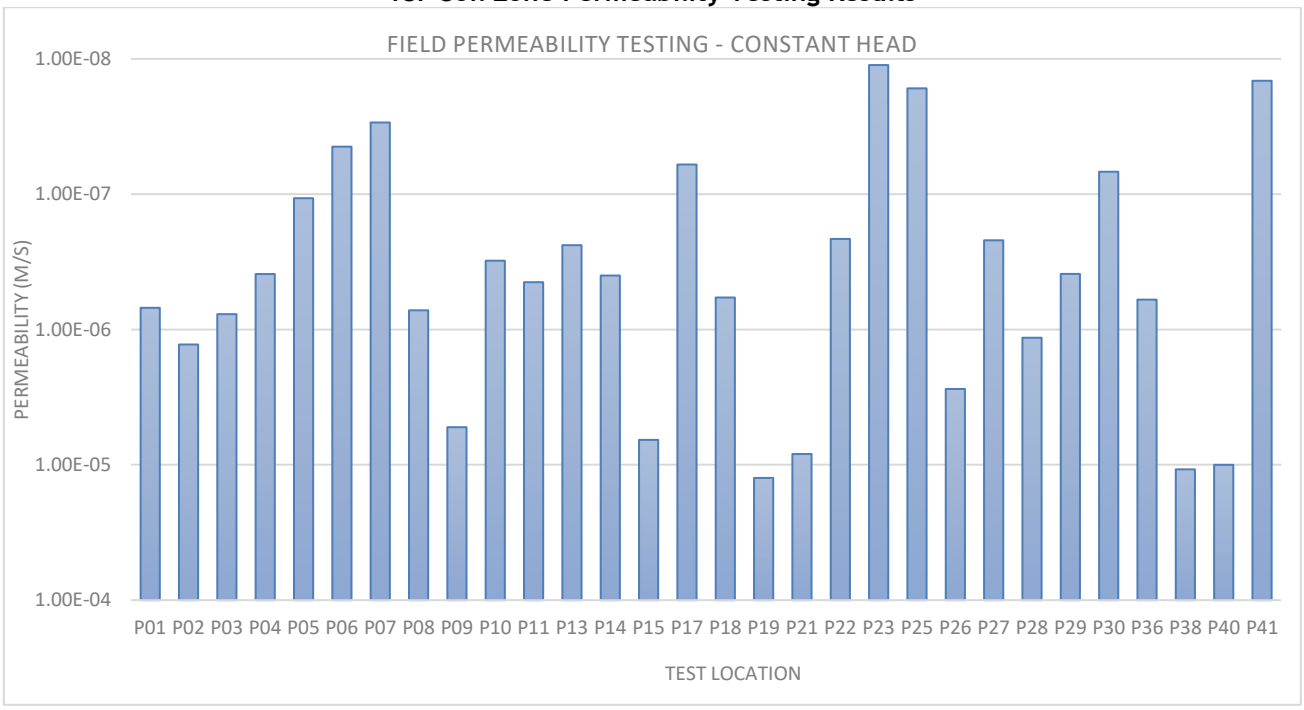


Plate 22
TSF Soil Zone Laboratory Permeability Testing Results

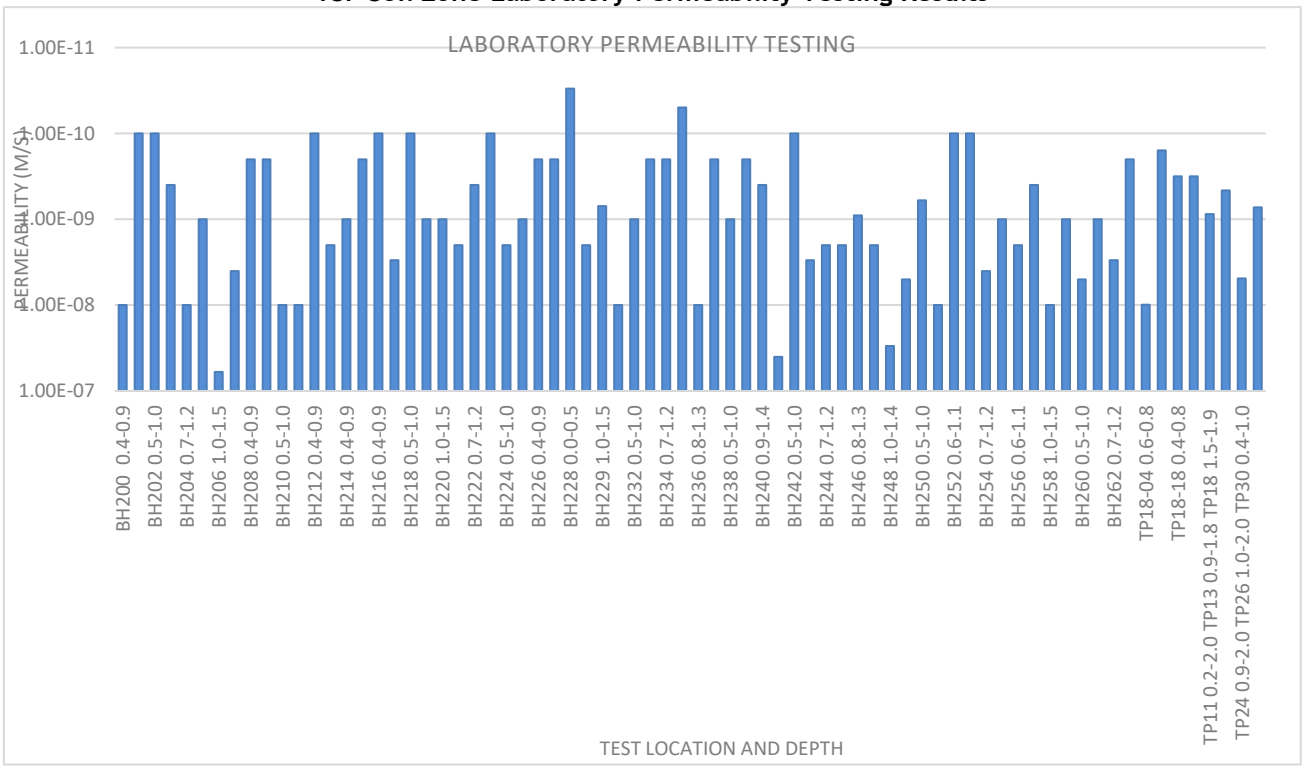
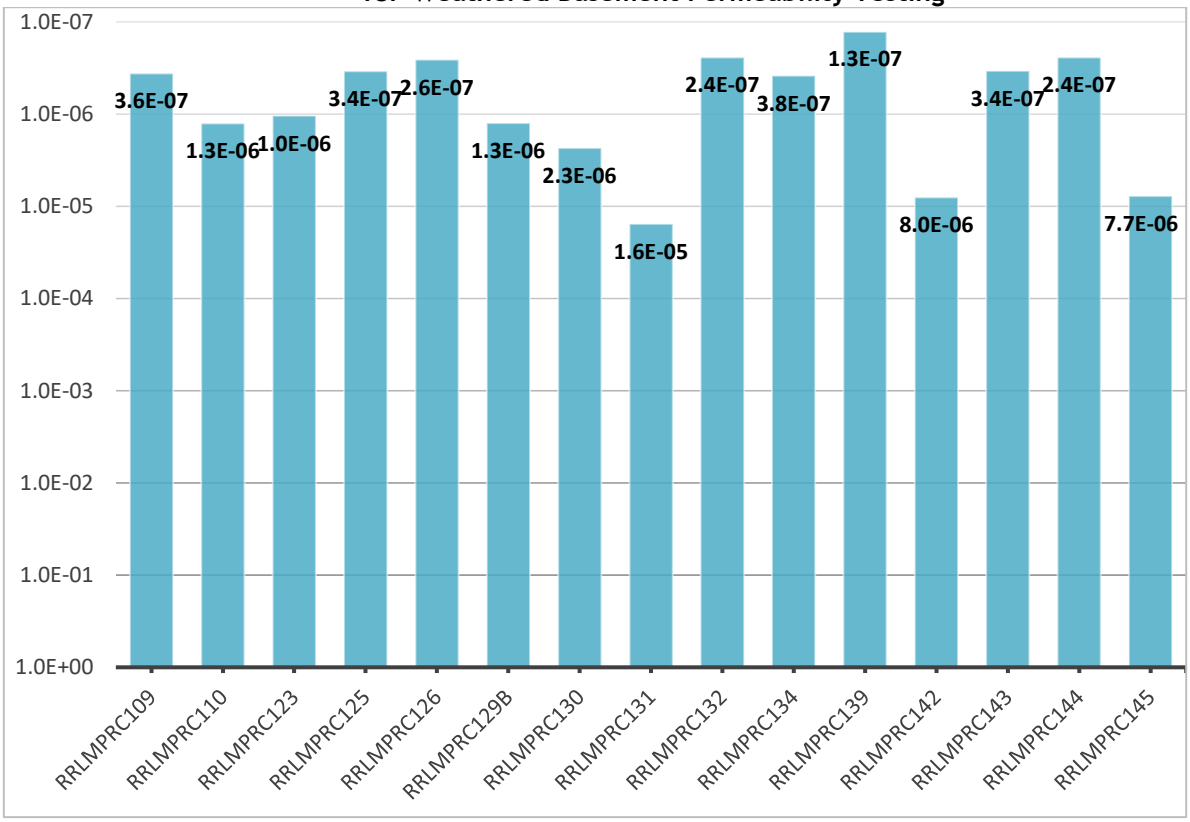


Plate 23
TSF Weathered Basement Permeability Testing



The above results of the permeability testing of the TSF soil and basement sequences are summarised in **Table 10.**

Table 10
Summary of Field (Insitu) Permeability Test Results

Target Sequence (Test Depth Range)	Range of Measured Permeability Values (m/s)	Average Permeability (m/s)
Soil Zone (0.0 to 3.0m)	1×10^{-5} to 1×10^{-8}	5×10^{-7}
Upper Weathered Basement (4.0 to 20.0m)	5×10^{-7} to 5×10^{-9}	5×10^{-8}
Lower Fresh Basement (greater than 20.0m)	K_{hor} - 2.3×10^{-8} K_{vert} - 1.2×10^{-9}	K_{hor} - 2.3×10^{-8} K_{vert} - 1.2×10^{-9}

Note that the permeabilities provided in Table 8 represent "gross" values having been calculated over test intervals that extend from ground surface to the base of the target sequence. These results indicate that gross permeability would vary with depth, of the order of 10^{-6} to 10^{-8} m/s within the upper soil and basement profile; grading to 10^{-7} to 10^{-8} m/s within the lower basement. Furthermore, structure observed within basement sequences, suggests that permeabilities would be primarily a function of secondary porosities (e.g. fracturing/fissures), with the permeability of the intact rock mass likely to be substantially lower.

Further interpretation of insitu permeabilities as presented in Appendix B indicates that structurally, the basement is moderately fractured. It can be inferred that fracturing is more intense along structural lineaments, with the main drainage line through the TSF area interpreted as structure controlled. Gross permeability through these more fractured zones is therefore higher, estimated to be of the order of 10^{-7} m/s. Away from drainage lines, permeabilities between 10^{-7} and 10^{-8} m/s can be expected.

5.5 Geotechnical Conditions

Geotechnical investigations completed within the proposed TSF site area in support of concept development. The scope of the investigation was to assess:

(i) Extent and thickness of clayey soils occurring within the storage area; and

(ii) Hydrogeological characteristics of foundation sequences within the embankment area, as a means of assessing seepage potential for the storage (refer **Section 5.4**).

Interpretation of geotechnical characteristics of the TSF site was based on test pitting and laboratory testing of representative samples of soils encountered. A site investigation report addressing this scope is reproduced as **Appendix A**. A summary of geotechnical conditions relevant to TSF development included in this report is provided below.

5.5.1 Soil Classification Test Results

Results of laboratory soil classification testwork carried out as described in **Appendix A**, are summarised in **Table 11** with the material testwork certificates provided in **Appendix A.**

Table 11
Summary Results of Laboratory Testwork

Sample No.*	Material	USCS Symbol	Moisture Field Content (%)	Shrinkage Linear (%)	Atterberg Limits			Particle Size Distribution (Percent passing particle size mm)							Emerson Class No	Maximum Dry Density (kg/m^3)	Optimum Moisture Content (%)
					LL (%)	PL (%)	PI (%)	37.5	19.0	9.5	4.75	2.36	0.425	0.075			
TP3 1.0-1.8m	CLAY wt gravel	CI-CH	15.2	13.5	49	18	31	100	89	87	84	82	80	72	3	-	-
TP6 3.0m	CLAY wt sand	CI	21.2	9.5	35	15	20	100	100	96	93	90	79	69	3	-	-
TP9 0.5-1.0m	CLAY wt gravel	CI	15.5	8.0	37	19	18	100	100	96	91	83	77	73	3	-	-
TP11 0.2-2.0m	CLAY	CI	17.0	10	40	18	22	100	98	92	91	89	83	80	3	1.65	20.5
TP11 2.3-3.7m	CLAY wt sand/gravel	CH/SC	20.4	8.5	51	29	22	100	98	93	88	80	62	54	3		
TP13 0.9-1.8m	CLAY	CI	11.7	9.5	36	16	20	100	100	98	94	91	89	87	3	-	-
TP17 0.6-1.2m	CLAY wt sand	CI	16.7	12.0	43	15	28	100	100	99	98	95	75	67	3	-	-
TP18 1.5-1.9m	CLAY wt gravel	CH	18.5	16.0	63	20	43	100	97	87	80	77	74	72	3	1.58	21.0
TP18 1.9-3.2m	CLAY	CH	22.3	6.5	54	23	31	100	100	99	99	98	90	84	3		
TP21 0.4-0.6m	CLAY	CI	12.2	8.5	39	17	22	100	100	100	99	98	95	92	3	-	-
TP22 1.0-1.5m	CLAY wt gravel	CI-CH	18.3	17.0	50	17	33	100	100	93	84	79	73	69	3	-	-
TP23 1.0-1.5m	CLAY wt sand	CI	20.6	9.0	38	19	19	100	100	100	99	98	90	80	3	1.64	19.0

Table 11
Summary Results of Laboratory Testwork (Cont'd)

Sample No.*	Material	USCS Symbol	Field Moisture Content	Linear Shrinkage (%)	Atterberg Limits			Particle Size Distribution (Percent passing particle size mm)							Emerson Class No	Maximum Dry Density	Optimum Moisture Content
TP24 0.9-2.0m	Sandy SILT/ Silty SAND	MI/SM	16.2	4	36	28	8	100	100	100	99	96	81	66	3		
TP26 1.0-2.0m	Sandy SILT/ Silty SAND	MI/SM	15.2	3.0	32	26	6	100	100	100	100	92	61	49	3	-	-
TP27 0.7-1.3m	Clayey SAND	SC	27.5	16.0	51	18	33	100	100	100	97	88	51	32	3	-	-
TP30 0.4-1.0m	Sandy CLAY / Clayey SAND	CL	14.5	4.5	28	15	13	100	100	100	100	98	89	86	4	1.67	19.5
TP31 1.5-2.4m	CLAY	CI	25.0	4.5	47	18	29	100	100	100	99	99	97	95	3		
TP32 0.4-2.0m	CLAY	CI	13.9	11.0	39	16	23	100	100	100	100	97	94	90	3	-	-
TP33 0.4-0.9m	CLAY wt sand	CI	14.5	5.0	32	18	14	100	100	99	97	96	86	81	4	-	-
TP36 0.3-2.1m	CLAY	CI	17.1	5.5	34	18	16	100	100	100	99	96	90	83	3	-	-
TP11 0.2-2.0m TP13 0.9-1.8m TP18 1.5-1.9m	CLAY	CI	-	11.0	46	20	26	100	100	98	96	93	86	82	-	1.60	17.5
TP21 0.4-0.6m TP22 1.0-1.5m TP23 1.0-1.5m	CLAY wt gravel	CI	-	13.5	45	117	30	100	100	95	84	78	72	68	-	1.75	17.0
TP24 0.9-2.0m TP26 1.0-2.0m TP30 0.4-1.0m	CLAY wt sand	CI	-	3.5	36	25	11	100	100	100	98	91	82	75	-	1.71	17.5
TP32 0.4-2.0m TP33 0.4-0.9m	CLAY	CI	-	5.0	33	17	16	100	100	100	99	96	90	86	-	1.76	16.5

5.5.2 Permeability and Strength Test Results

Consolidated un-drained (CU) shear strength testing were undertaken on a four combined samples from as described in **Appendix B**, to provide expected effective cohesion (c') and effective friction angles (ϕ') of the soils. Permeability testing was also undertaken on these samples to determine the permeability coefficients of the soils.

A summary of the CU and permeability testing is provided in **Table 12** below with the complete set of material test work certificates provided in **Appendix B**.

Table 12
Summary Results of CU Testing

Combined Sample*	Geotechnical Parameter		
	Effective Cohesion c' (kPa)	Effective Friction Angle□ ϕ (degrees)	*Permeability k (m/s)
TP11 - 0.2-2.0, TP13 - 0.9-1.8, TP18 – 1.5-1.9	1.5	30.1	8×10^{-10}
TP21 – 0.4-0.6, TP22 – 1.0-1.5 , TP23 – 1.0-1.5	6.8	31.0	4×10^{-10}
TP24 – 0.9-2.0, TP26 – 1.0-2.0, TP30 – 0.4-1.0	4.1	33.0	5×10^{-9}
TP32 – 0.4-2.0, TP33 – 0.4-0.9	5.3	30.5	7×10^{-10}

*Sample remoulded to 98% Standard Compaction and Standard Optimum Moisture Content.

Table 13
Summary Results of Borehole Testing

Test ID	Depth (mbgl)	Standard Optimum Moisture Content (%)	Maximum Dry Density (t/m3)	Permeability k(20) (m/s)
BH200	0.4-0.9	11.6	1.76	1.00E-08
BH201	0.5-1.0	18.9	1.67	1.00E-10
BH202	0.5-1.0	20.2	1.64	1.00E-10
BH211	0.4-0.9	13	1.79	1.00E-08
BH212	0.4-0.9	19.2	1.85	1.00E-10
BH215	0.5-1.0	14	1.89	2.00E-10
BH216	0.4-0.9	14.7	1.8	1.00E-10
BH221	1.0-1.5	16.5	1.78	2.00E-09
BH223	0.5-1.0	24.1	1.54	1.00E-10
BH224	0.5-1.0	14.8	1.87	2.00E-09
BH225	0.4-0.9	17	1.78	1.00E-09
BH230	0.8-1.3	14	1.86	1.00E-08
BH236	0.8-1.3	14.5	1.77	-

Table 13
Summary Results of Borehole Testing (Cont'd)

Test ID	Depth (mbgl)	Standard Optimum Moisture Content (%)	Maximum Dry Density (t/m3)	Permeability k(20) (m/s)
BH239	0.7-1.2	17.5	1.73	2.00E-10
BH240	0.9-1.4	15.5	1.8	4.00E-10
BH241	0.5-1.0	9	2.03	4.00E-08
BH242	0.5-1.0	19	1.86	1.00E-10
BH244	0.7-1.2	17	1.81	2.00E-09
BH245	0.5-1.0	16.5	1.8	2.00E-09
BH246	0.8-1.3	14	1.82	9.00E-10
BH247	0.5-1.0	16	1.83	2.00E-09
BH248	1.0-1.4	13	1.86	3.00E-08
BH249	0.8-1.3	17	1.74	5.00E-09
BH251	0.7-1.2	13	1.84	1.00E-08
BH252	0.6-1.1	14.5	1.82	1.00E-10
BH253	0.7-1.2	13	1.86	1.00E-10
BH254	0.7-1.2	15.5	1.8	4.00E-09
BH255	0.7-1.2	15.5	1.78	1.00E-09
BH256	0.6-1.1	15.5	1.77	2.00E-09
BH257	0.5-1.0	11.5	1.91	4.00E-10
BH258	1.0-1.5	11	1.95	1.00E-08
BH259	1.0-1.5	16	1.8	1.00E-09
BH260	0.5-1.0	13	1.84	5.00E-09
BH261	0.8-1.3	12	1.92	1.00E-09
BH262	0.7-1.2	17	1.75	3.00E-09
BH263	0.7-1.2	14.5	1.81	2.00E-10

5.5.3 Inferred Geotechnical Characteristics

The inferred engineering properties based on the above testwork results of the soil profile are as follows:

- the soil profile below any topsoil horizon is generally of high strength (inferred undrained shear strength of 100kPa);
- fines fraction is typically greater than 60% with the clay fraction described as medium to high plasticity;
- compacted densities (Standard Compaction) achieved dry densities of 1.58t/m^3 to 1.75t/m^3 with optimum moisture content ranging from 16.5% to 21%;
- subject to laboratory recompaction/re-engineering, materials recovered from the soil profile are considered to be of low permeability (typically less than 1 x 10^{-9} m/s)
- the soils are considered to be moderately dispersive and as such, given the variable and sometimes high silt/sand fraction, the soil may be considered to be "erodible" on slopes when subject to concentrated stormwater flow.

5.6 Seismic Risk

5.6.1 Regional Context

Continental Australia is located entirely on the Indo-Australian Tectonic Plate and away from the plate boundary. Seismic activity within Australia is generally intraplate, therefore such activity is typically infrequent and shallow (surface to 20km depth). In terms of seismic activity, Australia is divided into three regions, being the Western, Central and Eastern Regions. The MGP site is located within the Eastern Region, with seismic activity in the region generally related to the Tasman geosynclines with no major lineations. Rather, activity within the Eastern Region appears to be the result of regional stresses in the crust, likely to be the result of a predominant north-south compression (Chen and Scawthorn, 2003).

5.6.2 Seismicity of TSF Site

The TSF site lies within Mid to Late Silurian Anson Formation (lying within the Northwest Mumbil Group), which were formed some 430 million years ago. The faults in the region experienced most of their relative motion up to the mid Triassic, some 200 million years ago. The region therefore has a low level of historical seismicity.

No active faults have been identified in the region surrounding the site. The nearest significant fault is the Godolphin Fault Zone located less than 1km to the west of the TSF site, with a fault length of some 250km. Based on Wells and Coppersmith (1994), faults of about 250km length correspond to the rupture from an earthquake of magnitude of around ML 8.0(Richter scale) and displacements greater than 10m.

Plate 24
Australia 500 Year Peak Ground Acceleration Hazard Map (source: Geoscience Australia)

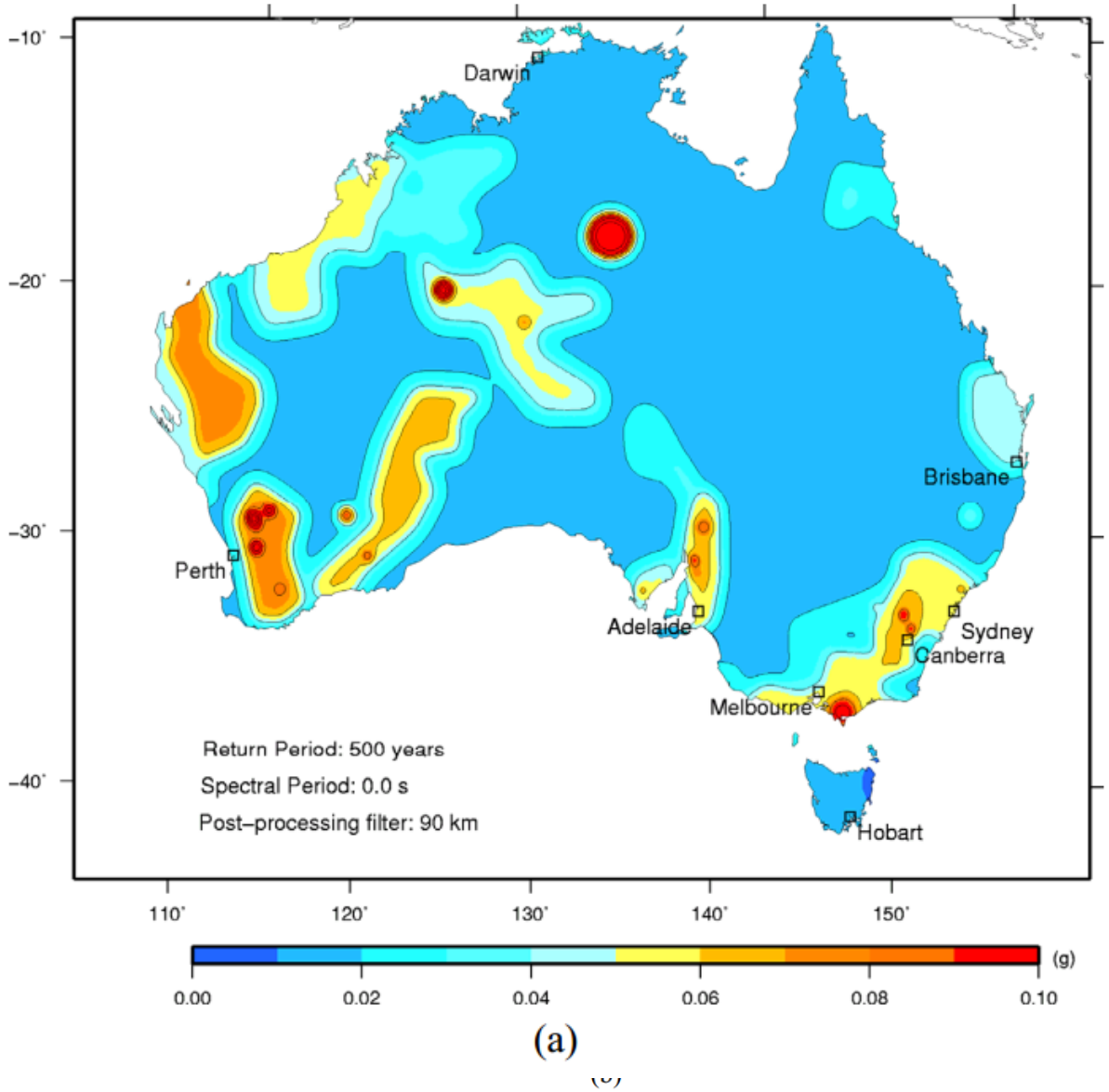


Figure 43: *The 500 year return period PGA hazard map calculated with a 50/50 weighting in the regions where the hotspot exceeds the hazard shown in Figure 40. The model was then smoothed with a 90 km wide Gaussian filter. The map is shown in 2D in (a) and in 3D perspective in (b). The State and Territories capital cities are labelled in (a). This map is the authors' preferred weighting and smoothing.*

In summary, the ancient faults located within or quite close to the proposed TSF site are unlikely to be active and if reactivated will likely not produce a large earthquake. The peak ground accelerations (pga) as sourced from Geoscience Australia are summarized as follows:

- 500 year ARI 0.06g
- 2,500 year ARI 0.22g
- 10,000 year ARI 0.4g

5.7 Tailings Characterisation and Associated Design Implications

As outlined in **Section 2.2**, the proposed TSF will provide containment capacity for tailings produced at McPhillamys Project. Tailings pilot testing has been undertaken as part of metallurgical assessment of the ore body, with two indicative tailings samples provided for geotechnical testing by ATCW. Details of the tailings testing, including laboratory test certificates are provided in **Appendix F**. Review of the tailings testwork results and available literature for gold ore tailings, inferred characteristics and geotechnical properties as provided below.

5.7.1 Physical Characteristics

Physical and geotechnical test work was undertaken on a samples of tailings derived from the Discover Ridge Tailings Slurry and McPhillamys Gold Tailings Sample. Representative physical characteristics for tailings are summarised in **Table 14**.

Table 14
Representative Physical Characteristics of Tailings

Parameter	McPhillamys Gold Tailings Sample
Geotechnical Classification	CLAY (CL), Non-Plastic
Particle Density	2.96 t/m^3
Particle Size Distribution	P_{80} 130µm
Atterberg Limits (Plasticity)	Non-Plastic

5.7.2 Tailings Settled Densities

The tailings are likely to exhibit rapid settling behaviour following deposition. Achievable settled densities are expected to be as follows:

Settled Condition	Condition Description	McPhillamys Gold Tailings Sample Achievable Settled Density (t/m^3)
Undrained	• Initial beaching on a low permeability foundation. • Settlement around the decant (supernatant water pond)	1.36 to 1.39
Drained	• Beaching on a previously air-dried layer of tailings (or a permeable foundation).	1.49

Assuming controlled thin layer, sub-aerial beaching of tailings based on a nominal rate of tailings surface rise of less than 3m per annum, it is anticipated that an average dry density for consolidated tailings will be of the order of 1.5t/m^3.

5.7.3 Beach Slopes

The inferred beach slopes expected to be achieved, subject to sub-aerial deposition methods, would be of the order of 0.5% to 1.0%, with steeper slopes closer to the discharge points and the beach generally forming a slightly concave beach shape representing a segregating beach deposition regime consistent with the operating slurry densities achieved.

5.7.4 Permeability

Permeability of deposited tailings subject to drained settlement of 1x10^{-7} m/s is considered typical. For the purpose of design, saturated permeabilities for tailings within a range of 10^{-6} to 10^{-8} m/s is considered reasonable, with the upper-bound values being representative for the coarse tailings

fraction and the lower-bound values, for the fine fraction. Representative permeabilities determined from the Constant Head Method for Discover Ridge Tailings Slurry and McPhillamys Gold Tailings Sample are $3.1x10^{-7}$ m/s and $1.0x10^{-7}$ m/s, respectively.

5.7.5 Tailings Seepage Geochemistry

Geochemical characterisation of the tailings material was undertaken by SRK Consulting (Australasia) Pty Ltd (SRK) with details of the geochemical characterisation provided in EIS Appeindix G. Summary of the outcomes of the testwork and characterisation of the tailings material extracted from SRK(2019) is provided below.

Based on the proposed processing methods for McPhillamys, namely the detoxification of the tailings prior to pumping to the TSF, the TSF seepage water quality would be anticipated to be similar to the tailings liquid fraction test results obtained for the MCPTST samples (i.e. samples which have undergone cyanide detoxification). Results indicate that this seepage would be anticipated to be elevated in SO4 and Se in comparison to ANZECC (2000) livestock drinking water guidelines and therefore capture and active management (as is proposed herein) is recommended.

The McPhillamys tailings are generally sulphidic and classify as PAF, and kinetic tests were initiated in Q2 2019 on the five MCPTST samples (data not available from these tests at time of reporting). As a precursor to kinetic testing, the sulphide oxidation rates of three of the MCPTST samples were measured using an oxygen consumption rate cell. During this test, each sample is placed in an airtight vessel and depletion of the oxygen content of air in the cell headspace over time is used to calculate the sulphide oxidation rate, under the assumption that oxidation of sulphides in the sample has consumed oxygen from the headspace.

Results from this testing indicated oxygen consumption rates in the range 2.3 x $10^{-1°}$ to 2.9 x $10^{-1°}$ kg oxygen per kg sample per second (kgO_2/kg/s). In SRK's experience, these rates are not particularly high for sulphidic tailings samples, suggesting that the sulphides are not particularly reactive. The measured oxygen consumption rates measured equate to a release rate of 34-43 mg SO_4/kg(tailings)/clay. Although this SO_4 release would likely be accompanied by acidity and associated elevated analyte concentrations, oxidation would not be occurring throughout the mass of tailings deposited, due to the predominantly saturated state (which inhibits sulphide oxidation). Localised oxidation, e.g. on areas of dry tailings beach could result in seepage with elevated SO_4 and acidity in comparison to the tailings liquid fraction; however, this would either be captured in the decant pond or seep into the facility. As the tailings contain ANC, there would be a degree of neutralisation of seepage as it slowly moved through the tailings, and it may be that the contained ANC would be enough to neutralise acidity released from oxidation on beach areas during the operational life of the TSF.

Following closure of the TSF, plans include construction of a store and release cover to inhibit infiltration. Seepage is therefore predicted to diminish in the years following closure, when tailings are no longer being deposited into the TSF. During this time, a large portion of seepage would consist of draindown of process water, deposited in the TSF along with tailings.

Based on the above, the following summary/conclusions were provided by SRK:

The liquid fraction of tailings, which may be indicative of initial and ongoing operational seepage from the TSF, contained elevated concentrations of SO_4, F and Se. Localised generation of AMD is anticipated in the TSF, where unsaturated conditions occur in beach areas and this will generate seepage which will either collect in the decant or seep into the TSF. Acidic seepage into the TSF during operations may be neutralised by ANC within the tailings. Results for samples which were analysed after being through cyanide detoxification highlighted the value of this process which is

planned for use at McPhillamys. Non-detoxed samples had higher concentrations of cyanide and several other analytes, such as Cu, which complexes with cyanide.

As with all characterisation programs, the samples analysed are assumed to be representative of the mass of material to be mined. Nevertheless, ongoing verification of material properties on implementation of the project is recommended as a best practice measure.

6 TSF WATER MANAGEMENT

6.1 Background and Strategy

The strategy with respect to TSF water management is to maintain compliance with regulatory containment requirements, subject to the following conditions:

- Minimising catchment draining to TSF. Based on the proposed layouts as shown, the following catchments will report to the TSF
- Water inputs and outputs associated within the TSF water management system would include the following:

Inputs	Outputs
Direct Rainfall	Decant Return
Tailings Water	Evaporation
Return Seepage Water	Seepage Loss
	Loss to Tailings Storage/Interstitial Water

It is noted that the recovery of decant water is proposed to occur via a skid mounted centrifugal pump. Decant water would be returned to the Process Water Dam within the plant area. The objective of decant recovery would be to minimise the ponded volume within the decant pond, resulting in maximising water reuse and reducing off-site water make-up requirements.

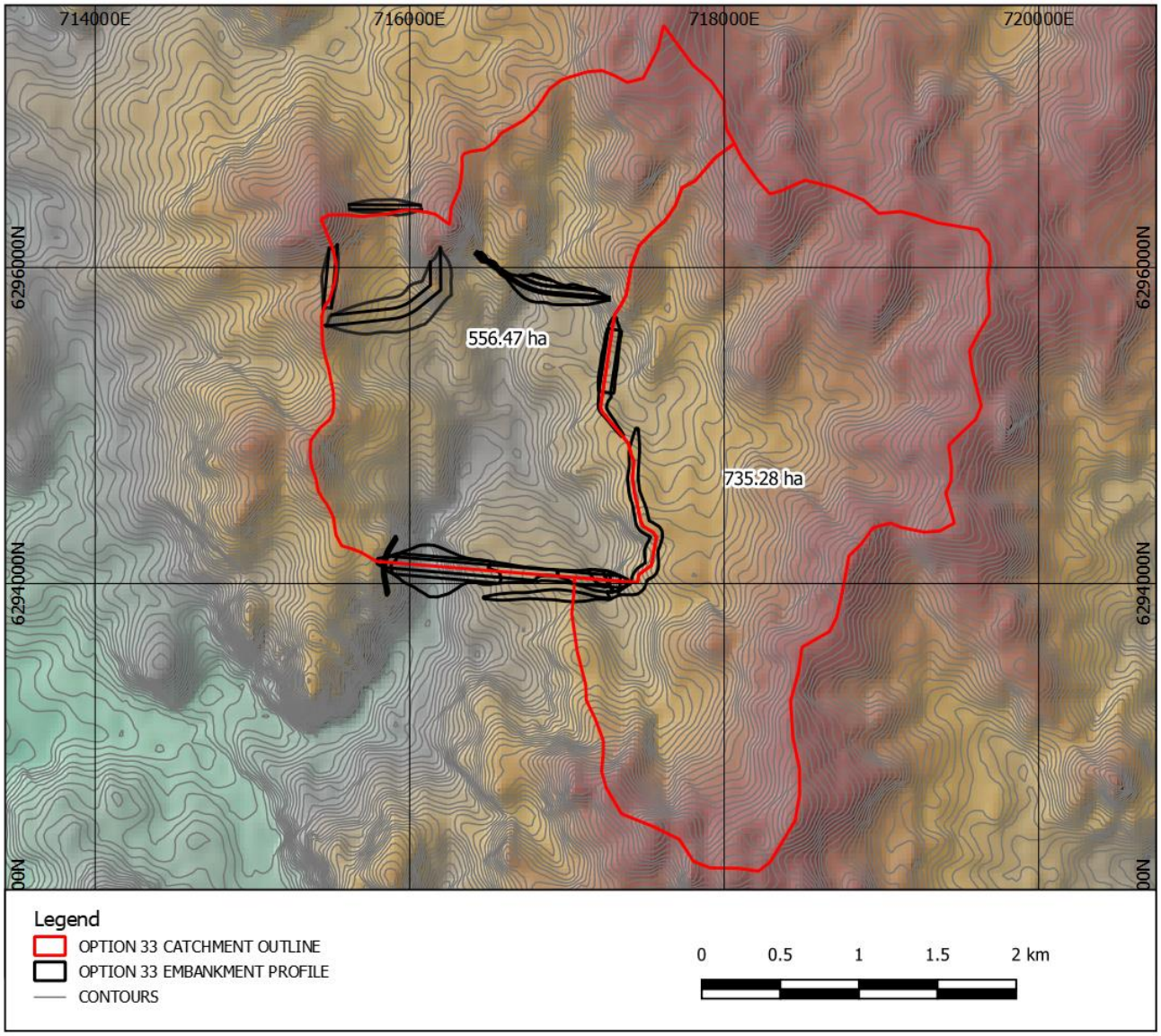
6.2 TSF Catchment Delineation

Data relating to disturbed catchment areas have been obtained from survey detail sourced from Shuttle Radar Topography Mission (SRTM) Hydro Enforced 1 Second DEM (Geoscience Australia, 2018). Catchment areas relevant to the water balance model are summarised as follows:

- Final TSF Surface Area 282 ha
- External TSF Catchment 275 ha
- Diverted Catchment Area 736 ha

The extents of the catchments as described above are shown on **Plate 25**.

Plate 25
McPhillamys TSF – Catchment Delineation



6.3 Operational Freeboard Requirements

Operational freeboard requirements were determined based on Section 4.2.2, which references *DSC3F Tailings Dams*.

The DSC3F requirements for operational freeboard along with the calculated freeboard depths and volumes are presented below in **Table 15**.

Table 15
DSC3F Operational Freeboard Requirements and Freeboard Determination

Parameter	Extreme Consequence Requirement (DSC3F)	TSF
Beach Freeboard (AEP-72hr storm)-min	10^{-4} AEP	1800 ML (RL 960.8m)
Pond Recovery Time (days) -max	7 days	7 days
Operational Freeboard (mm) -min	500mm	500mm
Environmental Freeboard* (AEP-72hr) – indicative	10^{-4} AEP	1800 ML (RL 960.3m)
Total Freeboard (AEP-critical duration)	10^{-7} AEP	8500 ML (RL 958.0m)

*Note, the Environmental Freeboard level dictates the maximum Operating Pond Level.

6.3.1 Freeboard Requirement Discussion

The Beach Freeboard and Environmental Freeboard for the TSF were determined assuming the diversion system remains operational. The catchment diverted by the clean water drains was not considered, as these drains are designed to accommodate flows from the peak duration 1 in 100 AEP storm. The Environmental Freeboard requirement is considered in the overall capacity of the TSF, and is considered in addition to the maximum accumulated decant water volume within the storage, estimated to be some 207ML (provided by HEC, refer EIS Appendix J).

The Total Freeboard requirement is achieved by utilising the TSF storage capacity and hydraulic capacity of the spillway, which is designed to a minimum of 1 in 10,000,000 AEP (PMF) critical duration storm event (refer **Section 6.3**).

The Operational Freeboard requirement is achieved, based on the maximum elevation of tailings deposition not exceeding the spillway invert level and hence, a minimum Operational Freeboard of 1.0m will be achieved.

6.4 Emergency Spillway

An emergency spillway is a mandatory requirement for any regulated dam. As outlined in **Section 4.2.2**, the design criteria for the TSF emergency spillway, based on an EXTREME consequence category, it is to achieve a capacity equivalent to a 1 in 10,000,000 year ARI event. The design of the engineering spillway is addressed in **Section 7.3**.

6.5 Tailings Consolidation Assessment

6.5.1 Model Development

A tailings settlement/consolidation assessment was undertaken based on simplified mass water and materials balance analysis to assess the physical layout of the TSF against the proposed production schedule. The key aspects of this assessment are estimated tailings dry density subject to settlement and consolidation/air-drying and associated rate of tailings surface rise. The key driver to these tailings behaviours is loss of tailings water through bleed (settlement) and evaporation.

Base-case conditions for this analysis, on which the TSF is designed, are summarised below:

- Tailings throughput 7 Mtpa
- Tailings Dry Density - Sedimentation Phase 1.1t/m^3
- Tailings Dry Density - Consolidation/Air Drying Phase 1.49t/m^3
- Tailings Permeability 10^{-6} to 10^{-8}m/s

The parameters adopted for the analysis, to assess the impact of increased tailings production, are outlined in **Table 16.**

Table 16
Mass Balance Assessment Data

Parameter	Input	Comment/Source
Throughput	7.0Mtpa	As discussed with Regis
Climate – Rainfall and Evaporation Data	Monthly average climate data modelled	Refer **Section 5.1**
TSF Beach Surface Area	Varied as follows: Year 1 - 70ha Year 3 – 143ha Year 5 – 202ha Year 10 – 270ha	Based on **Section 3.5.1**
Tailings Grading	Coarse Fraction 80% (greater than 0.006mm size) Fine Fraction 20% (less than 0.006mm size)	Based on **Section 5.7**
Tailings Initial Settlement/Bleed Time	2 to 4 days	Sourced from Settlement curves and similar project experience
Salinity Reduction factor for evaporation from saline tailings	0.9	Newson and Fahey (1998)[1]

The basis of the analysis was to assess the potential water losses, per unit area of tailings beach, from bleed and evaporation, with adjustment for time of exposure subject to production rate, available TSF surface area, deposition sequence timing, partitioning across the beach for tailings coarse and fine fractions and the effects of salinity.

6.5.2 Results of Analysis

Results from the mass water and materials balance analysis are summarised in **Table 17,** with predicted tailings beach dry density plotted in **Plate 26.**

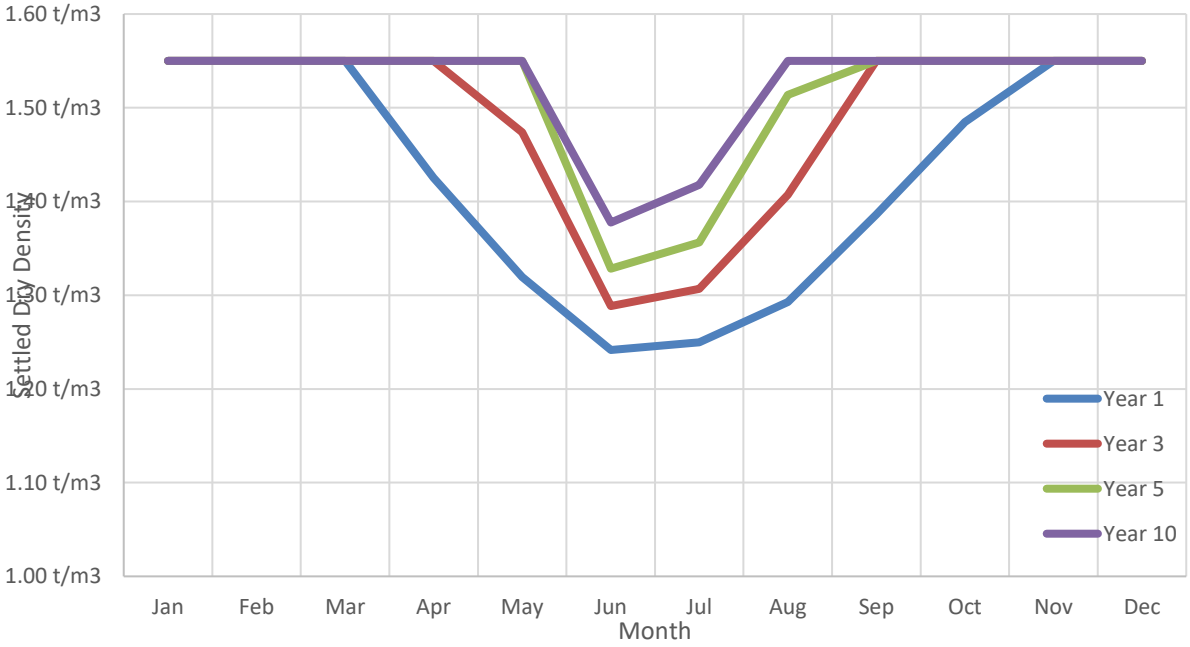
[1] Newson and Fahey (1998), Research into saline-tailings disposal and decommissioning, MERIWA Project M241

Table 17
Mass Balance Results

End of Year	Predicted Composite/Average Tailings Beach Dry Density* (t/m^3)
1	1.42
3	1.49
5	1.51
10	1.52

* Combined coarse and fine fractions

Plate 26
Mass Water and Materials Balance Results



Based on the above assessment, the following comments/interpretations are provided:

- For the proposed TSF arrangement and operating conditions as described herein, it is considered that the storage area has been suitably sized to maximise the opportunity for the tailings to consolidate and drain.
- The months of May through to August, with average rainfall near to or greater than evaporation will limit/reduce the evaporation effects of consolidation. Although noting that thin layer deposition will provide surface drainage to maximise bleed of water from the beach.

7 ENGINEERING ANALYSES

7.1 Seepage Controls Assessment

7.1.1 Preface

As outlined in Section 4.2.4, seepage management for the TSF shall comply with the EPA guideline for Solid Waste Landfills, EPA (2015). Given that the proposed TSF seepage management system is varied from the prescribed "base case" in EPA (2015), the following section presents the seepage management options considered for the TSF and validation of the preferred system complying with EPA (2015).

A total of nine alternative seepage management systems were assessed to capture a range of potential controls. The control options are based on typical current practices. Sensitivities for options were also considered. The overall object was to assess the value/impact of inclusion of each of the controls as well as providing an overall indication of the critical hydrogeological inputs to achieve a seepage performance in accordance with EPA (2015).

7.1.2 Seepage Control Options

In consultation with Regis, seepage control measures/options considered for the TSF are summarised as follows:

- Embankment with upstream clay core.
- A deepened cut-off key beneath the embankment clay core considered at varying depths from 4m to 8m.
- Storage floor lining systems for the TSF including:
  - EPA (2015) prescribed 1,000mm clay liner at 1 x 10^{-9}m/s permeability.
  - Clay liner of thicknesses less than 1,000mm (ie 600mm and 300mm).
  - Geocomposite liner (GCL), being a proprietary product.
- Installation of a grout curtain beneath the embankment clay core cut-off key.
- Seepage interception trench system (nominally 4m deep).

A description of model setup and boundary conditions adopted for analyses covering these options is provided below.

(i) Base Case (Nominal Cut-Off Key)

The base case scenario comprised a rock fill embankment with upstream clay fill core formed to a crest height of RL 962.0m. A cut-off key located beneath the clay fill core, extending to intersect the basement sequences to a depth of 4m.

The tailings beach was assumed to be saturated and at the spill level and although considered conservative/worst case, for the purpose of comparing options it was considered appropriate.

Boundary conditions applied included a groundwater level beyond the zone of influence downstream from the embankment of some 4m below natural ground level, with permeable basement sequences extending to some 50m in depth.

(ii) Deep Cut-Off Key Options (6m and 8m Cut-Off Key)

The deepened cut-off key scenario comprised the "base case" scenario with a deepened cut-off key extending to depths of 6m and 8m respectively.

(iii) Storage Lining Options

Storage lining scenarios comprise the "base case" scenario with a number of alternative lining systems/extents as follows:

- Clay Fill of 300mm, 600mm and 1,000mm thickness respectively extending over the entire storage floor area
- GCL, considering both partial storage area as well as upstream embankment lining.
- No Lining

(iv) Seepage Recovery System

Seepage Recovery system comprises the "base case" scenario with a seepage interception and collection system sited downstream of the cut-off key beneath the embankment rock fill zone.

In addition to the above, and completeness in understanding the controls for seepage potential, scenario was also run assuming it was a water dam structure (ie replacing the tailings with water), no TSF which would quantify underlying groundwater flow.

For all above scenarios, sensitivity analyses were also carried out on embankment/storage height/stage of development (Stages 1, 2 and 3 as described in **Section 3.2**) and basement material permeability characteristics.

Model material input parameters and sensitivities are outlined below.

7.1.3 Seepage Model Setup

Seepage analysis has comprised computer-based numerical seepage modelling using the SEEP/W finite element package. SEEP/W is formulated on the basis of Darcy's Law for both saturated and unsaturated flow. The model iteratively solves mass balance differential equations for a grid of finite elements, based on appropriate boundary conditions.

Key input to the seepage model consists of saturated permeabilities for the layers forming the modelled profile. The permeability values for the materials modelled are summarised in **Table 16**. These permeability values were based on available geotechnical data as summarised in **Section 5.0**. Material sensitivities analysed are also detailed in **Table 18**.

Table 18
Permeability Values used in Seepage Analyses

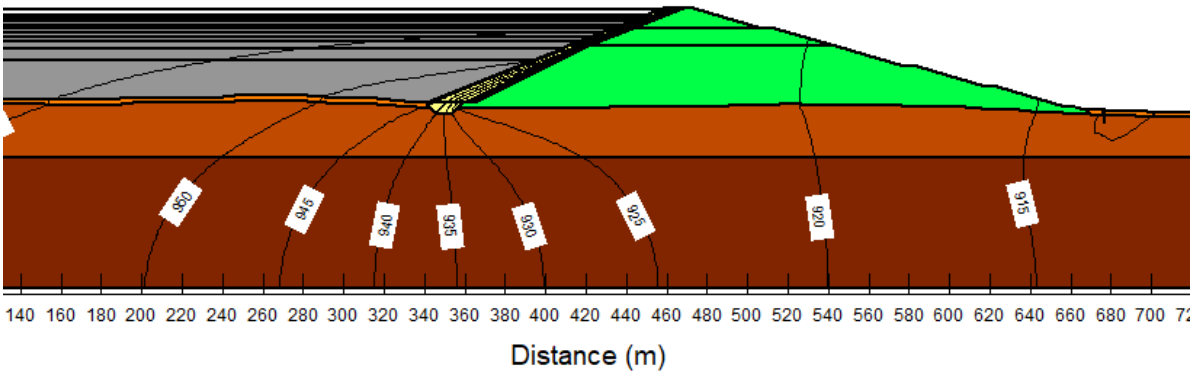
Layer Description	Base Case Permeability, k_{sat} (m/s)	Sensitivity Analyses	
		Minimum Permeability, k_{sat} (m/s)	Maximum Permeability, k_{sat} (m/s)
• Tailings			
Recently placed tailings beach	1×10^{-6}	-	-
Mature tailings beach	1×10^{-7}	-	-
• Engineered (Embankment) Materials			
Clay Fill	1×10^{-9}	1×10^{-8}	5×10^{-10}
Rock Fill	1×10^{-6}	N/A	N/A
Geomembrane	1×10^{-10}	N/A	N/A
• Insitu Materials			
Surface Soils	5×10^{-7}	1×10^{-8}	1×10^{-6}
Upper Basement (to 20m depth)	1×10^{-7}	1×10^{-8}	1×10^{-6}
Lower Basement	1×10^{-6}	1×10^{-8}	1×10^{-6}

+

The seepage model configuration for the assessment of the seepage controls is presented in **Plate 27**.

Plate 27
Seepage Controls Model Configuration

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0	0
	Eff Rock Fill	Saturated Only	1e-06			1	0	0	0
	Eff Surface Soils	Saturated Only	5e-08			1	0	0	0
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0	0



7.1.4 Seepage Controls Model Results

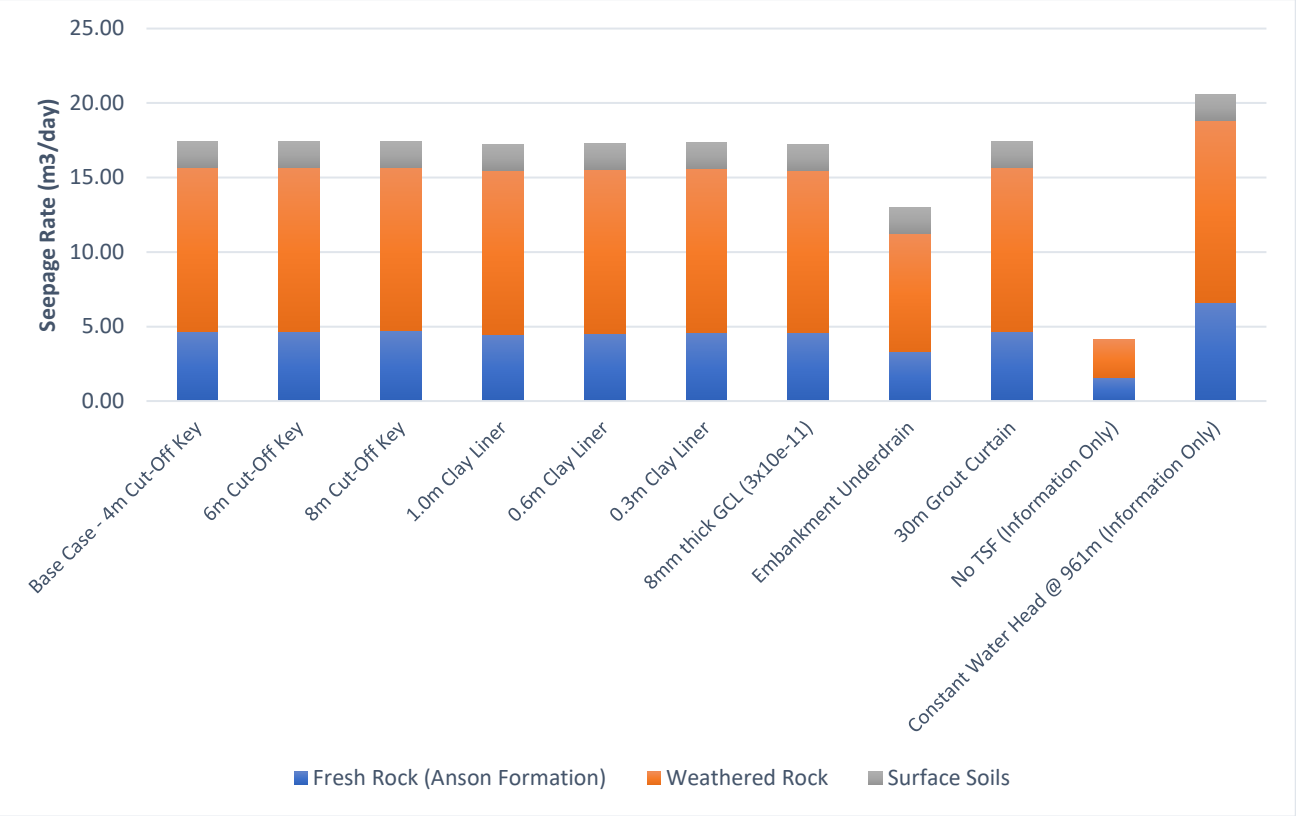
Downstream seepage flux was measured at the embankment downstream toe for each of the above scenarios with the flux from the 1D model factored by 1,000 (approximate equivalent embankment length for the cross section modelled) to represent an estimate of the total main embankment seepage rates. These results are summarised in **Table 19**.

Table 19
Seepage Analyses

Option/ Scenario	Description	Calculated Seepage Flow within Fresh Rock Zone (m^3/day)	Calculated Seepage Flow within Weathered Rock Zone (m^3 /day)	Calculated Seepage Flow Within Soils Zone (m^3/day)	Total Calculated Seepage Flow (m^3/day)
1	Base Case – Embankment Clay Core with 4m Cut-Off Key	4.67	10.99	1.74	17.40
2	Deepened Cut-off Key (6m)	4.69	10.98	1.74	17.41
3	Deepened Cut-off Key (8m)	4.71	10.95	1.74	17.40
4	Storage Liner (Clay Fill 1,000mm thick)	4.49	10.99	1.74	17.22
5	Storage Liner (Clay Fill 600mm thick)	4.54	11.00	1.74	17.28
6	Storage Liner (Clay Fill 300mm thick)	4.58	11.02	1.74	17.33
7	GCL Floor Liner Over Storage Area	4.60	10.87	1.74	17.20
8	Seepage Interception Trench and Recovery	3.34	7.93	1.74	13.01
9	Grout Curtain (modelled at 10^{-8}m/s)	4.69	10.99	1.74	17.41
10	Comparison Only – No TSF	1.59	2.53	0.00	4.12
11	Comparison Only – Water Dam	6.64	12.20	1.74	20.57

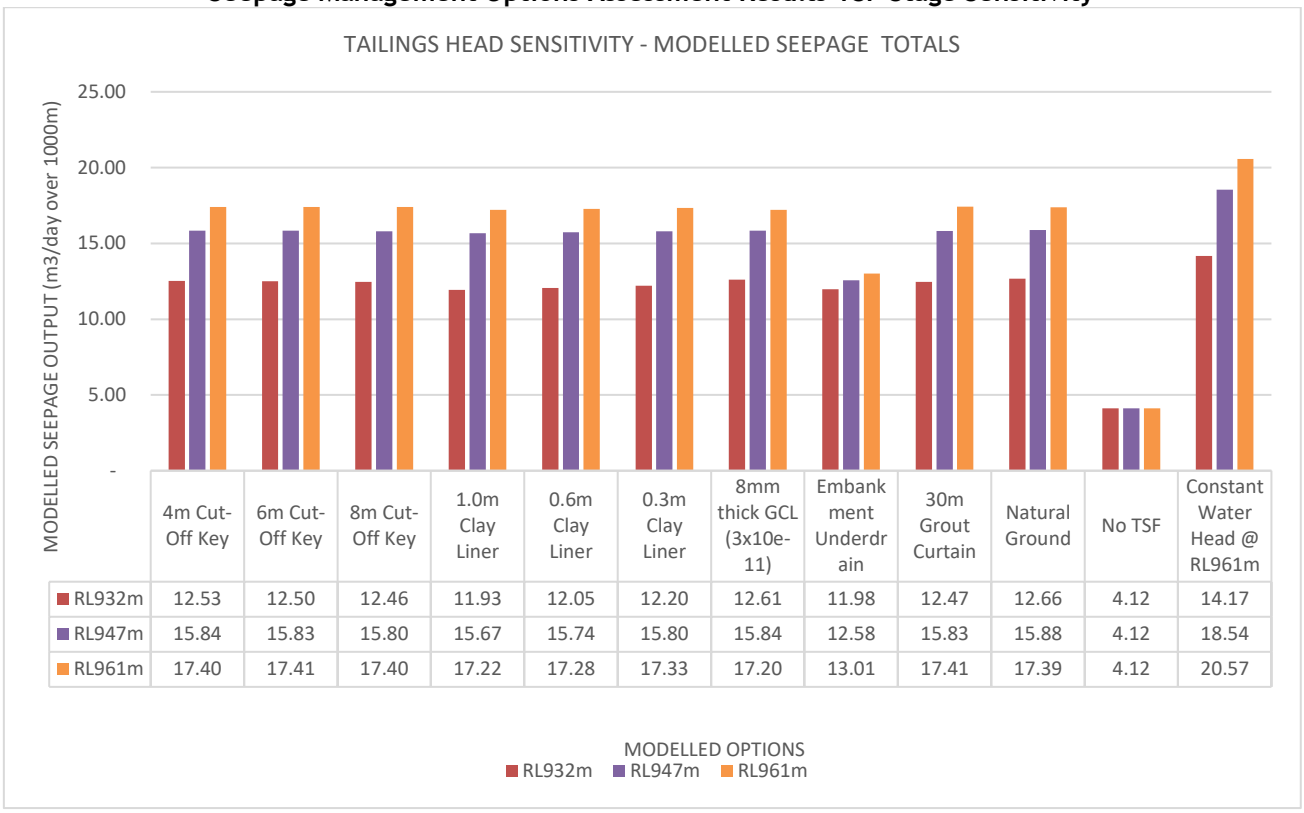
It should be noted that these seepage rates are based on the model as described above for the purpose of assessing the effectiveness of each of the controls, with estimates of actual seepage rates for the preferred TSF configuration provided in **Section 7.2**. Graphical presentation of the above options/scenarios is provided in **Plate 28**.

Plate 28
Seepage Management Options Assessment Results



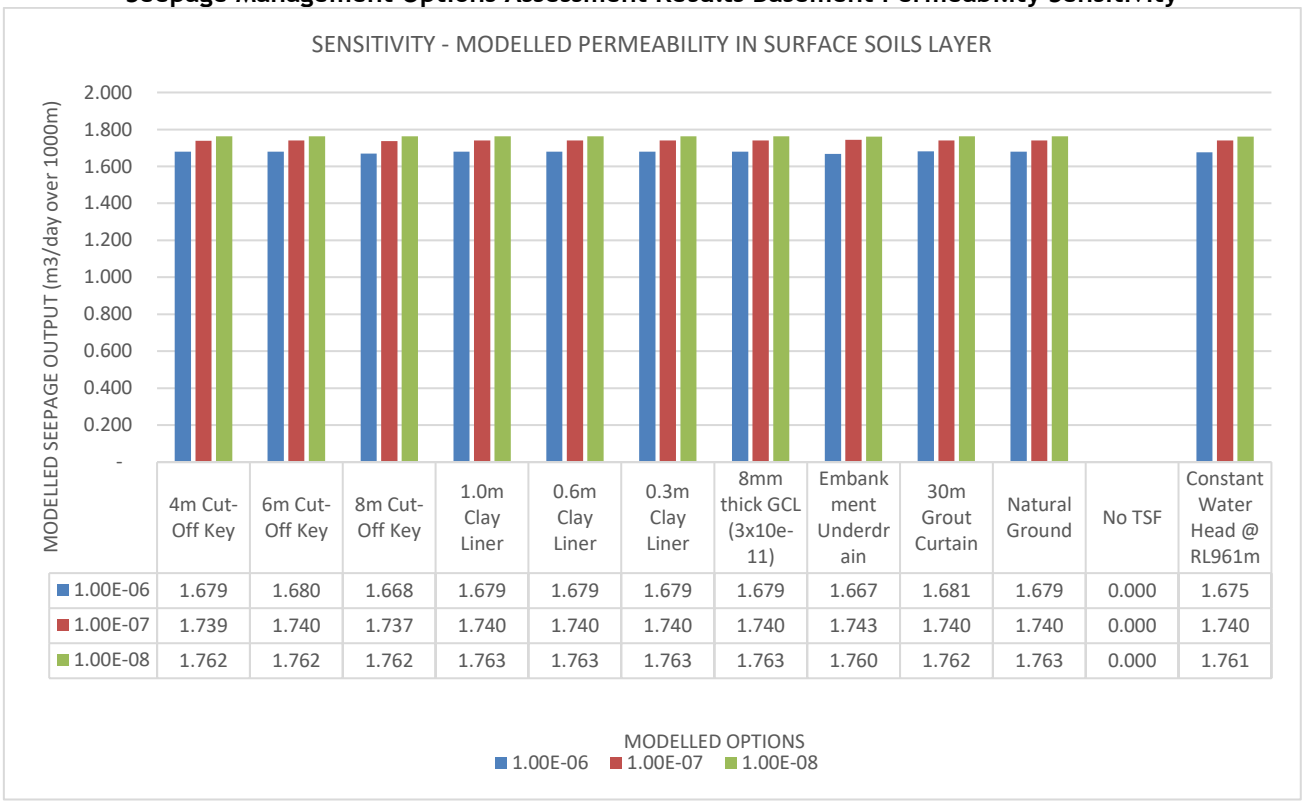
Sensitivity Results for both varied embankment storage levels (stages 1, 2 and 3) and varied basement permeabilities are presented in **Plates 29** and **30**, respectively.

Plate 29
Seepage Management Options Assessment Results TSF Stage Sensitivity



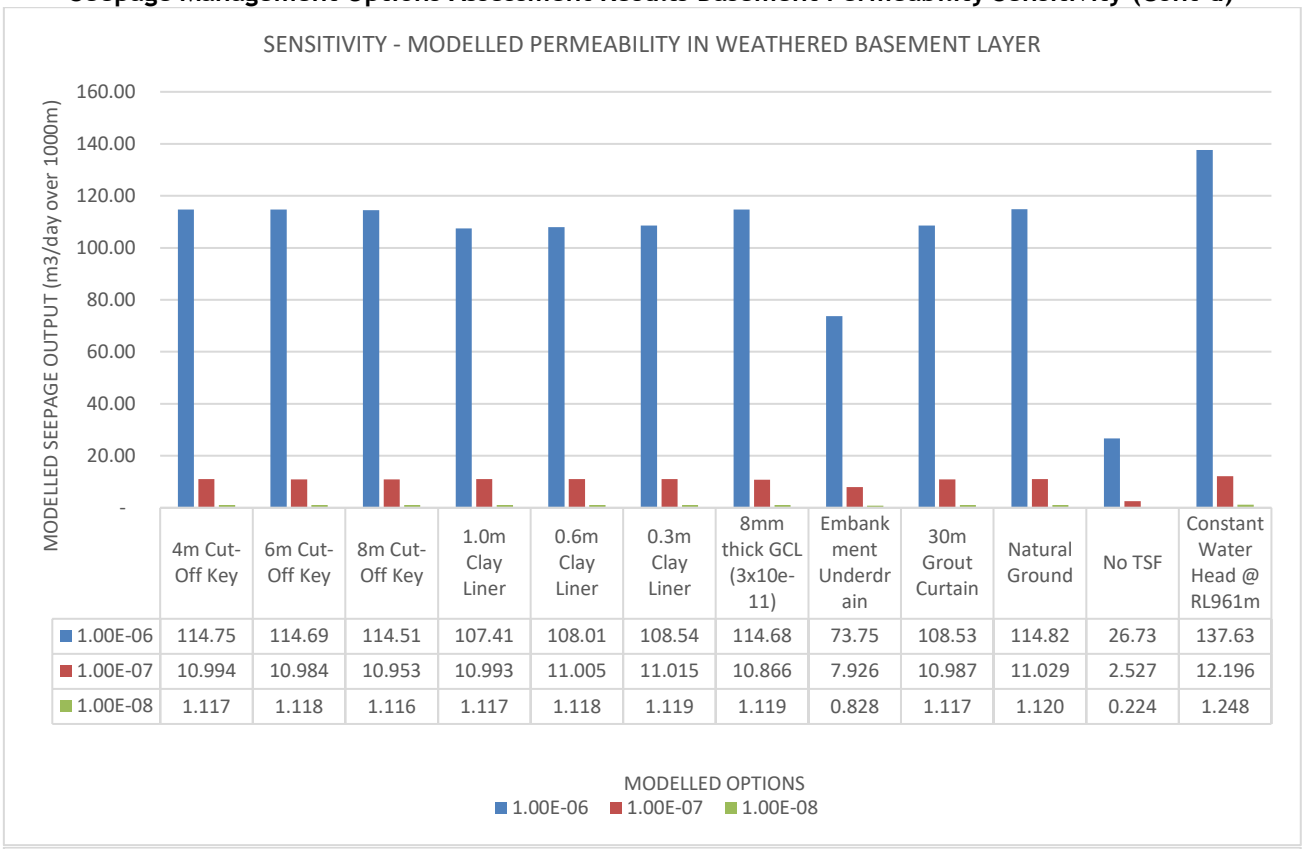
	4m Cut-Off Key	6m Cut-Off Key	8m Cut-Off Key	1.0m Clay Liner	0.6m Clay Liner	0.3m Clay Liner	8mm thick GCL (3x10e-11)	Embankment Underdrain	30m Grout Curtain	Natural Ground	No TSF	Constant Water Head @ RL961m
RL932m	12.53	12.50	12.46	11.93	12.05	12.20	12.61	11.98	12.47	12.66	4.12	14.17
RL947m	15.84	15.83	15.80	15.67	15.74	15.80	15.84	12.58	15.83	15.88	4.12	18.54
RL961m	17.40	17.41	17.40	17.22	17.28	17.33	17.20	13.01	17.41	17.39	4.12	20.57

Plate 30
Seepage Management Options Assessment Results Basement Permeability Sensitivity

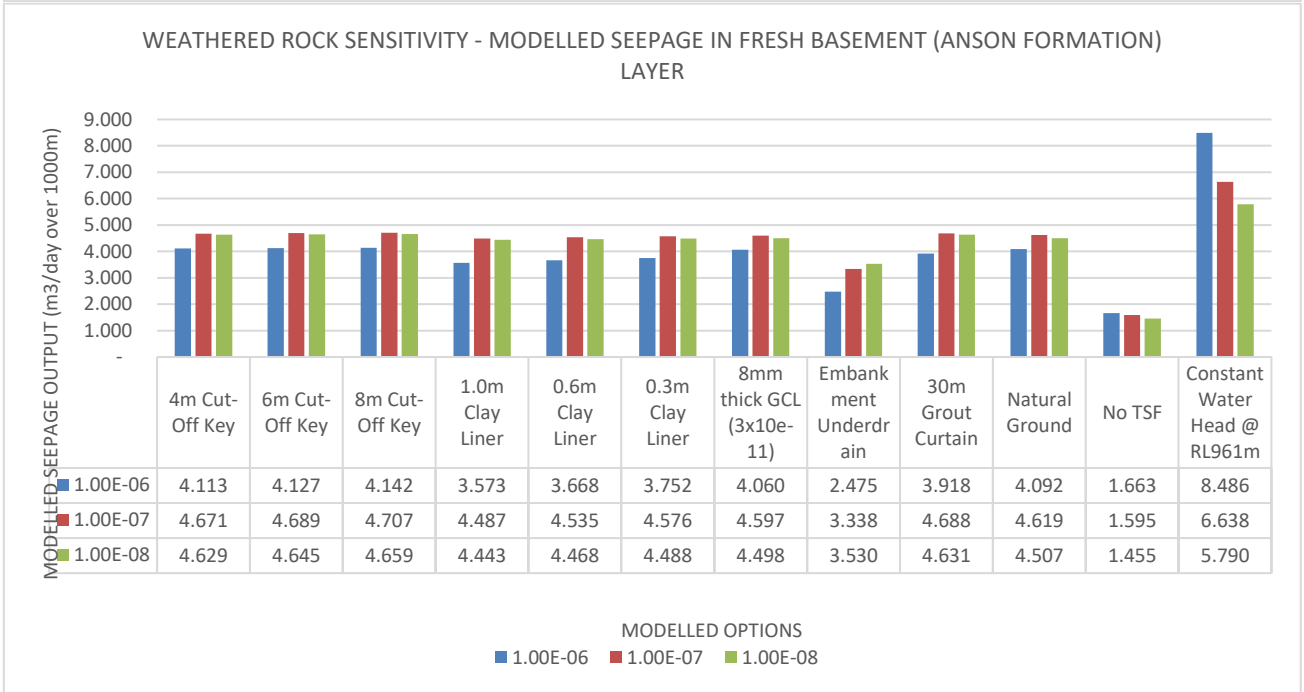


	4m Cut-Off Key	6m Cut-Off Key	8m Cut-Off Key	1.0m Clay Liner	0.6m Clay Liner	0.3m Clay Liner	8mm thick GCL (3x10e-11)	Embankment Underdrain	30m Grout Curtain	Natural Ground	No TSF	Constant Water Head @ RL961m
1.00E-06	1.679	1.680	1.668	1.679	1.679	1.679	1.679	1.667	1.681	1.679	0.000	1.675
1.00E-07	1.739	1.740	1.737	1.740	1.740	1.740	1.740	1.743	1.740	1.740	0.000	1.740
1.00E-08	1.762	1.762	1.762	1.763	1.763	1.763	1.763	1.760	1.762	1.763	0.000	1.761

Plate 30
Seepage Management Options Assessment Results Basement Permeability Sensitivity (Cont'd)



	4m Cut-Off Key	6m Cut-Off Key	8m Cut-Off Key	1.0m Clay Liner	0.6m Clay Liner	0.3m Clay Liner	8mm thick GCL (3x10e-11)	Embankment Underdrain	30m Grout Curtain	Natural Ground	No TSF	Constant Water Head @ RL961m
1.00E-06	114.75	114.69	114.51	107.41	108.01	108.54	114.68	73.75	108.53	114.82	26.73	137.63
1.00E-07	10.994	10.984	10.953	10.993	11.005	11.015	10.866	7.926	10.987	11.029	2.527	12.196
1.00E-08	1.117	1.118	1.116	1.117	1.118	1.119	1.119	0.828	1.117	1.120	0.224	1.248



	4m Cut-Off Key	6m Cut-Off Key	8m Cut-Off Key	1.0m Clay Liner	0.6m Clay Liner	0.3m Clay Liner	8mm thick GCL (3x10e-11)	Embankment Underdrain	30m Grout Curtain	Natural Ground	No TSF	Constant Water Head @ RL961m
1.00E-06	4.113	4.127	4.142	3.573	3.668	3.752	4.060	2.475	3.918	4.092	1.663	8.486
1.00E-07	4.671	4.689	4.707	4.487	4.535	4.576	4.597	3.338	4.688	4.619	1.595	6.638
1.00E-08	4.629	4.645	4.659	4.443	4.468	4.488	4.498	3.530	4.631	4.507	1.455	5.790

The results presented in **Table 19** indicate that the seepage control measure having greatest impact on seepage reduction comprises the embankment underdrain with all other options performing at a similar standard. Interpretation of these results in the context of the model are as follows:

- Tailings fill will provide moderate seepage control measure, thereby emphasizing the importance to operate and develop the TSF such that the tailings profile achieves a maximum density and minimum permeability.
- Basement sequences also limit seepage at depth, with most of the seepage movement within the weather basement zone.
- The continued storage development (ie increasing storage elevation) will correspond to increasing seepage rates, although noting that the underdrain scenario was the least sensitive to increased storage levels.
- Based on **Plate 30**, the critical aspect for seepage sensitivity is the permeability of the weathered basement layer in terms of impact on total seepage volume per day. Notwithstanding, the sensitivity results did not change the comparative performance between options with the underdrain scenario providing the best performance compared to the alternative control systems.

7.1.5 Addressing EPA Guidelines and Seepage Controls Adopted

Based on the above and in consideration of EPA (2015), the following seepage control measures have been adopted for the TSF design:

- Low permeability containment zone and associated cut-off key to extend into weathered basement sequences with localised cut-off key deepening in areas identified as preferential pathways, such as the two main drainage alignments traversing the TSF area.
- Managed tailings deposition to maximise recovery of available water and maintain the decant generally in a central location away from the Main Embankment.
- Seepage interception system capable of recovering near surface seepage flows.
- Targeted storage lining in areas exposed to basement sequences (drainage lines) as well as the decant area.
- Storage lining of the entire storage area to achieve an equivalent of 1m at 1 x 10^{-9} m/s Clay Fill. As a minimum for materials capable of achieving a permeability of less than 3 x 10^{-10} m/s, rip, moisture condition and compact to achieve a minimum 300mm.

Review of the above seepage management system against the EPA (2015) criteria for providing an alternative leachate barrier system (Refer **Section 4.2.4**) is tabulated in **Table 20**.

7.1.6 Conceptual TSF Seepage Response

The conceptualised representation of seepage from the TSF based on the proposed development is provided in **Plate 31**. This pictorial representation is based on the detailed seepage modelling outputs and is provided to clarify the expected seepage movement from the TSF system.

Plate 31
TSF Conceptual Seepage (Source EMM, 2019)

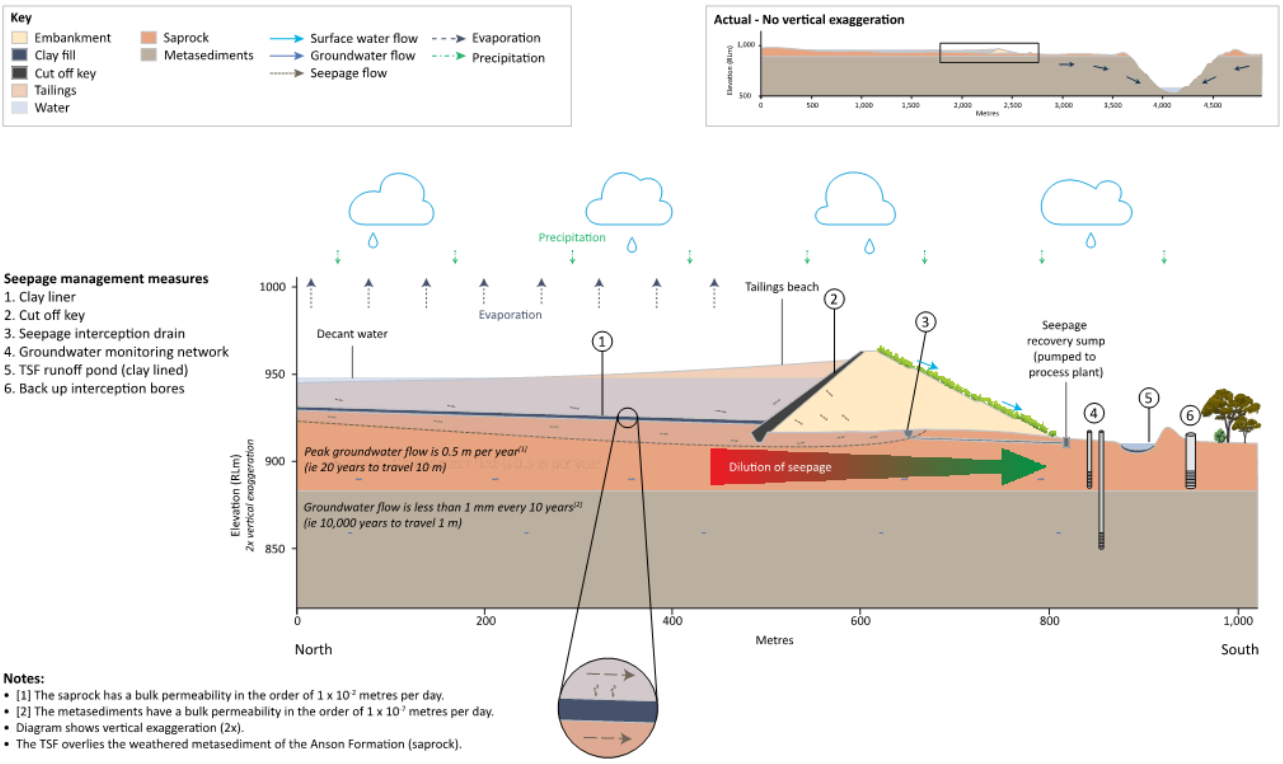


Table 20
Justification for Alternative Leachate Barrier EPA (2015)

EPA Guideline	Proposed TSF Design
The alternative proposal must be able to achieve the required outcomes for a leachate barrier and be compatible with achievement of the required outcomes for all other environmental issues.	*Modelling shows compliance with guidelines will be met. Other environmental issues will be covered*
Clear reasons should be given for proposing an alternative in preference to the acceptable measure(s) in these guidelines.	*The measures outlined in the Guidelines will be met or exceeded using the current methodology.*
The proposal must fully describe the properties and predicted performance of the alternative leachate barrier. For each barrier layer, this includes but is not limited to thickness, hydraulic properties, strength, resistance to degradation, long-term behaviour, compatibility with adjoining layers, compatibility with the site's leachate, slope stability where relevant, and construction methods. Performance predictions should be supported by all necessary test results, calculations and modelling.	*Testwork to date will be augmented with further investigations as part of the detailed design to demonstrate compliance.*
A hydrogeological investigation must characterise the surrounding soil and groundwater and must identify any risks to water bodies and other sensitive receptors in the locality. The assessment should be done in accordance with a recognised guideline for hydrogeological assessments.	Refer EIS Appendix K
In some cases, the EPA may require a peer review of the proposal by a suitably qualified and experienced person. Examples of these situations are when the proposal involves a major departure from the acceptable design measure(s) in this section or when the landfill is located near sensitive receptors.	Independent Review of this Document is being facilitated by Regis
Even where these circumstances apply, there should be a minimum level of site preparation work. The top surface of the landfill floor and side walls should be reworked to at least 300 millimetres to remove any fissures, fractures or desiccated soil.	*Current methodology will comply*

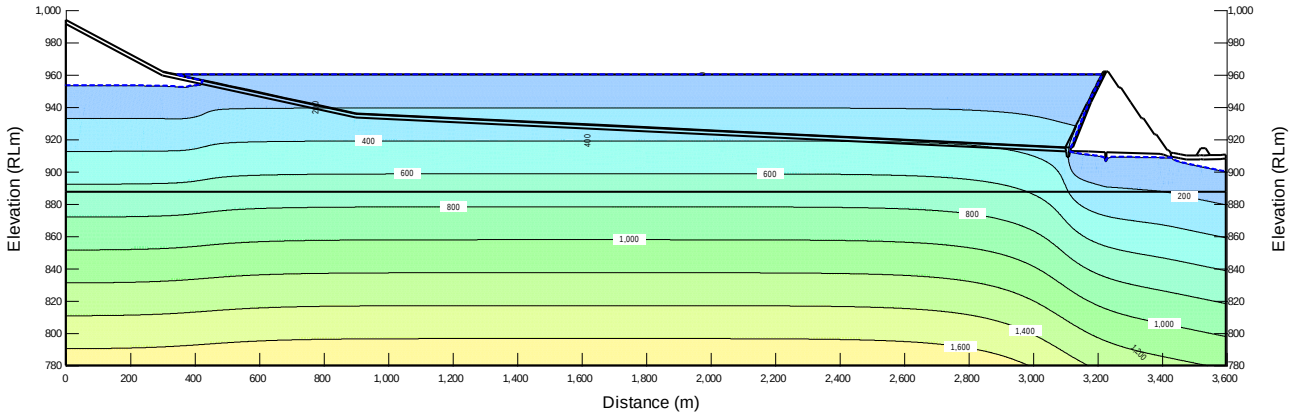
7.2 TSF Seepage Rates Estimation (Transient Modelling)

7.2.1 Model Description

Estimation of the seepage rates from the TSF has been undertaken using a simplified 1D transient seepage model, taken at the location where the embankment height is greatest, being the Main Embankment generally coincident with Belubula River and the model extending for the for length of the storage area. The model configuration is shown on **Plate 32**. The Seepage controls applied in the model include upstream Clay core, 4m deep cut-off key, storage lining and a seepage interception trench beneath the embankment rock fill zone.

Plate 32
Transient Seepage Model Configuration

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0

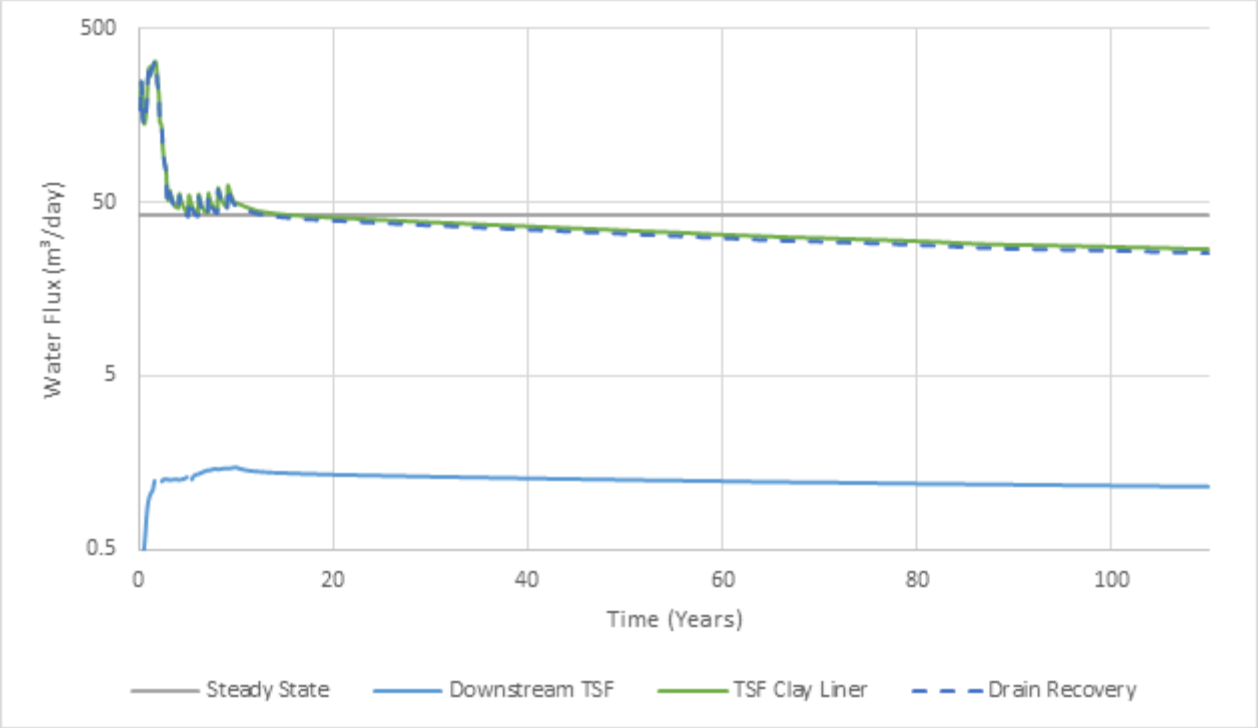


The model period comprised some 10 years of the operation and a further 100 years post closure to assess seepage rates through the storage liner and downstream of the embankment. Seepage interception trench recovery rates were also calculated.

7.2.2 Model Results

Model results of the transient seepage modelling were weighted/factored based on the TSF storage volume divided by the 1D model tailings cross sectional area to provide a estimate of overall seepage losses from the TSF. The weighted model results are presented graphically in **Plate 33**. Model outputs for years 1 to 10 during operations and years 10 to 110 post closure are provided in **Appendix C**.

Plate 33
Transient Seepage Model Results



The above results indicate that the initial seepage rates over the first 2 years within the TSF through the clay liners is expected to be greater, although not reflected at the downstream toe. It is interpreted that this seepage water over the initial years is largely seeping to fill the unsaturated zone beneath the TSF. Following saturation of the basement the flow through the TSF liner generally reaches a seepage rate of the order of 50m^3/day with seepage reporting downstream of the TSF of the 1.5m^3/day. The seepage Interception Trench recovery rates mirror the model liner seepage rates, reaching a peak of 320m^3/day (3.8L/s) by 18 months and then reducing to approximately 50m^3/day (1.3L/s) by year 3. These above results were compared to a steady state model which provided a seepage rate of 42.5m^3/day.

The interpretation of the above results based on operational experience of similar facilities is that seepage rate would typically be a maximum of 50m^3/day. It is also emphasised that the effective construction and operation of the Seepage Interception Trench will recovery most of the seepage water.

It can also be seen from the results as attached in **Appendix C**, that the drainage of the TSF will be of the order of decades and therefore planning of the TSF closure should the seepage geochemistry be problematic, will need to incorporate a long term seepage recovery system, subject to actual seepage water quality achieved.

7.3 TSF Embankment Design

7.3.1 Scope

Geotechnical analysis has been carried out to confirm the general suitability of the proposed TSF embankment section, as well as to optimise seepage control measures adopted for the development. For the purpose of this analysis, the following embankment configuration has been adopted, which represents the Stage 3 (ultimate) development condition for TSF (refer **Section 3.4**).

- External Batter Slopes — 4(H):1(V) average
- Internal Batter Slopes — 2(H):1(V)
- Crest Width — 15m
- Embankment Crest Level (Stage 3/Ultimate Condition) — RL 962m
- Full Supply (Emergency Spillway) Level — RL 961m

The general material types proposed for use in construction of the TSF embankment, based on material selection criteria outlined in **Section 4.3.4**, are outlined in **Table 21**.

Table 21
General Construction Material Types for TSF

Construction Material Type	Application
Clay Fill	**Upstream containment zone**
Rock Fill	
- Select	**Filter Zone (Separation between Clay Fill and Rock Fill)**
- NAF	**Embankment Buttress**

A single TSF embankment section was taken for analysis, taken at the location where the embankment height is greatest, being the Main Embankment generally coincident with Belubula River. The scope of geotechnical analysis carried out on this section is summarised below:

Analysis	Condition	Relevant Model Output/Purpose
Seepage	Steady State/Equilibrium Conditions	• Steady state phreatic surface within embankment based on fully supply level of RL 961m • Input to steady state stability analysis
Slope Stability	(i) Steady State Equilibrium Conditions (ii) Seismic Loading	• Factors of safety against embankment slope failure

Details of geotechnical analyses are provided in the following sections.

7.3.2 Seepage Analysis

Seepage analysis for the TSF is detailed in Section 7.1. For the purpose of the stability analyses, the "Base Case" seepage option was used as it represents worst case performance of the embankment in terms of stability analyses

Modelling was carried out on the "tailings-filled" configuration, as being the condition expected to create the highest magnitude of seepage.

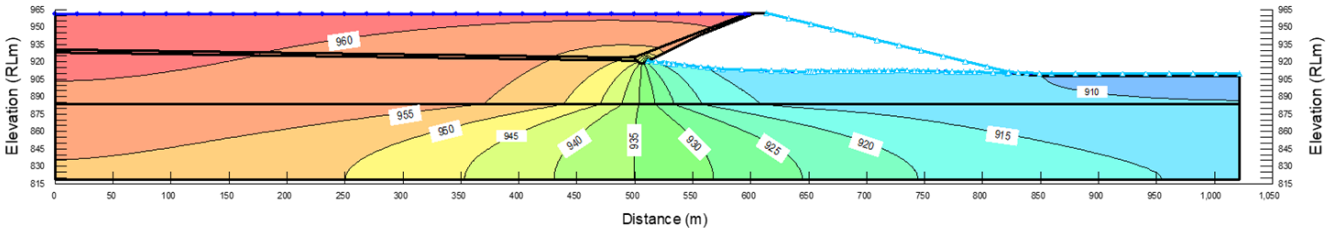
7.3.2.1 Phreatic Surface for Proposed Arrangement

The results of the seepage analysis for the proposed arrangement as described in **Section 7.1** is presented on **Plate 34**, showing lines of equal head (equipotential lines) and flow vectors. The output indicates that a significant head loss occurs through the embankment core. Seepage flows

are concentrated beneath the cut-off key. Further details of the model output are provided in **Appendix C**.

Plate 34
Seepage Results (Total Head Contours)

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay (K=1e-9)	1	0		
	Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.05	0	0	0
	Rock Fill	(none)							
	Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils (K=5e-008)	1	0		
	Tailings	Saturated / Unsaturated		Tailings	Tailings (K=1e-007)	0.1	0		
	Weathered Rock	Saturated Only	1e-08			1	0	0	0



7.3.3 TSF Embankment Stability Analyses

Stability analysis with respect to the proposed TSF embankment configuration has been undertaken to confirm the suitability of the adopted configurations as outlined in **Section 7.1.3**. Stability modelling was carried out using the General Limit Equilibrium (GLE) method, which calculates a factor of safety against slope failure based on moment and force equilibrium. Slope stability analyses were completed using the SLOPE/W computer package with the Bishop Simplified method of analysis selected. Similar to seepage analyses, the embankment location was aligned at Belubula River, the portion of the TSF embankment of greatest height.

It is noted that stability analyses in relation to internal batter was not undertaken, as these embankments will not be exposed for extended periods of time. Furthermore, given the preliminary phase of design works, end-of-construction conditions were not analysed.

The following outlines and quantifies the design parameters adopted in the stability analyses completed:

(i) Material Parameters

Parameters for insitu, engineered and placed materials forming the analysed TSF embankment cross sections, quantified based on geotechnical conditions as outlined in **Section 5.0** are summarised in **Table 22**.

Table 22
Material Parameters Adopted for Stability Analyses

Material Type/Sequence	Bulk Density (kN/m^3)	Effective Cohesion (kPa)	Effective Friction Angle (degrees)
Foundation sequences:			
• Upper profile-soils	18.0	0	28
• Weathered Rock Basement	22.0	0	32
• Fresh Rock Basement	26.0	10	42
Construction Materials			
• Clay fill	18.0	1	32
• Rock fill	21.0	0	42
Deposited Tailings	17.0	0	25

(ii) Hydrostatic Conditions within Embankment

Output from the steady-state seepage modelling shown in **Section 7. 2.2** provides a profile of the developed phreatic surface within the TSF embankment subject to proposed seepage control measures. The hydrostatic conditions represented by this phreatic surface profiles provide direct input the slope stability analyses, via coupled SEEP/SLOPE modelling.

(iii) Seismic Effects

The effects of seismic loading considered as part of the slope stability analysis are based on **Section 5.6**, with a seismic coefficient for the maximum design earthquake (MDE) of 0.4. Strength reduction of 20% was also applied to embankment Clay Fill and Tau sigma ratio for tailings assuming liquefaction of 0.04. Additional deformation assessment based on Makdisi and Seed (1978) would be carried out if the FOS from the peak seismic coefficient falls below 1.0.

The results of the stability analyses under the conditions as described above are summarised in **Table 23**.

Table 23
Results of Stability Analyses

Modelling Condition	Target Minimum Factor of Safety (refer Section 4.2.3)	Modelled Result
Steady State Seepage	1.5	2.7
Steady State Seepage with Seismic Effects Pseudo Static	1.1	0.9*

*Indicates during the peak acceleration the embankment would be subject to some permanent deformation.

Output from this modelling is shown on **Plates 35 and 36**. The results of these analyses indicate that nominated target minimum factors of safety listed in **Table 21** is achieved for the steady state case and that some deformation under the seismic (MDE) would be experienced.

An assessment of the displacement of the embankment under MDE has been carried out in accordance with Makdisi and Seed (1978), summarised as follows:

- PGA (g) - 0.4
- Embankment Height – 51m
- Undrainded Strength - 100KPa
- Bulk Density - 1.9t/m^3
- Embankment Yield Acceleration - 0.33g
- Estimated Deformation –
  - Upper Bound - 10mm
  - Lower Bound - <5mm

These displacements, based on the MDE earthquake are considered negligible and significantly less than the operating freeboard of the TSF.

Plate 35
Stability Result (Steady State)

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Clay Core	Mohr-Coulomb	18	1	32	0
	Eff Cut-Off Key	Mohr-Coulomb	18	1	32	0
	Eff Fresh Rock (Anson Formation)	Mohr-Coulomb	26	10	45	0
	Eff Rock Fill	Mohr-Coulomb	20	0	42	0
	Eff Surface Soils	Mohr-Coulomb	18	0	28	0
	Eff Tailings	Mohr-Coulomb	17	0	25	0
	Eff Transition Zone	Mohr-Coulomb	20	0	42	0
	Eff Weathered Rock	Mohr-Coulomb	22	0	32	0

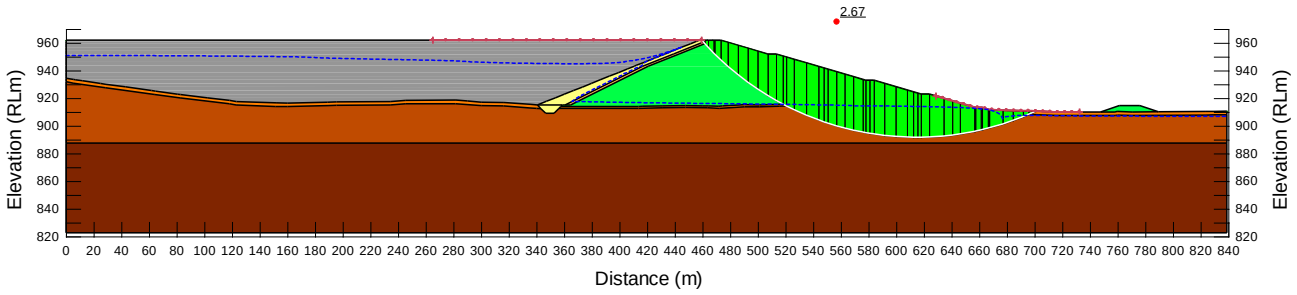
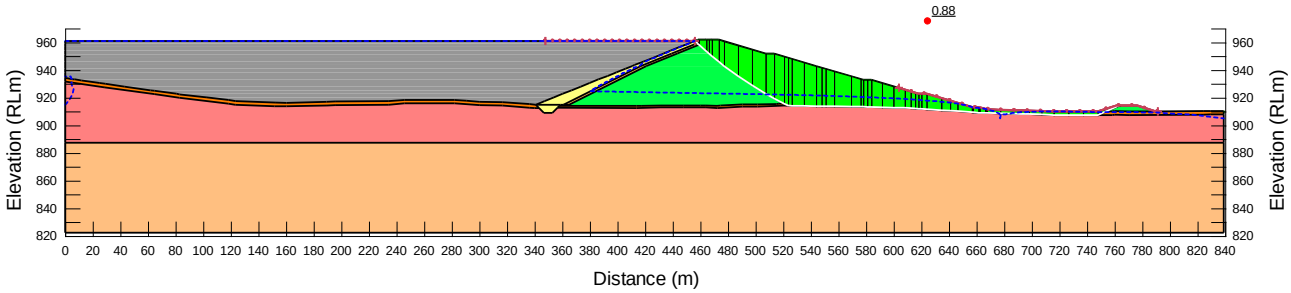


Plate 36
Stability Results (Seismic Case)

Color	Name	Model	Unit Weight (kN/m³)	Minimum Strength (kPa)	Tau/Sigma Ratio	Cohesion (kPa)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Fresh Rock (Anson Formation) (Impenetrable)	Bedrock (Impenetrable)							
	Eff Rock Fill	Mohr-Coulomb	20				0	42	0
	Eff Surface Soils	Mohr-Coulomb	18				0	28	0
	Eff Transition Zone	Mohr-Coulomb	20				0	42	0
	Eff Weathered Rock (Impenetrable)	Bedrock (Impenetrable)							
	UD Clay Core	Undrained (Phi=0)	18			110			
	UD Cut-Off Key	Undrained (Phi=0)	18			110			
	UD Tailings	SHANSEP	17	5	0.2				



7.2 Emergency Spillway Sizing

7.2.1 Methodology and Contributing Catchment

Sizing of the emergency spillway for TSF was performed by way of a simplified routing timestep analysis. A hydrological model was built, with inflow hydrographs determined using the Rational Method. Runoff coefficients were adopted as 1.0 and diversion works were assumed to have failed for the purpose of this assessment. Catchment areas were defined as described in **Section 6.2**.

7.2.2 Design Analysis

A PMP analysis for the TSF site is presented in **Section 5.1.3**. The basis of design for the proposed spillway and the adopted hydraulic properties for broad-crested weir (spillway) configurations, are summarised in **Table 24.**

Table 24
Emergency Spillway Sizing - Adopted Configurations

Spillway	Method of Discharge Determination	Discharge Coefficient, C_D	Spillway Width, L	Spillway Depth
TSF	$Q = C_D \times L \times H^{1.5}$	1.45	30.0 m	1.0 m

7.2.3 Spillway Analysis and Results

Design rainfall depths for varying durations (15 minutes to 120 hours) subject to the PMF event (as outlined in **Section 6.4**) were applied to the spillway analysis. Peak water elevation above the spillway invert determined the critical design event. Details of the critical condition are summarised in **Table 25** with this critical event graphically presented on **Plate 37**.

Table 25
Spillway Sizing - Critical Design Outcomes

Design Event Duration	Peak Discharge	Peak Water Depth over Spillway	Available Freeboard
3000 min	16.6m^3/s	0.4 m	0.6 m

Plate 37
Water Elevation Above Emergency Spillway Invert

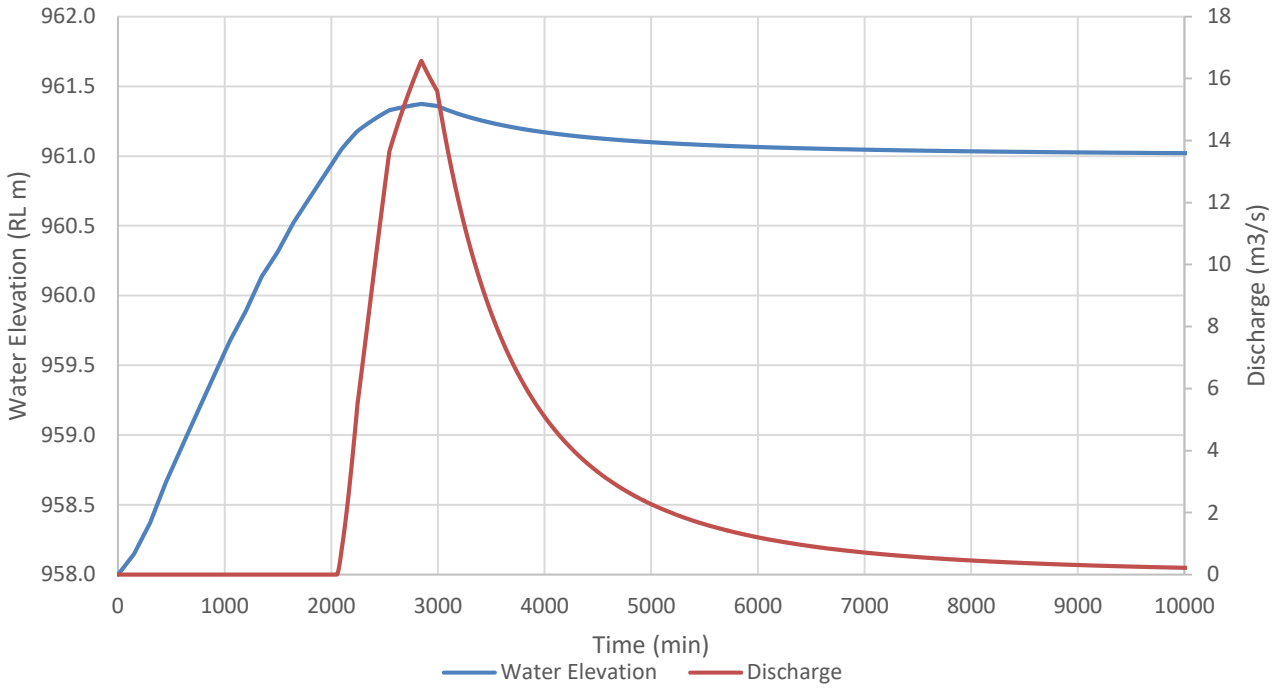


Plate 37 indicates that a peak water elevation above the TSF spillway invert of 0.4m is possible under the PMF design rainfall event. Available freeboard in this scenario is some 600mm.

7.3 Flood Assessment

A flooding assessment for TSF has been carried out to assess the flood security status of the storage. The purpose of this assessment was to assess whether local flooding was possible and whether inundation of the downstream portion of the embankment is possible.

Based on the local topography and the location of the TSF at the head of the Belubula River catchment, it was assessed that external flooding impacts on the TSF were not likely. Notwithstanding, it is recognised that upstream catchment exists for the TSF with this catchment included as part of the spillway design.

8 TSF CONSTRUCTION ASPECTS

8.1 Typical Construction Approach

8.1.1 Preparation Works

8.1.1.1 Installation of erosion and sediment control Measures

Erosion and sediment control measures shall be implemented to minimise the offsite release of sediment within surface water runoff. Particular attention shall be paid to surface runoff from areas of construction/filling and Clay Fill borrow areas. Sediment control provisions would comprise, as a minimum, silt fences and hay bales, with construction of TSF Runoff Interception WMF to act as the initial sedimentation basins for the works.

Erosion and Sediment control works are described in **Section 8.3**.

8.1.1.2 Decommissioning of bores within the TSF area

Prior to site clearing and stripping, all investigation and monitoring bores would need to be located and grouted using 8 parts sand to 1 part cement grout for the fill depth of each well.

8.1.1.3 Site clearing and topsoil stripping

Clearing and stripping would be carried out within the embankment footprint area, emergency spillway and storage area.

Clearing would generally include the complete removal of all debris, trees, stumps, scrub and fallen timber. Clearing in areas to be excavated or filled shall also include the grubbing of stumps and roots in excess of 25mm diameter. Materials removed in clearing operations would be stockpiled in windrows outside of the storage area.

Topsoil stripping would be undertaken within the all areas to be excavated or filled and within the storage area. Nominal topsoil stripping thickness is 0.1m. Stripped topsoils would be stockpiled and profiled as nominated by Regis for reuse in rehabilitation works.

8.1.2 Foundation Works

8.1.2.1 General Subexcavation

General subexcavation below the cleared and topsoil stripped surface would be carried out beneath the entire width of the embankment foundations to remove weak, compressible or over-saturated soils. The anticipated depth range of foundation subexcavation is 0.4m to 1.0m.

8.1.2.1 Cut-Off Key Excavation

A cut-off key would be excavated beneath the cleared, stripped, and sub-excavated foundation surfaces over which embankment construction is to be undertaken, and would be excavated to refusal of a 20t excavator or equivalent such that the cut-off key excavation extends through weak to very weak rock. Approximate depth of cut-off key excavation would be of the order of 6m within the two drainage alignments and tapering to approximately 3m to 4m on the upper abutment areas. Localised grouting of seepage areas and irregular surfaces may also be required to allow placement of the clay fill.

8.1.3 Earthworks

The material types proposed in the construction of the TSF embankment, and the relevant application of these materials, are listed in **Table 26**.

Table 26
Construction Material Types

Material Type	Application
Clay Fill	• Construction of the low permeability core zone and backfilling cut-off keys • Construction of storage blanketing within the former drainage areas
Rock Fill	• Construction of embankment buttressing • Erosion protection for batter surfaces, spillways, drains etc.
Select Rock Fill	• Filter zone (zone against downstream face of Clay Fill) • Wearing surface for embankment crests

Typical selection criteria for the above materials are provided in **Section 4.2.4**. The following outlines typical specifications for the construction materials proposed, and identifies the locations for sourcing of these materials.

8.1.3.1 Clay Fill

Clay fill materials can be selectively sourced from borrows located within the storage area and the general surrounds of TSF. These materials have typically comprised residual soils. The following geotechnical properties are applicable to available materials, which would represent the minimum selection criteria for these materials.

Plasticity	Liquid Limit	> 30%
	Linear Shrinkage	< 5%
Particle Size Distribution	Minimum percent less than 0.075 mm size	40%
Permeability*	Not greater than	$1x10^{-9}$ m/s

* Recompacted to specified compaction and assessed based on compacted density and moisture content

The key issues related to selection of clay fill are the achievable permeabilities, strength and the serviceability of the compacted material. These issues are related directly to the adopted compaction specification - both dry density ratio and compaction moisture content.
In assessing an appropriate compaction specification to achieve desired clay fill permeability, it is recognised that the control on permeability is based on soil structure, such that soil grains are mostly in contact and the void space or micro-pores are minimised. To reduce void space, a "kneading" type compaction is recommended, with the compacted moisture content greater than the optimum for that material to overcome the dry clod strength of the clay material. Based on this philosophy, the following earthworks construction standards are considered appropriate:

(i) Compacted Clay Fill densities (at the selected compaction moisture content) should be maximised to increase shear strength and minimise settlement potential.

(ii) The Clay Fill zone forming remaining cut off key zones, placed against the foundation and abutment surfaces, should be constructed to achieve as low a permeability as is possible as a primary seepage control measure, with fill strength being of lesser significance. A compaction moisture content within this zone, ranging from 0 to +4% of optimum, is therefore considered appropriate.

(iii) Within the core of each embankment section, the key compacted fill properties include low permeability and high strength. This combination would be achievable with compaction moisture contents being close to optimum, with a moisture range of –2 to +2% being considered appropriate.

In summary, the recommended compaction standards for Clay Fill zones associated with the TSF works are as follows:

Clay Fill Zone	Location	Compaction Specification*	
		Dry Density Ratio	Moisture Content
I	Cut-Off Key (against foundation and abutment surfaces)	98%	0 to +4% of optimum moisture content
II	Embankment Core	98%	-2 to +3% of optimum moisture content

*** Based on standard compaction, as determined by AS1289.5.1.1**

8.1.3.2 Rock Fill

It is expected that Rock Fill for use in the TSF works would be sourced predominantly from the mining activities. Based on the nature of mining and the variable structure of the geology within the McPhillamys Project pit, the grading of the run-of-mine waste rock would likely be variable. Notwithstanding, the properties of the Rock Fill used in embankment construction would ideally include:

- high compacted strength;
- stable with respect to vertical settlement and volume instability
- high permeability compared with clay fill material
- suitable grading to reduce the migration of fines from adjacent filter zones; and
- durable and non-acid producing.

It would be appropriate that the Rock Fill is coarsest towards the exposed downstream face of the embankment to provide erosion resistance, with finer materials to be placed against the core to enhance the performance of the filter zone.

It is considered that the suitability of materials selected as Rock Fill for different zones within the embankment would be assessed visually. The suitability of these materials would be confirmed by monitoring the performance of the Rock Fill under compaction and visual assessment of the integrity of the formed layer. The Rock Fill material would therefore be subject to a defined method specification.

8.1.3.3 Select Rock Fill

Select Rock Fill would be used to form the embankment filter zone and also to provide embankment crest armouring. Select Rock Fill would comprise Rock Fill possessing the finest available particle distribution. It is expected that this material would consist predominantly of NAF materials. Selection of Select Rock Fill for use as filter material would be based on the product possessing relatively even proportions of fine and coarse particles and on achieving a competent zone of low voids when compacted.

8.1.4 Storage Lining

Storage lining of the TSF would comprise the following:

- Full depth Storage Blanket (minimum 1,000mm) placed and compacted using Clay Fill in areas of exposed basement sequences (weathered and/or fresh basement zones). It is envisaged that the extent of this lining will primarily be confined to the drainage features such as the former Belubula River.
- Storage Liner (minimum 300mm), comprising the exposure of the soil zone, scarifying/ripping, moisture conditioning and compaction to provide a minimum 300mm thick of Clay Fill with a permeability of less than 3×10^{-10} m/s
- Proprietary Liner (Geomembrane), comprising a suitable geocomposite clay liner or membrane type liner with a permeability of less than 1×10^{-12} m/s. This liner would be installed over a compacted in-situ liner which would exceed a permeability of 1×10^{-9} m/s

8.2 Construction Materials Schedule – Bill of Quantities

A bill of construction material quantities Stages 1, 2 and 3of the TSF development is provided in **Table 27**.

Table 27
Construction Bill of Quantities

Item	Scheduled Item	Unit	Stage 1 Quantity	Stage 2 Quantity	Stage 3 Quantity	Total Quantity
1.0	SITE PREPRARATION					
1.1	Backfill monitoring and investigation bores with sand cement grout	No	30		0	30
1.2	Remove debris, trees, stumps, scrub and fallen timber 25 m beyond work area, push into windrows, as specified.	ha	156	166	81	403
1.3	Strip topsoil from TSF footprint and stockpile at designated locations, nominally 100mm	ha	156	166	81	403
2.0	EXCAVATIONS					
2.1	Subexcavation beneath the Embankments, nominally 1.0m deep					
	Main Embankment	m^2	283,000	71,000	14,000	368,000
	Eastern Embankment	m^2	61,000	0	0	61,000
	Northern Embankment	m^2	78,000	0	0	78,000
2.2	Cut-Off Key excavation, minimum 6m wide and nominally 4m deep	m	700	1,250	1,200	3,150
	Main Embankment	m	740	770	110	1,620
	Eastern Embankment	m	830	0	0	830
	Northern Embankment	m	750	0	0	750
3.0	SEEPAGE COLLECTION WORKS					
3.1	Excavate trenches, supply and install piping and drainage aggregate	m	1,700	0	0	1,700
3.2	Supply and install precast 6m deep 1.5m dia concrete seepage sumps and concrete base	No.	2	0	0	2
4.0	EMBANKMENT CONSTRUCTION					
4.1	Clay Fill - Supply, condition, place & compact					
	Main Embankment	m^3	88,000	71,000	71,000	230,000
	Eastern Embankment	m^3	96,000	0	0	96,000
	Northern Embankment	m^3	167000	0	0	167,000
4.2	Select Rock Fill – Supply, place and compact					
	Main Embankment	m^3	33,000	44,000	45,000	132,000
	Eastern Embankment	m^3	0	0	0	0
	Northern Embankment	m^3	0	0	0	0

Table 27
Construction Bill of Quantities (Cont'd)

Item	Scheduled Item	Unit	Stage 1 Quantity	Stage 2 Quantity	Stage 3 Quantity	Total Quantity
4.3	Rock Fill - Supply, place & compact					
	Main Embankment	m^3	1,790,000	2,550,000	370,000	4,710,000
	Eastern Embankment	m^3	310,000	0	0	310,000
	Northern Embankment	m^3	565,000	0	0	565,000
5.0	STORAGE BLANKETING					
	Storage Blanket – source Clay Fill, condition, place and compact to form 1,000mm liner	m^2	120,000	0	0	113,000
	Storage Liner – rip, scarify condition and compact to form 300mm compacted layer.	m^2	1,240,000	980,000	600,000	2,820,000
6.0	MISCELLANEOUS WORKS					
6.1	Emergency Spillway, Excavation	m^3	227,000	158,000	69,000	454,000
6.2	TSF Runoff Interception WMF, including earthworks and spillways	m^3	13,000	0	0	13,000
6.3	Clean Water Diversion drains	m^3			1,109,000	1,109,000
6.4	Embankment Instrumentation (piezometers and Survey Monuments)	No	12	6	6	16
6.5	Decant Causeway Rock Fill (Pumping and piping by Operations)	m^3	20,000	120,000	160,000	290,000
6.6	Tailings delivery pipeline and spigots at a maximum 100m centres	m	8,700	0	0	
6.7	Final Discharge Channel	m^3			160,000	160,000

***Clean Water Diversion and Final Discharge Channel to be installed post operations at TSF Closure**

8.3 Erosion and Sediment Control Planning

The detailed soil and erosion control plan would be developed as part of the TSF Stage 1 construction documentation, notwithstanding, the general approach proposed for the development is presented below.

8.3.1 Aims

The aim of an Erosion and Sediment Control Plan (ESCP) is to take all reasonable and practicable measures to minimise short and long-term soil erosion and the adverse effects of sediment transport.

Specifically, measures for the protection of impacts caused by construction sites fall into two categories:

- **Erosion Control** – the prevention of sediment and particle loss from earth surfaces, typically by the action of external forces such as running water, rainfall, and wind; and

- **Sediment Control** – measures to prevent the occurrence of un-natural levels of sediment transfer. Typically, the transfer of clay (fine sediments) are of concern.

The Erosion and Sediment Control Plan will combine both erosion control and sediment control measures to manage construction impacts associated with the TSF construction works.

8.3.2 Construction Activities and Sequencing

Construction activities considered relevant to erosion and sediment control planning for TSF are as follows:

- Stripping and excavation of topsoil, subsoil and earth fill borrow;
- Stripping of unsuitable materials from embankment footprints;
- Stockpiling; and
- Embankment earthworks.

Effective control of erosion and sediment transport will require effective sequencing of activities associated with the TSF construction. Conceptual sequencing for TSF is provided in **Table 28**.

Table 28
Erosion and Sediment Control Activity Sequencing

Sequence	Activity	Erosion and Sediment Control **Outcomes**
1	Construction of TSF Runoff Interception WMF	• Two water dams/sediment basins to be constructed down-gradient of initial embankment footprint works prior to clearing and stripping. • Clean water diversion drains for the works to be established as part of initial works. • One temporary sediment basin to be constructed down-gradient of the clay borrow excavation area prior clearing, stripping and excavation.
2	Construction of Cleanwater Diversions	• Two check dams to be formed in existing drainage lines, upstream of initial embankment footprint. Cleanwater reporting to the check dams to be pumped over the embankment foundation works into natural drainage channels.
3	Clearing & Stripping of Initial Embankment Footprint	• Runoff from initial embankment construction to report to sediment basins.
4	Clearing & Stripping of Clay Borrow Area	• Initial clay borrow area to be restricted to less than 2.0ha with runoff from clay borrow excavation and surrounding disturbances to report to the downstream sediment basins. Following establishment of TSF embankment to a minimum 40ML capacity, remaining borrow area can be cleared and stripped.
5	Excavation of Clay Borrow	• Runoff from clay borrow excavation and surrounding disturbances to report to sediment basin and/or TSF.
6	Initial Embankment Construction Works	• Initial embankment works to occur immediately upstream of sediment basin locations with undisturbed catchment diverted around these areas.

Activities 1 and 2 are to occur prior to all other activities. Care shall be taken to minimise the time between activities which expose erodible material and provide sediment sources (Activities 3 and 4) and activities considered to produce positive erosion and sediment control outcomes (Activities 5 and 6).

Achievement of the erosion and sediment control outcomes of Activities 3 and 4 may require minor bunding and drainage works for routing of surface runoff to sediment basins.

8.3.3 Erosion Control

Minimisation of clean water ingress into the construction site is the principal method of minimising erosion on construction sites. For the TSF construction works, the construction of check dams upstream of embankment works, and associated bypass pumps achieves a similar aim.

Erosion of the construction works would be expected to occur under the following scenarios:

- Erosion from the incomplete embankment construction works (downstream side) caused by rainfall impact;
- Erosion as a result of ponding against incomplete embankment works (upstream and downstream side);
- Erosion from stockpiling activities; and
- Erosion as a result of construction vehicular movement.

Mitigation of this erosion is to occur as described in **Table 29**.

Table 29
Erosion Mitigation Strategies

Erosion Pathway	Mitigation Strategy
Rainfall Erosion on incomplete embankments batter	• Embankment works to drain to sediment basins where practicable. • General fill / clay fill to be compacted, trimmed and finished to a generally smooth surface on same day of placement. • Silt fencing to be employed as required in locations directed by the drawings.
Ponding against incomplete embankment works	• Local infilling as required to prevent ponding.
Ponding against stockpiles	• Inspection of stockpile footprints prior to placement to identify ponding areas. • Infilling of potential ponding areas with topsoil, mulching and seeding. • Stockpile inverts to be kept free of trash / debris.
Vehicle Erosion	• Vehicles to use site roads where practicable. • Vehicles leaving the construction area to be washed down.

8.3.4 Sediment Control

Sediment capture at areas of downstream runoff generation is necessary to prevent excessive sediment transport occurring from disturbed areas (embankment footprint) and associated construction roads. As described in **Section 8.3.2,** a sediment basin is to be located down-gradient of the embankment footprint as indicated on Drawings**.**

TSF Runoff Interception WMF classified as Type D basins (IECA: *Best Practice Erosion and Sediment Control*, 2008):

Basin	Sizing	Type	Catchment Area	Runoff Coefficient	Rainfall Event Criteria	Rainfall Depth
TSF Runoff Interception WMF	13ML	D	24ha	1.0	85th Percentile 5-day Rainfall Event	49.7mm

As embankment construction proceeds in the construction works life, it is anticipated that sediment laden runoff reporting from disturbed areas will report to the TSF storage area (upstream of the embankment) and will therefore be contained within the TSF.
Where runoff from the downstream batters of construction works cannot be easily captured, silt fences and/or straw bales are to be installed, to minimise sediment transport offsite.

8.4 Construction Quality Assurance (QA)

Recommended QA/QC provisions related to the construction of the TSF embankment are summarised below. These requirements will be addressed in detail in the specification, subject to the detailed design.

8.4.1 Foundation Preparations

Foundation preparations for the lift embankment construction works would comprise a combination (as required) of clearing/surface stripping and subexcavation. QA/QC requirements for this phase of construction would include full-time superintendence of the foundation preparation works, to provide advice on surface stripping thicknesses and to delineate the extent of foundation subexcavations, as required. The most important aspects of foundation preparations is to achieve an effective foundation surface on which the embankment could be constructed and the excavation of the cut-off key to a depth that intersects moderate to low permeability foundations.

8.4.2 Embankment Earthworks

The QA/QC objectives for embankment earthworks would be to confirm compliance of fill construction with specified compaction standards.

Specific QA/QC requirements for construction of the embankments would involve ongoing technical supervision, particularly during the initial stages of earthworks, to correlate construction methods against achievable fill compaction standards. The suitability of construction materials would also be assessed as part of this supervision, with provision included in the specification for fill material compliance testwork. Direction and supervision of QA testing of the fill materials, as placed, would also be undertaken. The basis for this QA program is insitu density and moisture content determinations, carried out on earth fill.

Observation of the response of the Clay Fill to compaction and loading would also be carried out as part of supervision of the works. Particular note of the occurrence of heaving and displacement of the completed surface would be made.

In addition to the above, observation of the embankment (in conjunction with review of survey data in relation to the temporary survey marks) would be carried out to support the interpretation of current geotechnical stability of the section.

9 OPERATIONS AND CLOSURE ASPECTS

A number of operational and closure issues apply to the ultimate TSF to maintain consistency with the concept design philosophies adopted. These issues are outlined below and provide a summary description of the deposition, water and seepage management, and rehabilitation requirements for the TSF.

9.1 Tailings Deposition Practices

As outlined in **Section 3.0**, the general design philosophy adopted for the TSF development is based on the use of sub-aerial techniques for tailings deposition. Such techniques involve discharge of tailings from multiple locations on the perimeter of the TSF. Water liberated in conjunction with the deposition phase is recovered for return to the process plant via the Secondary WMF.
The significance of sub-aerial deposition techniques in the context of the proposed TSF development concept is such that:

- tailings storage efficiencies are maximized; and
- tailings permeabilities are reduced, minimising the rate of seepage.

Appropriate sequencing of tailings deposition is also suggested to ensure that over-drying of exposed tailings surface is avoided to minimise the potential for dusting of the tailings surface. A management process is therefore recommended, subject to dusting potential/issues, in relation to the TSF to avoid the implications of over-drying. Such a process may include periodic irrigation of the beach, primarily for disposal of excess water as a means of improving the site water balance (as required). Alternatively, application of an appropriate surface treatment to limit dusting may be undertaken.

9.2 Tailings Water Management

Tailings water recovery from the TSF surface is integral to sub-aerial deposition techniques. During the operation of the system, transferring decant water from the TSF to the Process Water Dam shall be a priority to minimise the risk of spill from the TSF, recognising that spill from the system should only occur in the event of an extreme rainfall period, and should cease generally within 24 hours of cessation of the event. Attention during operation should also be made to avoid surcharging the system with excess water volumes from alternative sources

9.3 Seepage Fate and Control

Conceptually, under worst case conditions assuming limited seepage mitigation measures are implemented and/or proposed seepage systems are not operated over the long term, seepage from the storage during the operation of the TSF and into the post closure phase would occur by development of a seepage plume, initially migrating slowly downwards into the foundation sequences. A local groundwater mound would form beneath the storage, either directly connected with the underlying groundwater system, or perched above a horizon of lower permeability. This mound will eventually move hydraulically down gradient, likely towards the south. The time taken for such seepage to migrate would depend on the hydraulic capacity of the seepage pathways that may exist, either through the basement or beneath the cut-off key.
Based on the above conceptual conditions, it is likely that the fate of seepage from the storage would be to concentrate through the drainage line to the south of the storage. Evidence of seepage from the storage is likely to be observed as follows:

- Expression of seepage at ground surface directly downstream from the embankment.
- Depending on the continuity of surface soils, some seepage springs may appear in depressions/hollows or intersecting drainages further downstream.

From the seepage analysis completed (refer **Section 7.1**), it appears that the most significant mechanism for seepage from the TSF to occur is through the embankment foundation units, and to a lesser extent, through the embankment.

To address the above seepage potential, a number of feasible measures, focussing on the above seepage mechanisms, which can reduce the magnitude of seepage from the storage have been considered. The seepage control measures that have been incorporated into the seepage model and reflected in the proposed concept design are as follows:

- A foundation cut-off key to intersect the basement sequences.
- A low permeability embankment core zone.
- Partial blanketing of the storage floor.
- Seepage recovery system.

The seepage rates estimated from the analysis, based on the above control measures (recognising that these results are conservative based on the saturated conditions assumed), are of a magnitude that is considered manageable, and represent only a small proportion of the total water inputs to the TSF.

In addition to the proposed seepage control measures, monitoring and if necessary, subsequent implementation of additional seepage controls is a fundamental component of the TSF development. Groundwater monitoring, particularly down gradient from the TSF should be implemented. Where additional controls are considered necessary, such controls may comprise one or a combination of the following:

- Installation of pumps in the groundwater monitoring bores, or construction of dedicated groundwater recovery wells;
- Refinement of the water recovery practices adopted to reduce the volume of water retained within the system.

9.4 TSF Rehabilitation

9.4.1 Preface

The final landform will be subject to investigation works and detailed assessment in the years prior to closure and would typically include assessment of the water chemistry and the surrounding environment and consideration of infrastructure to remain post closure and land use (subject to relevant agreements).

The typical objectives to be adopted for rehabilitation of the TSF would be to create a landform that is:

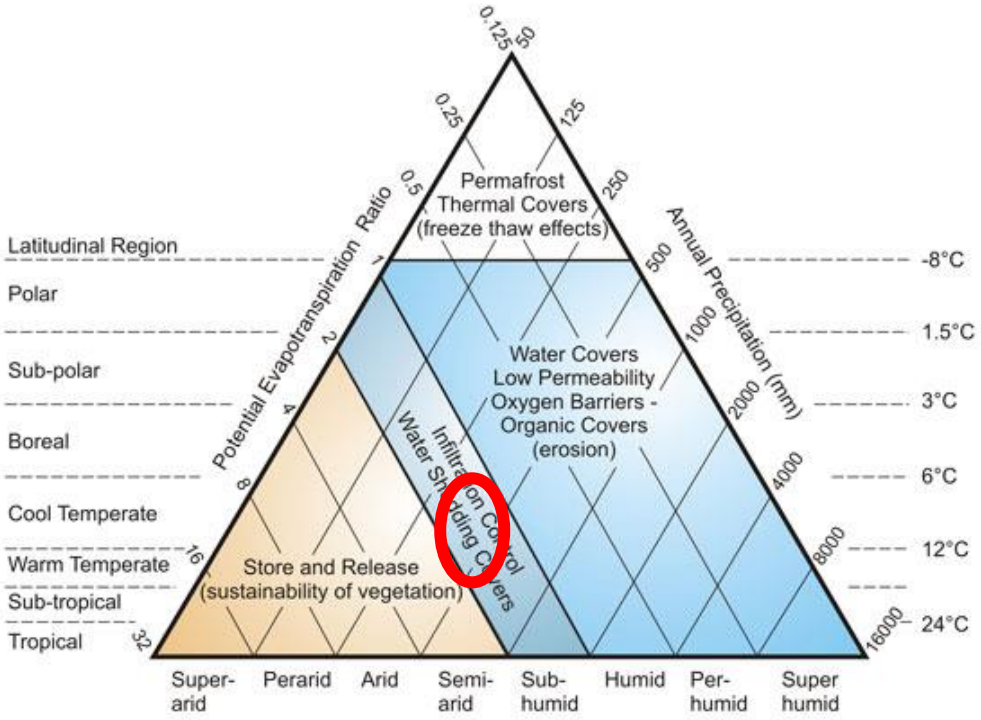
(i) stable and sustainable;

(ii) compatible with the surrounding landform; and

(iii) of minimum long term environmental impact (i.e. non-polluting).

Based on the above and in accordance with INAP's Global Acid Drainage Guide (Refer **Plate 38**), suggested capping arrangement suitable for the site conditions would be store and release or water shedding type cap.

Plate 38
Suggested Capping Arrangement (source: Global Acid Rock Drainage Guide, INAP)
Red Circle Indicating Site Conditions



9.4.2 Closure Water Management

Maintain the rainfall runoff capacity to comply with regulatory requirements within the existing TSF area, until such a time that it is demonstrated that the runoff is of suitable quality to allow discharge from the site. The final landform/beach and embankment development as provided in the drawings is sufficient to comply with the operational freeboard requirements as detailed in **Section 6.3**. Following demonstrated compliance with release criteria, the final ponded area would be breached/filled to facilitate drainage of the area.

9.4.3 Landform Development

It is envisaged that the final TSF landform would comprise long-term stable external batters with an upper surface formed such that ponding is substantially avoided. This would therefore necessitate a final campaign of tailings deposition within the TSF to infill any significant depression, although maintaining DSA as outlined above. The conceptual formation of the final tailings beach is shown on **Figure 12**, which shows the beach generally grading from west to east with an overflow channel incorporated on the eastern perimeter to discharge runoff into Twelve Mile Creek catchment. Formation of the release channel would occur following surface rehabilitation of the TSF and subsequent performance monitoring achieving water quality objectives/criteria, with this process envisaged to take several years following completion of deposition.

9.4.4 Tailings Surface Capping

A tailings surface cap would serve the following purposes:

(a) facilitate ongoing surface water drainage and prevent ponding;

(b) stabilise the surface to mitigate against potential ongoing erosion; and

(c) reduce potential rainfall infiltration into the tailings as recharge to seepage.

To address the above, tailings capping options assessment would need to be undertaken prior to completion of the TSF.

Notwithstanding the above, the conceptual cap would comprise the following components. This configuration assumes that the tailings would remain geochemically benign.

- Tailings Surface Stabilisation Layer (Capillary Break)

  To provide a geotechnically competent surface over the surface of the tailings, a stabilisation layer may be necessary. The purpose of the stabilisation layer would be to provide a competent subgrade or bridging layer, which would limit the effective surcharge onto the tailings surface and thereby limit potential settlements. The area most likely to require stabilisation would be the decant pond surface, due to the likely extent of saturated slimes materials.

  The stabilisation layer would typically comprise rock mattress (the rock comprising competent and durable material).

- Surface Cover Layer

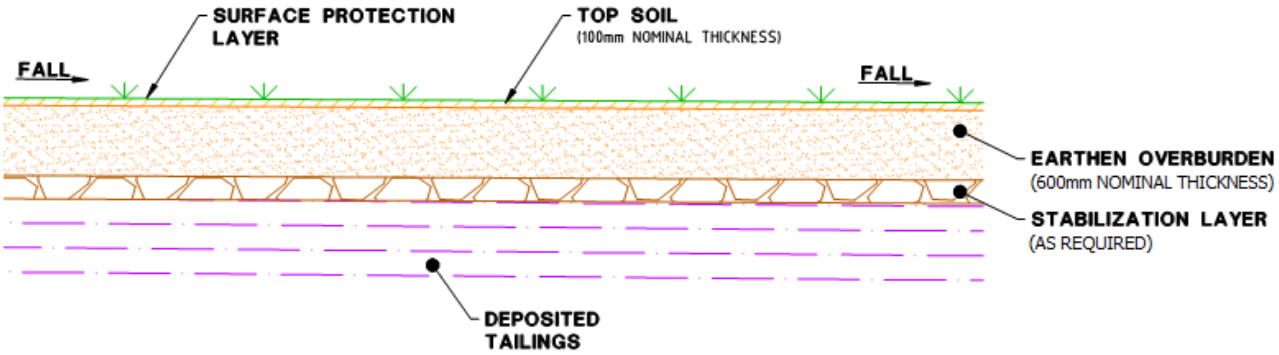
  To protect the tailings surface from erosion and exposure deterioration (through wetting and drying), a surface cover layer would be required. This layer would also be utilised as a rooting zone for vegetation depending on the proposed end land use.

  This layer would be formed typically using select earthen material from run-of-mine weathered overburden. Geochemically, the earthen material should be non-acid producing. From a geotechnical perspective, the material should be non-erosive/dispersive.

  The thickness of this layer would be selected to not only maintain drainage, but also to compensate for settlement within the underlying tailings. A hummocky final land surface may also have some benefit with respect to maintaining moisture within the surface layers to support vegetation growth and to reduce erosion potential. The final surface landform would be subject to further, on-going assessment through the final stages of the facility.

  A conceptual detail of the proposed TSF capping arrangement is provided in **Plate 39**.

Plate 39
Conceptual TSF Capping Arrangement



A more detailed assessment of a suitable capping configuration would need to be completed, subject to more data being available with respect to the physical and geochemical characteristics of the tailings. In particular, geochemical compatibility between the tailings and capping materials must be confirmed to ensure the integrity of the capping horizon is not compromised.

10 SURVEILANCE AND MONITORING OF TSF

The minimum suggested site surveillance and monitoring of TSF to comply with ANCOLD (2012) with the key components of this program as follows:

- Monitoring of the phreatic surface within the embankment and foundations –a minimum of eight piezometers. Monitoring should be undertaken using automated loggers with trigger response action plan levels set to provide automated warnings/notifications. Data would be reviewed at a frequency not greater than 3 months. Monitoring of the stored water levels should also be undertaken.
- Settlement monitoring of the embankment –a minimum of 8 monuments is suggested with 5 crest monuments and 3 on the downstream batter. Monitoring should be undertaken at a frequency of not greater than 6 months during periods of high water levels. In addition, noting the advancement in technology, consideration for Interferometric Synthetic Aperture Radar (INSAR) to provide complete surface monitoring is recommended.
- Visual inspections (documented) of TSF as follows:
  - Weekly and/or significant rainfall incident related inspections to inspect the physical conditions of the embankment, spillway, pipelines, seepage system and diversion system. These inspections would be carried out by suitably trained site personnel.
  - Annual and/or incident related dam safety inspections to review monitoring data (phreatic surface and settlement monitoring) and inspect conditions of embankment, spillway, pipelines, seepage system, diversion drains etc. These inspections would be completed by a suitably experienced and qualified Engineer.

In addition to the above, additional monitoring recommended for the TSF is as follows:

- Groundwater monitoring. Details of the groundwater.
- Downstream surface water quality monitoring.
- Operations monitoring including all pumped inflow, outflows, seepage recovery rates, enhanced evaporation operations, storage water levels and tailings beach development surveys.

REFERENCES

[1] ANCOLD (1998), Guidelines for Design of Dams for Earthquakes, Australian National Committee on Large Dams.

[2] ANCOLD (2012), Guidelines for Design on Tailings Dams, Australian National Committee on Large Dams.

[3] ANCOLD (2003), Guidelines on Dam Safety Management, Australian National Committee on Large Dams.

[4] EPA(2015), Environmental Guidelines Solid Waste Landfills, State of NSW EPA

[5] EPA(2017), Tailings Dam Liner Policy, Letter dated 15 December 2017 to R.W. Corkery and Co Pty Limited, reference EF17/10659.

[6] Fell et all (2005), Geotechnical Engineering of Dams, CRC Press, 2005

[7] French et al (2015), The McPhillamys Gold Deposit, Kings Plains, NSW, Discovery History and Geology of the McPhillamys Gold Deposit, Lachlan Fold Belt NSW, By Tara French, Peter Duerden, Jeff Bigelow, Hugh Simmons, Paul Flitcroft, presented at 2015 Mines and Wines Conference, Perth, September 2015

[8] Leps, T.M, *Review of Shearing Strength of Rockfill*, ASCE Journal Soil Mechanics and Foundations, July 1970.

[9] Makdisi and Seed (1978), Simplified procedures for estimating dam and embankment earthquake induced deformations, Journal of the Geotechnical Engineering Division-Asce, 104, 849-867

[10] M Leonard, D. Burbidge and M. Edwards (2013). *Atlas of Seismic Hazard Maps of Australia, Seismic hazard maps, hazard curves and hazard spectra.* Geoscience Australia, Record 2013/41.

[11] M. E. Hynes-Griffin and A. G. Franklin (1984). *Rationalizing the Seismic Coefficient Method.* Miscellaneous Paper GL-84-13, US Army Corps of Engineers Waterways Experiment Station, Vicksburg, 1984, 21 p.

[12] NSW Dams Safety Committee (June 2010), Surveillance Reports for Dams, Guidance Sheet DSC2C.

[13] NSW Dams Safety Committee (June 2010), Operation and Maintenance for Dams, Guidance Sheet DSC2F.

[14] NSW Dams Safety Committee (June 2010), Emergency Management for Dams, Guidance Sheet DSC2G.

[15] NSW Dam Safety Committee (June 2015), Consequence Categories for Dams, DSC Guidance Sheet 3A.

[16] NSW Dam Safety Committee (June 2010), Acceptable Earthquake Capacity for Dams, DSC Guidance Sheet 3C.

[17] NSW Dam Safety Committee (June 2012), Tailings Dams, DSC Guidance Sheet 3F.

DRAWINGS

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT



LOCALITY PLAN
SCALE: 1:200,000

N

DRAWING LIST

DWG NO.	DRAWING TITLE	REVISION
101	SITE LOCALITY PLAN AND DRAWING LIST	D
102	PROJECT LAYOUT	D
103	TSF STAGE 1 LAYOUT	D
104	TSF STAGE 2 LAYOUT	D
105	TSF STAGE 3 LAYOUT	D
106	TSF LONG TERM LAYOUT	D
107	TSF STAGE 1 LAYOUT DETAIL	D
108	TSF STAGE 1 MAIN EMBANKMENT CONSTRUCTION	D
109	TSF STAGE 2 LAYOUT DETAIL	D
110	TSF STAGE 3 LAYOUT DETAIL	D
111	TSF STAGE 3 FINAL LANDFORM	D
112	TSF SECTIONS & SEEPAGE DETIALS	D
113	TSF SECTIONS & DETAILS	D
114	TSF SECTIONS & DETAILS	D
115	TSF DETAILS	D
116	TSF POST CLOSURE LAYOUT	E
117	TSF POST CLOSURE DETAIL	B
201	GEOTECHNICAL TSF INVESTIGATIONS	D
202	TSF SURFACE GEOLOGY	D

GENERAL CONSTRUCTION NOTES

1. THESE NOTES APPLY TO ALL PROJECT DRAWINGS IN THE SET UNLESS NOTED OTHERWISE AND SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATION.
2. ALL LEVELS ARE IN METRES TO AUSTRALIAN HEIGHT DATUM (AHD).
3. ALL COORDINATES ARE IN METRES TO MAP GRID AUSTRALIAN (MGA-55).
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
5. DIMENSIONS AND LOCATIONS OF EXISTING STRUCTURES SHALL BE CONFIRMED ON SITE BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS.
6. LOCATION AND DEPTH OF ALL SERVICES TO BE VERIFIED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.
7. DIMENSIONS SHALL NOT BE SCALED OFF DRAWINGS.

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE: 1:200,000
JOB No. 113272-02
DATE JUL 2018
DESIGN JL
DRAWN JS
CHECKED RH
APPROVED RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

SITE LOCALITY PLAN
AND DRAWING LIST

101

SHEET SIZE A3 Rev. D

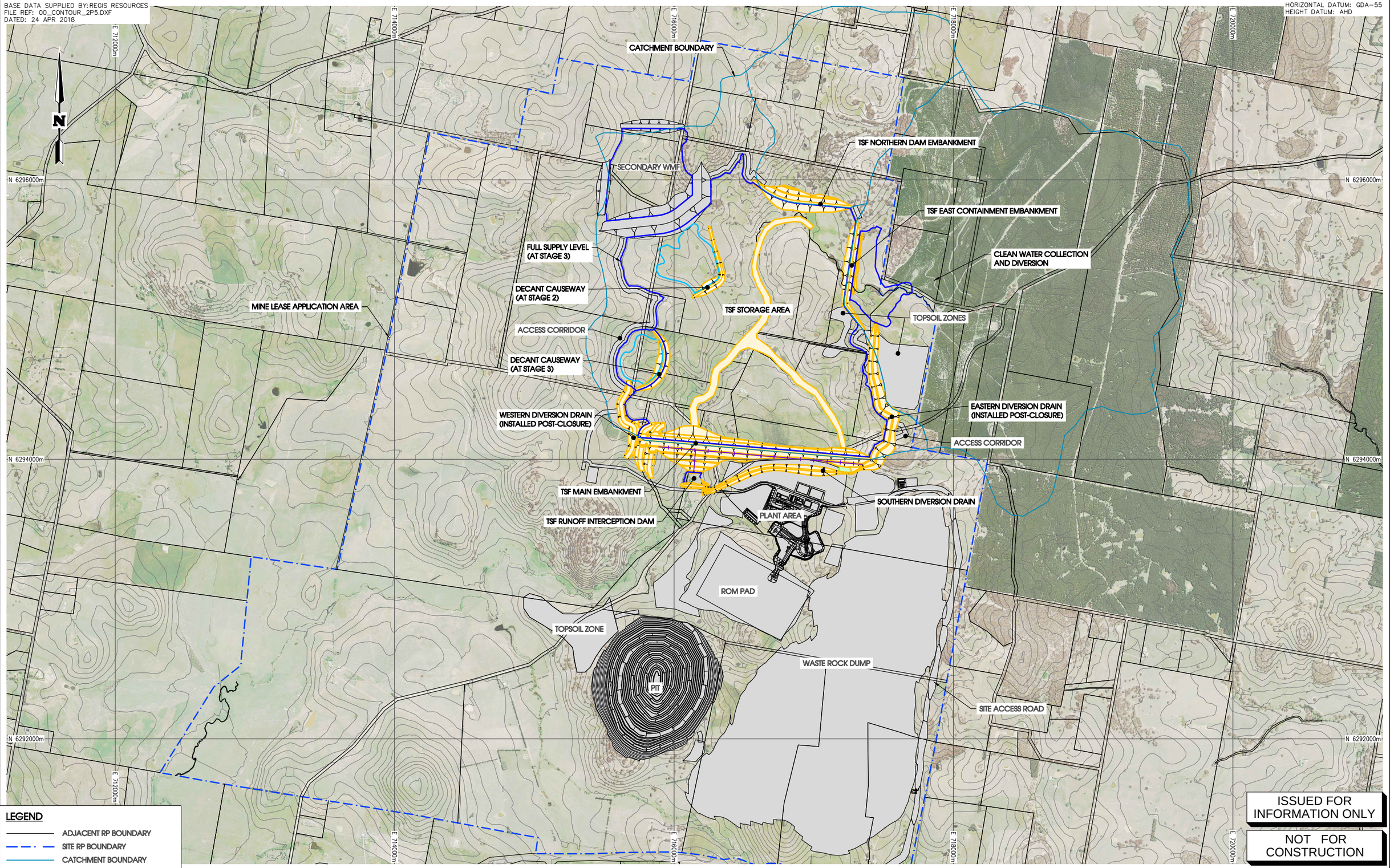
Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 1 OF 17

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-101-101-D.dwg

BASE DATA SUPPLIED BY: REGIS RESOURCES
FILE REF: 00_CONTOUR_2P5.DXF
DATED: 24 APR 2018

HORIZONTAL DATUM: GDA-55
HEIGHT DATUM: AHD



LEGEND

- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:25,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

PROJECT LAYOUT

102

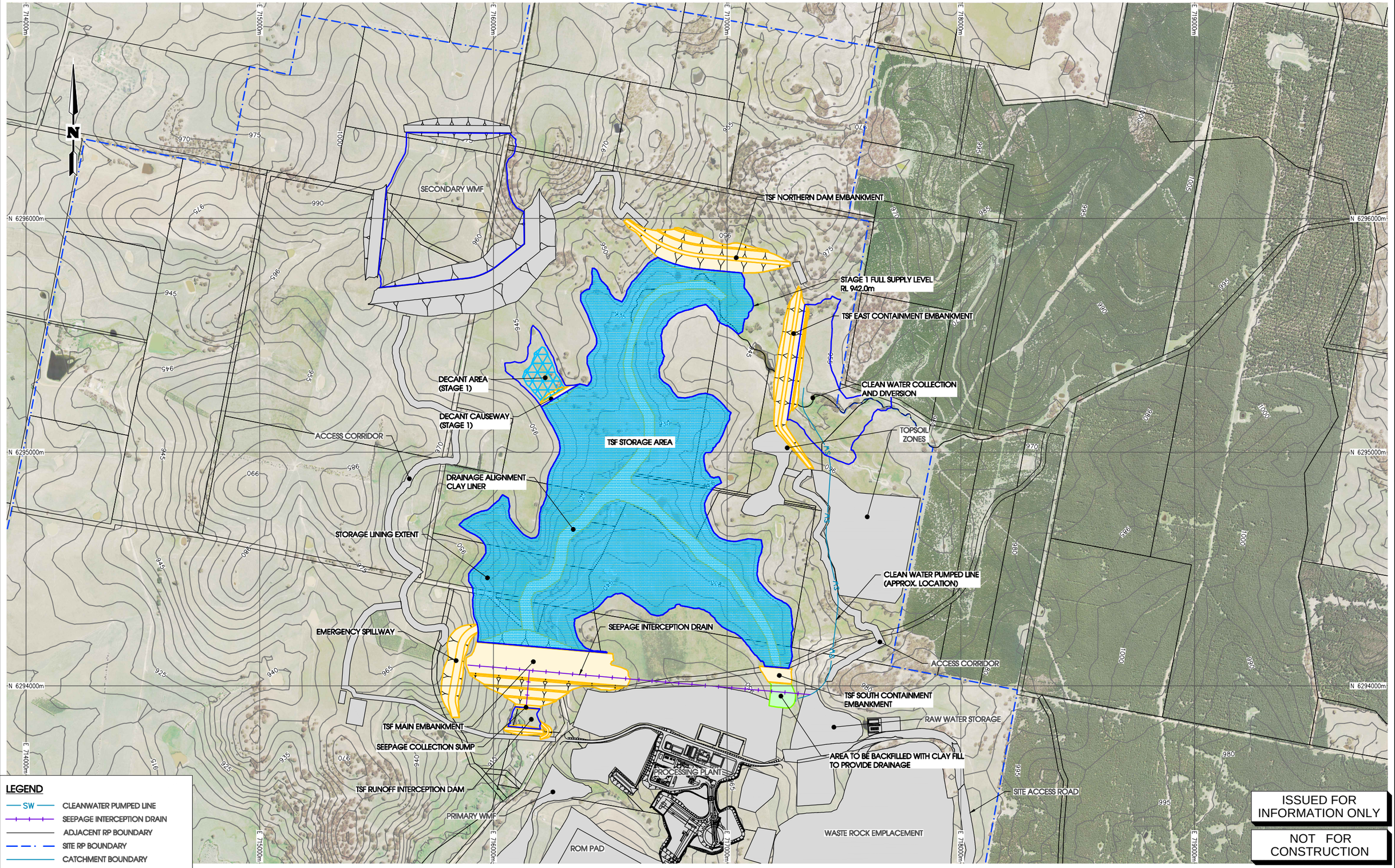
SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 2 OF 17

Plotted By: AmeliaL
Plotted Time: 1605:21
Plotted Date: 13/05/19

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-102-102-D.dwg



LEGEND

- SW — CLEANWATER PUMPED LINE
- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

103

TSF
STAGE 1 LAYOUT

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 3 OF 17

Plotted By:
Plotted Time:
Plotted Date:

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-103-103-D.dwg

SECONDARY WMF

TSF NORTHERN DAM EMBANKMENT

STAGE 2 FULL SUPPLY LEVEL RL 951.0m

TSF EAST CONTAINMENT EMBANKMENT

CLEAN WATER COLLECTION AND DIVERSION

DECANT AREA (STAGE 2)

DECANT CAUSEWAY (STAGE 2)

TSF STORAGE AREA

ACCESS CORRIDOR

STORAGE LINING EXTENT

TOPSOIL ZONES

CLEAN WATER PUMPED LINE (APPROX. LOCATION)

SEEPAGE INTERCEPTION DRAIN

EMERGENCY SPILLWAY

ACCESS CORRIDOR

TSF MAIN EMBANKMENT

RAW WATER STORAGE

SEEPAGE COLLECTION SUMP

AREA TO BE BACKFILLED WITH CLAY FILL TO PROVIDE DRAINAGE

PROCESSING PLANT

TSF RUNOFF INTERCEPTION DAM

SITE ACCESS ROAD

PRIMARY WMF

WASTE ROCK EMPLACEMENT

ROM PAD

E 714000m E 715000m E 716000m E 717000m E 718000m E 719000m

N 6296000m N 6295000m N 6294000m

LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 1

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

Plotted By: Amellot
Plotted Time: 16:09:18
Plotted Date: 13/05/19

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/06/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

104

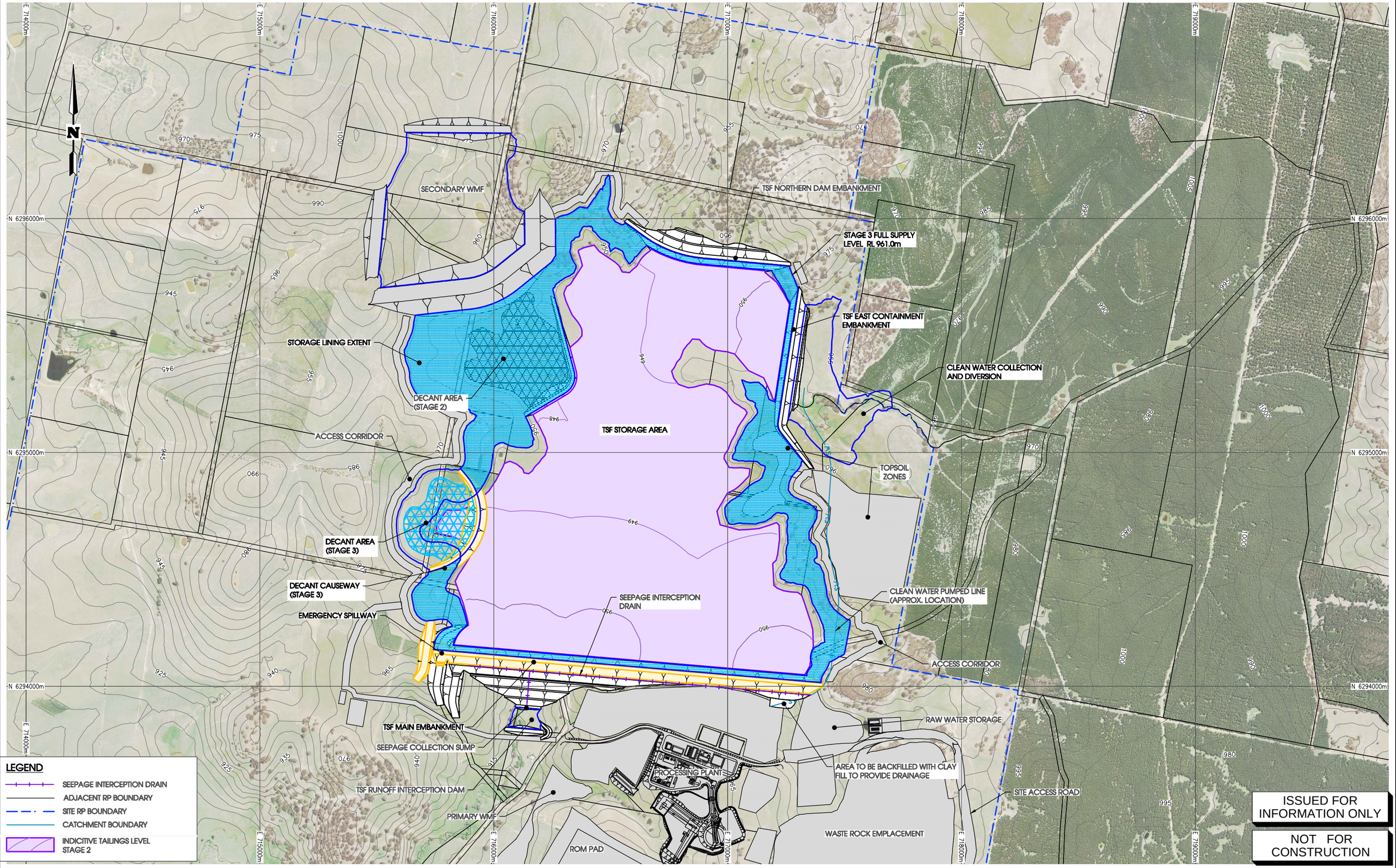
TSF
STAGE 2 LAYOUT

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 4 OF 17

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-104-104-D.dwg



LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 2

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

105

TSF
STAGE 3 LAYOUT

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 5 OF 17

Plotted By: MarkC
Plotted Time: 14:01:58
Plotted Date: 13/05/19

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-105-105-D.dwg

EMBANKMENT TO BE REMOVED

EMBANKMENT TO BE REMOVED

SECONARY WMF TO BE FILLED AND PROFILED TO PROVIDE DRAINAGE

SECONDARY WMF

TSF NORTHERN DAM EMBANKMENT

STAGE 3 FULL SUPPLY LEVEL RL 961.0m

TSF EAST CONTAINMENT EMBANKMENT

CLEAN WATER COLLECTION AND DIVERSION

CLEAN WATER PUMPED LINE (APPROX. LOCATION) TO BE REMOVED

TOPSOIL ZONES

ACCESS CORRIDOR

TSF STORAGE AREA

DECANT AREA (STAGE 3)

EASTERN DIVERSION DRAIN (INSTALLED POST-CLOSURE)

SEEPAGE INTERCEPTION DRAIN

WESTERN DIVERSION DRAIN (INSTALLED POST-CLOSURE)

ACCESS CORRIDOR

TSF MAIN EMBANKMENT

RAW WATER STORAGE

SEEPAGE COLLECTION SUMP

AREA TO BE BACKFILLED WITH CLAY FILL TO PROVIDE DRAINAGE

PROCESSING PLANT

TSF RUNOFF INTERCEPTION DAM

SOUTHERN DIVERSION DRAIN

SITE ACCESS ROAD

PRIMARY WMF

WASTE ROCK EMPLACEMENT

ROM PAD

LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 3

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

106

TSF
LIFE OF MINE LAYOUT

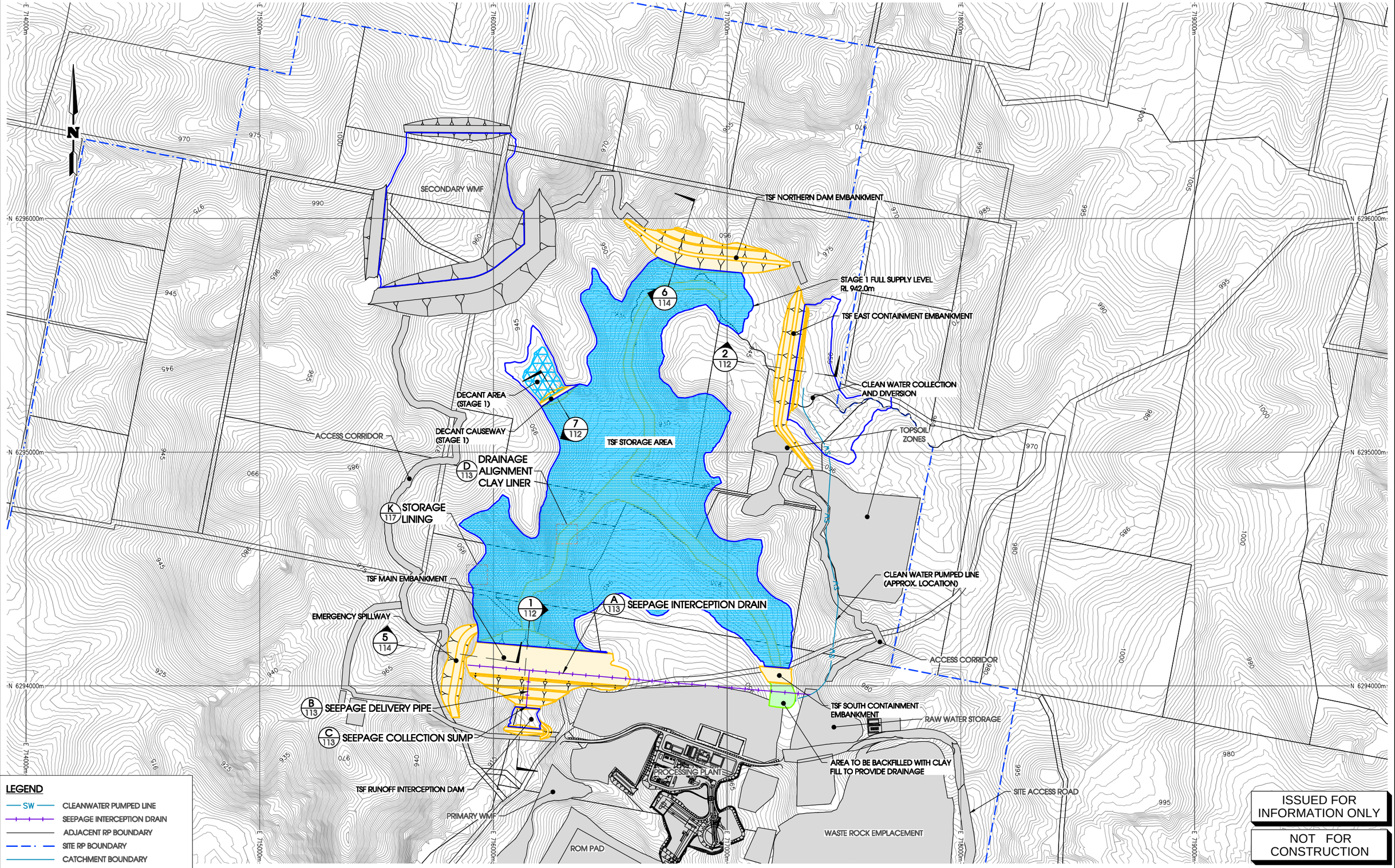
SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 6 OF 17

Plotted By: SteveT
Plotted Time: 14:53:36
Plotted Date: 27/07/18

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-106-106-D.dwg



LEGEND

- SW — CLEANWATER PUMPED LINE
- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/06/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

107

TSF
STAGE 1 LAYOUT
DETAIL

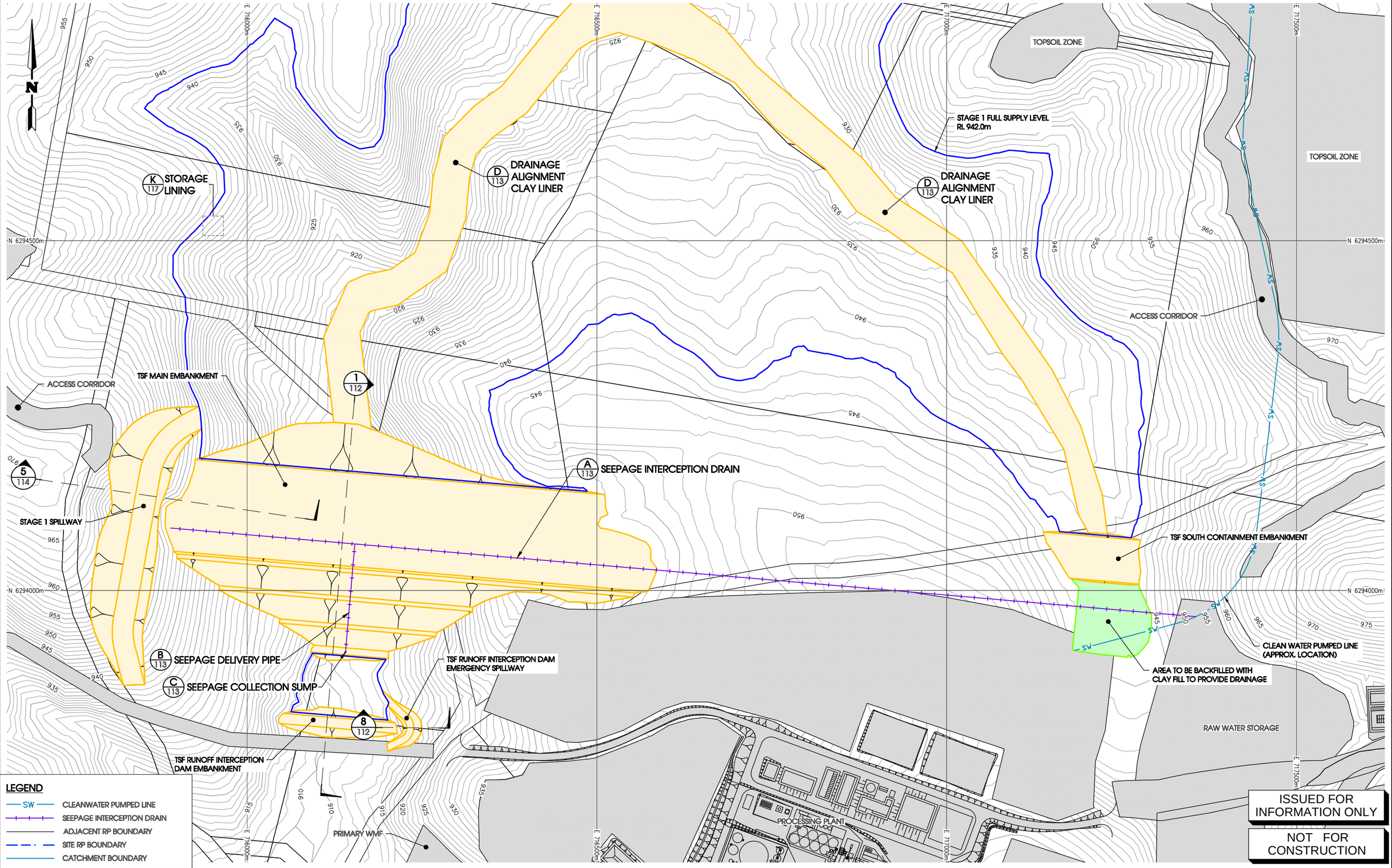
SHEET SIZE	A3	Rev.	D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 7 OF 17

Plotted By:
Plotted Time:
Plotted Date:

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-107-107-D.dwg



No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:5,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
STAGE 1 MAIN
EMBANKMENT CONSTRUCTION

108

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 8 OF 17

Plotted By: SteveT
Plotted Time: 14:51:44
Plotted Date: 27/07/18

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-108-108-D.dwg

SECONDARY WMF

TSF NORTHERN DAM EMBANKMENT

STAGE 2 FULL SUPPLY LEVEL RL 951.0m

TSF EAST CONTAINMENT EMBANKMENT

CLEAN WATER COLLECTION AND DIVERSION

DECANT AREA (STAGE 2)

DECANT CAUSEWAY (STAGE 2)

TSF STORAGE AREA

ACCESS CORRIDOR

K 117 STORAGE LINING

TOPSOIL ZONES

TSF MAIN EMBANKMENT

EMERGENCY SPILLWAY

A 113 SEEPAGE INTERCEPTION DRAIN

CLEAN WATER PUMPED LINE (APPROX. LOCATION)

ACCESS CORRIDOR

B 113 SEEPAGE DELIVERY PIPE

C 113 SEEPAGE COLLECTION SUMP

RAW WATER STORAGE

AREA TO BE BACKFILLED WITH CLAY FILL TO PROVIDE DRAINAGE

PROCESSING PLANT

TSF RUNOFF INTERCEPTION DAM

SITE ACCESS ROAD

PRIMARY WMF

WASTE ROCK EMPLACEMENT

ROM PAD

6/114 2/112 7/112 1/112 3/114 5/114

LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 1

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

109

TSF
STAGE 2 LAYOUT
DETAIL

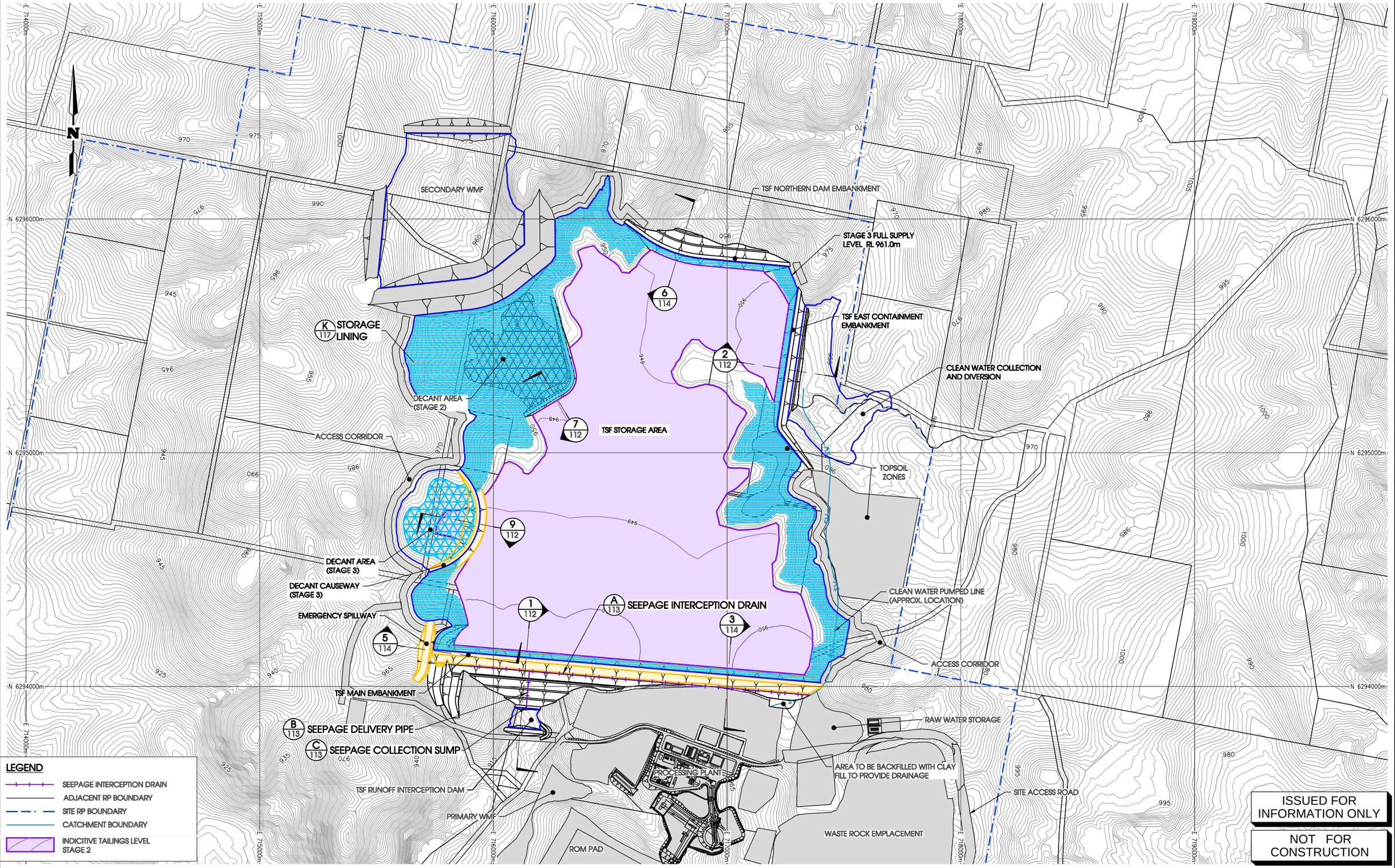
SHEET SIZE	A3	Rev.	D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 9 OF 17

Plotted By: Amelial.
Plotted Time: 16:09:18
Plotted Date: 13/05/19

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-109-109-D.dwg



ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

110

TSF
STAGE 3 LAYOUT
DETAIL

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 10 OF 17

Plotted By: MarkC
Plotted Time: 14:01:58
Plotted Date: 13/05/19

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-110-110-D.dwg

EMBANKMENT TO BE REMOVED

EMBANKMENT TO BE REMOVED

SECONARY WMF TO BE FILLED AND PROFILED TO PROVIDE DRAINAGE

SECONDARY WMF

TSF NORTHERN DAM EMBANKMENT

STAGE 3 FULL SUPPLY LEVEL RL 961.0m

TSF EAST CONTAINMENT EMBANKMENT

CLEAN WATER COLLECTION AND DIVERSION

CLEAN WATER PUMPED LINE (APPROX. LOCATION) TO BE REMOVED

TOPSOIL ZONES

ACCESS CORRIDOR

TSF STORAGE AREA

DECANT AREA TO BE BACKFILLED

EASTERN DIVERSION DRAIN (INSTALLED POST-CLOSURE)

WESTERN DIVERSION DRAIN (INSTALLED POST-CLOSURE)

A 113 SEEPAGE INTERCEPTION DRAIN

ACCESS CORRIDOR

TSF MAIN EMBANKMENT

B 113 SEEPAGE DELIVERY PIPE

C 113 SEEPAGE COLLECTION SUMP

RAW WATER STORAGE

AREA TO BE BACKFILLED WITH CLAY FILL TO PROVIDE DRAINAGE

PROCESSING PLANT

SOUTHERN DIVERSION DRAIN

SITE ACCESS ROAD

TSF RUNOFF INTERCEPTION DAM

PRIMARY WMF

WASTE ROCK EMPLACEMENT

ROM PAD

LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 3

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

Plotted By: SteveT
Plotted Time: 14:53:36
Plotted Date: 27/07/18

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE: 1:15,000
JOB No. 113272-02
DATE JUL 2018
DESIGN JL
DRAWN JS
CHECKED RH
APPROVED RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
STAGE 3
FINAL LANDFORM

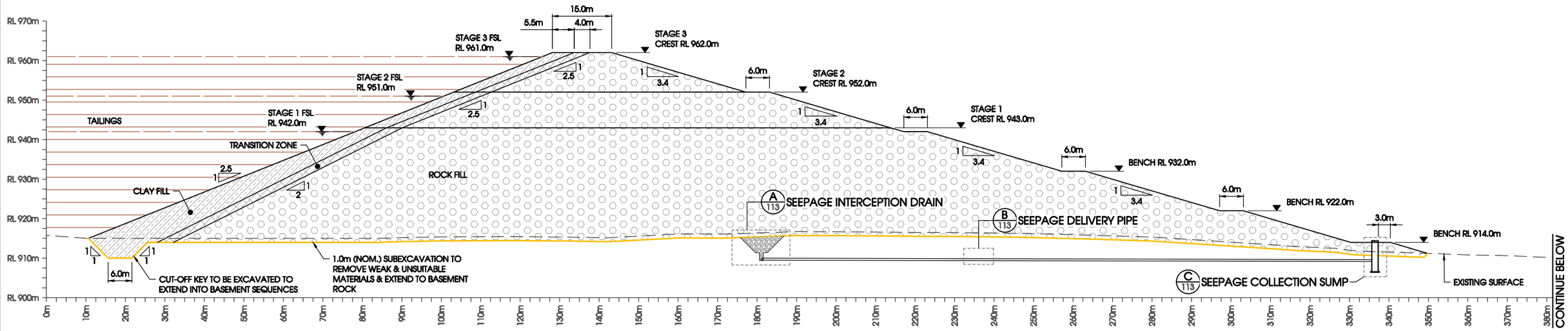
111

SHEET SIZE A3 Rev. D

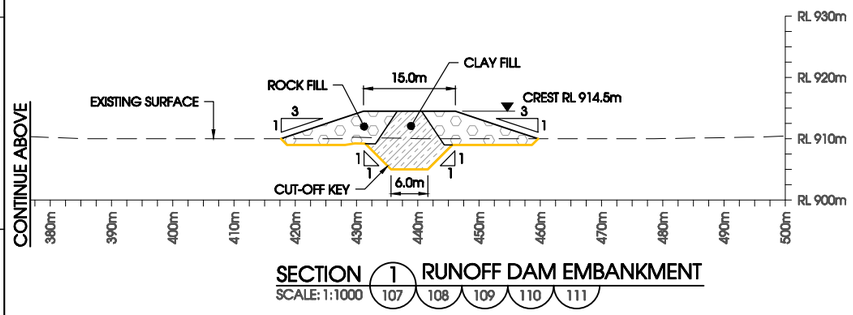
Conditions of Use:
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 11 OF 17

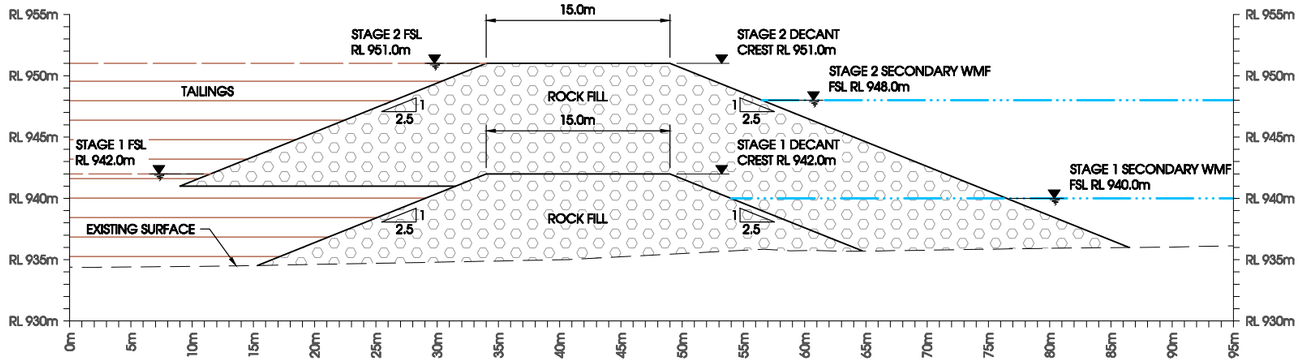
M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-111-111-D.dwg



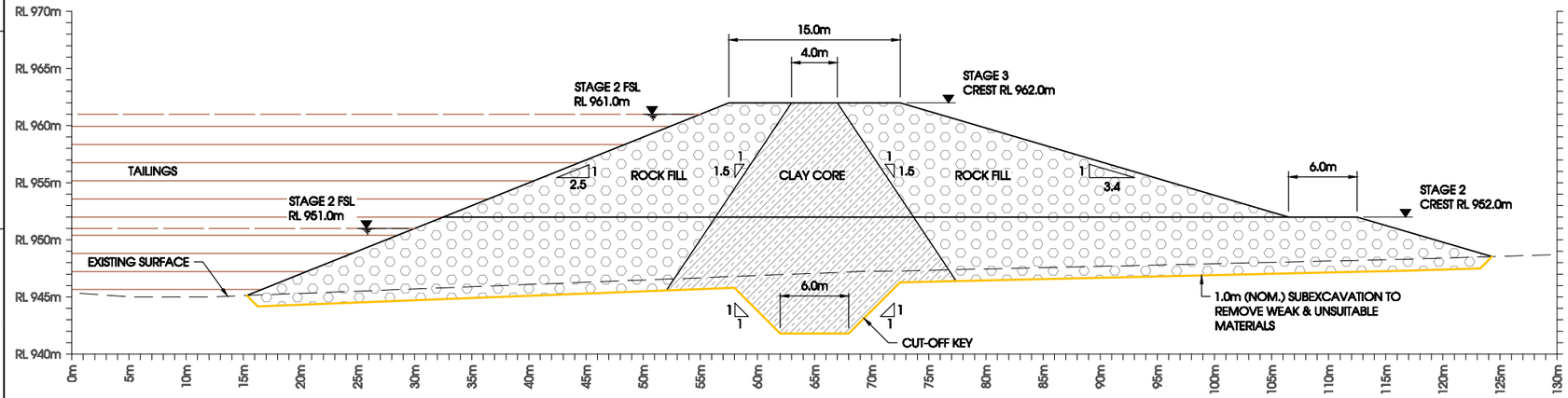
SECTION 1 MAIN EMBANKMENT
SCALE: 1:1000 (107) (108) (109) (110) (111)



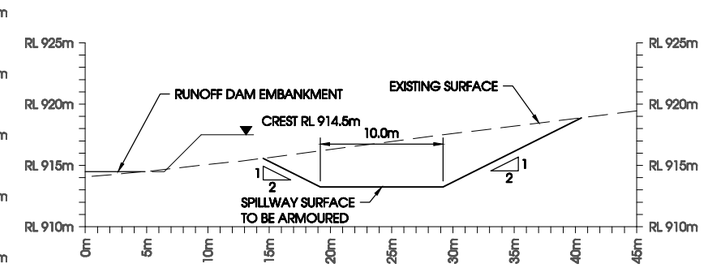
SECTION 1 RUNOFF DAM EMBANKMENT
SCALE: 1:1000 (107) (108) (109) (110) (111)



SECTION 7 STAGE 1 AND 2 DECANT CAUSEWAY
SCALE: 1:500 (107) (109) (110)



SECTION 2 EASTERN CONTAINMENT EMBANKMENT
SCALE: 1:500 (107) (109) (110) (111)



SECTION 8 RUNOFF DAM SPILLWAY
SCALE: 1:500 (108)

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

5 0 5 10 15 20 25
SCALE IN METRES 1:500 @ A3

10 0 10 20 30 40 50
SCALE IN METRES 1:1000 @ A3

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	AH		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE: AS SHOWN
JOB No. 113272-02
DATE JUL 2018
DESIGN JL
DRAWN JS
CHECKED RH
APPROVED RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
SECTIONS

112

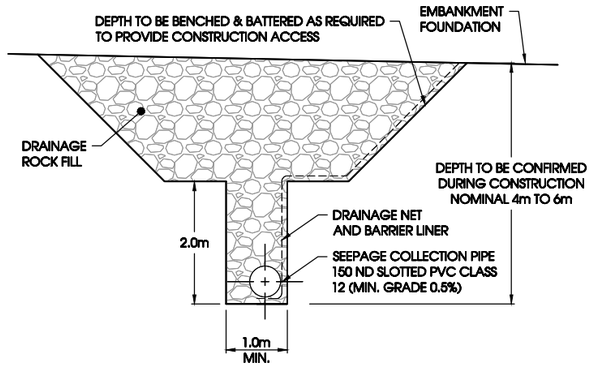
SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

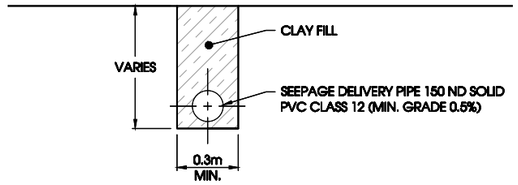
SHEET 12 OF 17

Plotted By: SteveT
Plotted Time: 15:57:34
Plotted Date: 06/08/18

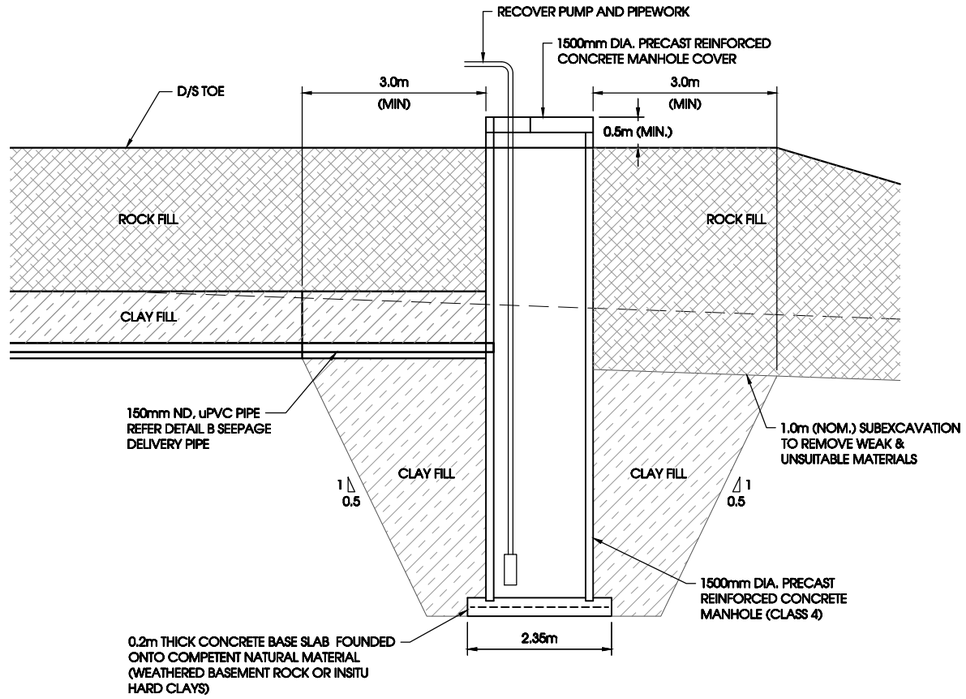
M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-112-112-D.dwg



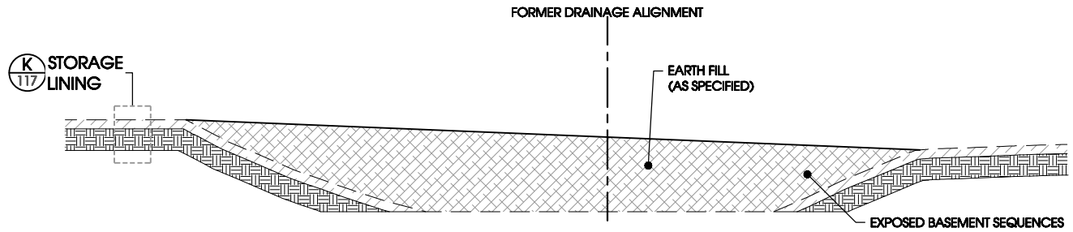
DETAIL A - SEEPAGE INTERCEPTION DRAIN
SCALE: 1:100



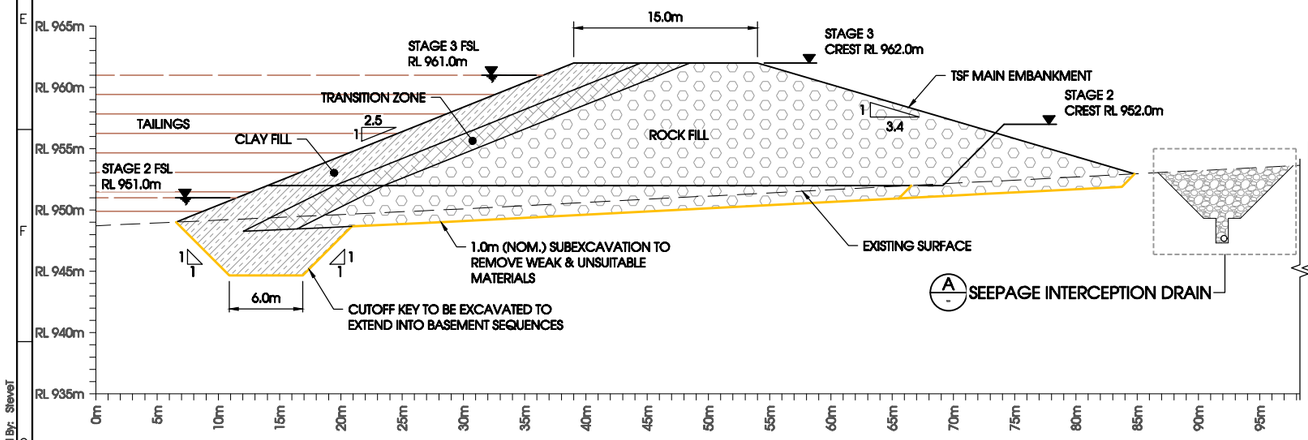
DETAIL B - SEEPAGE DELIVERY PIPE
SCALE: 1:100



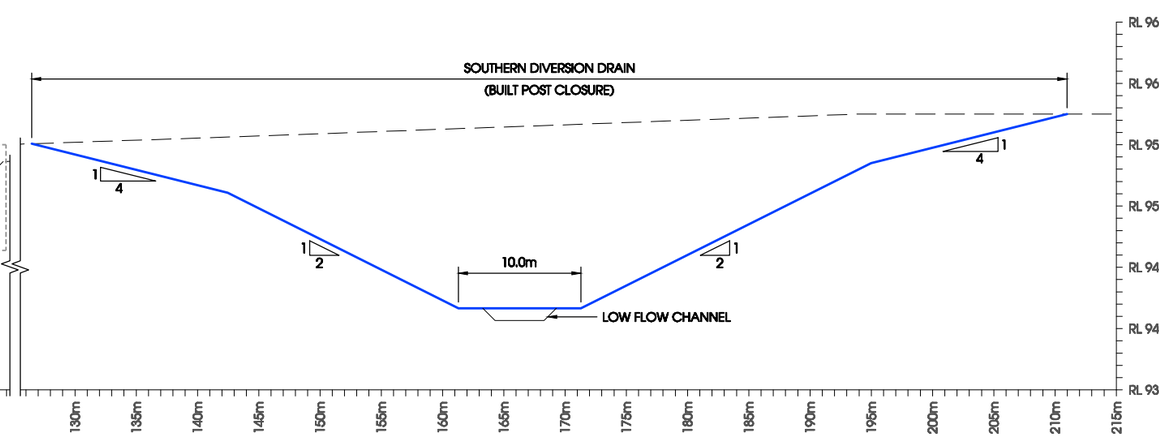
DETAIL C - SEEPAGE COLLECTION SUMP
SCALE: NTS



DETAIL D - DRAINAGE ALIGNMENT CLAY LINER
SCALE: 1:200 108



A - SEEPAGE INTERCEPTION DRAIN



SECTION 3 - MAIN EMBANKMENT
SCALE: 1:500 108 109 110 111

2 0 2 4 6 8 10
SCALE IN METRES 1:200 @ A3

1 0 1 2 3 4 5
SCALE IN METRES 1:100 @ A3

5 0 5 10 15 20 25
SCALE IN METRES 1:500 @ A3

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	AH		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	AS SHOWN
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
SECTIONS & SEEPAGE DETIALS

113

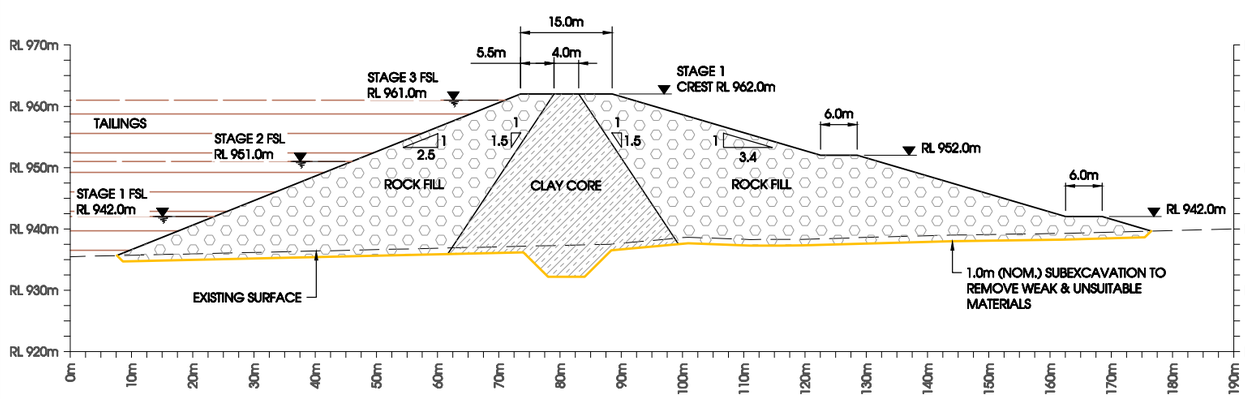
SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 13 OF 17

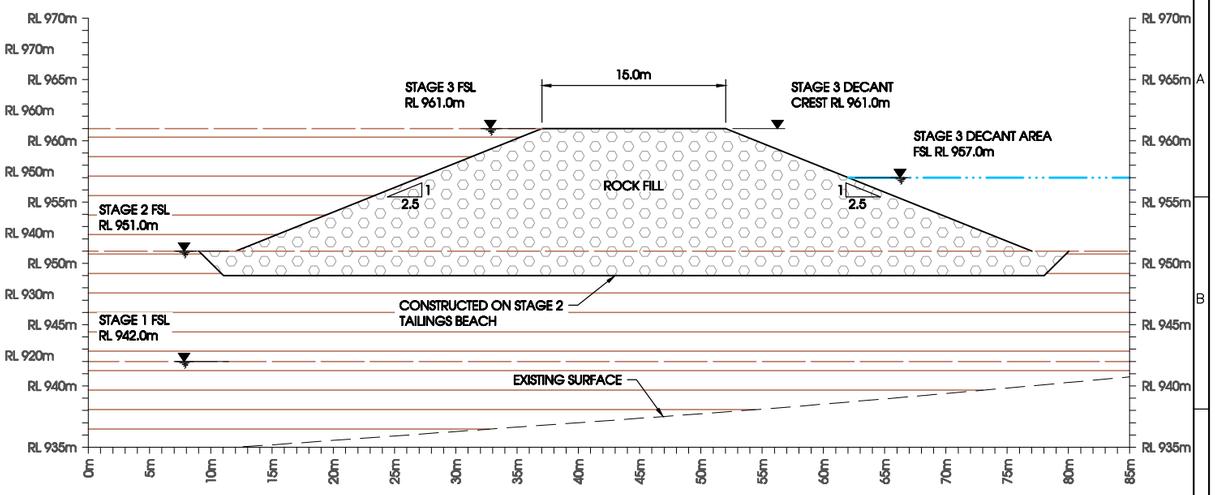
Plotted By: SteveT
Plotted Time: 15:57:34
Plotted Date: 06/08/18

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-113-113-D.dwg



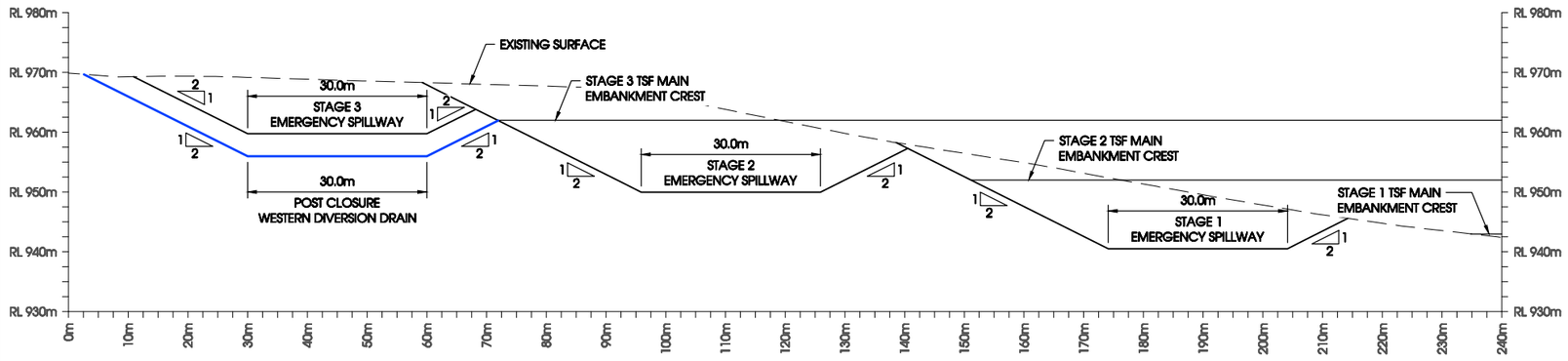
SECTION 6 NORTHERN CONTAINMENT EMBANKMENT

SCALE: 1:1000 (107) (109) (110) (111)



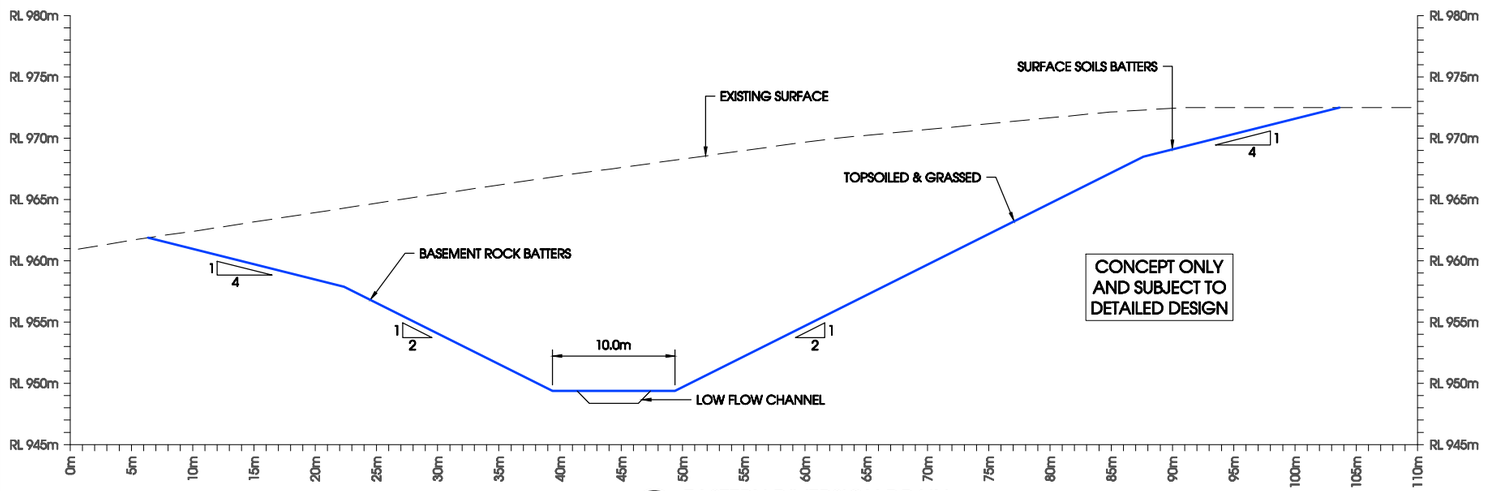
SECTION 9 STAGE 3 DECANT CAUSEWAY

SCALE: 1:500 (110) (111)



SECTION 5 STAGE 1, 2 & 3 TSF EMERGENCY SPILLWAYS AND WESTERN DIVERSION DRAIN

SCALE: 1:1000 (107) (109) (110) (111)



SECTION 4 EASTERN DIVERSION DRAIN

SCALE: 1:500 (110) (111)

5 0 5 10 15 20 25
SCALE IN METRES 1:500 @ A3

10 0 10 20 30 40 50
SCALE IN METRES 1:1000 @ A3

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	AH		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE: 1:500
JOB No. 113272-02
DATE JUL 2018
DESIGN JL
DRAWN JS
CHECKED RH
APPROVED RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
SECTIONS & DETAILS

114

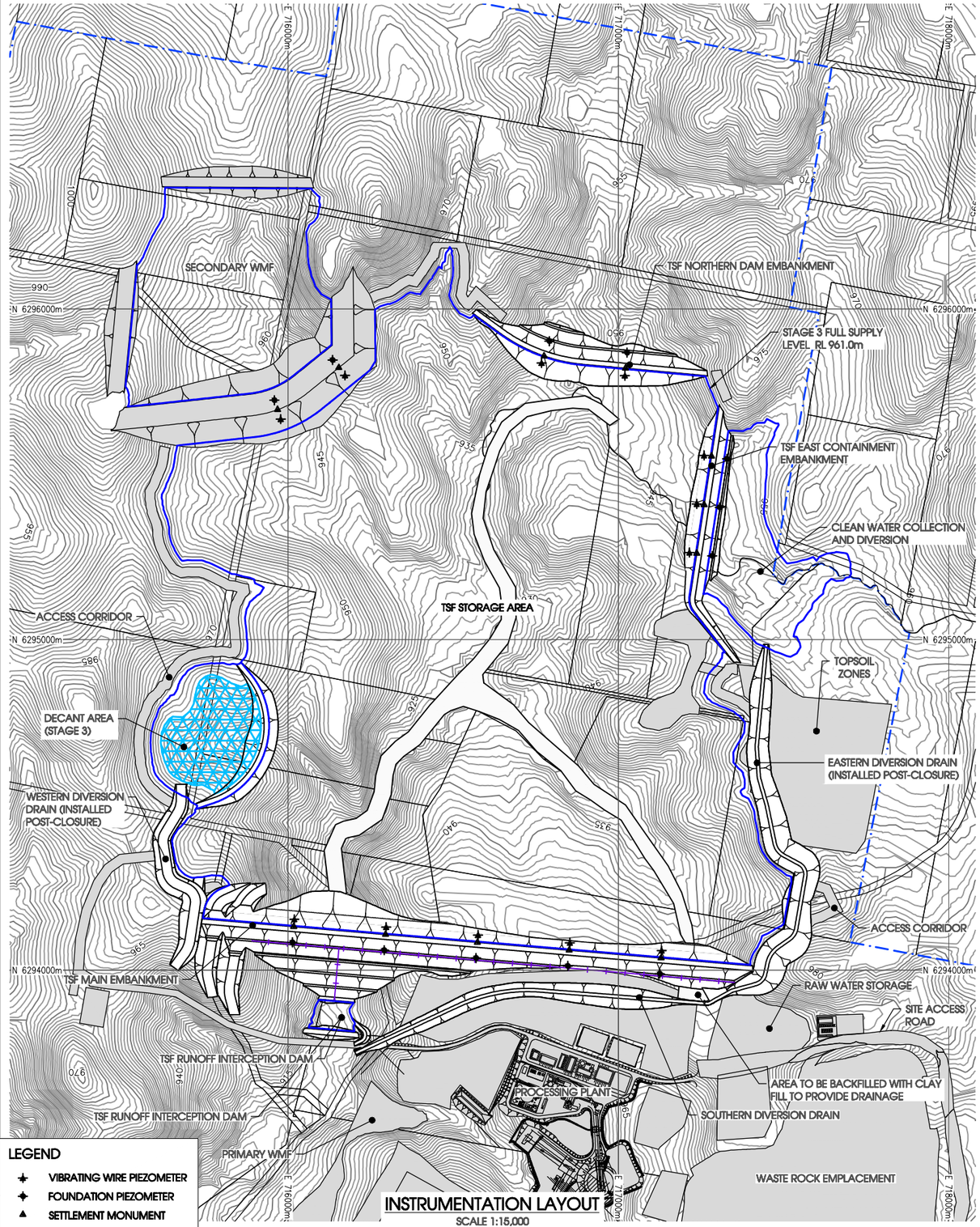
SHEET SIZE A3 Rev. D

Conditions of Use:
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 14 OF 17

Plotted By:
Plotted Time:
Plotted Date:

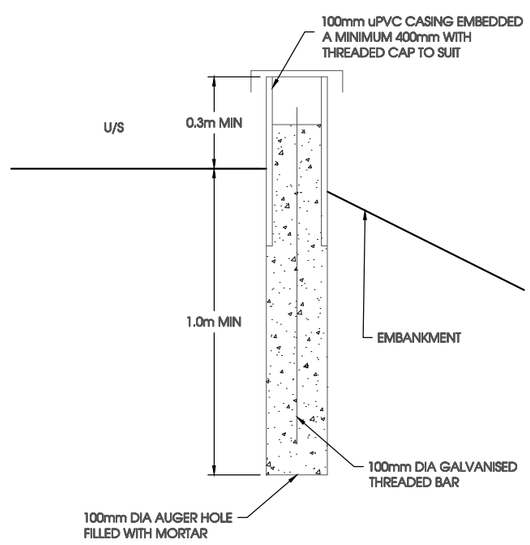
M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-114-114-D.dwg



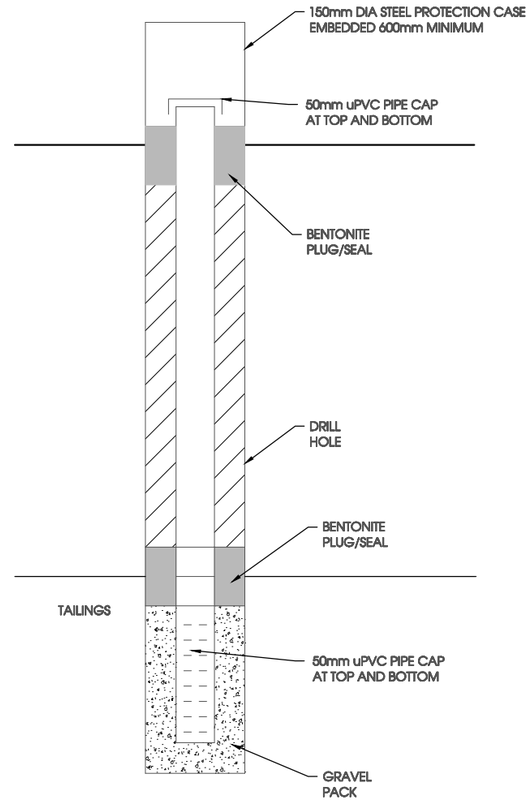
LEGEND

- VIBRATING WIRE PIEZOMETER
- FOUNDATION PIEZOMETER
- SETTLEMENT MONUMENT

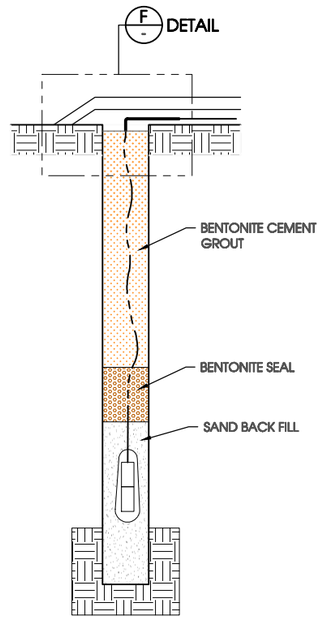
INSTRUMENTATION LAYOUT
SCALE 1:15,000



SETTLEMENT MONUMENT
NTS



PIEZOMETER COMPLETED WITH FOUNDATIONS
NTS



DETAIL E VIBRATING WIRE PIEZOMETER
SCALE: 1:100

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	12/04/19	AH		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	AS SHOWN
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
INSTRUMENTATION LAYOUT AND DETAILS

115

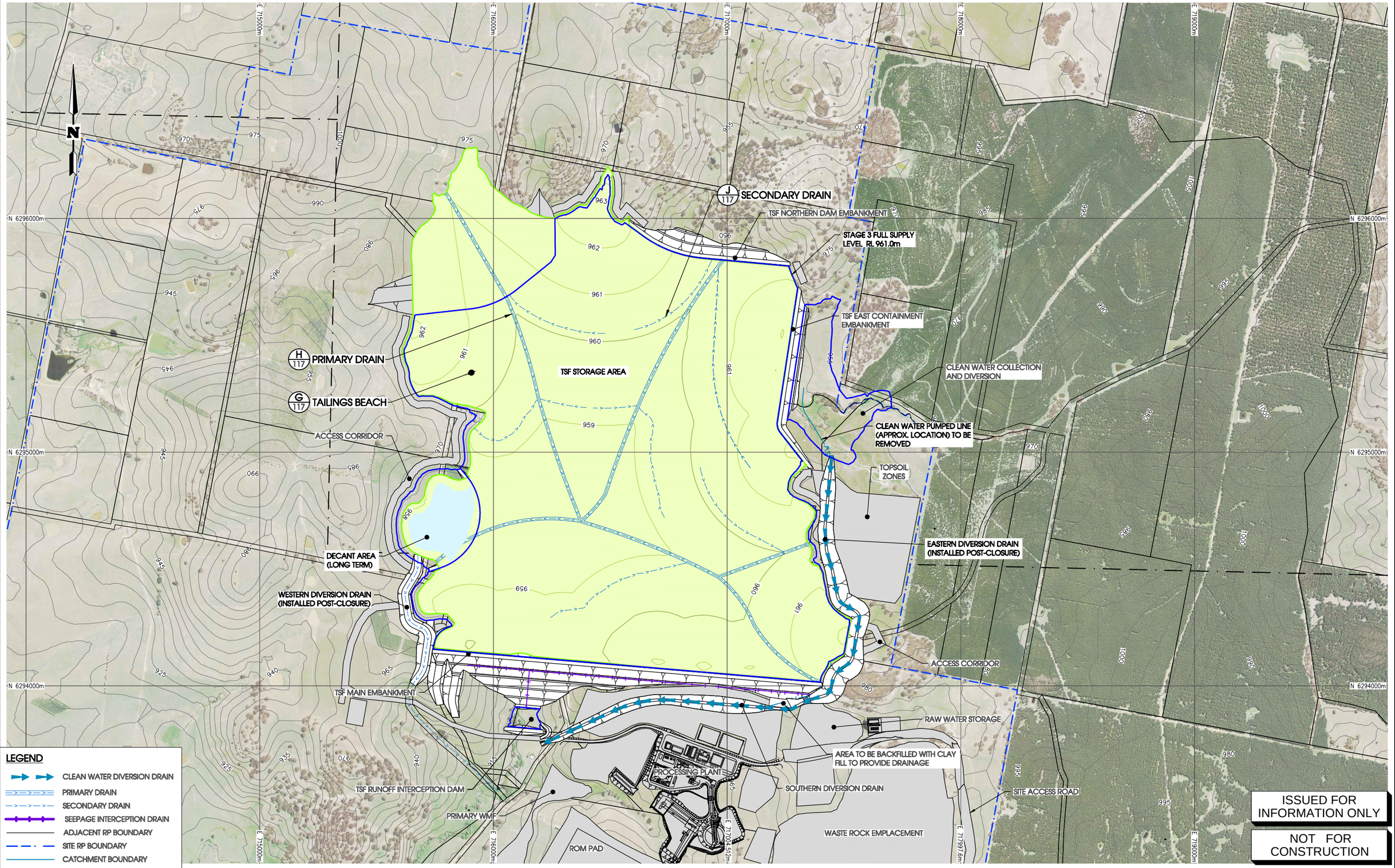
SHEET SIZE A3 Rev. D

Conditions of Use:
This drawing/document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 15 OF 17

Plotted By: SteveT
Plotted Time: 15:57:34
Plotted Date: 05/09/18

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-115-115-D.dwg



LEGEND

- CLEAN WATER DIVERSION DRAIN
- PRIMARY DRAIN
- SECONDARY DRAIN
- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
E	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
D	ISSUED FOR REVIEW	13/05/19	ALG		
C	ISSUED FOR REVIEW	13/05/19	JS		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams

A.B.N. 64 005 931 288
www.atcwilliams.com.au

Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

116

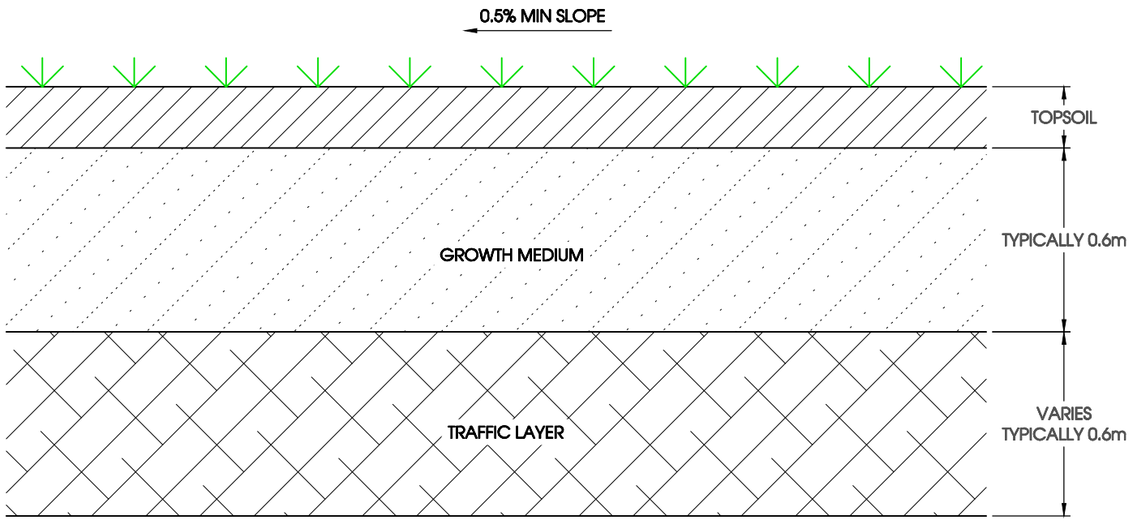
TSF
POST CLOSURE LAYOUT

SHEET SIZE A3 Rev. E

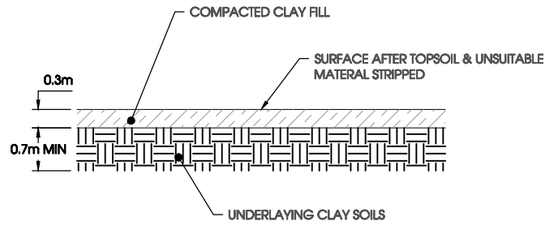
Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 16 OF 17

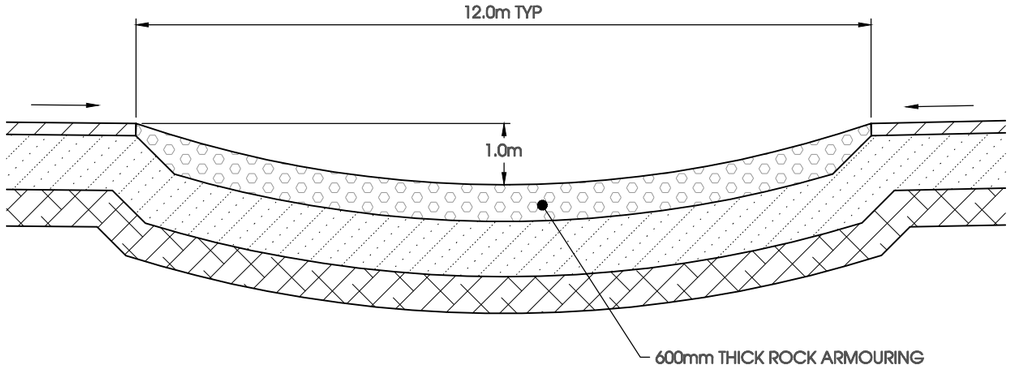
M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-116-116-E.dwg



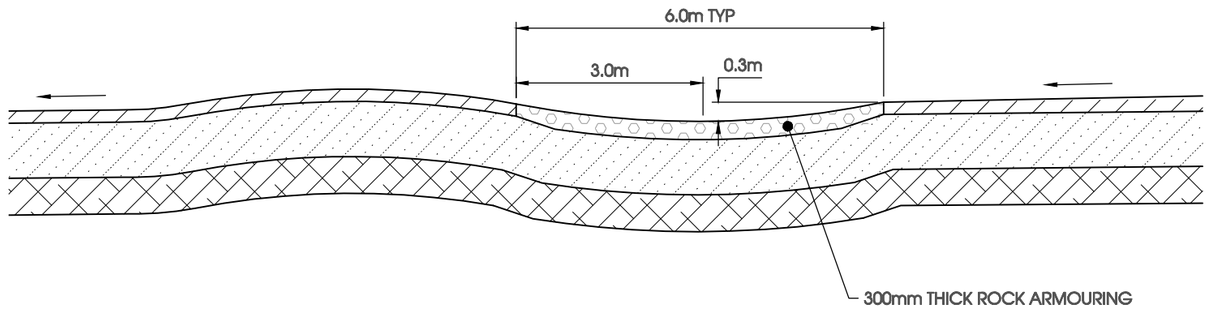
DETAIL G SCALE: 1:20 116 TAILINGS BEACH CAPPING



DETAIL K SCALE: 1:100 - STORAGE FLOOR LINER (INSITU CONDITIONING)



DETAIL H SCALE: 1:100 116 PRIMARY DRAIN



DETAIL J SCALE: 1:100 116 SECONDARY SWALE DRAIN

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
B	03/07/19	AH	RH	RH	
A	ISSUED FOR REVIEW	13/05/19	ALG		

SCALE:	AS SHOWN
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
POST CLOSURE DETAIL

117

SHEET SIZE A3 Rev. B

Conditions of Use:
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 17 OF 17

Plotted Date: 01/05/19 Plotted Time: 11:22:30 Plotted By: Amelia L

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-117-117-B.dwg

APPENDICES

APPENDIX A

REPORT

REGIS RESOURCES LIMITED

MCPHILLAMYS GOLD PROJECT

Kings Plains, NSW

Proposed TSF

Geotechnical Investigation Report

Date: July 2019

Report Number: 113272-02-R005a

Document History and Status

Title:	Proposed TSF – Geotechnical Investigation
Job Number/Extension:	113272.05
Document Number:	113272.02.R005a
Project Office:	Brisbane
File Path:	\\atcbnemvpfs01\Synergy\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Reports\R005\Text\113272-02-R005a.docx
Author:	Hubert Ayanu
Reviewer:	Ralph Holding
Job Manager:	Ralph Holding

Rev.	Status	Issued to	Issue Date	Signatures	
				Author	Reviewer
A	Draft Issue	Tom Ridges	09/07/2019	HAA	RH

This Revision distributed To:	Electronic Copy
Regis Resources Ltd	☑
ATCW Brisbane Office	On network

IMPORTANT NOTICE

Please refer to our Conditions of Investigation and Report

ATC Williams Pty Ltd
ABN 64 005 931 288
Melbourne T: +61 3 8587 0900 Perth T: +61 8 9213 1600 Brisbane T: +61 7 3352 7222
www.atcwilliams.com.au

CONSULT AUSTRALIA
Member Firm

CONDITIONS OF INVESTIGATION AND REPORT

Conditions of Report

1. This report has been prepared by us for the purposes stated herein. We do not accept responsibility for the consequences of extrapolation, extension or transference of the findings and recommendations of this report to different sites, cases or conditions.

2. This report is based in part on information which was provided to us by the client and/or others and which is not under our control. We do not warrant or guarantee the accuracy of this information.

3. We believe the conclusions and recommendations contained herein were reasonable and appropriate at the time of issue of the report. However, the user is cautioned that fundamental input assumptions upon which this report is based may change with time. It is the user's responsibility to ensure that input assumptions remain valid.

4. This report must be read in its entirety. This notice constitutes an integral part of the report, and must be reproduced with every copy.

5. This report is prepared solely for the use of the person or company to whom it is addressed. No responsibility or liability to any third party is accepted for any damages howsoever arising out of the use of this report by any third party.

6. Unless specifically agreed otherwise in the contract of engagement, ATC Williams retains Intellectual Property Rights over the contents of this report. The client is granted a licence to use the report for the purposes for which it was commissioned.

Geotechnical Investigation

7. Geotechnical site investigation necessarily involves the investigation of the subsurface conditions at a site at a few isolated locations, and the interpretation and extrapolation of those conditions to elsewhere on the site not so investigated. This procedure has been adopted at the site that is the subject of this report and due care and skill has been applied in carrying out and reporting on the work. Thus the findings, conclusions and comments contained in this report represent professional estimates and opinions and are not to be read as facts unless the context makes it clear to the contrary. In general, statements of fact are confined to statements as to what was done and/or what was observed. Other statements have been based on professional judgement.

8. The scope of the work has been planned in the absence of any fore-knowledge of the site other than that stated in the report. Unless otherwise stated we consider that the number of locations investigated and the depths to which they have been investigated are reasonable bearing in mind the scale and nature of the project, and the defined purpose for which the investigation was undertaken.

9. We do not accept any responsibility for any variance between the interpreted and extrapolated conditions and those that are revealed by any means subsequently. Specific warning is also given that many factors, either natural or artificial, may render ground conditions different from those which pertained at the time of the investigation. Should there be revealed during the construction or at any other time any apparent difference from subsurface conditions described or assessed in this report, it is strongly recommended that such differences be brought to our attention so that its significance may be assessed and appropriate advice given.

ATC Williams

TABLE OF CONTENTS

1 INTRODUCTION 1

2 SCOPE OF WORKS 1

3 PROJECT BACKGROUND 1
3.1 General 1
3.2 Site Description 1
3.2.1 Site Location 1
3.2.2 Published Geology 1
3.2.3 Site Topography 3

4 FIELDWORK 4
4.1 1st Site Investigation (2nd May to 5th May 2017) 4
4.1.1 Test Pitting 4
4.1.2 Laboratory Testing 5
4.1.3 Investigation Results 5
4.1.3.1 Stratigraphy 5
4.1.3.2 Laboratory Testing 7
4.1.4 1st Site Investigation Testing Summary 10
4.1.4.1 Basement Conditions 10
4.1.4.2 Soil Conditions 11
4.1.4.3 Potential Seepage Conditions 12
4.2 2nd and 3rd Site Investigation (11th December to 15th December 2017 and 8th January to 12th January 2018) 12
4.2.1 Test Pitting 12
4.2.2 Borehole Drilling 12
4.2.3 Laboratory testing 13
4.2.4 Investigation Results 14
4.2.4.1 Subsurface Conditions 14
4.2.4.2 Groundwater 15
4.2.5 aboratory test results 15
4.2.6 Summary and Recommendations 17
4.2.6.1 Excavation Conditions 17
4.2.6.2 Trafficability of Site Soils 17
4.2.6.3 Groundwater 18
4.2.6.4 Preliminary Design CBR 18
4.2.6.5 Shrink/ Swell Potential 18
4.2.6.6 Suitability of Excavated Material as Structural Fill 19
4.2.6.7 Earthquake Design 19
4.2.6.8 Soil Aggressivity to Buried Structures 19
4.3 4th Site Investigation (4th June 8th June 2018) 20
4.3.1 Test Pitting 20
4.3.2 Field Permeability Testing – Constant Head Test 21
4.3.3 Laboratory Testing 21
4.3.4 Investigation Results 22
4.3.4.1 Subsurface Conditions 22
4.3.4.2 Groundwater 24
4.3.4.3 Field Permeability Testing – Constant Head 24
4.3.5 Laboratory test results 26

4.3.6 Summary & recommendations 26
4.3.6.1 Groundwater and Seepage 26
4.3.6.2 Permeability 26
4.3.6.3 Trafficability of Site Soils 26
4.3.6.4 Excavation Conditions 27
4.3.6.5 Suitability of Excavated Material as Structural Fill 27
4.4 5th Site Investigation (18th March to 21st March 2019) 27
4.4.1 Borehole Drilling 28
4.4.2 Laboratory Testing 28
4.4.3 Investigation Results 29
4.4.3.1 Groundwater 29
4.4.4 Laboratory test results 29
4.4.5 Summary and Recommendations 31
4.4.5.1 Groundwater and Seepage 31
4.4.5.2 Permeability 31
4.4.5.3 Suitability of Excavated Material as Internal Storage Liner 31

REFERENCES 33

PLATES

PLATE 1 REGIONAL GEOLOGY MAP EXTRACT (REFERENCE BATHURST 1:250,000 – 1998) 3
PLATE 2 PROPOSED MCPHILLAMYS GOLD PROJECT SITE LOCALITY 4
PLATE 3 GEOTECHNICAL TEST PIT PLAN 6
PLATE 4 CASAGRANDE CHART 11
PLATE 5 PROJECT AREA AND PLANT SITE TEST LOCATIONS 13
PLATE 6 PROJECT AREA AND TEST LOCATIONS 21
PLATE 7 CONSTANT HEAD FIELD PERMEABILITY TESTING 24
PLATE 8 TESTING PROGRAM SITE LOCALITY 28

TABLES

TABLE 1 SUMMARY OF SITE STRATIGRAPHY 7
TABLE 2 SUMMARY RESULTS OF LABORATORY TESTWORK 8
TABLE 3 SUMMARY RESULTS OF CU TESTING 10
TABLE 4 SUMMARY OF INFERRED GEOTECHNICAL UNITS ENCOUNTERED 14
TABLE 5 INTERPRETED SUBSURFACE CONDITIONS 14
TABLE 6 SOIL CLASSIFICATION AND CBR LABORATORY TEST RESULTS 16
TABLE 7 SOIL AGGRESSIVITY LABORATORY TEST RESULTS 17
TABLE 8 SOIL AGGRESSIVITY EXPOSURE CLASSIFICATIONS 20
TABLE 9 SUMMARY OF INFERRED GEOTECHNICAL UNITS ENCOUNTERED 22
TABLE 10 INTERPRETTED SUBSURFACE CONDITIONS 23
TABLE 11 SUMMARY OF FIELD AND LABORATORY PERMEABILITY RESULTS 25
Table 12 SUMMARY OF LABORATORY TEST RESULTS 26
TABLE 13 SUMMARY OF LABORATORY TEST RESULTS 29

APPENDICES

Appendix A	-	TSF Option Layout
Appendix B1	-	Engineering Test Pit Logs - 1st Site Investigation (May 2017)
Appendix B2	-	Engineering Test Pit and Borehole Logs - 2nd and 3rd Site Investigation (Dec 2017 to January 2018)
Appendix B3	-	Engineering Test Pit Logs - 4th Site Investigation (June 2018)
Appendix B4	-	Engineering Borehole Logs -5th Site Investigation (March 2019)
Appendix C1	-	Test pits photographs - 2nd and 3rd Site Investigation (Dec 2017 to January 2018)
Appendix C2	-	Test pits photographs - 4th Site Investigation (June 2018)
Appendix D	-	Field Permeability Logs
Appendix E1	-	Laboratory Test Certificates - 1st Site Investigation (May 2017)
Appendix E2	-	Laboratory Test Certificates - 2nd and 3rd Site Investigation (Dec 2017 to January 2018)
Appendix E3	-	Laboratory Test Certificates - 4th Site Investigation (June 2018)
Appendix E4	-	Laboratory Test Certificates - 5th Site Investigation (March 2019)

1 INTRODUCTION

This report presents results of a geotechnical investigation carried out by ATC Williams Pty Ltd (ATCW) on behalf of Regis Resources Ltd (Regis) for site investigations conducted for the proposed McPhillamys Gold Project (MGP) from May 2017 through to March 2019.

The geotechnical investigation covers proposed locations of for several embankment options of the TSF. The objective of the geotechnical investigation is to assess subsurface conditions and to provide information for the design of the TSF and confirm permeability of subsurface materials for the proposed TSF options.

2 SCOPE OF WORKS

The scope of works for the geotechnical investigation consisted test pits and boreholes including permeability testing covering the area of the TSF Options.

Also included in the scope of works was the preparation of a geotechnical investigation report to include field and laboratory testing results.

3 PROJECT BACKGROUND

3.1 General

As part of the proposed MGP, Regis proposed to develop an open cut mining operation with associated carbon-in-leach (CIL) gold processing facility, waste rock dumps (WRD), water management infrastructure, TSF and associated infrastructure.

The selected preferred TSF Option is located to the north of the site and will consist of a valley type containment storage structure with a main embankment and minor upslope embankments. The proposed layout of the TSF option is provided in **Appendix A**.

3.2 Site Description

3.2.1 Site Location

The site is located in Kings Plains NSW and is approximately 27 kilometres south west of Bathurst and approximately 8km north east of Blayney in the Central Tablelands of NSW. The site is accessed off Dungeon road.

3.2.2 Published Geology

Published regional geological mapping of the site (Orange 1:100 000 Geological Series Sheet 8731, First Edition 1997) indicates the area is underlain by Silurian aged Anson Formation of the East Lachlan Fold Belt of New South Wales, Australia belonging to the Mumbil Group consisting of carbonaceous pyritic siltstone, felsic volcanics, volcanic sandstone and limestone.

The Bathurst geological map (Bathurst 1:250 000 Geological Series Sheet S155-8, Second Edition 1998) also indicates the geology of the area, McPhillamys Gold Project falls within the Silurian aged Anson Formation of the East Lachlan Fold Belt of New South Wales which typically consists of carbonaceous pyritic siltstone, felsic volcancis, volcanic sandstone and limestone.

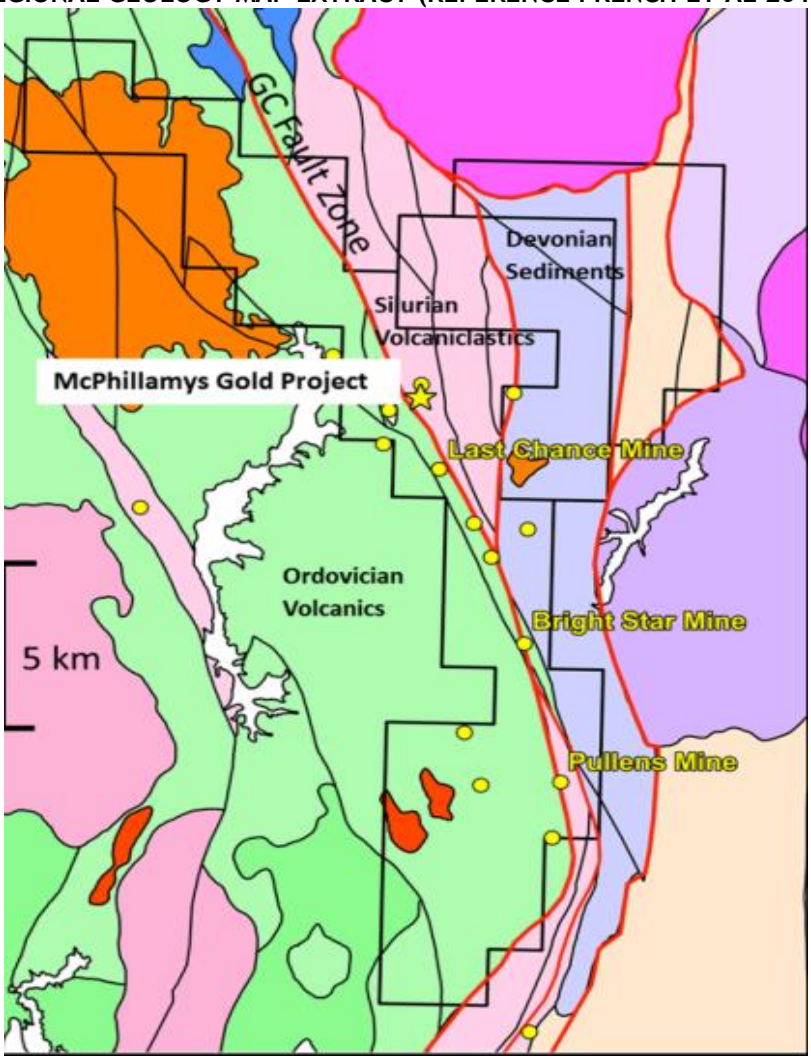
Both geological maps indicated part of the site is underlain by the Ordovician aged The Byng Volcanics belonging to the Cabonne Group consisting of basalt and volcaniclastic sandstone. Other geological units underlying the site include the Quaternary aged Cainozoic units consisting alluvium: gravel, sand, silt and clay and the Ordovician aged Blayney Volcanics belonging to the Cabonne Group consisting of clinopyroxene basalt, agglomeratic in places; volcanic sandstone.

Silurian dacitic volcaniclastics vary in composition from crystal tuffs to agglomeratic matrix supported accretions. Some ungrouped Devonian formations also exists within the eastern part of the site, and consist of slate, laminated siltstone and lithic sandstone. Occurrences of the Byng Volcanics of the Ordovician Volcanics consisting of basalt and volcaniclastic sandstone are dominant west of the Godolphin Fault with minor occurrences within the headwaters of the Belubula River. Jointing / lineation's associated with this geology is reported to be approximately parallel to the Godolphin Fault. There exists a shallow east-dipping domain boundary structure separating the Ordovician Macquarie Arc in the west from the Silurian Hill End Trough in the east, trending south-east to south-west and located less than 1km west of the MGP site.

The current investigation and previous investigations across the site carried out as part of a previous TSF option assessments indicated that the bedrock is overlain by mainly weathered rock and/ or clayey soils.

A regional geological map of the site is shown in **PLATE 1**.

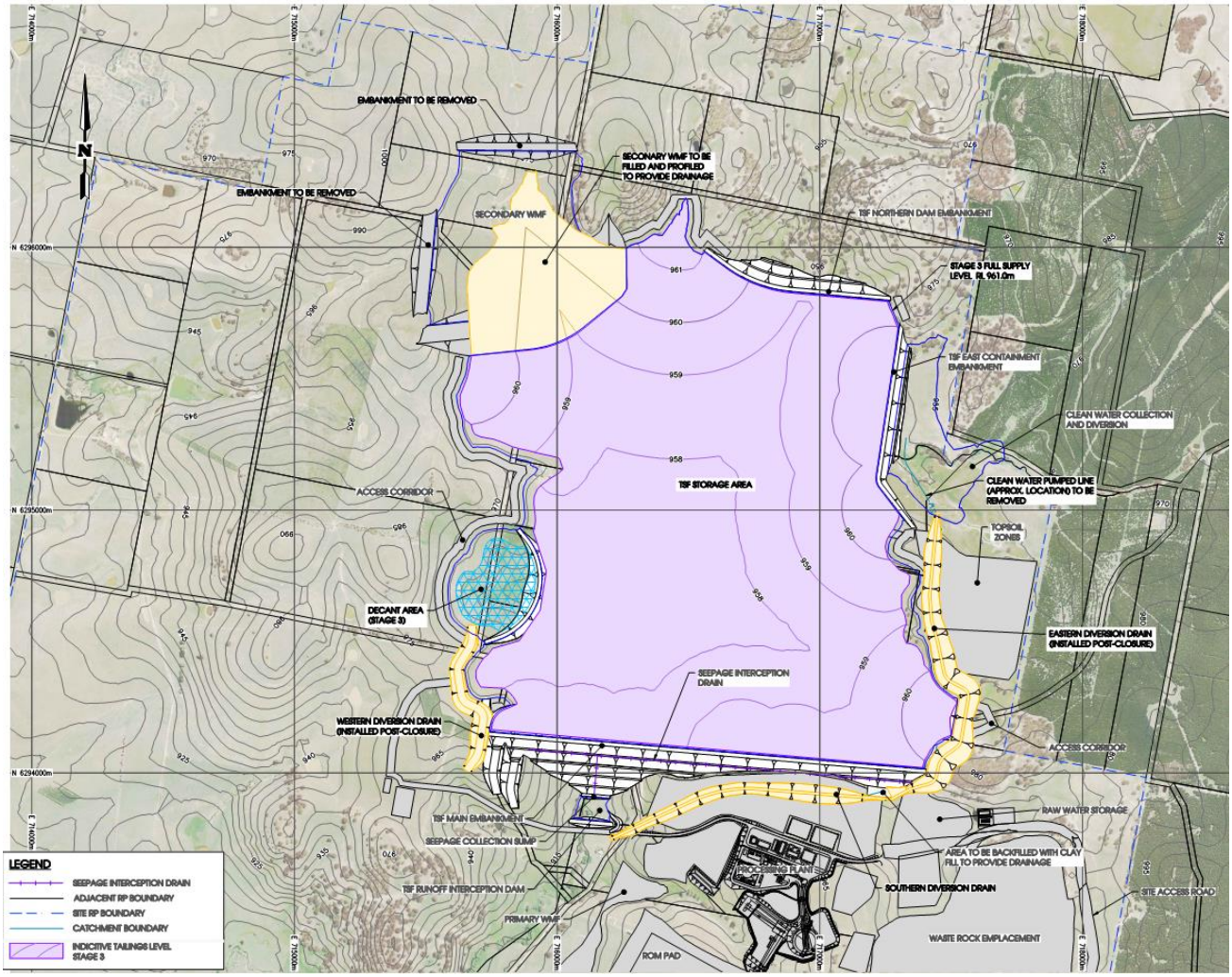
PLATE 1
REGIONAL GEOLOGY MAP EXTRACT (REFERENCE FRENCH ET AL 2015)



3.2.3 Site Topography

The project site is located in an area characterised by significant topographical relief. The land elevation ranges from about RL900m AHD along the margins of the Belubula River to RL1000m AHD on the various ridgelines throughout the site. The site is covered in cattle grazing grassland and bordered to the west by heavy coniferous forest. The Belubula River drainage alignment is lined with tea trees and gumtrees, of moderate coverage. The locality and proposed site infrastructure are illustrated in **PLATE 2.**

PLATE 2
PROPOSED MCPHILLAMYS GOLD PROJECT SITE LOCALITY



4 FIELDWORK

4.1 1st Site Investigation (2nd May to 5th May 2017)

4.1.1 Test Pitting

Test pitting was carried out as part of the geotechnical investigation to:

- Investigate near surface (soil) conditions within the TSF area;
- Assess the depth to which foundation preparation and cut off key excavations should extend (subject to appropriate design criteria and performance requirements);
- Locate potential construction material sources within the site; and
- Obtain representative samples of potential construction materials for the purpose of laboratory analysis.

Thirty-seven (37) test pits, labelled TP1 to TP37, were excavated within the site, to depths ranging between 1.30m (TP36) to 4.6m (TP2) below existing ground level. Test pits were excavated using a Hitachi Zaxis 200 excavator. A Geotechnical Engineer from ATCW logged the soil profile

encountered in the test pits. The test pit locations are shown in **PLATE 3**. Test pit logs are provided in **Appendix B1**.

Note also that a proposed eight (8) test pits west of the proposed main TSF and south saddleback embankments were unable to be excavated due to access issues.

4.1.2 Laboratory Testing

Bulk samples of representative soils intersected within the test pits during the investigation were recovered for the purpose of laboratory testwork. The samples were sealed in plastic bags and dispatched to the NATA registered TriLab laboratory. The following typical testwork suite was adopted:

- Moisture content
- Atterberg limits (liquid limit, plastic limit and plasticity index)
- Particle size distribution (by sieve analysis)
- Emerson Class (dispersion testing)
- Standard Compaction
- Permeability
- Triaxial

4.1.3 Investigation Results

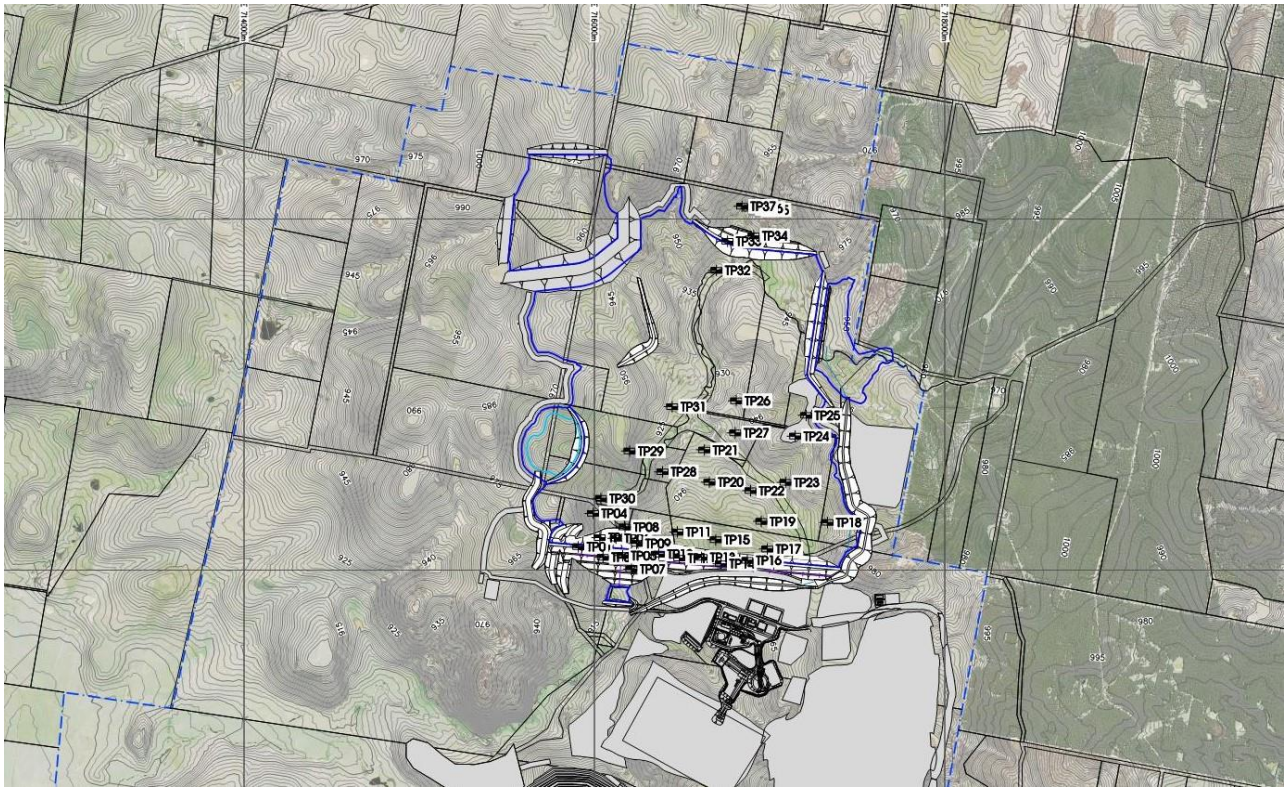
4.1.3.1 Stratigraphy

4.1.3.1.1 Test Pit Results

Test pits within the TSF storage/embankment areas intersected predominantly residual saprolitic Clays (formed by weathering of the underlying sulurian volcanics). Topsoil up to 0.4m thickness overlies the residual profile, which grades into predominately low to medium plasticity CLAYS with few occurrences of high plasticity clays and gravelly CLAY layers. The clays in most cases overlie weathered phyllites, sandstone and granites. Test pits adjacent to creek beds and floodplains contained layers of sandy Clay / clayey Sand below topsoil. Excavation refusal was encountered in a number of test pits within weathered rock or hard clay.

A summary of the average test pit soil profiles across the site is provided in **TABLE 1** with details of test pit logs included in **Appendix B1.**

PLATE 3
GEOTECHNICAL TEST PIT PLAN



Main Embankment Foundation

A subsurface profile section through the proposed alignment of the main TSF embankment indicates that the foundation is underlain by 0.30m thick topsoil overlying low to medium plasticity CLAYS overlying weathered bedrock at depth. An approximately 0.5m thick layer of Clayey SAND / Sandy CLAY was encountered in test pits within the Belubula River floodplain.

Storage/Borrow Area

The proposed storage / borrow areas for the main TSF embankment construction is primarily located east of the Belubula River drainage line. Test pitting results indicate the area from surface to contain an average 1.6m thick of medium plasticity CLAYS underlain by weathered bedrock. TP24 and TP26 located on a ridge and farthest from the TSF main embankment, have low plasticity SILT fines.

The storage / potential borrow area west of the Belubula River drainage is small, dominated by ridge slopes immediately upstream of the proposed TSF embankment, gradually sloping into flat floodplains about 500m upstream. Test pits excavated within this area yield subsurface soil profiles of 0.3m topsoil overlying 1.5m average thick medium plasticity CLAYs followed again by distinctly weathered bedrock.

North Saddleback Embankment

The subsoil profile below the proposed saddleback embankment consists of an approximately 1.5m thick layer of medium plasticity CLAY within the drainage alignment which thins out up the slope to 0.5m. This is then underlain by distinctly weathered rock to depth.

TABLE 1
SUMMARY OF SITE STRATIGRAPHY

AREAS	SEQUENCE				
	TOPSOIL	CLAY (low to medium plasticity	Sandy CLAY / Clayey SAND	Clayey GRAVEL	BEDROCK
Main Embankment	0.00 – 0.30m	0.30m – 2.5m	-	0.2-	2.0-2.7**
Storage Area West	0.00 - 1.00m	-	1.0-2.35	3.0-3.9*	2.35-3.0
Storage Area East	0.00 - 0.25m	-	0.25-0.90	-	0.9-1.3
North Saddleback Embankment	0.00 – 0.40m	0.40 – 2.20	-	-	2.20**

* Extent of Excavation

** Depth of excavation refusal

4.1.3.2 Laboratory Testing

4.1.3.2.1 Soil Classification Test Results

Results of laboratory soil classification testwork carried out are summarised in **TABLE 2** with the material testwork certificates provided in **Appendix E1.**

TABLE 2
SUMMARY RESULTS OF LABORATORY TESTWORK

Sample No.*	Material	USCS Symbol	Field Moisture Content (%)	Linear Shrinkage (%)	Atterberg Limits			Particle Size Distribution (Percent passing particle size mm)							Emerson Class No	Maximum Dry Density (kg/m^3)	Optimum Moisture Content (%)
					LL (%)	PL (%)	PI (%)	37.5	19.0	9.5	4.75	2.36	0.425	0.075			
TP3 1.0-1.8m	CLAY wt gravel	CI-CH	15.2	13.5	49	18	31	100	89	87	84	82	80	72	3	-	-
TP6 3.0m	CLAY wt sand	CI	21.2	9.5	35	15	20	100	100	96	93	90	79	69	3	-	-
TP9 0.5-1.0m	CLAY wt gravel	CI	15.5	8.0	37	19	18	100	100	96	91	83	77	73	3	-	-
TP11 0.2-2.0m	CLAY	CI	17.0	10	40	18	22	100	98	92	91	89	83	80	3	1.65	20.5
TP11 2.3-3.7m	CLAY wt sand/gravel	CH/SC	20.4	8.5	51	29	22	100	98	93	88	80	62	54	3		
TP13 0.9-1.8m	CLAY	CI	11.7	9.5	36	16	20	100	100	98	94	91	89	87	3	-	-
TP17 0.6-1.2m	CLAY wt sand	CI	16.7	12.0	43	15	28	100	100	99	98	95	75	67	3	-	-
TP18 1.5-1.9m	CLAY wt gravel	CH	18.5	16.0	63	20	43	100	97	87	80	77	74	72	3	1.58	21.0
TP18 1.9-3.2m	CLAY	CH	22.3	6.5	54	23	31	100	100	99	99	98	90	84	3		
TP21 0.4-0.6m	CLAY	CI	12.2	8.5	39	17	22	100	100	100	99	98	95	92	3	-	-
TP22 1.0-1.5m	CLAY wt gravel	CI-CH	18.3	17.0	50	17	33	100	100	93	84	79	73	69	3	-	-
TP23 1.0-1.5m	CLAY wt sand	CI	20.6	9.0	38	19	19	100	100	100	99	98	90	80	3	1.64	19.0
TP24 0.9-2.0m	Sandy SILT/ Silty SAND	MI/SM	16.2	4	36	28	8	100	100	100	99	96	81	66	3		
TP26 1.0-2.0m	Sandy SILT/ Silty SAND	MI/SM	15.2	3.0	32	26	6	100	100	100	100	92	61	49	3	-	-
TP27 0.7-1.3m	Clayey SAND	SC	27.5	16.0	51	18	33	100	100	100	97	88	51	32	3	-	-
TP30 0.4-1.0m	Sandy CLAY / Clayey SAND	CL	14.5	4.5	28	15	13	100	100	100	100	98	89	86	4	1.67	19.5
TP31 1.5-2.4m	CLAY	CI	25.0	4.5	47	18	29	100	100	100	99	99	97	95	3		

TABLE 2
SUMMARY RESULTS OF LABORATORY TESTWORK (CONT'D)

Sample No.*	Material	USCS Symbol	Field Moisture Content (%)	Linear Shrinkage (%)	Atterberg Limits			Particle Size Distribution (Percent passing particle size mm)							Emerson Class No	Maximum Dry Density (kg/m^3)	Optimum Moisture Content (%)
					LL (%)	PL (%)	PI (%)	37.5	19.0	9.5	4.75	2.36	0.425	0.075			
TP32 0.4-2.0m	CLAY	CI	13.9	11.0	39	16	23	100	100	100	100	97	94	90	3	-	-
TP33 0.4-0.9m	CLAY wt sand	CI	14.5	5.0	32	18	14	100	100	99	97	96	86	81	4	-	-
TP36 0.3-2.1m	CLAY	CI	17.1	5.5	34	18	16	100	100	100	99	96	90	83	3	-	-
TP11 0.2-2.0m TP13 0.9-1.8m TP18 1.5-1.9m	CLAY	CI	-	11.0	46	20	26	100	100	98	96	93	86	82	-	1.60	17.5
TP21 0.4-0.6m TP22 1.0-1.5m TP23 1.0-1.5m	CLAY wt gravel	CI	-	13.5	45	117	30	100	100	95	84	78	72	68	-	1.75	17.0
TP24 0.9-2.0m TP26 1.0-2.0m TP30 0.4-1.0m	CLAY wt sand	CI	-	3.5	36	25	11	100	100	100	98	91	82	75	-	1.71	17.5
TP32 0.4-2.0m TP33 0.4-0.9m	CLAY	CI	-	5.0	33	17	16	100	100	100	99	96	90	86	-	1.76	16.5

4.1.3.2.2 Permeability and Strength Test Results

Consolidated un-drained (CU) shear strength testing was undertaken on four combined samples from as described in **SECTION 4.1.2,** to provide expected effective cohesion (c') and effective friction angles (Ø') of the soils. Permeability testing were also undertaken on these samples to determine the permeability coefficients of the soils.

A summary of the CU and permeability testing is provided in **TABLE 3** below with the complete set of material test work certificates provided in **Appendix E1**.

TABLE 3
SUMMARY RESULTS OF CU TESTING

Combined Sample*	Geotechnical Parameter		
	Effective Cohesion c' (kPa)	Effective Friction Angle□ ϕ (degrees)	*Permeability k (m/s)
TP11 - 0.2-2.0, TP13 - 0.9-1.8, TP18 – 1.5-1.9	1.5	30.1	8×10^{-10}
TP21 – 0.4-0.6, TP22 – 1.0-1.5, TP23 – 1.0-1.5	6.8	31.0	4×10^{-10}
TP24 – 0.9-2.0, TP26 – 1.0-2.0, TP30 – 0.4-1.0	4.1	33.0	5×10^{-9}
TP32 – 0.4-2.0, TP33 – 0.4-0.9	5.3	30.5	7×10^{-10}

*Sample remoulded to 98% Standard Compaction and Standard Optimum Moisture Content.

4.1.4 1st Site Investigation Testing Summary

Based on the geotechnical data compiled as part of the investigation for the proposed TSF, the following summarises relevant geotechnical conditions and outlines criteria relevant to the TSF design:

4.1.4.1 Basement Conditions

- The proposed TSF embankment and storage area are located within the Anson Formation geology, dominated by sediments and volcaniclastic lithology.
- Basement sequences, beneath the residual soil profile are of sufficient geotechnical strength to support embankments. "Free dig" excavations into the upper weathered basement profile should be achievable to depths of at least 3m to 4m.
- Structurally, the basement appears to be layered with deep saprolite profile and minimal fracturing. It can be inferred that fracturing is more intense along fault and subfault alignments with the main drainage line of the TSF area interpreted as a possible fault alignment. Basement mass permeability through the more fractured zones is therefore high, estimated to be of the order of 10^{-6}m/s. Away from drainage lines, permeabilities between 10^{-7} and 10^{-8}m/s can be expected.
- Groundwater was encountered in test pits adjacent to drainage lines with the majority of test pits being dry.

4.1.4.2 Soil Conditions

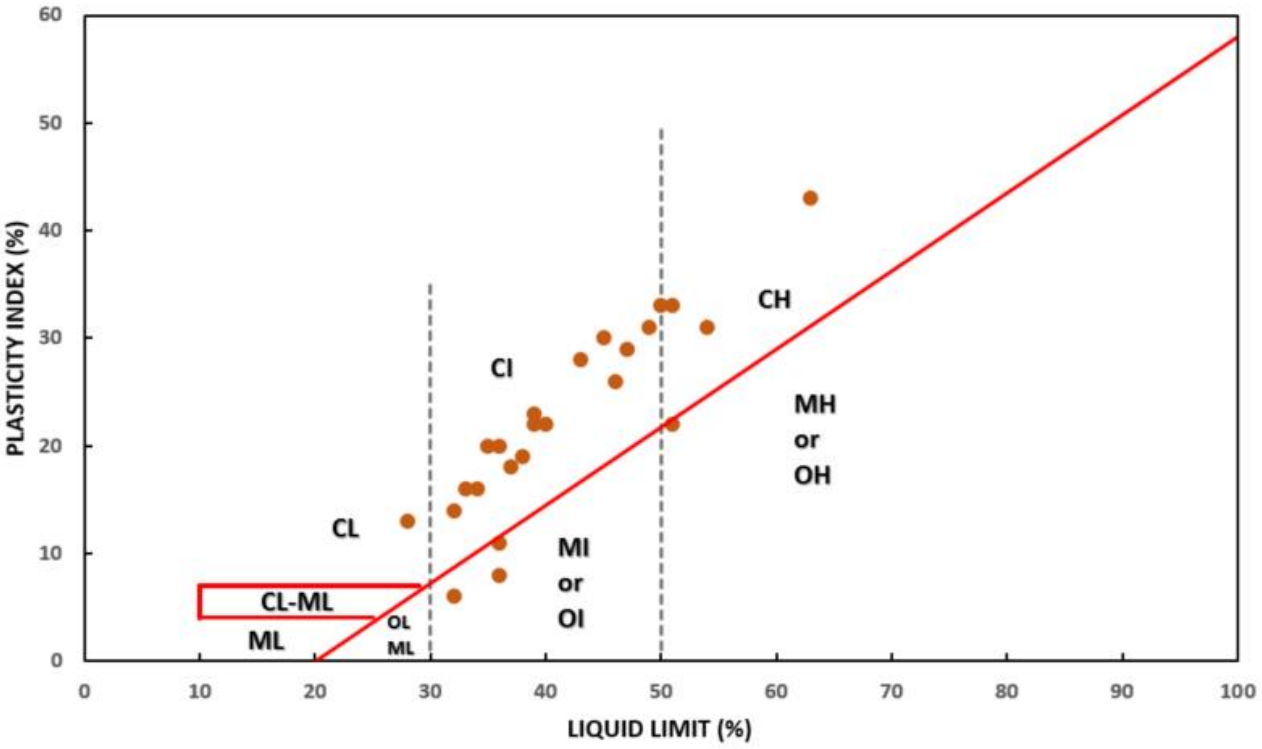
- Soil development within the storage area is generally uniform. Within the TSF catchment footprint, soil depths vary between 1.3m to in excess of 4.0m. The storage area is overlain by an average 0.3m thick topsoil overlying predominately low to medium CLAYs and few high plasticity CLAYs. Some occurrence of Clayey GRAVELs was encountered at soil/rock interfaces. Clayey SAND layers were also encountered in test pits located adjacent to the Belubula River alluvial flood plains. Atterberg Limits results completed from all testwork have been plotted on a Casagrande Chart (**PLATE 4**, based on McAnnally and Boyce, 1980), indicating these soils have a clay dominant content (i.e. plotting above the A-line).

- Laboratory permeability testing of soil sample including deduced permeabilities from CU testing yield very low permeabilities of the order of 10^{-10}m/s.

  Based on the laboratory results and the properties of clay soils within the site, low compacted permeabilities (generally of the order of 10^{-9} to 10^{-10}m/s) are expected to be achievable.

- CU testing yielding effective cohesions values of between 1.5kPa to 6.8kPa and an effective friction angle of between 30 to 33 degrees confirming development of adequate soil strength of the underlying soils at this site, once reworked.

PLATE 4
CASAGRANDE CHART



- It is noted that Emerson Class for the clays indicate that the material is potentially dispersive and therefore engineering design of a water structure utilising these materials should include appropriate specification of moisture conditioning and compaction and the use of embankment filters as required.

- Subject to the above, it is considered that all clayey soils located within the site have use as engineered fill of low permeability. The effect of removal of clayey soils, particularly from storage areas, should however be considered as a means of reducing seepage flow potential through basement sequences (specifically within drainage alignments).

4.1.4.3 Potential Seepage Conditions

- Based on the site topography and local geology, seepage flows are likely to be concentrated along the main Belubula River drainage alignment of the TSF area grading in a south-westerly direction.

4.2 2nd and 3rd Site Investigation (11th December to 15th December 2017 and 8th January to 12th January 2018)

The further geotechnical investigation was conducted between 11 and 15 December 2017 which comprised 19 test pits (out of 20 proposed test pits) and 7 boreholes (out of proposed 11 boreholes). TP05 was not completed due to access restrictions. The remainder of the 11 boreholes was completed as scheduled between 8 and 12 January 2018.

An ATCW Geotechnical Engineer was present to conduct:

- Liaison with Regis representatives and contractors;
- Geotechnical sampling, recording of test results and logging materials encountered; and
- Environmental sampling for aggressivity testing.

The test locations were marked by Regis representatives using a hand-held GPS.

4.2.1 Test Pitting

Test Pits, TP01 – TP04 and TP06 – TP20 were excavated using 3-5 tonne excavator supplied and operated by a subcontractor engaged by Regis. Target depths for the test pits were between 1.0m to 1.5m below ground level or prior refusal on rock.

Test pits were logged in accordance to AS 1726: Geotechnical Site Investigations by an ATCW Geotechnical Engineer who directed sampling and took colour photographs of the test pits and the test pit side walls. Selected pictures are attached in **Appendix C1**.

Bulk samples from the test pits were taken and delivered to a laboratory for NATA accredited testing and storage.

All test pits were backfilled and tamped using the excavator bucket upon completion.

4.2.2 Borehole Drilling

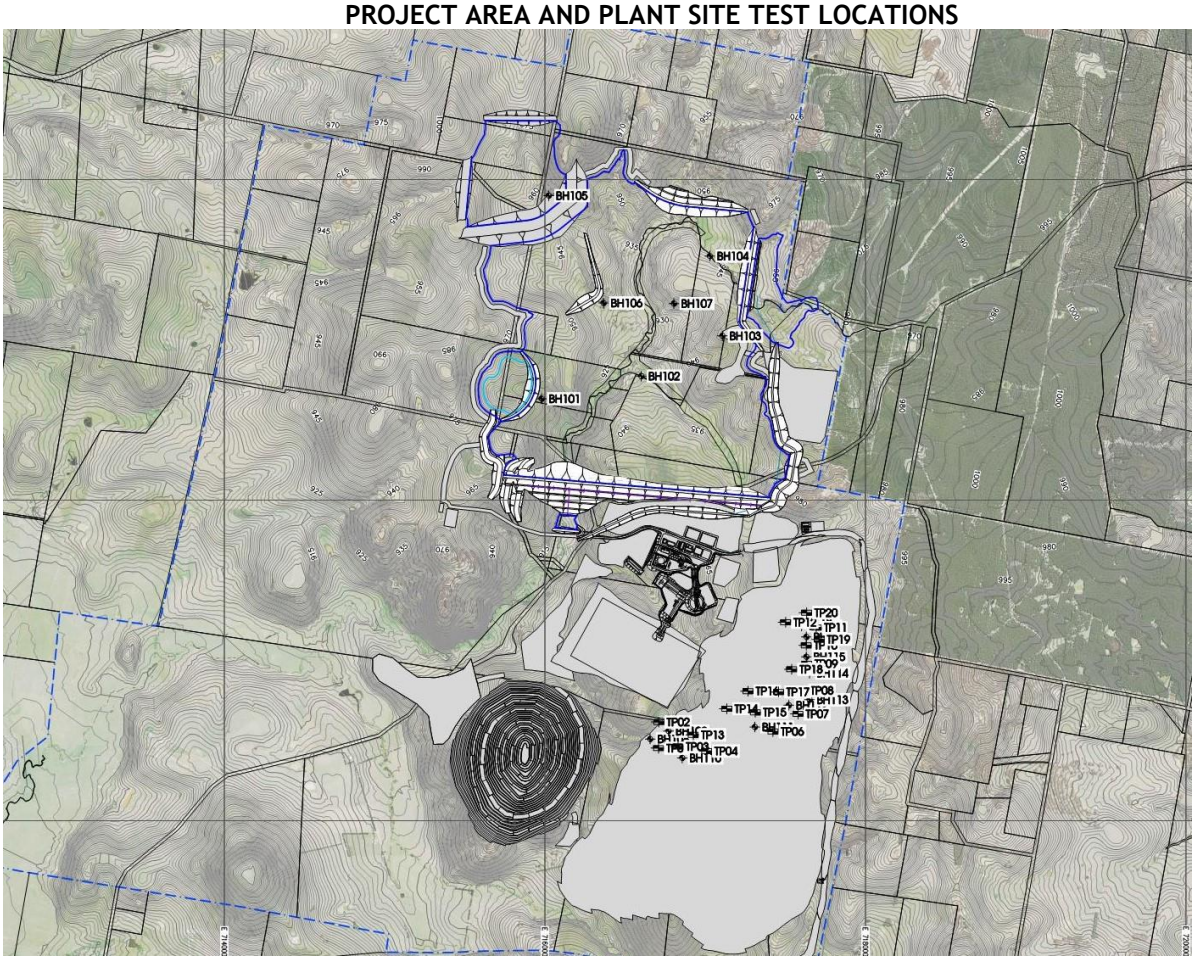
Boreholes BH108 to BH113 and BH118 were drilled using a 4WD vehicle mounted drill rig. Each borehole was advanced using air-boring technique with TC-bits to target depths or upon TC-bit refusal. Upon TC-bit refusal, boreholes were advanced using percussion drilling technique. Boreholes BH114 to BH117 were drilled using Geoprobe 7822DT drilling rig. Each borehole was advanced using auger drilling technique with TC-bits to target depths or prior auger refusal.

Standard Penetration Testing (SPT) was carried out at selected depth intervals to assess soil strength and obtain samples for logging and laboratory testing purposes. Environmental samples were also collected at selected depth intervals in the in the upper 6m of each borehole for soil aggressivity testing on selected samples.

Soil moisture and any groundwater noticed during the investigation were recorded and indicated on borehole logs attached in **Appendix B2**.

The locality of the testing program is illustrated in **PLATE 5**.

PLATE 5
PROJECT AREA AND PLANT SITE TEST LOCATIONS



4.2.3 Laboratory testing

Soil samples obtained during the investigation were taken to a NATA registered laboratory. The following tests were proposed to be carried out on selected samples:

- Standard Compaction and 4-day soaked California Bearing Ratio (CBR)
- Atterberg Limits
- Particle Size Distribution
- Moisture Content
- Multistage Triaxial (3 Stage)
- Soil Aggressivity Suite
- Shrink/ Swell Index

4.2.4 Investigation Results

4.2.4.1 Subsurface Conditions

Engineering test pit and borehole logs are presented in **Appendix B2** with photographs of the test pits and explanation sheets defining the terms and symbols adopted in the engineering logs preparation.

TABLE 4 provides a summary of the inferred geotechnical units encountered at the site.

TABLE 4
SUMMARY OF INFERRED GEOTECHNICAL UNITS ENCOUNTERED

Unit	Material/ Origin	Description
Unit 1a	Topsoil	TOPSOIL: SILTY CLAY (CL-CI), low to medium plasticity, brown, moist, dry of plastic limit, estimated very stiff to hard, occasional trace of rock fragments
Unit 1b	Alluvium/ Residual	SILTY CLAY, medium to high plasticity, brown and/ yellow brown/ pale brown and pale grey, moist, dry of plastic limit to moist, near plastic limit, stiff/ stiff to very stiff, occasional trace fine to medium grained sand
Unit 2	Weathered Rock	SILTSTONE, brown and yellow brown, extremely low to very low strength, extremely weathered

Interpreted Subsurface Conditions encountered are summarised in **TABLE 5.**

TABLE 5
INTERPRETED SUBSURFACE CONDITIONS

Test Location	Approximate RL (m AHD)	Depth to base of Inferred Geotechnical Unit (m)		
		Unit 1a	Unit 1b	Unit 2
TP01	TBA	0.2	>1.0	NE
TP02	TBA	0.2	>1.1	NE
TP03	TBA	0.2	>1.1	NE
TP04	TBA	0.2	>1.0	NE
TP06	TBA	0.2	>1.0	NE
TP07	TBA	0.2	>1.1	NE
TP08	TBA	0.2	>1.1	NE
TP09	TBA	0.2	>1.1	NE
TP10	TBA	0.2	>1.2	NE
TP11	TBA	0.2	>1.0	NE
TP12	TBA	0.2	>1.3	NE
TP13	TBA	0.2	>1.1	NE
TP14	TBA	0.2	>1.3	NE
TP15	TBA	0.2	>1.2	NE

Test Location	Approximate RL (m AHD)	Depth to base of Inferred Geotechnical Unit (m)		
		Unit 1a	Unit 1b	Unit 2
TP16	TBA	0.2	>1.3	NE
TP17	TBA	0.2	>1.2	NE
TP18	TBA	0.2	>1.1	NE
TP19	TBA	0.2	1.1	>1.4
TP20	TBA	0.2	>1.1	NE
BH108	TBA	0.3	5.5	>18.0
BH109	TBA	0.4	7.5	>19.0
BH110	TBA	0.3	2.8	>11.7
BH111	TBA	NE	2.5	>15.0
BH112	TBA	0.2	5.5	>15.0
BH113	TBA	0.4	2.2	>15.0
BH114	TBA	0.4	4.0	8.9
BH115	TBA	0.4	4.3	10.8
BH116	TBA	0.4	4.0	10.9
BH117	TBA	0.4	2.5	12.6
BH118	TBA	0.2	3.5	>15.0
Note: NE – Not Encountered				

4.2.4.2 Groundwater

Groundwater was only observed in BH110 at approximately 5.5 mbgl, within the siltstone bedding matrix. There was no major inflow and the material remained moist to wet. All other boreholes and test pits remained dry or dry to moist throughout the investigation. No monitoring wells were nominated to be installed to study the groundwater as part of this investigation.

4.2.5 Laboratory test results

Results of laboratory testing outlined in **Section 4.2.3** including soil classification and CBR testing are summarised in **TABLE 6** below and **TABLE 7** presents a summary of soil aggressivity test results. Detailed laboratory test certificates are presented in **Appendix E1**.

TABLE 6
SOIL CLASSIFICATION AND CBR LABORATORY TEST RESULTS

Test ID	Depth (m) BGL	Optimum Moisture Content (%)	Maximum Dry Density (t/m^3)	CBR (%) [1]	Atterberg Limits				Particle Size Distribution			Multi-Stage Triaxial [2]		
					LL (%)	PL (%)	PI (%)	Linear Shrinkage (%)	<75µm (%)	75µm - 2.36mm (%)	2.36mm - 63mm	Stage 1 to 2 **C' (kPa) / Φ' (Degrees)**	Stage 2 to 3 **C' (kPa) / Φ' (Degrees)**	Stage 1 to 3 **C' (kPa) / Φ' (Degrees)**
TP02	0.5-0.9	17.2	1.65	5.0	-				-			-		
TP03	0.6-1.0	18.1	1.705	-	-				-			11.7/ 29.5	5.7/ 5.7	8.2/ 30.9
TP04	0.3-0.8	19.7	1.63	7.0	-				-			-		
TP06	0.4-0.8	13.9	1.82	4.5	34	16	18	10.0	56	30	14	-		
TP07	0.5-0.9	14.3	1.811	-	-				-			5.9/ 29.6	3.9/ 30.2	4.8/ 30.1
TP08	0.5-0.9	15.0	1.70	3.5	-				-			-		
TP12	0.4-0.9	17.6	1.64	3.5	47	18	29	12.5	88	12	0	-		
TP15	0.2-0.6	20.1	1.656	-	-				-			3.5/ 26.0	5.4/ 25.4	4.4/ 25.6
TP16	0.6-1.2	13.5	1.74	1.0	-				-					
TP18	0.3-0.8	16.2	1.72	8.0	-				-					
TP19	0.4-1.0	18.3	1.72	2.5	-				-					
TP20	0.4-0.9											12.5/ 29.7	6.1/ 31.4	9.3/ 30.9

NOTES:

[1] CBR results based on 4-day soaked with 4.5kg surcharge
[2] 3 Stage with Cell Pressures:
Stage 1 – 600kPa
Stage 2 – 700kPa
Stage 3 – 900kPa
Back Pressure – 500kPa

TABLE 7
SOIL AGGRESSIVITY LABORATORY TEST RESULTS

Test ID	Depth (m) BGL	Material	pH (pH Unit)	Moisture Content (%)	Sulphates (SO_4) (mg/kg)	Chlorides (mg/kg)
BH109	2.50 – 2.95	SILTY CLAY	6.4	17.3	<10	<10
BH110	1.00 – 1.45	SILTY CLAY	7.0*	24.7	<10	50
BH111	2.50 – 2.57	SILTSTONE, XW	5.9	25.5	10	<10
BH112	4.00 – 4.45	SILTY CLAY	5.3*	9.1	<10	160
BH113	1.00 – 1.20	SILTY CLAY	6.7	21.0	<10	<10
BH114	2.50 – 2.75	SILTY CLAY	7.2	21.2	<10	<10
BH115	4.00 – 4.36	SILTY CLAY	7.4	13.5	<10	<10
BH116	1.00 – 1.45	SILTY CLAY	6.8	11.9	<10	<10
BH117	5.50 – 5.62	SILTSTONE, XW	8.2	9.6	<10	<10
BH118	4.00 – 4.43	QUARTZ, XW AND SILTSTONE, XW	6.4	11.3	<10	<10
QC2		SILTY CLAY	6.3	16.5	<10	<10

Note:
* - pH extraction holding time breach
QC2 is a duplicate sample of BH118 1.00-1.45m

4.2.6 Summary and Recommendations

4.2.6.1 Excavation Conditions

Excavations into soils encountered onsite may be required depending on the proposed structural foundation levels. Excavation is possible using conventional earthmoving equipment such as tracked loaders and hydraulic excavators. Where excavations encounter medium to high strength rock, ripping or the use of rock hammers and rock saws may be required.

Excavations below the groundwater table where encountered should be limited especially in areas where the presence of soil that will collapse into the excavation is observed. Temporary excavations above the water table should be battered at 1V:1H for stiff or better consistency clays and 1V:2H for sands. Steeper batters are only recommended where inspection is carried out by a suitably qualified geotechnical engineer.

Excavation contractors should be required to consider the borehole and test pit logs and photographs and make their own interpretation of the capacity and productivity of specific plant.

4.2.6.2 Trafficability of Site Soils

It is assessed based on soils encountered on site that construction plants such as trucks and excavators can be allowed to travel without requiring working platform. Where wet conditions exist, it may be required to provide a suitable working platform comprising of gravel material such as Austroads Spec. DBG20/ DGB40. Where heavy plants such as piling rigs or mobile cranes are to traffic the site, specific analysis of the working platform requirements will be required to assess working platform thickness.

4.2.6.3 Groundwater

From the investigation results, groundwater appears to be deep across the site with boreholes drilled up to target depths/ auger refusal between 8.9m to 19.0m without encountering groundwater. Groundwater was only encountered collected in the weathered rock matrix in BH110 at 5.5m below ground level without any inflow and the borehole remained moist through to 11.7m.

Previous investigations indicated the groundwater table at the site to be below 16.0 mbgl. It is likely that groundwater inflow where encountered will impact excavations. Excavations below the water table should be designed to cater for groundwater inflow. It is not anticipated that major groundwater inflows during excavations will occur; however, groundwater seepages are likely due to high rainfall events, local drainage conditions, etc. and provision should be made for pumping from sumps.

4.2.6.4 Preliminary Design CBR

Eight (8) CBR tests completed on samples collected during the investigation indicated CBR values of 1.0% to 8.0% at 98% Standard Compaction. However, the design CBR will be dependent on the underlying subgrade material which varies across the site and likely to be alluvial and residual silty/ clayey soils. A design CBR of 1.0% is recommended for pavements constructed on clayey subgrade.

If wet subgrade exist at the time of construction or deleterious materials are encountered at subgrade level, these materials should be over-excavated and be replaced with a minimum depth of 250mm of well graded granular select material with CBR of 15% or greater. The requirement for, and extent of subgrade replacement should be confirmed by the geotechnical authority at the time of construction.

Where rock subgrade materials are encountered, the rock should be ripped and re-compacted for a minimum depth of 300mm to break-up preferential drainage paths and provide a dense homogeneous surface on which to construct pavements.

Filling that is to form the subgrade for pavements should be compacted to at least 100% Standard Compaction at moisture content within 2% of Standard Optimum Moisture Content.

4.2.6.5 Shrink/ Swell Potential

The investigation did not encounter any fill and it is not expected that excavations will encounter fill across the site, however, in areas where fill occurs on the site or where there is no vegetative cover and the area is prone to erosion, a site classification of 'P' as defined in AS2870-2011 should be adopted. If the fill or material is excavated and recompacted, it may be possible to found a pad footing on the recompacted fill. Reclassification of the site would depend on the nature and thickness of the compacted fill and foundation recommendations should be developed based on AS2870-2011.

Where alluvial and residual soils are relatively shallow and would form bearing stratum for a pad footing, a classification of other than 'P' could be adopted. Pad foundations could be adopted for structures with similar scale and building loads to residential structures, based on the guidelines in AS2870-2011. Sites underlain by residual and alluvial soils can be classified as 'M' as defined in AS2870-2011. In areas of deep-seated moisture, the classification shall be modified by the addition of '-D).

4.2.6.6 Suitability of Excavated Material as Structural Fill

The majority of soils encountered on site will likely be suitable for use on site as landscaping material and with suitable grading and treatment as controlled fill for use beneath pavement and structural areas.

Units 1b and 2 materials are considered suitable for reuse as controlled fill provided any foreign materials such as building rubble, decomposing tree stumps, etc. are removed and the material is graded to remove any 'oversize' materials.

Any near surface topsoil/ alluvium is not considered suitable for reuse as controlled fill and should be stockpiled for landscaping purposes.

If any ripped rock is anticipated, it may be suitable for use as fill provided the material is crushed to reduce oversize materials.

4.2.6.7 Earthquake Design

Peak ground accelerations to be resisted by a structure is mainly dependent on the strength of the underlying soil and/ or rock. Soft soils are expected to amplify seismic accelerations and therefore requires structures built on them to be designed to resist higher seismic coefficient.

The site is classified as Class Ce – Shallow soil in accordance with the site sub-soil classes defined in AS1170.4-2007 Part 4, Earthquake Actions in Australia using bore logs, including measurement of geotechnical properties. Representative SPT N values across the site are greater than 6 which corresponds with the site classification of Ce. In the event, the entire structural footprint is founded on rock, then the site could be classified as Be or on hard rock, then the site may be classified as Ae.

A hazard factor of 0.08 is recommended based on AS1170.4-2007. The site has been assessed to have an Earthquake Design Category II with Importance Level 2 in accordance with AS1170.4-2007 assuming the height of the structures will likely be more than 12m but less than 50m.

Liquefaction potential is considered to be low in view of the limited amount of sandy deposits and low groundwater table across the site.

4.2.6.8 Soil Aggressivity to Buried Structures

Based on results of laboratory testing as summarised in **TABLE 7**, the soils have been compared to exposure classifications given in AS2159-2009 and are summarised in **TABLE 8**.

TABLE 8
SOIL AGGRESSIVITY EXPOSURE CLASSIFICATIONS

Test ID	Depth (m) BGL	Material	Exposure Classification for Concrete Piles	Exposure Classification for Steel Piles
BH109	2.50 – 2.95	SILTY CLAY	Non-aggressive	Non-aggressive
BH110	1.00 – 1.45	SILTY CLAY	Non-aggressive	Non-aggressive
BH111	2.50 – 2.57	SILTSTONE, XW	Non-aggressive	Non-aggressive
BH112	4.00 – 4.45	SILTY CLAY	Mild	Non-aggressive
BH113	1.00 – 1.20	SILTY CLAY	Non-aggressive	Non-aggressive
BH114	2.50 – 2.75	SILTY CLAY	Non-aggressive	Non-aggressive
BH115	4.00 – 4.36	SILTY CLAY	Non-aggressive	Non-aggressive
BH116	1.00 – 1.45	SILTY CLAY	Non-aggressive	Non-aggressive
BH117	5.50 – 5.62	SILTSTONE, XW	Non-aggressive	Non-aggressive
BH118	4.00 – 4.43	QUARTZ, XW AND SILTSTONE, XW	Non-aggressive	Non-aggressive

Soils encountered across the site have been tested and results from the tests as summarised above indicated the soils are classified as “non-aggressive” exposure for both concrete and steel piles in all boreholes except in BH112 which was classified as “mild” exposure to concrete piles.

4.3 4th Site Investigation (4th June 8th June 2018)

The further geotechnical investigation was conducted between 4 and 9 June 2018 which comprised 29 test pits (out of 30 proposed test pits) and 30 shallow solid flight auger boreholes completed at previously investigated test locations for field permeability testing. TP30 was not completed due to the proximity to Aboriginal Heritage Sites. Bulk soil samples were collected for laboratory testing.

An ATCW Geotechnical Engineer was present to conduct:

- Liaison with Regis representatives and contractors;
- Geotechnical sampling, recording of test results and logging materials encountered; and
- Environmental sampling for aggressivity testing.

The test locations were marked by Regis using a hand-held GPS.

4.3.1 Test Pitting

Test Pits, TP01 – TP29 were excavated using 3-5 tonne excavator supplied and operated by a subcontractor engaged by Regis. Target depth for the test pits was 1.5 mbgl or prior excavator bucket refusal.

Test pits were logged by an ATCW Geotechnical Engineer who directed sampling and took colour photographs of the test pits and side walls. Engineering test pit logs are attached in **Appendix B3** and selected photographs of the test pits are attached in **Appendix C2**.

Bulk samples from the test pits were taken and delivered to a laboratory for NATA accredited testing and storage.

All test pits were backfilled and tamped using the excavator bucket upon completion.

4.3.2 Field Permeability Testing – Constant Head Test

Shallow solid flight auger boreholes were drilled using a 4WD vehicle mounted drill rig at previously investigated locations for field permeability testing. 100mm diameter augers were used to make nominal 120mm diameter holes for the testing. Talsma-Hallam permeameter was used for the field permeability testing in accordance to AS/NZS 1547:2012.

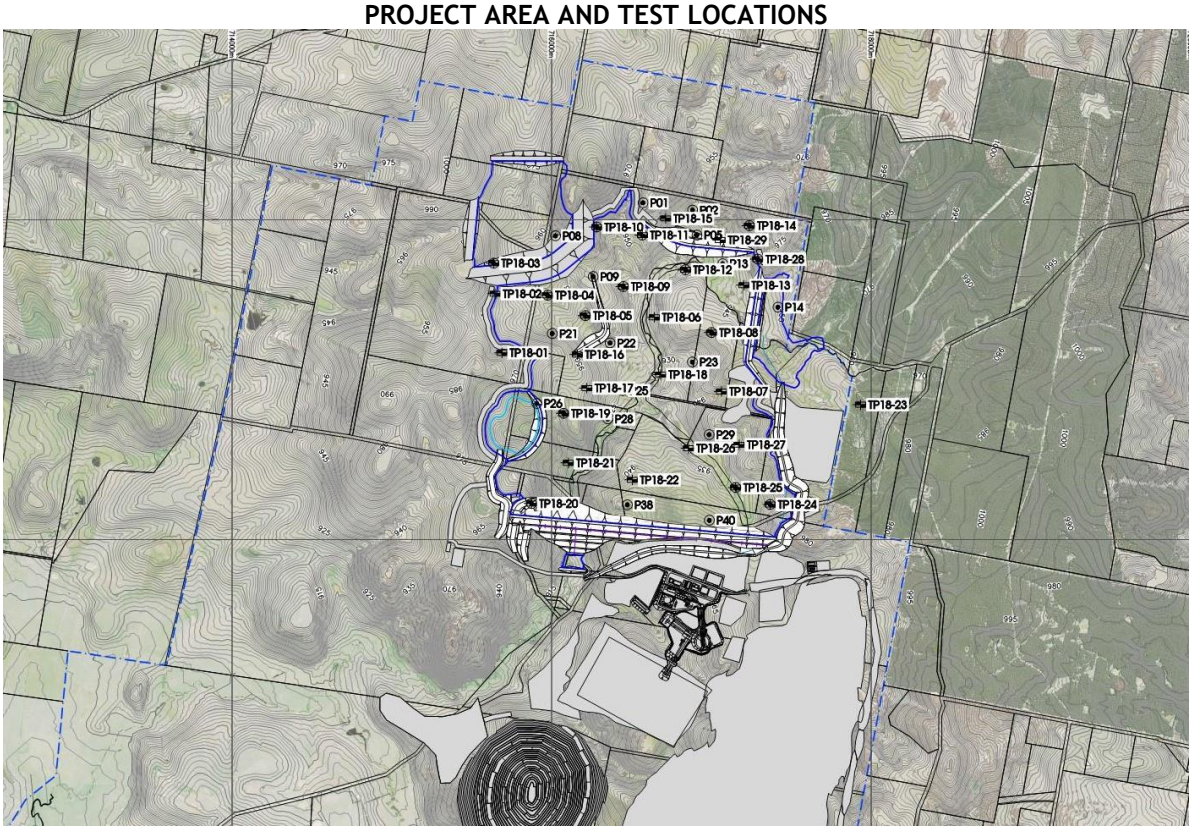
The method uses constantly maintained head of water to determine the permeability of soil. The Talsma-Hallam permeameter used for testing at the site was modified to measure permeabilities less than $1x10^{-7}$ m/s. The test is an 'above the water table test' and suitable for locations where the groundwater table is at least 0.5m below the test hole. This condition was met across the site as the groundwater table is greater than 0.5m below the test holes and the surrounding soils were not saturated.

In a constant-head test, the water runs out of an unlined test hole in the ground and is replenished at the same rate from a reservoir, so that the head of water in the hole remains the same. The loss of water from the reservoir is measured over time and a mathematical model is used to calculate the coefficient of permeability, K_{sat}, from the measurements.

Overnight pre-soaking of the test holes is not necessary, as the test itself indicates when stable infiltration has occurred.

PLATE 6 illustrates the locations of field work testing.

PLATE 6
PROJECT AREA AND TEST LOCATIONS



4.3.3 Laboratory Testing

Soil samples obtained during the investigation were taken to a NATA registered laboratory. The following tests were proposed to be carried out on selected samples:

- Particle Size Distribution
- Atterberg Limits
- Standard Compaction; and
- Falling head permeability testing.

4.3.4 Investigation Results

4.3.4.1 Subsurface Conditions

Engineering test pit logs are presented in **Appendix B3** with photographs of the test pits and explanation sheets defining the terms and symbols adopted in the engineering logs preparation.

TABLE 9 provides a summary of the inferred geotechnical units encountered at the site.

TABLE 9
SUMMARY OF INFERRED GEOTECHNICAL UNITS ENCOUNTERED

Unit	Material/ Origin	Description
Unit 1a	Topsoil	TOPSOIL: SILTY CLAY (CL-CI), low to medium plasticity, yellow brown and/or brown, moist, dry of plastic limit, estimated very stiff to hard to friable, occasionally grading to SILSTONE, extremely weathered, very low TOPSOIL: SANDY CLAY (CL-CI), low to medium plasticity, yellow brown, fine to medium, with gravel, moist, dry of plastic limit, estimated very stiff to hard TOPSOIL: SILT (ML), low plasticity, yellow brown and/or brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard
Unit 1b	Alluvium/ Residual	SILTY CLAY (CI-CH), medium to high plasticity, brown and/or yellow brown/ pale brown and/or pale grey and/or orange brown, occasionally with gravel and cobbles (cobble size Quartz), moist, dry of plastic limit, estimated hard to friable, occasionally grading to SILTSTONE, very low strength, extremely weathered, layered SANDY CLAY (CI-CH), medium to high plasticity, pale grey and/or yellow brown or red brown, fine to medium, with gravel, moist, dry of plastic limit, estimated hard to friable, occasionally grading to SILTSTONE, very low strength, extremely weathered, layered or SILT (ML), low plasticity, pale yellow brown or yellow brown, with sand, moist, dry of plastic limit, estimated very stiff to hard, grading to CLAYEY SILT or CLAYEY SILT (ML), low plasticity, yellow brown, low plasticity, with sand, moist, dry of plastic limit, estimated hard to friable, grading to SILTSTONE, very low strength, extremely weathered, layered or GRAVELLY CLAY (CL-CI), low to medium plasticity, yellow brown or red brown, fine to coarse, subangular to angular, with cobbles, moist, dry of plastic limit, estimated hard, grading to SILTSTONE, low to medium strength, highly weathered or SANDY SILT (ML), low plasticity, pale yellow brown, fine to medium, moist, dry of plastic limit, estimated hard, grading to SILTSTONE, very low strength, extremely weathered, layered or SANDY GRAVEL (GP), fine to coarse, subangular to angular, red brown and pale grey, fine to coarse, dry, estimated very dense
Unit 2	Weathered Rock	SILTSTONE, red brown and dark grey, low to medium, extremely weathered to highly weathered, layered

Interpreted Subsurface Conditions encountered are summarised in **TABLE 10**.

.

TABLE 10
INTERPRETTED SUBSURFACE CONDITIONS

Test Location	Approximate RL (m AHD)	Depth to base of Inferred Geotechnical Unit (m)		
		Unit 1a	Unit 1b	Unit 2
TP18-01	TBA	0.2	>1.5	NE
TP18-02	TBA	0.3	>1.5	NE
TP18-03	TBA	0.2	0.5	>0.5
TP18-04	TBA	0.2	>1.4	NE
TP18-05	TBA	0.2	>1.6	NE
TP18-06	TBA	0.2	>1.4	NE
TP18-07	TBA	0.2	>1.2	NE
TP18-08	TBA	0.2	>1.5	NE
TP18-09	TBA	0.2	>1.5	NE
TP18-10	TBA	0.2	>1.5	NE
TP18-11	TBA	0.2	>1.4	NE
TP18-12	TBA	0.2	>1.5	NE
TP18-13	TBA	0.2	>1.7	NE
TP18-14	TBA	0.1	1.0	>1.0
TP18-15	TBA	0.2	0.5	>0.5
TP18-16	TBA	0.2	1.1	>1.3
TP18-17	TBA	0.2	>1.5	NE
TP18-18	TBA	0.2	>1.4	NE
TP18-19	TBA	0.2	>1.4	NE
TP18-20	TBA	0.2	>1.4	NE
TP18-21	TBA	0.2	1.2	>1.4
TP18-22	TBA	0.2	0.4	>0.4
TP18-23	TBA	0.2	>1.2	NE
TP18-24	TBA	0.2	>1.7	NE
TP18-25	TBA	0.25	>1.5	NE
TP18-26	TBA	0.2	>1.8	NE
TP18-27	TBA	0.2	>1.3	NE
TP18-28	TBA	0.2	1.1	>1.3
TP18-29	TBA	0.2	>1.6	NE

Note:
NE – Not Encountered

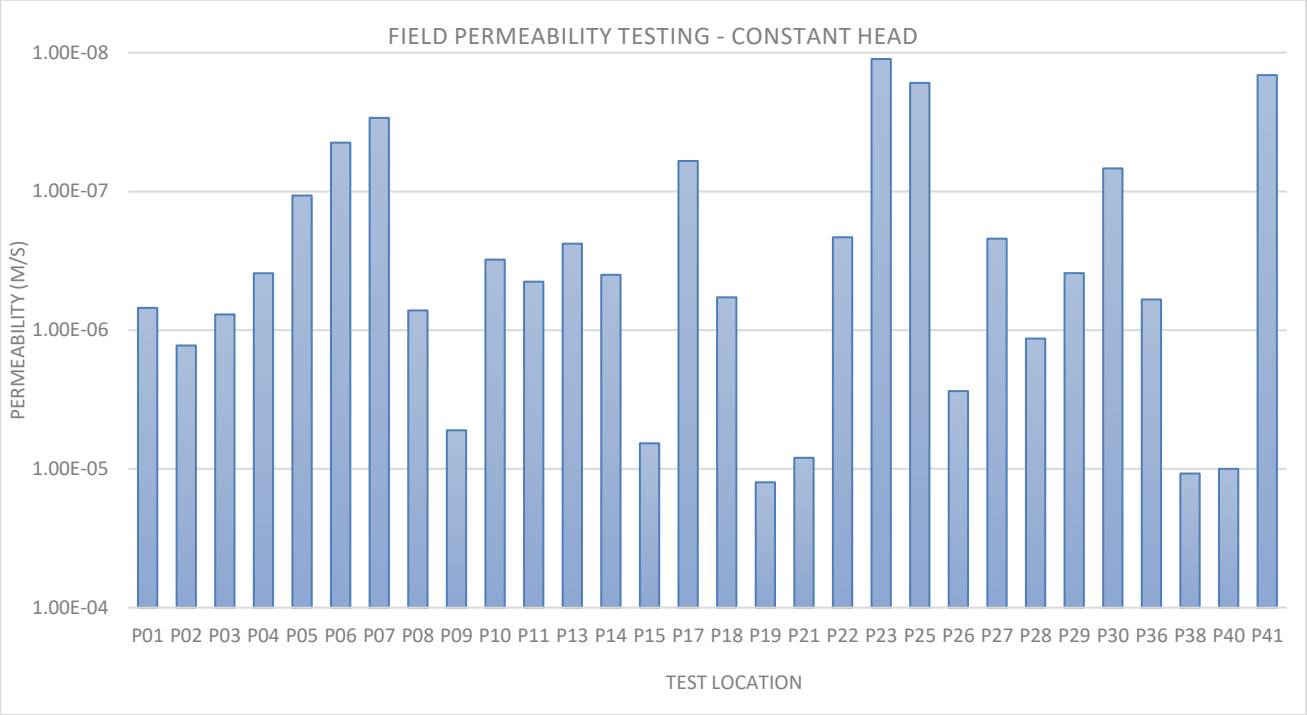
4.3.4.2 Groundwater

Groundwater was not observed in any of the test pits or permeability auger holes. No monitoring wells are nominated to be installed to study the groundwater as part of this investigation. Data available for the site indicates groundwater to be approximately 16 mbgl.

4.3.4.3 Field Permeability Testing – Constant Head

Field permeability logs are attached in **Appendix D**. Summary plot of the permeability results are shown in **PLATE 7**.

PLATE 7
CONSTANT HEAD FIELD PERMEABILITY TESTING



Summary of permeability results (field and laboratory) is presented in **TABLE 11**.

TABLE 11
SUMMARY OF FIELD AND LABORATORY PERMEABILITY RESULTS

Test Location	Corresponding Test Location	Field Permeability Result (m/s)	Laboratory Permeability Result (m/s)
P01	OM765	6.91E-07	-
P02	TP36	1.29E-06	-
P03	TP18-14	7.70E-07	-
P04	TP18-28	3.89E-07	-
P05	TP34	1.07E-07	-
P06	TP18-11	4.45E-08	-
P07	TP18-10	2.95E-08	-
P08	BH105	7.21E-07	-
P09	OM764	5.27E-06	-
P10	TP18-09	3.10E-07	-
P11	TP18-12	4.47E-07	-
P13	OM766	2.38E-07	-
P14	OM767	3.99E-07	1.57E-10
P15	TP18-08	6.54E-06	-
P17	TP18-05	6.03E-08	-
P18	TP18-04	5.80E-07	9.88E-09
P19	TP18-03	1.25E-05	-
P21	OM756	8.32E-06	-
P22	BH106	2.14E-07	-
P23	OM768	1.11E-08	3.15E-10
P25	TP31	1.65E-08	-
P26	OM755	2.75E-06	-
P27	TP18-19	2.19E-07	-
P28	OM763	1.15E-06	-
P29	OM770	3.88E-07	-
P30	TP18-25	6.82E-08	3.17E-10
P36	TP18-20	6.01E-07	-
P38	TP11	1.08E-05	-
P40	TP17	1.00E-05	-
P41	TP18-24	1.45E-08	-

NOTE:
OM – Completed by Sustainable Soils Management – 2017
TP – Completed by ATCW - (2017 and 2018)

4.3.5 Laboratory test results

Results of laboratory testing outlined in **Section 4.3.3** including soil classification testing are summarised in **Table 12**. Detailed laboratory test certificates are attached in **Appendix E3**.

Table 12
SUMMARY OF LABORATORY TEST RESULTS

Test ID	Depth (m) bgl	Optimum Moisture Content (%)	Maximum Dry Density (t/m³)	Permeability $k_{(20)}$ (m/s)	Atterberg Limits				Particle Size Distribution		
					Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	<75µm (%)	75µm - 2.36m (%)	2.36mm - 63mm (%)
TP18-04	0.6-0.8	20.3	1.61	9.88E-09	49	21	28	12.5	67	28	5
TP18-13	0.8-1.0	20.7	1.69	1.57E-10	51	15	36	16.0	88	12	0
TP18-18	0.4–0.8	15.6	1.75	3.15E-10	49	14	35	14.5	91	7	2
TP18-25	0.9-1.1	16.5	1.77	3.17E-10	48	14	34	14.0	87	12	1

4.3.6 Summary & recommendations

4.3.6.1 Groundwater and Seepage

Groundwater was not encountered in any of the test pits completed as part of this investigation. However, previous studies predict the groundwater at the site to be about 16 mbgl. The groundwater is expected to be sympathetic with the topography.

The preferential seepage paths across the site is possibly along the cross-river faulting and the river drainage alignment.

4.3.6.2 Permeability

Field permeability results and laboratory results indicated low permeability of the soils encountered at the test locations. The silty and clayey soils compacted to the optimum moisture content are able to achieve permeability about 1 x 10^{-9} m/s or less.

Review of data from other investigations indicate the presence of fresh rock at depths generally greater than 10 mbgl. Permeability of the Anson Formation was given as 5 x 10^{-7} m/s in previous works conducted by others. Our field permeability results confirm the varying permeability from 1 x 10^{-6} m/s to 1 x 10^{-8} m/s with the lower permeabilities encountered in the silty and clayey soils. Subject to this, it is considered that all clayey soils can be used as engineered fill of low permeability.

4.3.6.3 Trafficability of Site Soils

It is assessed based on soils encountered on site that construction plants such as trucks and excavators can be allowed to travel without requiring working platform. Where wet conditions exist, it may be required to provide a suitable working platform comprising of gravel material such as Austroads Spec. DBG20/ DGB40. Where heavy plants such as piling rigs or mobile cranes are to

traffic the site, specific analysis of the working platform requirements will be required to assess working platform thickness.

4.3.6.4 Excavation Conditions

The soil profile across the storage area and below the embankment is generally made up of shallow topsoil underlain by alluvial/ residual soils. The alluvial and residual soils are underlain by weathered rock and fresh rock at depth.

Excavations into soils encountered on site may be required depending on the proposed structural foundation levels. Excavation is possible using conventional earthmoving equipment such as tracked loaders and hydraulic excavators. Where excavations encounter medium to high strength rock, ripping or the use of rock hammers and rock saws may be required.

It is not expected that excavations for the TSF would encounter the groundwater. However, excavations below the groundwater table where encountered should be limited, particularly due to the presence of soil that will collapse into the excavation. Temporary excavations above the water table should be battered at 1V:1H for stiff clays and 1V:2H for sands. Steeper batters are only recommended where designed for and an inspection is carried out by a suitably qualified geotechnical engineer.

Excavation contractors should be required to consider the test pit logs and photographs and make their own interpretation of the capacity and productivity of specific plant.

4.3.6.5 Suitability of Excavated Material as Structural Fill

Laboratory results indicate the soils encountered across the site are mainly silty and clayey soils with gravel and sand as minor components (where encountered) with varying plasticity. However, they are mainly of medium plasticity. The majority of soils encountered on site will likely be suitable for use on site as landscaping material and with suitable grading and treatment as controlled fill for use beneath pavement and structural areas.

The proposed TSF embankment and storage area is underlain by the Silurian aged Anson Formation. The basement geology is dominated by carbonaceous pyritic siltstone, felsic volcanics, volcanic sandstone and limestone. The basement weathered siltstone encountered in the test pits is layered and therefore not fractured. Fracturing if present will be intense along possible fault and sub-fault alignments.

Units 1b and 2 materials are considered suitable for reuse as controlled fill provided any foreign materials such as decomposing tree stumps, etc. are removed and the material is graded to remove any 'oversize' materials. Any near surface topsoil/ alluvium is not considered suitable for reuse as controlled fill and should be stockpiled for reuse as landscaping material.

The effect of removing clayey soils, especially from seepage areas should however be considered as a means of reducing seepage flow potential through basement sequences. Engineering design of the TSF utilising the clayey soils encountered on site should include appropriate specification of moisture conditioning and compaction and the use of embankment filters as required.

4.4 5th Site Investigation (18th March to 21st March 2019)

A geotechnical investigation was undertaken from 18 through to 21 March 2019 which comprised of 63 boreholes out of the originally proposed 64 completed. An ATCW representative was present at the time of the geotechnical investigation to conduct the following:

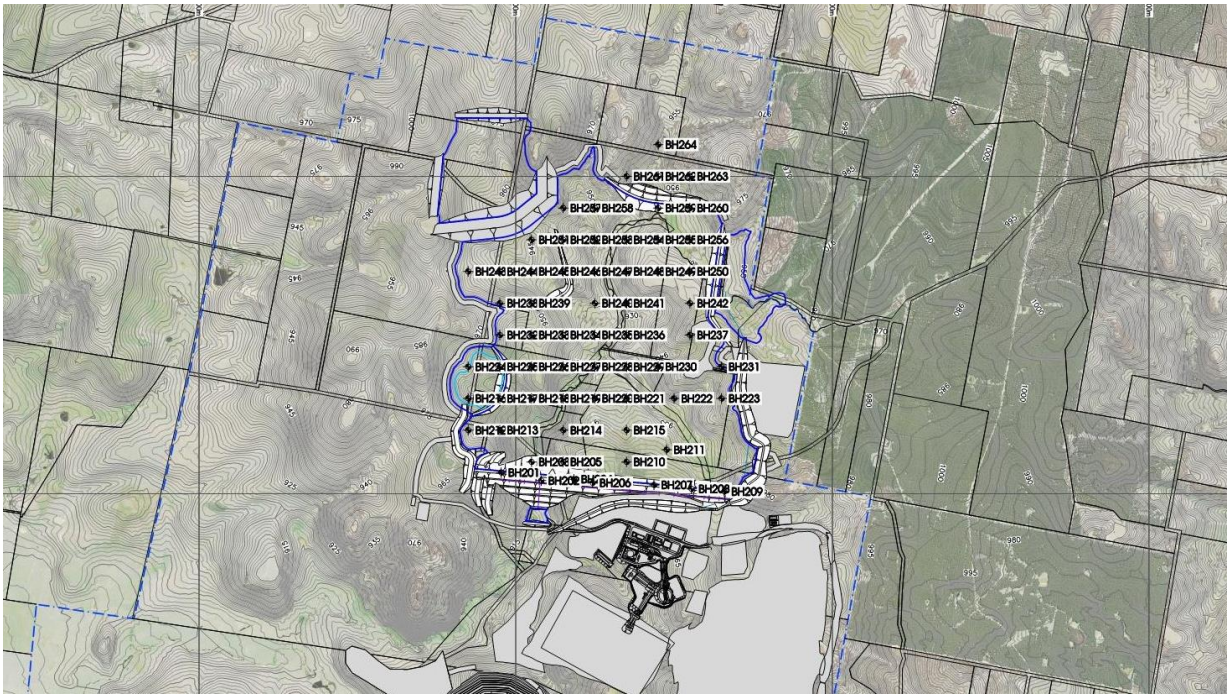
- Liaison with Regis representatives and contractors;
- Geotechnical sampling, recording of test results and logging materials encountered; and
- Field work documentation.

4.4.1 Borehole Drilling

Boreholes BH200-BH263 were drilled using a 4WD vehicle mounted drill rig, however borehole BH231 was located on private property and was therefore inaccessible. Each borehole was advanced using auger drillings techniques down to a maximum depth of 1.5 m. The boreholes were drilled using a JCB 205T skid steer loader with 450mm diameter auger. Soil moisture and any groundwater noticed during the investigation were recorded and indicated on borehole logs attached in **Appendix B4**.

The locality of the field program testing is shown in **PLATE 8**.

PLATE 8
TESTING PROGRAM SITE LOCALITY



The primary purpose of the borehole testing was to identify the presence of clay within the internal storage of the TSF.

4.4.2 Laboratory Testing

Soil samples obtained during the investigation were taken to a NATA registered laboratory. The following tests were proposed to be carried out on selected samples:

- Standard Compaction; and
- Falling head permeability testing.

4.4.3 Investigation Results

Engineering borehole logs are presented in **Appendix B4** with photographs of the borehole field work and explanation sheets defining the terms and symbols adopted in the engineering logs preparation.

Site soils indicate varying topsoils with primary components consisting of either clay and/or sand, the material has varying topsoils depths between 0 to 0.2m depths. Continuing materials primarily comprised of a clay material with additional secondary components consisting of sands, silts and gravels.

4.4.3.1 Groundwater

Groundwater was observed in one of the borehole tests (BH228) at a depth of 1.3m, none of the other borehole testing locations encountered groundwater. No monitoring wells are nominated to be installed to study the groundwater as part of this investigation.

4.4.4 Laboratory test results

Results of laboratory testing outlined in **Section 4.4.2** including soil classification testing are summarised in **TABLE 13**. Detailed laboratory test certificates are attached in **Appendix E4**.

TABLE 13
SUMMARY OF LABORATORY TEST RESULTS

Test ID	Depth (mbgl)	Standard Optimum Moisture Content (%)	Maximum Dry Density (t/m^3)	Permeability $k_{(20)}$ (m/s)
BH244	0.7-1.2	17	1.81	2.00E-09
BH239	0.7-1.2	17.5	1.73	2.00E-10
BH245A	0.5-1.0	16.5	1.8	2.00E-09
BH246	0.8-1.3	14	1.82	9.00E-10
BH252	0.6-1.1	14.5	1.82	1.00E-10
BH251	0.7-1.2	13	1.84	1.00E-08
BH256	0.6-1.1	15.5	1.77	2.00E-09
BH257	0.5-1.0	11.5	1.91	4.00E-10
BH260	0.5-1.0	13	1.84	5.00E-09
BH263	0.7-1.2	14.5	1.81	2.00E-10
BH262	0.7-1.2	17	1.75	3.00E-09
BH261	0.8-1.3	12	1.92	1.00E-09
BH258	1.0-1.5	11	1.95	1.00E-08
BH259	1.0-1.5	16	1.8	1.00E-09
BH255	0.7-1.2	15.5	1.78	1.00E-09
BH221	1.0-1.5	16.5	1.78	2.00e-09
BH240	0.9-1.4	15.5	1.80	4.00E-10
BH241	0.5-1.0	9.0	2.03	4.00E-08
BH230	0.8-1.3	14.0	1.86	1.00E-08

Test ID	Depth (mbgl)	Standard Optimum Moisture Content (%)	Maximum Dry Density (t/m^3)	Permeability $k_{(20)}$ (m/s)
BH247	0.5-1.0	16.0	1.83	2.00E-09
BH253	0.7-1.2	13.0	1.86	1.00E-10
BH248	1.0-1.4	13.0	1.86	3.00E-08
BH254	0.7-1.2	15.5	1.80	4.00E-09
BH249	0.8-1.3	17.0	1.74	5.00E-09
BH236	0.8-1.3	14.5	1.77	1.00E-08
BH211	0.4-0.9	13.0	1.79	1.00E-08
BH215	0.5-1.0	14.0	1.89	2.00E-10
BH223	0.5-1.0	24.1	1.54	1.00E-10
BH242	0.5-1.0	19.0	1.86	1.00E-10
BH212	0.4-0.9	19.2	1.85	1.00E-10
BH216	0.4-0.9	14.7	1.80	1.00E-10
BH224	0.5-1.0	14.8	1.87	2.00E-09
BH225	0.4-0.9	17.0	1.78	1.00E-09
BH200	0.4-0.9	11.6	1.76	1.00E-08
BH201	0.5-1.0	18.9	1.67	1.00E-10
BH202	0.5-1.0	20.2	1.64	1.00E-10
BH222	0.7-1.2	16.0	1.86	4.00E-10
BH229	1.0-1.5	10.5	1.99	7.00E-10
BH235	0.8-1.3	16.5	1.77	5.00E-11
BH228	0.0-0.5 1.0-1.5	18.0 16.0	1.70 1.76	3.00E-11 2.00E-09
BH203	1.0-1.5	19.5	1.67	4.00E-10
BH204	0.7-1.2	12.4	1.79	1.00E-08
BH205	0.7-1.2	21.8	1.62	1.00E-09
BH206	1.0-1.5	17.7	1.74	6.00E-08
BH207	0.8-1.3	11.2	1.88	4.00E-09
BH210	0.5-1.0	11.6	1.82	1.00E-08
BH213	0.8-1.3	16.2	1.74	2.00E-09
BH214	0.4-0.9	17.4	1.74	1.00E-09
BH219	1.0-1.5	21.1	1.65	1.00E-09
BH220	1.0-1.5	14.6	1.82	1.00E-09
BH217	0.6-1.1	19.9	1.60	3.00E-09
BH226	0.4-0.9	15.8	1.81	2.00E-10
BH234	0.7-1.2	18.9	1.73	2.00E-10
BH227	0.5-1.0	20.8	1.70	2.00E-10

Test ID	Depth (mbgl)	Standard Optimum Moisture Content (%)	Maximum Dry Density (t/m^3)	Permeability $k_{(20)}$ (m/s)
BH208	0.4-0.9	17.7	1.73	2.00E-10
BH209	0.5-1.0	17.2	1.73	2.00E-10
BH218	0.5-1.0	16.9	1.75	1.00E-10
BH233	0.6-1.1	16.7	1.74	2.00E-10
BH232	0.5-1.0	15.7	1.81	1.00E-09
BH238	0.5-1.0	13.7	1.93	1.00E-09
BH237	0.5-1.0	18.6	1.80	2.00E-10
BH243	0.5-1.0	14.9	1.86	3.00E-09
BH250	0.5-1.0	18.7	1.74	6.00E-10

4.4.5 Summary and Recommendations

4.4.5.1 Groundwater and Seepage

Groundwater was not encountered in any of the boreholes completed excluding one test at a depth of (BH228) at a depth of 1.3m. However, previous studies predict the groundwater at the site to be about 16 mbgl. The groundwater is expected to be sympathetic with the topography.

The preferential seepage paths across the site is possibly along the cross-river faulting and the river drainage alignment.

4.4.5.2 Permeability

Field permeability results and laboratory results indicated low permeability of the soils encountered at the test locations. The silty and clayey soils compacted to the optimum moisture content are able to achieve permeability about 1 x 10^{-8} m/s or less.

Review of the data indicates the upper surface soils down to a depth of approximately 1.5m are primarily comprise of a clay material with a varying mixture of secondary components of silts, sands and gravels. Subject to this, it is considered that all clayey soils can be used as engineered fill of low to medium permeability.

4.4.5.3 Suitability of Excavated Material as Internal Storage Liner

Laboratory results indicate the soils encountered across the site to comprise primarily of clayey soils with a mixture of secondary components. The material being sourced is to identify the suitability of an internal clay liner within the internal TSF as a seepage prevention measure. The in-situ material would require topsoil stripping including removal of any foreign material including tree stumps and additional in-situ materials not deemed suitable for lining purposes.

Laboratory results indicate the soils encountered across the site are mainly silty and clayey soils with gravel and sand as minor components (where encountered) with varying plasticity. However, they are mainly of medium plasticity. The majority of soils encountered on site will likely be suitable for use on site as landscaping material and with suitable grading and treatment as controlled fill for use beneath pavement and structural areas.

Units 1b and 2 materials are considered suitable for reuse as controlled fill provided any foreign materials such as decomposing tree stumps, etc. are removed and the material is graded to remove any 'oversize' materials. Any near surface topsoil/ alluvium is not considered suitable for reuse as controlled fill and should be stockpiled for reuse as landscaping material.

The effect of removing clayey soils, especially from seepage areas should however be considered as a means of reducing seepage flow potential through basement sequences. Engineering design of the TSF utilising the clayey soils encountered on site should include appropriate specification of moisture conditioning and compaction and the use of embankment filters as required.

REFERENCES

[1] ANCOLD (1998), Guidelines on the Design of Dams for Earthquakes, Australian National Committee on Large Dams, 1998.

[2] Department of Planning & Environment Resources & Energy, *Bathurst Sheet SI/55-08, 1: 250 000 Geological Series*, Queensland, 1998

[3] Chen and Scawthorn (2003), Earthquake Engineering Handbook, tayler and fransis group January 2003.

[4] Wells, D and Coppersmith, K,J (1994), likelihood of surface ruptures a function of magnitude, Seismological research letters, 64,54

[5] Geoscience Australia (2012), The 2012 Australian Earthquake Hazard Map, Record 2012-71.

[6] French. T, Duerden.P, Bigelow. J, Simmons. H, Flitcroft. P (2015), The McPhillamys Gold Deposit, Kings Plains, NSW, Discovery History and Geology of the McPhillamy Gold Deposit, Lachlan fold belt, NSW, September 2015.

[7] Duerden.P (2010, The McPhillamys Gold Deposit, A significant discovery in the Lachland Fold Belt, central western NSW, Mines and Wines 2010, Mudgee.

[8] ANCOLD (2012), Guidelines for Design on Tailings Dams, Australian National Committee on Large Dams.

[9] EPA (2017), Tailings Dam Liner Policy, Letter dated 15 December 2017 to R.W. Corkery and Co Pty Limited, reference EF17/10659

[10] Leps, T.M, *Review of Shearing Strength of Rockfill*, ASCE Journal Soil Mechanics and Foundations, July 1970.

[11] Fell et all (2005), Geotechnical Engineering of Dams, CRC Press, 2005

[12] Australia 1:100 000 Geological Series, Orange New South Wales Sheet 8731, First Edition 1997

[13] ATCW (2017), McPhillamys Gold Project – Life of Mine Tailings Storage Options Assessment, Ref. 113272-02-L01-a, Dated 31 March 2017

[14] Standards Australia (AS 1726:2017) – Geotechnical Site Investigations, Standards Australia Publication No. AS 1726:2017, Fourth Edition, 2017

[15] Standards Australia (AS 2159:2009) – Piling – Design and Installation, Standards Australia Publication No. AS 2159:2009, Third Edition, 2009

[16] Standards Australia (AS 2870:2011) – Residential Slabs and Footings, Standards Australia Publication No. AS 2870:2011.

[17] Standards Australia (AS/NZ 1170.0:2002) – Structural Design Actions, Standards Australia Publication No. AS 1170:2002.

[18] Standards Australia (AS1170.4-2007) – Structural Design Actions, Standards Australia Publication No. AS1170.4-2007.

[19] Atlas of Seismic Hazard Maps of Australia, Seismic hazard maps, hazard curves and hazard spectra, Geoscience Australia, Record 2013/41, M. Leonard, D. Burbidge and M. Edwards

[20] AS/NZS 1547:2012 – On site Domestic Wastewater Management – Standards Australia

[21] Australia 1:100 000 Geologcial Series, Orange New South Wales Sheet 8731, First Edition 1997

[22] AS1726:2017 – Geotechnical Site Investigation – Standards Australia

[23] AS/NZS 1547:2012 – On site Domestic Wastewater Management – Standards Australia

[24] ATCW (2017), McPhillamys Gold Project – Life of Mine Tailings Storage Options Assessment, Ref. 113272-02-L0A-a, Dated 31 March 2017.

[25] Australia 1:100 000 Geological Series, Orange New South Wales Sheet 8731, First Edition 1997

[26] AS1726:2017 – Geotechnical Site Investigations – Standards Australia

[27] AS/NZS 1547:2012 – On-site Domestic-Wasterwater Management – Standards Australia

[28] ATCW (2017), McPhillamys Gold Project – Life of Mine Tailings Storage Options Assessment, Ref. 113272-02-L01-a, Dated: 31 March 2017

APPENDIX A

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT



LOCALITY PLAN
SCALE: 1:200,000

N

DRAWING LIST

DWG NO.	DRAWING TITLE	REVISION
101	SITE LOCALITY PLAN AND DRAWING LIST	D
102	PROJECT LAYOUT	D
103	TSF STAGE 1 LAYOUT	D
104	TSF STAGE 2 LAYOUT	D
105	TSF STAGE 3 LAYOUT	D
106	TSF LONG TERM LAYOUT	D
107	TSF STAGE 1 LAYOUT DETAIL	D
108	TSF STAGE 1 MAIN EMBANKMENT CONSTRUCTION	D
109	TSF STAGE 2 LAYOUT DETAIL	D
110	TSF STAGE 3 LAYOUT DETAIL	D
111	TSF STAGE 3 FINAL LANDFORM	D
112	TSF SECTIONS & SEEPAGE DETIALS	D
113	TSF SECTIONS & DETAILS	D
114	TSF SECTIONS & DETAILS	D
115	TSF DETAILS	D
116	TSF POST CLOSURE LAYOUT	E
117	TSF POST CLOSURE DETAIL	B
201	GEOTECHNICAL TSF INVESTIGATIONS	D
202	TSF SURFACE GEOLOGY	D

GENERAL CONSTRUCTION NOTES

1. THESE NOTES APPLY TO ALL PROJECT DRAWINGS IN THE SET UNLESS NOTED OTHERWISE AND SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATION.
2. ALL LEVELS ARE IN METRES TO AUSTRALIAN HEIGHT DATUM (AHD).
3. ALL COORDINATES ARE IN METRES TO MAP GRID AUSTRALIAN (MGA-55).
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
5. DIMENSIONS AND LOCATIONS OF EXISTING STRUCTURES SHALL BE CONFIRMED ON SITE BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS.
6. LOCATION AND DEPTH OF ALL SERVICES TO BE VERIFIED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.
7. DIMENSIONS SHALL NOT BE SCALED OFF DRAWINGS.

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE: 1:200,000
JOB No. 113272-02
DATE JUL 2018
DESIGN JL
DRAWN JS
CHECKED RH
APPROVED RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

SITE LOCALITY PLAN
AND DRAWING LIST

101

SHEET SIZE A3 Rev. D

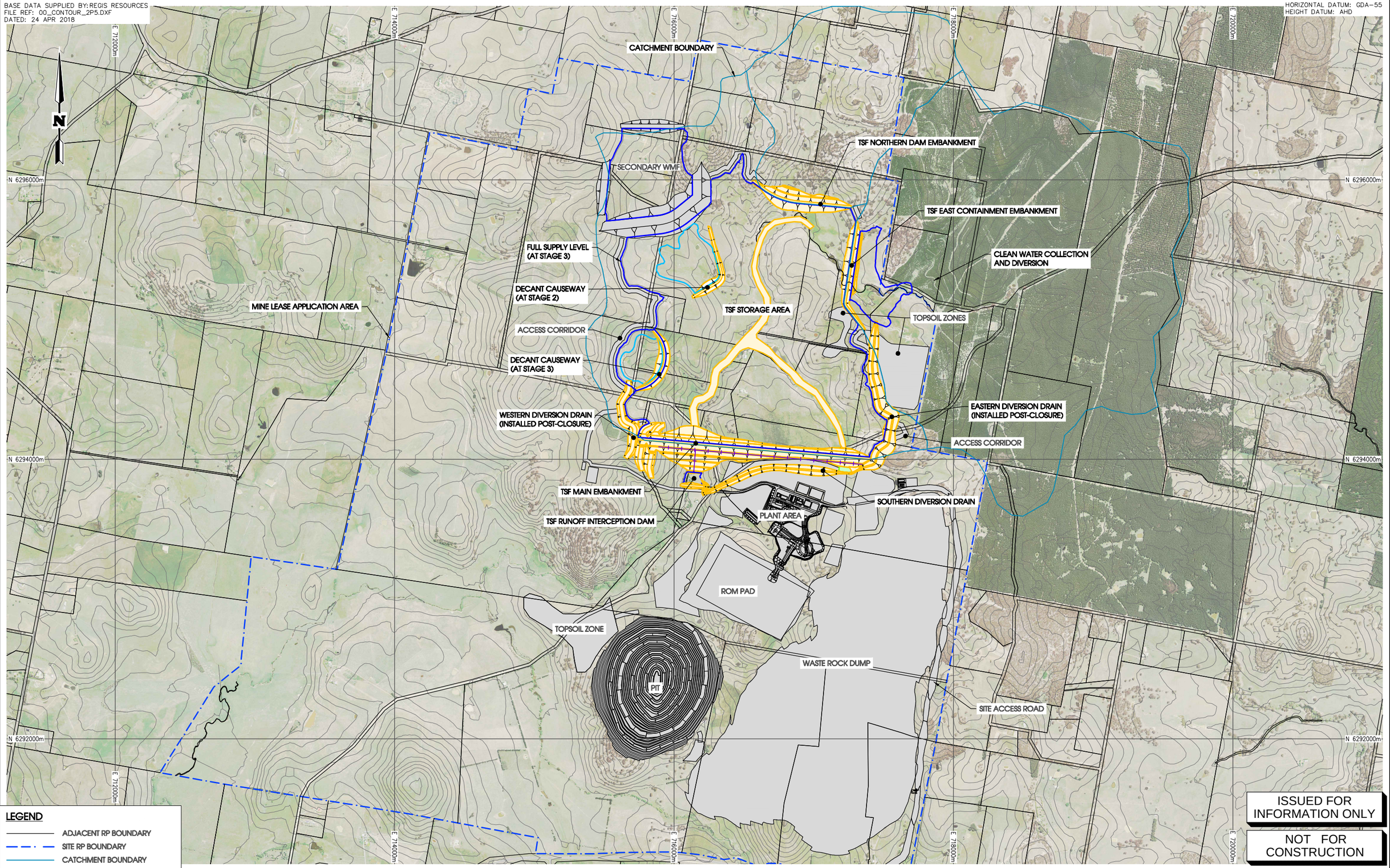
Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 1 OF 17

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-101-101-D.dwg

BASE DATA SUPPLIED BY: REGIS RESOURCES
FILE REF: 00_CONTOUR_2P5.DXF
DATED: 24 APR 2018

HORIZONTAL DATUM: GDA-55
HEIGHT DATUM: AHD



LEGEND

- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:25,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

PROJECT LAYOUT

102

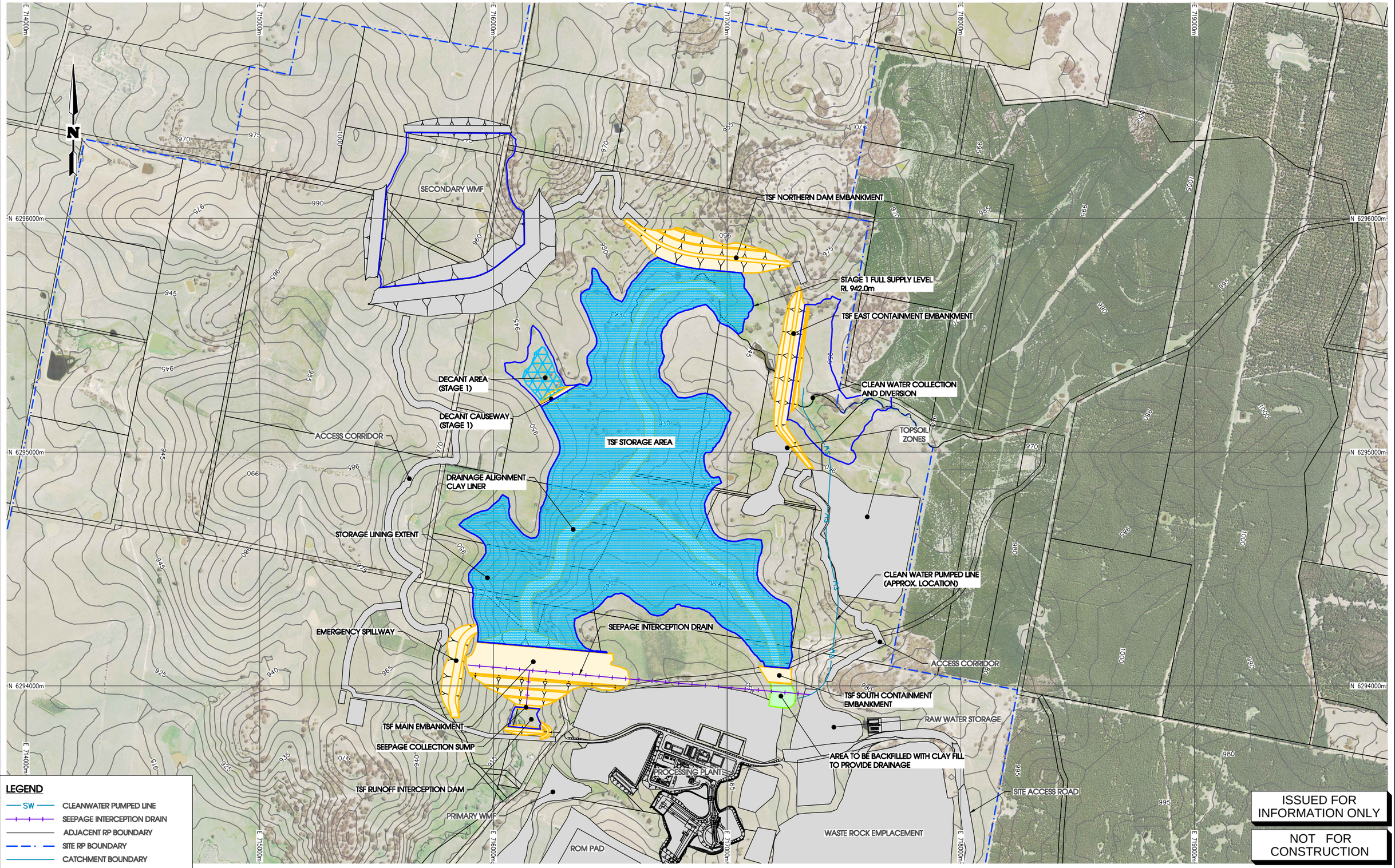
SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 2 OF 17

Plotted By: AmeliaL
Plotted Time: 1605:21
Plotted Date: 13/05/19

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-102-102-D.dwg



LEGEND

- SW — CLEANWATER PUMPED LINE
- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

103

TSF
STAGE 1 LAYOUT

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 3 OF 17

Plotted By:
Plotted Time:
Plotted Date:

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-103-103-D.dwg

SECONDARY WMF

TSF NORTHERN DAM EMBANKMENT

STAGE 2 FULL SUPPLY LEVEL RL 951.0m

TSF EAST CONTAINMENT EMBANKMENT

CLEAN WATER COLLECTION AND DIVERSION

DECANT AREA (STAGE 2)

DECANT CAUSEWAY (STAGE 2)

TSF STORAGE AREA

ACCESS CORRIDOR

STORAGE LINING EXTENT

TOPSOIL ZONES

CLEAN WATER PUMPED LINE (APPROX. LOCATION)

SEEPAGE INTERCEPTION DRAIN

EMERGENCY SPILLWAY

ACCESS CORRIDOR

TSF MAIN EMBANKMENT

RAW WATER STORAGE

SEEPAGE COLLECTION SUMP

AREA TO BE BACKFILLED WITH CLAY FILL TO PROVIDE DRAINAGE

PROCESSING PLANT

TSF RUNOFF INTERCEPTION DAM

SITE ACCESS ROAD

PRIMARY WMF

WASTE ROCK EMPLACEMENT

ROM PAD

E 714000m E 715000m E 716000m E 717000m E 718000m E 719000m

N 6296000m N 6295000m N 6294000m

LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 1

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

Plotted By: Amellot
Plotted Time: 16:09:18
Plotted Date: 13/05/19

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/06/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

104

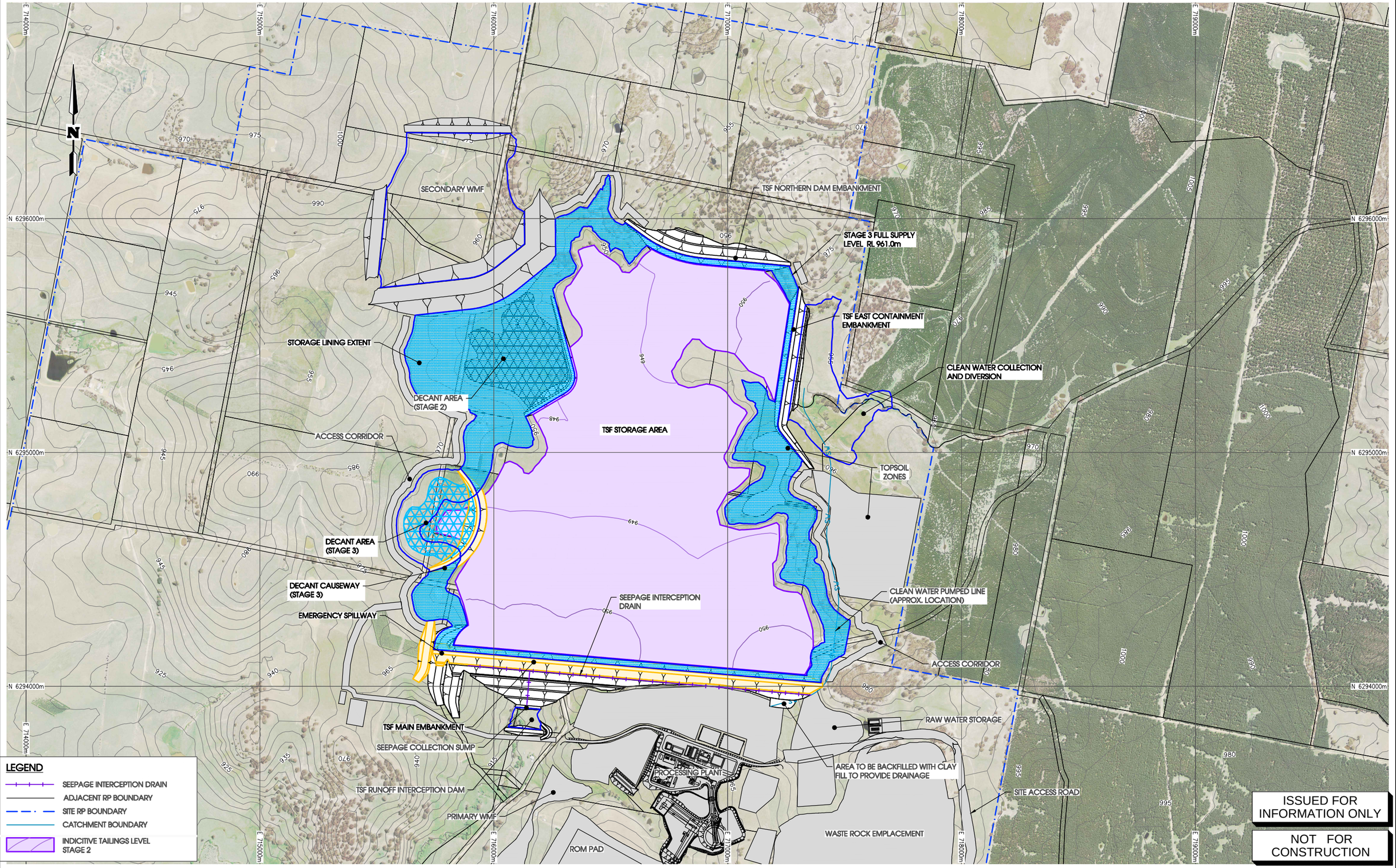
TSF
STAGE 2 LAYOUT

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 4 OF 17

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-104-104-D.dwg



LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 2

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

105

TSF
STAGE 3 LAYOUT

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 5 OF 17

Plotted By: MarkC
Plotted Time: 14:01:58
Plotted Date: 13/05/19

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-105-105-D.dwg

EMBANKMENT TO BE REMOVED

EMBANKMENT TO BE REMOVED

SECONARY WMF TO BE FILLED AND PROFILED TO PROVIDE DRAINAGE

SECONDARY WMF

TSF NORTHERN DAM EMBANKMENT

STAGE 3 FULL SUPPLY LEVEL RL 961.0m

TSF EAST CONTAINMENT EMBANKMENT

CLEAN WATER COLLECTION AND DIVERSION

CLEAN WATER PUMPED LINE (APPROX. LOCATION) TO BE REMOVED

TOPSOIL ZONES

ACCESS CORRIDOR

TSF STORAGE AREA

DECANT AREA (STAGE 3)

EASTERN DIVERSION DRAIN (INSTALLED POST-CLOSURE)

SEEPAGE INTERCEPTION DRAIN

WESTERN DIVERSION DRAIN (INSTALLED POST-CLOSURE)

ACCESS CORRIDOR

TSF MAIN EMBANKMENT

RAW WATER STORAGE

SEEPAGE COLLECTION SUMP

AREA TO BE BACKFILLED WITH CLAY FILL TO PROVIDE DRAINAGE

PROCESSING PLANT

TSF RUNOFF INTERCEPTION DAM

SOUTHERN DIVERSION DRAIN

SITE ACCESS ROAD

PRIMARY WMF

WASTE ROCK EMPLACEMENT

ROM PAD

LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 3

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

106

TSF
LIFE OF MINE LAYOUT

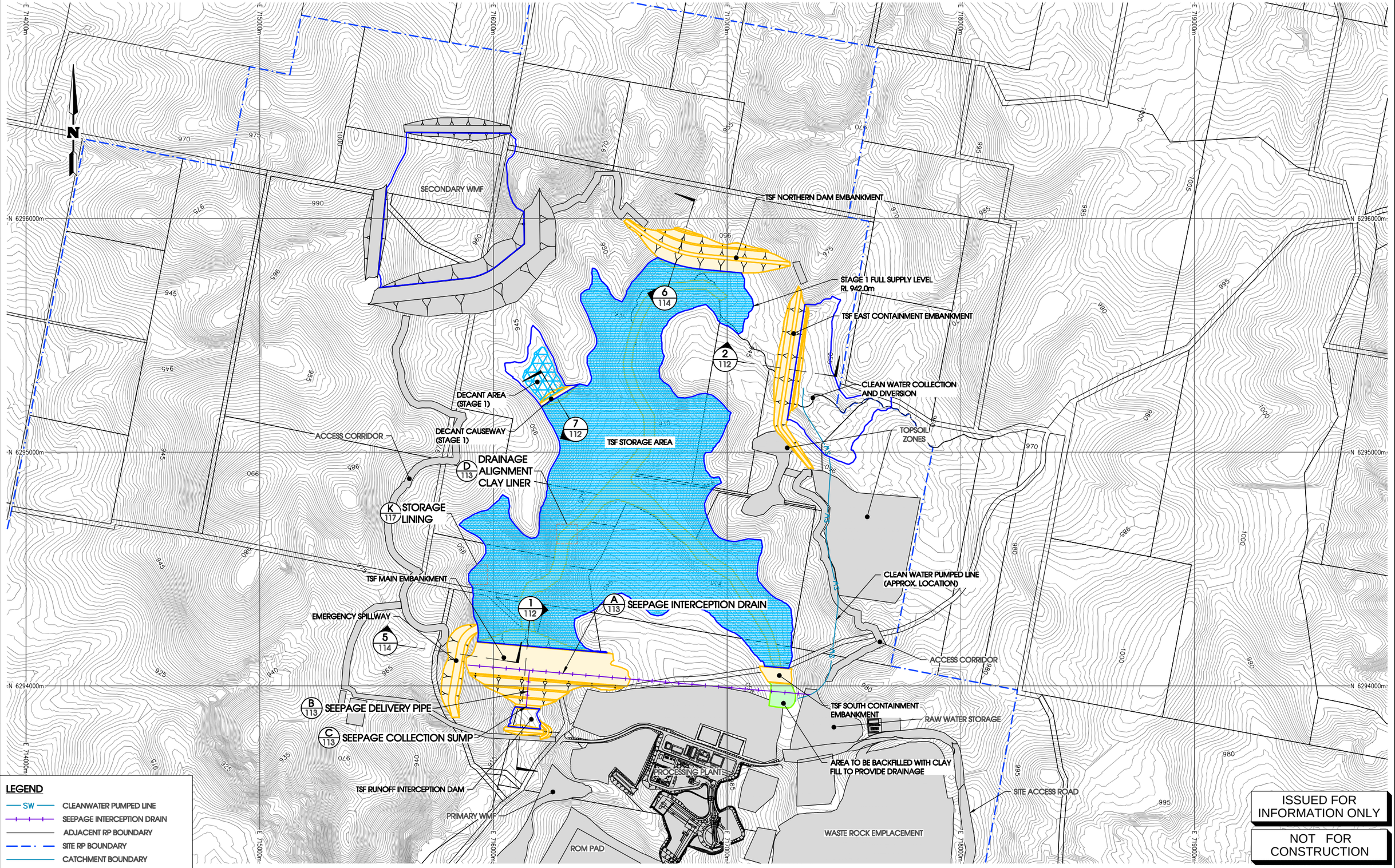
SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 6 OF 17

Plotted By: SteveT
Plotted Time: 14:53:36
Plotted Date: 27/07/18

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-106-106-D.dwg



LEGEND

- SW — CLEANWATER PUMPED LINE
- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/06/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

107

TSF
STAGE 1 LAYOUT
DETAIL

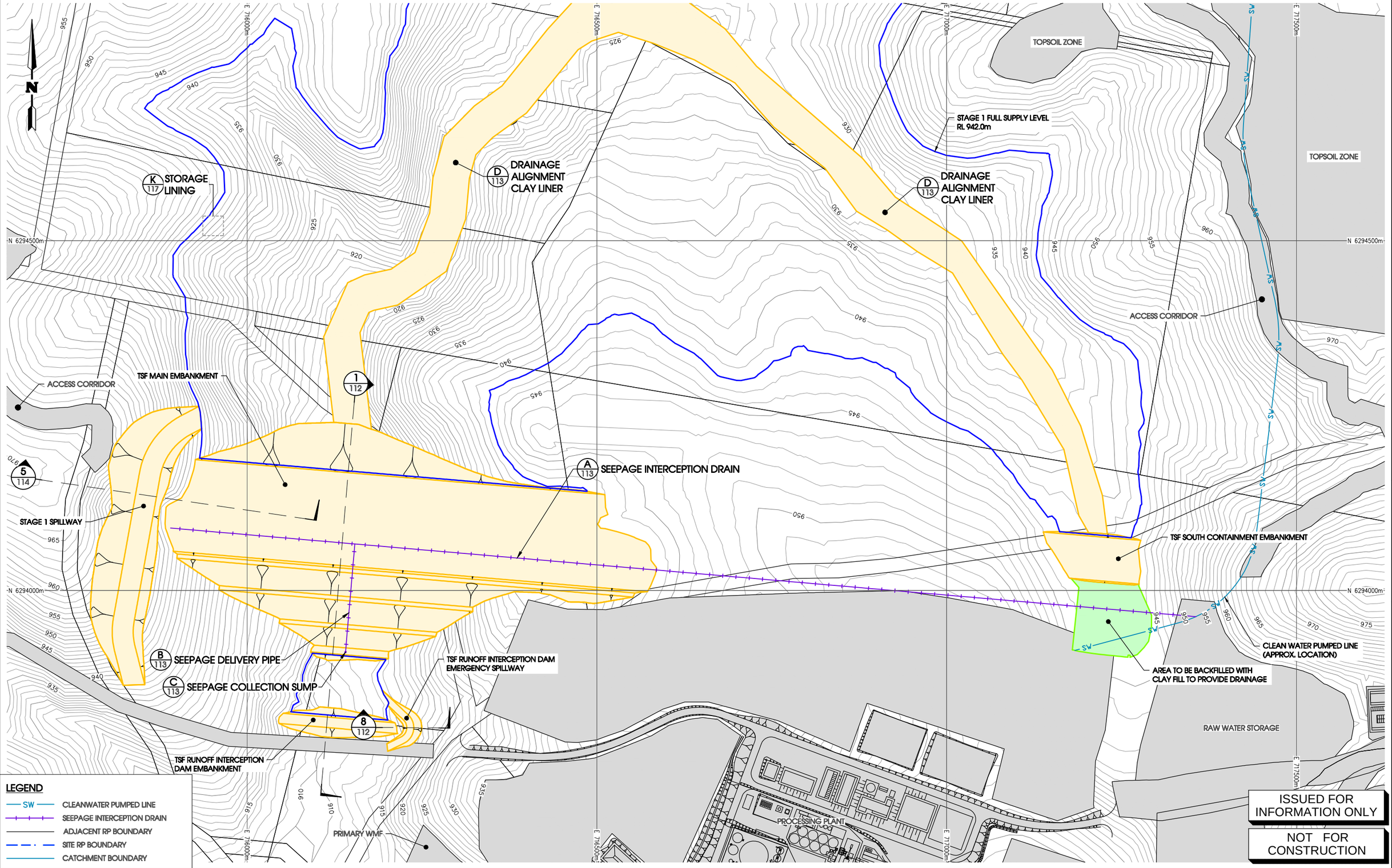
SHEET SIZE	A3	Rev.	D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 7 OF 17

Plotted By:
Plotted Time:
Plotted Date:

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-107-107-D.dwg



No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:5,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
STAGE 1 MAIN
EMBANKMENT CONSTRUCTION

108

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 8 OF 17

Plotted By: SteveT
Plotted Time: 14:51:44
Plotted Date: 27/07/18

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-108-108-D.dwg

SECONDARY WMF

TSF NORTHERN DAM EMBANKMENT

STAGE 2 FULL SUPPLY LEVEL RL 951.0m

TSF EAST CONTAINMENT EMBANKMENT

CLEAN WATER COLLECTION AND DIVERSION

DECANT AREA (STAGE 2)

DECANT CAUSEWAY (STAGE 2)

TSF STORAGE AREA

ACCESS CORRIDOR

K 117 STORAGE LINING

TOPSOIL ZONES

TSF MAIN EMBANKMENT

EMERGENCY SPILLWAY

A 113 SEEPAGE INTERCEPTION DRAIN

CLEAN WATER PUMPED LINE (APPROX. LOCATION)

ACCESS CORRIDOR

B 113 SEEPAGE DELIVERY PIPE

C 113 SEEPAGE COLLECTION SUMP

RAW WATER STORAGE

AREA TO BE BACKFILLED WITH CLAY FILL TO PROVIDE DRAINAGE

PROCESSING PLANT

TSF RUNOFF INTERCEPTION DAM

SITE ACCESS ROAD

PRIMARY WMF

WASTE ROCK EMPLACEMENT

ROM PAD

6/114 2/112 7/112 1/112 3/114 5/114

LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 1

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

109

TSF
STAGE 2 LAYOUT
DETAIL

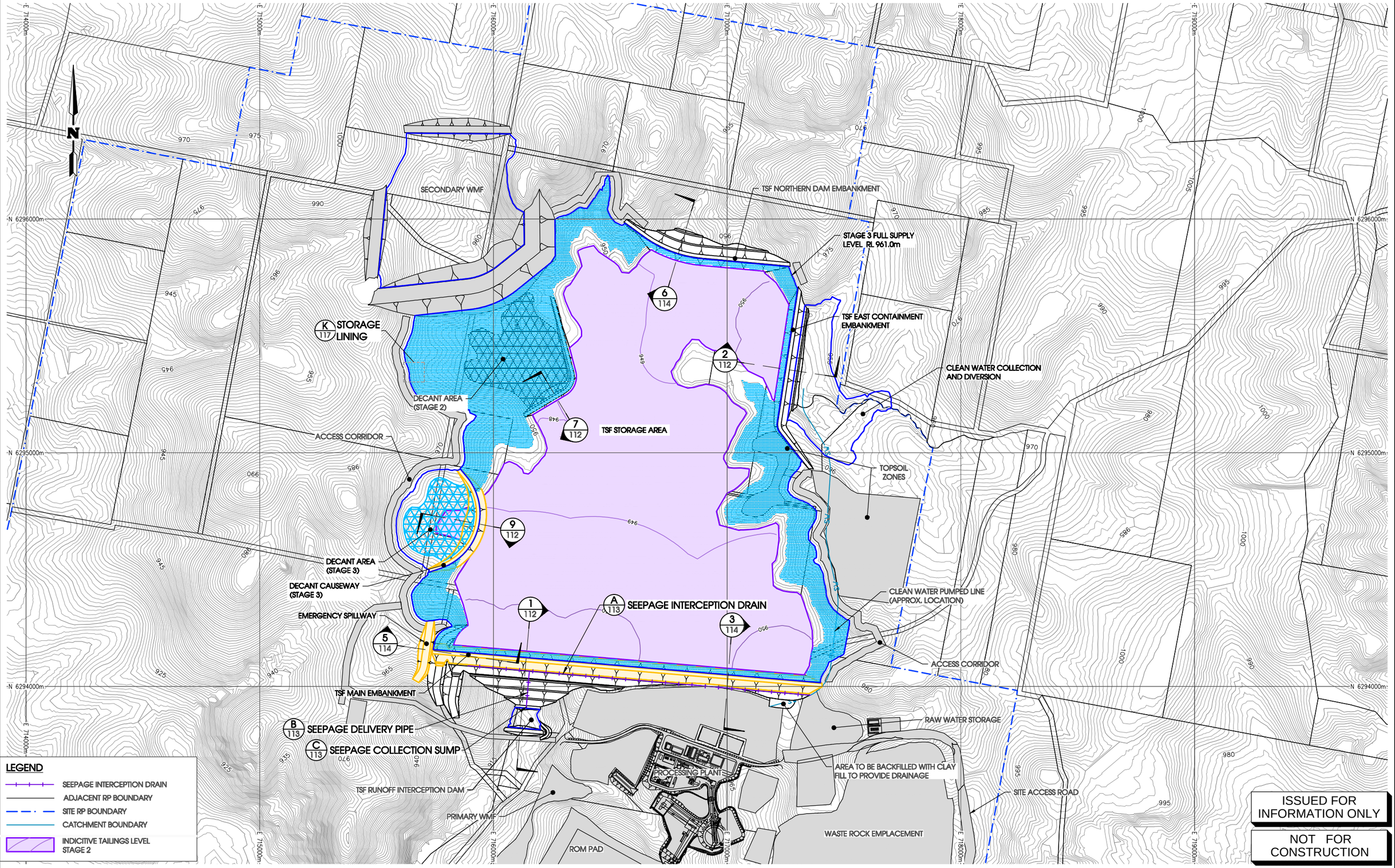
SHEET SIZE	A3	Rev.	D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 9 OF 17

Plotted By: Amelial.
Plotted Time: 16:09:18
Plotted Date: 13/05/19

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-109-109-D.dwg



ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

110

TSF
STAGE 3 LAYOUT
DETAIL

SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 10 OF 17

Plotted By: MarkC
Plotted Time: 14:01:58
Plotted Date: 13/05/19

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-110-110-D.dwg

EMBANKMENT TO BE REMOVED

EMBANKMENT TO BE REMOVED

SECONARY WMF TO BE FILLED AND PROFILED TO PROVIDE DRAINAGE

SECONDARY WMF

TSF NORTHERN DAM EMBANKMENT

STAGE 3 FULL SUPPLY LEVEL RL 961.0m

TSF EAST CONTAINMENT EMBANKMENT

CLEAN WATER COLLECTION AND DIVERSION

CLEAN WATER PUMPED LINE (APPROX. LOCATION) TO BE REMOVED

TOPSOIL ZONES

ACCESS CORRIDOR

TSF STORAGE AREA

DECANT AREA TO BE BACKFILLED

EASTERN DIVERSION DRAIN (INSTALLED POST-CLOSURE)

WESTERN DIVERSION DRAIN (INSTALLED POST-CLOSURE)

A 113 SEEPAGE INTERCEPTION DRAIN

ACCESS CORRIDOR

TSF MAIN EMBANKMENT

B 113 SEEPAGE DELIVERY PIPE

C 113 SEEPAGE COLLECTION SUMP

RAW WATER STORAGE

AREA TO BE BACKFILLED WITH CLAY FILL TO PROVIDE DRAINAGE

PROCESSING PLANT

SOUTHERN DIVERSION DRAIN

SITE ACCESS ROAD

TSF RUNOFF INTERCEPTION DAM

PRIMARY WMF

WASTE ROCK EMPLACEMENT

ROM PAD

LEGEND

- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- INDICITIVE TAILINGS LEVEL STAGE 3

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

Plotted By: SteveT
Plotted Time: 14:53:36
Plotted Date: 27/07/18

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE: 1:15,000
JOB No. 113272-02
DATE JUL 2018
DESIGN JL
DRAWN JS
CHECKED RH
APPROVED RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
STAGE 3
FINAL LANDFORM

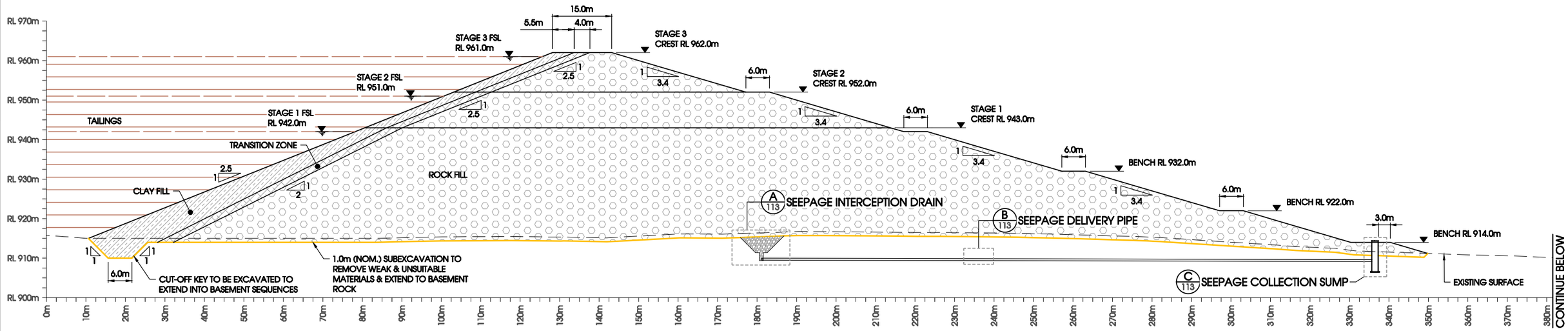
111

SHEET SIZE A3 Rev. D

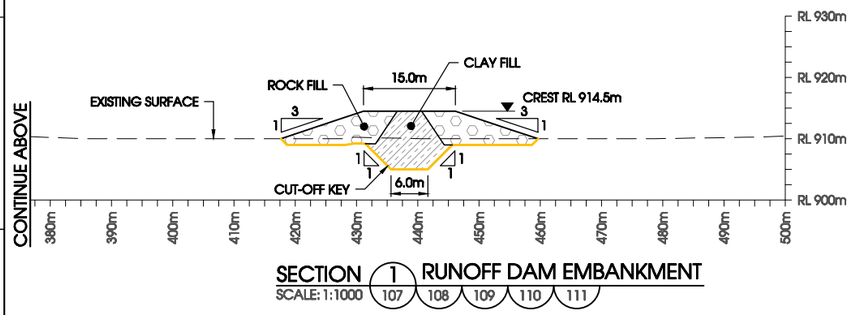
Conditions of Use:
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 11 OF 17

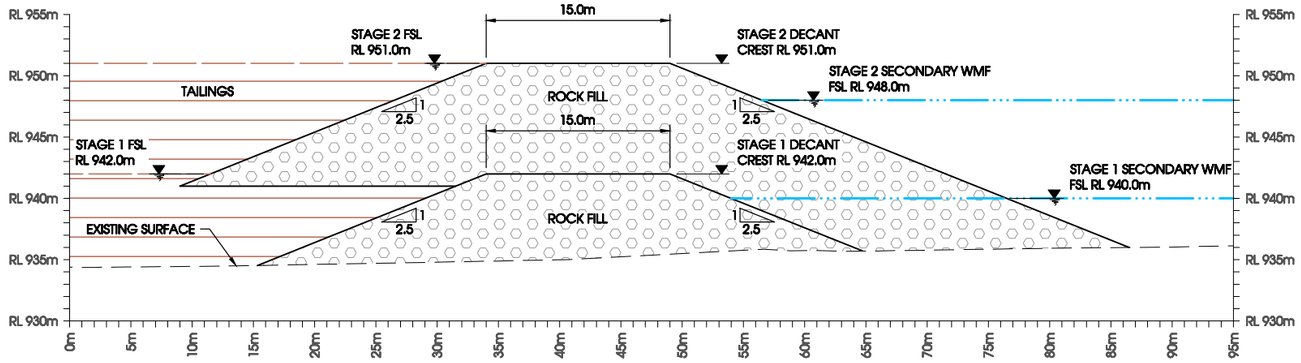
M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-111-111-D.dwg



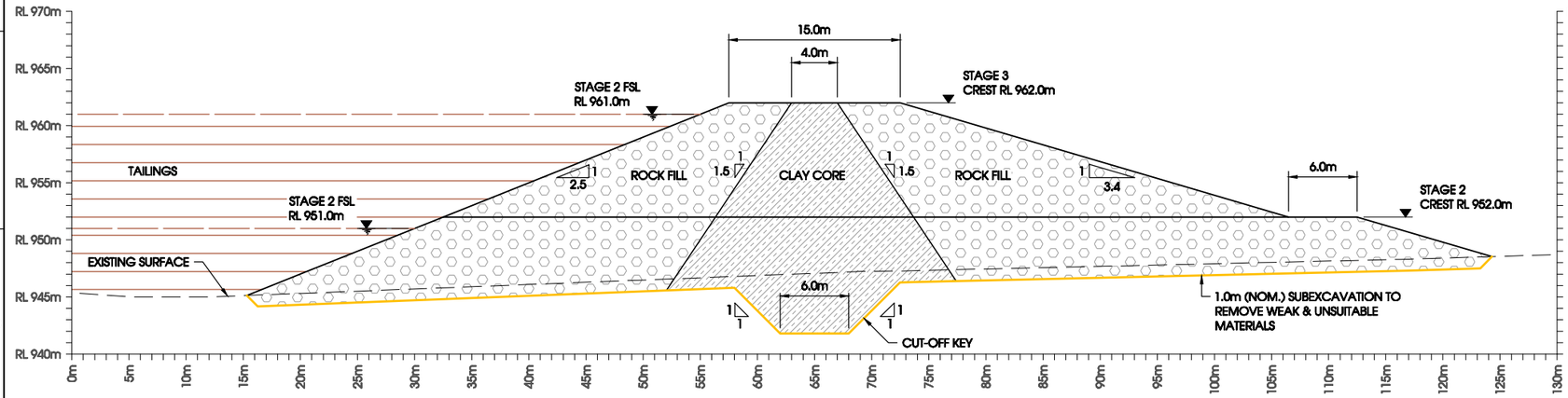
SECTION 1 MAIN EMBANKMENT
SCALE: 1:1000 (107) (108) (109) (110) (111)



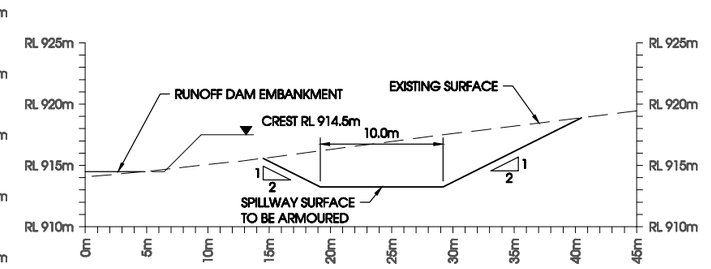
SECTION 1 RUNOFF DAM EMBANKMENT
SCALE: 1:1000 (107) (108) (109) (110) (111)



SECTION 7 STAGE 1 AND 2 DECANT CAUSEWAY
SCALE: 1:500 (107) (109) (110)



SECTION 2 EASTERN CONTAINMENT EMBANKMENT
SCALE: 1:500 (107) (109) (110) (111)



SECTION 8 RUNOFF DAM SPILLWAY
SCALE: 1:500 (108)

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

5 0 5 10 15 20 25
SCALE IN METRES 1:500 @ A3

10 0 10 20 30 40 50
SCALE IN METRES 1:1000 @ A3

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	AH		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE: AS SHOWN
JOB No. 113272-02
DATE JUL 2018
DESIGN JL
DRAWN JS
CHECKED RH
APPROVED RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
SECTIONS

112

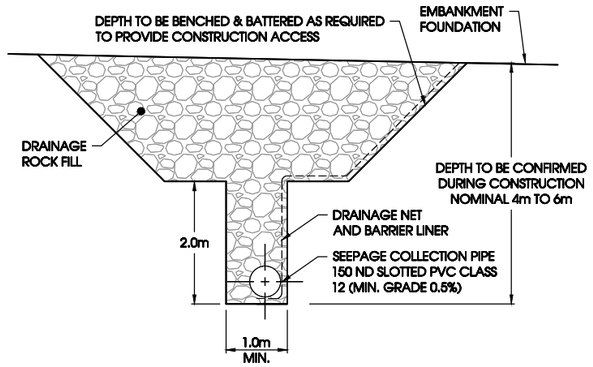
SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

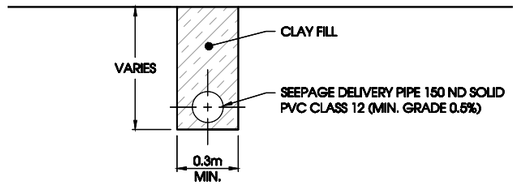
SHEET 12 OF 17

Plotted By: SteveT
Plotted Time: 15:57:34
Plotted Date: 06/08/18

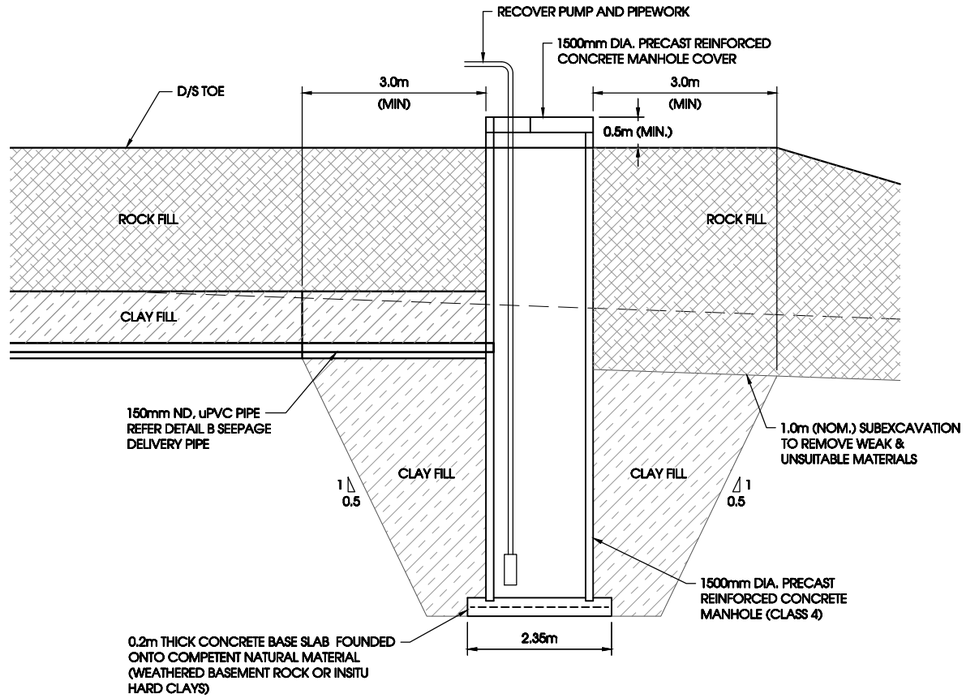
M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-112-112-D.dwg



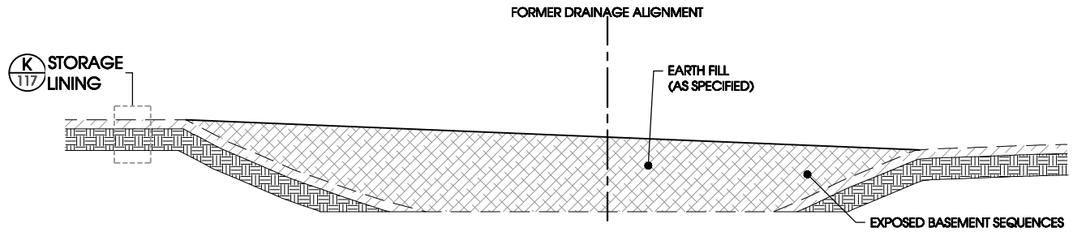
DETAIL A - SEEPAGE INTERCEPTION DRAIN
SCALE: 1:100



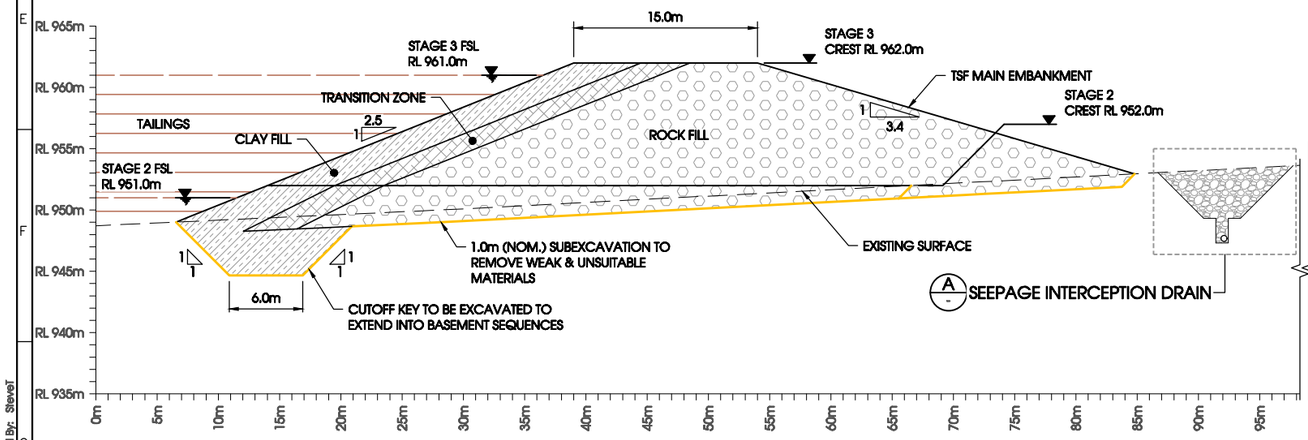
DETAIL B - SEEPAGE DELIVERY PIPE
SCALE: 1:100

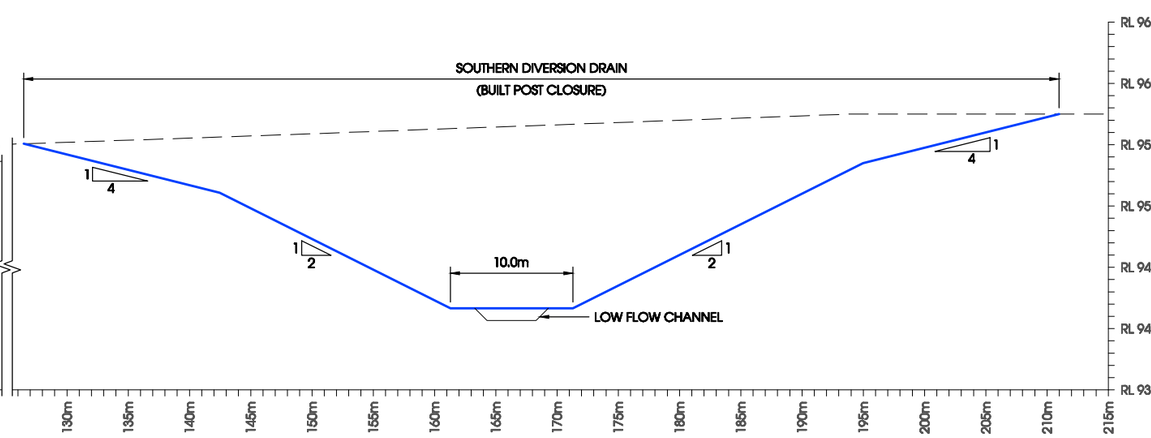


DETAIL C - SEEPAGE COLLECTION SUMP
SCALE: NTS



DETAIL D - DRAINAGE ALIGNMENT CLAY LINER
SCALE: 1:200 108





SECTION 3 - MAIN EMBANKMENT
SCALE: 1:500 108 109 110 111

2 0 2 4 6 8 10
SCALE IN METRES 1:200 @ A3

1 0 1 2 3 4 5
SCALE IN METRES 1:100 @ A3

5 0 5 10 15 20 25
SCALE IN METRES 1:500 @ A3

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	AH		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	AS SHOWN
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
SECTIONS & SEEPAGE DETIALS

113

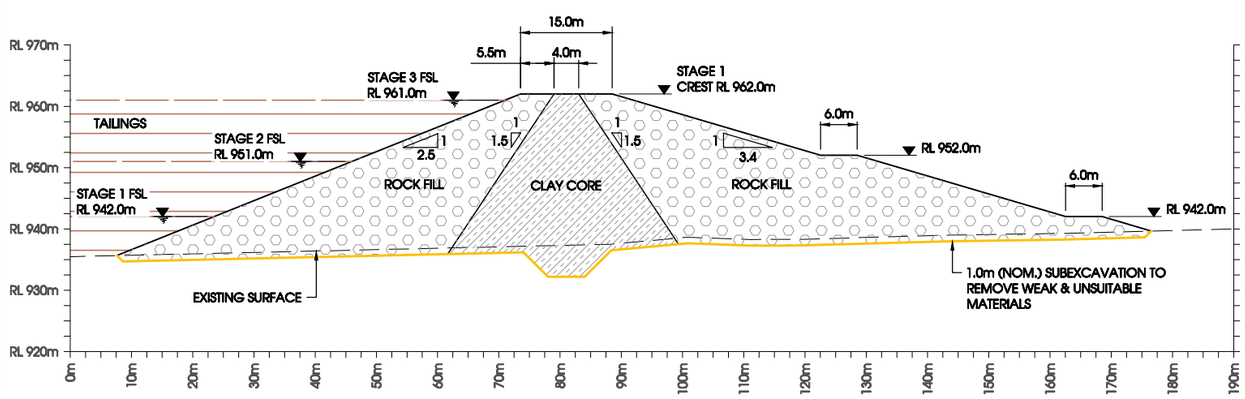
SHEET SIZE A3 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 13 OF 17

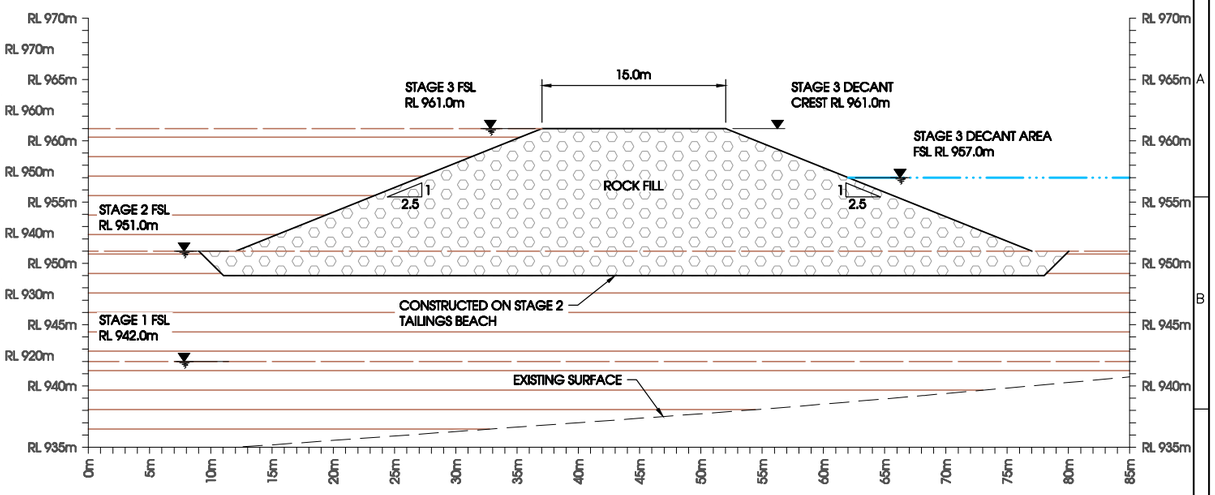
Plotted By: SteveT
Plotted Time: 15:57:34
Plotted Date: 06/08/18

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-113-113-D.dwg



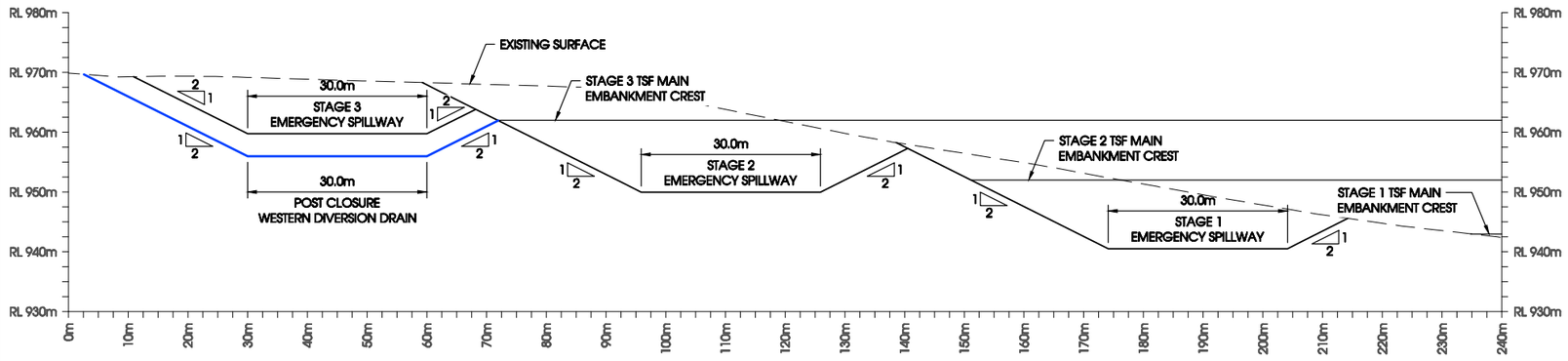
SECTION 6 NORTHERN CONTAINMENT EMBANKMENT

SCALE: 1:1000 (107) (109) (110) (111)



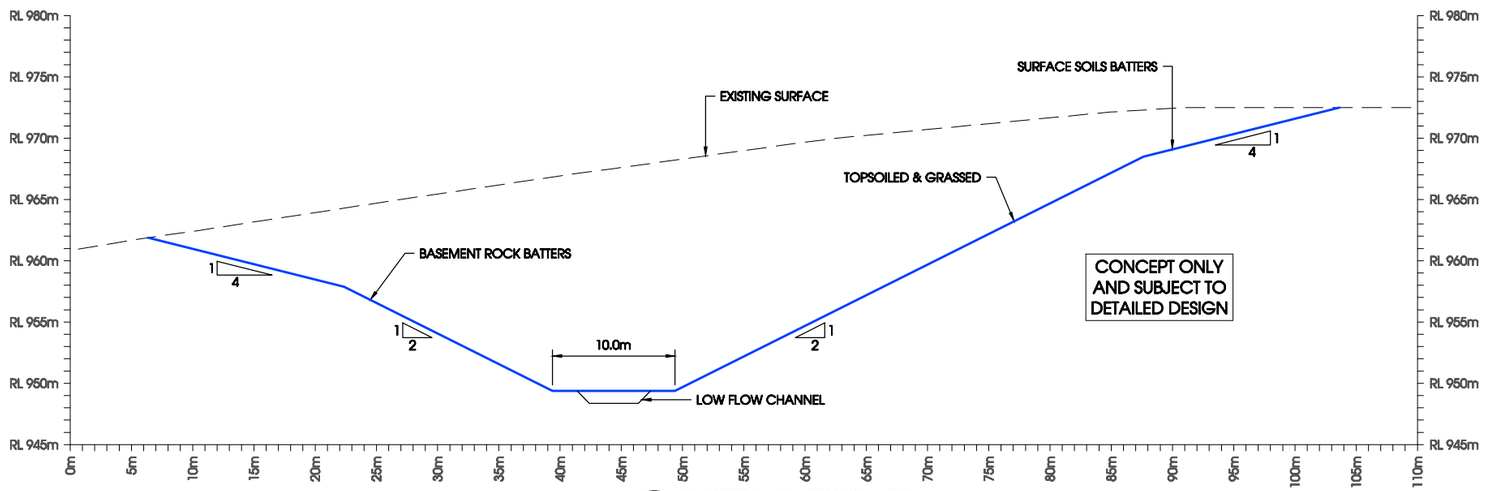
SECTION 9 STAGE 3 DECANT CAUSEWAY

SCALE: 1:500 (110) (111)



SECTION 5 STAGE 1, 2 & 3 TSF EMERGENCY SPILLWAYS AND WESTERN DIVERSION DRAIN

SCALE: 1:1000 (107) (109) (110) (111)



SECTION 4 EASTERN DIVERSION DRAIN

SCALE: 1:500 (110) (111)

5 0 5 10 15 20 25
SCALE IN METRES 1:500 @ A3

10 0 10 20 30 40 50
SCALE IN METRES 1:1000 @ A3

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	AH		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE: 1:500
JOB No. 113272-02
DATE JUL 2018
DESIGN JL
DRAWN JS
CHECKED RH
APPROVED RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
SECTIONS & DETAILS

114

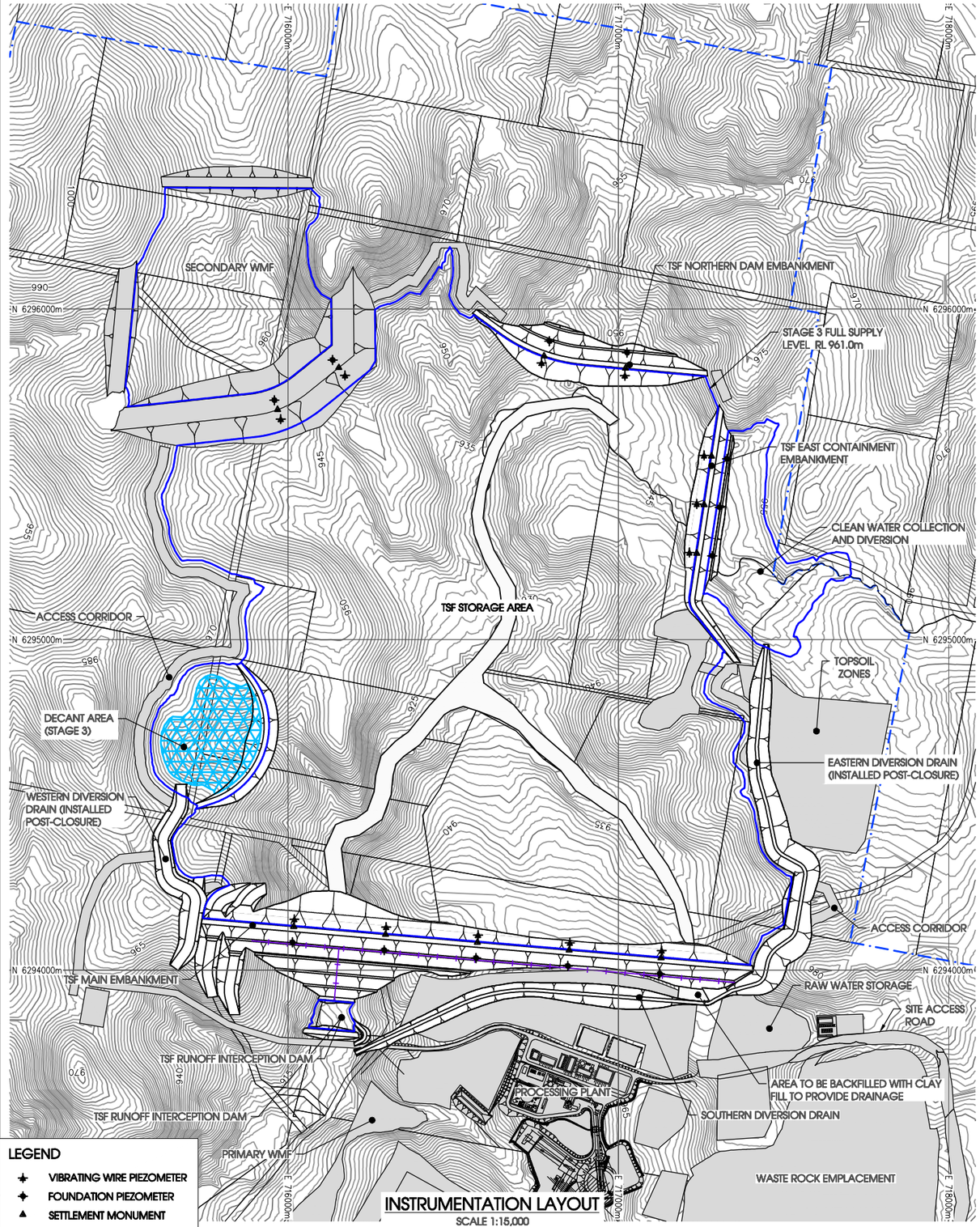
SHEET SIZE A3 Rev. D

Conditions of Use:
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 14 OF 17

Plotted By:
Plotted Time:
Plotted Date:

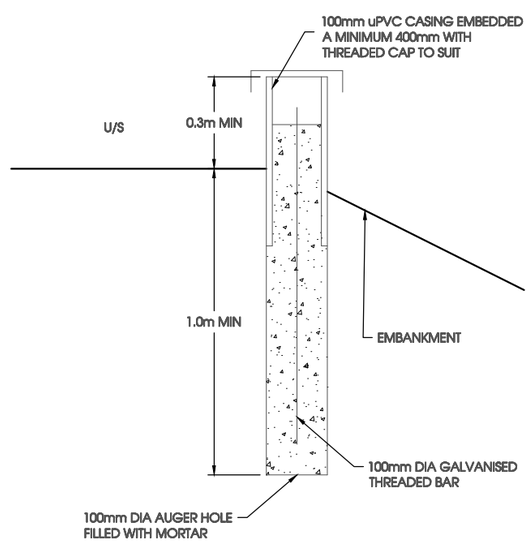
M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-114-114-D.dwg



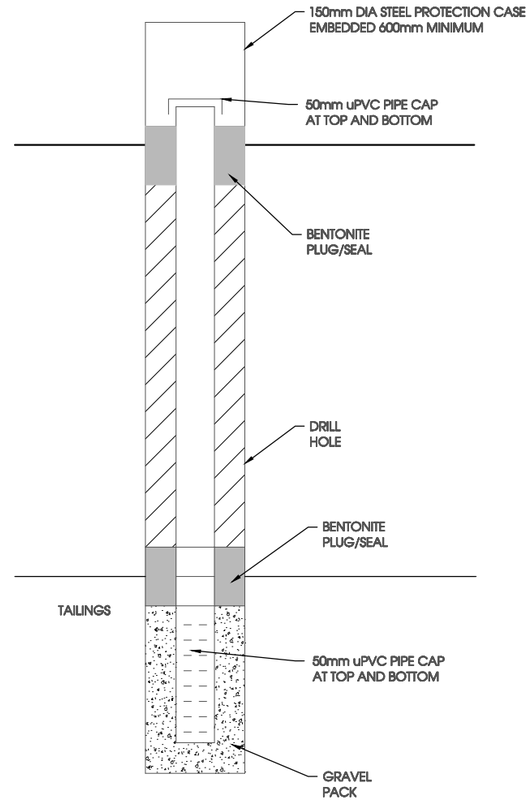
LEGEND

- VIBRATING WIRE PIEZOMETER
- FOUNDATION PIEZOMETER
- SETTLEMENT MONUMENT

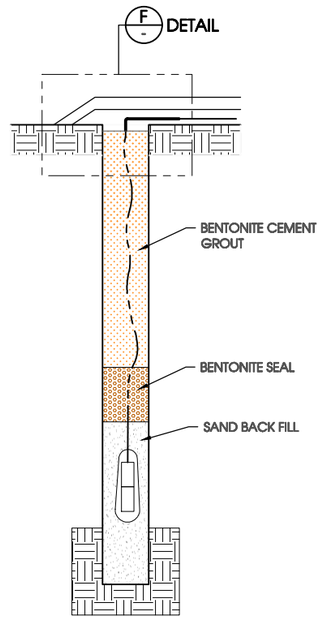
INSTRUMENTATION LAYOUT
SCALE 1:15,000



SETTLEMENT MONUMENT
NTS



PIEZOMETER COMPLETED WITH FOUNDATIONS
NTS



DETAIL E VIBRATING WIRE PIEZOMETER
SCALE: 1:100

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	12/04/19	AH		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	AS SHOWN
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
INSTRUMENTATION LAYOUT AND DETAILS

115

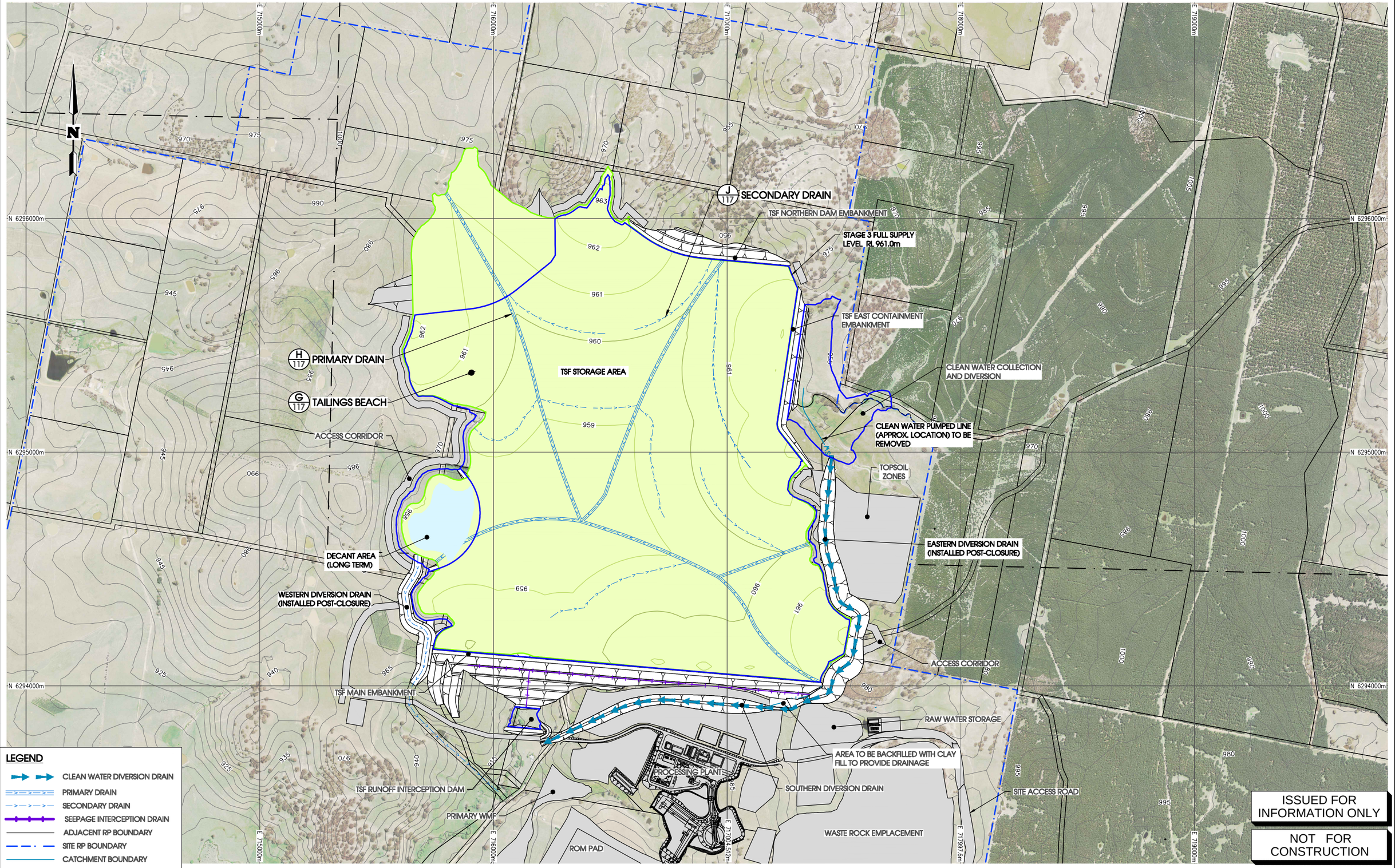
SHEET SIZE A3 Rev. D

Conditions of Use:
This drawing/document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 15 OF 17

Plotted By: SteveT
Plotted Time: 15:57:34
Plotted Date: 05/09/18

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-115-115-D.dwg



LEGEND

- CLEAN WATER DIVERSION DRAIN
- PRIMARY DRAIN
- SECONDARY DRAIN
- SEEPAGE INTERCEPTION DRAIN
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
E	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
D	ISSUED FOR REVIEW	13/05/19	ALG		
C	ISSUED FOR REVIEW	13/05/19	JS		
B	ISSUED FOR REVIEW	08/02/19	JS		
A	ISSUED FOR REVIEW	21/09/18	JS		

SCALE:	1:15,000
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams

A.B.N. 64 005 931 288
www.atcwilliams.com.au

Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

116

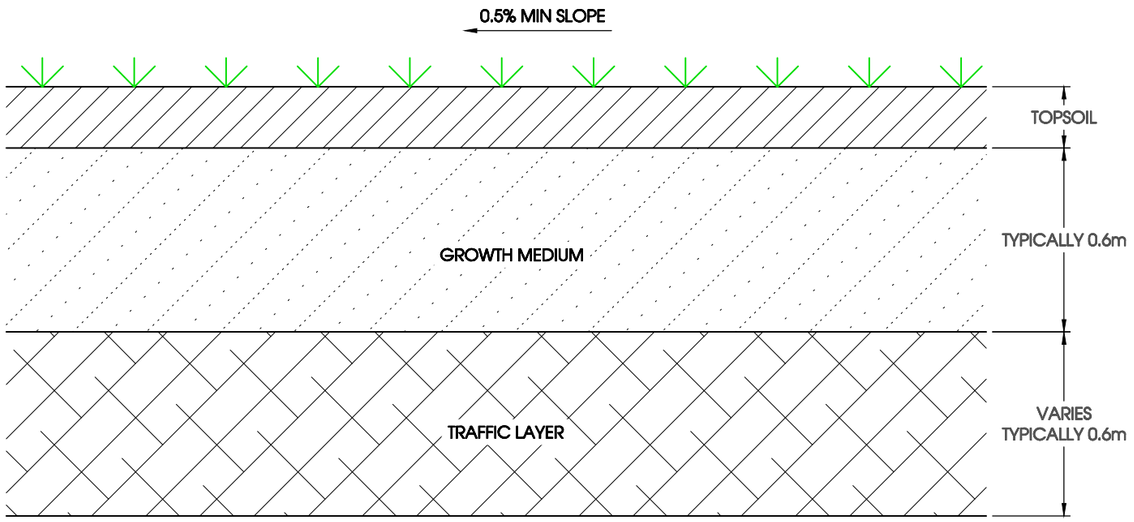
TSF
POST CLOSURE LAYOUT

SHEET SIZE A3 Rev. E

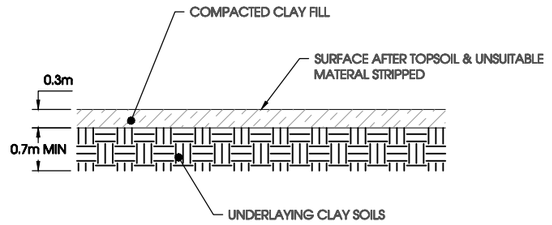
Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 16 OF 17

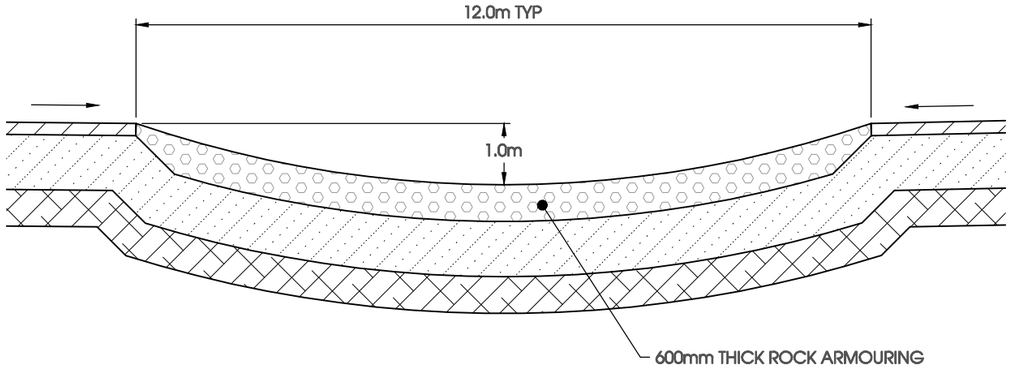
M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-116-116-E.dwg



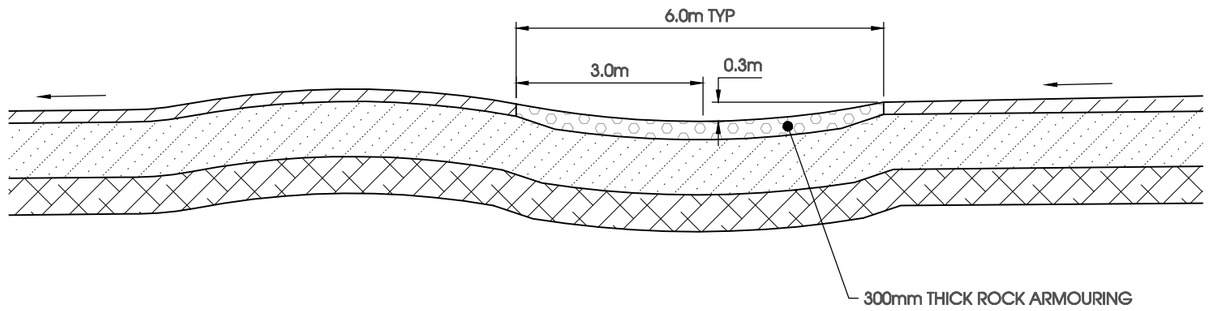
DETAIL G SCALE: 1:20 116 TAILINGS BEACH CAPPING



DETAIL K SCALE: 1:100 - STORAGE FLOOR LINER (INSITU CONDITIONING)



DETAIL H SCALE: 1:100 116 PRIMARY DRAIN



DETAIL J SCALE: 1:100 116 SECONDARY SWALE DRAIN

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
B	03/07/19	AH	RH	RH	
A	ISSUED FOR REVIEW	13/05/19	ALG		

SCALE:	AS SHOWN
JOB No.	113272-02
DATE	JUL 2018
DESIGN	JL
DRAWN	JS
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
POST CLOSURE DETAIL

117

SHEET SIZE A3 Rev. B

Conditions of Use:
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

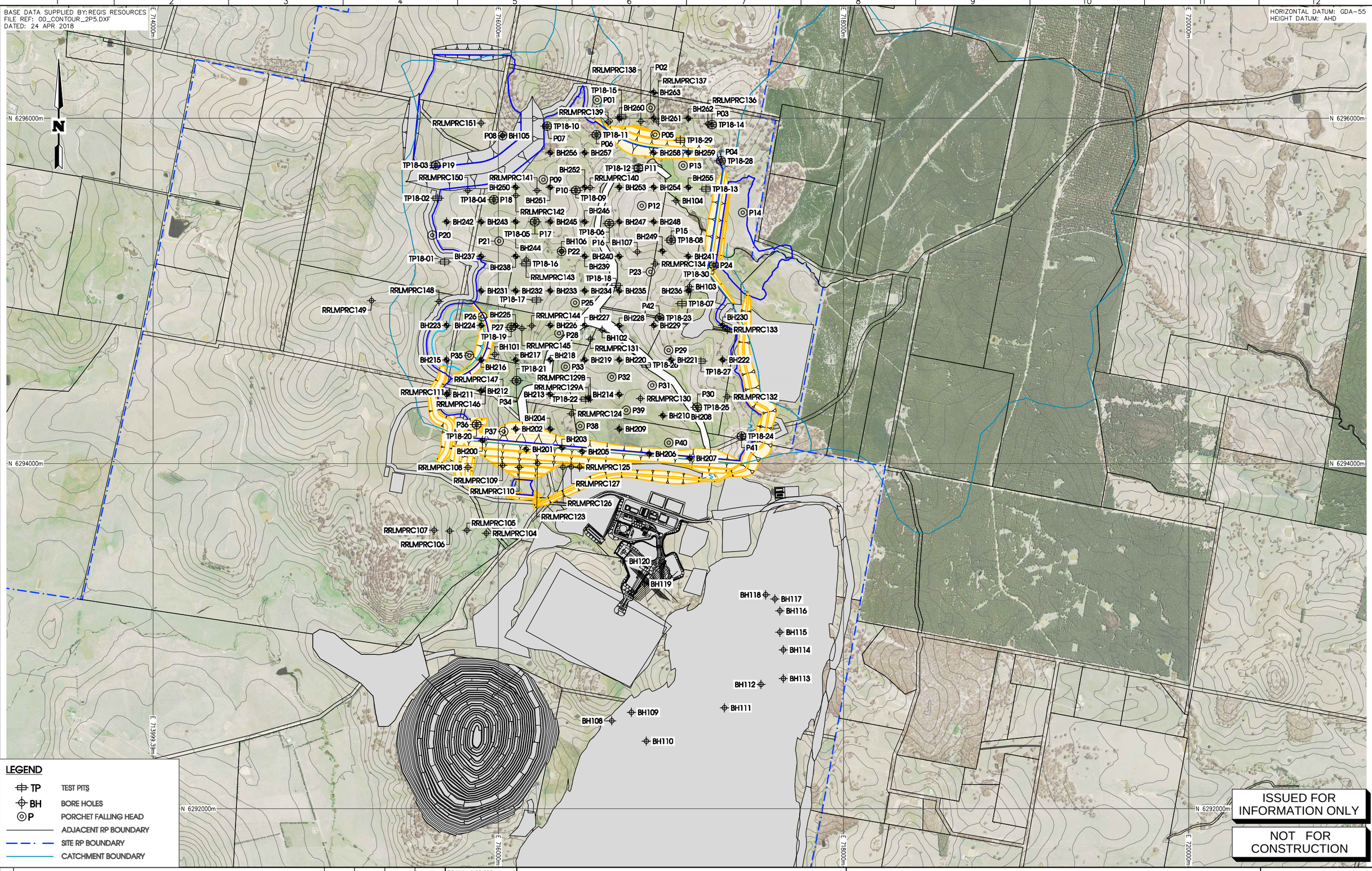
SHEET 17 OF 17

Plotted Date: 01/05/19 Plotted Time: 11:22:30 Plotted By: Amelia L

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-117-117-B.dwg

BASE DATA SUPPLIED BY: REGIS RESOURCES
FILE REF: 00_CONTOUR_2P5.DXF
DATED: 24 APR 2018

HORIZONTAL DATUM: GDA-55
HEIGHT DATUM: AHD



LEGEND

- TP — TEST PITS
- BH — BORE HOLES
- P — PORCHET FALLING HEAD
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	RF		
A	ISSUED FOR REVIEW	16/01/19	RF		

SCALE:	1:20,000
JOB No.	113272-02
DATE	JAN. 2019
DESIGN	RF
DRAWN	RF
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

GEOTECHNICAL
TSF INVESTIGATIONS

201

SHEET SIZE A5 Rev. D

Conditions of Use
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 1 OF 2

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-201-201-D.dwg

BASE DATA SUPPLIED BY: REGIS RESOURCES
FILE REF: 00_CONTOUR_2P5.DXF
DATED: 24 APR 2018

HORIZONTAL DATUM: GDA-55
HEIGHT DATUM: AHD

E 713500m
E 716000m
E 718500m
E 721000m
N 6295000m
N 6292500m

961
960
959
958
960
959
958
960
959
960

LEGEND

- ALLUVIUM
- BASALT
- BYNG VOLCANIICS
- ANSON VOLCANICS (METASEDIMENTS)
- ANSON FORMATION
- BLAYNEY VOLCANICS
- TP TEST PITS
- BH BORE HOLES
- P PORCHET FALLING HEAD TEST
- ADJACENT RP BOUNDARY
- SITE RP BOUNDARY
- CATCHMENT BOUNDARY
- STRUCTURES

ISSUED FOR INFORMATION ONLY

NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D
D	ISSUED FOR REVIEW	03/07/19	AH	RH	RH
C	ISSUED FOR REVIEW	13/05/19	MC		
B	ISSUED FOR REVIEW	08/02/19	RF		
A	ISSUED FOR REVIEW	16/01/19	RF		

SCALE:	1:25,000
JOB No.	113272-02
DATE	JAN. 2019
DESIGN	RF
DRAWN	RF
CHECKED	RH
APPROVED	RH

ATC Williams
A.B.N. 64 005 931 288
www.atcwilliams.com.au
Melb T +61 3 8587 0900 melbourne@atcwilliams.com.au
Bris T +61 7 3352 7222 brisbane@atcwilliams.com.au
Perth T +61 8 9213 1600 perth@atcwilliams.com.au

REGIS RESOURCES
MCPHILLAMYS GOLD PROJECT

TSF
SURFACE GEOLOGY

202

SHEET SIZE A6 Rev. D

Conditions of Use:
This drawing document may only be used with permission from ATC Williams Pty Ltd for the purpose for which it was prepared and must NOT be used by any other person or for any other purpose.

SHEET 2 OF 2

M:\Synergy\Projects\113\113272 McPhillamys Gold Project\02 Tailings and Water DFS\Drawings and Figures\113272-02-202-202-D.dwg

APPENDIX B1

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP01

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-2-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Sand, low plasticity, orange/brown, fine with roots, dry.		0.5									
Clayey GRAVEL, (GC), very dense, fine and medium, black coal rock pieces, within high plasticity lateritic clay, red/brown, dry.		1.0									
CLAY, (CI-CH), firm to stiff, medium to high plasticity, grey/red/orange, dry.		1.5 2.0 2.5 3.0									RESIDUAL SOIL
Test Pit TP01 terminated at 3.4 m		3.5		BS							
		4.0 4.5 5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP02

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-2-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT with Sand, (ML), low plasticity, beige, ~30% fine and medium grained sand, with roots, dry.											
Clayey GRAVEL, (GC), very dense, fine and medium sized ironstone nodule gravels, white, ~40% medium plasticity grey/brown fines, dry.		0.5									RESIDUAL SOIL
CLAY, (CH), very soft to hard, medium to high plasticity, orange mottled grey, occurrence of few fine and medium sized gravels, dry.		1.0									
		1.5									
		2.0									
PHYLITTE, fine grained, brown, extremely weathered to residual soil, with occurrence of quartz gravels and cobbles, maximum diameter 200mm, dry.		2.5									RESIDUAL SOIL TO EXTREMELY WEATHERED ROCK
		3.0									
		3.5									
		4.0		BS							
		4.5									
Test Pit TP02 terminated at 4.6 m		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP03

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-2-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silt with Sand, low plasticity, brown, with roots, dry.		0									
CLAY with gravel, (CI), medium plasticity, light brown, ~15% fine and medium sized coalstone nodules, dry.		0.5									RESIDUAL SOIL
		1.0		BS			15.2	49	31	72	
		1.5									
Clayey GRAVEL, (GC), dense, fine and medium sized, quartz gravels, brown, ~15% medium plasticity fines, dry to moist.		2.0									RESIDUAL SOIL
		2.5									
GRANITE cobbles in clay matrix, coarse grained, green/grey, extremely to highly weathered, low strength, maximum diameter 200mm.		3.0									EXTREMELY TO HIGHLY WEATHERED ROCK
		3.5									
Test Pit TP03 terminated at 3.8 m		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP04

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-2-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silt with Sand, brown, low plasticity with roots, dry.		0									
CLAY, (CL), firm to stiff, low plasticity, light brown, dry.		0.5									RESIDUAL SOIL
		1.0									
PHYLITTE, fine grained, micaceous structure, black/grey, extremely weathered, friable, very low strength, dry.		1.5									EXTREMELY WEATHERED ROCK
		2.0									
Test Pit TP04 terminated at 2.5 m		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP05

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-2-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER 4 **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silt with sand, brown, low plasticity with roots, dry.		0									
CLAY, (CH), stiff, high plasticity, black, dry to moist.		0.5									RESIDUAL SOIL
As above.....change in colour to orange mottled grey, moist.		1.0									
		1.5									
Clayey SAND, (SC), medium dense, medium and coarse grained, brown, ~20% low plasticity clay, few sub-rounded quartz gravels, wet.		2.0		BS							
		2.5									
PHYLLITE, fine grained, orange/black, extremely weathered, low strength, massive.		3.0									EXTREMELY WEATHERED ROCK
		3.5									
Test Pit TP05 terminated at 4 m		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP06

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-2-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER 3.7 **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT with Sand, brown, low plasticity with roots, dry.											
CLAY with sand (CI), firm, medium plasticity, brown/orange, few coalstone nodules, moist, friable.		0.5									
		1.0									
		1.5									
As above.....change in colour to grey, high plasticity.		2.0									
		2.5									
		3.0		BS			21.2	35	20	69	
(SC-CH) Clayey SAND / Sandy CLAY, (SC-CH), soft to firm, high plasticity, orange/brown, fine and medium sized gravels, maximum diameter 30mm, moist.		3.5	▶								RESIDUAL SOIL
		4.0									
Test Pit TP06 terminated at 4.1 m		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP07

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-2-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT with Sand, brown, low plasticity with roots, dry.		0									
CLAY, (CH), soft to firm, high plasticity, grey mottled orange, moist.		0.5									
		1.0									
Clayey SAND, (SC), loose to medium dense, fine to coarse grained, orange / brown, ~40% high plasticity clay fines, wet.		1.5		BS							RESIDUAL SOIL
		2.0									
GRANITE, coarse grained, brown, highly weathered, low strength, planar blocks, maximum diameter 200mm.		2.5									HIGHLY WEATHERED ROCK
		3.0									
		3.5									
Test Pit TP07 terminated at 3.5 m		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP08

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT with Sand, brown, low plasticity with roots, dry.											Numerous rock outcrops on surface.
CLAY, (CH), firm to stiff, medium plasticity, red, dry.		0.5									RESIDUAL SOIL
As above.....occurrence of medium sized sub-angular gravels, dry.		1.0									
PHYLITTE, fine grained, khaki, foliated with distinctive micacious luster, extremely weathered, very low strength, massive.		1.5									EXTREMELY WEATHERED ROCK
		2.0									
		2.5									Rock ripper used at 2.5m depth.
		3.0									
Test Pit TP08 terminated at 3.2 m		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP09

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT with Sand, brown, low plasticity with roots, dry.											
CLAY with gravel, (CI), firm to stiff, medium plasticity, brown, fine to medium sized, dry.		0.5		BS			15.5	37	18	73	RESIDUAL SOIL
		1.0									
PHYLITTE, fine grained, khaki black stained, foliated with distinctive micacious luster, extremely weathered, very low strength, massive.		1.5									EXTREMELY WEATHERED ROCK
		2.0									
Test Pit TP09 terminated at 2.4 m		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP10

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Silty CLAY, firm to stiff, low to medium plasticity, with roots, dry.		0									
CLAY, (CH), firm to stiff, high plasticity, brown, dry.		0.5									RESIDUAL SOIL
As above.....occurrence of a medium dense, fine to medium, 50mm thick gravel seam.		1.0		BS							
PHYLLITE (occuring as CLAY), medium to high plasticity, white/brown, fines some occurences of cobbles, maximum diameter 150mm, moist.		1.5									RESIDUAL SOIL TO EXTREMELY WEATHERED ROCK
		2.0									
		2.5									
		3.0									
		3.5									
Test Pit TP10 terminated at 3.9 m		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP11

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Silty CLAY, firm to stiff, low to medium plasticity,with roots, dry.		0									
CLAY, (CI), firm to stiff, medium plasticity, brown, dry.		0.5		BS			17	40	22	80	
		1.0									
		1.5									
		2.0									
CLAY with sand/gravel, (CI), very stiff to hard, high plasticity, fine and medium quartz seam, brown, dry, fractured.		2.0					20.4	51	22	54	RESIDUAL SOIL TO EXTREMELY WEATHERED ROCK
PHYLLITE, green/gold, foliated, friable with quartz occurrence, extremely weathered, low strength.		2.5		BS							
		3.0									
		3.5									
Test Pit TP11 terminated at 3.7 m		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP12

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Silty CLAY, firm to stiff, low plasticity, roots, dry.											
Gravelly CLAY, (CL-CI), low to medium plasticity, light brown fines with black coalstone nodules, maximum diameter 30mm, dry.		0.5									RESIDUAL SOIL
As above.....decreasing quantity of black coalstone gravels, occurrence of 5mm to 10mm thick quartz seam, fractured.		1.0									
PHYLITTE, fine grained, brown and orange, foliated with distinctive micaceous luster, extremely weathered, very low strength, massive.		1.5									EXTREMELY WEATHERED ROCK
		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
Test Pit TP12 terminated at 4.5 m		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP13

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Silty CLAY, firm to stiff, low plasticity, brown, coalstone nodules, roots, dry.		0									
CLAY (CI), medium plasticity, light brown, black coalstone nodules, maximum diameter 30mm, dry.		0.5									RESIDUAL SOIL
As above.....change in colour to grey/black/orange nodules more friable and weathered.		1.0		BS			11.7	36	20	87	
		1.5									
PHYLITTE, fine grained, brown and orange, foliated with distinctive micaceous luster, extremely weathered, very low strength, massive.		2.0									RESIDUAL SOIL / EXTREMELY WEATHERED ROCK Rock ripper used.
		2.5									
		3.0									
		3.5									
		4.0									
Test Pit TP13 terminated at 4 m		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP14

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
(CH) CLAY with Gravel, (CH), very stiff, medium to high plasticity, pale orange/orange/red, ~30% flat to sub-rounded gravels, maximum diameter 10mm, dry.		0.5									RESIDUAL SOIL
As above.....decrease in gravel quantity.		1.0									
PHYLLITE, fine grained, brown/orange, foliated with distinctive micaceous luster, extremely weathered, very low strength, massive.		1.5									EXTREMELY WEATHERED ROCK
		2.0									
		2.5									Rock ripper used
		3.0									
		3.5									
		4.0									
Test Pit TP14 terminated at 4.1 m		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP15

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
Gravelly CLAY, (Cl-CH), firm to stiff, medium to high plasticity, pale brown, ~ 30% fine to medium sized gravels, dry.		0.5									RESIDUAL SOIL
		1.0									
CLAY with Gravel, (CH), stiff, medium to high plasticity, orange/black/grey, ~ 20% fine to medium sized gravels, maximum diameter 30mm, dry.		1.5									
Test Pit TP15 terminated at 1.95 m		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP16

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** TSF Embankment Foundation

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
(GC) Clayey GRAVEL, medium dense to dense, fine to coarse sized, pale brown, ~ 50% medium plasticity clay, moist.		0.5									RESIDUAL SOIL
As above.....change in colour to black/grey, coalstone gravel with some clay, decreasing clay content, moist.		1.0									
PHYLITTE, fine grained, orange, foliated with distinctive micaceous luster, extremely weathered, very low strength, massive.		1.5									RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
As above.....10mm quartz vein running perpendicular on pit wall, moist.		2.0 2.5 3.0 3.5									
Test Pit TP16 terminated at 3.8 m		4.0 4.5 5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP17

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.		0									
CLAY with sand (CI), very stiff to hard, medium plasticity, fine to coarse sand, moist.		0.5									RESIDUAL SOIL
As above.....change in colour to black/grey, coalstone gravel with some clay, decreasing clay content, moist.		1.0		BS							
PHYLITTE, fine grained, orange, foliated with distinctive micaceous luster, extremely weathered, very low strength, massive.		1.5					16.7	43	28	67	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
		2.0									
Test Pit TP17 terminated at 2.2 m		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-3-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Silty CLAY with Gravel, firm, low plasticity, light brown, maximum diameter 20mm, with roots, dry.		0.0									
CLAY, (CH), firm to stiff, high plasticity, grey mottled brown with black streaks, few occurrences of quartz gravels, moist.		0.5									RESIDUAL SOIL
		1.0									
		1.5		BS			18.5	63	43	72	
As above.....change to firm, grey mottled white/orange, moist.		2.0					22.3	54	31	84	
		2.5		BS							
		3.0									
Test Pit TP18 terminated at 3.2 m		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP19

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
CLAY with Gravel, (CI-CH), firm to stiff, medium to high plasticity, pale brown, ~30% fine to medium sized gravels, moist.		0.5									RESIDUAL SOIL
Clayey GRAVEL (GC), very dense, high plasticity, grey mottled orange, fine to coarse sized coalstone, dry. *As above.....change in size to fine to medium, quart seam.*		1.0 1.5									
CLAY with Gravel (CH), very stiff to hard, high plasticity, green/brown, ~40% fine to medium sized gravels, with roots, moist.		2.0									
Test Pit TP19 terminated at 2.2 m		2.5 3.0 3.5 4.0 4.5 5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP20

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Silty CLAY, low plasticity, firm, light brown, with roots, dry.											
Gravelly CLAY, (Cl-CH), stiff, medium to high plasticity, brown with black coalstones, dry.		0.5									
(GC) Clayey GRAVEL, medium dense to dense, fine to medium sized, black mottled orange, coalstone gravels, ~40% medium plasticity fines, dry to moist. *As above.....change in gravel size to medium and coarse, brown white quartz gravels, maximum 200mm diameter.*		1.0 / 1.5									RESIDUAL SOIL Slightly fractured formation
Test Pit TP20 terminated at 1.6 m		2.0 / 2.5 / 3.0 / 3.5 / 4.0 / 4.5 / 5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP21

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Silty CLAY, low plasticity, firm, pale brown, with roots, dry.											
CLAY (CI), stiff to very stiff, medium plasticity, brown mottled orange, ~ 40% fine and medium black coalstone gravels, dry.		0.5		BS			12.2	39	22	92	RESIDUAL SOIL
SLATE, fine grained, marble, white to black, extremely to highly weathered rock, low strength.		1.0									EXTREMELY TO HIGHLY WEATHERED ROCK
Test Pit TP21 terminated at 1.4 m		1.5									
		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP22

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Silty CLAY, firm, low plasticity, light brown, with roots, dry.		0.5									
CLAY with gravel, (CI), very stiff, medium plasticity, brown with black coalstones, dry. *As above.....change in colour to grey and decreasing gravel content.*		1.0									RESIDUAL SOIL
CLAY with Gravel, (CH), very stiff to hard, high plasticity, orange/brown, occurrence of quartz cobbles, moist.		1.5		BS			18.3	50	33	69	
Test Pit TP22 terminated at 1.9 m		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP23

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY, firm, low plasticity, light brown, roots, dry.		0									
CLAY with sand (CI), firm to stiff, medium plasticity, grey, few occurrence of medium grained sand, fine sized quartz gravel clusters, moist.		0.5									RESIDUAL SOIL
		1.0		BS			20.6	38	19	80	
SLATE, fine grained, black to brown, extremely to high weathered, low to moderate strength, moist.		1.5									EXTREMELY TO HIGHLY WEATHERED ROCK
Test Pit TP23 terminated at 1.8 m		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP24

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY, firm, low plasticity, light brown, roots, dry.		0.5									
Sandy SILT / Silty SAND (SM/MI), stiff to very stiff, medium plasticity, orange, ~8% medium and coarse gravels, dry.											RESIDUAL SOIL
As above.....occurrence of 80mm thick quartz vein, fractured.		1.0		BS			16.2	36	8	66	
		1.5									
		2.0									
SLATE, fine grained, black to brown, extremely to high weathered, low strength, maximum diameter 50 to 300mm, moist.											EXTREMELY TO HIGHLY WEATHERED ROCK
Test Pit TP24 terminated at 2.4 m		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP25

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY, firm, low plasticity, light brown, roots, dry.		0.5									
CLAY with Gravel, (CI-CH), stiff to very stiff, medium plasticity, orange, fines ~15% fine sized coalstone gravels, dry.											RESIDUAL SOIL
As above.....increase in gravel content becoming Gravelly CLAY.		1.0									
Clayey GRAVEL, (GC), very dense, fine to coarse sized, dark brown, maximum diameter 200mm, ~50% fines, dry.		1.5									
		2.0									
Test Pit TP25 terminated at 2 m		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP26

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY, firm, low plasticity, light brown, roots, dry.											
Sandy SILT/Silty SAND (MI/SM), very stiff, medium plasticity, orange, ~10% coarse sub-angular grains, dry.		0.5									RESIDUAL SOIL
As above.....occurrence of 10mm thick quartz vein.		1.0									
PHYLLITE SCHIST, coarse grained, brown/grey, extremely weathered, low strength, moist to dry.		1.5		BS			15.2	32	6	49	EXTREMELY WEATHERED ROCK
		2.0									
Test Pit TP26 terminated at 2.4 m		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP27

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
Clayey SAND, (SC), medium plasticity, brown, ~30% fine and medium, coalstone gravels, maximum diameter 50mm, dry.		0.5									RESIDUAL SOIL
As above.....occurrence of quartz seam.											
As above.....decrease in gravel quantity.		1.0		BS			27.5	51	33	32	
Sandy CLAY, (CI-CH), very stiff, medium to high plasticity, brown mottled grey, ~40% coarse sand, moist to dry.		1.5									
		2.0									
Test Pit TP27 terminated at 2.1 m		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP28

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											Quartz rock outcrops and rock pieces scattered on surface, medium coverage.
Clayey GRAVEL, (GC), very dense, fine to medium, orange/red/black, black coalstone, ~40%, dry to moist.		0.5									RESIDUAL SOIL
		1.0									
BASALT, fine grained, extremely to highly weathered, dark grey/ orange, foliated, low strength, moist to dry.		1.5									EXTREMELY TO HIGHLY WEATHERED ROCK
		2.0									
Test Pit TP28 terminated at 2.1 m		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP29

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
PHYLITTE, fine grained, orange, foliated with distinctive micaceous luster, extremely to highly weathered,low strength, massive.		0.5									EXTREMELY WEATHERED ROCK
As Above.....occurrence of quartz vein.											
SLATE, fine grained, orange/ brown, quartz pieces, highly weathered, low strength, maximum diameter 300mm.		1.0									HIGHLY WEATHERED ROCK
		1.5									
Test Pit TP29 terminated at 1.8 m		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP30

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
Sandy CLAY / Clayey SAND (CL/SC), very dense, fine to medium sized, pale brown to black coalstones, ~ 40% medium to high plasticity fines, dry to moist.		0.5		BS			14.5	28	13	86	RESIDUAL SOIL
SLATE, fine grained, orange black streaks, quartz pieces, layered, residual soil to extremely weathered, very low strength.		1.0									RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
		1.5									
Test Pit TP30 terminated at 1.9 m		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP31

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
CLAY, (CH), very stiff, high plasticity, orange/black, >10% fine to medium sized gravels, wet.		0.5									RESIDUAL SOIL
As above.....change in colour to orange mottled grey.		1.0									
As above.....increase in gravel content, occurrence of fine to medium sized coalstone gravels, maximum diameter 20mm, dense, wet.		1.5									
CLAY, soft, high plasticity, grey, soft, wet.				BK			25	47	29	95	
Test Pit TP31 terminated at 2.4 m		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP32

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-4-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
CLAY, (CI), hard, medium plasticity, dark grey, ~10% medium to coarse sized sub-angular sand, dry. *As above.....decreasing sand, <5% sand.*		0.5 1.0 1.5 2.0		BS			13.9	39	23	90	RESIDUAL SOIL
Sandy CLAY(CH), hard, high plasticity, orange mottled grey, ~30% fine to medium grained sand, dry.											
Test Pit TP32 terminated at 2.2 m		2.5 3.0 3.5 4.0 4.5 5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP33

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-5-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Silty CLAY with Gravel, firm, low plasticity, light brown, with roots, dry.											
CLAY with sand, (CI), firm to stiff, medium plasticity, grey mottled orange, ~30% medium sub-angular sand, dry.		0.5		BS			14.5	32	14	81	RESIDUAL SOIL
As above.....change in colour to orange.		1.0									
As above.....change in consistency stiff to very stiff, brown with black specks.		1.5									
Test Pit TP33 terminated at 2.2 m		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP34

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-5-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: Sandy CLAY, firm, low plasticity, light brown, medium to coarse grained, with roots, dry.											
CLAY with Sand, (Cl-CH), very stiff, medium to high plasticity, grey mottled orange, ~30% medium sub-angular sand, dry.		0.5									RESIDUAL SOIL
GRANITE, coarse grained, boulders occuring within clay matrix, highly weathered, low to moderate strength, maximum diameter 400mm.		1.0									HIGHLY WEATHERED Rock ripper used at 0.8m
		1.5									
Test Pit TP34 terminated at 1.6 m		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP35

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-5-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Sandy CLAY, firm, low plasticity, light brown, medium and coarse, with roots, dry.		0.5									
SANDSTONE, coarse grained, brown speckled grey, extremely weathered		1.0									EXTREMELY WEATHERED ROCK
As above.....change to highly weathered, occurrence of 3mm thick quartz vein.		1.5									HIGHLY WEATHERED ROCK Rock ripper used.
Test Pit TP35 terminated at 1.65 m		2.0 2.5 3.0 3.5 4.0 4.5 5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP36

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-5-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Sandy CLAY, firm, medium plasticity, light brown, medium and coarse, with roots, dry.											
CLAY, (CI), hard, high plasticity, white mottled orange, dry.		0.5		BS			17.1	34	16	83	RESIDUAL SOIL
As above..... change in consistency stiff to very stiff, medium plasticity to high plasticity, grey mottled orange.		1.0									HIGHLY TO MODERATELY WEATHERED ROCK Rock ripper used.
GRANITE, coarse grained, grey speckled brown, highly to moderately weathered, low strength, maximum diameter 200mm. Test Pit TP36 terminated at 1.3 m		1.5									
		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP37

CLIENT Regis Resources **PROJECT NAME** McPhillamy's Mine

JOB NUMBER 113272.02 **PROJECT LOCATION** Blayney, NSW

DATE STARTED 5-5-17 **R.L. SURFACE (m)** 0 **DATUM** AHD

GROUNDWATER **LOCATION** Storage Area

EQUIPMENT Hitachi Zaxis 200 - 20 TONNE **EASTING (m)** **NORTHING (m)**

TEST PIT SIZE 0.8mx2.0m **LOGGED BY** TKK **CHECKED BY** TKK

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL, Sandy CLAY, firm, medium plasticity, light brown, medium and coarse, with roots, dry.											
Sandy CLAY, (CH), hard, high plasticity, grey, ~ 30 % sub-angular sand, dry.		0.5									RESIDUAL SOIL
GRANITE, coarse grained, grey speckled brown, highly weathered, low strength, maximum diameter 200mm.											HIGHLY WEATHERED ROCK
As above..... change in colour to brown/orange, medium strength.		1.0									
Test Pit TP37 terminated at 1.45 m		1.5									
		2.0									
		2.5									
		3.0									
		3.5									
		4.0									
		4.5									
		5.0									

APPENDIX B2

TEST PIT NUMBER TP01

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION**

EQUIPMENT 3-5t Excavator **EASTING (m)** 716709 m E **NORTHING (m)** 6292452 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CL-CI), estimated stiff to very stiff, low to medium plasticity, yellow brown, moist, dry of plastic limit, trace fine to medium grained sand		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP01 terminated at 1 m		1.5									

ATC TEST PIT TEST PITS_MINE INFRASTRUCTURE_18-12-17.GPJ GINT AUSTRALIA.GDT 29-1-18

TEST PIT NUMBER TP02

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION**

EQUIPMENT 3-5t Excavator **EASTING (m)** 716711 m E **NORTHING (m)** 6292615 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CI-CH), estimated firm, medium to high plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff to very stiff, medium to high plasticity, pale brown and pale grey, moist, dry of plastic limit		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP02 terminated at 1.1 m		1.5									

TEST PIT NUMBER TP03

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 716831 m E **NORTHING (m)** 6292462 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CL-CI), estimated stiff to very stiff, low to medium plasticity, yellow brown, moist, dry of plastic limit		0.5		BS							ALLUVIAL
		1.0		BS							
Test Pit TP03 terminated at 1.1 m		1.5									

TEST PIT NUMBER TP04

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717009 m E **NORTHING (m)** 6292434 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CL-CI), estimated stiff to very stiff, low to medium plasticity, orange brown, moist, dry of plastic limit		0.5		BS							ALLUVIAL
Test Pit TP04 terminated at 1 m		1.0									
		1.5									

TEST PIT NUMBER TP06

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717423 m E **NORTHING (m)** 6292556 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff to very stiff, medium to high plasticity, yellow brown, moist, dry of plastic limit, with sand		0.5		BS				34	18	56	ALLUVIAL
Band of QUARTZ gravel		1.0									
Test Pit TP06 terminated at 1 m		1.5									

ATC TEST PIT TEST PITS_MINE INFRASTRUCTURE_18-12-17.GPJ GINT AUSTRALIA.GDT 29-1-18

TEST PIT NUMBER TP07

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717579 m E **NORTHING (m)** 6292666 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CL-CI), estimated stiff to very stiff, low to medium plasticity, pale brown, moist, dry of plastic limit		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP07 terminated at 1.1 m		1.5									

TEST PIT NUMBER TP08

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION**

EQUIPMENT 3-5t Excavator **EASTING (m)** 717608 m E **NORTHING (m)** 6292812 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff to very stiff, medium to high plasticity, yellow brown, moist, dry of plastic limit		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP08 terminated at 1.1 m		1.5									

TEST PIT NUMBER TP09

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION**

EQUIPMENT 3-5t Excavator **EASTING (m)** 717634 m E **NORTHING (m)** 6292979 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY (CL-CI), estimated stiff to very stiff, low to medium plasticity, pale brown, moist, near plastic limit		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP09 terminated at 1.1 m		1.5									

TEST PIT NUMBER TP10

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717631 m E **NORTHING (m)** 6293094 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CL-CI), estimated stiff, low to medium plasticity, brown, moist, dry of plastic limit											ALLUVIAL
yellow brown		0.5		BS							
		1.0									
Test Pit TP10 terminated at 1.2 m		1.5									

TEST PIT NUMBER TP11

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION**

EQUIPMENT 3-5t Excavator **EASTING (m)** 717693 m E **NORTHING (m)** 6293205 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff, medium to high plasticity, brown and yellow brown, moist, dry of plastic limit		0.5									ALLUVIAL
		1.0									
Test Pit TP11 terminated at 1 m		1.5									

TEST PIT NUMBER TP12

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION**

EQUIPMENT 3-5t Excavator **EASTING (m)** 717502 m E **NORTHING (m)** 6293238 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff, medium to high plasticity, pale brown, moist, dry of plastic limit, trace sand		0.5		BS				47	12.5	88	ALLUVIAL
		1.0									
Test Pit TP12 terminated at 1.3 m		1.5									

ATC TEST PIT TEST PITS_MINE INFRASTRUCTURE_18-12-17.GPJ GINT AUSTRALIA.GDT 29-1-18

TEST PIT NUMBER TP13

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 716926 m E **NORTHING (m)** 6292535 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, trace of rock fragments, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated firm, medium to high plasticity, pale brown, less trace of rock fragments, moist, dry of plastic limit		0.5									ALLUVIAL
		1.0									
Test Pit TP13 terminated at 1.1 m		1.5									

TEST PIT NUMBER TP14

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717135 m E **NORTHING (m)** 6292698 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, pale brown, moist, dry of plastic limit, trace rock fragments up to 100mm											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff to very stiff, medium to high plasticity, orange brown, moist, dry of plastic limit		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP14 terminated at 1.3 m		1.5									

TEST PIT NUMBER TP15

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717313 m E **NORTHING (m)** 6292676 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff to very stiff, medium to high plasticity, yellow brown and pale brown, moist, dry of plastic limit		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP15 terminated at 1.2 m		1.5									

TEST PIT NUMBER TP16

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION**

EQUIPMENT 3-5t Excavator **EASTING (m)** 717267 m E **NORTHING (m)** 6292808 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, trace roots, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CL-CI), estimated stiff to very stiff, low to medium plasticity, yellow brown and brown, trace roots, moist, dry of plastic limit		0.5									ALLUVIAL
yellow brown		1.0									
Test Pit TP16 terminated at 1.3 m		1.5									

ATC TEST PIT TEST PITS_MINE INFRASTRUCTURE_18-12-17.GPJ GINT AUSTRALIA.GDT 29-1-18

TEST PIT NUMBER TP17

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717458 m E **NORTHING (m)** 6292803 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, pale brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CH), estimated firm, high plasticity, pale brown and yellow brown, moist, near plastic limit		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP17 terminated at 1.2 m		1.5									

TEST PIT NUMBER TP18

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717540 m E **NORTHING (m)** 6292944 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff to very stiff, medium to high plasticity, yellow brown to orange brown, moist, dry of plastic limit		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP18 terminated at 1.1 m		1.5									

TEST PIT NUMBER TP19

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717711 m E **NORTHING (m)** 6293131 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff, medium to high plasticity, brown, moist, near plastic limit											ALLUVIAL/ RESIDUAL
brown and yellow brown		0.5									
		1.0									
SILTSTONE, extremely weathered, brown and yellow brown, very low strength											EXTREMELY WEATHERED ROCK
Test Pit TP19 terminated at 1.4 m		1.5									

ATC TEST PIT TEST PITS_MINE INFRASTRUCTURE_18-12-17.GPJ GINT AUSTRALIA.GDT 29-1-18

TEST PIT NUMBER TP20

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 11-12-17 **R.L. SURFACE (m)** _____ **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** _____

EQUIPMENT 3-5t Excavator **EASTING (m)** 717633 m E **NORTHING (m)** 6293297 m S

TEST PIT SIZE 0.3m Wide x 2.0m Long **LOGGED BY** HAA **CHECKED BY** CFT

Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											TOPSOIL
SILTY CLAY, (CI-CH), estimated stiff, medium to high plasticity, brown and yellow brown, moist, dry of plastic limit		0.5		BS							ALLUVIAL
		1.0									
Test Pit TP20 terminated at 1.1 m		1.5									

BOREHOLE NUMBER BH108

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 13-12-17 **COMPLETED** 13-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Primary Crusher

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	TOPSOIL: SILTY CLAY (CL-CI), estimated stiff, low to medium plasticity, brown, trace fine to medium grained sand, moist, dry of plastic limit											
	SILTY CLAY (CI-CH), very stiff, medium to high plasticity, yellow brown, trace fine to medium grained sand, moist, dry of plastic limit		1		SPT		5, 8, 12, N=20					
			2									
					SPT		5, 8, 12, N=20					
			3									
			4		SPT		15, 25, 30/130, N=R*					
			5									
	SILTSTONE, extremely weathered, pale grey and yellow brown, very low strength				SPT		22, 30/70, N=R*					
			6									
			7									
	very low to low strength		8									

ATC BORHOLE BOREHOLE2018.GPJ GINT AUSTRALIA.GDT 29-1-18

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH108

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 13-12-17 **COMPLETED** 13-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Primary Crusher

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	very low to low strength *(continued)*		9 10 11 12 13 14 15 16									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH108

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 13-12-17 **COMPLETED** 13-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Primary Crusher

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	very low to low strength *(continued)*		17									
			18									
	Borehole BH108 terminated at 18m		19									
			20									
			21									
			22									
			23									
			24									

BOREHOLE NUMBER BH109

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 13-12-17 **COMPLETED** 13-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Primary Crusher Tunnel Exit

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	TOPSOIL: SILTY CLAY (CL-CI), estimated stiff, low to medium plasticity, brown, trace fine to medium sand, moist, dry of plastic limit											
	SILTY CLAY (CI-CH), very stiff, medium to high plasticity, brown, trace fine to medium grained sand, moist, dry of plastic limit		1		SPT		7, 10, 11, N = 21					
			2									
	sand absent, hard		3		SPT		7, 15, 20, N = 35					
			4		SPT		6, 11, 25, N = 36					
			5									
			6		SPT		6, 13, 24, N = 37					
			7									
	SILTSTONE, extremely to highly weathered, pale grey and yellow brown, extremely low strength		8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH109

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 13-12-17 **COMPLETED** 13-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Primary Crusher Tunnel Exit

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	SILTSTONE, extremely to highly weathered, pale grey and yellow brown, extremely low strength *(continued)*		9 10 11 12 13 14 15 16									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH109

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 13-12-17 **COMPLETED** 13-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Primary Crusher Tunnel Exit

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	SILTSTONE, extremely to highly weathered, pale grey and yellow brown, extremely low strength *(continued)*		17									
	low to medium strength		18									
			19									
	Borehole BH109 terminated at 19m		20									
			21									
			22									
			23									
			24									

BOREHOLE NUMBER BH110

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 13-12-17 **COMPLETED** 13-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER **LOCATION** Secondary Crusher and Sizing Screen

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	TOPSOIL: SILTY CLAY (CL-CI), estimated stiff, low to medium plasticity, brown, trace fine to medium grained sand, moist, dry of plastic limit											
	SILTY CLAY (CI-CH), very stiff, medium to high plasticity, yellow brown, trace fine to medium grained sand, moist, dry of plastic limit		1		SPT		8, 13, 17, N = 30, QC1					
			2		SPT		8, 20, 30/120, N = R*					
	SILTSTONE, extremely weathered to highly weathered, grey and yellow brown, extremely low to very low strength		3									
			4		SPT		13, 20, 30/130, N = R*					
			5									
			6	Seepage	SPT		15, 22, 30/0, N = R*					
			7									
			8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH110

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 13-12-17 **COMPLETED** 13-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER **LOCATION** Secondary Crusher and Sizing Screen

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	SILTSTONE, extremely weathered to highly weathered, grey and yellow brown, extremely low to very low strength *(continued)*		9									
	highly weathered, low to medium strength		10									
	moderately weathered to slightly weathered, medium to high strength		11									
	Borehole BH110 terminated at 11.7m		12									
			13									
			14									
			15									
			16									

BOREHOLE NUMBER BH111

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 12-12-17 **COMPLETED** 12-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** CV-03

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	CLAYEY GRAVEL (GP), very dense, fine to medium grained, sub-angular to angular, pale grey and yellow brown, medium to high plasticity clay, dry, extremely weathered QUARTZ.		1		SPT		9, 29, 30, N = 59					
			2									
	SILTSTONE, extremely weathered, yellow brown, very low to low strength, with QUARTZITE bands		3		SPT		30/70, HB, N = R*					
	low strength		4		SPT		30/10, HB, N = R*					
			5									
			6									
			7									
			8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH111

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 12-12-17 **COMPLETED** 12-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** CV-03

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	SILTSTONE, extremely weathered, yellow brown, very low to low strength, with QUARTZITE bands *(continued)*		9 10 11 12 13 14 15									
	Borehole BH111 terminated at 15m		16									

BOREHOLE NUMBER BH112

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 12-12-17 **COMPLETED** 12-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Tertiary Crushers

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	TOPSOIL: SILTY CLAY (CL-CI), estimated stiff, low to medium plasticity, pale brown, moist, dry of plastic limit, trace fine to medium grained sand											
	SILTY CLAY (CI-CH), very stiff, medium to high plasticity, pale yellow brown, moist, dry of plastic limit, trace of fine to medium grained sand		1		SPT		5, 9, 11, N = 20					
			2									
	hard		3		SPT		12, 20. 25, N = 45					
	sand absent		4		SPT		9, 16, 22, N = 38					
			5									
	SILTSTONE, highly weathered, yellow brown, low strength		6		SPT		30/40 (HB), N = R*					
			7									
			8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH112

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 12-12-17 **COMPLETED** 12-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Tertiary Crushers

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	SILTSTONE, highly weathered, yellow brown, low strength *(continued)*		9 10 11 12 13 14 15									
	Borehole BH112 terminated at 15m		16									

BOREHOLE NUMBER BH113

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 14-12-17 **COMPLETED** 14-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Sizing Screen

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	TOPSOIL: SILTY CLAY (CL-CI), estimated stiff, low to medium plasticity, brown, moist, dry of plastic limit											
	SILTY CLAY (CL-CI), very stiff to hard, medium to high plasticity, yellow brown, moist, dry of plastic limit		1									
	hard				SPT		6, 18, 27, N = 45					
	probable QUARTZITE boulder (~800mm thick)		2									
PERCUSSION DRILLING	SILTSTONE, extremely weathered, pale brown and yellow brown, extremely low to very low strength		3									
			4									
			5									
			6									
			7									
			8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH113

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 14-12-17 **COMPLETED** 14-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Sizing Screen

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
PERCUSSION DRILLING	SILTSTONE, extremely weathered, pale brown and yellow brown, extremely low to very low strength *(continued)*											
	slightly weathered, pale grey and grey, medium strength		9									
			10									
			11									
			12									
			13									
			14									
			15									
	Borehole BH113 terminated at 15m		16									

BOREHOLE NUMBER BH114

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 8-1-18 **COMPLETED** 8-1-18 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Stockpile South

EQUIPMENT Geoprobe 7822DT **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w$_L$)	Plasticity Index (I$_P$)	% Finer than 0.075mm	Additional Observations
ADT	TOPSOIL: SILTY CLAY (CL-CI), estimated stiff, low to medium plasticity, pale brown and brown, moist, dry of plastic limit, trace fine to medium grained sand											
	SILTY CLAY (CL-CI), very stiff, low to medium plasticity, brown, moist, dry of plastic limit, trace fine to medium grained sand		1		SPT		5, 7, 9, N=16					
	with bands of SILTSTONE, extremely weathered, yellow brown and grey, extremely low strength		2									
	hard to friable, yellow brown and dark grey		3		SPT		18, 30/100mm, N=R*					
	SILTSTONE, highly weathered, yellow brown and pale grey, very low strength		4		SPT		30/100mm, N=R*					
			5									
			6		SPT		30/90mm, N=R*					
	medium strength		7									
			8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH114

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 8-1-18 **COMPLETED** 8-1-18 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Stockpile South

EQUIPMENT Geoprobe 7822DT **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
ADT	medium strength *(continued)*											
	medium to high strength											
	Borehole BH114 terminated at 8.9m		9									
			10									
			11									
			12									
			13									
			14									
			15									
			16									

ATC BORHOLE BOREHOLE2018.GPJ GINT AUSTRALIA.GDT 29-1-18

BOREHOLE NUMBER BH115

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 8-1-18 **COMPLETED** 8-1-18 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Stockpile Tunnel Entrance

EQUIPMENT Geoprobe 7822DT **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
ADT	TOPSOIL: SILTY CLAY (CL-CI), estimated sfiff, low to medium plasticity, pale yellow brown, moist, dry of plastic limit											
	SILTY CLAY (CI-CH), sfiff, medium to high plasticity, yellow brown, moist, dry of plastic limit		1		SPT		5, 5, 6, N=11					
	yellow brown and pale grey, moist, near plastic limit		2									
	firm		3		SPT		2, 2, 5, N=7					
			4		SPT		22, 29, 30/60mm, N=R*					
	QUARTZITE, extremely weathered, pale grey and yellow brown, extremely low to very low strength		5									
			6		SPT		17, 30/80mm, N=R*					
			7									
			8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH115

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 8-1-18 **COMPLETED** 8-1-18 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Stockpile Tunnel Entrance

EQUIPMENT Geoprobe 7822DT **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
ADT	QUARTZITE, extremely weathered, pale grey and yellow brown, extremely low to very low strength *(continued)*											
	SILTSTONE, extremely weathered, brown, extremely low to very low strength		9									
			10									
	Borehole BH115 terminated at 10.8m		11									
			12									
			13									
			14									
			15									
			16									

BOREHOLE NUMBER BH116

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 8-1-18 **COMPLETED** 8-1-18 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Mill East

EQUIPMENT Geoprobe 7822DT **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
ADT	TOPSOIL: SILTY CLAY (CL-CI), estimated stiff, low to medium plasticity, pale yellow brown, moist, dry of plastic limit											
	SILTY CLAY (CL-CI), estimated stiff, low to medium plasticity, yellow brown, moist, dry of plastic limit		1									
	firm				SPT		3, 2, 4, N=6					
			2									
	hard, yellow brown and brown				SPT		7, 20, 29, N=49					
			3									
	SILTSTONE, extremely weathered, yellow brown and brown, extremely low to very low strength		4		SPT		30/120, N=R*					
			5									
	brown				SPT		30/120, N=R*					
			6									
	low to medium strength											
			7									
			8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH116

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 8-1-18 **COMPLETED** 8-1-18 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Mill East

EQUIPMENT Geoprobe 7822DT **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
ADT	brown *(continued)*		9									
	extremely low to very low strength		10									
	low to medium strength											
	Borehole BH116 terminated at 10.9m		11									
			12									
			13									
			14									
			15									
			16									

BOREHOLE NUMBER BH117

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 9-1-18 **COMPLETED** 9-1-18 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** CIL Tank 7

EQUIPMENT Geoprobe 7822DT **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
ADT	TOPSOIL: SILTY CLAY (CL-CI), estimated stiff, low to medium plasticity, pale grey and pale yellow brown, moist, dry of plastic limit											
	SILTY CLAY (CI-CH), firm to stiff, medium to high plasticity, yellow brown, moist, near plastic limit		1		SPT		3, 4, 4, N=8					
			2									
	SILTSTONE, extremely weathered, yellow brown and dark grey, extremely low to very low strength				SPT		10, 30/130, N=R*					
			3									
			4		SPT		30/130, N=R*					
			5									
					SPT		30/120, N=R*					
			6									
	brown		7									
			8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH117

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 9-1-18 **COMPLETED** 9-1-18 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** CIL Tank 7

EQUIPMENT Geoprobe 7822DT **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
ADT	brown *(continued)*		9									
			10									
	low to medium strength		11									
			12									
	medium to high strength											
	Borehole BH117 terminated at 12.6m		13									
			14									
			15									
			16									

BOREHOLE NUMBER BH118

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 14-12-17 **COMPLETED** 14-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Tailings Thickener

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	TOPSOIL: SILTY CLAY, (CL-CI), estimated firm, low to medium plasticity, brown, moist, dry of plastic limit											
	stiff, medium to high plasticity, yellow brown		1		SPT		3, 5, 6, N = 11, QC2, QC3					
			2									
	low to medium plasticity moist, near plastic limit, with CLAYEY SILT bands				SPT		3, 6, 7, N = 13					
			3									
	Possible QUARTZITE boulder (~800mm thick)		4		SPT		15, 26, 30/130, HB, N = R*					
	SILTSTONE, extremely weathered, brown and yellow brown, extremely low strength		5									
					SPT		20, 30/100, HB, N = R*					
			6									
			7									
			8									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

BOREHOLE NUMBER BH118

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 14-12-17 **COMPLETED** 14-12-17 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** Tailings Thickener

EQUIPMENT Percussion Drill Rig **LOGGED BY** HAA **CHECKED BY** CFT

HOLE SIZE 120mm

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
TC-BIT AIRBORING	SILTSTONE, extremely weathered, brown and yellow brown, extremely low strength *(continued)*		9 10 11 12 13 14 15									
	Borehole BH118 terminated at 15m		16									

APPENDIX B3

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-01

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 971 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 715689 m E **NORTHING (m)** 6295168 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SANDY CLAY (CL-CI), low to medium plasticity, yellow brown, fine to medium, with gravel, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SANDY CLAY (CI-CH), medium to high plasticity, yellow brown, fine to medium, with gravel, moist, dry of plastic limit, estimated hard											ALLUVIAL
red brown, no gravel		0.5		BS							
SILTY CLAY (CI-CH), medium to high plasticity, pale grey and yellow brown, moist, dry of plastic limit, hard to friable grading to SILTSTONE, very low strength, extremely weathered, layered		1.0									RESIDUAL
Test Pit TP18-01 terminated at 1.5 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-02

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 966 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 715646 m E **NORTHING (m)** 6295537 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SANDY CLAY (CL-CI), low to medium plasticity, yellow brown, fine to medium, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SANDY CLAY (CI-CH), medium to high plasticity, yellow brown, fine to medium, with gravel and cobbles, moist, dry of plastic limit, estimated very stiff to hard		0.5									ALLUVIAL
SANDY CLAY (CI-CH), medium to high plasticity, yellow brown and pale grey, moist, dry of plastic limit, estimated hard to friable, grading to SILTSTONE, very low strength, extremely weathered, layered.		1.0									RESIDUAL
SILTY CLAY, (CI-CH), medium to high plasticity, yellow brown and pale grey, moist, dry of plastic limit, estimated hard to friable, grading to SILSTONE, very low strength, extremely weathered, layered.		1.5									
Test Pit TP18-02 terminated at 1.5 m		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-03

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 972 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 715637 m E **NORTHING (m)** 6295728 m S

TEST PIT SIZE 0.5m x 2.4m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILTY CLAY, (CL-CI), low to medium plasticity, yellow brown and brown, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILTY CLAY, (CI-CH), medium to high plasticity, yellow brown and brown, moist, dry of plastic limit, estimated hard to friable, grading to SILTSTONE, very low strength, extremely weathered, layered		0.5									RESIDUAL
Test Pit TP18-03 Virtual Refusal at 0.5 m		1.0 1.5 2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-04

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 951 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 715974 m E **NORTHING (m)** 6295528 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILTY CLAY, (CI-CH), medium to high plasticity, yellow brown, with fine to coarse grained sand, trace gravel, moist, dry of plastic limit, estimated hard		0.5		BS				49	28	67	ALLUVIAL
estimated hard to friable		1.0									RESIDUAL
Test Pit TP18-04 terminated at 1.4 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-05

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 942 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716211 m E **NORTHING (m)** 6295400 m S

TEST PIT SIZE 0.5m x 2.7m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, moist, dry of plastic limit, estimated very stiff to hard											ALLUVIAL
Grading to CLAYEY SILT, yellow brown		0.5									
		1.0									
SILTY CLAY, (CI-CH), medium to high plasticity, yellow brown and pale grey, moist, dry of plastic limit, estimated hard to friable		1.5									RESIDUAL
Test Pit TP18-05 terminated at 1.6 m		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-06

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 935 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716643 m E **NORTHING (m)** 6295390 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, with sand, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown and orange brown, with gravel and cobbles (cobble size Quartz), moist, dry of plastic limit, estimated hard to friable		1.0									RESIDUAL
Test Pit TP18-06 terminated at 1.4 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-07

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 951 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717064 m E **NORTHING (m)** 6294926 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, with sand, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown and orange brown, trace sand, moist, dry of plastic limit, estimated hard		1.0									RESIDUAL
Test Pit TP18-07 terminated at 1.2 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-08

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 950 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717001 m E **NORTHING (m)** 6295294 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, with sand, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
CLAYEY SILT (ML), low plasticity, yellow brown, low plasticity, moist, dry of plastic limit, estimated hard		1.0									
Test Pit TP18-08 terminated at 1.5 m		1.5									
		2.0									

ATC TEST PIT TEST PITS_NORTH AND SOUTH DAM.GPJ GINT AUSTRALIA.GDT 19-9-18

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-09

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 943 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716449 m E **NORTHING (m)** 6295582 m S

TEST PIT SIZE 0.5m x 2.7m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, with sand, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown and orange brown, trace sand, moist, dry of plastic limit, estimated hard		1.0									RESIDUAL
SANDY CLAY (CI-CH), medium to high plasticity, pale grey and yellow brown, fine to medium, moist, dry of plastic limit, estimated hard		1.5									
Test Pit TP18-09 terminated at 1.5 m		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-10

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 965 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716282 m E **NORTHING (m)** 6295954 m S

TEST PIT SIZE 0.5m x 2.7m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, grey and brown, moist, dry of plastic limit, estimated hard											RESIDUAL
trace cobbles (cobble size Quartz)		1.0									
Test Pit TP18-10 terminated at 1.5 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-11

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 960 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716568 m E **NORTHING (m)** 6295904 m S

TEST PIT SIZE 0.5m x 2.5m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, with sand, trace rootlets, moist, dry of limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown and orange brown, with sand, moist, dry of plastic limit, estimated hard		1.0									RESIDUAL
Test Pit TP18-11 terminated at 1.4 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-12

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 941 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716838 m E **NORTHING (m)** 6295687 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, with sand, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown and orange brown, moist, dry of plastic limit, estimated hard		1.0									RESIDUAL
Test Pit TP18-12 terminated at 1.5 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-13

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 953 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717203 m E **NORTHING (m)** 6295590 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, trace sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, moist, dry of plastic limit, estimated very stiff to hard											ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, brown, trace sand, moist, dry of plastic limit, very stiff to hard		0.5									RESIDUAL
				BS				51	36	88	PP ~350 kPa
		1.0									
grey											
		1.5									
Test Pit TP18-13 terminated at 1.7 m											
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-14

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 972 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717238 m E **NORTHING (m)** 6295963 m S

TEST PIT SIZE 0.5m x 2.4m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
GRAVELLY CLAY (CL-CI), low to medium plasticity, yellow brown, fine to coarse, with cobbles, moist, dry of plastic limit, estimated hard		0.5									RESIDUAL
grading to SILTSTONE, low to medium strength, highly weathered		1.0									WEATHERED ROCK
Test Pit TP18-14 Virtual Refusal at 1 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-15

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 958 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716714 m E **NORTHING (m)** 6296008 m S

TEST PIT SIZE 0.5m x 2.4m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SANDY SILT (ML), low plasticity, pale yellow brown, fine to medium, moist, dry of plastic limit, estimated hard											RESIDUAL
grading to SILTSTONE, very low strength, extremely weathered, layered		0.5									WEATHERED ROCK
Test Pit TP18-15 Virtual Refusal at 0.5 m		1.0									
		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-16

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 950 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716161 m E **NORTHING (m)** 6295157 m S

TEST PIT SIZE 0.5m x 2.5m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SANDY CLAY (CL), low plasticity, red brown, fine to medium, with gravel and cobbles, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SANDY CLAY (CI-CH), medium to high plasticity, red brown, fine to medium, with gravel and cobble, moist, dry of plastic limit, estimated very stiff to hard		0.5									RESIDUAL
		1.0									
SILTSTONE, red brown and dark grey, low to medium strength, extremely weathered to highly weathered											WEATHERED ROCK
Test Pit TP18-16 terminated at 1.3 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-17

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 946 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716221 m E **NORTHING (m)** 6294947 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SANDY CLAY (CI-CH), medium to high plasticity, yellow brown, fine to medium, with gravel, moist, dry of plastic limit, estimated hard		0.5									RESIDUAL
		1.0									
SANDY SILT (ML), low plasticity, red brown, pale grey and black, fine to medium, moist, dry of plastic limit, estimated hard grading to SILTSTONE, very low strength, extremely weathered, layered		1.5									WEATHERED ROCK
Test Pit TP18-17 terminated at 1.5 m		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-18

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 930 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716683 m E **NORTHING (m)** 6295032 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown and yellow brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILTY CLAY (CI-CH), medium to high plasticity, brown and grey, trace sand, moist, dry of plastic limit, estimated hard		0.5		BS				49	35	91	ALLUVIAL
		1.0									
Test Pit TP18-18 terminated at 1.4 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-19

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 945 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716075 m E **NORTHING (m)** 6294789 m S

TEST PIT SIZE 0.5m x 2.4m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown and brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
CLAYEY SILT (ML), low plasticity, yellow brown, low to medium, with sand, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
yellow brown, dark grey, hard to friable, grading to SILTSTONE, very low strength, extremely weathered, layered		1.0									WEATHERED ROCK
Test Pit TP18-19 terminated at 1.4 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-20

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 953 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 715874 m E **NORTHING (m)** 6294225 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
CLAYEY SILT (ML), low plasticity, yellow brown, low, with sand, moist, dry of plastic limit, estimated hard		0.5									RESIDUAL
		1.0									
hard to friable, grading to SILTSTONE, very low strength, extremely weathered, layered											WEATHERED ROCK
Test Pit TP18-20 terminated at 1.4 m		1.5									
		2.0									

ATC TEST PIT TEST PITS_NORTH AND SOUTH DAM.GPJ GINT AUSTRALIA.GDT 19-9-18

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-21

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 927 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716105 m E **NORTHING (m)** 6294479 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown and brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SANDY CLAY (CI-CH), medium to high plasticity, red brown, fine to medium, moist, dry of plastic limit, estimated hard		0.5		BS							RESIDUAL
hard to friable, grading to SILTSTONE, yellow brown and dark grey, very low strength, extremely weathered		1.0									WEATHERED ROCK
Test Pit TP18-21 terminated at 1.4 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-22

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 944 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716505 m E **NORTHING (m)** 6294373 m S

TEST PIT SIZE 0.5m x 2.4m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, trace sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
GRAVELLY CLAY (CL-CI), low to medium plasticity, red brown, fine to coarse, subangular to angular, with cobbles, moist, dry of plastic limit, estimated hard											RESIDUAL
Test Pit TP18-22 refusal at 0.4 m		0.5									
		1.0									
		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-23

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 944 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717934 m E **NORTHING (m)** 6294843 m S

TEST PIT SIZE 0.5m x 2.5m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, trace sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, moist, dry of plastic limit, estimated very stiff to hard		0.5									ALLUVIAL
SANDY GRAVEL (GP), fine to coarse, subangular to angular, red brown and pale grey, fine to coarse, dry, estimated very dense		1.0									RESIDUAL
Test Pit TP18-23 refusal at 1.2 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-24

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 951 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717368 m E **NORTHING (m)** 6294219 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown, moist, dry of plastic limit, estimated hard		1.0									RESIDUAL
Test Pit TP18-24 terminated at 1.7 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-25

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 940 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717152 m E **NORTHING (m)** 6294325 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, moist, dry of plastic limit, estimated very stiff to hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown and brown, trace sand, moist, dry of plastic limit, estimated hard		1.0		BS				48	34	87	RESIDUAL
Test Pit TP18-25 terminated at 1.5 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-26

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 934 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 716857 m E **NORTHING (m)** 6294571 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, trace sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, trace sand, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown and brown, moist, dry of plastic limit, estimated hard		1.0									RESIDUAL
		1.5									
Test Pit TP18-26 terminated at 1.8 m		2.0									

ATC TEST PIT TEST PITS_NORTH AND SOUTH DAM.GPJ GINT AUSTRALIA.GDT 19-9-18

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-27

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 947 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717174 m E **NORTHING (m)** 6294593 m S

TEST PIT SIZE 0.5m x 2.5m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, moist, dry of plastic limit, estimated hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown and brown, trace sand, moist, dry of plastic limit, estimated hard		1.0									RESIDUAL
Test Pit TP18-27 Virtual Refusal at 1.3 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-28

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 5-6-18 **R.L. SURFACE (m)** 970 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717290 m E **NORTHING (m)** 6295753 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, yellow brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
CLAYEY SILT (ML), low plasticity, pale yellow brown, low, with sand, moist, dry of plastic limit, estimated very stiff to hard		0.5									ALLUVIAL
SILTY CLAY (CI-CH), medium to high plasticity, yellow brown, with cobbles (Quartz), moist, dry of plastic limit, estimated hard		1.0									
hard to friable, grading to SILTSTONE, yellow brown, very low strength, extremely weathered											
Test Pit TP18-28 terminated at 1.3 m		1.5									
		2.0									

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

TEST PIT NUMBER TP18-29

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 4-6-18 **R.L. SURFACE (m)** 954 **DATUM** AHD

GROUNDWATER Not Encountered **LOCATION** South Dam TSF

EQUIPMENT 3-5t Excavator **EASTING (m)** 717055 m E **NORTHING (m)** 6295873 m S

TEST PIT SIZE 0.5m x 2.6m **LOGGED BY** HAA **CHECKED BY** SDW

Material Description: Soil: SOIL NAME, USCS SYMBOL, plasticity/ particle size & shape, colour, secondary components, minor components, moisture, consistency, structure, origin, additional observations. Rock: ROCK NAME, grain size, colour, fabric and texture, minor components, durability, strength, weathering, defects	Graphic Log	Depth (m)	Water	sample type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
TOPSOIL: SILT (ML), low plasticity, brown, with sand, trace rootlets, moist, dry of plastic limit, estimated very stiff to hard											TOPSOIL
SILT (ML), low plasticity, pale yellow brown, with sand, moist, dry of plastic limit, estimated very stiff to hard		0.5									ALLUVIAL
CLAYEY SILT (ML), low plasticity, pale yellow brown and brown, low to medium plasticity, moist, dry of plastic limit, estimated hard		1.0									RESIDUAL
Test Pit TP18-29 terminated at 1.6 m		1.5									
		2.0									

APPENDIX B4

BOREHOLE NUMBER BH200

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715908 **NORTHING (m)** 6294133

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SANDY CLAY (CI) - estimated stiff, medium plasticity, red brown gravelly sandy clay with some silt, moist. Sand is fine, gravel is medium to coarse, sub-angular to sub-rounded.		0.5		BS							
	Borehole BH200 terminated at 0.9m		1.0 1.5 2.0 2.5 3.0									

ATC BORHOLE BORES.GPJ GINT AUSTRALIA.GDT 29/3/19

BOREHOLE NUMBER BH201

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716161 **NORTHING (m)** 6294082

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w_l) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	SANDY SILTY CLAY (CI) - estimated hard, medium plasticity, pale grey and dark grey fine sandy silty clay, dry.		0.5									
	- estimated very stiff to hard, dark grey mottled orange brown, moist below 0.5m				BS							
			1.0									
	Borehole BH201 terminated at 1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH202

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716100 **NORTHING (m)** 6294200

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	SILTY CLAY (CI to CH) - estimated very stiff to hard, medium to high plasticity, dark grey mottled orange brown and black silty clay with trace of fine sand, moist.		0.5		BS							
			1.0									
	Borehole BH202 terminated at 1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH203

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716368 **NORTHING (m)** 6294091

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w_l) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose, dark grey, silty fine sand with rootlets, moist.		0.0									
	GRAVELLY SILTY CLAY (CL to CI) - estimated very stiff, low to medium plasticity, pale grey brown and red brown, fine to medium gravelly silty clay, moist.		0.5									
			1.0		BS							
	- with phyllite fragments below 1.3m		1.5									
	Borehole BH203 terminated at 1.5m		2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH204

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716300 **NORTHING (m)** 6294200

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale brown, silty fine sand with rootlets, moist.											
	GRAVELLY SILTY CLAY (CL) - estimated stiff to very stiff, low plasticity, pale yellow brown, fine to medium gravelly silty clay with some fine sand, moist.		0.5									
			1.0		BS							
	Borehole BH204 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH205

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716485 **NORTHING (m)** 6294068

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose, dark red brown, silty fine sand with rootlets, moist.											
	GRAVELLY SANDY CLAY (CI to CH) - estimated stiff to very stiff, medium to high plasticity, dark red brown, fine to medium gravelly sandy clay, moist.		0.5									
			1.0		BS							
	Borehole BH205 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH206

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716874 **NORTHING (m)** 6294055

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY SAND (SP) - estimated dense to very dense, pale grey, fine to medium gravelly silty fine sand with rootlets, moist.		0.5									
	GRAVELLY SANDY CLAY (CI) - estimated very stiff, medium plasticity, dark red brown, fine to coarse gravelly sandy clay, moist.		1.0		BS							
	Borehole BH206 terminated at 1.5m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH207

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717110 **NORTHING (m)** 6294030

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey, silty fine sand with rootlets, moist.											
	GRAVELLY SILTY CLAY (CI to CH) - estimated very stiff to hard, medium to high plasticity, pale grey and yellow brown, medium to coarse gravelly silty clay with some fine sand and trace cobbles, moist.		0.5									
			1.0		BS							
	Borehole BH207 terminated at 1.3m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH208

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717080 **NORTHING (m)** 6294270

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SANDY CLAY (CL) - estimated hard, low plasticity, pale grey and pale orange brown, fine gravelly sandy clay with some rootlets, dry											
	SILTY CLAY (CL to CI) - estimated hard, low to medium plasticity, dark grey and orange brown mottled black, silty clay, moist.		0.5		BS							
	Borehole BH208 terminated at 0.9m		1.0 1.5 2.0 2.5 3.0									

BOREHOLE NUMBER BH209

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716700 **NORTHING (m)** 6294200

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated medium dense, pale grey, silty fine sand topsoil, dry with rootlets											
	GRAVELLY SANDY CLAY (CI) - estimated stiff to very stiff, medium plasticity, pale orange brown mottled black, fine to medium gravelly sandy clay, moist.		0.5		BS							
			1.0									
	Borehole BH209 terminated at 1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH210

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716953 **NORTHING (m)** 6294277

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY CLAY (CI to CH) - estimated stiff to very stiff, medium to high plasticity, pale grey brown, medium to coarse gravelly silty clay with some fine sand, moist.		0.5		BS							
			1.0									
	Borehole BH210 terminated at 1.1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH211

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715700 **NORTHING (m)** 6294400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose, pale grey, silty fine sand topsoil, dry with rootlets GRAVELLY SANDY CLAY (CI) - estimated very stiff, medium plasticity, orange brown, pale grey and black, gravelly sandy clay, moist. Sand is fine to medium, gravel is medium to coarse, sub-angular to sub-rounded.		0.5		BS							
	Borehole BH211 terminated at 0.9m		1.0 1.5 2.0 2.5 3.0									

BOREHOLE NUMBER BH212

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715900 **NORTHING (m)** 6294420

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose, pale grey, silty fine sand topsoil, dry with rootlets SANDY SILTY CLAY (CL to CI) - estimated very stiff to hard, low to medium plasticity, grey and orange brown, fine sandy silty clay with some coarse gravel-sized fragments of sub-angular phyllite, moist.		0.5		BS							
	Borehole BH212 terminated at 0.9m		1.0 1.5 2.0 2.5 3.0									

BOREHOLE NUMBER BH213

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716300 **NORTHING (m)** 6294400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale brown, silty fine sand with rootlets, moist.		0.5									
	GRAVELLY SILTY CLAY (CI) - estimated stiff, medium plasticity, pale yellow brown, fine gravelly silty clay with trace of fine sand, moist.		1.0		BS							
	Borehole BH213 terminated at 1.3m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH214

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716700 **NORTHING (m)** 6294400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY CLAY (CI to CH) - estimated very stiff, medium to high plasticity, pale grey orange brown, fine to medium gravelly silty clay with some fine sand, moist.		0.5		BS							
	PHYLLITE - very low strength, highly weathered		1.0									
	Borehole BH214 terminated at 1m		1.5 2.0 2.5 3.0									

BOREHOLE NUMBER BH215

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715700 **NORTHING (m)** 6294600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: GRAVELLY SILTY SAND (SM) - estimated loose to medium dense, pale orange grey, gravelly silty fine sand topsoil, dry with rootlets. Gravel is medium, sub-rounded.											
	GRAVELLY SANDY CLAY (CL to CI) - estimated hard, low to medium plasticity, dark grey brown and black, gravelly sandy clay, moist. Sand is fine to coarse, gravel is medium to coarse, sub-angular phyllite.		0.5		BS							
	Borehole BH215 terminated at 1m		1.0									
			1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH216

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715900 **NORTHING (m)** 6294600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose, pale grey, silty fine sand topsoil, dry with rootlets SANDY SILTY CLAY (CI to CH) - estimated stiff to very stiff, medium to high plasticity, pale grey brown, black and orange, fine sandy silty clay with some fine gravel, moist.		0.5		BS							
	Borehole BH216 terminated at 0.9m		1.0 1.5 2.0 2.5 3.0									

BOREHOLE NUMBER BH217

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716100 **NORTHING (m)** 6294600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose, pale grey, silty fine sand topsoil, dry with rootlets											
	GRAVELLY SANDY CLAY (CL to CI) - estimated hard, low to medium plasticity, red brown mottled black, fine to medium gravelly sandy clay, moist.											
	- estimated very stiff to hard, medium plasticity below 0.5m		0.5		BS							
			1.0									
	Borehole BH217 terminated at 1.1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH218

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716300 **NORTHING (m)** 6294600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w_l) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	SANDY SILTY CLAY (CL to CI) - estimated stiff, low to medium plasticity, pale grey medium to coarse sandy silty clay, moist.		0.5									
	- estimated very stiff to hard, dark grey mottled orange brown, moist below 0.5m				BS							
			1.0									
	Borehole BH218 terminated at 1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH219

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716500 **NORTHING (m)** 6294600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w_l) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale brown, silty fine sand with rootlets, moist.											
	GRAVELLY SANDY CLAY (CI) - estimated stiff to very stiff, medium plasticity, pale grey and orange brown, fine to medium gravelly sandy clay, moist.		0.5									
	GRAVELLY SILTY CLAY (CI to CH) - estimated stiff to very stiff, medium to high plasticity, orange brown, fine to medium gravelly silty clay with trace of fine sand, moist.		1.0		BS							
			1.5									
	Borehole BH219 terminated at 1.5m		2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH220

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716700 **NORTHING (m)** 6294600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SANDY CLAY (CI to CH) - estimated stiff to very stiff, medium to high plasticity, pale grey, fine gravelly sandy clay with some silt, moist.		0.5									
	SANDY SILTY CLAY (CI) - estimated very stiff, medium plasticity, red brown, fine sandy silty clay with trace fine gravel, moist.		1.0		BS							
			1.5									
	Borehole BH220 terminated at 1.5m		2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH221

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717000 **NORTHING (m)** 6294600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w_l) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey brown, silty fine sand with rootlets, moist.											
	SANDY SILT (ML) - estimated medium dense, pale yellow brown fine sandy silt, moist.		0.5									
	GRAVELLY SANDY CLAY (CI) - estimated very stiff, medium plasticity, grey brown and orange red brown, fine to medium gravelly sandy clay, moist. Sand is fine to medium.		1.0		BS							
	Borehole BH221 terminated at 1.5m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH222

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717300 **NORTHING (m)** 6294600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: SILTY GRAVELLY SAND (SP) - estimated loose to medium dense, pale grey brown, silty fine gravelly sand with rootlets, moist.											
	GRAVELLY SANDY CLAY (CL to CI) - estimated stiff to very stiff, low to medium plasticity, pale yellow brown and grey brown, fine to medium gravelly sandy clay with some cobbles, moist. Sand is medium to coarse.		0.5									
			1.0		BS							
	Borehole BH222 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH223

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715700 **NORTHING (m)** 6294800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	SILTY GRAVELLY SAND (SP) - estimated medium dense to dense, pale grey, silty gravelly silty sand, dry with rootlets. Sand and gravel is fine to medium, sub-angular.											
	GRAVELLY SILTY CLAY (CI) - estimated hard, medium plasticity, dark grey mottled red brown, gravelly silty clay with some fine sand, moist. Gravel is coarse, angular to sub-angular phyllite.		0.5		BS							
			1.0									
	Borehole BH223 terminated at 1.1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH224

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715900 **NORTHING (m)** 6294800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose, pale grey, silty fine sand topsoil, dry with rootlets SANDY SILTY CLAY (CI to CH) - estimated very stiff, medium to high plasticity, pale grey brown, black and orange, fine sandy silty clay with some fine gravel, moist.		0.5		BS							
	Borehole BH224 terminated at 1m		1.0									
			1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH225

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716100 **NORTHING (m)** 6294800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose, pale grey, silty fine sand topsoil, dry with rootlets SANDY SILTY CLAY (CI to CH) - estimated very stiff, medium to high plasticity, grey and orange brown fine to medium sandy silty clay with some fine gravel, moist.		0.5		BS							
	Borehole BH225 terminated at 0.9m		1.0 1.5 2.0 2.5 3.0									

BOREHOLE NUMBER BH226

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716300 **NORTHING (m)** 6294800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey brown, silty fine sand topsoil, dry with rootlets											
	GRAVELLY SANDY CLAY (CI) - estimated stiff to very stiff, medium plasticity, red brown mottled black, fine gravelly sandy clay with some silt, moist.		0.5		BS							
	Borehole BH226 terminated at 0.9m		1.0									
			1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH227

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716500 **NORTHING (m)** 6294800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: CLAYEY SAND (SC) - estimated dense to very dense, pale grey mottled orange, low plasticity clayey fine sand with some rootlets, moist											
	SANDY SILTY CLAY (CI) - estimated very stiff, medium plasticity, dark grey mottled orange brown, fine sandy silty clay, moist.		0.5		BS							
			1.0									
	Borehole BH227 terminated at 1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH228

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Seepage at 1.3m **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716700 **NORTHING (m)** 6294800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	SANDY SILTY CLAY (CI) - estimated very stiff to hard, medium plasticity, pale grey mottled brown and black, fine sandy silty clay, moist		0.5		BS							
	SILTY CLAY (CH) - estimated soft to firm, high plasticity, dark grey, moist to wet silty clay with trace fine sand		1.0	Seepage	BS							
	Borehole BH228 terminated at 1.5m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH229

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716900 **NORTHING (m)** 6294800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	GRAVELLY SILTY SAND (SP) - estimated dense, pale grey and white, gravelly silty fine sand, dry. Gravel is fine to medium, sub-angular.											
	GRAVELLY SANDY CLAY (CI) - estimated hard, medium plasticity, pale orange brown, gravelly fine sandy clay with some silt, moist. Gravel is medium to coarse, sub-rounded.		0.5									
			1.0		BS							
			1.5									
	Borehole BH229 terminated at 1.5m											
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH230

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717300 **NORTHING (m)** 6294800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: GRAVELLY CLAYEY SAND (SP) - estimated loose, pale grey, fine gravelly clayey fine sand with rootlets, moist. Low plasticity clay portion.											
	GRAVELLY CLAYEY SAND (SP) - estimated medium dense, pale grey brown, gravelly clayey fine sand, moist. Gravel is medium to coarse, sub-rounded.		0.5									
	SILTY SANDY CLAY (CI) - estimated stiff to very stiff, medium plasticity, grey brown and pale orange, fine to coarse gravelly sandy clay, moist. Sand is fine to medium.		1.0		BS							
	Borehole BH230 terminated at 1.3m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH232

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716100 **NORTHING (m)** 6295000

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey, silty fine sand topsoil, dry with rootlets											
	GRAVELLY SANDY CLAY (CI) - estimated stiff to very stiff, medium plasticity, dark brown and black, fine to medium gravelly sandy clay with trace of cobbles, moist.		0.5		BS							
	- cobbles absent below 0.5m		1.0									
	Borehole BH232 terminated at 1.25m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH233

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716300 **NORTHING (m)** 6295000

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey, silty fine sand topsoil, dry with rootlets		0.5									
	GRAVELLY SANDY CLAY (CI) - estimated stiff to very stiff, medium plasticity, red brown, gravelly sandy clay, moist. Sand is medium to coarse, gravel is fine to coarse sub-angular quartz. Trace of cobbles.				BS							
			1.0									
	Borehole BH233 terminated at 1.1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH234

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716500 **NORTHING (m)** 6295000

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: CLAYEY SAND (SC) - estimated dense to very dense, pale grey mottled orange, low plasticity clayey fine sand with some rootlets, moist SANDY SILTY CLAY (CL to CI) - estimated hard, low to medium plasticity, dark grey mottled orange brown, fine sandy silty clay, moist. - estimated stiff to very stiff, orange brown below 0.7m		0.5 1.0		BS							
	Borehole BH234 terminated at 1.2m		1.5 2.0 2.5 3.0									

ATC BORHOLE BORES.GPJ GINT AUSTRALIA.GDT 29/3/19

BOREHOLE NUMBER BH235

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 18/3/19 **COMPLETED** 18/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716700 **NORTHING (m)** 6295000

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	GRAVELLY SILTY SAND (SP) - estimated dense, pale grey and white, gravelly silty fine sand, dry. Gravel is fine to medium, sub-angular.		0.5									
	SANDY SILTY CLAY (CI to CH) - estimated stiff to very stiff, medium to high plasticity, dark grey mottled orange brown, fine sandy silty clay with some fine gravel, moist.		1.0		BS							
	Borehole BH235 terminated at 1.5m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH236

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717100 **NORTHING (m)** 6295000

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: GRAVELLY CLAYEY SAND (SP) - estimated loose, dark brown, fine gravelly clayey fine sand with rootlets, moist. Low plasticity clay portion.											
	GRAVELLY CLAYEY SAND (SP) - estimated medium dense, pale grey brown, gravelly clayey fine sand, moist. Gravel is medium to coarse, sub-rounded.		0.5									
	GRAVELLY SANDY CLAY (CI) - estimated very stiff, medium plasticity, grey brown and pale orange, fine to coarse gravelly sandy clay, moist. Sand is fine to medium.		1.0		BS							
	Borehole BH236 terminated at 1.3m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH237

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715900 **NORTHING (m)** 6295200

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey, silty fine sand topsoil, dry with rootlets		0.0									
	GRAVELLY SANDY CLAY (CI) - estimated stiff to very stiff, medium plasticity, red brown and grey, fine to medium gravelly sandy clay, moist.		0.5		BS							
			1.0									
	Borehole BH237 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH238

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716100 **NORTHING (m)** 6295200

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey, silty fine sand with rootlets, dry											
	GRAVELLY SANDY CLAY (CI) - estimated stiff to very stiff, medium plasticity, red brown and black, gravelly sandy clay, moist. Sand and gravel is medium to coarse.		0.5		BS							
			1.0									
	Borehole BH238 terminated at 1.1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH239

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716500 **NORTHING (m)** 6295200

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY SAND (SP) - estimated very dense, pale brown, medium to coarse gravelly silty fine sand with some cobbles of quartzite, dry		0.5									
	SANDY SILTY CLAY (CI) - estimated stiff to very stiff, pale orange brown and dark orange brown, medium plasticity, fine sandy silty clay, moist		1.0		BS							
	Borehole BH239 terminated at 1.3m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH240

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716700 **NORTHING (m)** 6295200

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	GRAVELLY SILTY CLAY (CL to CI) - estimated very stiff to hard, low to medium plasticity, pale grey brown, fine to coarse gravelly silty clay with some fine sand, moist.		0.5									
	- dark grey mottled orange brown, medium to high plasticity below 0.9m		1.0		BS							
	- pale grey and orange brown below 1.2m											
	Borehole BH240 terminated at 1.4m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH241

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717100 **NORTHING (m)** 6295200

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: GRAVELLY SILTY SAND (SM) - estimated loose to medium dense, pale grey and white, gravelly silty fine sand topsoil, dry with rootlets. Gravel is medium, sub-rounded.											
	GRAVELLY SANDY CLAY (CL to CI) - estimated stiff to very stiff, low to medium plasticity, pale orange brown, fine to coarse gravelly sandy clay with some silt and occasional cobbles, moist.		0.5		BS							
			1.0									
	Borehole BH241 terminated at 1.1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH242

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 20/3/19 **COMPLETED** 20/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715700 **NORTHING (m)** 6295400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose, pale grey, silty fine sand topsoil, dry with rootlets											
	SANDY GRAVELLY CLAY (CL to CI) - estimated very stiff to hard, low to medium plasticity, pale grey, black and orange brown, sandy gravelly clay, moist. Sand is fine to medium, gravel is medium to coarse, sub-angular phyllite.		0.5		BS							
	Borehole BH242 terminated at 1m		1.0									
			1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH243

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 715900 **NORTHING (m)** 6295400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SAND (SP) - estimated dense, pale grey coarse gravelly sand, dry. Gravel is sub-angular phyllite.		0.5									
	GRAVELLY CLAY (CL) - estimated hard, low plasticity, dark grey and red brown, coarse gravelly clay, moist.		1.0		BS							
	Borehole BH243 terminated at 1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH244

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716100 **NORTHING (m)** 6295400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	SILTY GRAVELLY SAND (SP) - estimated dense, pale orange brown, silty gravelly sand, dry. Sand and gravel is medium to coarse.											
	SANDY SILTY CLAY (CI) - estimated stiff to very stiff, medium plasticity, pale grey and red orange brown, medium to coarse sandy silty clay with some fine gravel, moist.		0.5		BS							
	Borehole BH244 terminated at 1.2m		1.0									
			1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH245

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716300 **NORTHING (m)** 6295400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY SAND (SP) - estimated very dense, pale brown, medium to coarse gravelly silty fine sand with some cobbles of quartzite, dry		0.5									
	Borehole BH245 terminated at 0.9m		1.0 1.5 2.0 2.5 3.0									

ATC BORHOLE BORES.GPJ GINT AUSTRALIA.GDT 29/3/19

BOREHOLE NUMBER BH245A

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716323 **NORTHING (m)** 6295393

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY SAND (SP) - estimated very dense, pale brown, medium to coarse gravelly silty fine sand with some cobbles of quartzite, dry											
	SANDY SILTY CLAY (CI to CH) - estimated very stiff, medium to high plasticity, red brown and grey, fine sandy silty clay, moist		0.5		BS							
			1.0									
	Borehole BH245A terminated at 1.3m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH246

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716500 **NORTHING (m)** 6295400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY SAND (SP) - estimated dense to very dense, pale grey and white, fine gravelly silty fine sand, dry.											
	SANDY SILTY CLAY (CI to CH) - estimated stiff to very stiff, medium to high plasticity, grey brown mottled red brown, fine sandy silty clay with trace of fine gravel, moist.		0.5									
			1.0		BS							
	Borehole BH246 terminated at 1.3m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH247

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716700 **NORTHING (m)** 6295400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: GRAVELLY SILTY SAND (SM) - estimated loose to medium dense, pale grey brown, gravelly silty fine sand topsoil, dry with rootlets. Gravel is medium, sub-rounded.											
	GRAVELLY SANDY CLAY (CI) - estimated very stiff, medium plasticity, orange brown, fine to coarse gravelly sandy clay with some silt and occasional cobbles, moist.		0.5		BS							
	Borehole BH247 terminated at 1m		1.0									
			1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH248

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716900 **NORTHING (m)** 6295400

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey, silty fine sand with some fine gravel, moist.											
	GRAVELLY SILTY CLAY (CL to CI) - estimated stiff to very stiff, low to medium plasticity, pale grey brown and orange brown, medium to coarse gravelly silty clay with some fine sand, moist.		0.5									
			1.0		BS							
	Borehole BH248 terminated at 1.4m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH249

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716950 **NORTHING (m)** 9295230

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey, silty fine sand with some fine gravel, moist.											
	GRAVELLY SILTY CLAY (CL to CI) - estimated very stiff to hard, low to medium plasticity, pale grey and orange brown, fine to coarse gravelly silty clay with some medium to coarse sand, moist.		0.5									
			1.0		BS							
	Borehole BH249 terminated at 1.3m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH250

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716100 **NORTHING (m)** 6295600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w_l) (%)	Liquid Limit (w_l)	Plasticity Index (I_p)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY CLAYEY SAND (SP) - estimated dense, pale grey, gravelly low plasticity clayey sand, moist. Sand and gravel is medium to coarse.											
	SANDY SILTY CLAY (CI) - estimated stiff to very stiff, medium plasticity, pale grey and red orange brown, medium to coarse sandy silty clay with some fine gravel, moist.		0.5		BS							
	Borehole BH250 terminated at 1m		1.0									
			1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH251

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716300 **NORTHING (m)** 6295600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale grey, silty fine sand, dry.		0.0									
	SANDY SILTY CLAY (CI) - estimated very stiff, medium plasticity, red brown, fine to medium sandy silty clay with some fine sub-rounded gravel, moist.		0.5									
			1.0		BS							
	Borehole BH251 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH252

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716500 **NORTHING (m)** 6295600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY SAND (SP) - estimated dense to very dense, pale brown, gravelly silty fine sand, moist. Gravel is fine to coarse.											
	GRAVELLY SANDY CLAY (CI) - estimated very stiff, medium plasticity, dark green brown, gravellly sandy clay, moist. Sand is fine to medium, gravel is medium to coarse, sub-angular.		0.5		BS							
			1.0									
	Borehole BH252 terminated at 1.1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH253

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716700 **NORTHING (m)** 6295600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: SILTY SAND (SM) - estimated dense to very dense, pale grey and white, silty fine sand with some fine gravel, moist.											
	SANDY SILTY CLAY (CL) - estimated very stiff to hard, low plasticity, pale grey brown, medium to coarse sandy silty clay with some fine to coarse gravel and cobbles, moist.		0.5		BS							
			1.0									
	Borehole BH253 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH254

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716900 **NORTHING (m)** 6295600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale brown, silty fine sand with rootlets, moist.		0.0									
	SANDY SILTY CLAY (CI) - estimated stiff to very stiff, medium plasticity, pale orange and grey brown, fine to coarse sandy silty clay with trace of medium to coarse gravel, moist.		0.5									
			1.0		BS							
	Borehole BH254 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH255

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717100 **NORTHING (m)** 6295600

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	TOPSOIL: SILTY SAND (SM) - estimated loose to medium dense, pale brown, silty fine sand with rootlets, moist.											
	SANDY SILTY CLAY (CI) - estimated hard, medium plasticity, pale orange and grey brown, fine to coarse sandy silty clay with trace of medium to coarse gravel, moist.		0.5									
	- estimated stiff to very stiff below 0.6m		1.0		BS							
	Borehole BH255 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH256

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716300 **NORTHING (m)** 6295800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	GRAVELLY SILTY SAND (SP) - estimated medium dense to dense, pale grey, gravelly silty fine sand, dry. Gravel is medium to coarse, sub-rounded.		0.5									
	SANDY SILTY CLAY (CL to CI) - estimated hard, low to medium plasticity, dark grey mottled red orange brown, medium sandy silty clay, moist.		1.0		BS							
	Borehole BH256 terminated at 1.1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH257

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716500 **NORTHING (m)** 6295800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY SAND (SP) - estimated medium dense to dense, pale grey, gravelly silty fine sand, dry. Gravel is medium to coarse, sub-rounded.											
	SANDY GRAVELLY CLAY (CL to CI) - estimated very stiff to hard, low to medium plasticity, pale orange and grey brown, fine sandy gravelly clay, moist. Gravel is fine to coarse, sub-angular to sub-rounded		0.5		BS							
			1.0									
	Borehole BH257 terminated at 1.1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH258

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716900 **NORTHING (m)** 6295800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	GRAVELLY SILTY SAND (SP) - estimated medium dense to dense, pale orange brown, gravelly silty fine sand, moist. Gravel is medium to coarse, sub-angular to sub-rounded.		0.5									
	GRAVELLY SILTY CLAY (CL to CI) - estimated very stiff to hard, low to medium plasticity, pale grey and orange brown, gravelly silty clay with some medium sand, moist. Gravel is medium to coarse, angular.		1.0		BS							
	Borehole BH258 terminated at 1.5m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH259

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717100 **NORTHING (m)** 6295800

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	GRAVELLY SILTY SAND (SP) - estimated medium dense to dense, pale grey brown, gravelly silty fine sand, moist. Gravel is fine to medium, rounded.		0.5									
	SANDY SILTY CLAY (CI) - estimated stiff to very stiff, medium plasticity, pale grey and orange brown, fine to coarse sandy silty clay with some fine gravel, moist.		1.0		BS							
			1.5									
	Borehole BH259 terminated at 1.5m		2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH260

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716700 **NORTHING (m)** 6296000

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w_l) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	SANDY GRAVELLY CLAY (CI) - estimated stiff to very stiff, medium plasticity, pale grey brown, sandy gravelly clay, moist. Sand is fine to coarse, gravel is fine, sub-angular.		0.5									
	- pale grey brown mottled orange brown below 0.5m				BS							
			1.0									
	Borehole BH260 terminated at 1m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH261

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716900 **NORTHING (m)** 6296000

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
	GRAVELLY SILTY SAND (SP) - estimated medium dense to dense, pale orange brown, gravelly silty fine sand, moist. Gravel is medium to coarse, sub-angular to sub-rounded.		0.5									
	GRAVELLY SANDY CLAY (CL to CI) - estimated very stiff, low to medium plasticity, pale grey and orange brown, gravelly sandy clay with some silt, moist. Sand and gravel is medium to coarse.		1.0		BS							
	Borehole BH261 terminated at 1.3m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH262

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 717100 **NORTHING (m)** 6296000

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	TOPSOIL: GRAVELLY SILTY CLAY (CL) - estimated stiff, low plasticity, pale grey brown gravelly silty clay with some fine sand with rootlets, moist. Gravel is medium to coarse, sub-rounded.		0.0									
	GRAVELLY SANDY CLAY (CI) - estimated very stiff, medium plasticity, red brown fine gravelly sandy clay with trace silt, moist. Sand is fine to coarse.		0.5		BS							
			1.0									
	Borehole BH262 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

BOREHOLE NUMBER BH263

ATC Williams

ATC Williams Pty Ltd
Lvl 2, 16-20 Edmondstone St, Newmarket QLD 4051
Tel: (07) 3352 7222
email: brisbane@atcwilliams.com.au

CLIENT Regis Resources Ltd **PROJECT NAME** McPhillamys Gold Project - Permeability Test Bores

JOB NUMBER 113272.02 **PROJECT LOCATION** Kings Plains, NSW

DATE STARTED 19/3/19 **COMPLETED** 19/3/19 **R.L. SURFACE (m)** **DATUM** AHD

GROUNDWATER Not encountered **LOCATION**

EQUIPMENT JCB 205T skid steer loader with 450mm diam. auger **LOGGED BY** CFT **CHECKED BY**

HOLE SIZE 450mm **EASTING (m)** 716900 **NORTHING (m)** 6296150

Drilling Method	Material Description: Soil: TYPE, USCS SYMBOL, strength, plasticity or particle size, colour, secondary components, moisture condition (structure/bedding) Rock: TYPE, WEATHERING, colour, fabric, estimated strength, structure/bedding	Graphic Log	Depth (m)	Water	Sample Type	sample lost / sample disturbed	Samples Tests Remarks	Natural Moisture (w) (%)	Liquid Limit (w_L)	Plasticity Index (I_P)	% Finer than 0.075mm	Additional Observations
Solid Flight Auger	SANDY SILTY CLAY (CI) - estimated stiff, medium plasticity, pale grey brown, medium sandy silty clay with trace of fine gravel, moist.		0.5									
	- estimated very stiff to hard, dark grey brown below 0.6m		1.0		BS							
	Borehole BH263 terminated at 1.2m		1.5									
			2.0									
			2.5									
			3.0									

APPENDIX C1



Plate 1 - TP01



Plate 2 - TP01 Sidewall



Plate 3 - TP02



Plate 4 - TP02 Sidewall



Plate 5 - TP03



Plate 6 - TP03 Sidewall



Plate 7 - TP04



Plate 8 - TP04 Sidewall



Plate 9 - TP06



Plate 10 - TP06 Sidewall



Plate 11 - TP07



Plate 12 - TP07 Sidewall



Plate 13 - TP08



Plate 14 - TP08 Sidewall



Plate 15 - TP09



Plate 16 - TP09 Sidewall



Plate 17 - TP10



Plate 18 – TP10 Sidewall



Plate 19 – TP11



Plate 20 – TP11 Sidewall



Plate 21 – TP12



Plate 22 – TP12 Sidewall



Plate 23 – TP13



Plate 24 – TP13 Sidewall



Plate 25 – TP14



Plate 26 – TP14 Sidewall



Plate 27 – TP15



Plate 28 – TP15 Sidewall



Plate 29 – TP16



Plate 30 – TP16 Sidewall



Plate 31 – TP17



Plate 32 – TP17 Sidewall



Plate 33 – TP18



Plate 34 – TP18 Sidewall



Plate 35 – TP19



Plate 36 – TP19 Sidewall



Plate 37 – TP20



Plate 38 – TP20 Sidewall

APPENDIX C2



Plate 1 – TP18-01



Plate 2 – TP18-01 Sidewall



Plate 3 – TP18-02



Plate 4 – TP18-02 Sidewall



Plate 5 – TP18-03



Plate 6 – TP18-03 Sidewall



Plate 7 – TP18-04



Plate 8 – TP18-04 Sidewall



Plate 9 – TP18-06



Plate 10 – TP18-06 Sidewall



Plate 11 – TP18-07



Plate 12 – TP18-07 Sidewall



Plate 13 – TP18-08



Plate 14 – TP18-08 Sidewall



Plate 15 – TP18-09



Plate 16 – TP18-09 Sidewall



Plate 17 – TP18-10



Plate 18 – TP18-10 Sidewall



Plate 19 – TP18-11



Plate 20 – TP18-11 Sidewall



Plate 21 – TP18-12



Plate 22 – TP18-12 Sidewall



Plate 23 – TP18-13



Plate 24 – TP18-13 Sidewall



Plate 25 – TP18-14



Plate 26 – TP18-14 Sidewall



Plate 27 – TP18-15



Plate 28 – TP18-15 Sidewall



Plate 29 – TP18-16



Plate 30 – TP18-16 Sidewall



Plate 31 – TP18-17



Plate 32 – TP18-17 Sidewall



Plate 33 – TP18-18



Plate 34 – TP18-18 Sidewall



Plate 35 – TP18-19



Plate 36 – TP18-19 Sidewall



Plate 37 – TP18-20



Plate 38 – TP18-20 Sidewall



Plate 39 – TP18-21



Plate 40 – TP18-21 Sidewall



Plate 41 – TP18-22



Plate 42 – TP18-22 Sidewall



Plate 43 – TP18-23



Plate 44 – TP18-23 Sidewall



Plate 45 – TP18-24



Plate 46 – TP18-24 Sidewall



Plate 47 – TP18-25



Plate 48 – TP18-25 Sidewall



Plate 49 – TP18-26



Plate 50 – TP18-26 Sidewall



Plate 51 – TP18-27



Plate 52 – TP18-27 Sidewall



Plate 53 – TP18-28



Plate 54 – TP18-28 Sidewall



Plate 55 – TP18-29



Plate 56 – TP18-29 Sidewall

APPENDIX D

Job No:	113272.02	**Date:**	8-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P01		

Depth of Borehole:	60	**cm**
Height of water in Borehole:	30	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1300	0.00
120	1255	22.50
180	1238	17.00
240	1220	18.00
300	1205	15.00
360	1195	10.00
420	1180	15.00
480	1155	25.00
600	1130	12.50
900	1062	13.60
1200	998	12.80
1500	936	12.40
1800	892	8.80

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	11.00	cm^3/min
k:	**6.91E-07**	m/sec
k:	6.91E-05	cm/sec

Job No:	113272.02	**Date:**	8-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P02		

Depth of Borehole:	70	**cm**
Height of water in Borehole:	28	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1250	0.00
120	1184	33.00
180	1162	22.00
240	1136	26.00
300	1112	24.00
360	1086	26.00
420	1054	32.00
480	1030	24.00
600	980	25.00
900	852	25.60
1200	720	26.40
1500	594	25.20
1800	474	24.00
2100	355	23.80

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	18.73	cm^3/min
k:	**1.29E-06**	m/sec
k:	1.29E-04	cm/sec

Job No:	113272.02	**Date:**	8-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P03		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	40	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1480	0.00
120	1400	40.00
180	1368	32.00
240	1338	30.00
300	1308	30.00
360	1280	28.00
420	1250	30.00
480	1229	21.00
600	1178	25.50
900	1061	23.40
1200	970	18.20
1500	872	19.60
1800	786	17.20
2100	702	16.80
2400	620	16.40

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	17.97	cm^3/min
k:	**7.70E-07**	m/sec
k:	7.70E-05	cm/sec

Job No:	113272.02	**Date:**	8-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P04		

Depth of Borehole:	100	**cm**
Height of water in Borehole:	45	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1440	0.00
120	1412	14.00
180	1401	11.00
240	1382	19.00
300	1368	14.00
360	1350	18.00
420	1335	15.00
480	1320	15.00
600	1292	14.00
900	1226	13.20

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	10.69	cm^3/min
k:	**3.89E-07**	m/sec
k:	3.89E-05	cm/sec

Job No:	113272.02	**Date:**	8-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P05		

Depth of Borehole:	90	**cm**
Height of water in Borehole:	40	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1450	0.00
120	1428	11.00
180	1422	6.00
240	1419	3.00
300	1415	4.00
360	1411	4.00
420	1408	3.00
480	1404	4.00
600	1400	2.00
900	1386	2.80
1200	1377	1.80
1500	1368	1.80
1800	1360	1.60
2100	1352	1.60
2400	1344	1.60

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	2.49	cm^3/min
k:	**1.07E-07**	m/sec
k:	1.07E-05	cm/sec

Job No:	113272.02	**Date:**	8-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P06		

Depth of Borehole:	140	**cm**
Height of water in Borehole:	85	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1520	0.00
120	1500	10.00
180	1496	4.00
240	1491	5.00
300	1486	5.00
360	1481	5.00
420	1479	2.00
480	1476	3.00
600	1470	3.00
900	1452	3.60
1200	1436	3.20
1500	1420	3.20

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	3.09	cm^3/min
k:	**4.45E-08**	m/sec
k:	4.45E-06	cm/sec

Job No:	113272.02	**Date:**	8-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P07		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	33	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1400	0.00
120	1398	1.00
180	1397	1.00
240	1396	1.00
300	1395	1.00
360	1394	1.00
420	1393	1.00
480	1392	1.00
600	1391	0.50
900	1390	0.20
1200	1389	0.20
1500	1388	0.20

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	0.53	cm^3/min
k:	**2.95E-08**	m/sec
k:	2.95E-06	cm/sec

Job No:	113272.02	**Date:**	07-06-18
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P08		

Depth of Borehole:	100	**cm**
Height of water in Borehole:	55	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1500	0.00
120	1406	47.00
180	1370	36.00
240	1334	36.00
300	1298	36.00
360	1264	34.00
420	1230	34.00
480	1196	34.00
600	1128	34.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	26.28	cm^3/min
k:	**7.21E-07**	m/sec
k:	7.21E-05	cm/sec

Job No:	113272.02	**Date:**	07-06-18
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P09		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	35	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1420	0.00
120	1105	157.50
180	965	140.00
240	825	140.00
300	685	140.00
360	545	140.00
420	410	135.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	102.66	cm^3/min
k:	**5.27E-06**	m/sec
k:	5.27E-04	cm/sec

Job No:	113272.02	**Date:**	7-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P10		

Depth of Borehole:	100	**cm**
Height of water in Borehole:	55	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1520	0.00
120	1462	29.00
180	1440	22.00
240	1422	18.00
300	1408	14.00
360	1395	13.00
420	1383	12.00
480	1372	11.00
600	1350	11.00
900	1295	11.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	11.32	cm^3/min
k:	**3.10E-07**	m/sec
k:	3.10E-05	cm/sec

Job No:	113272.02	**Date:**	8-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P11		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	30	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1550	0.00
120	1503	23.50
180	1488	15.00
240	1478	10.00
300	1470	8.00
360	1462	8.00
420	1454	8.00
480	1446	8.00
600	1432	7.00
900	1404	5.60
1200	1378	5.20

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	7.10	cm^3/min
k:	**4.47E-07**	m/sec
k:	4.47E-05	cm/sec

Job No:	113272.02	**Date:**	8-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P13		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	29	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1530	0.00
120	1510	10.00
180	1502	8.00
240	1497	5.00
300	1492	5.00
360	1487	5.00
420	1482	5.00
480	1478	4.00
600	1470	4.00
900	1454	3.20
1200	1438	3.20
1500	1424	2.80

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	3.63	cm^3/min
k:	**2.38E-07**	m/sec
k:	2.38E-05	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P14		

Depth of Borehole:	70	**cm**
Height of water in Borehole:	25	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1470	0.00
120	1440	15.00
180	1424	16.00
240	1410	14.00
300	1400	10.00
360	1392	8.00
420	1384	8.00
480	1379	5.00
600	1370	4.50
900	1352	3.60
1200	1342	2.00
1500	1332	2.00
1800	1326	1.20
2100	1321	1.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	5.02	cm^3/min
k:	**3.99E-07**	m/sec
k:	3.99E-05	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P15		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	27	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1520	0.00
120	1230	145.00
180	1090	140.00
240	965	125.00
300	845	120.00
360	725	120.00
420	610	115.00
480	495	115.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	90.84	cm^3/min
k:	**6.54E-06**	m/sec
k:	6.54E-04	cm/sec

Job No:	113272.02	**Date:**	7-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P17		

Depth of Borehole:	70	**cm**
Height of water in Borehole:	30	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1410	0.00
120	1402	4.00
180	1400	2.00
240	1399	1.00
300	1398	1.00
360	1397	1.00
420	1396	1.00
480	1395	1.00
600	1393	1.00
900	1388	1.00
1200	1384	0.80
1500	1380	0.80

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	0.96	cm^3/min
k:	**6.03E-08**	m/sec
k:	6.03E-06	cm/sec

Job No:	113272.02	**Date:**	7-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P18		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	33	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1550	0.00
120	1486	32.00
180	1460	26.00
240	1436	24.00
300	1415	21.00
360	1396	19.00
420	1380	16.00
480	1368	12.00
600	1350	9.00
900	1318	6.40
1200	1288	6.00
1500	1260	5.60
1800	1232	5.60
2100	1204	5.60

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	10.46	cm^3/min
k:	**5.80E-07**	m/sec
k:	5.80E-05	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P19		

Depth of Borehole:	55	**cm**
Height of water in Borehole:	35	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1400	0.00
120	650	375.00
180	350	300.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	243.87	cm^3/min
k:	**1.25E-05**	m/sec
k:	1.25E-03	cm/sec

Job No:	113272.02	**Date:**	7-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P21		

Depth of Borehole:	50	**cm**
Height of water in Borehole:	25	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1160	0.00
120	850	155.00
180	705	145.00
240	560	145.00
300	420	140.00
360	280	140.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	104.77	cm^3/min
k:	**8.32E-06**	m/sec
k:	8.32E-04	cm/sec

Job No:	113272.02	**Date:**	7-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P22		

Depth of Borehole:	70	**cm**
Height of water in Borehole:	38	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1100	0.00
120	1078	11.00
180	1068	10.00
240	1059	9.00
300	1052	7.00
360	1045	7.00
420	1039	6.00
480	1033	6.00
600	1023	5.00
900	998	5.00
1200	978	4.00
1500	958	4.00
1800	941	3.40

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	4.66	cm^3/min
k:	**2.14E-07**	m/sec
k:	2.14E-05	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P23		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	55	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1508	0.00
120	1505	1.50
180	1504	1.00
240	1503	1.00
300	1502	1.00
360	1502	0.00
420	1502	0.00
480	1502	0.00
600	1502	0.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	0.41	cm^3/min
k:	**1.11E-08**	m/sec
k:	1.11E-06	cm/sec

Job No:	113272.02	**Date:**	7-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P25		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	35	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1142	0.00
120	1140	1.00
180	1140	0.00
240	1140	0.00
300	1139	1.00
360	1138	1.00
420	1137	1.00
480	1137	0.00
600	1137	0.00
900	1137	0.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	0.32	cm^3/min
k:	**1.65E-08**	m/sec
k:	1.65E-06	cm/sec

Job No:	113272.02	**Date:**	07-06-18
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P26		

Depth of Borehole:	75	**cm**
Height of water in Borehole:	28	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1120	0.00
120	987	66.50
180	925	62.00
240	865	60.00
300	805	60.00
360	750	55.00
420	695	55.00
480	645	50.00
600	555	45.00
900	330	45.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	40.02	cm^3/min
k:	**2.75E-06**	m/sec
k:	2.75E-04	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P27		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	45	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1500	0.00
120	1470	15.00
180	1455	15.00
240	1442	13.00
300	1431	11.00
360	1422	9.00
420	1416	6.00
480	1410	6.00
600	1400	5.00
900	1375	5.00
1200	1350	5.00
1500	1325	5.00
1800	1301	4.80

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	6.01	cm^3/min
k:	**2.19E-07**	m/sec
k:	2.19E-05	cm/sec

Job No:	113272.02	**Date:**	7-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P28		

Depth of Borehole:	85	**cm**
Height of water in Borehole:	45	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1100	0.00
120	1000	50.00
180	950	50.00
240	905	45.00
300	860	45.00
360	815	45.00
420	770	45.00
480	730	40.00
600	654	38.00
900	470	36.80

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	31.70	cm^3/min
k:	**1.15E-06**	m/sec
k:	1.15E-04	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P29		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	35	**cm**
Average diameter of Borehole:	11	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1130	0.00
120	1100	15.00
180	1085	15.00
240	1072	13.00
300	1062	10.00
360	1052	10.00
420	1043	9.00
480	1035	8.00
600	1019	8.00
900	980	7.80
1200	941	7.80
1500	902	7.80
1800	865	7.40

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	7.15	cm^3/min
k:	**3.88E-07**	m/sec
k:	3.88E-05	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P30		

Depth of Borehole:	110	**cm**
Height of water in Borehole:	30	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1450	0.00
120	1446	2.00
180	1444	2.00
240	1442	2.00
300	1440	2.00
360	1438	2.00
420	1436	2.00
480	1434	2.00
600	1432	1.00
900	1432	0.00
1200	1432	0.00
1500	1432	0.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	1.08	cm^3/min
k:	**6.82E-08**	m/sec
k:	6.82E-06	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P36		

Depth of Borehole:	100	**cm**
Height of water in Borehole:	50	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1450	0.00
120	1390	30.00
180	1362	28.00
240	1334	28.00
300	1308	26.00
360	1282	26.00
420	1256	26.00
480	1230	26.00
600	1180	25.00
900	1064	23.20

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	19.12	cm^3/min
k:	**6.01E-07**	m/sec
k:	6.01E-05	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P38		

Depth of Borehole:	85	**cm**
Height of water in Borehole:	30	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1520	0.00
120	1020	250.00
180	790	230.00
240	560	230.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	171.01	cm^3/min
k:	**1.08E-05**	m/sec
k:	1.08E-03	cm/sec

Job No:	113272.02	**Date:**	7-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P40		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	25	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1280	0.00
120	905	187.50
180	735	170.00
240	565	170.00
300	395	170.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	126.00	cm^3/min
k:	**1.00E-05**	m/sec
k:	1.00E-03	cm/sec

Job No:	113272.02	**Date:**	9-6-2018
Project:	McPhillamys Gold Project	**Operator:**	HAA
Test Site:	P41		

Depth of Borehole:	80	**cm**
Height of water in Borehole:	27	**cm**
Average diameter of Borehole:	12	**cm**
Depth to any impermeable layer:	-	**cm**

Comments about the site (waterlogging, fissures, biological pores etc.):

Test No 1		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**
0	1460	0.00
120	1457	1.50
180	1456	1.00
240	1456	0.00
300	1456	0.00
360	1456	0.00
420	1456	0.00
480	1456	0.00
600	1456	0.00
900	1456	0.00

Test No 2		
Time (s)	**Level in tube (mm)**	**Drop in level (mm/min)**

Q:	0.20	cm^3/min
k:	**1.45E-08**	m/sec
k:	1.45E-06	cm/sec

APPENDIX E1

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Report No: BRIS17S-01372-1
Issue No: 1

Material Test Report

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 21/06/2017

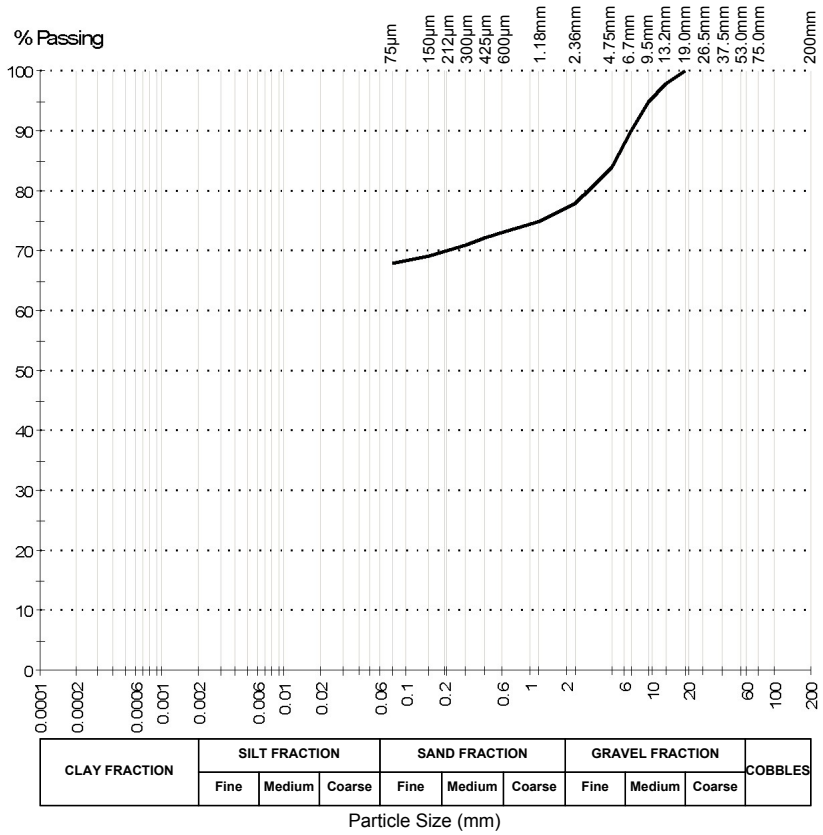
Sample Details

Sample ID:	BRIS17S-01372
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Composite Samples
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP21 0.4-0.6m, TP22 1.0-1.5m, TP23 1.0-1.5m

Other Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	13.5	
Mould Length (mm)		250.1	
Liquid Limit (%)	AS 1289.3.1.2	47	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	17	
Plasticity Index (%)	AS 1289.3.3.1	30	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	98	
9.5mm	95	
6.7mm	90	
4.75mm	84	
2.36mm	78	
1.18mm	75	
600µm	73	
425µm	72	
300µm	71	
150µm	69	
75µm	68	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01373-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 21/06/2017

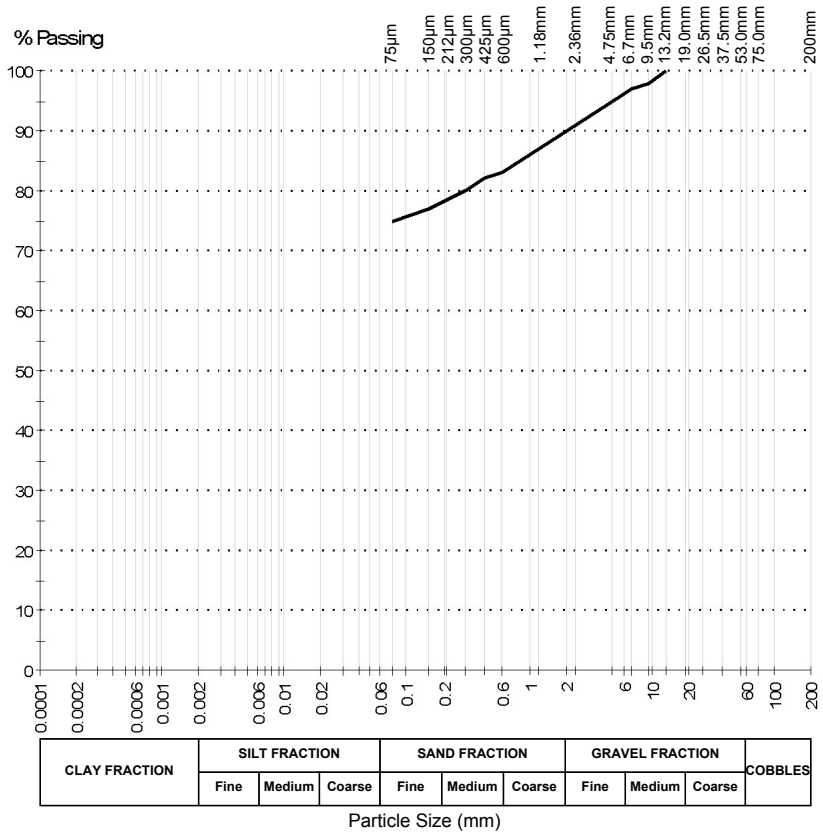
Sample Details

Sample ID:	BRIS17S-01373
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Composite Samples
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP24 0.9-2.0m, TP26 1.0-2.0m, TP30 0.4-1.0m

Other Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	3.5	
Mould Length (mm)		249.7	
Liquid Limit (%)	AS 1289.3.1.2	36	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	25	
Plasticity Index (%)	AS 1289.3.3.1	11	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	98	
6.7mm	97	
4.75mm	95	
2.36mm	91	
1.18mm	87	
600µm	83	
425µm	82	
300µm	80	
150µm	77	
75µm	75	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Report No: BRIS17S-01374-1
Issue No: 1

Material Test Report

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 21/06/2017

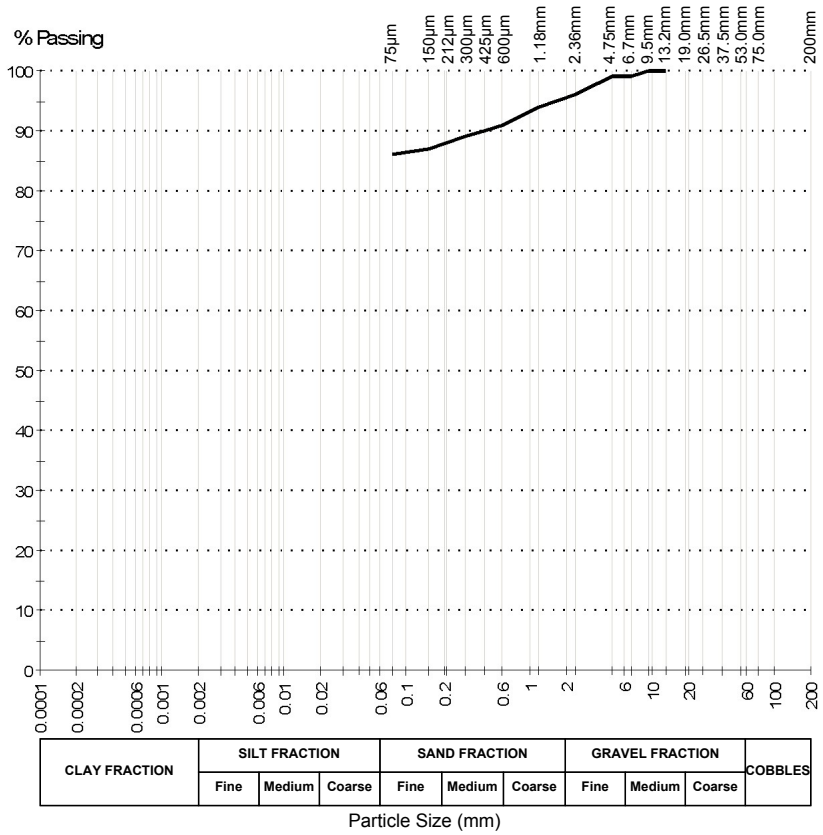
Sample Details

Sample ID:	BRIS17S-01374
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Composite Samples
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP32 0.4-2.0m, TP33 0.4-0.9m

Other Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	5.0	
Mould Length (mm)		250	
Liquid Limit (%)	AS 1289.3.1.2	33	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	17	
Plasticity Index (%)	AS 1289.3.3.1	16	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	100	
6.7mm	99	
4.75mm	99	
2.36mm	96	
1.18mm	94	
600µm	91	
425µm	90	
300µm	89	
150µm	87	
75µm	86	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01371-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 21/06/2017

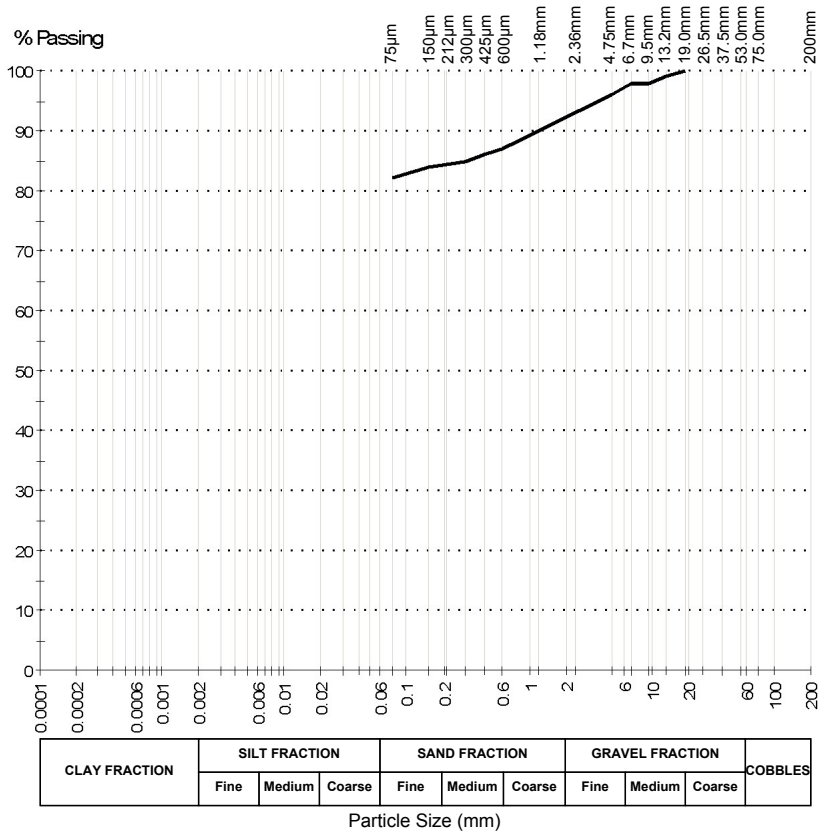
Sample Details

Sample ID:	BRIS17S-01371
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Composite Samples
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP11 0.2-2.0m, TP13 0.9-1.8m, TP18 1.5-1.9m

Other Test Results

Description	Method	Result	Limits
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	11.0	
Mould Length (mm)		250	
Liquid Limit (%)	AS 1289.3.1.2	46	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	20	
Plasticity Index (%)	AS 1289.3.3.1	26	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	99	
9.5mm	98	
6.7mm	98	
4.75mm	96	
2.36mm	93	
1.18mm	90	
600µm	87	
425µm	86	
300µm	85	
150µm	84	
75µm	82	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS17S-01373
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

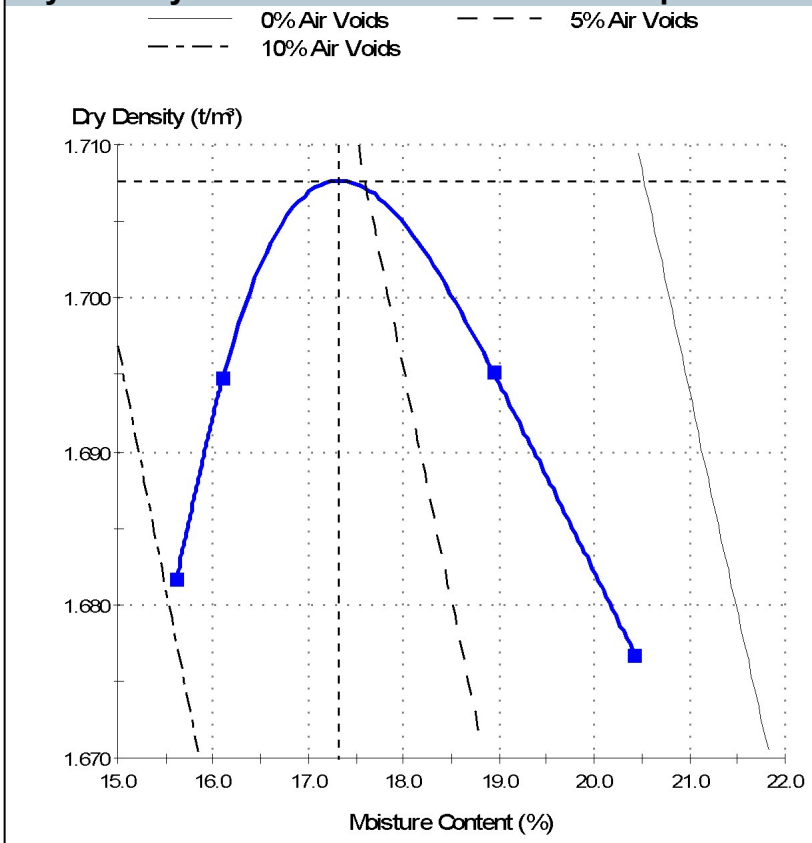
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 21/06/2017

Sample Details

Sample ID:	BRIS17S-01373	**Sampling Method:**	Submitted by client
Date Sampled:		**Material:**	Composite Samples
Date Submitted:		**Source:**	In situ
Date Tested:	16/06/2017	**Specification:**	AS Grading
Project Location:	McPhillamy's Gold Project		
Sample Location:	TP24 0.9-2.0m, TP26 1.0-2.0m, TP30 0.4-1.0m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.71**
Standard OMC (%):	**17.5**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS17S-01374
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

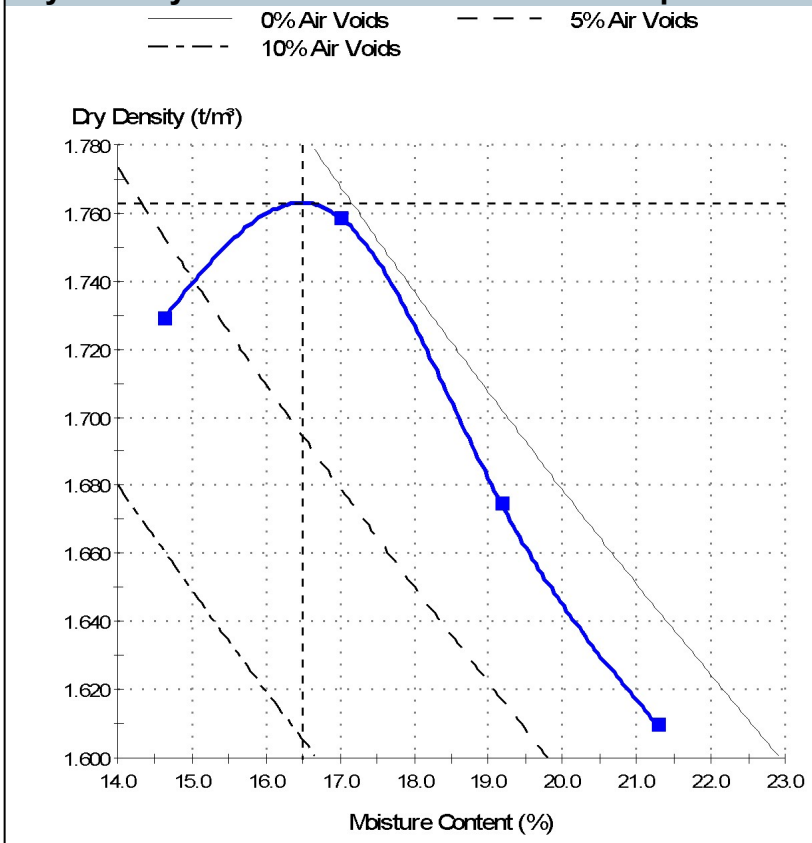
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 21/06/2017

Sample Details

Sample ID:	BRIS17S-01374	**Sampling Method:**	Submitted by client
Date Sampled:		**Material:**	Composite Samples
Date Submitted:		**Source:**	In situ
Date Tested:	16/06/2017	**Specification:**	AS Grading
Project Location:	McPhillamy's Gold Project		
Sample Location:	TP32 0.4-2.0m, TP33 0.4-0.9m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.76**
Standard OMC (%):	**16.5**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS17S-01371
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

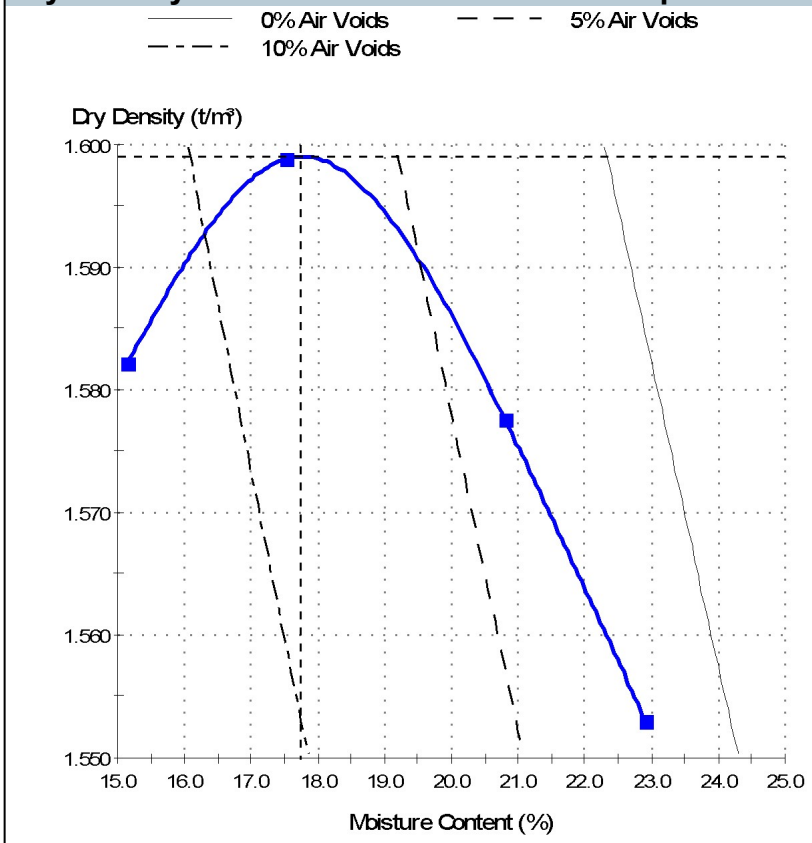
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 21/06/2017

Sample Details

Sample ID:	BRIS17S-01371	**Sampling Method:**	Submitted by client
Date Sampled:		**Material:**	Composite Samples
Date Submitted:		**Source:**	In situ
Date Tested:	15/06/2017	**Specification:**	AS Grading
Project Location:	McPhillamy's Gold Project		
Sample Location:	TP11 0.2-2.0m, TP13 0.9-1.8m, TP18 1.5-1.9m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.60**
Standard OMC (%):	**17.5**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS17S-01372
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

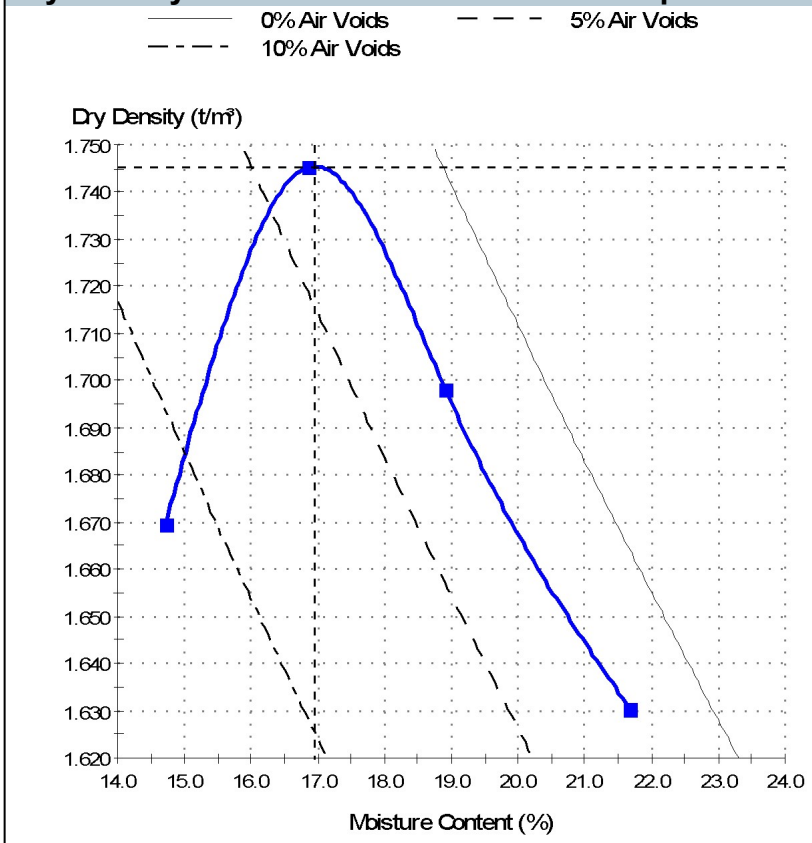
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 21/06/2017

Sample Details

Sample ID:	BRIS17S-01372	**Sampling Method:**	Submitted by client
Date Sampled:		**Material:**	Composite Samples
Date Submitted:		**Source:**	In situ
Date Tested:	16/06/2017	**Specification:**	AS Grading
Project Location:	McPhillamy's Gold Project		
Sample Location:	TP21 0.4-0.6m, TP22 1.0-1.5m, TP23 1.0-1.5m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.75**
Standard OMC (%):	**17.0**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01354-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

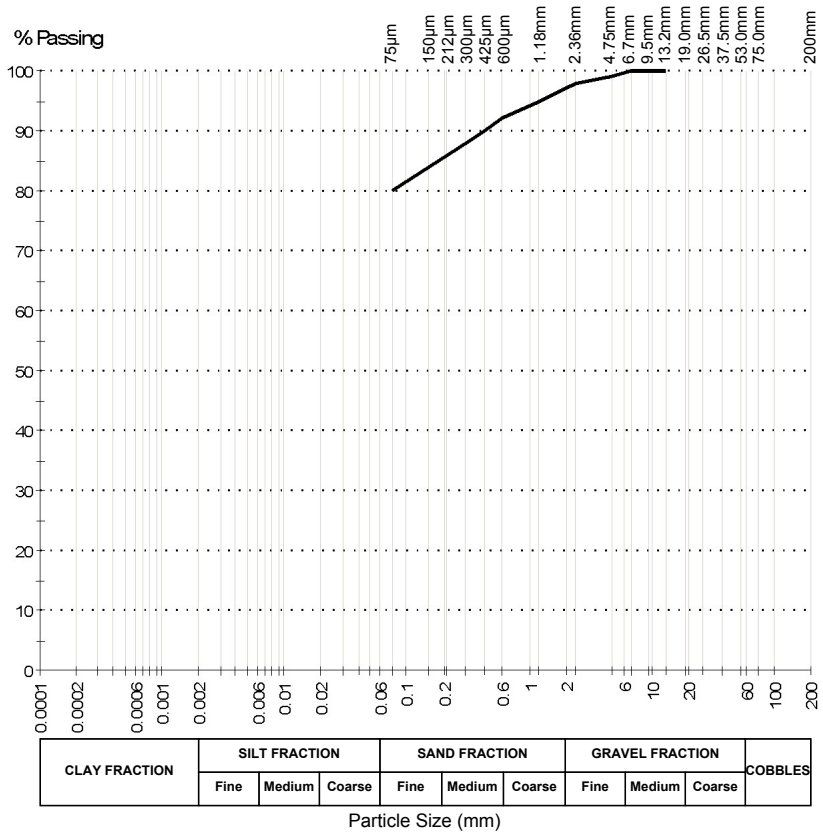
Sample Details

Sample ID:	BRIS17S-01354
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), grey
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP23 1.0-1.5m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	20.6	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	9.0	
Mould Length (mm)		249.8	
Liquid Limit (%)	AS 1289.3.1.2	38	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	19	
Plasticity Index (%)	AS 1289.3.3.1	19	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	98	
1.18mm	95	
600µm	92	
425µm	90	
300µm	88	
150µm	84	
75µm	80	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01354-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

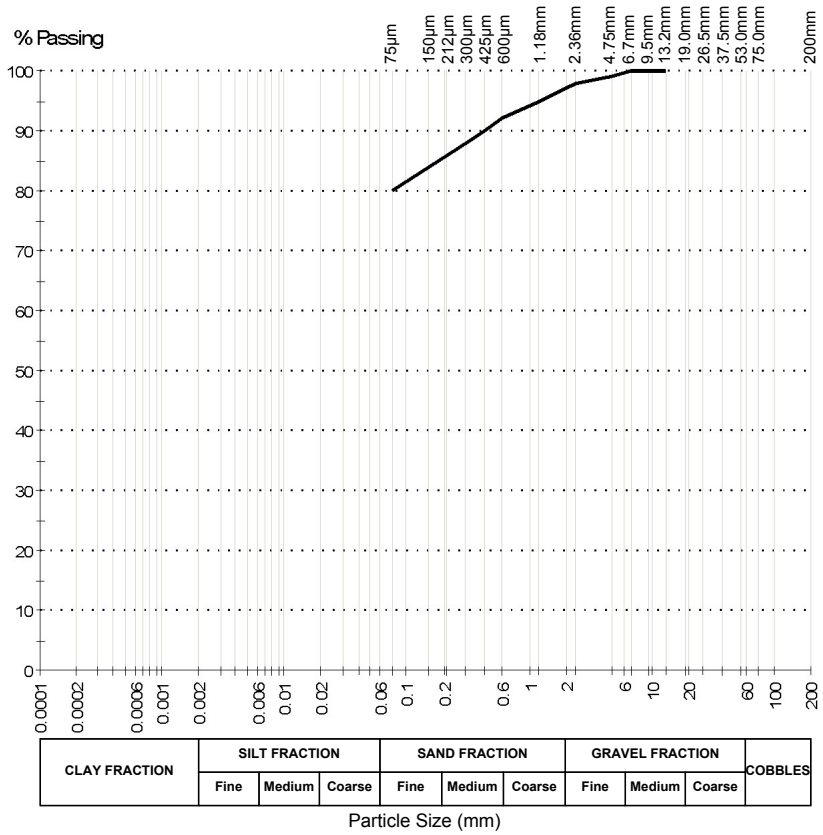
Sample Details

Sample ID:	BRIS17S-01354
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), grey
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP23 1.0-1.5m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY (CH) grey	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	98	
1.18mm	95	
600µm	92	
425µm	90	
300µm	88	
150µm	84	
75µm	80	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01355-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

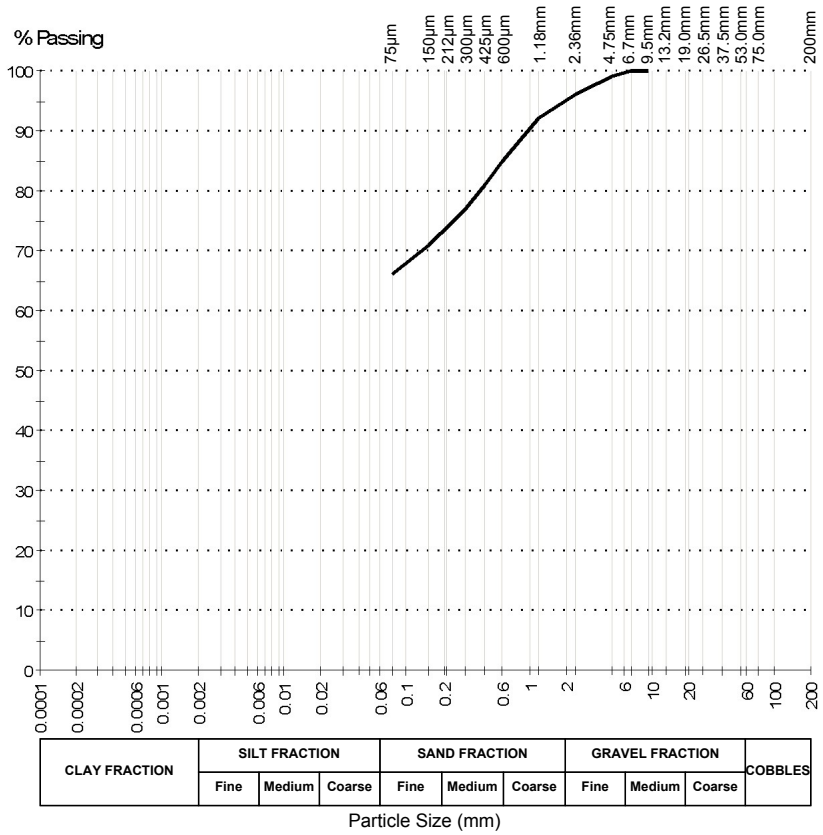
Sample Details

Sample ID:	BRIS17S-01355
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY with Gravel, orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP24
	0.9-2.0m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	16.2	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	4.0	
Mould Length (mm)		249.9	
Liquid Limit (%)	AS 1289.3.1.2	36	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	28	
Plasticity Index (%)	AS 1289.3.3.1	8	
Date Tested		15/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	96	
1.18mm	92	
600µm	85	
425µm	81	
300µm	77	
150µm	71	
75µm	66	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Report No: BRIS17S-01355-1
Issue No: 1

Material Test Report

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

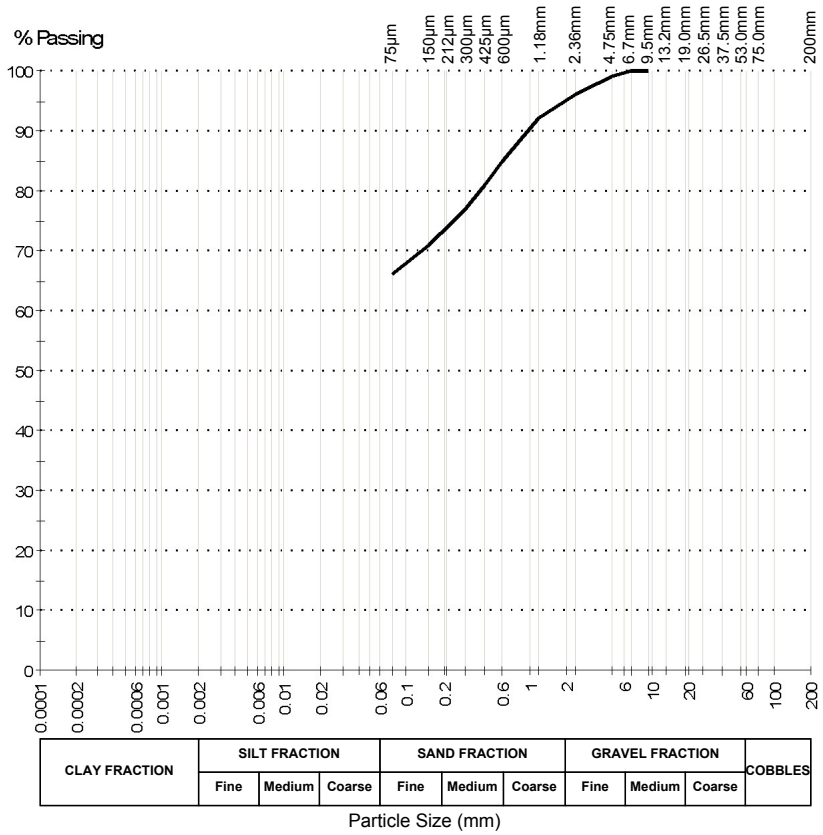
Sample Details

Sample ID:	BRIS17S-01355
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY with Gravel, orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP24 0.9-2.0m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY with gravel, orange	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	96	
1.18mm	92	
600µm	85	
425µm	81	
300µm	77	
150µm	71	
75µm	66	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01356-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

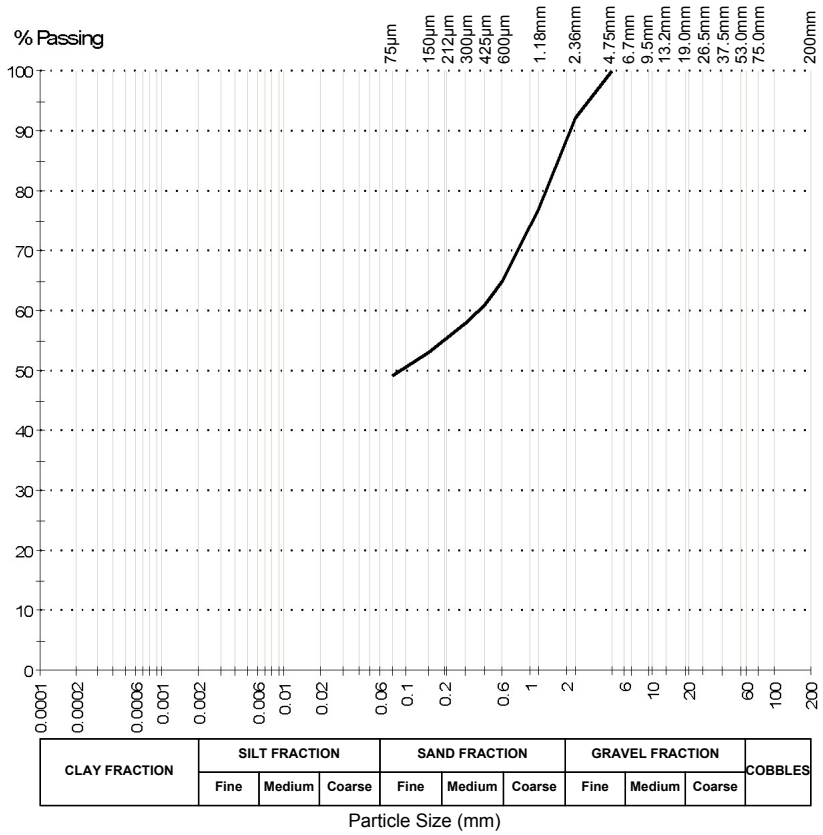
Sample Details

Sample ID:	BRIS17S-01356
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Clayey SAND, grey/brown
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP26 1.0-2.0m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	15.2	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	3.0	
Mould Length (mm)		249.8	
Liquid Limit (%)	AS 1289.3.1.2	32	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	26	
Plasticity Index (%)	AS 1289.3.3.1	6	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
4.75mm	100	
2.36mm	92	
1.18mm	77	
600µm	65	
425µm	61	
300µm	58	
150µm	53	
75µm	49	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01356-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

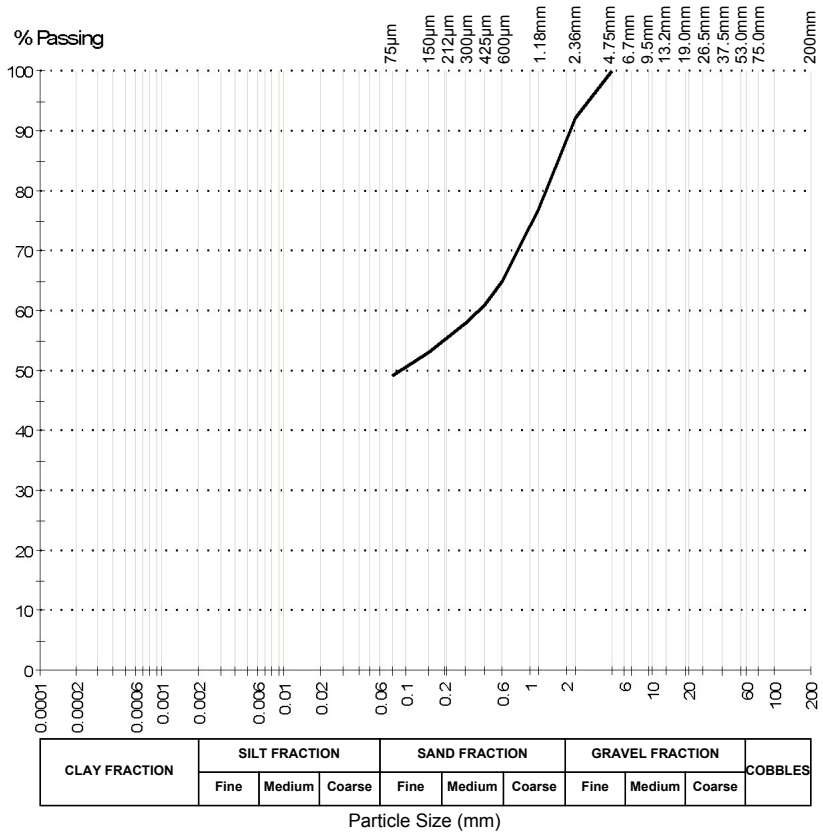
Sample Details

Sample ID:	BRIS17S-01356
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Clayey SAND, grey/brown
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP26 1.0-2.0m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		Clayey SAND, grey brown	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
4.75mm	100	
2.36mm	92	
1.18mm	77	
600µm	65	
425µm	61	
300µm	58	
150µm	53	
75µm	49	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01357-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

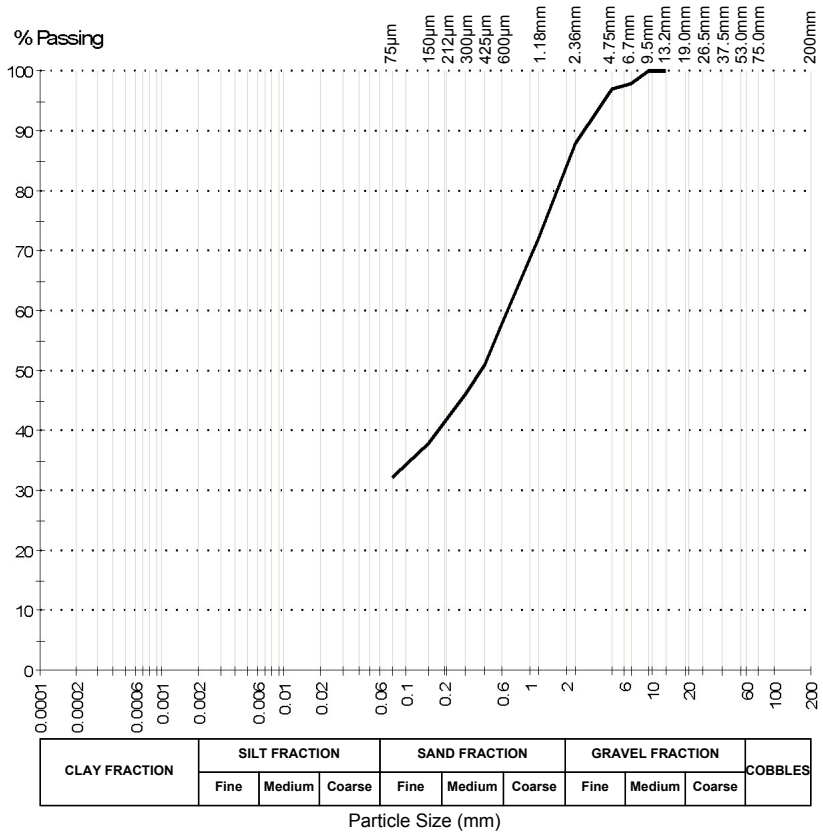
Sample Details

Sample ID:	BRIS17S-01357
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY with Gravel, orange/brown
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP27
	0.7-1.3m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	27.5	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	16.0	
Mould Length (mm)		250	
Curling		Yes	
Liquid Limit (%)	AS 1289.3.1.2	51	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	18	
Plasticity Index (%)	AS 1289.3.3.1	33	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	100	
6.7mm	98	
4.75mm	97	
2.36mm	88	
1.18mm	72	
600µm	58	
425µm	51	
300µm	46	
150µm	38	
75µm	32	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01357-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

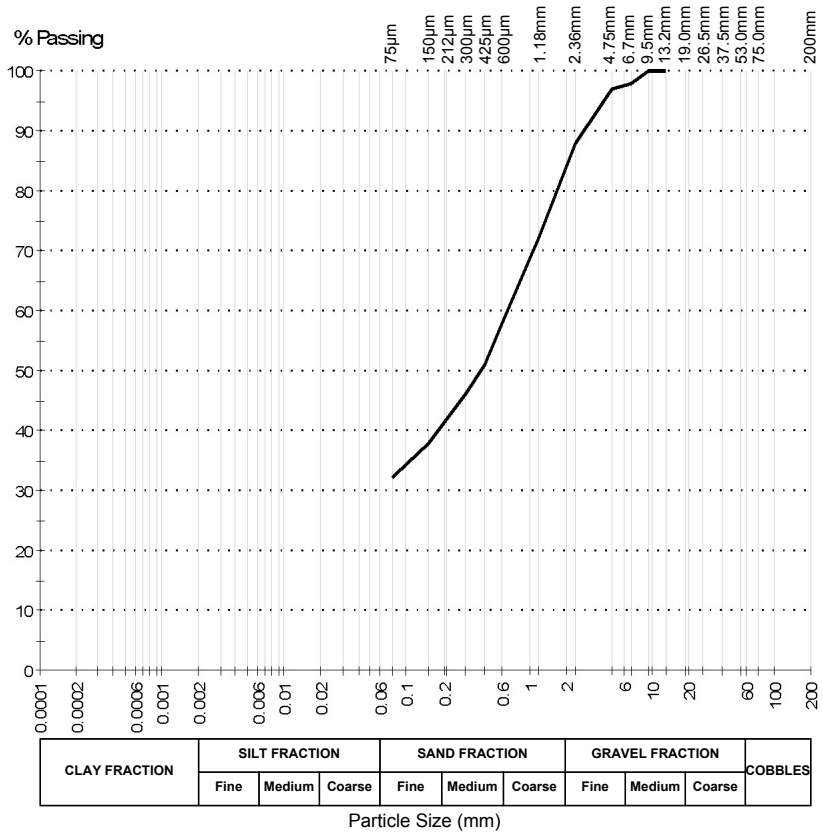
Sample Details

Sample ID:	BRIS17S-01357
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY with Gravel, orange/brown
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP27 0.7-1.3m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY with gravel, orange/brown	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	100	
6.7mm	98	
4.75mm	97	
2.36mm	88	
1.18mm	72	
600µm	58	
425µm	51	
300µm	46	
150µm	38	
75µm	32	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01358-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

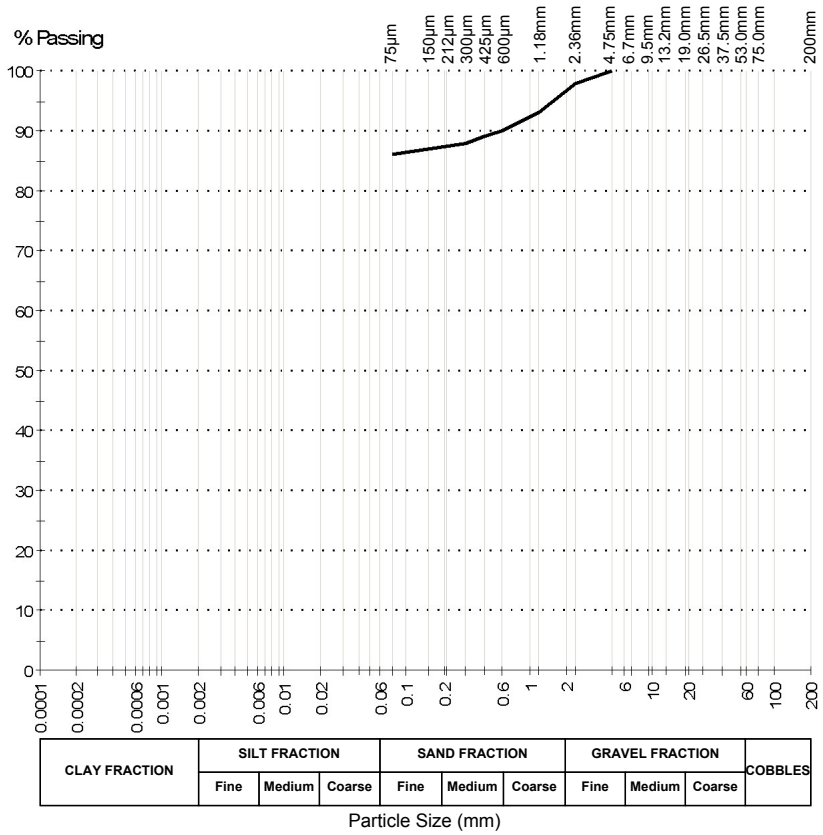
Sample Details

Sample ID:	BRIS17S-01358
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Clayey GRAVEL, pale brown
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP30
	0.4-1.0m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	14.5	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	4.5	
Mould Length (mm)		249.9	
Liquid Limit (%)	AS 1289.3.1.2	28	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	15	
Plasticity Index (%)	AS 1289.3.3.1	13	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
4.75mm	100	
2.36mm	98	
1.18mm	93	
600µm	90	
425µm	89	
300µm	88	
150µm	87	
75µm	86	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Report No: BRIS17S-01358-1
Issue No: 1

Material Test Report

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

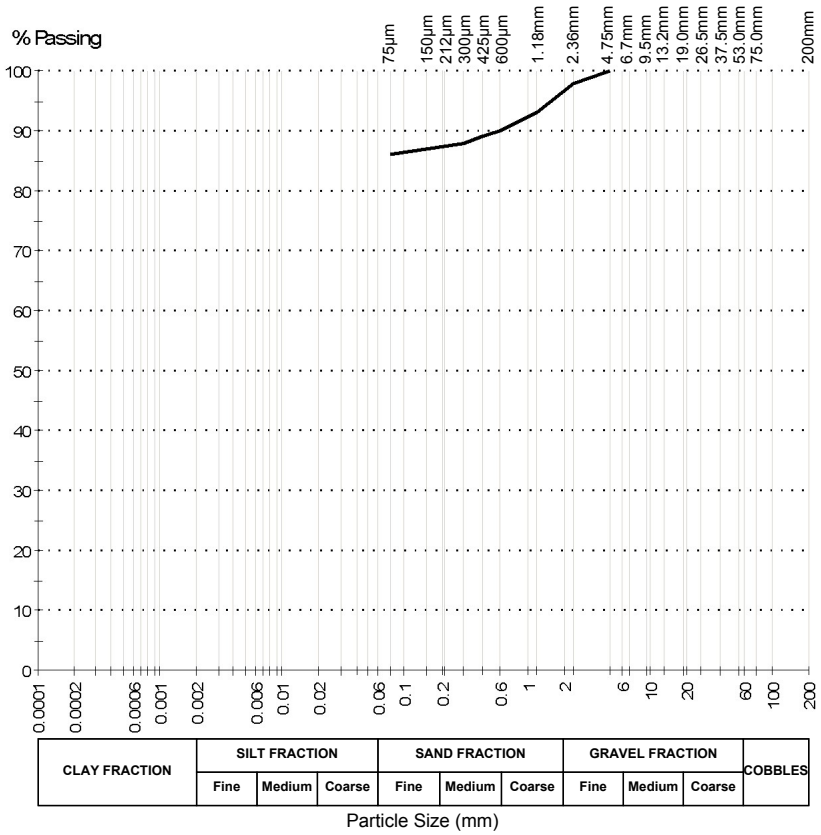
Sample Details

Sample ID: BRIS17S-01358
Client Sample:
Date Sampled:
Source: In situ
Material: Clayey GRAVEL, pale brown
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: McPhillamy's Gold Project
Sample Location: TP30
0.4-1.0m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	4	
Soil Description		Clayey GRAVEL, pale brown	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		20/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
4.75mm	100	
2.36mm	98	
1.18mm	93	
600µm	90	
425µm	89	
300µm	88	
150µm	87	
75µm	86	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01359-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

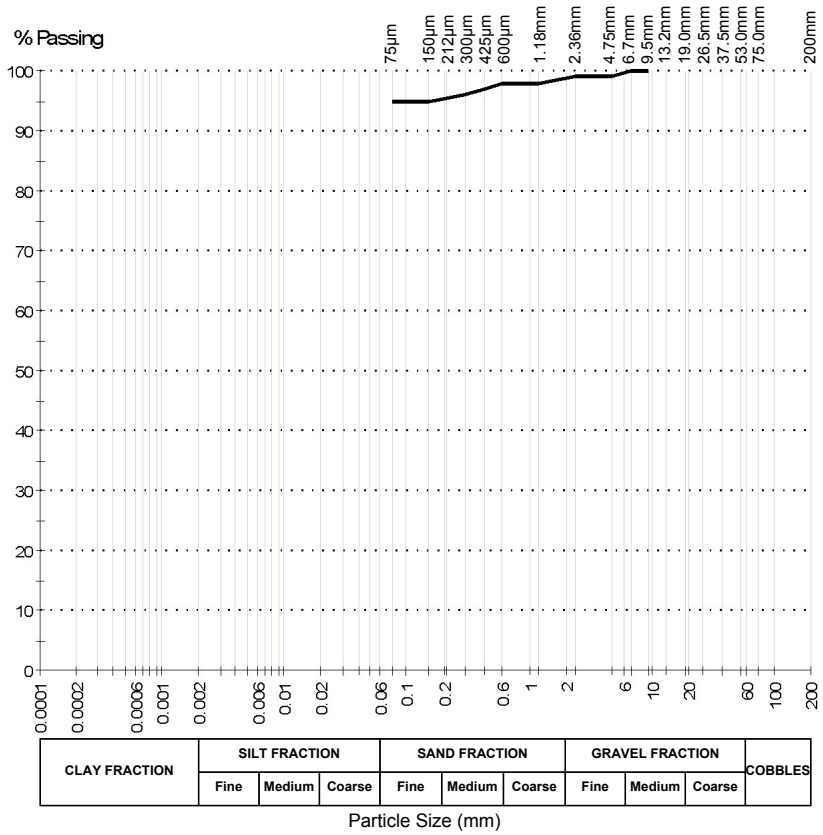
Sample Details

Sample ID:	BRIS17S-01359
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), grey
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP31
	1.5-2.4m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	25.0	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	4.5	
Mould Length (mm)		249.9	
Liquid Limit (%)	AS 1289.3.1.2	47	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	18	
Plasticity Index (%)	AS 1289.3.3.1	29	
Date Tested		15/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	99	
1.18mm	98	
600µm	98	
425µm	97	
300µm	96	
150µm	95	
75µm	95	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01359-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

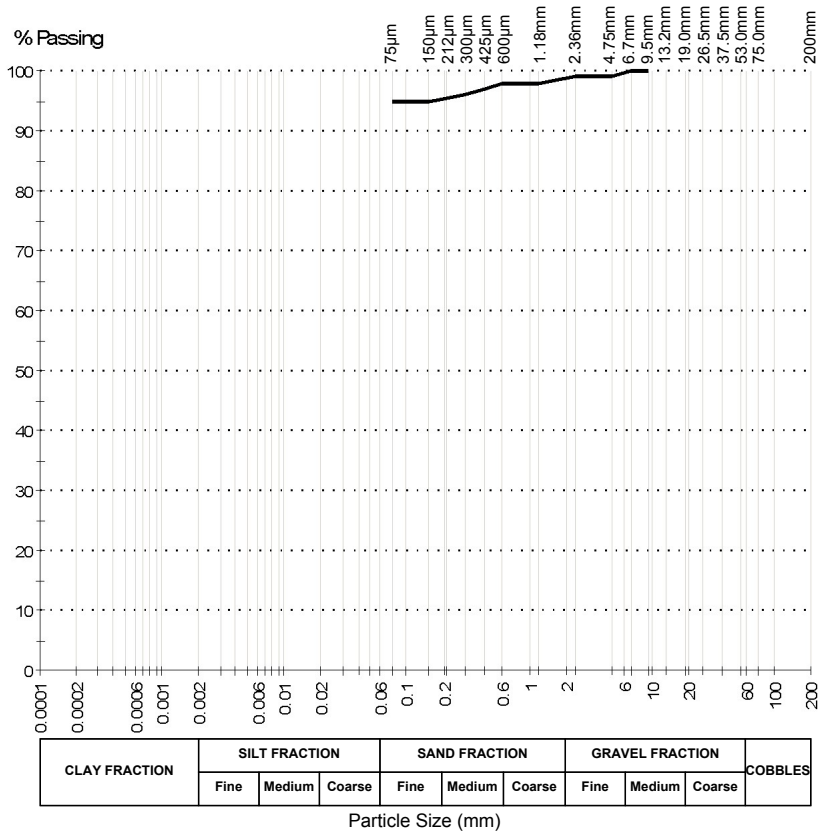
Sample Details

Sample ID:	BRIS17S-01359
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), grey
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP31
	1.5-2.4m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY (CH), grey	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	99	
1.18mm	98	
600µm	98	
425µm	97	
300µm	96	
150µm	95	
75µm	95	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01360-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

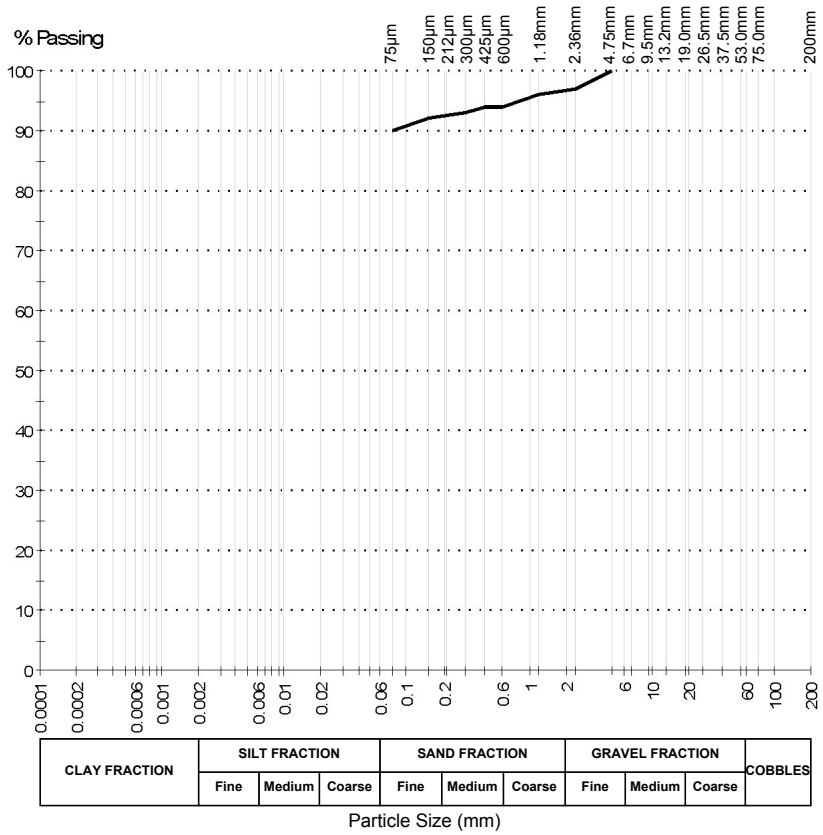
Sample Details

Sample ID:	BRIS17S-01360
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), dark grey/black
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP32 0.4-2.0m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	13.9	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	11.0	
Mould Length (mm)		250.1	
Curling		Yes	
Liquid Limit (%)	AS 1289.3.1.2	39	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	16	
Plasticity Index (%)	AS 1289.3.3.1	23	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
4.75mm	100	
2.36mm	97	
1.18mm	96	
600µm	94	
425µm	94	
300µm	93	
150µm	92	
75µm	90	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01360-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

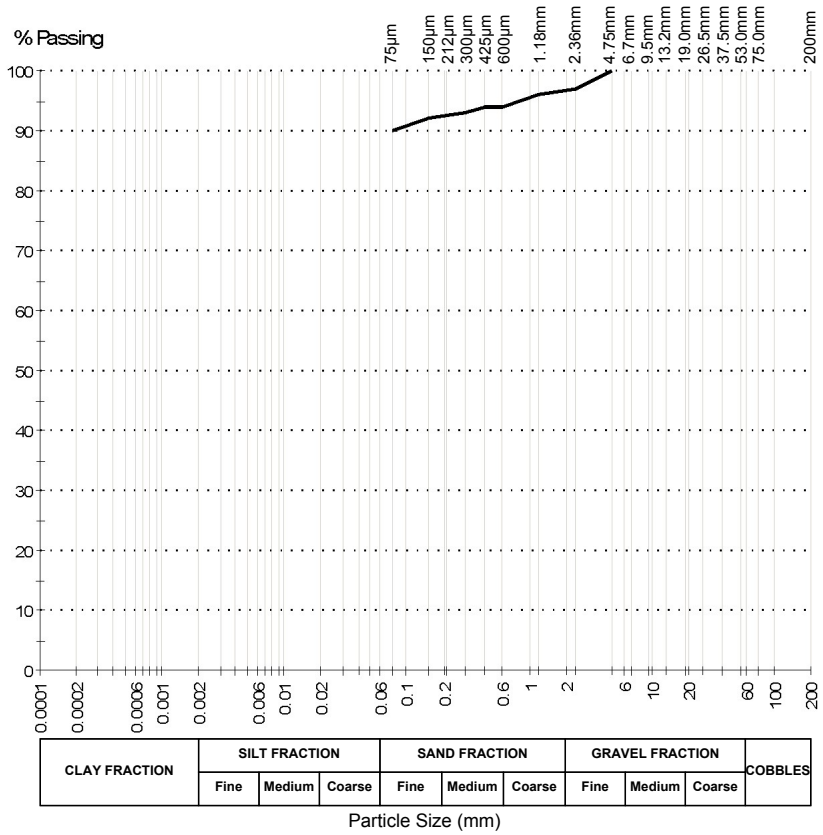
Sample Details

Sample ID:	BRIS17S-01360
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), dark grey/black
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP32 0.4-2.0m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY (CH), dark grey/black	
Type of Water		Disitlled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
4.75mm	100	
2.36mm	97	
1.18mm	96	
600µm	94	
425µm	94	
300µm	93	
150µm	92	
75µm	90	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01361-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

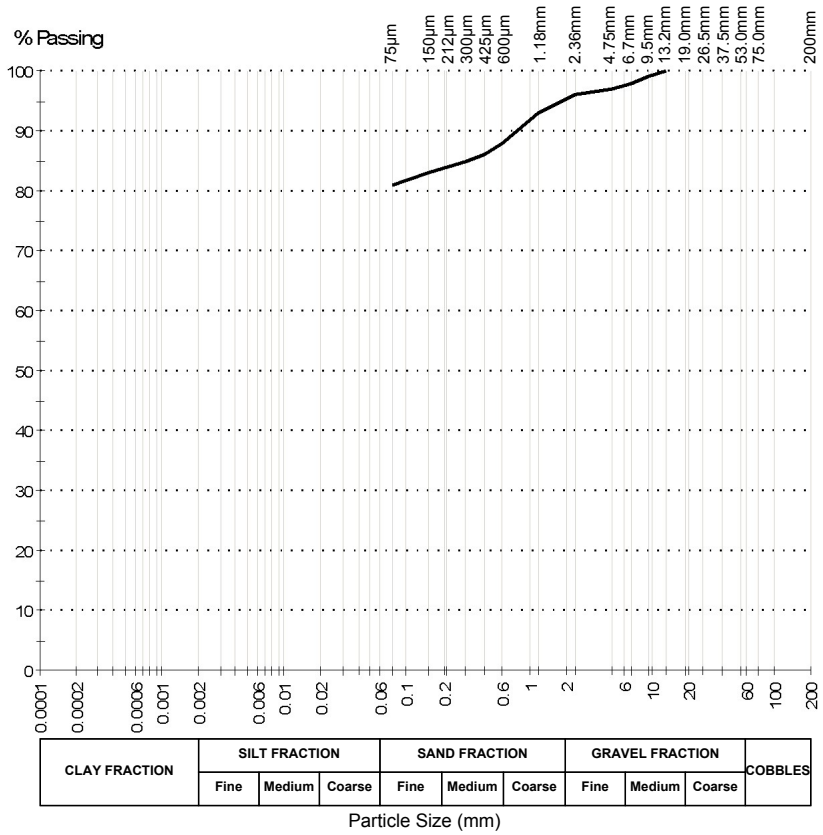
Sample Details

Sample ID:	BRIS17S-01361
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY with Sand, grey/pale brown
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP33 0.4-0.9m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	14.5	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	5.0	
Mould Length (mm)		250.1	
Liquid Limit (%)	AS 1289.3.1.2	32	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	18	
Plasticity Index (%)	AS 1289.3.3.1	14	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	99	
6.7mm	98	
4.75mm	97	
2.36mm	96	
1.18mm	93	
600µm	88	
425µm	86	
300µm	85	
150µm	83	
75µm	81	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01361-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

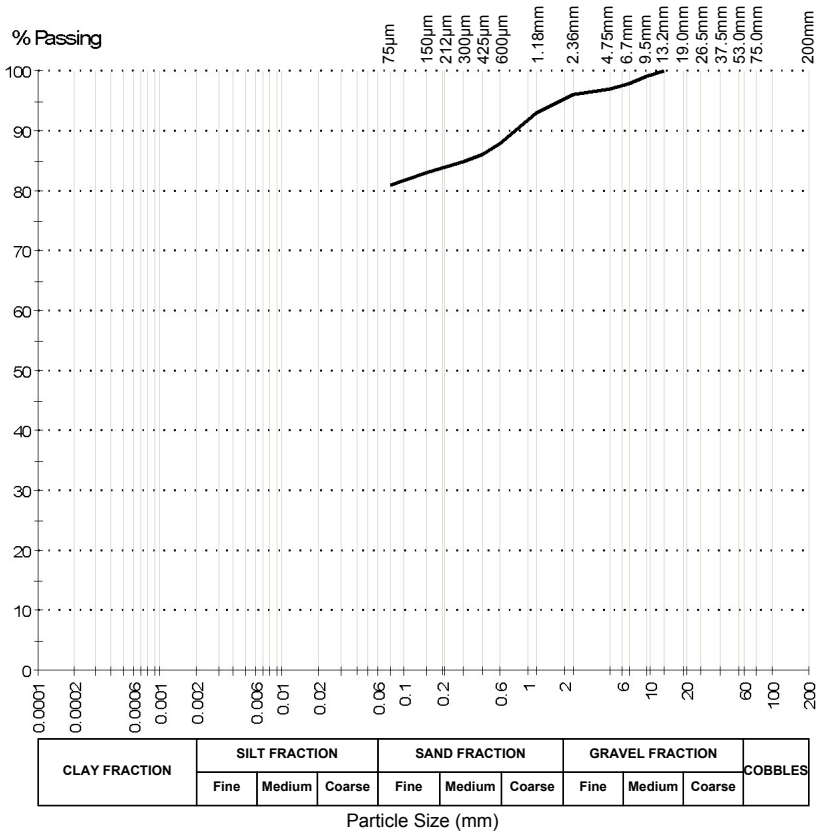
Sample Details

Sample ID: BRIS17S-01361
Client Sample:
Date Sampled:
Source: In situ
Material: CLAY with Sand, grey/pale brown
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: McPhillamy's Gold Project
Sample Location: TP33
0.4-0.9m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	4	
Soil Description		CLAY with Sand, grey/pale brown	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	99	
6.7mm	98	
4.75mm	97	
2.36mm	96	
1.18mm	93	
600µm	88	
425µm	86	
300µm	85	
150µm	83	
75µm	81	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01362-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

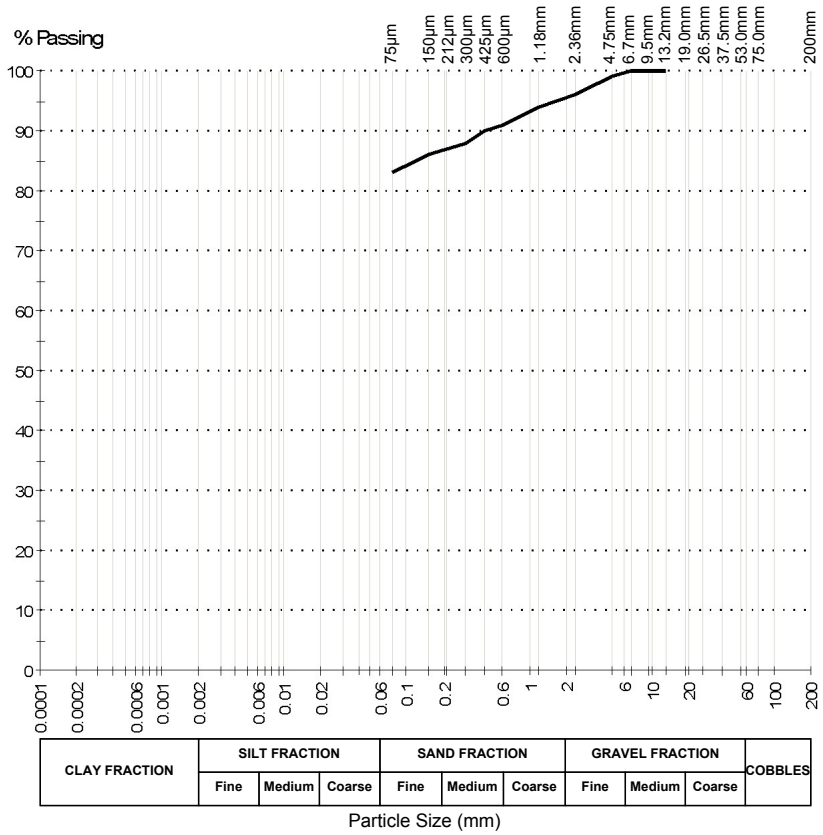
Sample Details

Sample ID:	BRIS17S-01362
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Sandy CLAY
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP36 0.3-1.2m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	17.1	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	5.5	
Mould Length (mm)		250	
Liquid Limit (%)	AS 1289.3.1.2	34	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	18	
Plasticity Index (%)	AS 1289.3.3.1	16	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	96	
1.18mm	94	
600µm	91	
425µm	90	
300µm	88	
150µm	86	
75µm	83	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01362-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

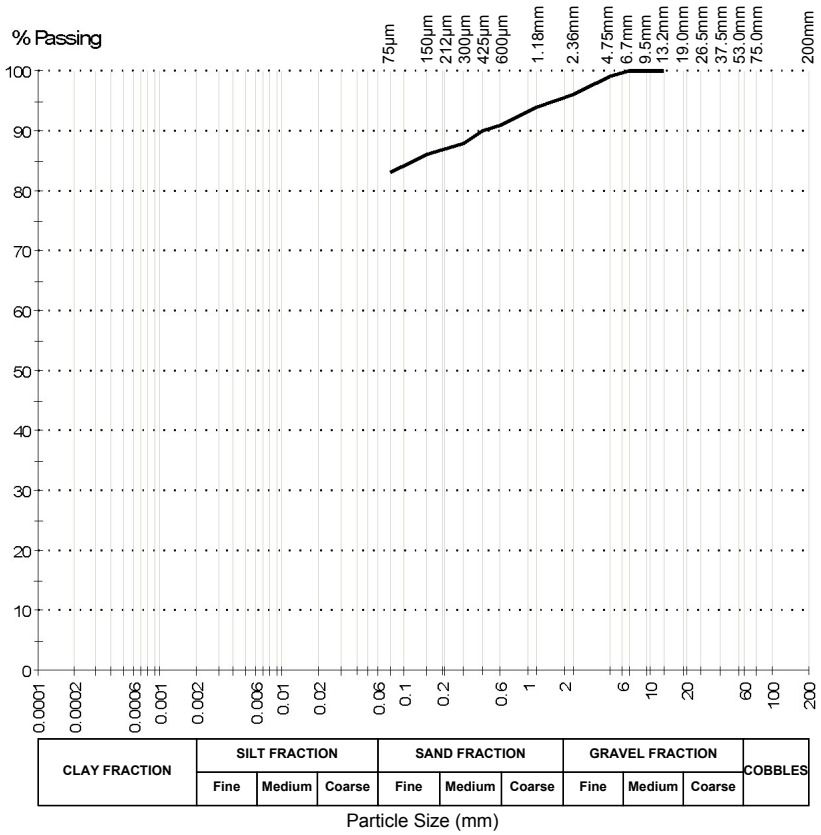
Sample Details

Sample ID:	BRIS17S-01362
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Sandy CLAY
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP36 0.3-1.2m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		Sandy CLAY	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	96	
1.18mm	94	
600µm	91	
425µm	90	
300µm	88	
150µm	86	
75µm	83	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01343-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

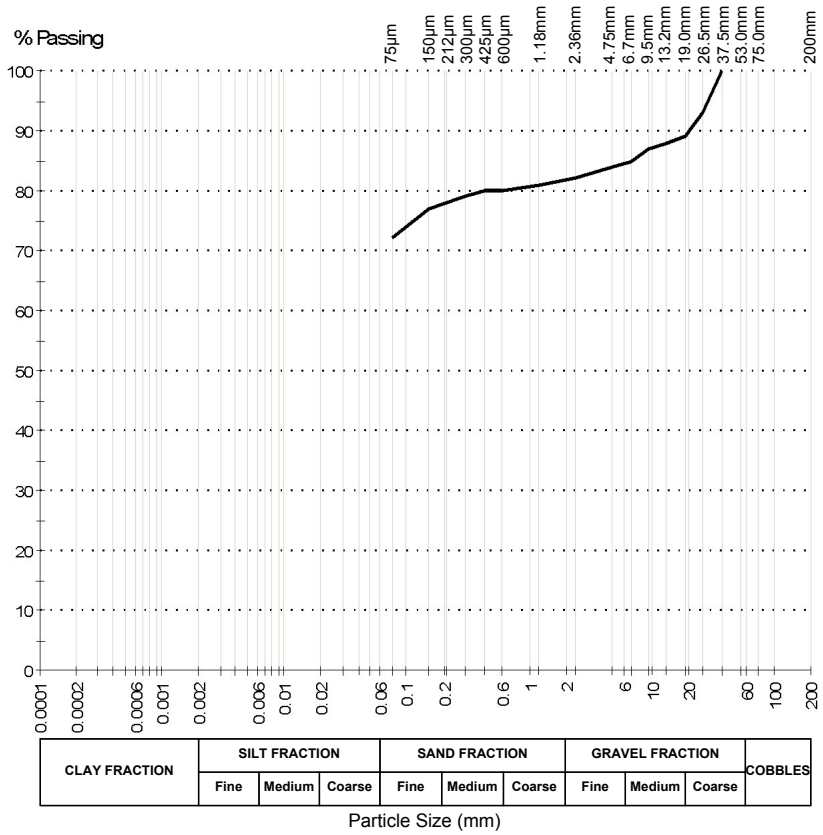
Sample Details

Sample ID:	BRIS17S-01343
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Gravelly CLAY / Clayey GRAVEL
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP3 1.0-1.8m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	15.2	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	13.5	
Mould Length (mm)		250	
Curling		Yes	
Liquid Limit (%)	AS 1289.3.1.2	49	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	18	
Plasticity Index (%)	AS 1289.3.3.1	31	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
37.5mm	100	
26.5mm	93	
19.0mm	89	
13.2mm	88	
9.5mm	87	
6.7mm	85	
4.75mm	84	
2.36mm	82	
1.18mm	81	
600µm	80	
425µm	80	
300µm	79	
150µm	77	
75µm	72	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01343-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

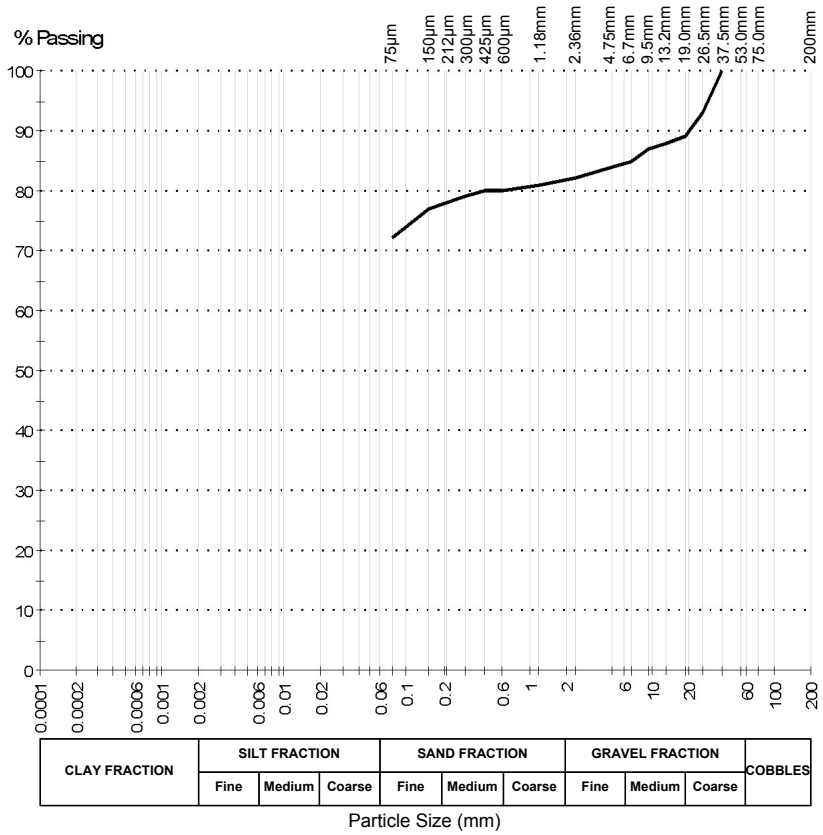
Sample Details

Sample ID:	BRIS17S-01343
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Gravelly CLAY / Clayey GRAVEL
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP3 1.0-1.8m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		Gravelly CLAY red/brown	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
37.5mm	100	
26.5mm	93	
19.0mm	89	
13.2mm	88	
9.5mm	87	
6.7mm	85	
4.75mm	84	
2.36mm	82	
1.18mm	81	
600µm	80	
425µm	80	
300µm	79	
150µm	77	
75µm	72	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01344-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

NATA
WORLD RECOGNISED ACCREDITATION

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

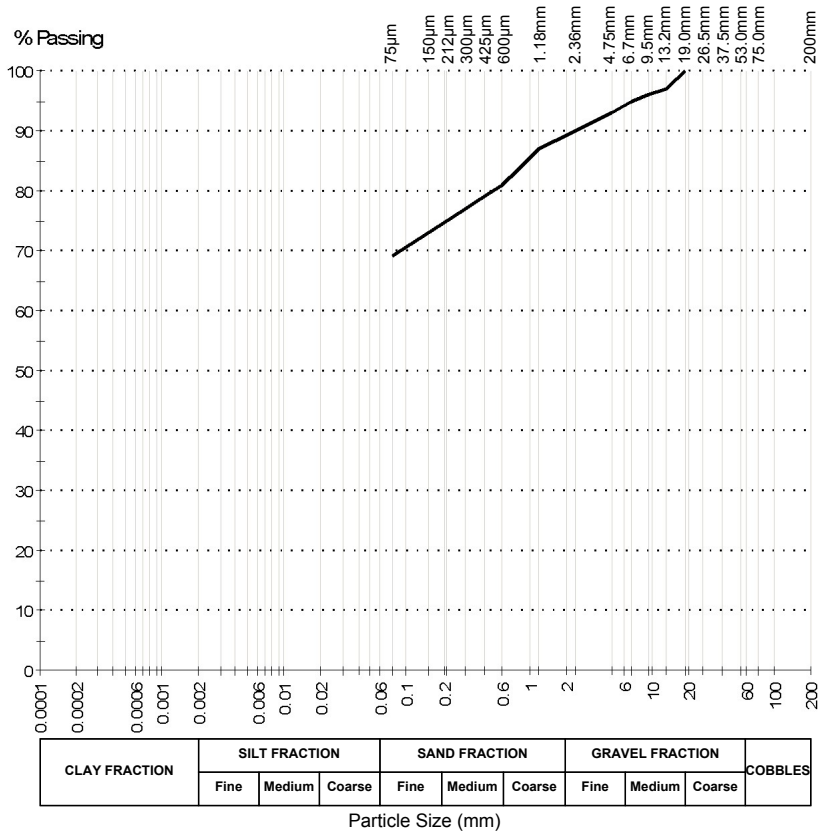
Sample Details

Sample ID:	BRIS17S-01344
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY, brown/orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP6
	3.0m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	21.2	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	9.5	
Mould Length (mm)		250.5	
Curling		Yes	
Liquid Limit (%)	AS 1289.3.1.2	35	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	15	
Plasticity Index (%)	AS 1289.3.3.1	20	
Date Tested		15/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	97	
9.5mm	96	
6.7mm	95	
4.75mm	93	
2.36mm	90	
1.18mm	87	
600µm	81	
425µm	79	
300µm	77	
150µm	73	
75µm	69	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01344-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

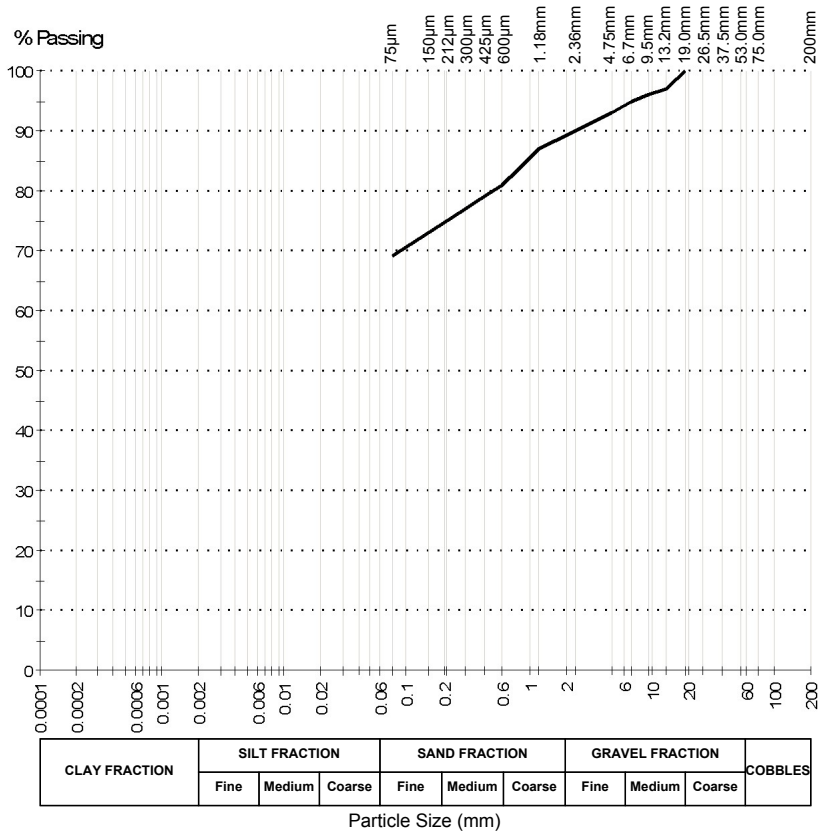
Sample Details

Sample ID:	BRIS17S-01344
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY, brown/orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP6 3.0m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY brown/orange	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	97	
9.5mm	96	
6.7mm	95	
4.75mm	93	
2.36mm	90	
1.18mm	87	
600µm	81	
425µm	79	
300µm	77	
150µm	73	
75µm	69	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01345-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

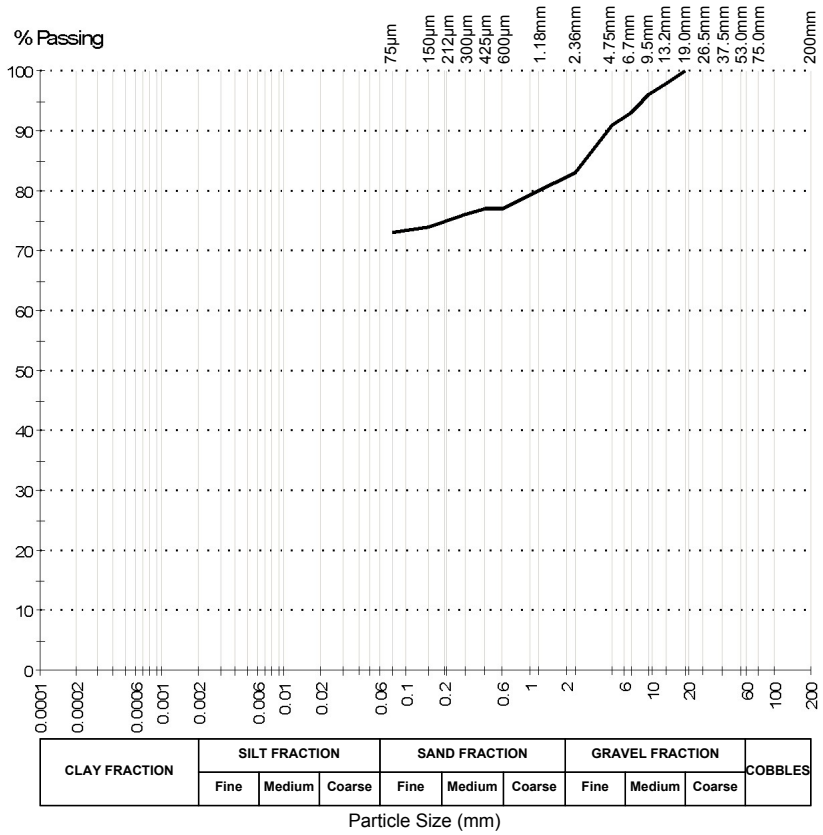
Sample Details

Sample ID:	BRIS17S-01345
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY with gravel, brown/orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP9
	0.5-1.0m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	15.5	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	8.0	
Mould Length (mm)		249.9	
Liquid Limit (%)	AS 1289.3.1.2	37	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	19	
Plasticity Index (%)	AS 1289.3.3.1	18	
Date Tested		15/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	98	
9.5mm	96	
6.7mm	93	
4.75mm	91	
2.36mm	83	
1.18mm	80	
600µm	77	
425µm	77	
300µm	76	
150µm	74	
75µm	73	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01345-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

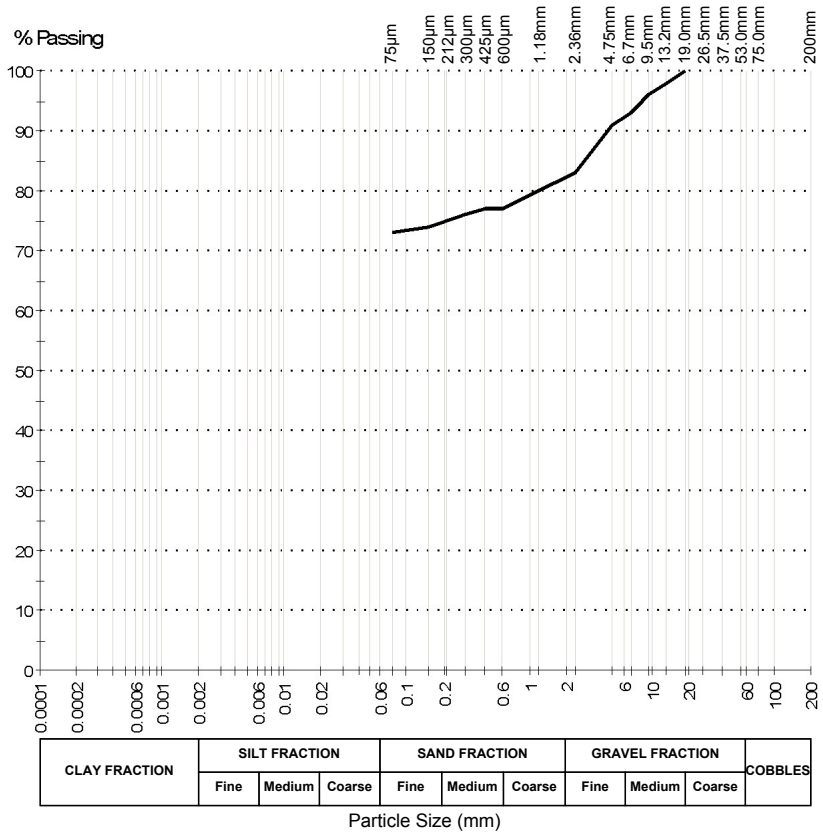
Sample Details

Sample ID:	BRIS17S-01345
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY with gravel, brown/orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP9 0.5-1.0m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY with gravel, brown/orange	
Type of Water		Distilled	
Temperature of Water (°C)		0.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	98	
9.5mm	96	
6.7mm	93	
4.75mm	91	
2.36mm	83	
1.18mm	80	
600µm	77	
425µm	77	
300µm	76	
150µm	74	
75µm	73	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01346-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

NATA
WORLD RECOGNISED ACCREDITATION

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

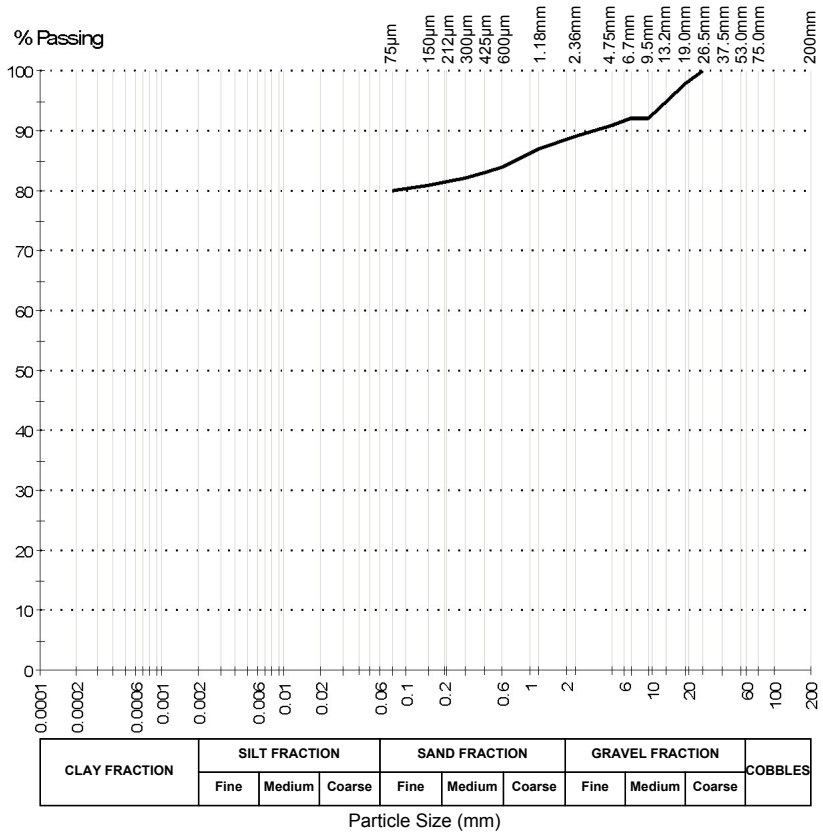
Sample Details

Sample ID:	BRIS17S-01346
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY with gravel, brown/orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP11 0.2-2.0m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	17.0	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	10.0	
Mould Length (mm)		249.7	
Liquid Limit (%)	AS 1289.3.1.2	40	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	18	
Plasticity Index (%)	AS 1289.3.3.1	22	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
26.5mm	100	
19.0mm	98	
13.2mm	95	
9.5mm	92	
6.7mm	92	
4.75mm	91	
2.36mm	89	
1.18mm	87	
600µm	84	
425µm	83	
300µm	82	
150µm	81	
75µm	80	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01346-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

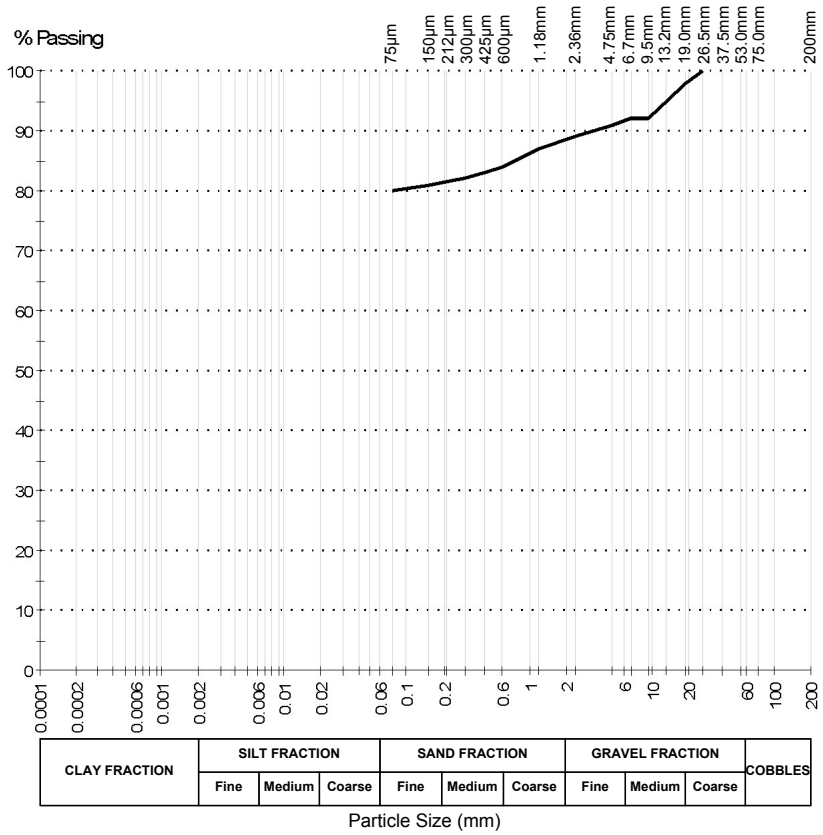
Sample Details

Sample ID:	BRIS17S-01346
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY with gravel, brown/orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP11 0.2-2.0m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		RS-EW PHYLITE	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
26.5mm	100	
19.0mm	98	
13.2mm	95	
9.5mm	92	
6.7mm	92	
4.75mm	91	
2.36mm	89	
1.18mm	87	
600µm	84	
425µm	83	
300µm	82	
150µm	81	
75µm	80	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01347-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

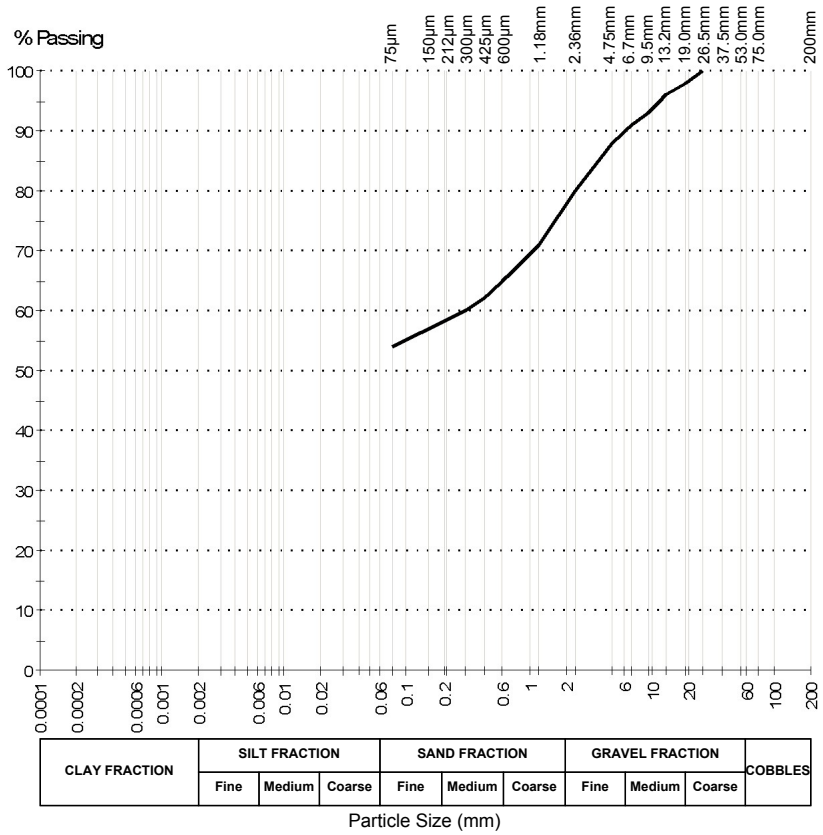
Sample Details

Sample ID:	BRIS17S-01347
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	RS - EW PHYLITE
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP11
	2.3-3.7m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	20.4	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	8.5	
Mould Length (mm)		249.9	
Liquid Limit (%)	AS 1289.3.1.2	51	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	29	
Plasticity Index (%)	AS 1289.3.3.1	22	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
26.5mm	100	
19.0mm	98	
13.2mm	96	
9.5mm	93	
6.7mm	91	
4.75mm	88	
2.36mm	80	
1.18mm	71	
600µm	65	
425µm	62	
300µm	60	
150µm	57	
75µm	54	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01347-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

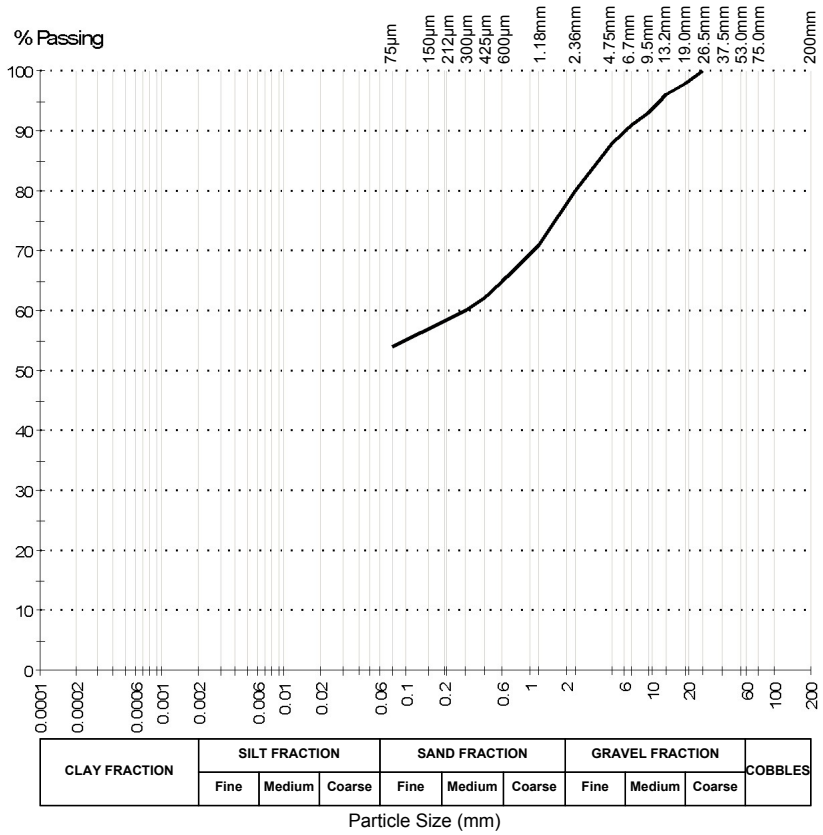
Sample Details

Sample ID:	BRIS17S-01347
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	RS - EW PHYLITE
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP11 2.3-3.7m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		RS - EW PHYLITE	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
26.5mm	100	
19.0mm	98	
13.2mm	96	
9.5mm	93	
6.7mm	91	
4.75mm	88	
2.36mm	80	
1.18mm	71	
600µm	65	
425µm	62	
300µm	60	
150µm	57	
75µm	54	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01348-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

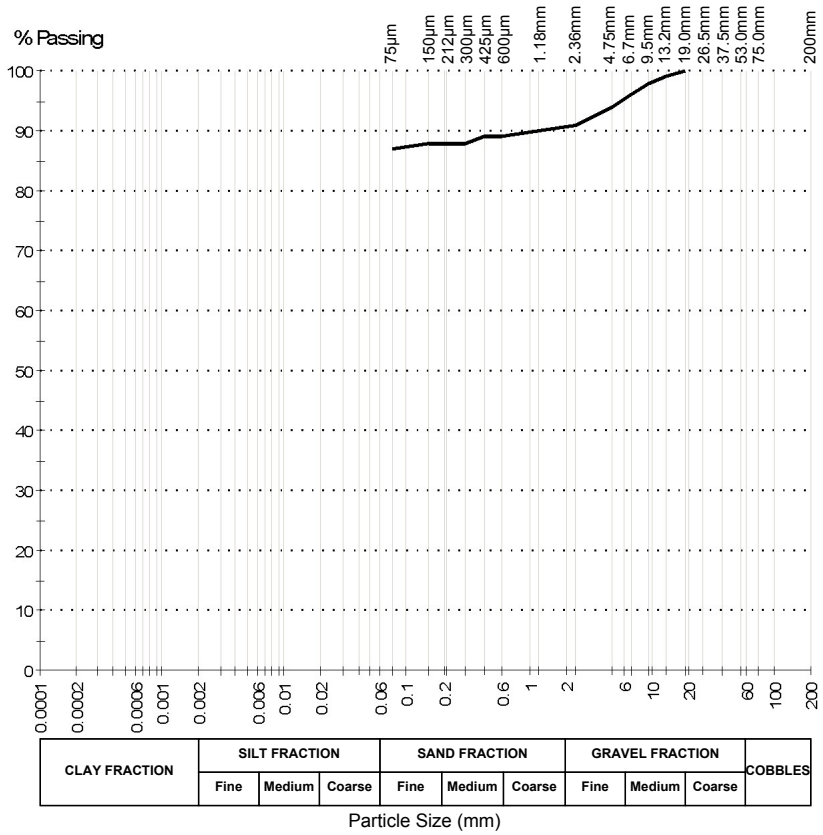
Sample Details

Sample ID:	BRIS17S-01348
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Clay with gravel, light brown.
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP13
	0.9-1.8m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	11.7	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	9.5	
Mould Length (mm)		250.1	
Curling		Yes	
Liquid Limit (%)	AS 1289.3.1.2	36	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	16	
Plasticity Index (%)	AS 1289.3.3.1	20	
Date Tested		15/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	99	
9.5mm	98	
6.7mm	96	
4.75mm	94	
2.36mm	91	
1.18mm	90	
600µm	89	
425µm	89	
300µm	88	
150µm	88	
75µm	87	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01348-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

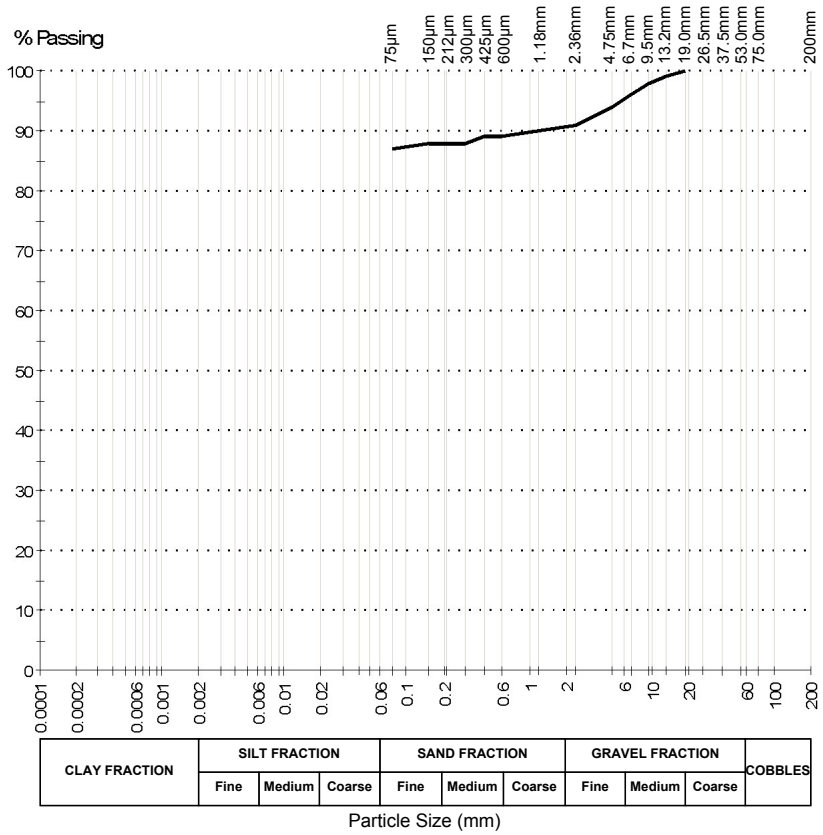
Sample Details

Sample ID:	BRIS17S-01348
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Clay with gravel, light brown.
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP13 0.9-1.8m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY with gravel, light brown	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	99	
9.5mm	98	
6.7mm	96	
4.75mm	94	
2.36mm	91	
1.18mm	90	
600µm	89	
425µm	89	
300µm	88	
150µm	88	
75µm	87	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01349-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

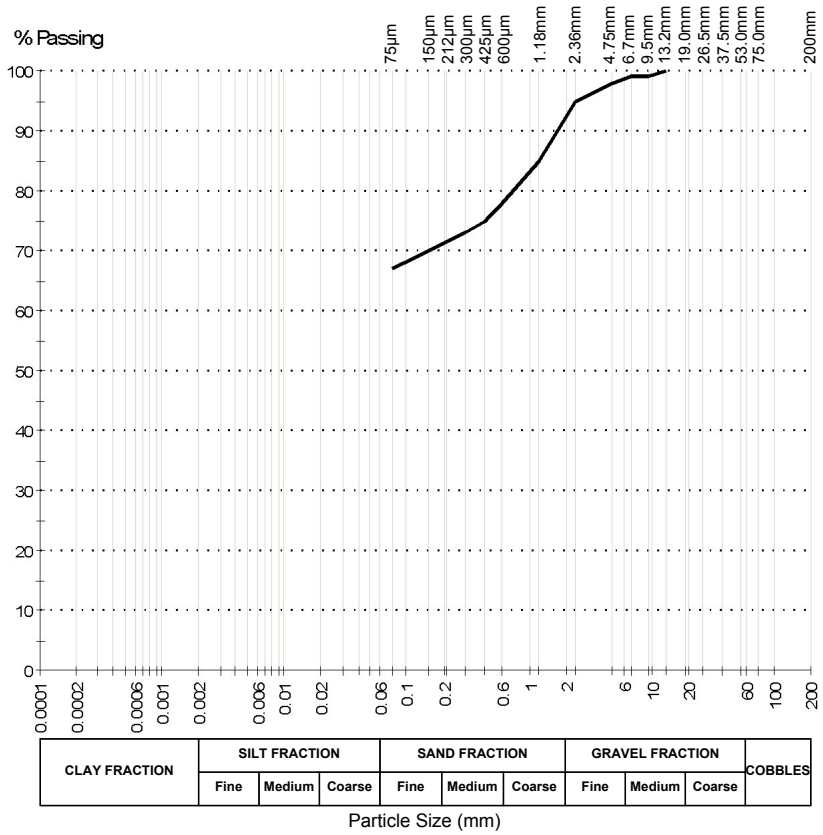
Sample Details

Sample ID:	BRIS17S-01349
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Clayey GRAVEL
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP17
	0.6-1.2

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	16.7	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	12.0	
Mould Length (mm)		250	
Curling		Yes	
Liquid Limit (%)	AS 1289.3.1.2	43	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	15	
Plasticity Index (%)	AS 1289.3.3.1	28	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	99	
6.7mm	99	
4.75mm	98	
2.36mm	95	
1.18mm	85	
600µm	78	
425µm	75	
300µm	73	
150µm	70	
75µm	67	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01349-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

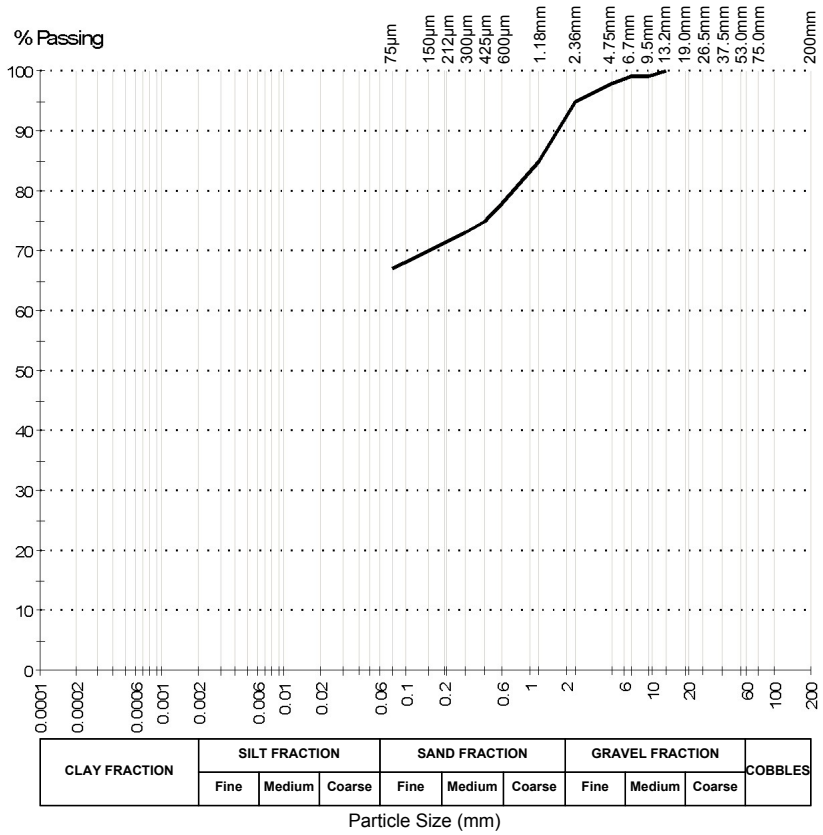
Sample Details

Sample ID:	BRIS17S-01349
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	Clayey GRAVEL
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP17
	0.6-1.2

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		Clayey GRAVEL	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	99	
6.7mm	99	
4.75mm	98	
2.36mm	95	
1.18mm	85	
600µm	78	
425µm	75	
300µm	73	
150µm	70	
75µm	67	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01350-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

NATA
WORLD RECOGNISED ACCREDITATION

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

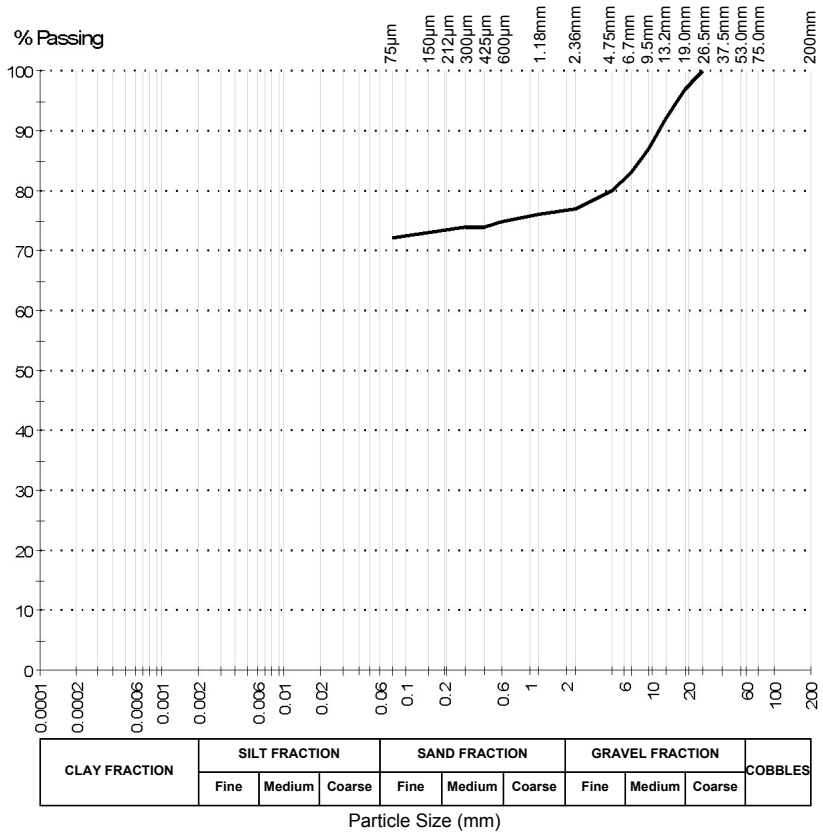
Sample Details

Sample ID:	BRIS17S-01350
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), grey/brown
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP18 1.5-1.9m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	18.5	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	16.0	
Mould Length (mm)		250	
Liquid Limit (%)	AS 1289.3.1.2	63	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	20	
Plasticity Index (%)	AS 1289.3.3.1	43	
Date Tested		16/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
26.5mm	100	
19.0mm	97	
13.2mm	92	
9.5mm	87	
6.7mm	83	
4.75mm	80	
2.36mm	77	
1.18mm	76	
600µm	75	
425µm	74	
300µm	74	
150µm	73	
75µm	72	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01350-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

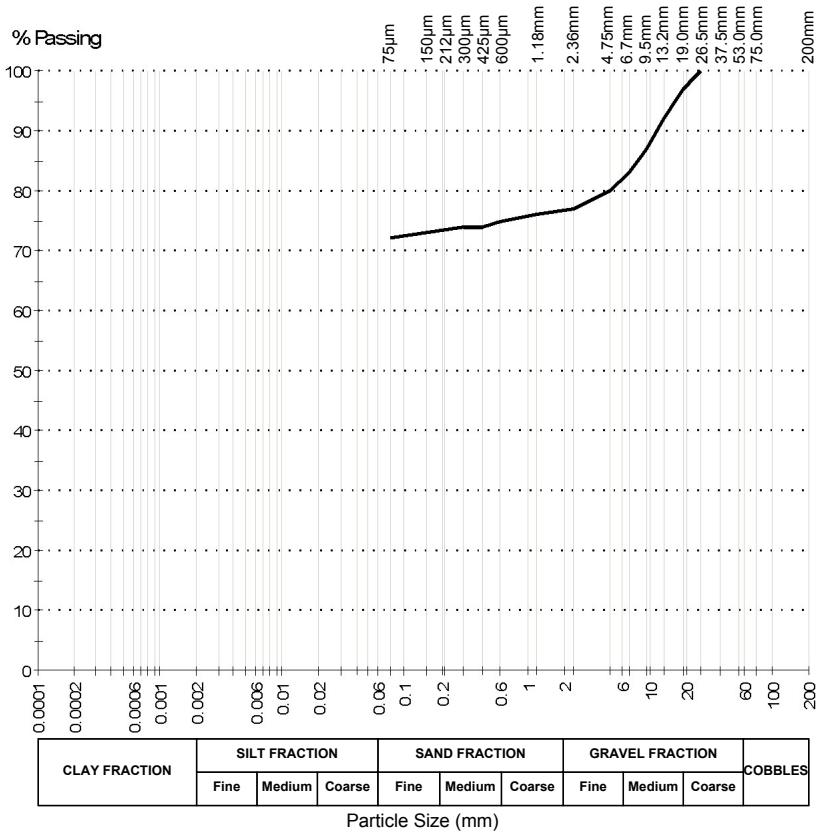
Sample Details

Sample ID:	BRIS17S-01350
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), grey/brown
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP18 1.5-1.9m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY (CH) grey/brown	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
26.5mm	100	
19.0mm	97	
13.2mm	92	
9.5mm	87	
6.7mm	83	
4.75mm	80	
2.36mm	77	
1.18mm	76	
600µm	75	
425µm	74	
300µm	74	
150µm	73	
75µm	72	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Material Test Report

Report No: BRIS17S-01351-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

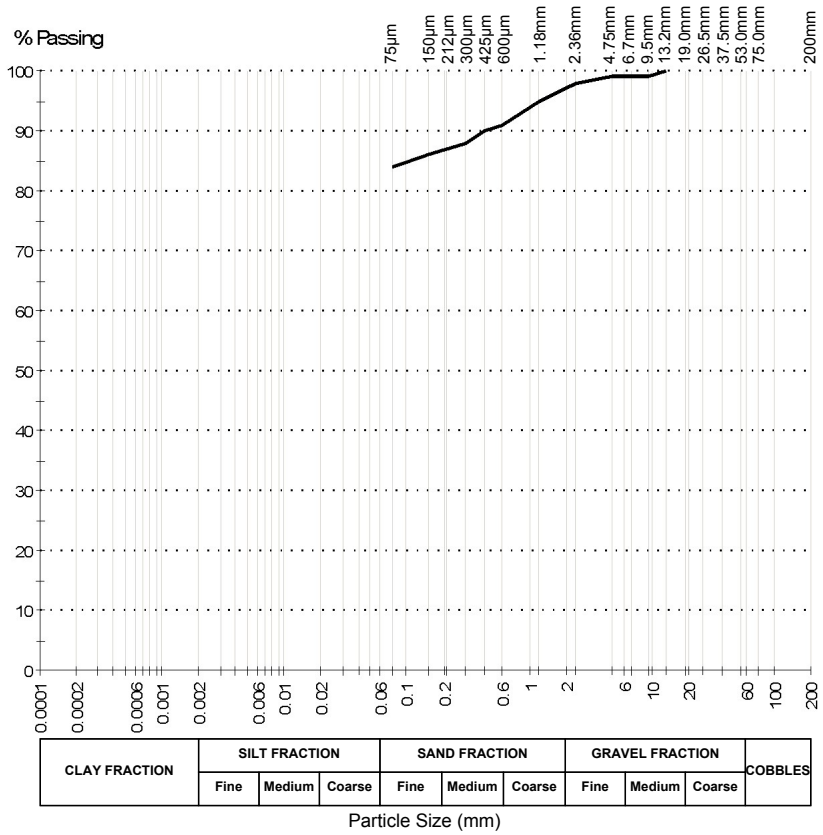
Sample Details

Sample ID:	BRIS17S-01351
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	RS-EW PHYLITE (Gr CLAY), Grey
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP18
	1.9-3.2

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	22.3	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	6.5	
Mould Length (mm)		250	
Liquid Limit (%)	AS 1289.3.1.2	54	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	23	
Plasticity Index (%)	AS 1289.3.3.1	31	
Date Tested		15/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	99	
6.7mm	99	
4.75mm	99	
2.36mm	98	
1.18mm	95	
600µm	91	
425µm	90	
300µm	88	
150µm	86	
75µm	84	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01351-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

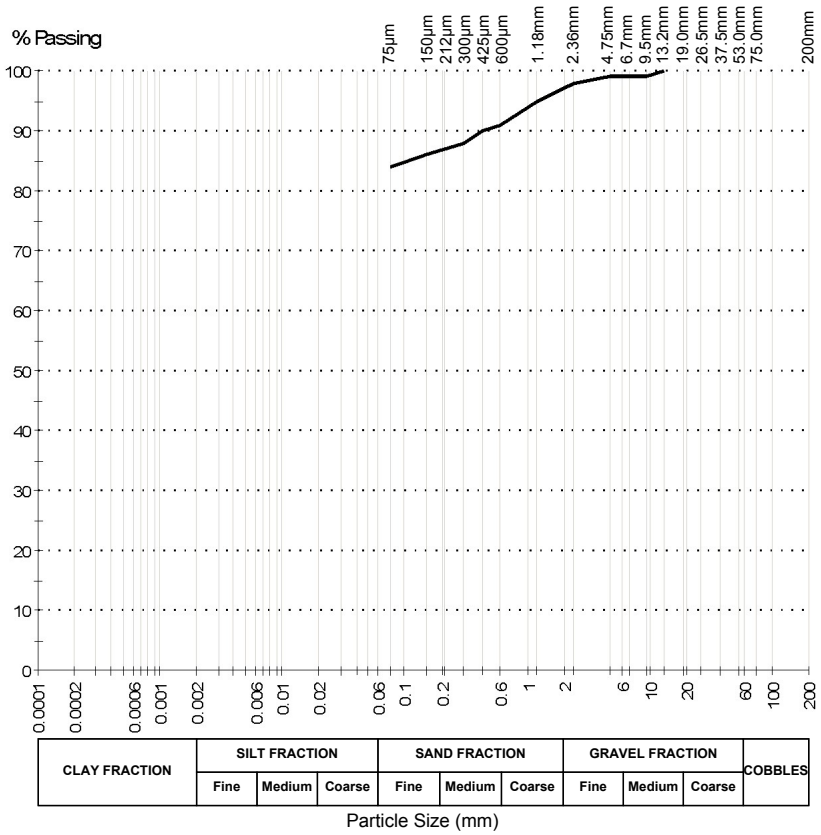
Sample Details

Sample ID:	BRIS17S-01351
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	RS-EW PHYLITE (Gr CLAY), Grey
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP18 1.9-3.2

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		RS-EW PHYLITE (Gr CLAY), grey	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 21/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
13.2mm	100	
9.5mm	99	
6.7mm	99	
4.75mm	99	
2.36mm	98	
1.18mm	95	
600µm	91	
425µm	90	
300µm	88	
150µm	86	
75µm	84	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01352-1
Issue No: 1

Client: ATC Williams Pty Ltd
Level 2, 16-20 Emondstone Street
Newmarket QLD 4051

Principal:
Project No.: 754-BRIS00066AA
Project Name: McPhillamy's Gold Project
Lot No.: **TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

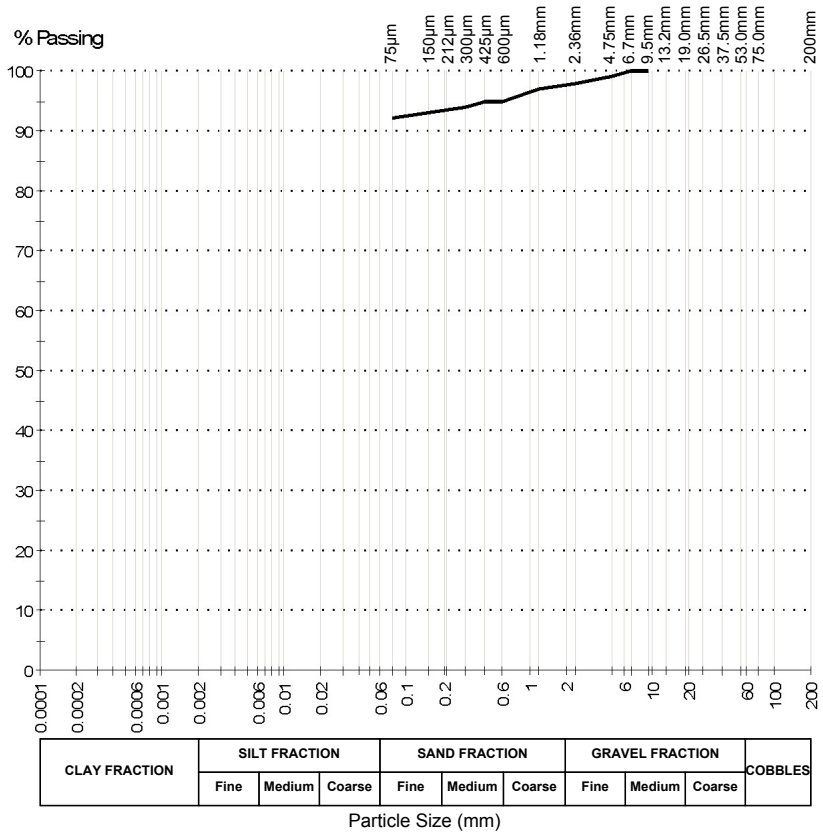
Sample Details

Sample ID:	BRIS17S-01352
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), brown mottled orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP21
	0.4-0.6m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	12.2	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	8.5	
Mould Length (mm)		250	
Curling		Yes	
Liquid Limit (%)	AS 1289.3.1.2	39	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	17	
Plasticity Index (%)	AS 1289.3.3.1	22	
Date Tested		15/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	98	
1.18mm	97	
600µm	95	
425µm	95	
300µm	94	
150µm	93	
75µm	92	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01352-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

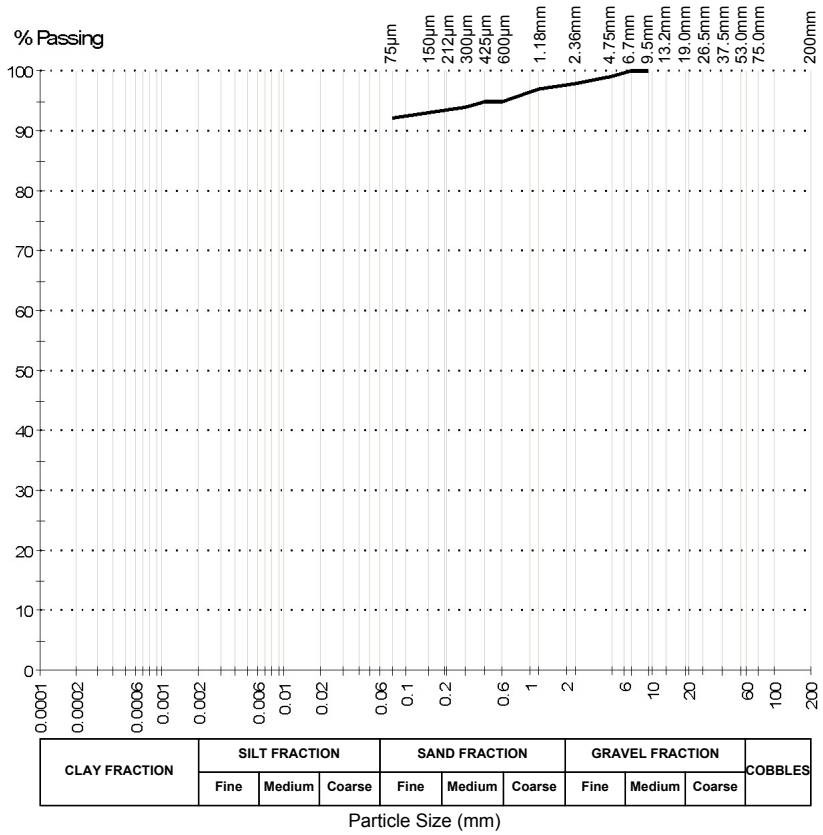
Sample Details

Sample ID:	BRIS17S-01352
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (CH), brown mottled orange
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP21 0.4-0.6m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY (CH), brown mottled orange	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
9.5mm	100	
6.7mm	100	
4.75mm	99	
2.36mm	98	
1.18mm	97	
600µm	95	
425µm	95	
300µm	94	
150µm	93	
75µm	92	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01353-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

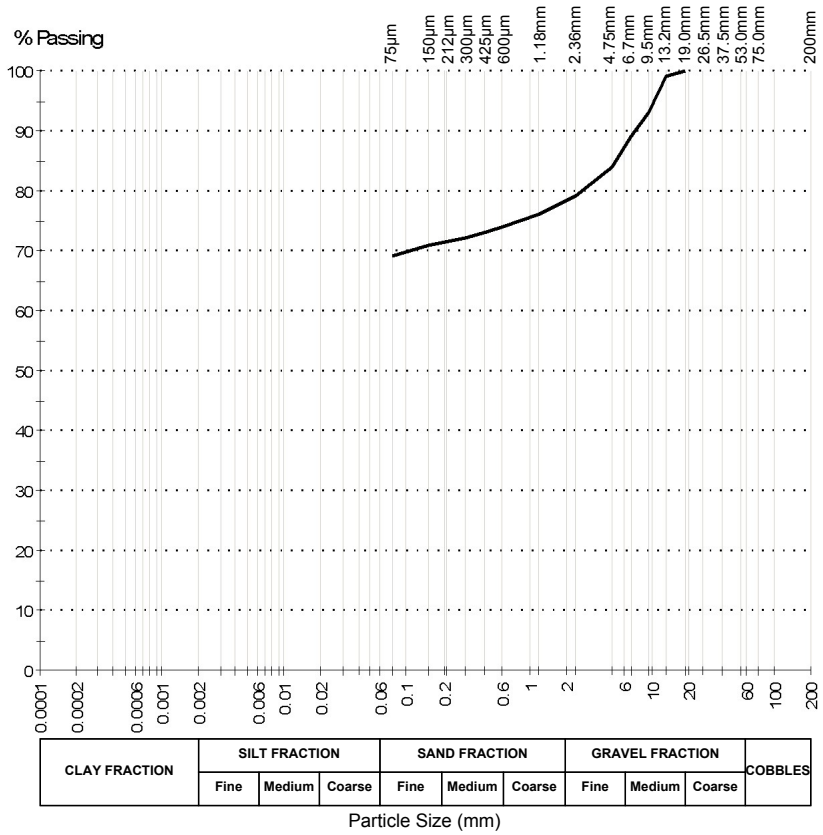
Sample Details

Sample ID:	BRIS17S-01353
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (RS TO EW ROCK)
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP22 1.0-1.5m

Other Test Results

Description	Method	Result	Limits
Moisture Content (%)	AS 1289.2.1.1	18.3	
Sample History	AS 1289.1.1	Oven-dried	
Preparation	AS 1289.1.1	Dry Sieved	
Linear Shrinkage (%)	AS 1289.3.4.1	17.0	
Mould Length (mm)		250.1	
Curling		Yes	
Liquid Limit (%)	AS 1289.3.1.2	50	
Method		One Point	
Plastic Limit (%)	AS 1289.3.2.1	17	
Plasticity Index (%)	AS 1289.3.3.1	33	
Date Tested		15/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	99	
9.5mm	93	
6.7mm	89	
4.75mm	84	
2.36mm	79	
1.18mm	76	
600µm	74	
425µm	73	
300µm	72	
150µm	71	
75µm	69	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Material Test Report

Report No: BRIS17S-01353-1
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

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.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

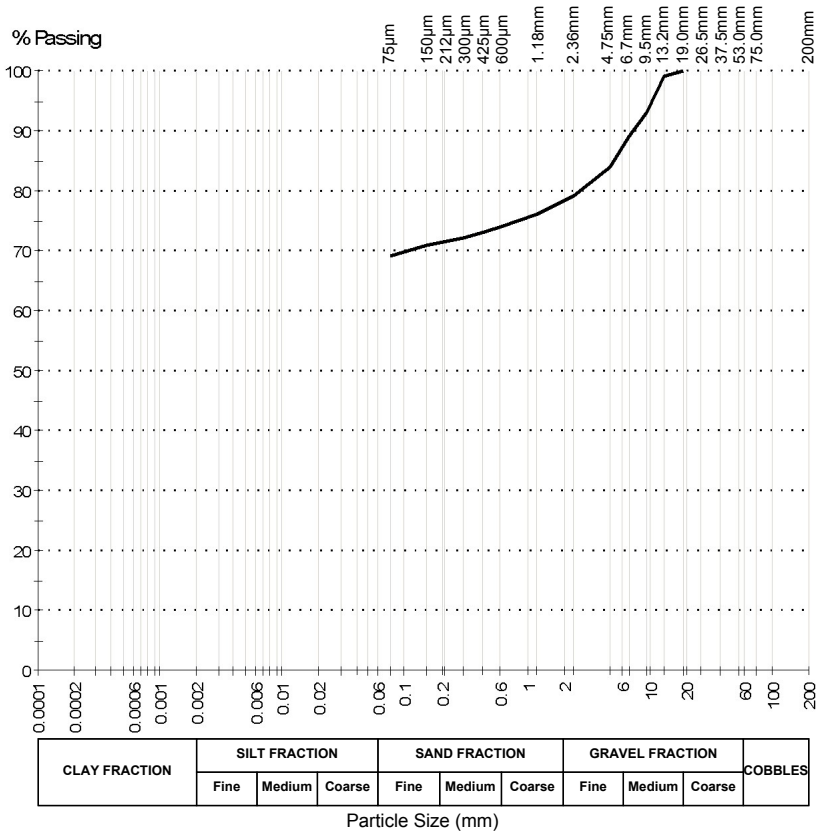
Sample Details

Sample ID:	BRIS17S-01353
Client Sample:	
Date Sampled:	
Source:	In situ
Material:	CLAY (RS TO EW ROCK)
Specification:	AS Grading
Sampling Method:	Submitted by client
Project Location:	McPhillamy's Gold Project
Sample Location:	TP22 1.0-1.5m

Other Test Results

Description	Method	Result	Limits
Emerson Class Number	AS 1289.3.8.1	3	
Soil Description		CLAY (RS to EW ROCK)	
Type of Water		Distilled	
Temperature of Water (°C)		23.0	
Date Tested		19/06/2017	

Particle Size Distribution



Method: AS 1289.3.6.1
Drying by: Oven
Date Tested: 20/06/2017

Note: Sample Washed

Sieve Size	% Passing	Limits
19.0mm	100	
13.2mm	99	
9.5mm	93	
6.7mm	89	
4.75mm	84	
2.36mm	79	
1.18mm	76	
600µm	74	
425µm	73	
300µm	72	
150µm	71	
75µm	69	

Comments

N/A

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS17S-01368
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

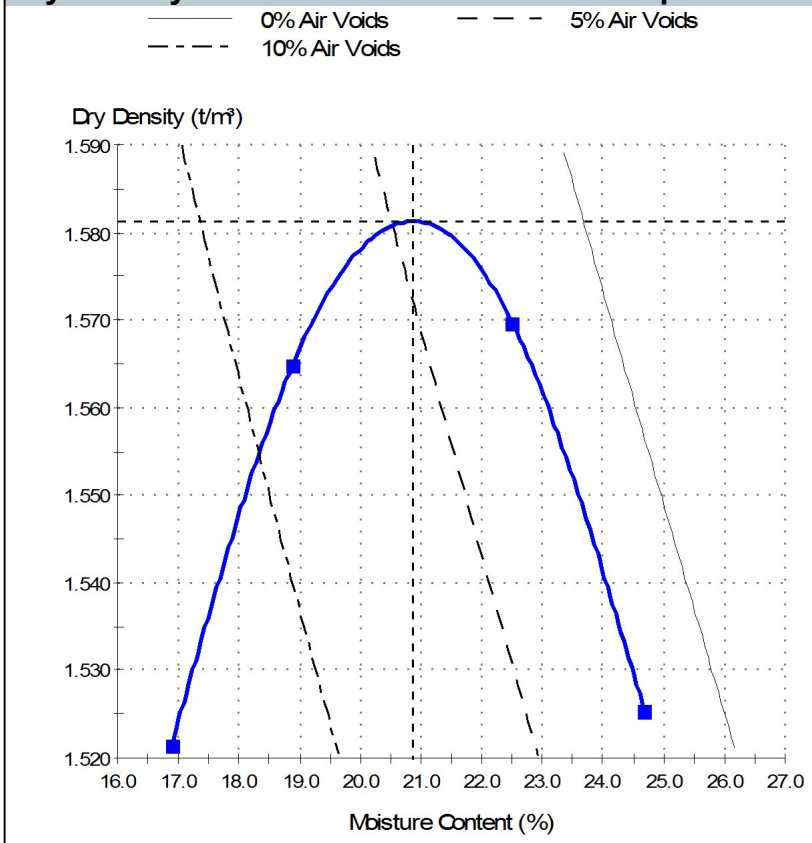
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

Sample Details

Sample ID:	BRIS17S-01368	**Sampling Method:**	Submitted by client
Date Sampled:		**Material:**	Composite Sample
Date Submitted:	26/05/2017	**Source:**	In situ
Date Tested:	16/06/2017	**Specification:**	
Project Location:	McPhillamy's Gold Project		
Sample Location:	TP18, 1.5-1.9m & 1.9-3.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.58**
Standard OMC (%):	**21.0**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS17S-01369
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

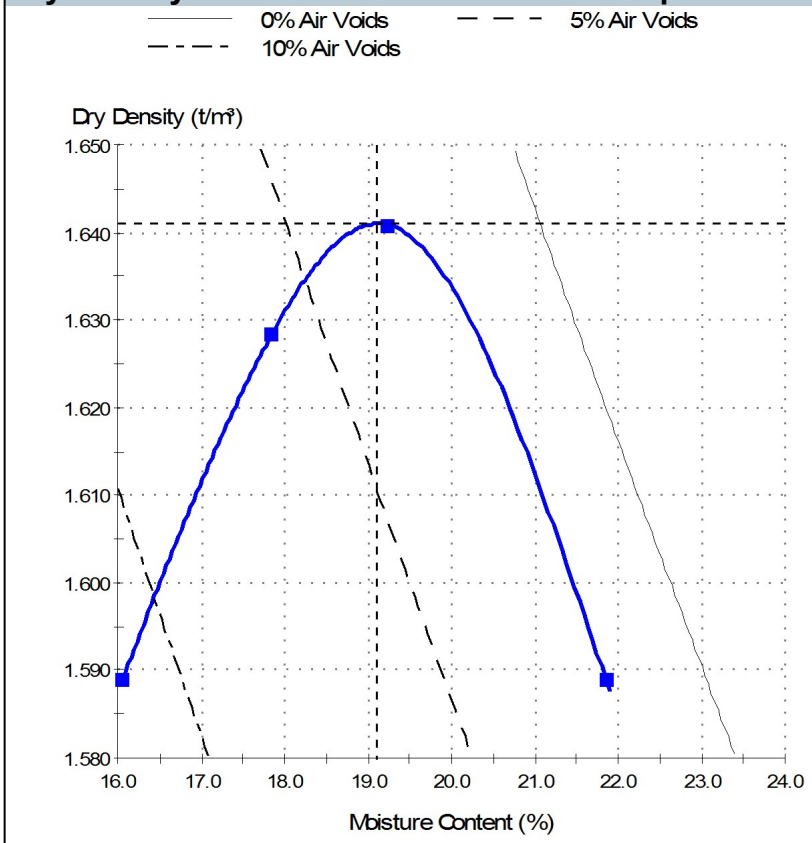
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

Sample Details

Sample ID:	BRIS17S-01369	**Sampling Method:**	Submitted by client
Date Sampled:		**Material:**	Composite Sample
Date Submitted:	26/05/2017	**Source:**	In situ
Date Tested:	16/06/2017	**Specification:**	
Project Location:	McPhillamy's Gold Project		
Sample Location:	TP23 & TP24, 1.0-1.5m & 0.9-2.0m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): **1.64**

Standard OMC (%): **19.0**

Retained Sieve 19mm (%):

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS17S-01370
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

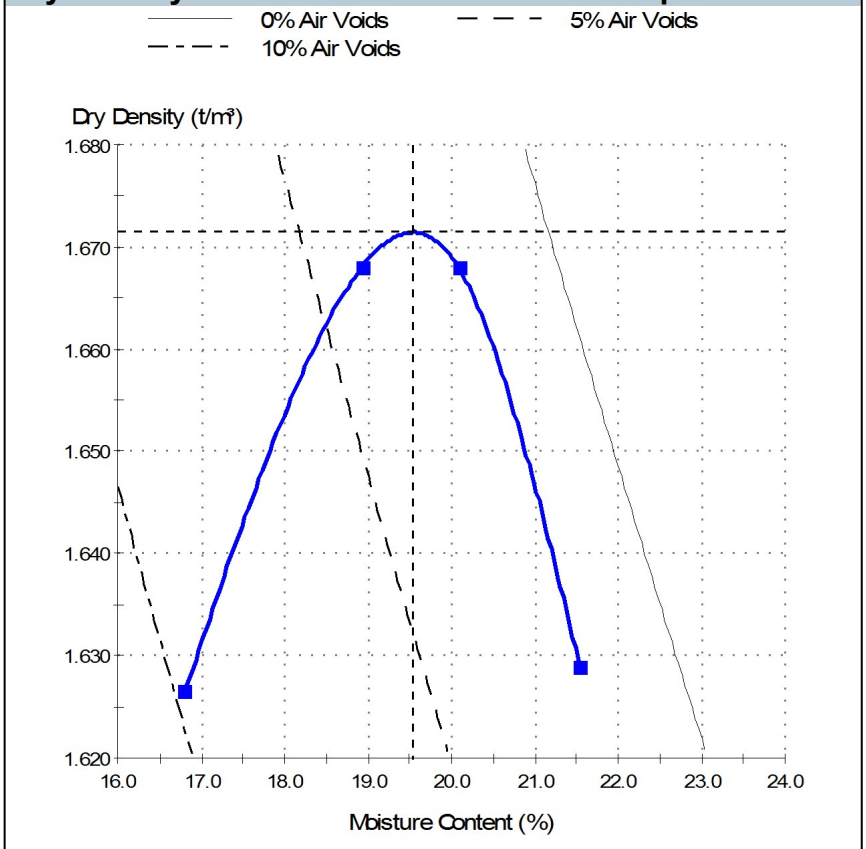
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

Sample Details

Sample ID:	BRIS17S-01370	**Sampling Method:**	Submitted by client
Date Sampled:		**Material:**	Composite Sample
Date Submitted:	26/05/2017	**Source:**	In situ
Date Tested:	16/06/2017	**Specification:**	
Project Location:	McPhillamy's Gold Project		
Sample Location:	TP30 & TP31, 0.4-1.0m & 1.5-2.4m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.67**
Standard OMC (%):	**19.5**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS17S-01367
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

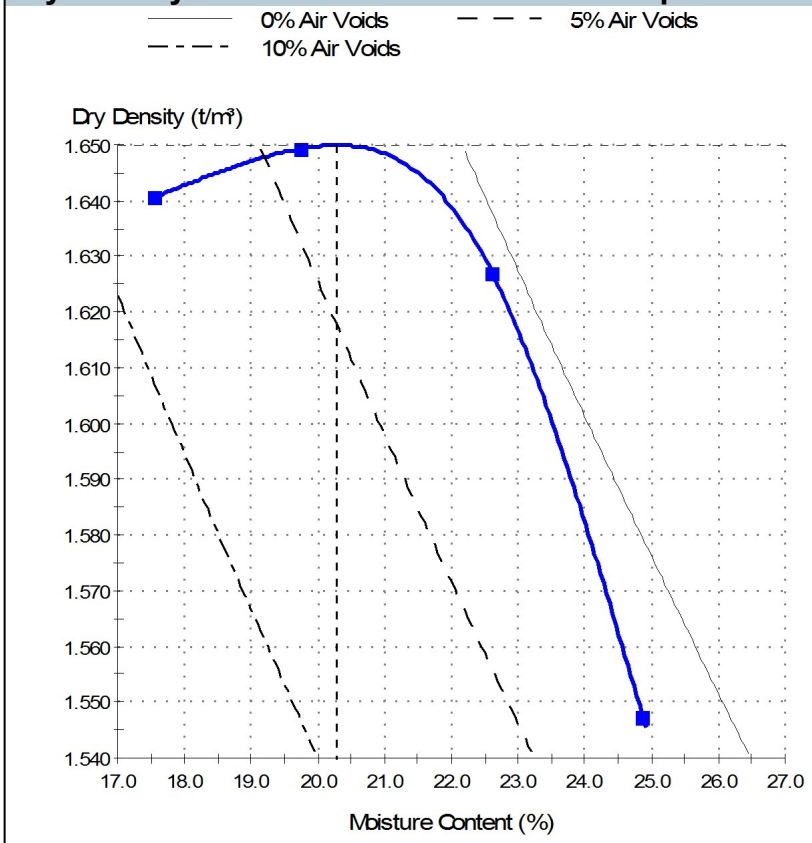
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Warren Cootes
(Senior Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 29/06/2017

Sample Details

Sample ID:	BRIS17S-01367	**Sampling Method:**	Submitted by client
Date Sampled:		**Material:**	Composite Sample
Date Submitted:	26/05/2017	**Source:**	In situ
Date Tested:	16/06/2017	**Specification:**	
Project Location:	McPhillamy's Gold Project		
Sample Location:	TP11 , 0.2-2.0m & 2.3-3.7m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.65**
Standard OMC (%):	**20.5**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Newstead Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD, 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS17S-01372

NATA Accredited laboratory Number: 431

Date of Issue: 07/07/2017

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	TP21 0.4-0.6, TP22 1.0-1.5, TP23 1.0-1.5
Principal:	NA	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS17W00696	**TRN:**	As per client

SAMPLE

Sample ID:	BRIS17S-01372	**Material Description:**	Insitu
Client Sample ID:	NA	**Sampling Method:**	Submitted by Client
Date Sample:	Not Stated	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.75**	**Specimen Dry Density**	**t/m3**	**1.72**
Specimen OMC	**%**	**17**	**Specimen Wet Density**	**t/m3**	**2.01**

LABORATORY DENSITY RATIO	**%**	**98.2**
LABORATORY MOISTURE RATIO	**%**	**98.6**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**4.6×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**4×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Newstead Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD, 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS17S-01373

NATA Accredited laboratory Number: 431

Date of Issue: 07/07/2017

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	TP24 0.9-2.0, TP26 1.0-2.0, TP30 0.4-1.0
Principal:	NA	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS17W00696	**TRN:**	As per client

SAMPLE

Sample ID:	BRIS17S-01373	**Material Description:**	Insitu
Client Sample ID:	NA	**Sampling Method:**	Submitted by Client
Date Sample:	Not Stated	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**21**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.71**	**Specimen Dry Density**	**t/m3**	**1.68**
Specimen OMC	**%**	**17.5**	**Specimen Wet Density**	**t/m3**	**1.97**

LABORATORY DENSITY RATIO	**%**	**98.2**
LABORATORY MOISTURE RATIO	**%**	**98.8**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**4.9×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**5×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Newstead Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD, 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS17S-01373

NATA Accredited laboratory Number: 431

Date of Issue: 07/07/2017

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	TP32 0.4-2.0, TP33 0.4-0.9
Principal:	NA	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS17W00696	**TRN:**	As per client

SAMPLE

Sample ID:	BRIS17S-01374	**Material Description:**	Insitu
Client Sample ID:	NA	**Sampling Method:**	Submitted by Client
Date Sample:	Not Stated	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**21**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.76**	**Specimen Dry Density**	**t/m3**	**1.73**
Specimen OMC	**%**	**16.5**	**Specimen Wet Density**	**t/m3**	**2.01**

LABORATORY DENSITY RATIO	**%**	**98.2**
LABORATORY MOISTURE RATIO	**%**	**98.3**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**7.3×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**7×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Newstead Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD, 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS17S-01371

NATA Accredited laboratory Number: 431

Date of Issue: 07/07/2017

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	TP11 0.2-2.0, TP13 0.9-1.8, TP18 1.5-1.9
Principal:	NA	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS17W00696	**TRN:**	As per client

SAMPLE

Sample ID:	BRIS17S-01371	**Material Description:**	Insitu
Client Sample ID:	NA	**Sampling Method:**	Submitted by Client
Date Sample:	Not Stated	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.6**	**Specimen Dry Density**	**t/m3**	**1.57**
Specimen OMC	**%**	**17.5**	**Specimen Wet Density**	**t/m3**	**1.84**

LABORATORY DENSITY RATIO	**%**	**97.9**
LABORATORY MOISTURE RATIO	**%**	**100.8**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**8.7×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**8×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

coffey
A TETRA TECH COMPANY

31 Hope Street, Melrose Park NSW 2114
T : (61 2) 8876 0500
ABN 55 139 460 521

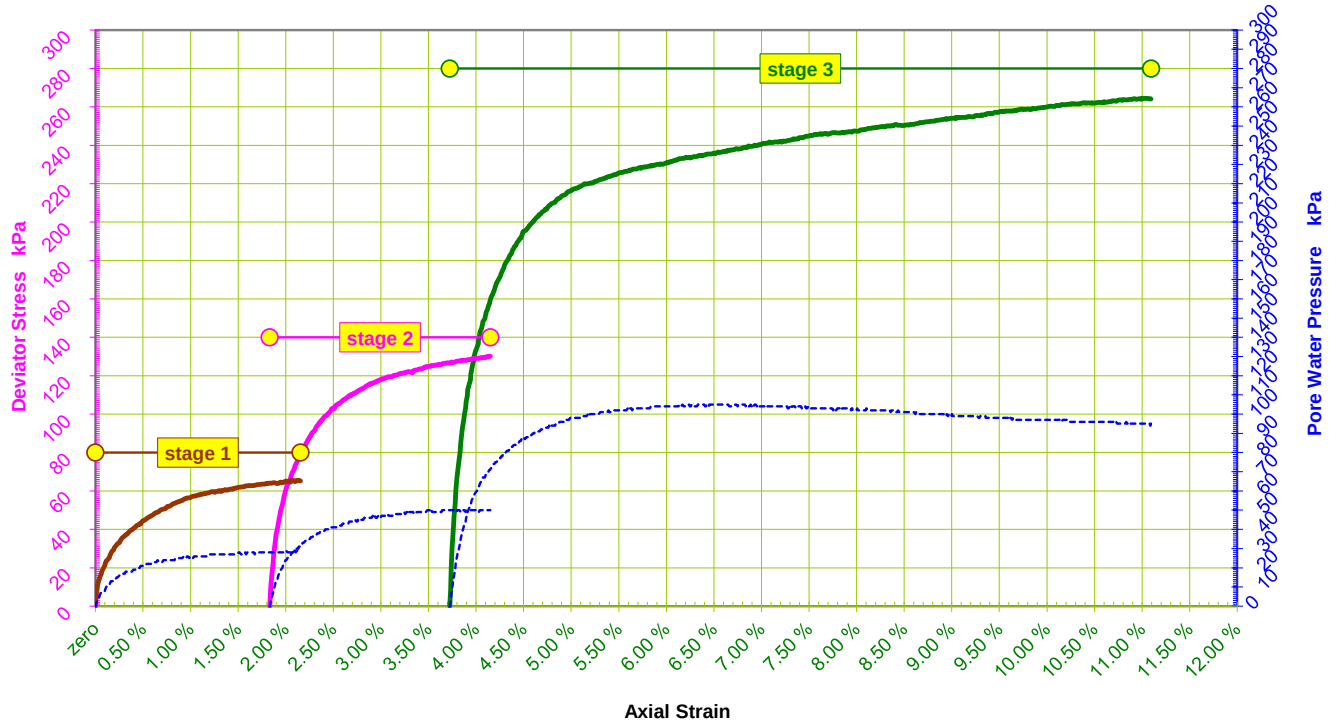
CU - Triaxial shear test: stress - strain plots

client : COFFEY SERVICES AUSTRALIA PTY LTD
principal : ATC Williams
project : 754-BRIS00066AA - McPhillamy's Gold Project
location : Blayney, NSW

job no : 754-SYDS00030AA
date : 18 July 2017
report number: IOLT 0172
laboratory number: ARTA17S-00480

Sample number: **TP24 (0.9 to 2.00 m), TP26 (1.0 to 2.00m), TP30 (0.4 to 1.00 m) Combined**
Test Method : **AS1289.6.4.2 (Note 4)**
Failure Criteria: **Maximum principal effective stress ratio**

Material Classification: (CI) SANDY SILTY CLAY - medium plasticity, mottled grey-yellow brown, fine to coarse sand, trace of fine to medium gravel.
note 1 : Single Individual Recompacted Specimen - (Multistage)
note 2 : Recompacted to 98% of Standard Maximum Dry Density and at Standard Optimum Moisture Content.
note 3 : Initial Specimen Dimensions (mm):- 152.5 x 77.2 (Dia); Initial Bar B response = 0.95
note 4 : Sample and pressures supplied by Client; Type of failure: progressive plastic deformation.



Type of Test: Saturated, consolidated, undrained, with pore water measurements.

Shear Stage Data

Stage	Strain Rate	ε_f	σ_3'	u_0	u_f	$(\sigma_1 - \sigma_3)\phi$
	%/min	%	kPa	kPa	kPa	kPa
1	0.0050	2.123	21.000	700.000	729.000	65.491
2	0.0050	4.132	50.000	700.000	750.000	130.190
3	0.0050	8.323	98.000	700.000	802.000	250.171

Back Pressure: 700.0 kPa

Cell Pressure(s):
Stage 1: 750.0 kPa
Stage 2: 800.0 kPa
Stage 3: 900.0 kPa

Consolidation Stage Data

Stage	$\Delta\sigma_3$ kPa				Drainage Condition
1	50.00				one end and radial boundary
2	100.00				one end and radial boundary
3	200.00				one end and radial boundary

Angle of Friction: 33.0 degrees
Cohesion: 4.1 kPa

GLEN TRIAX 2 004 2010

Moisture Contents:
Initial: Stage 1: 17.5 %
Final: Whole: Stage 3: 21.5 %

Initial Dry Density: 1.68 t/m3
Initial Wet Density: 1.97 t/m3

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

Authorised Signature: Garry K Collins 18/07/17

coffey
A TETRA TECH COMPANY

31 Hope Street, Melrose Park NSW 2114
T : (61 2) 8876 0500
ABN 55 139 460 521

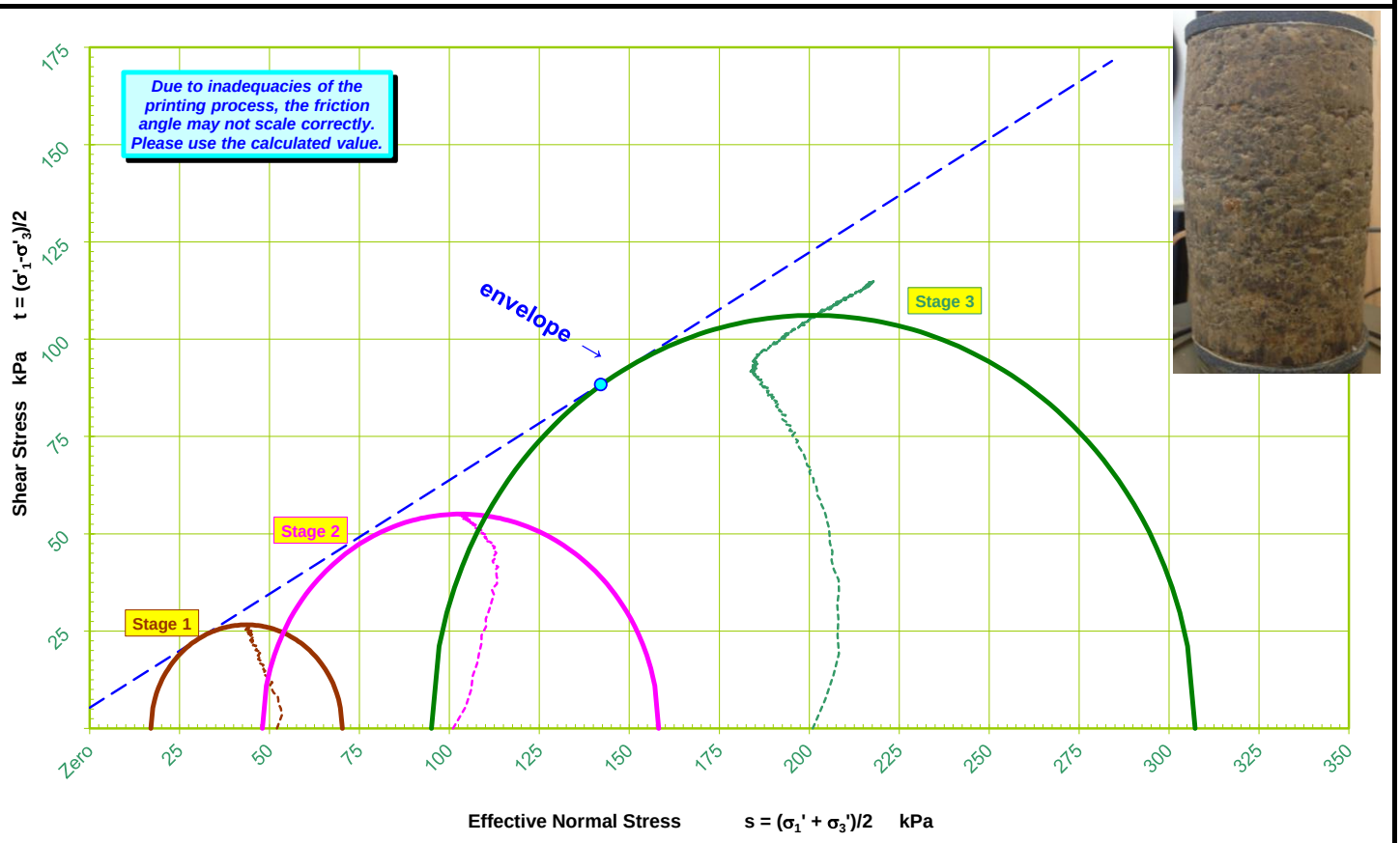
CU - Triaxial shear test: shear path & Mohr circle plot

client : *COFFEY SERVICES AUSTRALIA PTY LTD*
principal : *ATC Williams*
project : *754-BRIS00066AA - McPhillamy's Gold Project*
location : *Blayney, NSW*

job no : ***754-SYDS00030AA***
date : *18 July 2017*
report number: *IOLT 0173*
laboratory number: *ARTA17S-00481*

Sample number: ***TP32 (0.4 to 2.00 m), TP33 (0.4 to 0.90m) Combined***
Test Method : ***AS1289.6.4.2 (Note 4)***
failure criteria: ***Maximum principal effective stress ratio***

material classification: *(CI) SANDY SILTY CLAY - medium plasticity, mottled light brown-brown, fine to coarse sand, trace of fine to medium gravel.*
note 1 : *Single Individual Recompacted Specimen - (Multistage)*
note 2 : *Recompacted to 98% of Standard Maximum Dry Density and at Standard Optimum Moisture Content.*
note 3 : *Initial Specimen Dimensions (mm):- 152.5 x 77.2 (Dia); Initial Bar B response = 0.95*
note 4 : *Sample and pressures supplied by Client; Type of failure: progressive plastic deformation.*



Type of Test: *Saturated, consolidated, undrained, with pore water measurements.*

Shear Stage Data

Stage	Strain Rate %/min	ε_f %	σ_3' kPa	σ_1' kPa	$(\sigma_1' + \sigma_3')/2$ kPa	$(\sigma_1' - \sigma_3')/2$ kPa	$\sigma 1' / \sigma 3'$	u_0 kPa	u_f kPa	$(\sigma_1 - \sigma_3)\phi$ kPa
1	0.0050	1.671	17.000	70.241	43.621	26.621	4.132	798.000	833.000	53.241
2	0.0050	3.243	48.000	158.158	103.079	55.079	3.295	799.000	852.000	110.158
3	0.0050	8.161	95.000	307.264	201.132	106.132	3.234	799.000	905.000	212.264

Consolidation Stage Data

Stage	$\Delta\sigma_3$ kPa				Drainage Condition
1	52.00				one end and radial boundary
2	101.00				one end and radial boundary
3	201.00				one end and radial boundary

Angle of Friction: ***30.5*** *degrees*
Cohesion: ***5.3*** *kPa*

GLEN TRIAX 1 004 2010

Moisture Contents:

Initial:
Stage 1: *16.5 %*
Final:
Whole : Stage 3: *18.9 %*

Initial Dry Density: *1.72 t/m3*
Initial Wet Density: *2.01 t/m3*

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

Authorised Signature: Garry K Collins 18/07/17

coffey
A TETRA TECH COMPANY

31 Hope Street, Melrose Park NSW 2114
T : (61 2) 8876 0500
ABN 55 139 460 521

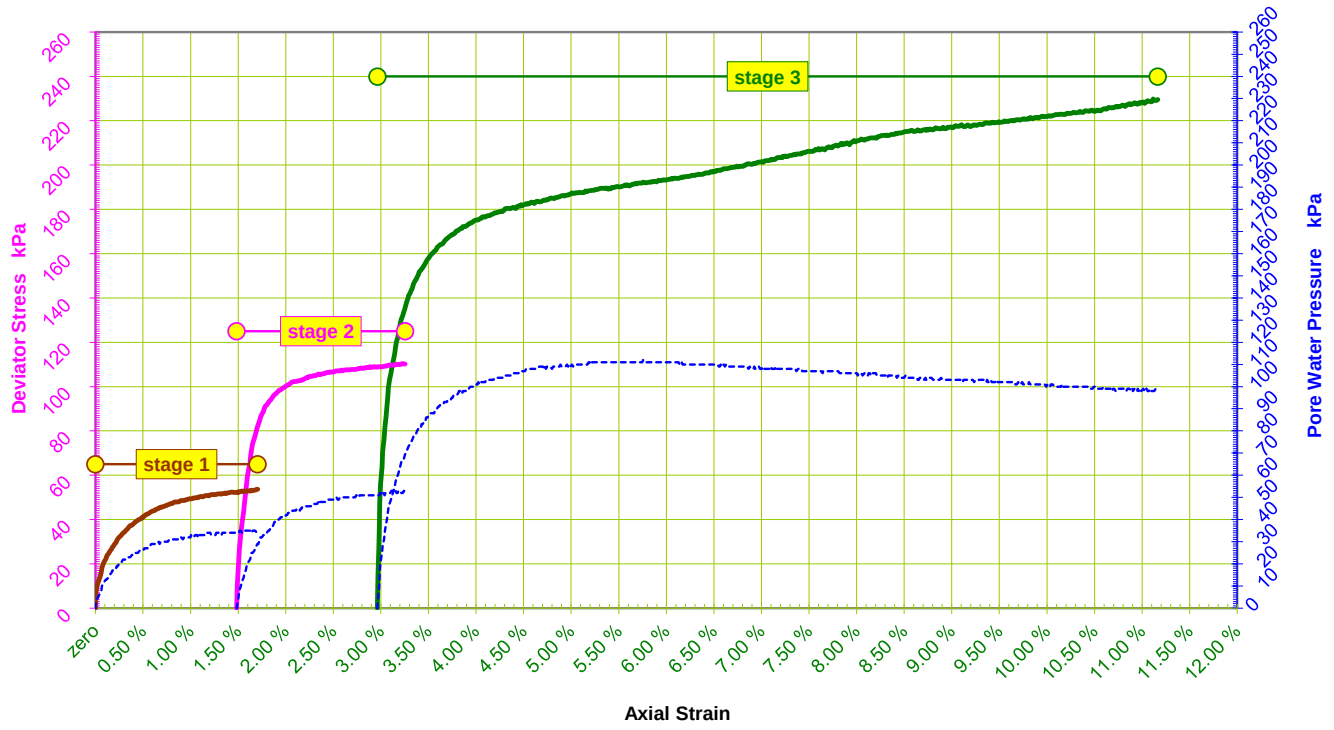
CU - Triaxial shear test: stress - strain plots

client : COFFEY SERVICES AUSTRALIA PTY LTD
principal : ATC Williams
project : 754-BRIS00066AA - McPhillamy's Gold Project
location : Blayney, NSW

job no : 754-SYDS00030AA
date : 18 July 2017
report number: IOLT 0173
laboratory number: ARTA17S-00481

Sample number: **TP32 (0.4 to 2.00 m), TP33 (0.4 to 0.90m) Combined**
Test Method : **AS1289.6.4.2 (Note 4)**
Failure Criteria: **Maximum principal effective stress ratio**

Material Classification: (CI) SANDY SILTY CLAY - medium plasticity, mottled light brown-brown, fine to coarse sand, trace of fine to medium gravel.
note 1 : Single Individual Recompacted Specimen - (Multistage)
note 2 : Recompacted to 98% of Standard Maximum Dry Density and at Standard Optimum Moisture Content.
note 3 : Initial Specimen Dimensions (mm):- 152.5 x 77.2 (Dia); Initial Bar B response = 0.95
note 4 : Sample and pressures supplied by Client; Type of failure: progressive plastic deformation.



Type of Test: Saturated, consolidated, undrained, with pore water measurements.

Shear Stage Data

Stage	Strain Rate	ε_f	σ_3'	u_0	u_f	$(\sigma_1 - \sigma_3)\phi$
	%/min	%	kPa	kPa	kPa	kPa
1	0.0050	1.671	17.000	798.000	833.000	53.241
2	0.0050	3.243	48.000	799.000	852.000	110.158
3	0.0050	8.161	95.000	799.000	905.000	212.264

Back Pressure: 800.0 kPa

Cell Pressure(s):
Stage 1: 850.0 kPa
Stage 2: 900.0 kPa
Stage 3: 1000.0 kPa

Consolidation Stage Data

Stage	$\Delta\sigma_3$ kPa				Drainage Condition
1	52.00				one end and radial boundary
2	101.00				one end and radial boundary
3	201.00				one end and radial boundary

Angle of Friction: 30.5 degrees
Cohesion: 5.3 kPa

GLEN TRIAX 2 004 2010

Moisture Contents:
Initial: Stage 1: 16.5 %
Final: Whole: Stage 3: 18.9 %

Initial Dry Density: 1.72 t/m3
Initial Wet Density: 2.01 t/m3

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

Authorised Signature: Garry K Collins 18/07/17

coffey
A TETRA TECH COMPANY

31 Hope Street, Melrose Park NSW 2114
T : (61 2) 8876 0500
ABN 55 139 460 521

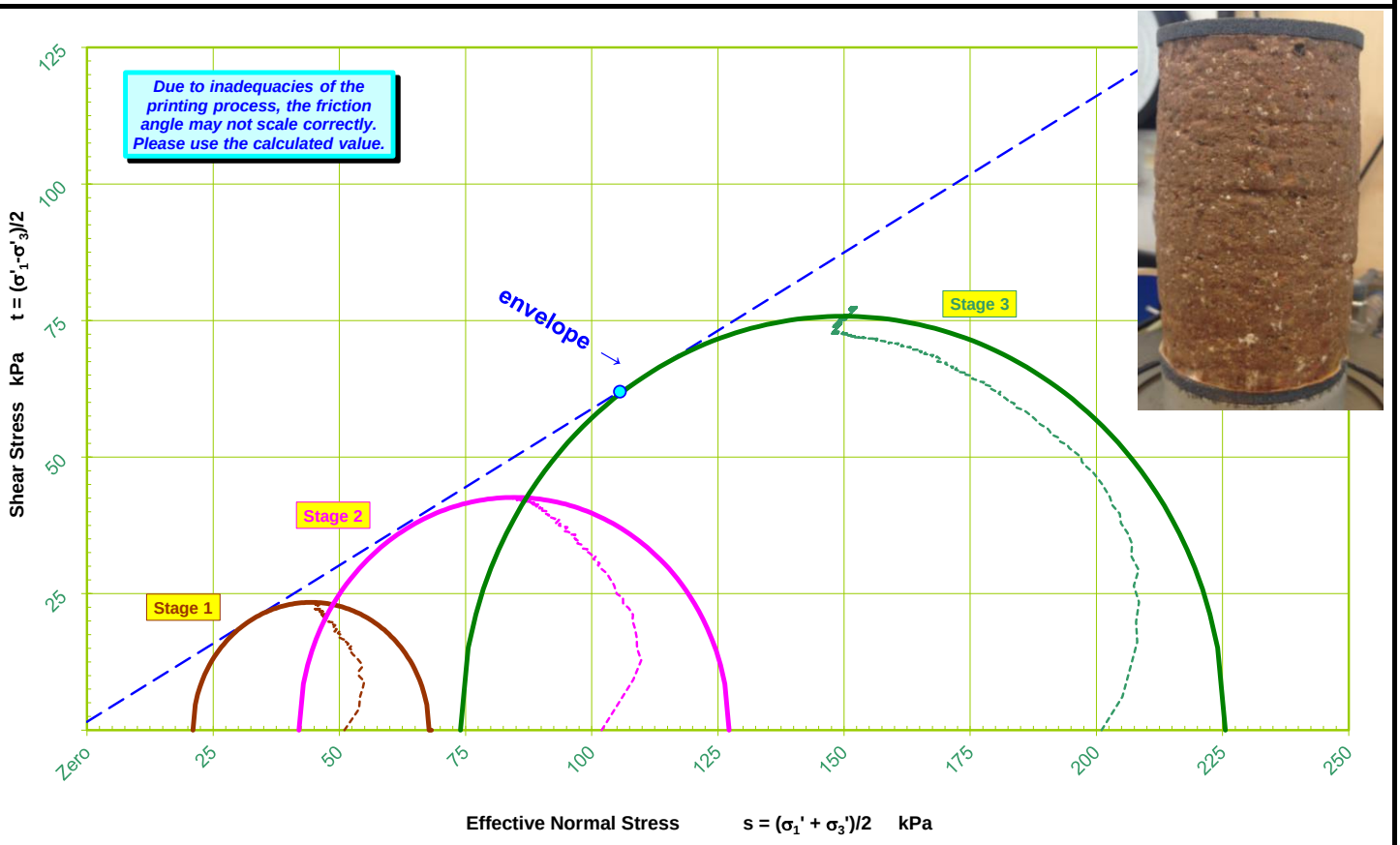
CU - Triaxial shear test: shear path & Mohr circle plot

client : *COFFEY SERVICES AUSTRALIA PTY LTD*
principal : *ATC Williams*
project : *754-BRIS00066AA - McPhillamy's Gold Project*
location : *Blayney, NSW*

job no : ***754-SYDS00030AA***
date : *18 July 2017*
report number: *IOLT 0170*
laboratory number: *ARTA17S-00478*

Sample number: ***TP11 (0.2 to 2.00 m), TP13 (0.9 to 1.80m), TP18 (1.5 to 1.90 m) Combined***
Test Method : ***AS1289.6.4.2 (Note 4)***
failure criteria: ***Maximum principal effective stress ratio***

material classification: *(CI) SANDY SILTY CLAY - medium plasticity, mottled light red-red brown, fine to coarse sand, trace of fine to medium gravel.*
note 1 : *Single Individual Recompacted Specimen - (Multistage)*
note 2 : *Recompacted to 98% of Standard Maximum Dry Density and at Standard Optimum Moisture Content.*
note 3 : *Initial Specimen Dimensions (mm):- 152.5 x 77.2 (Dia); Initial Bar B response = 0.95*
note 4 : *Sample and pressures supplied by Client; Type of failure: progressive plastic deformation.*



Type of Test: *Saturated, consolidated, undrained, with pore water measurements.*

Shear Stage Data

Stage	Strain Rate %/min	ε_f %	σ_3' kPa	σ_1' kPa	$(\sigma_1' + \sigma_3')/2$ kPa	$(\sigma_1' - \sigma_3')/2$ kPa	$\sigma 1' / \sigma 3'$	u_0 kPa	u_f kPa	$(\sigma_1 - \sigma_3)\phi$ kPa
1	0.0050	1.393	21.000	67.785	44.392	23.392	3.228	899.000	929.000	46.785
2	0.0050	3.157	42.000	127.221	84.611	42.611	3.029	898.000	958.000	85.221
3	0.0050	9.118	74.000	225.550	149.775	75.775	3.048	899.000	1026.000	151.550

Consolidation Stage Data

Stage	$\Delta\sigma_3$ kPa				Drainage Condition
1	51.00				one end and radial boundary
2	102.00				one end and radial boundary
3	201.00				one end and radial boundary

Angle of Friction: ***30.0*** *degrees*
Cohesion: ***1.5*** *kPa*

GLEN TRIAX 1 004 2010

Moisture Contents:

Initial:	Stage 1:	17.5 %	
Final:			
Whole :	Stage 3:		24.9 %

Initial Dry Density: *1.57 t/m3*
Initial Wet Density: *1.84 t/m3*

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

Authorised Signature: Garry K Collins 18/07/17

coffey
A TETRA TECH COMPANY

31 Hope Street, Melrose Park NSW 2114
T : (61 2) 8876 0500
ABN 55 139 460 521

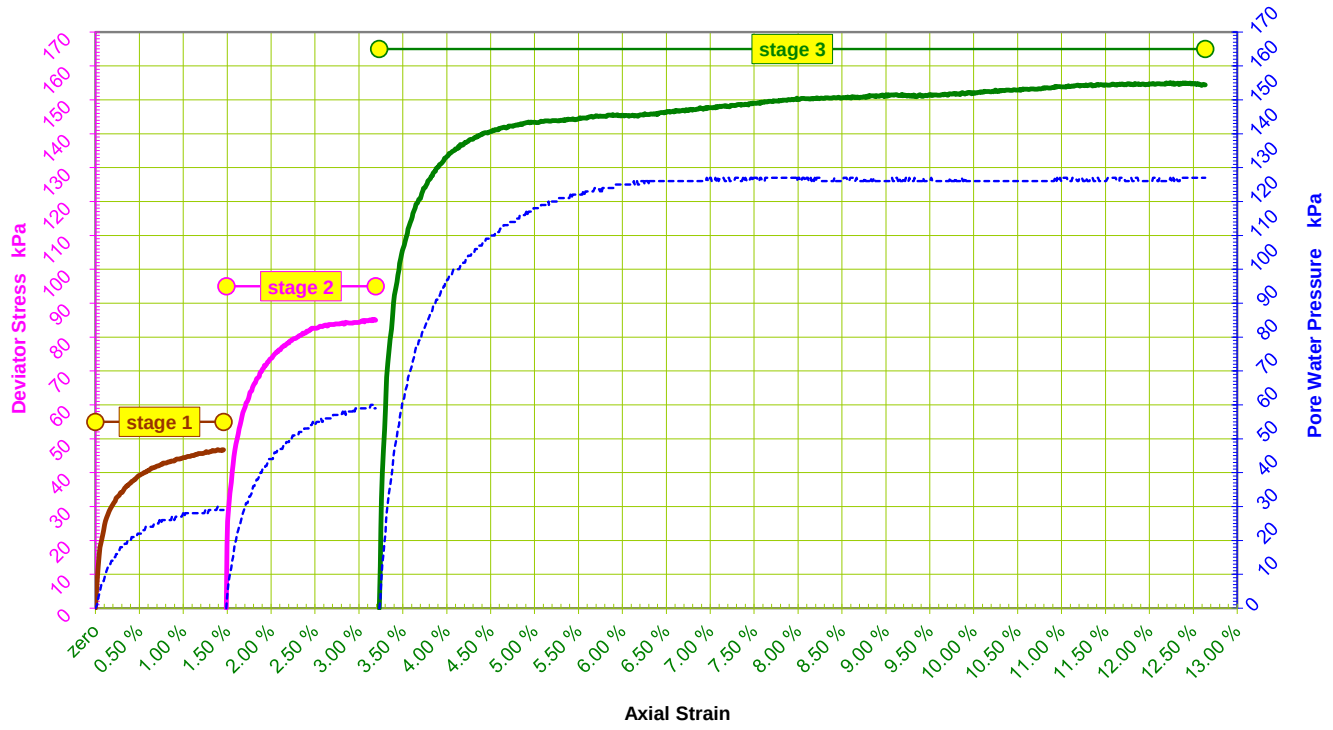
CU - Triaxial shear test: stress - strain plots

client : COFFEY SERVICES AUSTRALIA PTY LTD
principal : ATC Williams
project : 754-BRIS00066AA - McPhillamy's Gold Project
location : Blayney, NSW

job no : 754-SYDS00030AA
date : 18 July 2017
report number: IOLT 0170
laboratory number: ARTA17S-00478

Sample number: **TP11 (0.2 to 2.00 m), TP13 (0.9 to 1.80m), TP18 (1.5 to 1.90 m) Combined**
Test Method : **AS1289.6.4.2 (Note 4)**
Failure Criteria: **Maximum principal effective stress ratio**

Material Classification: (CI) SANDY SILTY CLAY - medium plasticity, mottled light red-red brown, fine to coarse sand, trace of fine to medium gravel.
note 1 : Single Individual Recompacted Specimen - (Multistage)
note 2 : Recompacted to 98% of Standard Maximum Dry Density and at Standard Optimum Moisture Content.
note 3 : Initial Specimen Dimensions (mm):- 152.5 x 77.2 (Dia); Initial Bar B response = 0.95
note 4 : Sample and pressures supplied by Client; Type of failure: progressive plastic deformation.



Type of Test: Saturated, consolidated, undrained, with pore water measurements.

Shear Stage Data

Stage	Strain Rate	ε_f	σ_3'	u_0	u_f	$(\sigma_1 - \sigma_3)\phi$
	%/min	%	kPa	kPa	kPa	kPa
1	0.0050	1.393	21.000	899.000	929.000	46.785
2	0.0050	3.157	42.000	898.000	958.000	85.221
3	0.0050	9.118	74.000	899.000	1026.000	151.550

Back Pressure: 900.0 kPa

Cell Pressure(s):

Stage 1:	950.0 kPa
Stage 2:	1000.0 kPa
Stage 3:	1100.0 kPa

Consolidation Stage Data

Stage	$\Delta\sigma_3$ kPa				Drainage Condition
1	51.00				one end and radial boundary
2	102.00				one end and radial boundary
3	201.00				one end and radial boundary

Angle of Friction: 30.0 degrees
Cohesion: 1.5 kPa

GLEN TRIAX 2 004 2010

Moisture Contents:

Initial:	Stage 1:	17.5 %	
Final:			
	Whole: Stage 3:		24.9 %

Initial Dry Density: 1.57 t/m3
Initial Wet Density: 1.84 t/m3

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

Authorised Signature: Garry K Collins 18/07/17

coffey
A TETRA TECH COMPANY

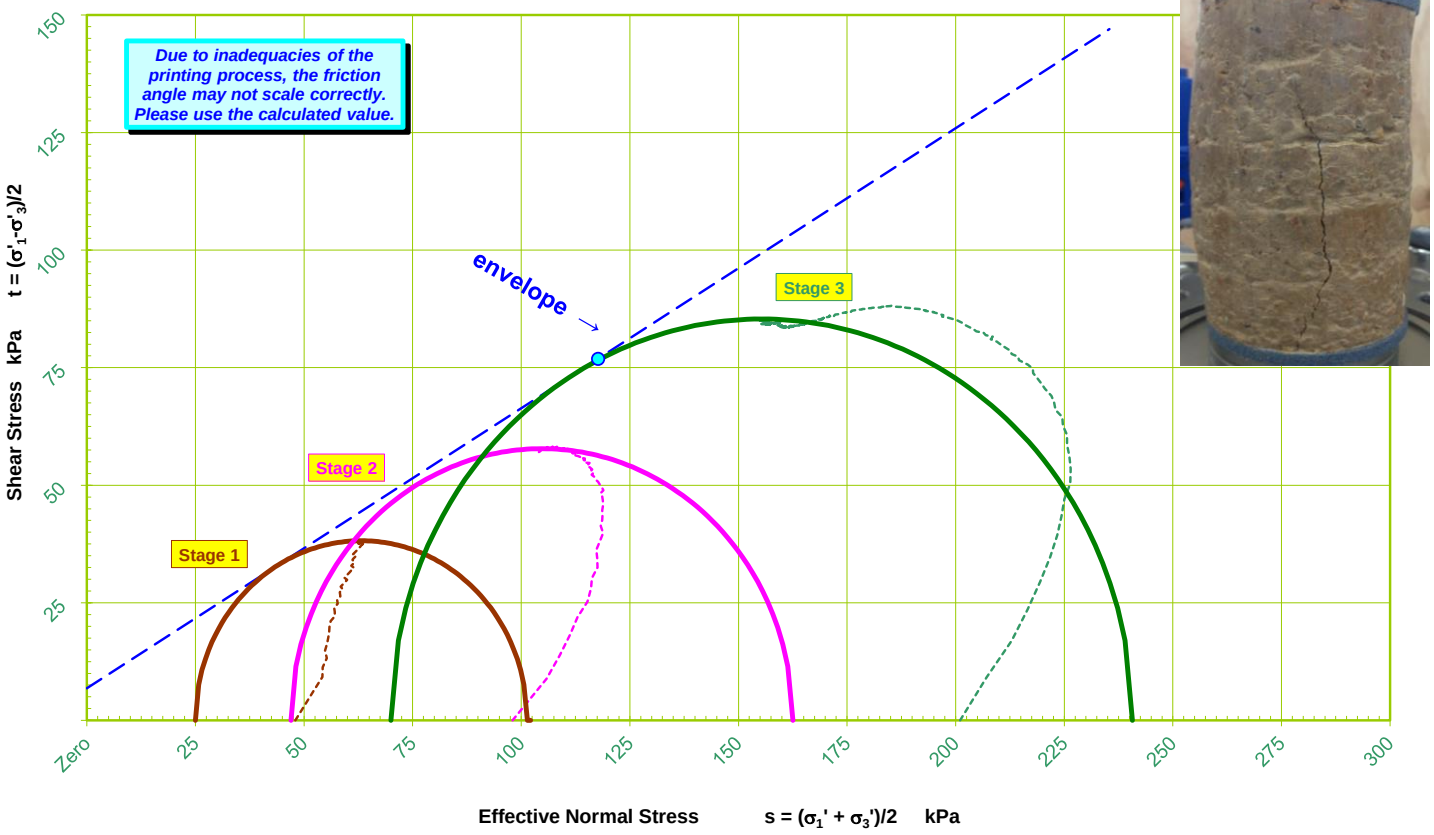
31 Hope Street, Melrose Park NSW 2114
T : (61 2) 8876 0500
ABN 55 139 460 521

CU - Triaxial shear test: shear path & Mohr circle plot

client : COFFEY SERVICES AUSTRALIA PTY LTD
job no : 754-SYDS00030AA
principal : ATC Williams
date : 18 July 2017
project : 754-BRIS00066AA - McPhillamy's Gold Project
report number: IOLT 0171
location : Blayney, NSW
laboratory number: ARTA17S-00479

Sample number: TP21 (0.4 to 0.60 m), TP22 (1.0 to 1.50m), TP23 (1.0 to 1.50 m) Combined
Test Method : AS1289.6.4.2 (Note 4)
failure criteria: Maximum principal effective stress ratio

material classification: (CI) SANDY SILTY CLAY - medium plasticity, mottled brown, fine to coarse sand, trace of fine to medium gravel.
note 1 : Single Individual Recompacted Specimen - (Multistage)
note 2 : Recompacted to 98% of Standard Maximum Dry Density and at Standard Optimum Moisture Content.
note 3 : Initial Specimen Dimensions (mm):- 152.5 x 77.2 (Dia); Initial Bar B response = 0.95
note 4 : Sample and pressures supplied by Client; Type of failure: progressive plastic deformation.



Type of Test: *Saturated, consolidated, undrained, with pore water measurements.*

Shear Stage Data

Stage	Strain Rate %/min	ε_f %	σ_3' kPa	σ_1' kPa	$(\sigma_1' + \sigma_3')/2$ kPa	$(\sigma_1' - \sigma_3')/2$ kPa	$\sigma 1' / \sigma 3'$	u_0 kPa	u_f kPa	$(\sigma_1 - \sigma_3)\phi$ kPa
1	0.0050	0.741	25.000	101.388	63.194	38.194	4.056	602.000	625.000	76.388
2	0.0050	1.943	47.000	162.536	104.768	57.768	3.458	602.000	653.000	115.536
3	0.0050	8.311	70.000	240.682	155.341	85.341	3.438	599.000	730.000	170.682

Consolidation Stage Data

Stage	$\Delta\sigma_3$ kPa				Drainage Condition
1	48.00				one end and radial boundary
2	98.00				one end and radial boundary
3	201.00				one end and radial boundary

Angle of Friction: 31.0 degrees
Cohesion: 6.8 kPa

GLEN TRIAX 1 004 2010

Moisture Contents:

Initial:	Stage 1:	17.0 %	
Final:			
Whole :	Stage 3:		21.8 %

Initial Dry Density: 1.72 t/m3
Initial Wet Density: 2.01 t/m3

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

Authorised Signature: Garry K Collins 18/07/17

coffey
A TETRA TECH COMPANY

31 Hope Street, Melrose Park NSW 2114
T : (61 2) 8876 0500
ABN 55 139 460 521

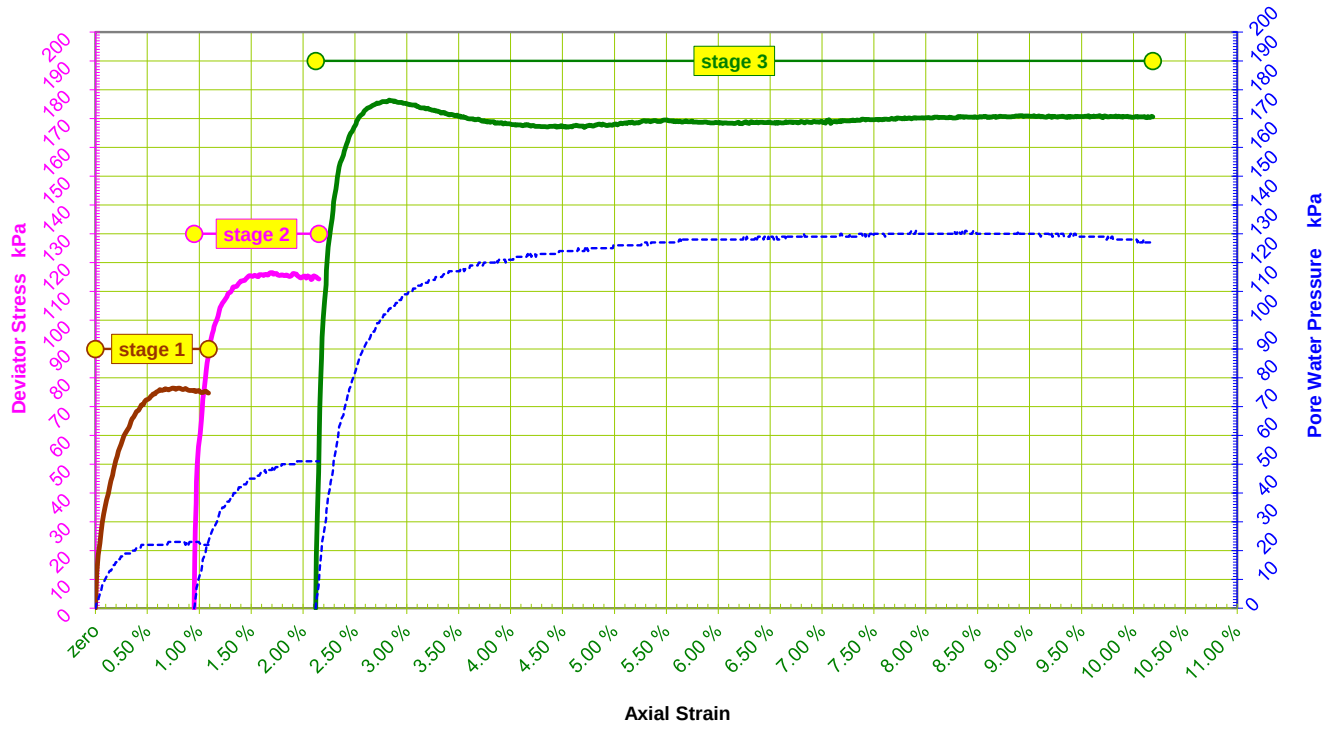
CU - Triaxial shear test: stress - strain plots

client : COFFEY SERVICES AUSTRALIA PTY LTD
principal : ATC Williams
project : 754-BRIS00066AA - McPhillamy's Gold Project
location : Blayney, NSW

job no : 754-SYDS00030AA
date : 18 July 2017
report number: IOLT 0171
laboratory number: ARTA17S-00479

Sample number: **TP21 (0.4 to 0.60 m), TP22 (1.0 to 1.50m), TP23 (1.0 to 1.50 m) Combined**
Test Method : **AS1289.6.4.2 (Note 4)**
Failure Criteria: **Maximum principal effective stress ratio**

Material Classification: (CI) SANDY SILTY CLAY - medium plasticity, mottled brown, fine to coarse sand, trace of fine to medium gravel.
note 1 : Single Individual Recompacted Specimen - (Multistage)
note 2 : Recompacted to 98% of Standard Maximum Dry Density and at Standard Optimum Moisture Content.
note 3 : Initial Specimen Dimensions (mm):- 152.5 x 77.2 (Dia); Initial Bar B response = 0.95
note 4 : Sample and pressures supplied by Client; Type of failure: progressive plastic deformation.



Type of Test: Saturated, consolidated, undrained, with pore water measurements.

Shear Stage Data

Stage	Strain Rate	ε_f	σ_3'	u_0	u_f	$(\sigma_1 - \sigma_3)\phi$
	%/min	%	kPa	kPa	kPa	kPa
1	0.0050	0.741	25.000	602.000	625.000	76.388
2	0.0050	1.943	47.000	602.000	653.000	115.536
3	0.0050	8.311	70.000	599.000	730.000	170.682

Back Pressure: 600.0 kPa

Cell Pressure(s):
Stage 1: 650.0 kPa
Stage 2: 700.0 kPa
Stage 3: 800.0 kPa

Consolidation Stage Data

Stage	$\Delta\sigma_3$ kPa				Drainage Condition
1	48.00				one end and radial boundary
2	98.00				one end and radial boundary
3	201.00				one end and radial boundary

Angle of Friction: 31.0 degrees
Cohesion: 6.8 kPa

GLEN TRIAX 2 004 2010

Moisture Contents:
Initial: Stage 1: 17.0 %
Final: Whole: Stage 3: 21.8 %

Initial Dry Density: 1.72 t/m3
Initial Wet Density: 2.01 t/m3

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

Authorised Signature: Garry K Collins 18/07/17

coffey
A TETRA TECH COMPANY

31 Hope Street, Melrose Park NSW 2114
T : (61 2) 8876 0500
ABN 55 139 460 521

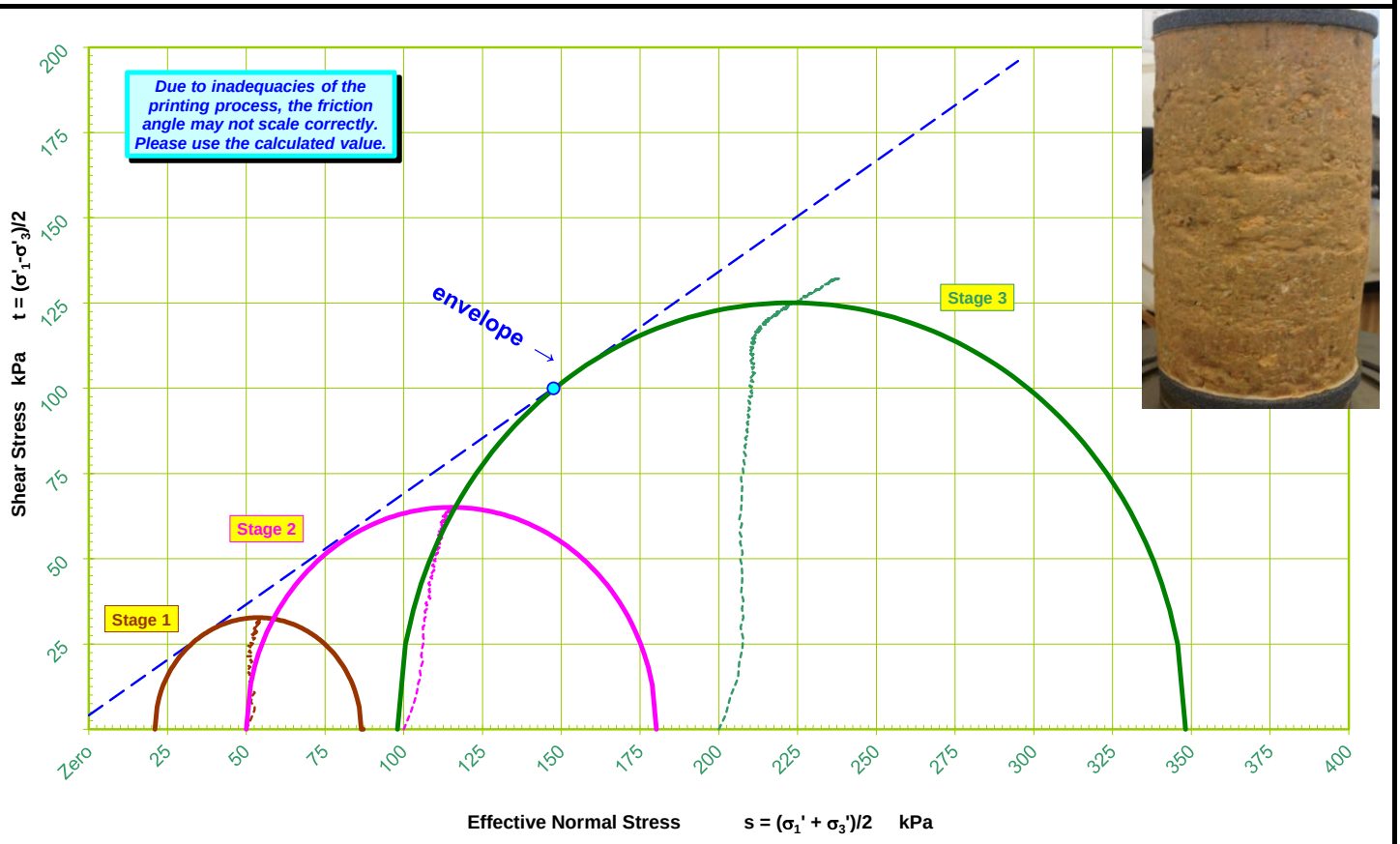
CU - Triaxial shear test: shear path & Mohr circle plot

client : *COFFEY SERVICES AUSTRALIA PTY LTD*
principal : *ATC Williams*
project : *754-BRIS00066AA - McPhillamy's Gold Project*
location : *Blayney, NSW*

job no : ***754-SYDS00030AA***
date : *18 July 2017*
report number: *IOLT 0172*
laboratory number: *ARTA17S-00480*

Sample number: ***TP24 (0.9 to 2.00 m), TP26 (1.0 to 2.00m), TP30 (0.4 to 1.00 m) Combined***
Test Method : ***AS1289.6.4.2 (Note 4)***
failure criteria: ***Maximum principal effective stress ratio***

material classification: *(CI) SANDY SILTY CLAY - medium plasticity, mottled grey-yellow brown, fine to coarse sand, trace of fine to medium gravel.*
note 1 : *Single Individual Recompacted Specimen - (Multistage)*
note 2 : *Recompacted to 98% of Standard Maximum Dry Density and at Standard Optimum Moisture Content.*
note 3 : *Initial Specimen Dimensions (mm):- 152.5 x 77.2 (Dia); Initial Bar B response = 0.95*
note 4 : *Sample and pressures supplied by Client; Type of failure: progressive plastic deformation.*



Type of Test: *Saturated, consolidated, undrained, with pore water measurements.*

Shear Stage Data

Stage	Strain Rate %/min	ε_f %	σ_3' kPa	σ_1' kPa	$(\sigma_1' + \sigma_3')/2$ kPa	$(\sigma_1' - \sigma_3')/2$ kPa	$\sigma 1' / \sigma 3'$	u_0 kPa	u_f kPa	$(\sigma_1 - \sigma_3)\phi$ kPa
1	0.0050	2.123	21.000	86.491	53.746	32.746	4.119	700.000	729.000	65.491
2	0.0050	4.132	50.000	180.190	115.095	65.095	3.604	700.000	750.000	130.190
3	0.0050	8.323	98.000	348.171	223.085	125.085	3.553	700.000	802.000	250.171

Consolidation Stage Data

Stage	$\Delta\sigma_3$ kPa				Drainage Condition
1	50.00				one end and radial boundary
2	100.00				one end and radial boundary
3	200.00				one end and radial boundary

Angle of Friction: ***33.0*** *degrees*
Cohesion: ***4.1*** *kPa*

GLEN TRIAX 1 004 2010

Moisture Contents:

Initial:
Stage 1: *17.5 %*
Final:
Whole : Stage 3: *21.5 %*

Initial Dry Density: *1.68 t/m3*
Initial Wet Density: *1.97 t/m3*

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

Authorised Signature: Garry K Collins 18/07/17

APPENDIX E2

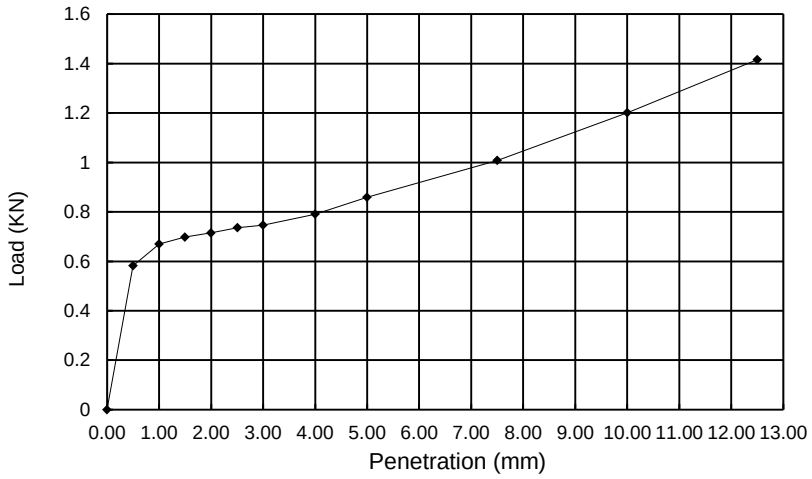
CALIFORNIA BEARING RATIO REPORT

Client:	ATC Williams	**Source:**	TP 02 0.5-0.9m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Silty CLAY
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No.:**	B44641-CBR
Job No.:	B17585	**Lab No.:**	B44641

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used		Standard	Dry Density			
Maximum Dry Density t/m3		1.65	At Compaction	1.62 t/m3	98.0 % Comp.	
Optimum Moisture Content %		17.2	After Soaking	1.62 t/m3	98.0 % Comp.	
No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	17.4	101
Drop of Rammer	mm	300	After Soaking	%	21.8	127
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	22.4	131
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	21.8	127
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking	%	1.0	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 5.0 % 2.5 mm Penetration

Notes:

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

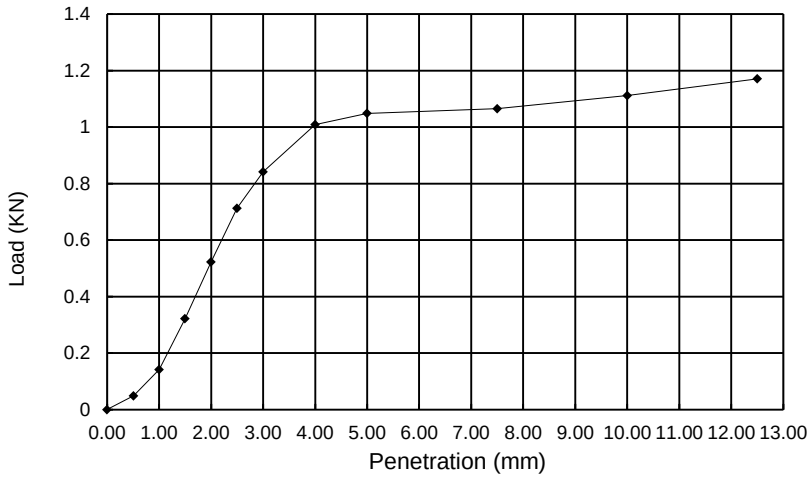
CALIFORNIA BEARING RATIO REPORT

Client:	ATC Williams	**Source:**	TP 04 0.3-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Silty CLAY
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No.:**	B44643-CBR
Job No.:	B17585	**Lab No.:**	B44643

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used		Standard	Dry Density			
Maximum Dry Density t/m3		1.63	At Compaction	1.59 t/m3	98.0	% Comp.
Optimum Moisture Content %		19.7	After Soaking	1.64 t/m3	101.0	% Comp.
No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	20.0	101
Drop of Rammer	mm	300	After Soaking	%	22.3	113
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	24.0	122
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	22.3	113
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking	%	-0.1	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 7.0 % 2.5 mm Penetration

Notes:

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

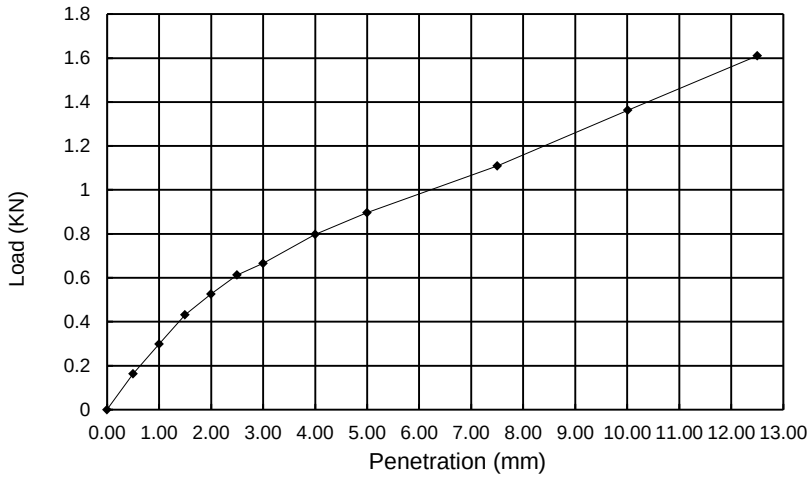
CALIFORNIA BEARING RATIO REPORT

Client:	ATC Williams	**Source:**	TP 06 0.4-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Sandy CLAY
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No.:**	B44644-CBR
Job No.:	B17585	**Lab No.:**	B44644

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used		Standard	Dry Density				
Maximum Dry Density t/m3		1.82	At Compaction	1.77	t/m3	97.0	% Comp.
Optimum Moisture Content %		13.9	After Soaking	1.82	t/m3	100.0	% Comp.
No. of Layers		3	Moisture Content				Moisture Ratio (%)
Blows per Layer		53	At Compaction		%	13.8	99
Drop of Rammer	mm	300	After Soaking		%	14.5	104
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)		%	16.4	118
Surcharge Used	kg	4.5	After Penetration (Entire Depth)		%	14.5	104
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking		%	0.7	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 4.5 % 2.5 mm Penetration

Notes:

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

SOIL CLASSIFICATION REPORT

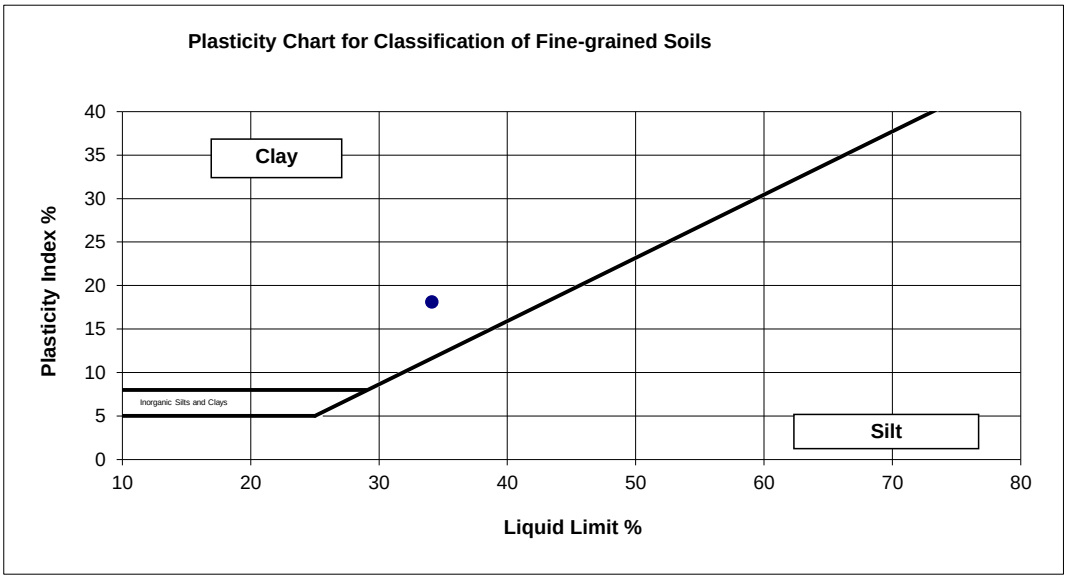
Client:	ATC Williams	**Source:**	TP 06 0.4-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Sandy CLAY
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No:**	B44644-PI
Job No:	B17585	**Lab No:**	B44644

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☑ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☑ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	34	**Linear Shrinkage (%):**	10.0
Plastic Limit (%):	16	**Field Moisture Content (%):**	-
Plastic Index:	18		



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Brad Morris

24/01/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

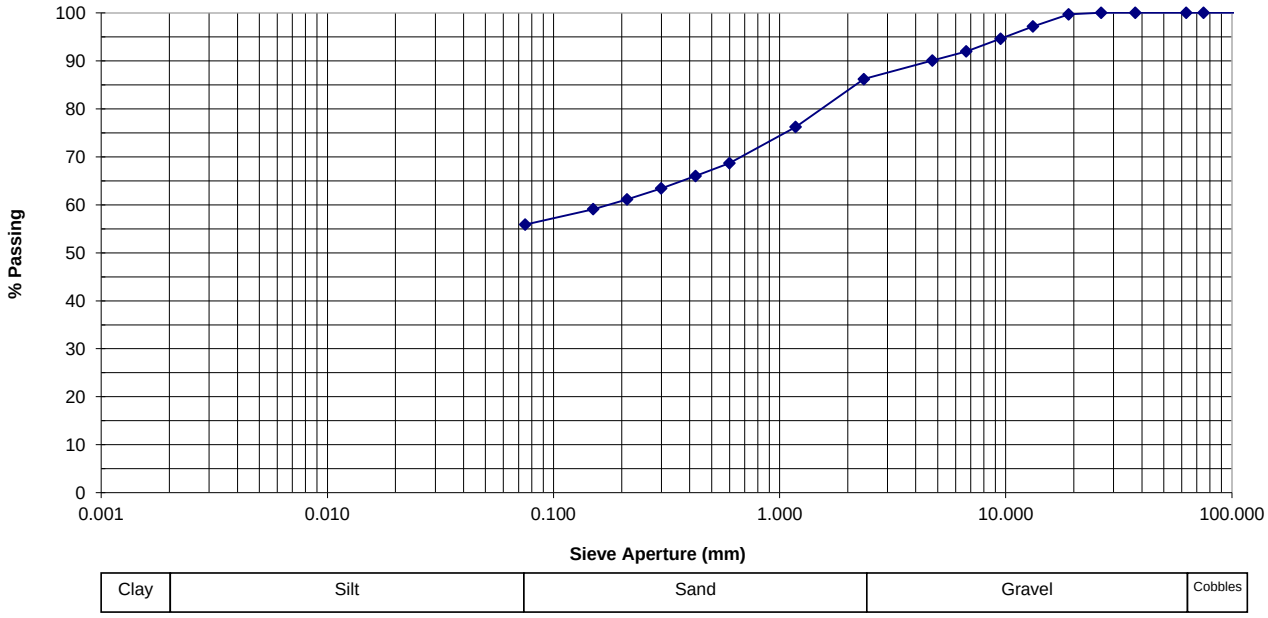
PARTICLE SIZE DISTRIBUTION REPORT

Client:	ATC Williams	**Source:**	TP 06 0.4-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Sandy CLAY
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No:**	B44644-PSD
Job No:	B17585	**Lab No:**	B44644

Test Procedure: ☑ AS1289 3.6.1 Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving

Sampling: Sampled by Client **Date Sampled:** 11/12/2017

Preparation: Prepared in accordance with the test method



Sieve Apperture: (mm)	% Passing	Specification N/A Envelope	Sieve Aperture: (mm)	% Passing	Specification N/A Envelope
200	100		4.75	90	
75	100		2.36	86	
63	100		1.18	76	
37.5	100		0.600	69	
26.5	100		0.425	66	
19	100		0.300	63	
13.2	97		0.212	61	
9.5	95		0.150	59	
6.7	92		0.075	56	

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

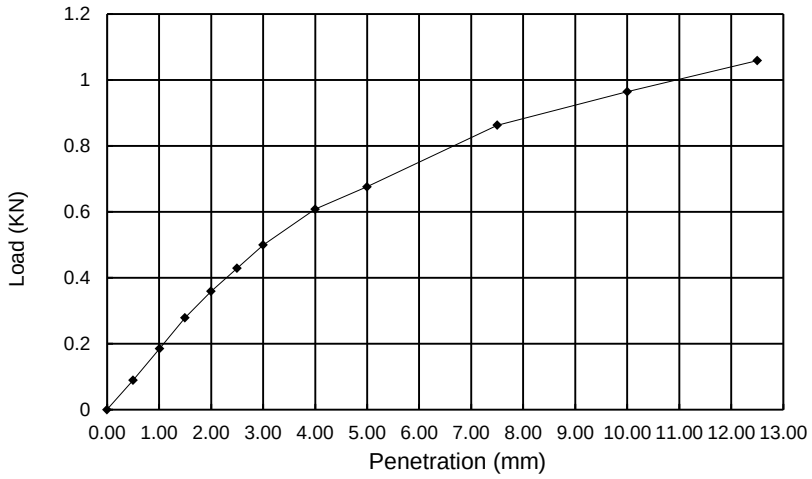
CALIFORNIA BEARING RATIO REPORT

Client:	ATC Williams	**Source:**	TP 08 0.5-0.9m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Silty CLAY
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No.:**	B44646-CBR
Job No.:	B17585	**Lab No.:**	B44646

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used		Standard	Dry Density			
Maximum Dry Density t/m3		1.70	At Compaction	1.67 t/m3	98.0	% Comp.
Optimum Moisture Content %		15.0	After Soaking	1.70 t/m3	100.0	% Comp.
No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	15.0	100
Drop of Rammer	mm	300	After Soaking	%	18.1	121
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	20.1	134
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	18.1	121
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking	%	0.6	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 3.5 % 2.5 mm Penetration

Notes:

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

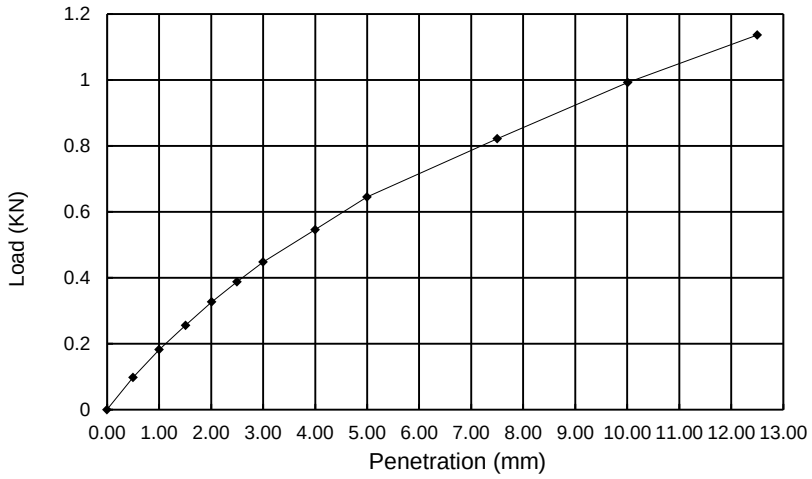
CALIFORNIA BEARING RATIO REPORT

Client:	ATC Williams	**Source:**	TP 12 0.4-0.9m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY with sand
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No.:**	B44647-CBR
Job No.:	B17585	**Lab No.:**	B44647

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used		Standard	Dry Density			
Maximum Dry Density t/m3		1.64	At Compaction	1.61 t/m3	98.0	% Comp.
Optimum Moisture Content %		17.6	After Soaking	1.58 t/m3	96.0	% Comp.
No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	17.6	100
Drop of Rammer	mm	300	After Soaking	%	23.6	134
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	24.5	139
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	23.6	134
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking	%	2.0	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 3.5 % 5.0 mm Penetration

Notes:

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

SOIL CLASSIFICATION REPORT

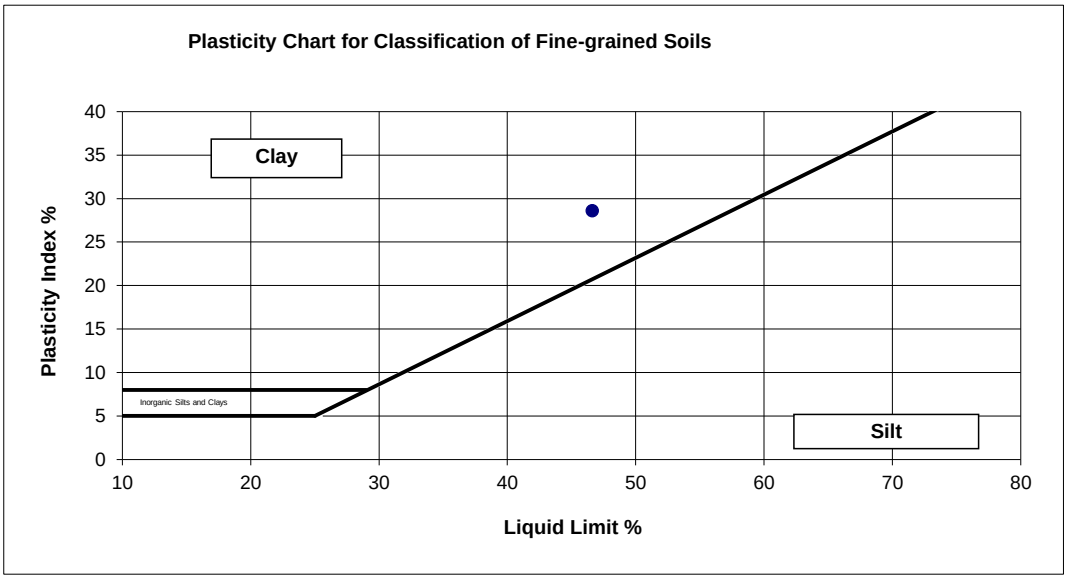
Client:	ATC Williams	**Source:**	TP 12 0.4-0.9m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY with sand
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No:**	B44647-PI
Job No:	B17585	**Lab No:**	B44647

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☑ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☑ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	47	**Linear Shrinkage (%):**	12.5
Plastic Limit (%):	18	**Field Moisture Content (%):**	-
Plastic Index:	29		



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Brad Morris

24/01/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

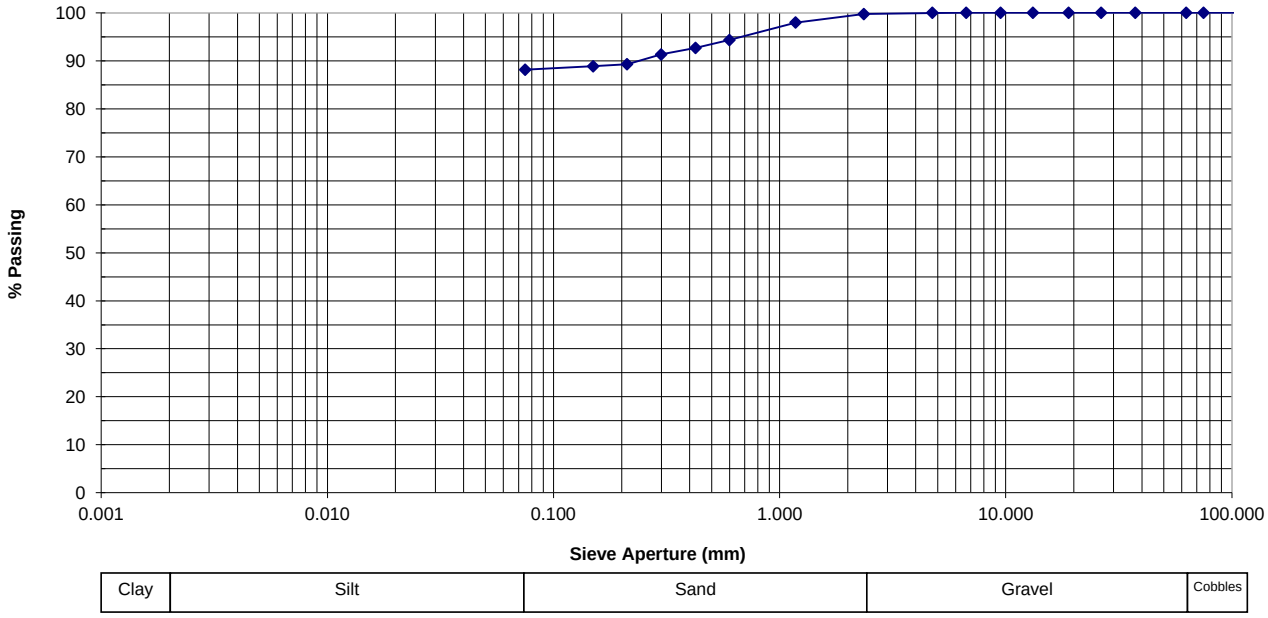
PARTICLE SIZE DISTRIBUTION REPORT

Client:	ATC Williams	**Source:**	TP 12 0.4-0.9m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY with sand
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No:**	B44647-PSD
Job No:	B17585	**Lab No:**	B44647

Test Procedure: ☑ AS1289 3.6.1 Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving

Sampling: Sampled by Client **Date Sampled:** 11/12/2017

Preparation: Prepared in accordance with the test method



Sieve Apperture: (mm)	% Passing	Specification N/A Envelope	Sieve Aperture: (mm)	% Passing	Specification N/A Envelope
200	100		4.75	100	
75	100		2.36	100	
63	100		1.18	98	
37.5	100		0.600	94	
26.5	100		0.425	93	
19	100		0.300	91	
13.2	100		0.212	89	
9.5	100		0.150	89	
6.7	100		0.075	88	

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

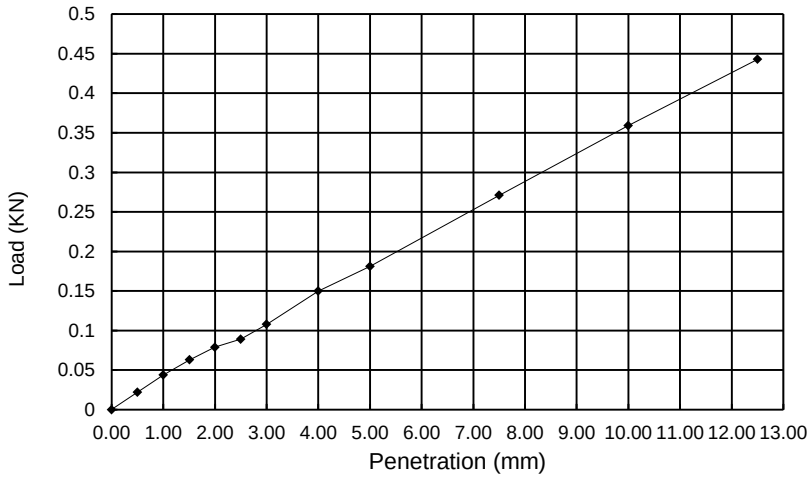
CALIFORNIA BEARING RATIO REPORT

Client:	ATC Williams	**Source:**	TP 16 0.6-1.2m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Silty CLAY
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No.:**	B44649-CBR
Job No.:	B17585	**Lab No.:**	B44649

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used		Standard	Dry Density				
Maximum Dry Density t/m3		1.74	At Compaction	1.71	t/m3	99.0	% Comp.
Optimum Moisture Content %		13.5	After Soaking	1.74	t/m3	100.0	% Comp.
No. of Layers		3	Moisture Content				Moisture Ratio (%)
Blows per Layer		53	At Compaction		%	13.7	101
Drop of Rammer	mm	300	After Soaking		%	16.6	123
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)		%	17.1	126
Surcharge Used	kg	4.5	After Penetration (Entire Depth)		%	16.6	123
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking		%	4.3	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 1.0 % 5.0 mm Penetration

Notes:

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

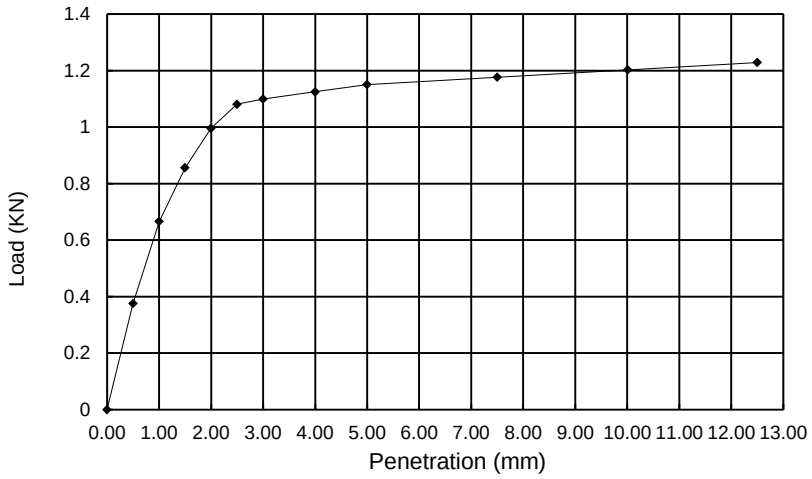
CALIFORNIA BEARING RATIO REPORT

Client:	ATC Williams	**Source:**	TP 18 0.3-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Silty CLAY
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No.:**	B44650-CBR
Job No.:	B17585	**Lab No.:**	B44650

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used		Standard	Dry Density			
Maximum Dry Density t/m3		1.72	At Compaction	1.69 t/m3	98.0	% Comp.
Optimum Moisture Content %		16.2	After Soaking	1.85 t/m3	108.0	% Comp.
No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	16.2	100
Drop of Rammer	mm	300	After Soaking	%	19.4	120
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	20.0	123
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	19.4	120
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking	%	1.1	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 8.0 % 2.5 mm Penetration

Notes:

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

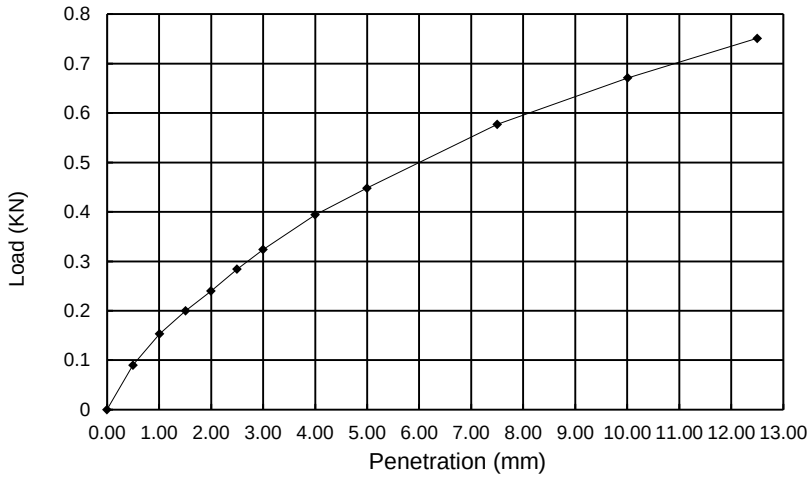
CALIFORNIA BEARING RATIO REPORT

Client:	ATC Williams	**Source:**	TP 19 0.4-1.0m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Silty CLAY
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No.:**	B44651-CBR
Job No.:	B17585	**Lab No.:**	B44651

Test Procedure:

- ☑ AS1289 6.1.1 Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort
- ☑ AS1289 2.1.1 Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)

Sampling:	Sampled by Client	**Date Sampled:**	11/12/2017
Preparation:	Prepared in accordance with the test method		



Compaction and Placement Data

Compaction Used		Standard	Dry Density			
Maximum Dry Density t/m3		1.72	At Compaction	1.69 t/m3	98.0	% Comp.
Optimum Moisture Content %		18.3	After Soaking	1.68 t/m3	98.0	% Comp.
No. of Layers		3	Moisture Content			Moisture Ratio (%)
Blows per Layer		53	At Compaction	%	18.2	99
Drop of Rammer	mm	300	After Soaking	%	19.9	109
Mass of Rammer	kg	2.7	After Penetration (Top 30mm)	%	20.1	110
Surcharge Used	kg	4.5	After Penetration (Entire Depth)	%	19.9	109
% Ret. 19mm Sieve		0	Swell After 4 Days Soaking	%	1.1	

Note: material coarser than +19mm Sieve was discarded (as per test method)

California Bearing Ratio

CBR (4-day Soaked) = 2.5 % 5.0 mm Penetration

Notes:

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

SOIL CLASSIFICATION REPORT

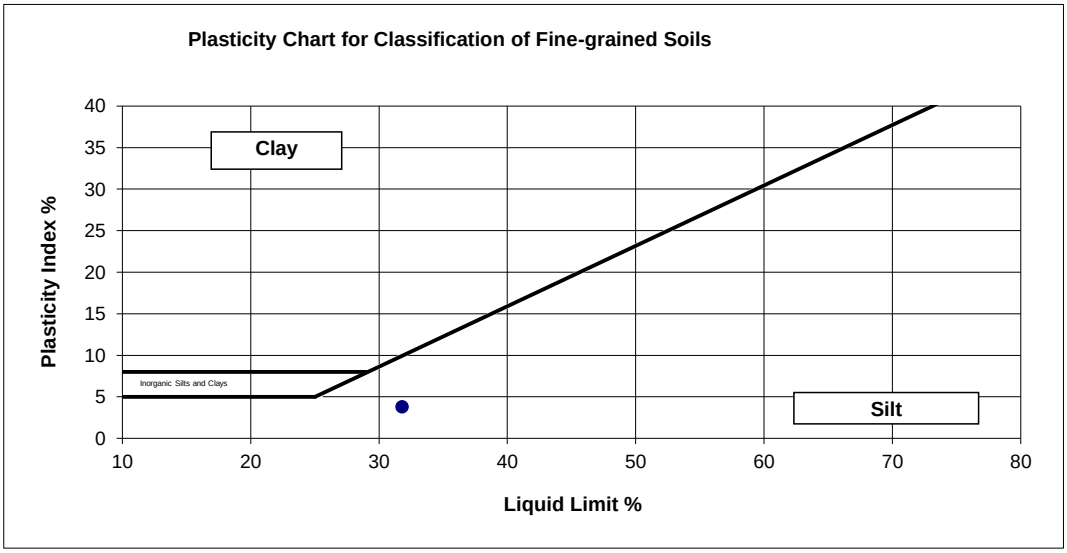
Client:	ATC Williams	**Source:**	BH103 1.00-1.45m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY with sand
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No:**	B44841-PI
Job No:	B17585	**Lab No:**	B44841

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☑ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☐ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Macquarie Geotechnical Staff in accordance with RMS T100	**Date Sampled:**	11/01/2018
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	32	**Linear Shrinkage (%):**	-
Plastic Limit (%):	28	**Field Moisture Content (%):**	-
Plastic Index:	4		



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: NA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Brad Morris

24/01/2018

Date:

MACQUARIE GEOTECH
Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

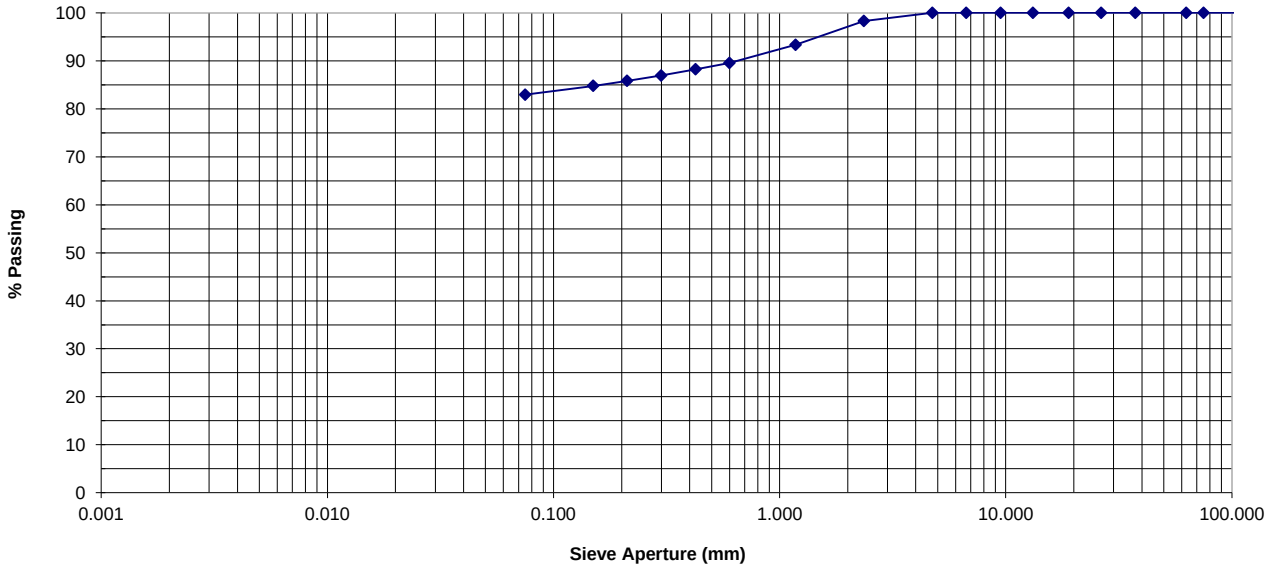
PARTICLE SIZE DISTRIBUTION REPORT

Client:	ATC Williams	**Source:**	BH103 1.00-1.45m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY with sand
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No:**	B44841-PSD
Job No:	B17585	**Lab No:**	B44841

Test Procedure: ☑ AS1289 3.6.1 Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving

Sampling: Sampled by Client **Date Sampled:** 11/01/2018

Preparation: Prepared in accordance with the test method



Sieve Apperture: (mm)	% Passing	Specification N/A Envelope	Sieve Aperture: (mm)	% Passing	Specification N/A Envelope
200			4.75	100	
75			2.36	98	
63			1.18	93	
37.5			0.600	90	
26.5			0.425	88	
19			0.300	87	
13.2	100		0.212	86	
9.5	100		0.150	85	
6.7	100		0.075	83	

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

SOIL CLASSIFICATION REPORT

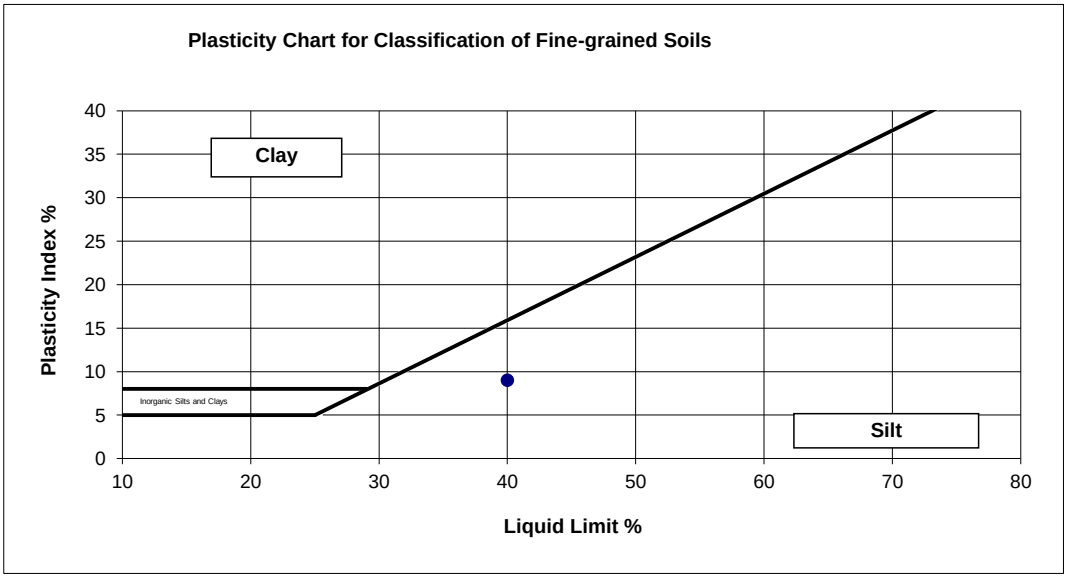
Client:	ATC Williams	**Source:**	BH105 1.00-1.28m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Sandy CLAY with gravel
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No:**	B44842-PI
Job No:	B17585	**Lab No:**	B44842

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☑ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☑ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☑ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☐ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	11/01/2018
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	40	**Linear Shrinkage (%):**	-
Plastic Limit (%):	31	**Field Moisture Content (%):**	-
Plastic Index:	9		



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: NA

NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Brad Morris

24/01/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

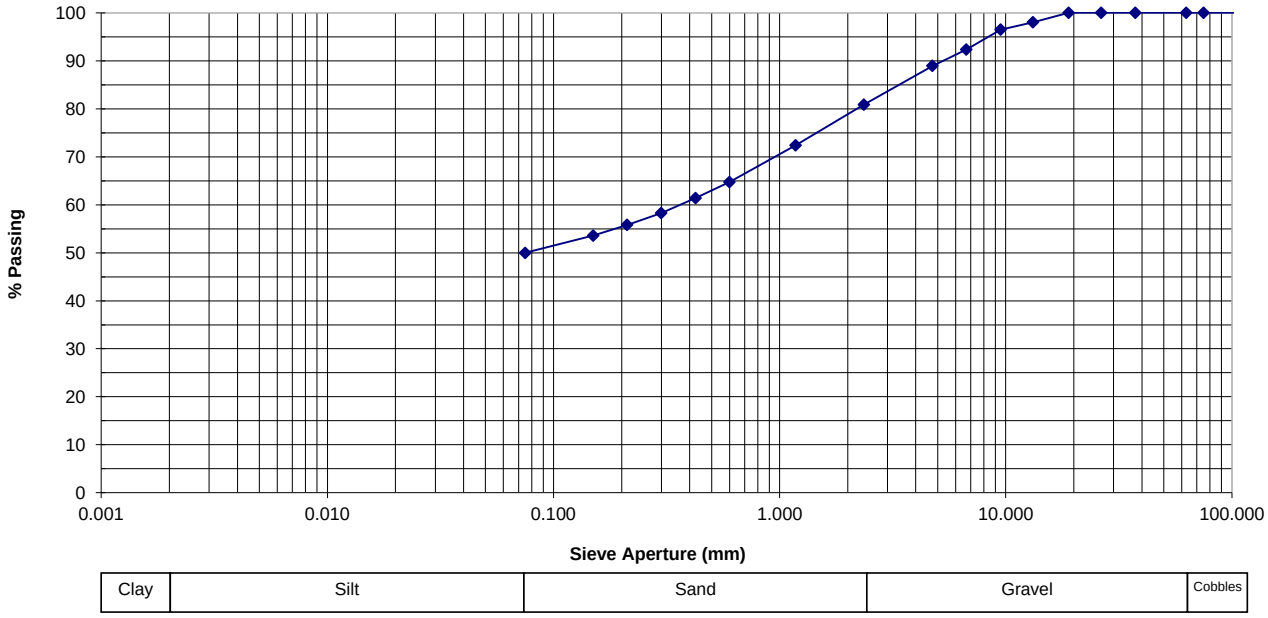
PARTICLE SIZE DISTRIBUTION REPORT

Client:	ATC Williams	**Source:**	BH105 1.00-1.28m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	Sandy CLAY with gravel
Project:	ATC Williams - Dam Foundations (McPHILLAMYS 113272)	**Report No:**	B44842-PSD
Job No:	B17585	**Lab No:**	B44842

Test Procedure: ☑ AS1289 3.6.1 Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving

Sampling: Sampled by Client **Date Sampled:** 11/01/2018

Preparation: Prepared in accordance with the test method



Sieve Apperture: (mm)	% Passing	Specification N/A Envelope	Sieve Aperture: (mm)	% Passing	Specification N/A Envelope
200	100		4.75	89	
75	100		2.36	81	
63	100		1.18	72	
37.5	100		0.600	65	
26.5	100		0.425	61	
19	100		0.300	58	
13.2	98		0.212	56	
9.5	97		0.150	54	
6.7	92		0.075	50	

NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Bradley Morris

24/01/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1727082**	Page	: 1 of 4
Client	: **ATC WILLIAMS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: MR RALPH HOLDING	Contact	: Customer Services EB
Address	: A DIVISION OF ATC WILLIAMS P/L PO BOX 3309 Level 2, 16-20 Edmondstone Street NEWMARKET QLD, AUSTRALIA 4051	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 33666588	Telephone	: +61-7-3243 7222
Project	: McPHILLAMYS GOLD PROJ	Date Samples Received	: 19-Dec-2017 12:05
Order number	: ----	Date Analysis Commenced	: 20-Dec-2017
C-O-C number	: ----	Issue Date	: 04-Jan-2018 09:34
Sampler	: HUBERT AYANU		
Site	: ----		
Quote number	: EN/222/17		
No. of samples received	: 7		
No. of samples analysed	: 7		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Greg Vogel	Laboratory Manager	Brisbane Acid Sulphate Soils, Stafford, QLD
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH109 2.50-2.95	BH110 1.00-1.45	BH111 2.50-2.57	BH112 4.00-4.45	BH113 1.00-1.20
			Client sampling date / time	13-Dec-2017 00:00	13-Dec-2017 00:00	12-Dec-2017 00:00	12-Dec-2017 00:00	14-Dec-2017 00:00
Compound	CAS Number	LOR	Unit	EB1727082-001	EB1727082-002	EB1727082-003	EB1727082-004	EB1727082-005
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**6.4**	**7.0**	**5.9**	**5.3**	**6.7**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**17.3**	**24.7**	**25.5**	**9.1**	**21.0**
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	**10**	<10	<10
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	<10	**50**	<10	**160**	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BH118 4.00-4.43	QC2	----	----	----
			Client sampling date / time	14-Dec-2017 00:00	14-Dec-2017 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB1727082-006	EB1727082-007	--------	--------	--------
				Result	Result	----	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**6.4**	**6.3**	**----**	**----**	**----**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**11.3**	**16.5**	**----**	**----**	**----**
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	**10**	**----**	**----**	**----**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	<10	<10	**----**	**----**	**----**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB1727082**	Page	: 1 of 3
Client	: **ATC WILLIAMS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: MR RALPH HOLDING	Contact	: Customer Services EB
Address	: A DIVISION OF ATC WILLIAMS P/L PO BOX 3309 Level 2, 16-20 Edmondstone Street NEWMARKET QLD, AUSTRALIA 4051	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 33666588	Telephone	: +61-7-3243 7222
Project	: McPHILLAMYS GOLD PROJ	Date Samples Received	: 19-Dec-2017
Order number	: ----	Date Analysis Commenced	: 20-Dec-2017
C-O-C number	: ----	Issue Date	: 04-Jan-2018
Sampler	: HUBERT AYANU		
Site	: ----		
Quote number	: EN/222/17		
No. of samples received	: 7		
No. of samples analysed	: 7		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Greg Vogel	Laboratory Manager	Brisbane Acid Sulphate Soils, Stafford, QLD
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 1329691)									
EB1727086-004	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.5	8.4	0.00	0% - 20%
EB1727082-001	BH109 2.50-2.95	EA002: pH Value	----	0.1	pH Unit	6.4	6.4	0.00	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1329697)									
EB1727082-001	BH109 2.50-2.95	EA055: Moisture Content	----	1	%	17.3	17.5	1.16	0% - 50%
ED040S: Soluble Major Anions (QC Lot: 1329692)									
EB1727082-001	BH109 2.50-2.95	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 1329693)									
EB1727082-001	BH109 2.50-2.95	ED045G: Chloride	16887-00-6	10	mg/kg	<10	<10	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA002 : pH (Soils) (QCLot: 1329691)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98	102
				----	7 pH Unit	99.7	98	102
ED040S: Soluble Major Anions (QCLot: 1329692)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	500 mg/kg	93.9	90	114
ED045G: Chloride by Discrete Analyser (QCLot: 1329693)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	89.1	83	119
				<10	5000 mg/kg	106	83	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1801730**	Page	: 1 of 2
Client	: **ATC WILLIAMS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: HUBERT AYANU	Contact	: Customer Services EB
Address	: A DIVISION OF ATC WILLIAMS P/L PO BOX 3309 Level 2, 16-20 Edmondstone Street NEWMARKET QLD, AUSTRALIA 4051	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: McPHILLAMYS GOLD PROJ	Date Samples Received	: 12-Jan-2018 12:35
Order number	: ----	Date Analysis Commenced	: 15-Jan-2018
C-O-C number	: ----	Issue Date	: 18-Jan-2018 14:18
Sampler	: HUBERT AYANU		
Site	: ----		
Quote number	: EN/222/17		
No. of samples received	: 4		
No. of samples analysed	: 4		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- CORROSION ASSESSMENT: As per Australian Standard (AS2159-1995, section 6), the Exposure Classification for all samples is rated Non Aggressive. ALS is not NATA accredited for this comment.

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**BH114 2.50-2.75**	**BH115 4.00-4.36**	**BH116 1.00-1.45**	**BH117 5.50-5.62**	**----**
			Client sampling date / time	08-Jan-2018 00:00	08-Jan-2018 00:00	08-Jan-2018 00:00	09-Jan-2018 00:00	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB1801730-001**	**EB1801730-002**	**EB1801730-003**	**EB1801730-004**	**--------**
				Result	Result	Result	Result	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**7.2**	**7.4**	**6.8**	**8.2**	**----**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**21.2**	**13.5**	**11.9**	**9.6**	**----**
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	<10	<10	**----**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	<10	<10	<10	<10	**----**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB1801730**	Page	: 1 of 3
Client	: **ATC WILLIAMS P/L**	Laboratory	: Environmental Division Brisbane
Contact	: HUBERT AYANU	Contact	: Customer Services EB
Address	: A DIVISION OF ATC WILLIAMS P/L PO BOX 3309 Level 2, 16-20 Edmondstone Street NEWMARKET QLD, AUSTRALIA 4051	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: McPHILLAMYS GOLD PROJ	Date Samples Received	: 12-Jan-2018
Order number	: ----	Date Analysis Commenced	: 15-Jan-2018
C-O-C number	: ----	Issue Date	: 18-Jan-2018
Sampler	: HUBERT AYANU		
Site	: ----		
Quote number	: EN/222/17		
No. of samples received	: 4		
No. of samples analysed	: 4		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 1368216)									
EB1801730-001	BH114 2.50-2.75	EA002: pH Value	----	0.1	pH Unit	7.2	7.0	2.26	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1368219)									
EB1801555-001	Anonymous	EA055: Moisture Content	----	1	%	5.6	5.6	0.00	No Limit
EB1801715-003	Anonymous	EA055: Moisture Content	----	1	%	15.0	14.6	2.91	0% - 50%
ED040S: Soluble Major Anions (QC Lot: 1368217)									
EB1801730-001	BH114 2.50-2.75	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	<10	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 1368218)									
EB1801730-001	BH114 2.50-2.75	ED045G: Chloride	16887-00-6	10	mg/kg	<10	<10	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA002 : pH (Soils) (QCLot: 1368216)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98	102
				----	7 pH Unit	100	98	102
ED040S: Soluble Major Anions (QCLot: 1368217)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	500 mg/kg	101	90	114
ED045G: Chloride by Discrete Analyser (QCLot: 1368218)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	93.1	83	119
				<10	5000 mg/kg	102	83	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

APPENDIX E3

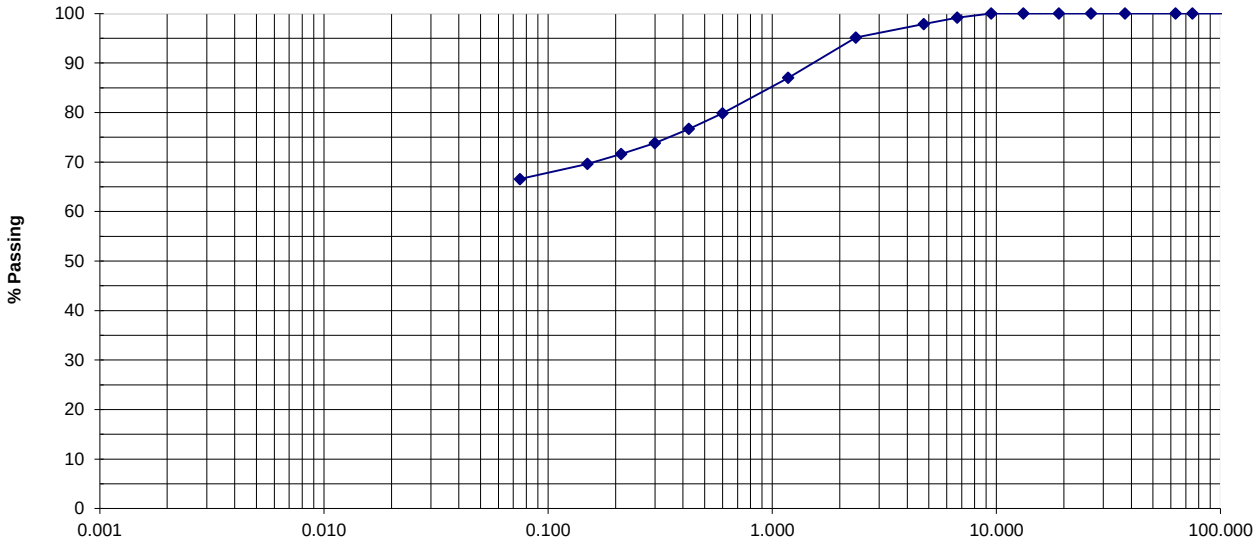
PARTICLE SIZE DISTRIBUTION REPORT

Client:	ATC Williams	**Source:**	TP18-04 0.6-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY with sand trace gravel
Project:	Blayney Drilling	**Report No:**	B48845-PSD
Job No:	B18270	**Lab No:**	B48845

Test Procedure: ☑ AS1289 3.6.1 Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving

Sampling: Sampled by Client **Date Sampled:** 4/06/2018

Preparation: Prepared in accordance with the test method



Clay	Silt	Sand	Gravel	Cobbles

Sieve Apperture: (mm)	% Passing	Specification N/A Envelope	Sieve Aperture: (mm)	% Passing	Specification N/A Envelope
200	100		4.75	98	
75	100		2.36	95	
63	100		1.18	87	
37.5	100		0.600	80	
26.5	100		0.425	77	
19	100		0.300	74	
13.2	100		0.212	72	
9.5	100		0.150	70	
6.7	99		0.075	67	

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

John Boyle

5/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

SOIL CLASSIFICATION REPORT

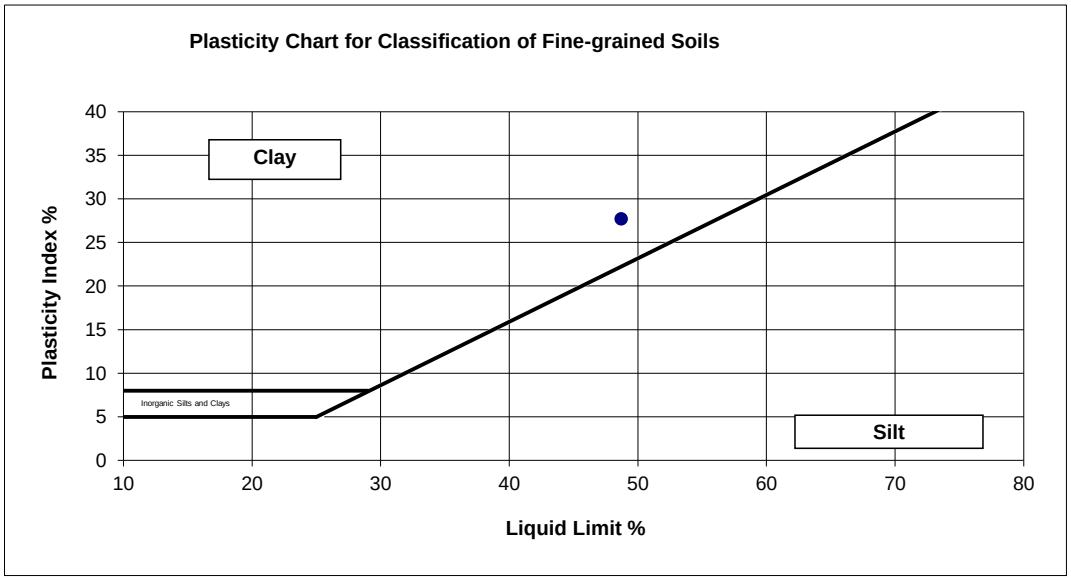
Client:	ATC Williams	**Source:**	TP18-04 0.6-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY with sand trace gravel
Project:	Blayney Drilling	**Report No:**	B48845-PI
Job No:	B18270	**Lab No:**	B48845

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☐ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☐ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☐ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☐ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	4/06/2018
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	49	**Linear Shrinkage (%):**	12.5
Plastic Limit (%):	21	**Field Moisture Content (%):**	-
Plastic Index:	28		



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

John Boyle

16/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

FALLING HEAD PERMEABILITY REPORT

Client:	ATC Williams	**Source:**	TP18-04 0.6-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY with sand trace gravel
Project:	Blayney Drilling	**Report No:**	B48845-FHP
Job No:	B18270	**Lab No:**	B48845

Test Procedure:

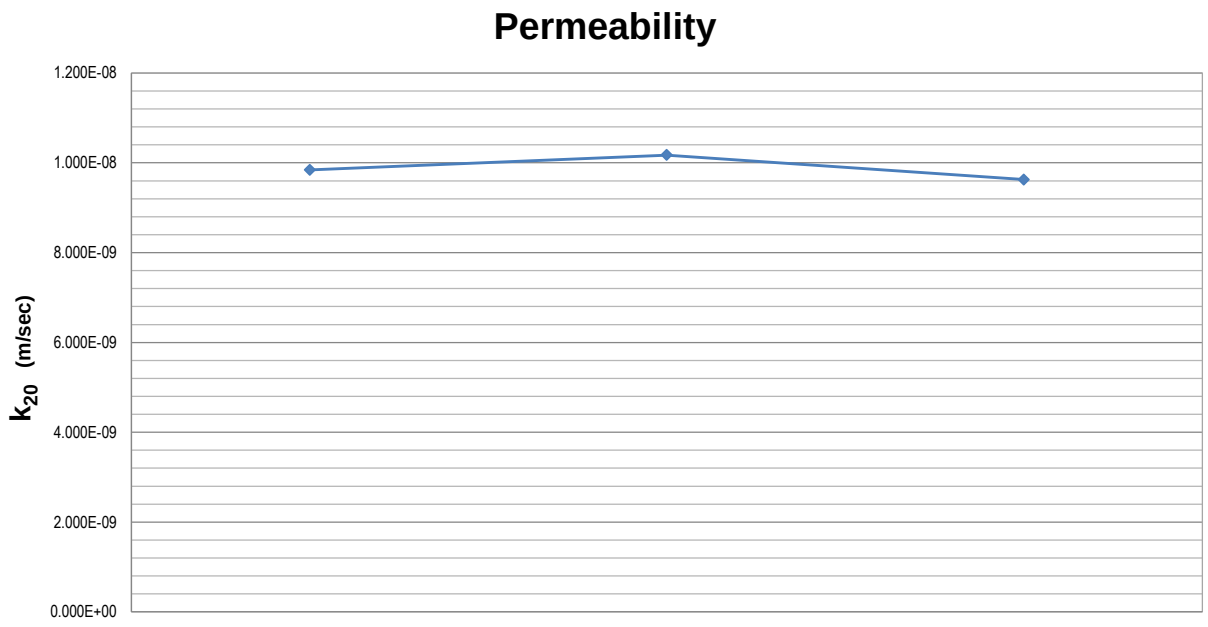
- ☑ AS1289 6.7.2 Soil strength and consolidation tests - Determination of a soil - Falling head method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort

Sampling:	Sampled by Client	**Date Sampled:**	4/06/2018
Preparation:	Prepared in accordance with the test method		

RESULTS

Standard Maximum Dry Density (t/m³)	**1.61**	Hydraulic Gradient	**0.0**
Optimum Moisture Content (%)	**20.3**	Surcharge (kPa)	**0.0**
Placement Moisture Content (%)	**20.3**	Head Pressure Applied (kPa)	**0.0**
Moisture Ratio (%)	**100.1**	Standard Compaction	**STANDARD**
Placement Dry Density (t/m^3)	**1.61**	Percentage Material Retained/Sieve Size (mm)	**0 % on 9.5**
Density Ratio (%)	**99.9**	Sample Height and Diameter (mm)	**103.5 x 98.2**

PERMEABILITY $k_{(20)}$ = 9.88E-09 (m/sec)



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

JABoyle

John Boyle

5/07/2018

Date:

MACQUARIE GEOTECH

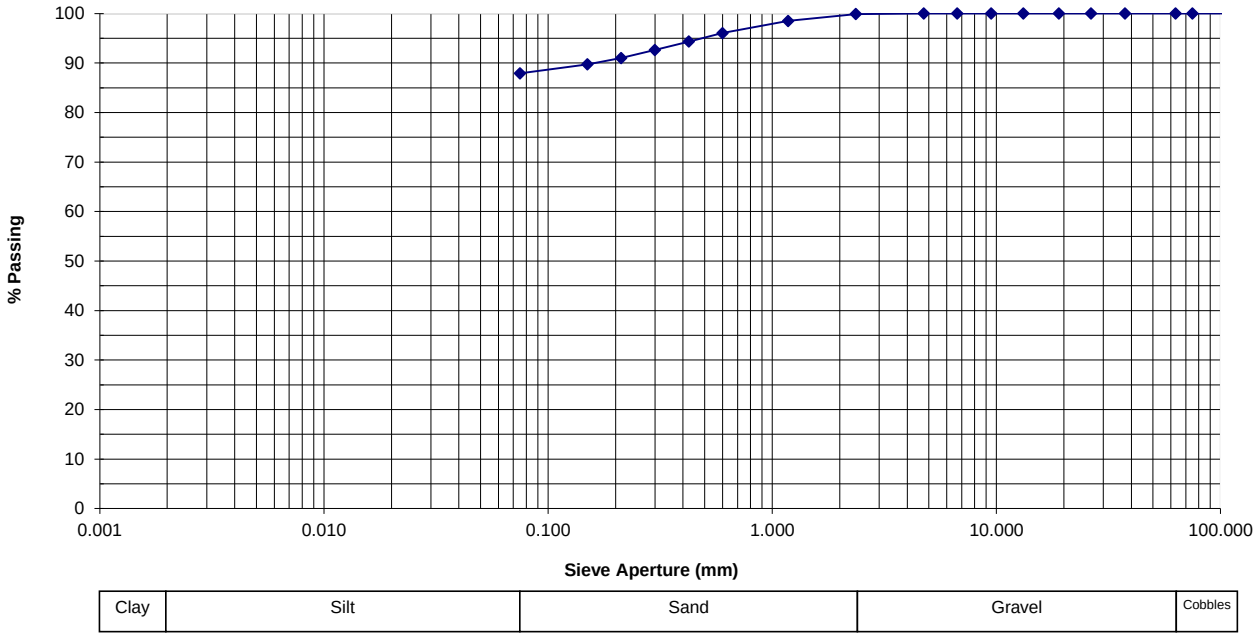
Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

PARTICLE SIZE DISTRIBUTION REPORT

Client:	ATC Williams	**Source:**	TP18-13 0.8-1.0m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY trace sand
Project:	Blayney Drilling	**Report No:**	B48846-PSD
Job No:	B18270	**Lab No:**	B48846

Test Procedure: ☑ AS1289 3.6.1 Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving

Sampling:	Sampled by Client	**Date Sampled:**	5/06/2018
Preparation:	Prepared in accordance with the test method		



Sieve Apperture: (mm)	% Passing	Specification N/A Envelope	Sieve Aperture: (mm)	% Passing	Specification N/A Envelope
200	100		4.75	100	
75	100		2.36	100	
63	100		1.18	99	
37.5	100		0.600	96	
26.5	100		0.425	94	
19	100		0.300	93	
13.2	100		0.212	91	
9.5	100		0.150	90	
6.7	100		0.075	88	

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

John Boyle

5/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

SOIL CLASSIFICATION REPORT

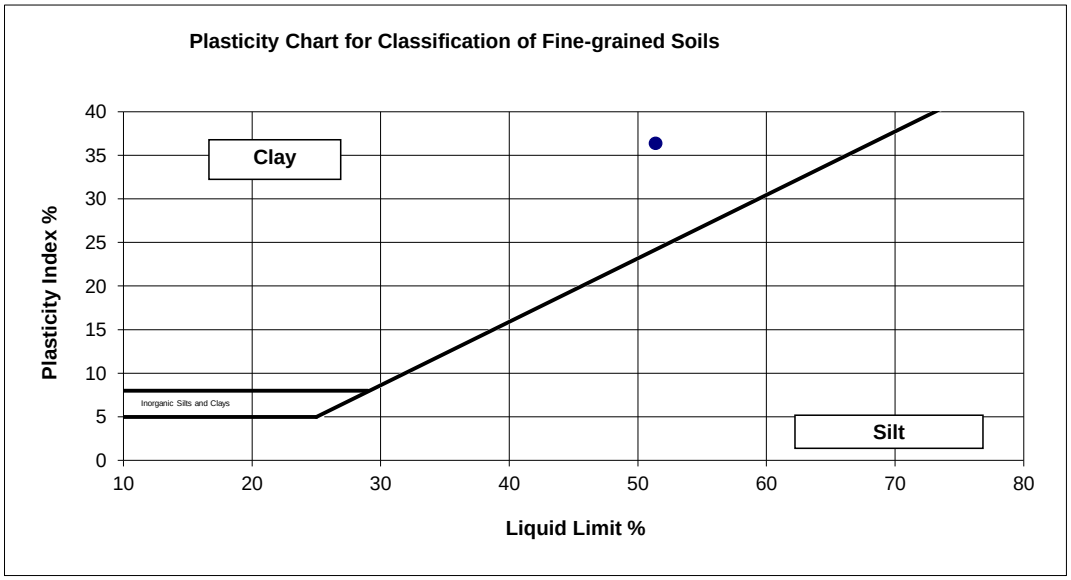
Client:	ATC Williams	**Source:**	TP18-13 0.8-1.0m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY trace sand
Project:	Blayney Drilling	**Report No:**	B48846-PI
Job No:	B18270	**Lab No:**	B48846

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☐ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☐ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☐ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☐ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	5/06/2018
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	51	**Linear Shrinkage (%):**	16.0
Plastic Limit (%):	15	**Field Moisture Content (%):**	-
Plastic Index:	36		



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

John Boyle

16/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

FALLING HEAD PERMEABILITY REPORT

Client:	ATC Williams	**Source:**	TP18-13 0.8-1.0m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY trace sand
Project:	Blayney Drilling	**Report No:**	B48846-FHP
Job No:	B18270	**Lab No:**	B48846

Test Procedure:

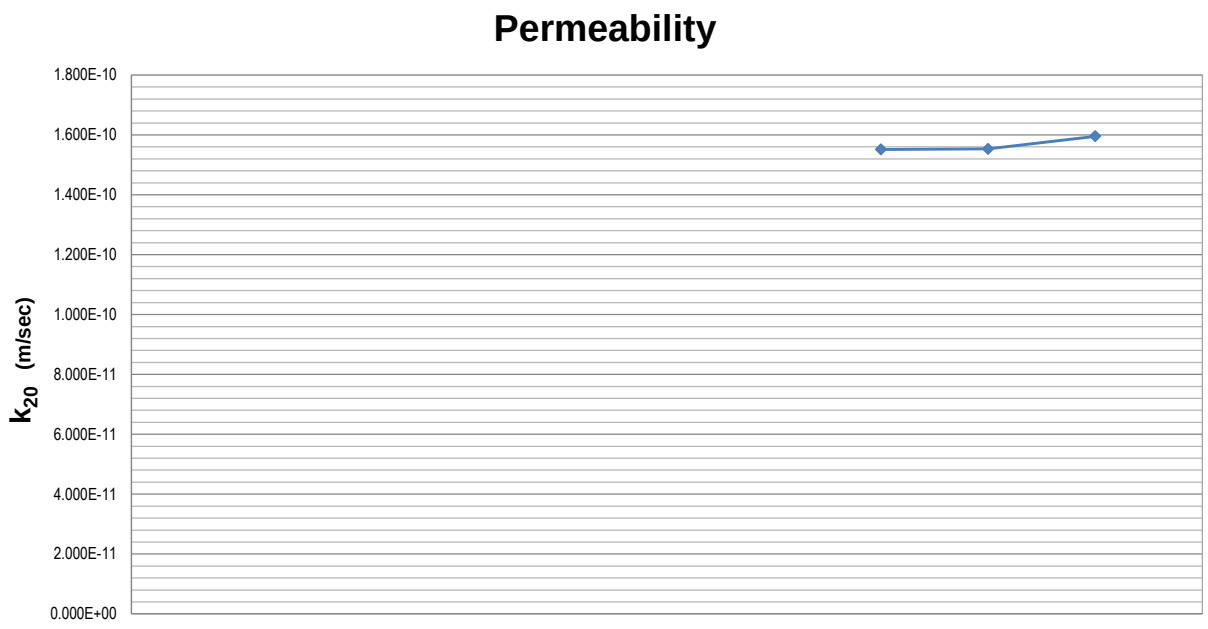
- ☑ AS1289 6.7.2 Soil strength and consolidation tests - Determination of a soil - Falling head method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort

Sampling:	Sampled by Client	**Date Sampled:**	5/06/2018
Preparation:	Prepared in accordance with the test method		

RESULTS

Standard Maximum Dry Density (t/m³)	**1.69**	Hydraulic Gradient	**0.0**
Optimum Moisture Content (%)	**20.7**	Surcharge (kPa)	**0.0**
Placement Moisture Content (%)	**20.7**	Head Pressure Applied (kPa)	**0.0**
Moisture Ratio (%)	**99.9**	Standard Compaction	**0.00**
Placement Dry Density (t/m^3)	**1.69**	Percentage Material Retained/Sieve Size (mm)	**0 % on 9.5**
Density Ratio (%)	**100.0**	Sample Height and Diameter (mm)	**103.5 x 98**

PERMEABILITY $k_{(20)}$ = 1.57E-10 (m/sec)



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

JABoyle

John Boyle

5/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

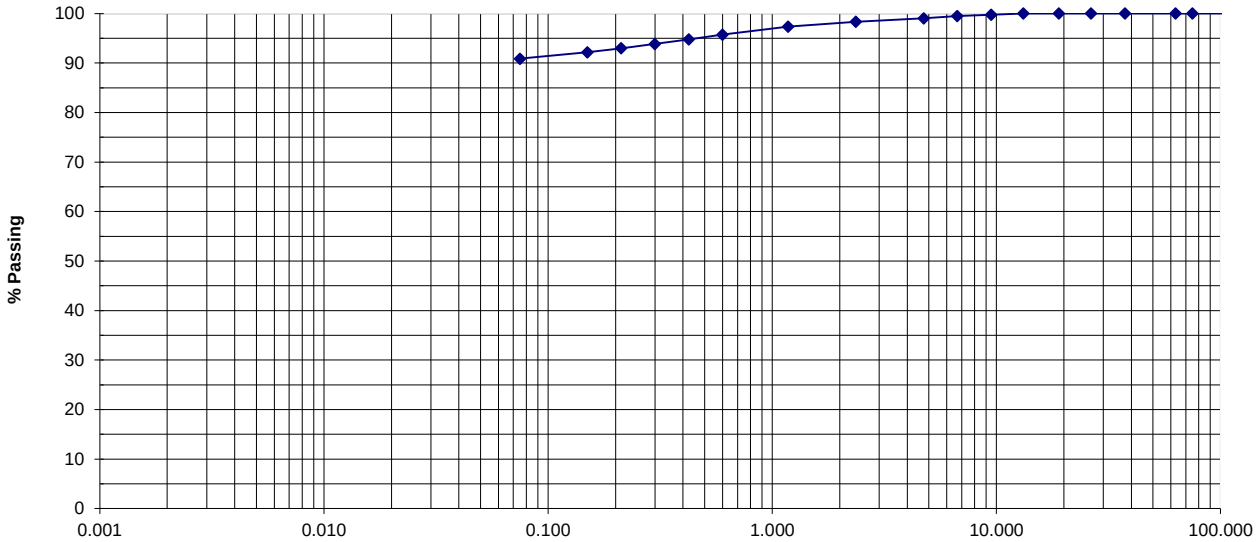
PARTICLE SIZE DISTRIBUTION REPORT

Client:	ATC Williams	**Source:**	TP18-18 0.4-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY trace sand and gravel
Project:	Blayney Drilling	**Report No:**	B48847-PSD
Job No:	B18270	**Lab No:**	B48847

Test Procedure: ☑ AS1289 3.6.1 Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving

Sampling: Sampled by Client **Date Sampled:** 5/06/2018

Preparation: Prepared in accordance with the test method



Sieve Apperture: (mm)	% Passing	Specification N/A Envelope	Sieve Aperture: (mm)	% Passing	Specification N/A Envelope
200	100		4.75	99	
75	100		2.36	98	
63	100		1.18	97	
37.5	100		0.600	96	
26.5	100		0.425	95	
19	100		0.300	94	
13.2	100		0.212	93	
9.5	100		0.150	92	
6.7	100		0.075	91	

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

John Boyle

5/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

SOIL CLASSIFICATION REPORT

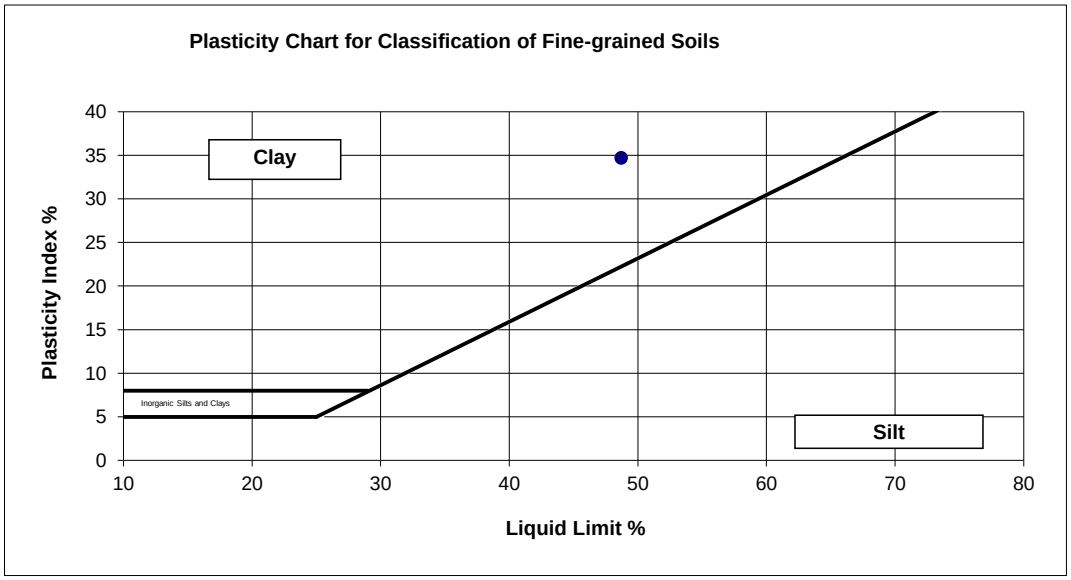
Client:	ATC Williams	**Source:**	TP18-18 0.4-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY trace sand and gravel
Project:	Blayney Drilling	**Report No:**	B48847-PI
Job No:	B18270	**Lab No:**	B48847

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☐ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☐ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☐ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☐ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	5/06/2018
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	49	**Linear Shrinkage (%):**	14.5
Plastic Limit (%):	14	**Field Moisture Content (%):**	-
Plastic Index:	35		



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Curling Occuring

NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

John Boyle

16/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

FALLING HEAD PERMEABILITY REPORT

Client:	ATC Williams	**Source:**	TP18-18 0.4-0.8m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY trace sand and gravel
Project:	Blayney Drilling	**Report No:**	B48847-FHP
Job No:	B18270	**Lab No:**	B48847

Test Procedure:

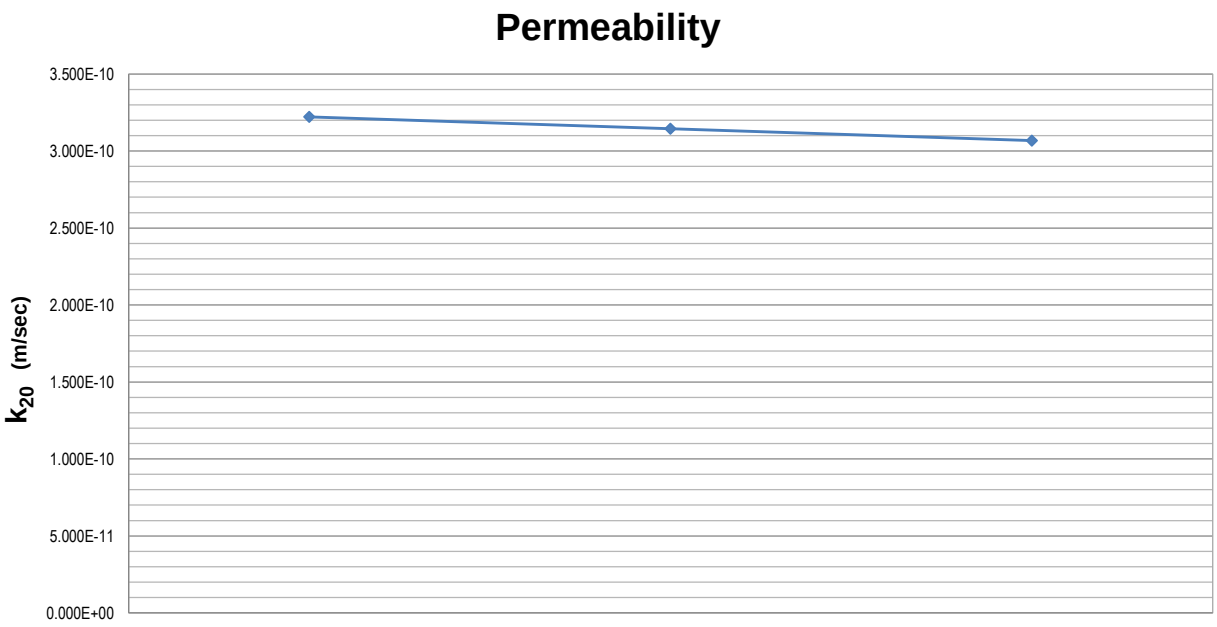
- ☑ AS1289 6.7.2 Soil strength and consolidation tests - Determination of a soil - Falling head method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort

Sampling:	Sampled by Client	**Date Sampled:**	5/06/2018
Preparation:	Prepared in accordance with the test method		

RESULTS

Standard Maximum Dry Density (t/m³)	**1.75**	Hydraulic Gradient	**0.0**
Optimum Moisture Content (%)	**15.6**	Surcharge (kPa)	**0.0**
Placement Moisture Content (%)	**15.6**	Head Pressure Applied (kPa)	**0.0**
Moisture Ratio (%)	**99.8**	Standard Compaction	**0.00**
Placement Dry Density (t/m^3)	**1.75**	Percentage Material Retained/Sieve Size (mm)	**0 % on 9.5**
Density Ratio (%)	**100.1**	Sample Height and Diameter (mm)	**103.4 x 98.1**

PERMEABILITY $k_{(20)}$ = 3.15E-10 (m/sec)



NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

JABoyle

John Boyle

5/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

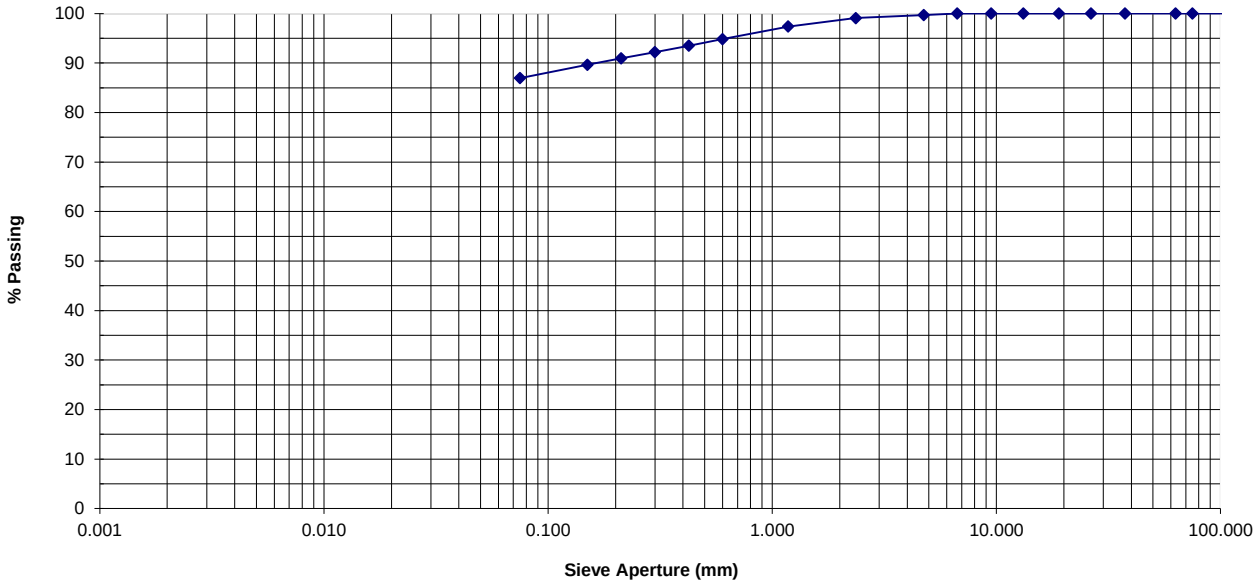
PARTICLE SIZE DISTRIBUTION REPORT

Client:	ATC Williams	**Source:**	TP18-25 0.9-1.1m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY trace sand and gravel
Project:	Blayney Drilling	**Report No:**	B48848-PSD
Job No:	B18270	**Lab No:**	B48848

Test Procedure: ☑ AS1289 3.6.1 Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving

Sampling: Sampled by Client **Date Sampled:** 5/06/2018

Preparation: Prepared in accordance with the test method



Sieve Apperture: (mm)	% Passing	Specification N/A Envelope	Sieve Aperture: (mm)	% Passing	Specification N/A Envelope
200	100		4.75	100	
75	100		2.36	99	
63	100		1.18	97	
37.5	100		0.600	95	
26.5	100		0.425	94	
19	100		0.300	92	
13.2	100		0.212	91	
9.5	100		0.150	90	
6.7	100		0.075	87	

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

John Boyle

5/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

SOIL CLASSIFICATION REPORT

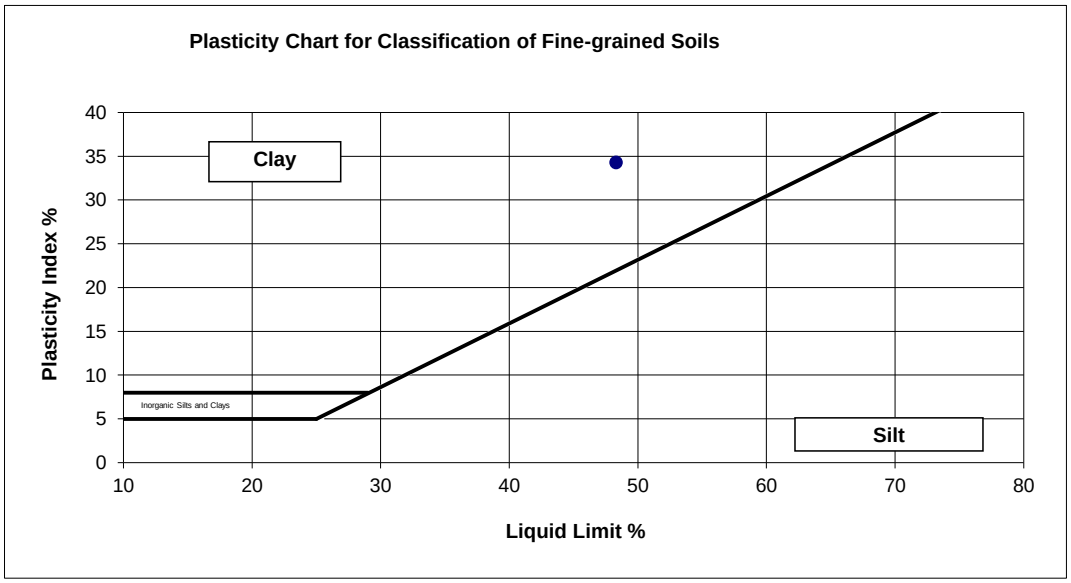
Client:	ATC Williams	**Source:**	TP18-25 0.9-1.1m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY trace sand and gravel
Project:	Blayney Drilling	**Report No:**	B48848-PI
Job No:	B18270	**Lab No:**	B48848

Test Procedure:

- ☐ AS1289 2.1.1 Soil moisture content tests (Oven drying method)
- ☐ AS1289 3.1.1 Soil classification tests - Determination of the liquid limit of a soil - Four point casagrande method
- ☐ AS1289 3.1.2 Soil classification tests - Determination of the liquid limit if a soil - One point Casagrande method (subsidiary method)
- ☐ AS1289 3.2.1 Soil classification tests - Determination of the plastic limit of a soil - Standard method
- ☐ AS1289 3.3.1 Soil classification tests - Calculation of the plasticity Index of a soil
- ☐ AS1289 3.4.1 Soil classification tests - Determination of the linear shrinkage of a soil - Standard method

Sampling:	Sampled by Client	**Date Sampled:**	5/06/2018
Preparation:	Prepared in accordance with the test method		

Liquid Limit (%):	48	**Linear Shrinkage (%):**	14.0
Plastic Limit (%):	14	**Field Moisture Content (%):**	-
Plastic Index:	34		



Soil Preparation Method: Dry Sieved
Soil History: Oven Dried
Soil Condition: Cracking Occuring

NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

JABoyle

John Boyle

16/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

FALLING HEAD PERMEABILITY REPORT

Client:	ATC Williams	**Source:**	TP18-25 0.9-1.1m
Address:	PO Box 3309 Newmarket QLD 4051	**Sample Description:**	CLAY trace sand and gravel
Project:	Blayney Drilling	**Report No:**	B48848-FHP
Job No:	B18270	**Lab No:**	B48848

Test Procedure:

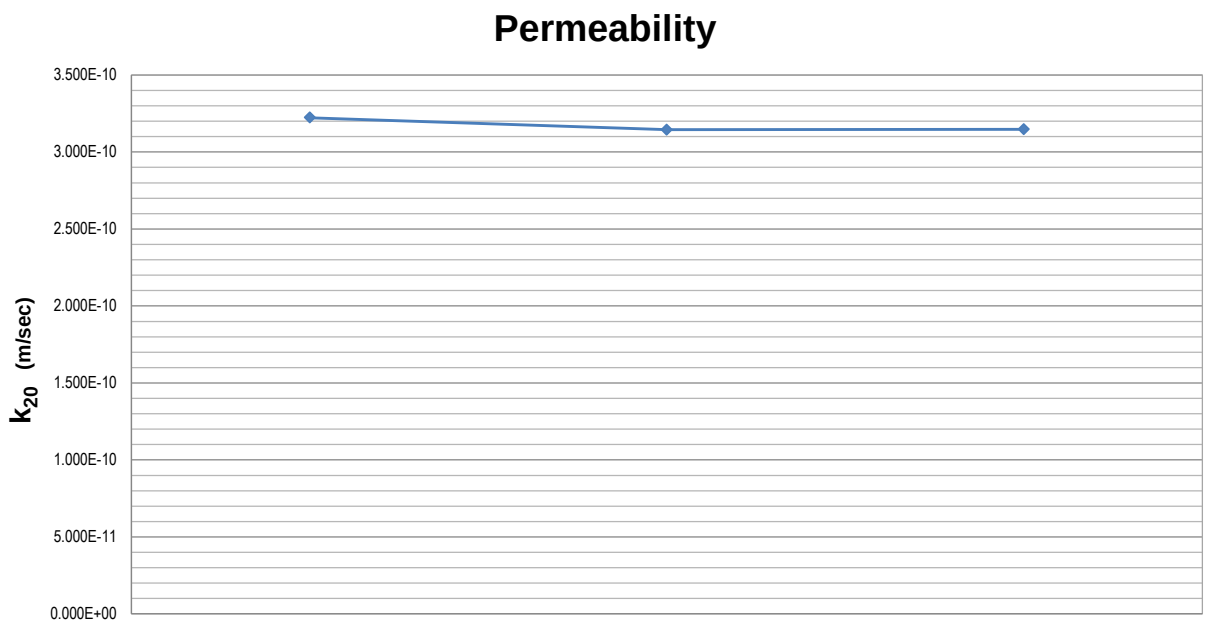
- ☑ AS1289 6.7.2 Soil strength and consolidation tests - Determination of a soil - Falling head method for a remoulded specimen
- ☑ AS1289 5.1.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using standard compactive effort
- ☐ AS1289 5.2.1 Soil compaction and density tests - Determination of the dry density/moisture content relationship of a soil using modified compactive effort

Sampling:	Sampled by Client	**Date Sampled:**	5/06/2018
Preparation:	Prepared in accordance with the test method		

RESULTS

Standard Maximum Dry Density (t/m³)	**1.77**	Hydraulic Gradient	**0.0**
Optimum Moisture Content (%)	**16.5**	Surcharge (kPa)	**0.0**
Placement Moisture Content (%)	**16.5**	Head Pressure Applied (kPa)	**0.0**
Moisture Ratio (%)	**100.2**	Standard Compaction	**STANDARD**
Placement Dry Density (t/m^3)	**1.77**	Percentage Material Retained/Sieve Size (mm)	**0 % on 9.5**
Density Ratio (%)	**100.1**	Sample Height and Diameter (mm)	**103.7 x 97.9**

PERMEABILITY $k_{(20)}$ = 3.17E-10 (m/sec)



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

JABoyle

John Boyle

5/07/2018

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
3 Watt Drive
Bathurst NSW 2795

APPENDIX E4

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02294

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd
	level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:** -

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 1/5/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH203 @ 1.0 - 1.5m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data , SMDD =1.67t/m3 OMC=19.5%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	1.98
Specimen moisture content	**%**	19.5
Specimen dry density	**t/m^3**	1.67
Laboratory density ratio	**%**	99
Laboratory moisture ratio	**%**	100
Coefficient of permeability	**(m/sec)**	4 x10^{-10}

.

Comments: This method is suitable for soils that have a coeffiecient of between x10-7 to x10-9 and as such is to slow for this test method.

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02295

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd
	level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:**-

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 1/5/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH204 @ 0.7 - 1.2m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data , SMDD =1.81t/m3 OMC=12.3%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	2.02
Specimen moisture content	**%**	12.4
Specimen dry density	**t/m^3**	1.79
Laboratory density ratio	**%**	99
Laboratory moisture ratio	**%**	101
Coefficient of permeability	**(m/sec)**	**1 x 10^{-8}**

Comments:

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02296

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd
	level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:**-

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 1/5/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH205 @ 0.7 - 1.2m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data , SMDD =1.64t/m3 OMC=21.7%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	1.97
Specimen moisture content	**%**	21.8
Specimen dry density	**t/m^3**	1.62
Laboratory density ratio	**%**	99
Laboratory moisture ratio	**%**	100
Coefficient of permeability	**(m/sec)**	**1 x 10^{-9}**

Comments:

Form Number: W001R37 Issue Date: 20/02/2018

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02297

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd
	level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:**-

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 1/5/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH206 @ 1.0- 1.5m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data , SMDD =1.77t/m3 OMC=17.5%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	2.05
Specimen moisture content	**%**	17.7
Specimen dry density	**t/m^3**	1.74
Laboratory density ratio	**%**	98
Laboratory moisture ratio	**%**	101
Coefficient of permeability	**(m/sec)**	**6 x 10^{-8}**

Comments:

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02298

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:**-

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 16/4/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH207 @ 0.8 - 1.3m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data , SMDD =1.92t/m3 OMC=11.3%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	2.09
Specimen moisture content	**%**	11.2
Specimen dry density	**t/m^3**	1.88
Laboratory density ratio	**%**	98
Laboratory moisture ratio	**%**	99
Coefficient of permeability	**(m/sec)**	**4 x 10^{-9}**

Comments:

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02299

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:**-

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 16/4/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH210 @ 0.5 - 1.0m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data, SMDD =1.85t/m3 OMC=11.5%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	2.03
Specimen moisture content	**%**	11.6
Specimen dry density	**t/m^3**	1.82
Laboratory density ratio	**%**	98
Laboratory moisture ratio	**%**	101
Coefficient of permeability	**(m/sec)**	**1 x 10^{-8}**

Comments:

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02300

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:**-

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 16/4/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH213 @ 0.8 - 1.3m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data , SMDD =1.77t/m3 OMC=16.1%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	2.02
Specimen moisture content	**%**	16.2
Specimen dry density	**t/m^3**	1.74
Laboratory density ratio	**%**	98
Laboratory moisture ratio	**%**	100
Coefficient of permeability	**(m/sec)**	**2 x 10^{-9}**

Comments:

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02301

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:**-

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 16/4/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH214 @ 0.4 - 0.9m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data , SMDD =1.77t/m3 OMC=17.3%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	2.05
Specimen moisture content	**%**	17.4
Specimen dry density	**t/m^3**	1.74
Laboratory density ratio	**%**	98
Laboratory moisture ratio	**%**	101
Coefficient of permeability	**(m/sec)**	**1 x 10^{-9}**

Comments:

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02302

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:**-

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 16/4/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH219 @ 1.0 - 1.5m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data , SMDD =1.66t/m3 OMC=21.2%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	1.99
Specimen moisture content	**%**	21.1
Specimen dry density	**t/m^3**	1.65
Laboratory density ratio	**%**	99
Laboratory moisture ratio	**%**	100
Coefficient of permeability	**(m/sec)**	**1 x 10^{-9}**

Comments:

Newcastle Laboratory

Coffey Services Australia Pty Ltd
16 Callistemon Close
Warabrook, NSW, 2304

ABN 55 139 460 521
Telephone: +61 2 4016 2300
Facsimile: +61 2 4016 2380

Falling Head Permeability Test Report

Report No.: FH-NEWC19S-02303

Issue No.: 1

This report replaces all previous isues of report no.

Client:	ATC WILLIAMS Pty Ltd
	level2,16-20 Emondstone street,Newmarket,QLD, 4051
Principal:	-
Job No.:	754- NEWC00752AA
Project:	Permeability Evaluation - Gold Project
Location:	Orange , NSW.
Lot No.:	- **TRN:**-

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.

Approved Signatory: Greg Eveleigh
Senior Geotechnician
NATA Accredited Laboratory Number: 431
Date of Issue: 1/5/2019

Sample Details

Test Procedure:	AS1289.6.7.2
Sample ID:	-
Client sample ID	113272.02
Date Sampled:	18-03-19
Sample type	Submitted by Client
Material:	Existing ground
Sample Location:	BH220 @1.0 - 1.5m

Other Sample Details:

Test conditions

Surcharge applied	**kPa**	3
Material retained on 19mm sieve	**%**	0
Hydrualic Gradient		1
Preparation		Sample remoulded to target of 98% SMDD at 100% OMC. Compaction data , SMDD =1.85t/m3 OMC=14.5%(AS 1289 5.1.1)

Test Results

Specimen wet density	**t/m^3**	2.09
Specimen moisture content	**%**	14.6
Specimen dry density	**t/m^3**	1.82
Laboratory density ratio	**%**	99
Laboratory moisture ratio	**%**	101
Coefficient of permeability	**(m/sec)**	**1 x 10^{-9}**

Comments:

Form Number: W001R37 Issue Date: 20/02/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS19S-01303
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

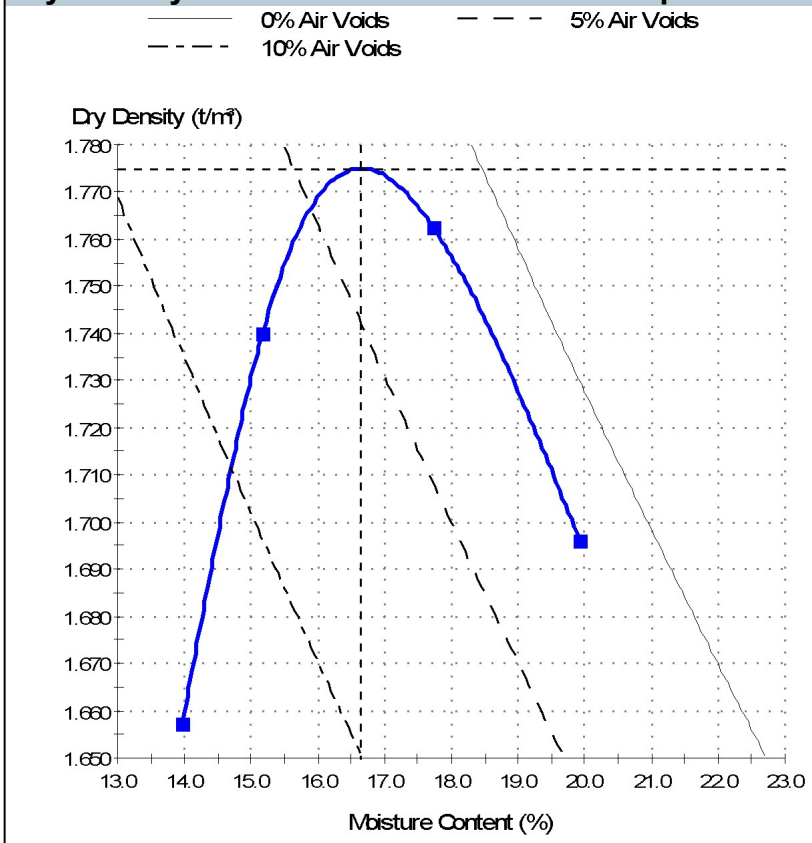
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 12/04/2019

Sample Details

Sample ID:	BRIS19S-01303	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	10/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Project		
Sample Location:	BH221, 1.0-1.5m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.78**
Standard OMC (%):	**16.5**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01303

NATA Accredited laboratory Number: 431

Date of Issue:

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH221, 1.0-1.5m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00534	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01303	**Material Description:**	Gravelly Sandy CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.78**	**Specimen Dry Density**	**t/m3**	**1.74**
Specimen OMC	**%**	**16.7**	**Specimen Wet Density**	**t/m3**	**2.04**

LABORATORY DENSITY RATIO	**%**	**97.7**
LABORATORY MOISTURE RATIO	**%**	**102.3**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**2.2×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**2×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01310
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

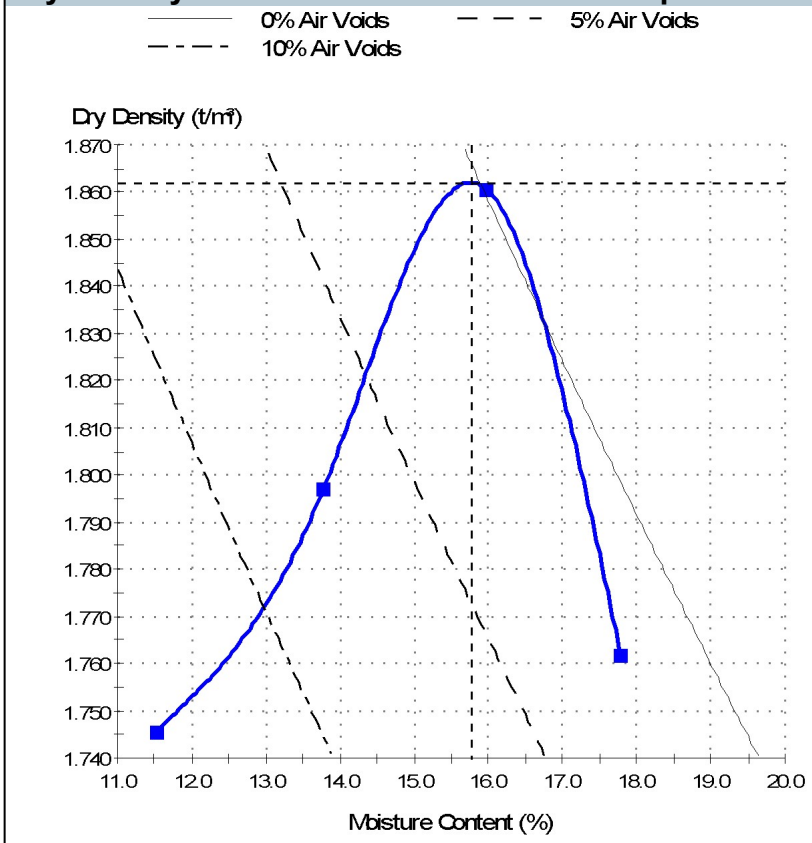
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 15/04/2019

Sample Details

Sample ID:	BRIS19S-01310	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	11/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH222, 0.7-1.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.86

Standard OMC (%): 16.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01310

NATA Accredited laboratory Number: 431

Date of Issue: 03/05/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH222, 0.7-1.2m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00536	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01310	**Material Description:**	Gravelly Sandy CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.86**	**Specimen Dry Density**	**t/m3**	**1.82**
Specimen OMC	**%**	**15.8**	**Specimen Wet Density**	**t/m3**	**2.11**

LABORATORY DENSITY RATIO	**%**	**97.9**
LABORATORY MOISTURE RATIO	**%**	**100.5**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**4.0×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**4×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS19S-01313
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

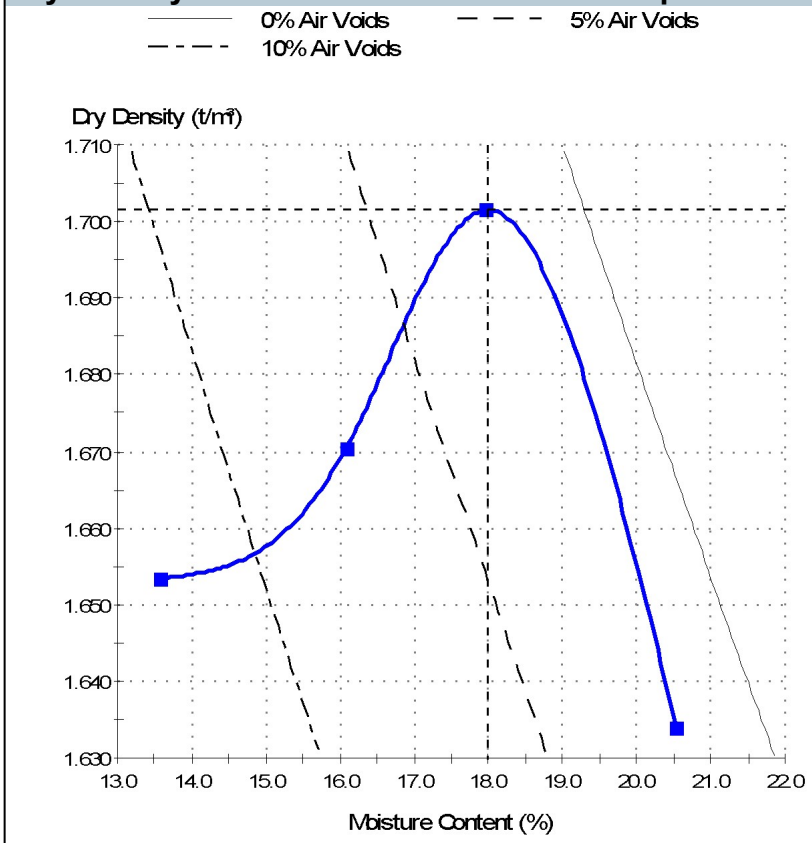
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 15/04/2019

Sample Details

Sample ID:	BRIS19S-01313	**Sampling Method:**	Submitted by client
Date Sampled:	18/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:		**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH228, 0.0-0.5m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.70

Standard OMC (%): 18.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01313

NATA Accredited laboratory Number: 431

Date of Issue: 03/05/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH228, 0.0-0.5m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00536	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01313	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	18/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.7**	**Specimen Dry Density**	**t/m3**	**1.67**
Specimen OMC	**%**	**18**	**Specimen Wet Density**	**t/m3**	**1.97**

LABORATORY DENSITY RATIO	**%**	**98.2**
LABORATORY MOISTURE RATIO	**%**	**98.7**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**3.0×10^{-11}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**3×10^{-11}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS19S-01314
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

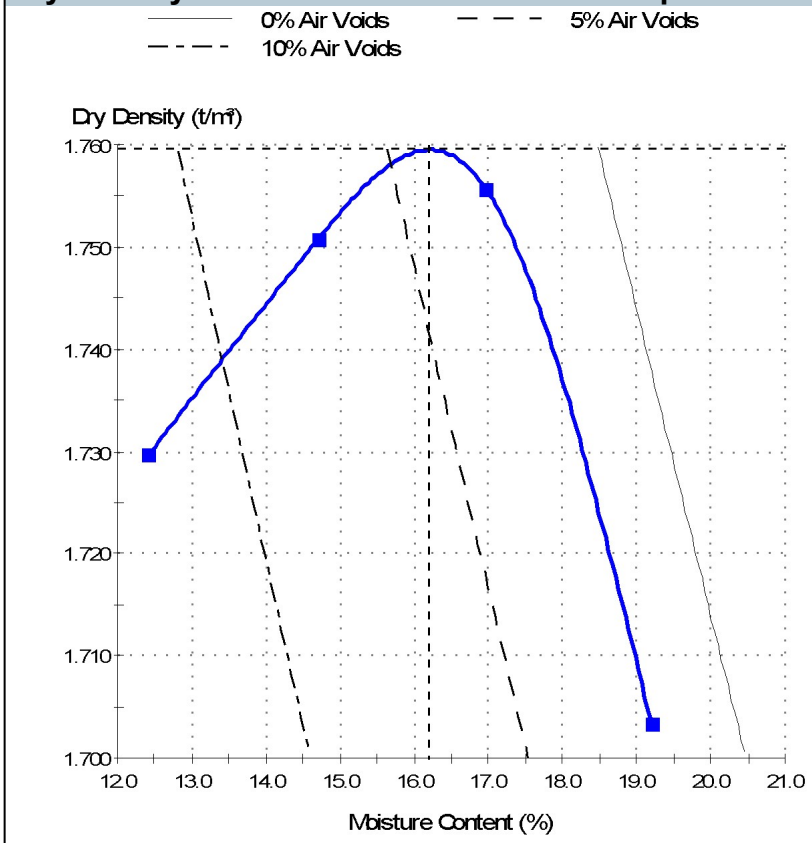
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 15/04/2019

Sample Details

Sample ID:	BRIS19S-01314	**Sampling Method:**	Submitted by client
Date Sampled:	18/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	12/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH228, 1.0-1.5m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.76

Standard OMC (%): 16.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01314

NATA Accredited laboratory Number: 431

Date of Issue: 03/05/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH228, 1.0-1.5m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00536	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01314	**Material Description:**	Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	18/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.76**	**Specimen Dry Density**	**t/m3**	**1.73**
Specimen OMC	**%**	**16.2**	**Specimen Wet Density**	**t/m3**	**2.00**

LABORATORY DENSITY RATIO	**%**	**98.3**
LABORATORY MOISTURE RATIO	**%**	**97.7**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**2.5×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**2×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01311
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

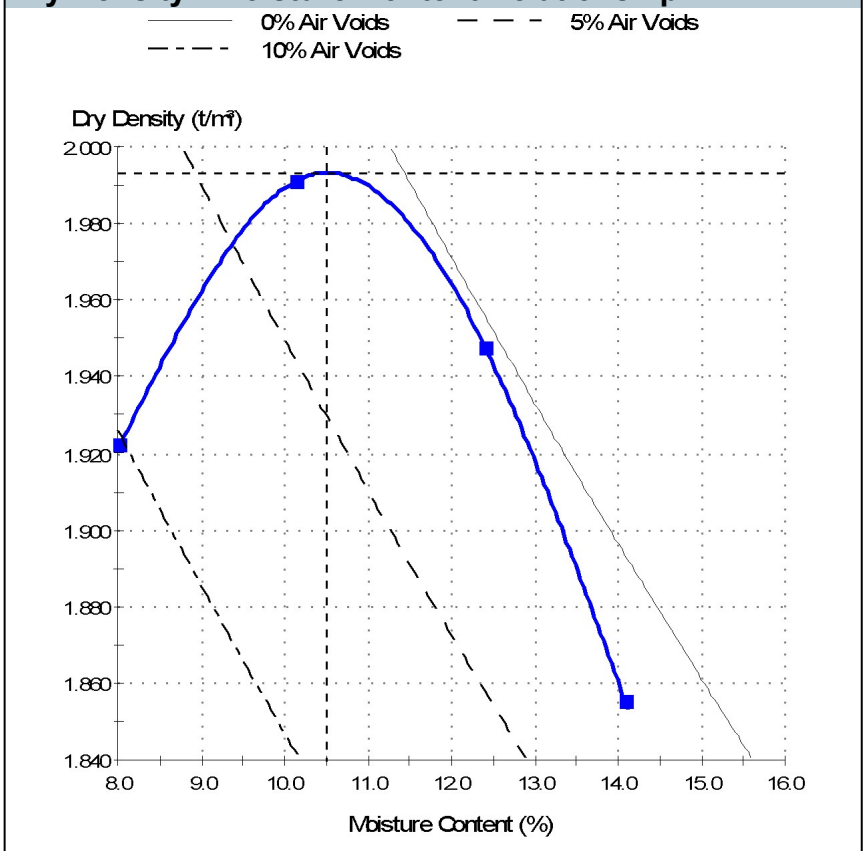
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 15/04/2019

Sample Details

Sample ID:	BRIS19S-01311	**Sampling Method:**	Submitted by client
Date Sampled:	18/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	11/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH229, 1.0-1.5m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.99

Standard OMC (%): 10.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01311

NATA Accredited laboratory Number: 431

Date of Issue: 03/05/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH229, 1.0-1.5m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00536	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01311	**Material Description:**	Gravelly Sandy CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	18/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.99**	**Specimen Dry Density**	**t/m3**	**1.95**
Specimen OMC	**%**	**10.5**	**Specimen Wet Density**	**t/m3**	**2.15**

LABORATORY DENSITY RATIO	**%**	**97.9**
LABORATORY MOISTURE RATIO	**%**	**101.1**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**7.4×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**7×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01301
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

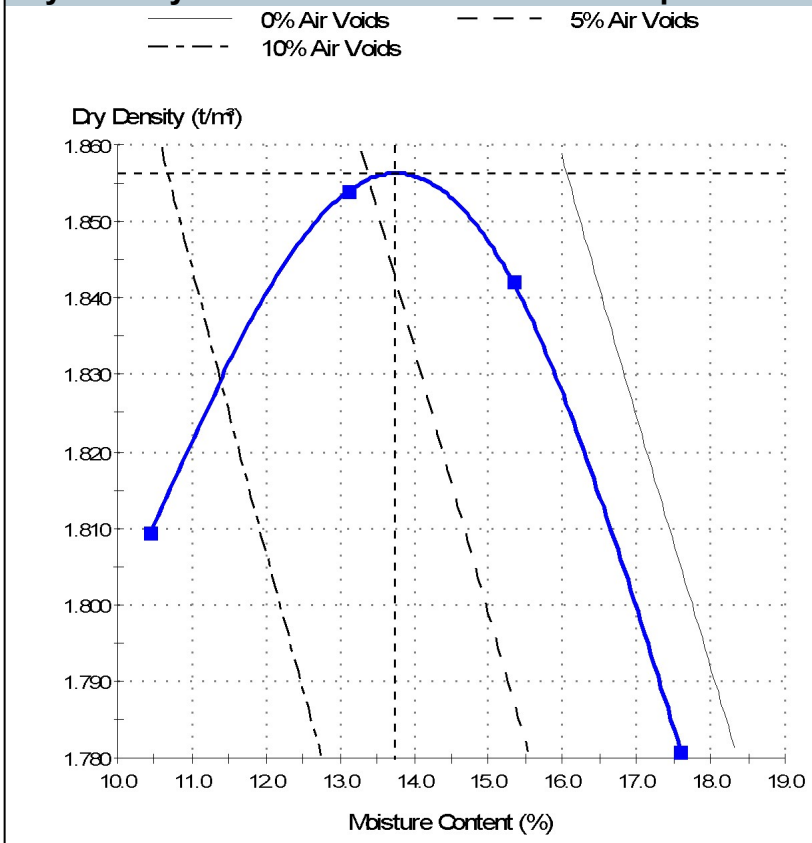
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 12/04/2019

Sample Details

Sample ID:	BRIS19S-01301	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	9/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Project		
Sample Location:	BH230, 0.8-1.3m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.86

Standard OMC (%): 14.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01301

NATA Accredited laboratory Number: 431

Date of Issue: 23/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH230, 0.8-1.3m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00534	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01301	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.86**	**Specimen Dry Density**	**t/m3**	**1.82**
Specimen OMC	**%**	**13.8**	**Specimen Wet Density**	**t/m3**	**2.07**

LABORATORY DENSITY RATIO	**%**	**97.9**
LABORATORY MOISTURE RATIO	**%**	**100.5**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**$1.4x10^{-8}$**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**1×10^{-8}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01312
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

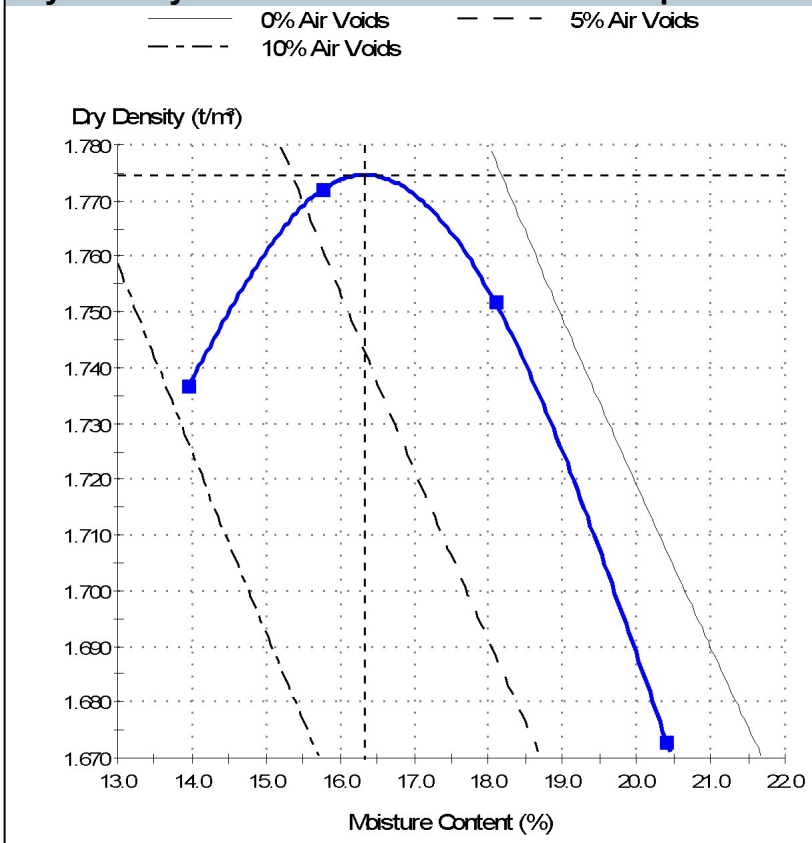
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 15/04/2019

Sample Details

Sample ID:	BRIS19S-01312	**Sampling Method:**	Submitted by client
Date Sampled:	18/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:		**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH235, 0.8-1.3m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.77

Standard OMC (%): 16.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01312

NATA Accredited laboratory Number: 431

Date of Issue: 03/05/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH235, 0.8-1.3m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00536	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01312	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	18/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.77**	**Specimen Dry Density**	**t/m3**	**1.73**
Specimen OMC	**%**	**16.3**	**Specimen Wet Density**	**t/m3**	**2.02**

LABORATORY DENSITY RATIO	**%**	**98.0**
LABORATORY MOISTURE RATIO	**%**	**100.2**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**5.1×10^{-11}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**5×10^{-11}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01302
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

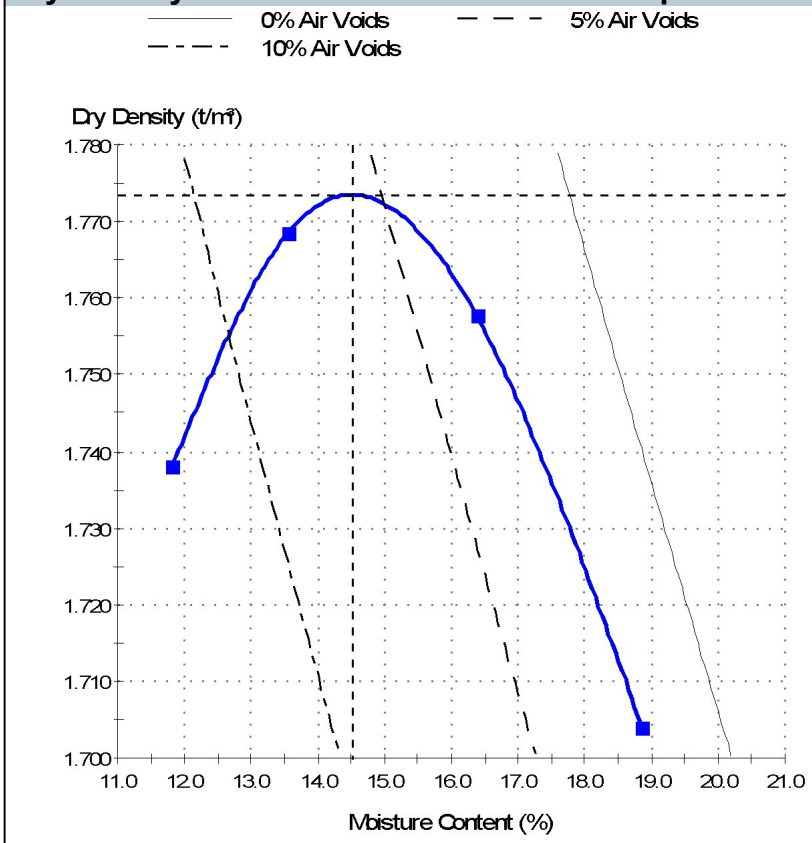
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 12/04/2019

Sample Details

Sample ID:	BRIS19S-01302	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	10/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Project		
Sample Location:	BH236, 0.8-1.3m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.77

Standard OMC (%): 14.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01302

NATA Accredited laboratory Number: 431

Date of Issue: 29/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH236, 0.8-1.3m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00534	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01302	**Material Description:**	Gravelly Sandy CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.77**	**Specimen Dry Density**	**t/m3**	**1.74**
Specimen OMC	**%**	**14.5**	**Specimen Wet Density**	**t/m3**	**1.99**

LABORATORY DENSITY RATIO	**%**	**98.1**
LABORATORY MOISTURE RATIO	**%**	**99.3**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.6×10^{-8}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**1×10^{-8}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01280
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:** Project No 113272.02

Accredited for compliance with ISO/IEC 17025 - Testing.

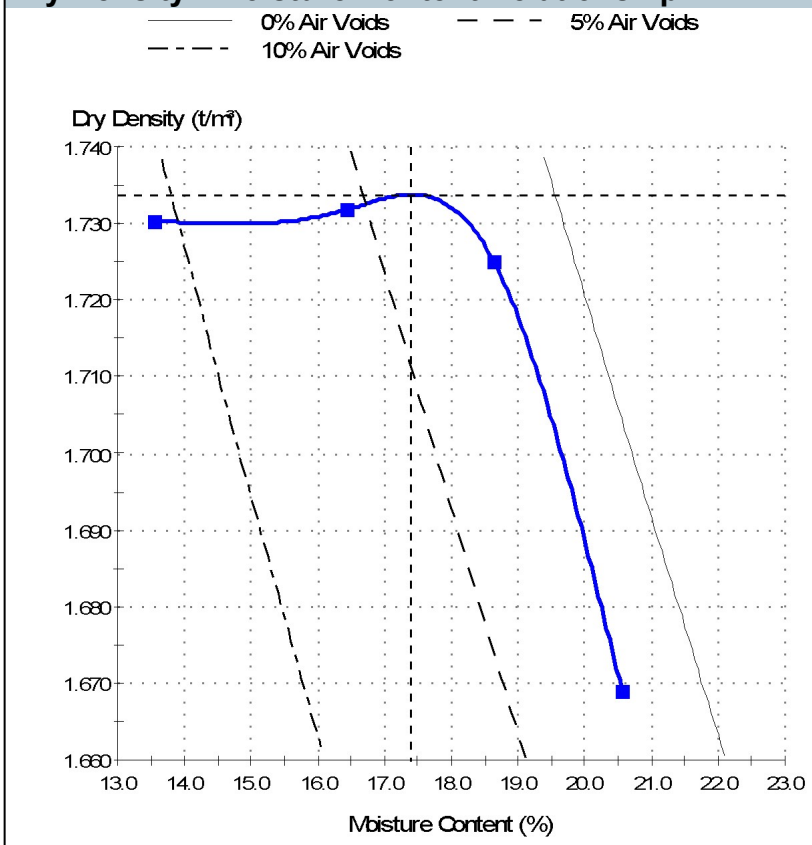
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 2/04/2019

Sample Details

Sample ID:	BRIS19S-01280	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	29/03/2019	**Specification:**	
Project Location:	McPhillamys Gold Mine		
Sample Location:	BH239, 0.7-1.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.73

Standard OMC (%): 17.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01280

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH239, 0.7-1.2m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00530	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01280	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.73**	**Specimen Dry Density**	**t/m3**	**1.69**
Specimen OMC	**%**	**17.5**	**Specimen Wet Density**	**t/m3**	**1.99**

LABORATORY DENSITY RATIO	**%**	**97.9**
LABORATORY MOISTURE RATIO	**%**	**100.4**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.6×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**2×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01299
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

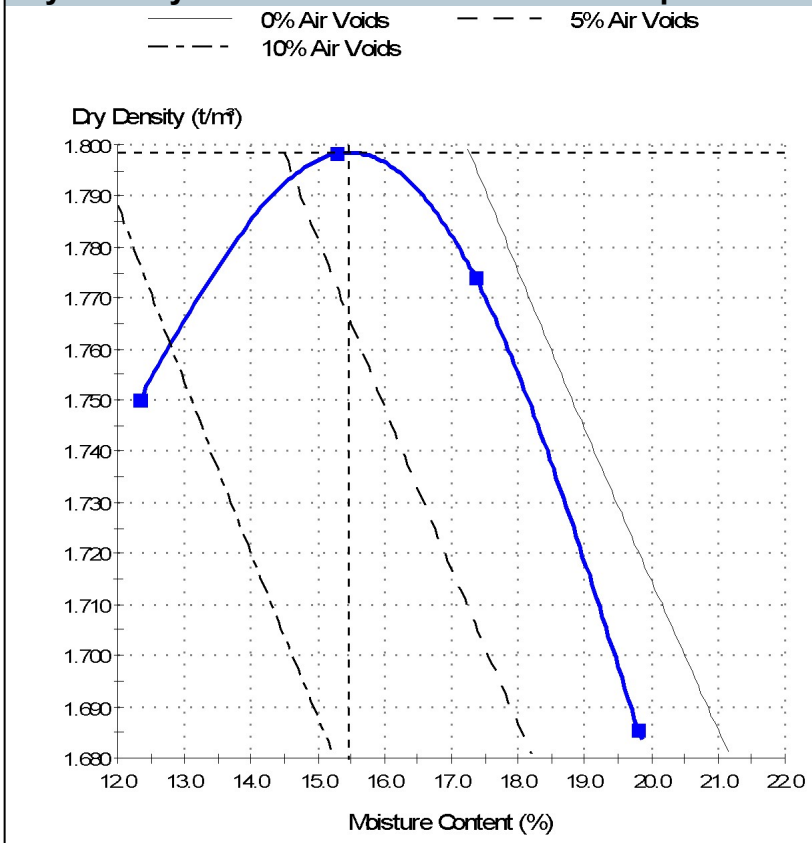
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 12/04/2019

Sample Details

Sample ID:	BRIS19S-01299	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	8/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Project		
Sample Location:	BH240, 0.9-1.4m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.80**
Standard OMC (%):	**15.5**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01299

NATA Accredited laboratory Number: 431

Date of Issue: 23/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH240, 0.9-1.4m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00534	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01299	**Material Description:**	Gravelly Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.8**	**Specimen Dry Density**	**t/m3**	**1.76**
Specimen OMC	**%**	**15.5**	**Specimen Wet Density**	**t/m3**	**2.04**

LABORATORY DENSITY RATIO	**%**	**97.7**
LABORATORY MOISTURE RATIO	**%**	**102.4**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**4.4×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**4×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01300
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

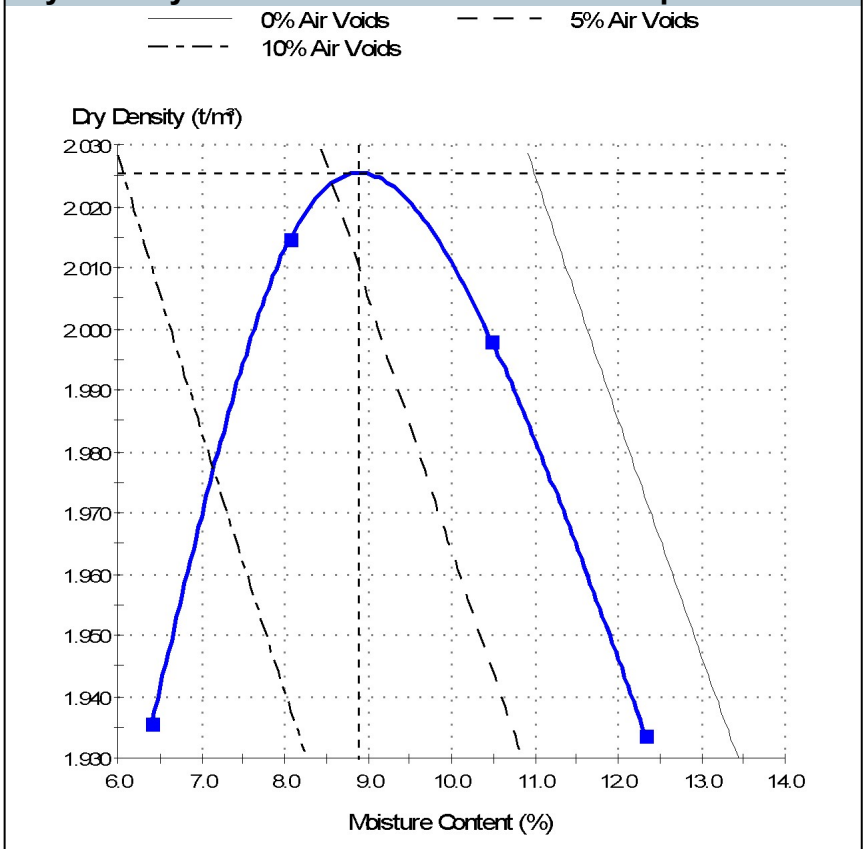
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 12/04/2019

Sample Details

Sample ID:	BRIS19S-01300	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	8/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Project		
Sample Location:	BH241, 0.5-1.0m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**2.03**
Standard OMC (%):	**9.0**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01300

NATA Accredited laboratory Number: 431

Date of Issue: 23/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH241, 0.5-1.0m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00534	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01300	**Material Description:**	Gravelly Sandy CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**2.03**	**Specimen Dry Density**	**t/m3**	**1.99**
Specimen OMC	**%**	**8.9**	**Specimen Wet Density**	**t/m3**	**2.17**

LABORATORY DENSITY RATIO	**%**	**98.1**
LABORATORY MOISTURE RATIO	**%**	**99.1**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**4.3×10^{-8}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**4×10^{-8}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01279
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:** Project No 113272.02

Accredited for compliance with ISO/IEC 17025 - Testing.

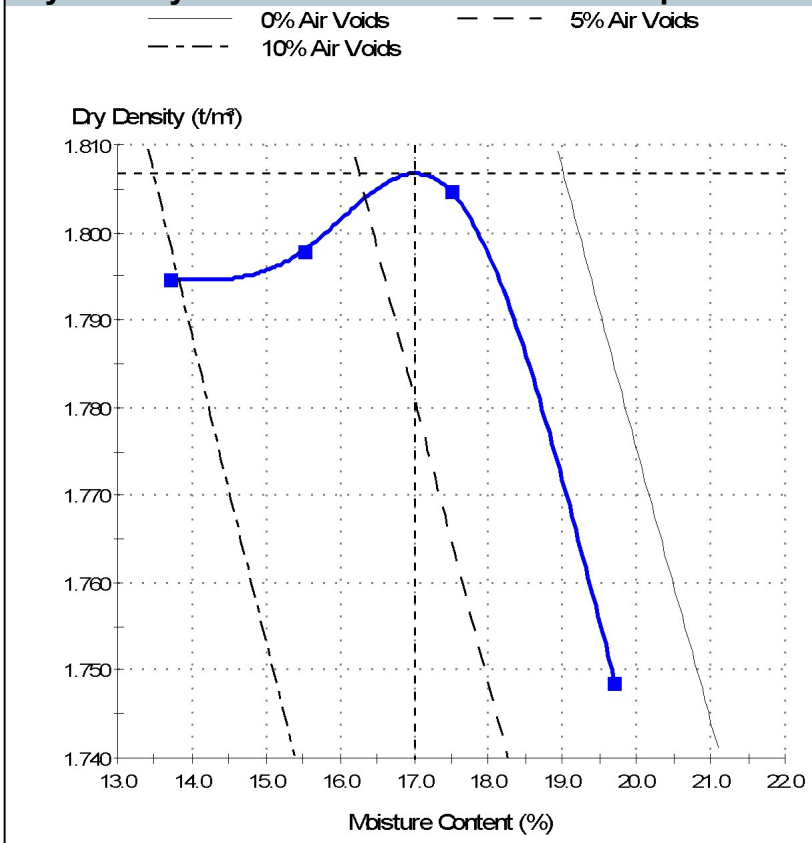
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 2/04/2019

Sample Details

Sample ID:	BRIS19S-01279	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	29/03/2019	**Specification:**	
Project Location:	McPhillamys Gold Mine		
Sample Location:	BH244, 0.7-1.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.81

Standard OMC (%): 17.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01279

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH244, 0.7-1.2m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00530	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01279	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.81**	**Specimen Dry Density**	**t/m3**	**1.78**
Specimen OMC	**%**	**17**	**Specimen Wet Density**	**t/m3**	**2.08**

LABORATORY DENSITY RATIO	**%**	**98.1**
LABORATORY MOISTURE RATIO	**%**	**99.0**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.7×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**2×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS19S-01281
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:** Project No 113272.02

Accredited for compliance with ISO/IEC 17025 - Testing.

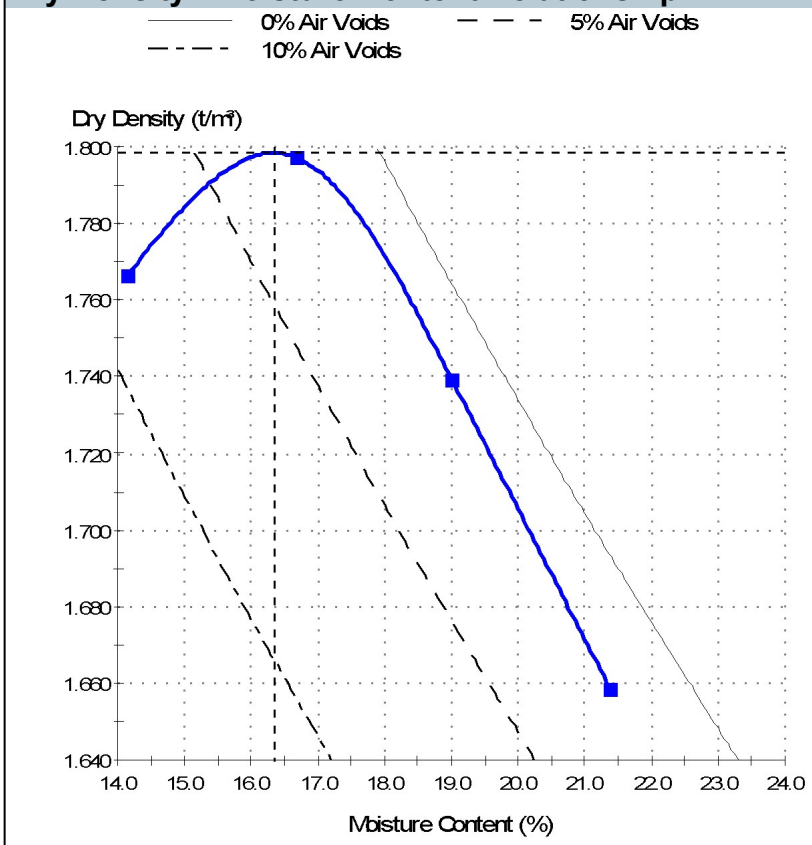
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 2/04/2019

Sample Details

Sample ID:	BRIS19S-01281	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	1/04/2019	**Specification:**	
Project Location:	McPhillamys Gold Mine		
Sample Location:	BH245A, 0.5-1.0m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.80

Standard OMC (%): 16.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01281

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH245A, 0.5-1.0m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00530	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01281	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.8**	**Specimen Dry Density**	**t/m3**	**1.77**
Specimen OMC	**%**	**16.5**	**Specimen Wet Density**	**t/m3**	**2.06**

LABORATORY DENSITY RATIO	**%**	**98.2**
LABORATORY MOISTURE RATIO	**%**	**98.6**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.7×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**2×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01282
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:** Project No 113272.02

Accredited for compliance with ISO/IEC 17025 - Testing.

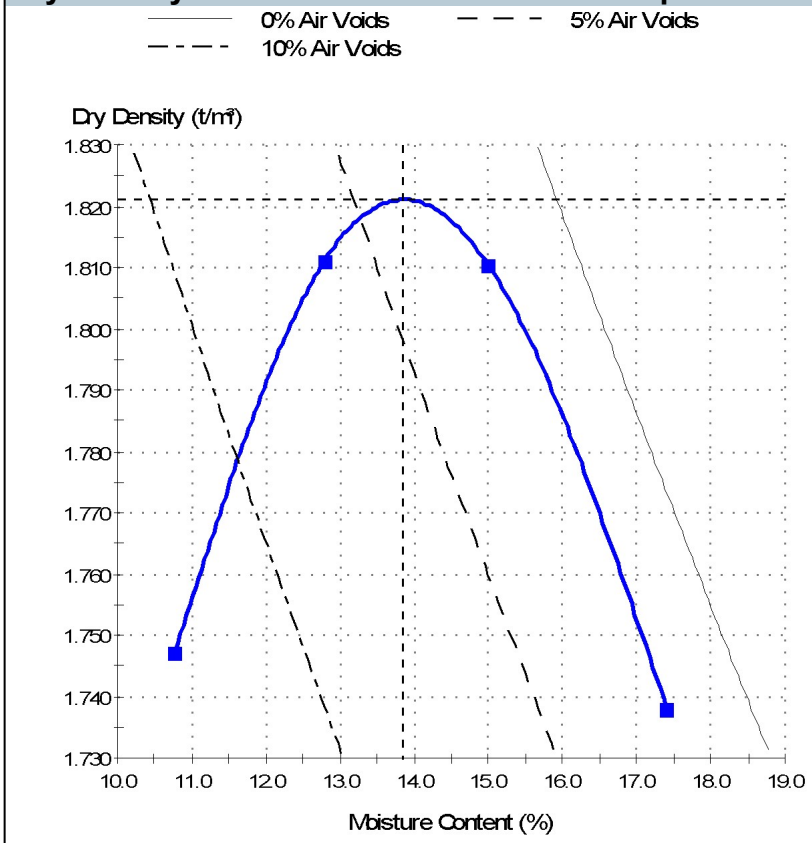
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 2/04/2019

Sample Details

Sample ID:	BRIS19S-01282	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	2/04/2019	**Specification:**	
Project Location:	McPhillamys Gold Mine		
Sample Location:	BH246, 0.8-1.3m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.82

Standard OMC (%): 14.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01282

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH246, 0.8-1.3m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00530	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01282	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.82**	**Specimen Dry Density**	**t/m3**	**1.78**
Specimen OMC	**%**	**14**	**Specimen Wet Density**	**t/m3**	**2.03**

LABORATORY DENSITY RATIO	**%**	**98.0**
LABORATORY MOISTURE RATIO	**%**	**99.7**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**9.7×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**9×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS19S-01298
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

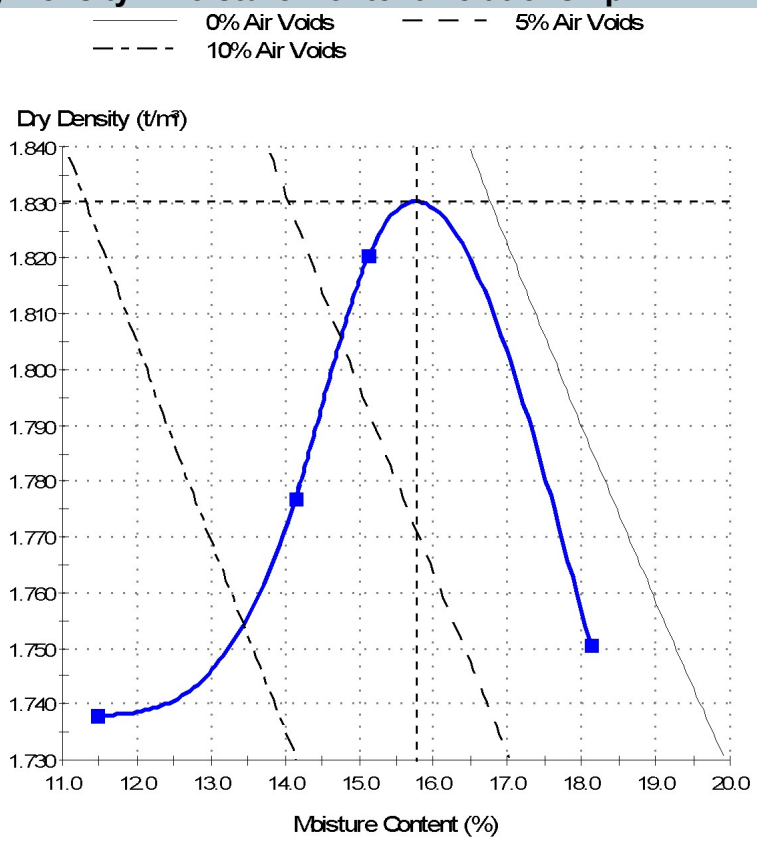
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 8/04/2019

Sample Details

Sample ID:	BRIS19S-01298	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	5/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH247, 0.5-1.0m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.83

Standard OMC (%): 16.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01298

NATA Accredited laboratory Number: 431

Date of Issue: 23/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH247, 0.5-1.0m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00533	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01298	**Material Description:**	Gravelly Sandy CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.83**	**Specimen Dry Density**	**t/m3**	**1.79**
Specimen OMC	**%**	**15.8**	**Specimen Wet Density**	**t/m3**	**2.08**

LABORATORY DENSITY RATIO	**%**	**98.0**
LABORATORY MOISTURE RATIO	**%**	**99.7**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.8×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**2×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01295
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

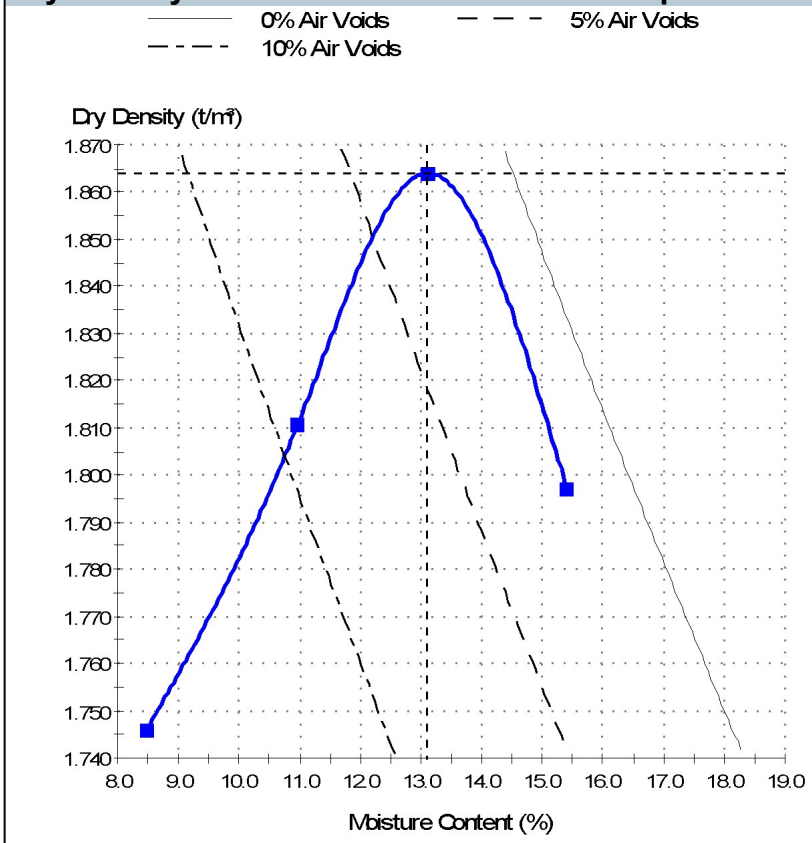
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 8/04/2019

Sample Details

Sample ID:	BRIS19S-01295	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	5/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH248, 1.0-1.4m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.86

Standard OMC (%): 13.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01295

NATA Accredited laboratory Number: 431

Date of Issue: 23/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH248, 1.0-1.4m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00533	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01295	**Material Description:**	Gravelly Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.86**	**Specimen Dry Density**	**t/m3**	**1.82**
Specimen OMC	**%**	**13.1**	**Specimen Wet Density**	**t/m3**	**2.06**

LABORATORY DENSITY RATIO	**%**	**97.9**
LABORATORY MOISTURE RATIO	**%**	**100.8**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**3.4×10^{-8}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**3×10^{-8}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01296
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

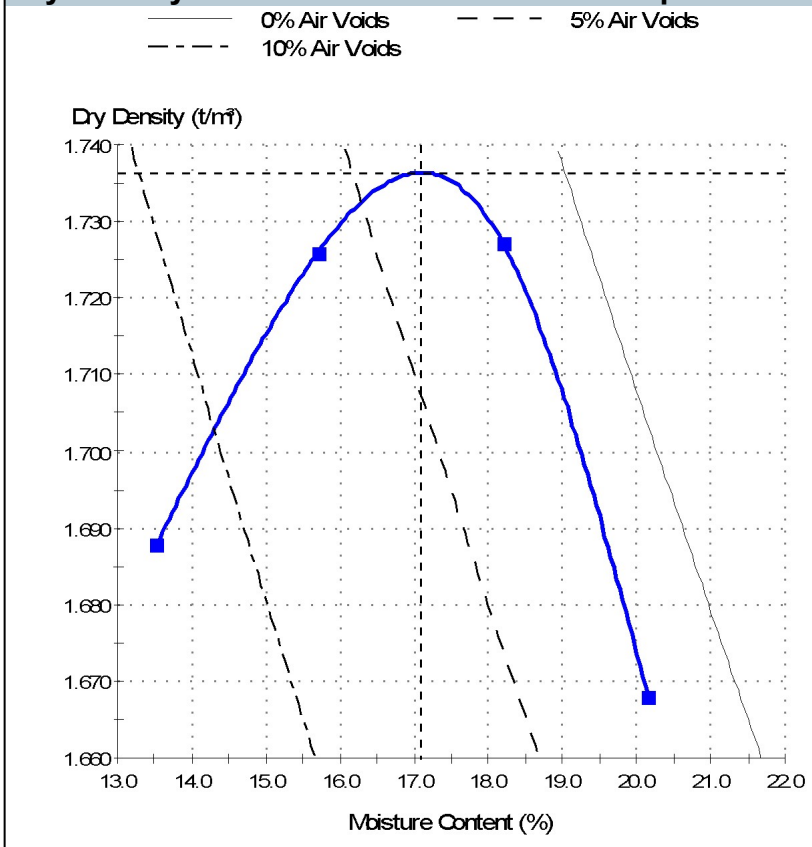
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 8/04/2019

Sample Details

Sample ID:	BRIS19S-01296	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	5/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH249, 0.8-1.3m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.74

Standard OMC (%): 17.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01296

NATA Accredited laboratory Number: 431

Date of Issue: 23/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH249, 0.8-1.3m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00533	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01296	**Material Description:**	Gravelly Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.74**	**Specimen Dry Density**	**t/m3**	**1.70**
Specimen OMC	**%**	**17.1**	**Specimen Wet Density**	**t/m3**	**2.00**

LABORATORY DENSITY RATIO	**%**	**97.8**
LABORATORY MOISTURE RATIO	**%**	**101.1**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**5.4×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**5×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01284
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

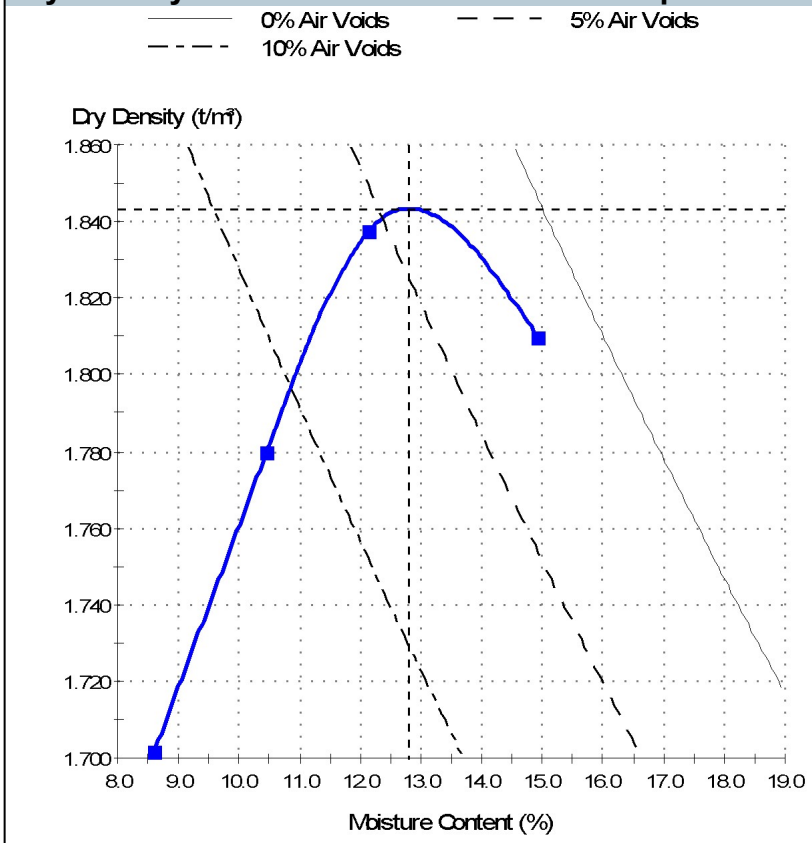
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 4/04/2019

Sample Details

Sample ID:	BRIS19S-01284	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	3/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH251, 0.7-1.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³):	**1.84**
Standard OMC (%):	**13.0**
Retained Sieve 19mm (%):	

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01284

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH251, 0.7-1.2m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00531	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01284	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.84**	**Specimen Dry Density**	**t/m3**	**1.80**
Specimen OMC	**%**	**13**	**Specimen Wet Density**	**t/m3**	**2.04**

LABORATORY DENSITY RATIO	**%**	**97.9**
LABORATORY MOISTURE RATIO	**%**	**100.8**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**$1.5x10^{-8}$**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**1×10^{-8}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01283
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:** Project No 113272.02

Accredited for compliance with ISO/IEC 17025 - Testing.

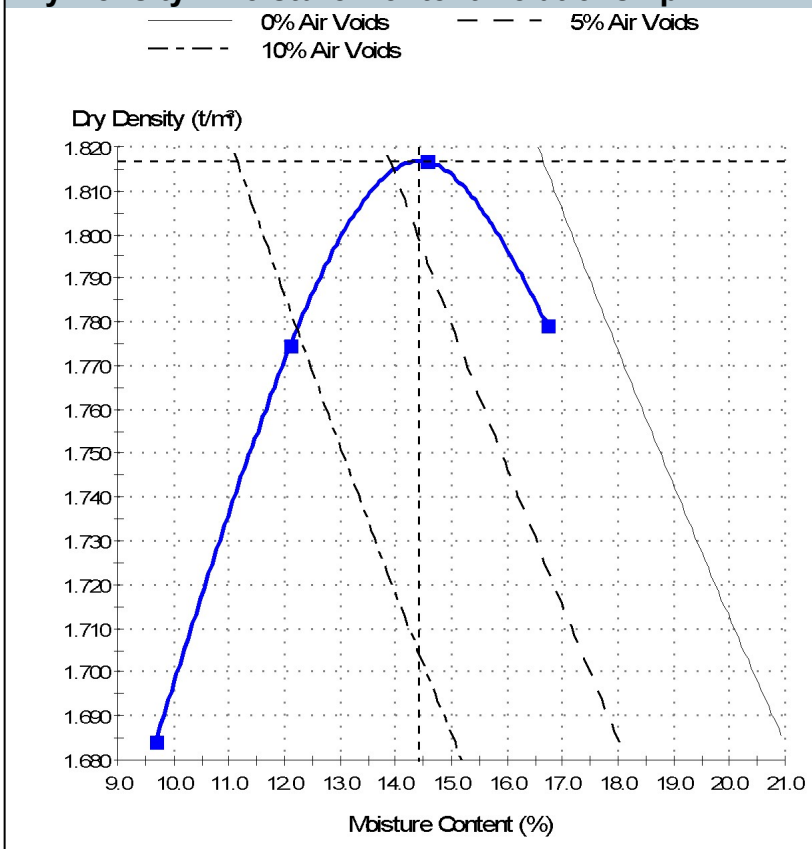
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 2/04/2019

Sample Details

Sample ID:	BRIS19S-01283	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	1/04/2019	**Specification:**	
Project Location:	McPhillamys Gold Mine		
Sample Location:	BH252, 0.6-1.1m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.82

Standard OMC (%): 14.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01283

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH252, 0.6-1.1m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00530	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01283	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.82**	**Specimen Dry Density**	**t/m3**	**1.78**
Specimen OMC	**%**	**14.5**	**Specimen Wet Density**	**t/m3**	**2.04**

LABORATORY DENSITY RATIO	**%**	**97.8**
LABORATORY MOISTURE RATIO	**%**	**101.4**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.2×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**1×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01297
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

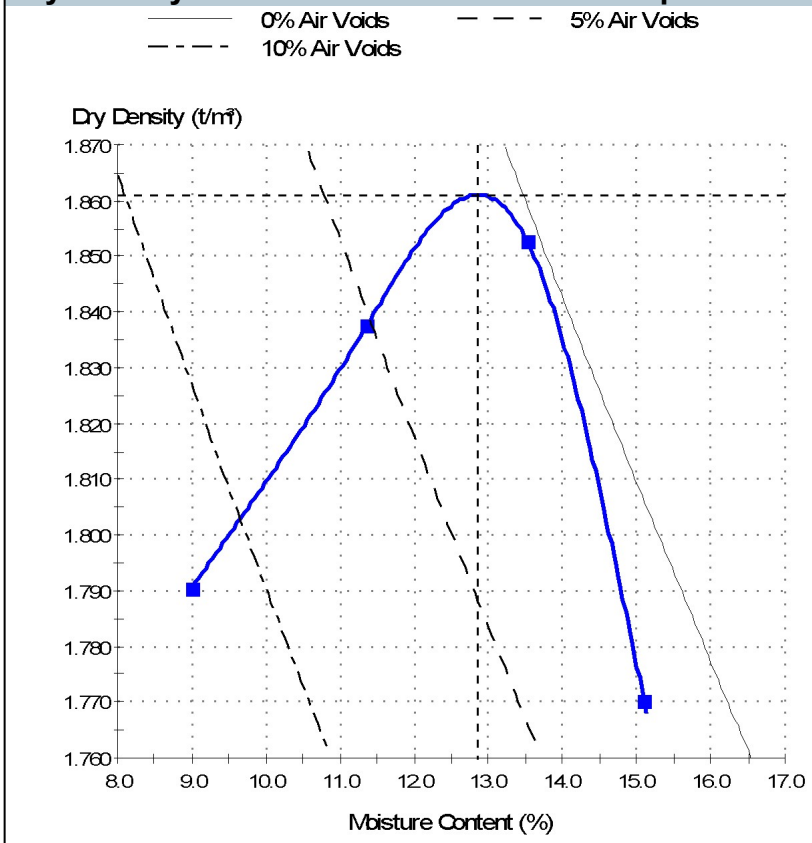
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 8/04/2019

Sample Details

Sample ID:	BRIS19S-01297	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	5/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH253, 0.7-1.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.86

Standard OMC (%): 13.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01297

NATA Accredited laboratory Number: 431

Date of Issue: 23/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH253, 0.7-1.2m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00533	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01297	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.86**	**Specimen Dry Density**	**t/m3**	**1.83**
Specimen OMC	**%**	**12.9**	**Specimen Wet Density**	**t/m3**	**2.06**

LABORATORY DENSITY RATIO	**%**	**98.1**
LABORATORY MOISTURE RATIO	**%**	**98.9**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.4×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**1×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01294
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

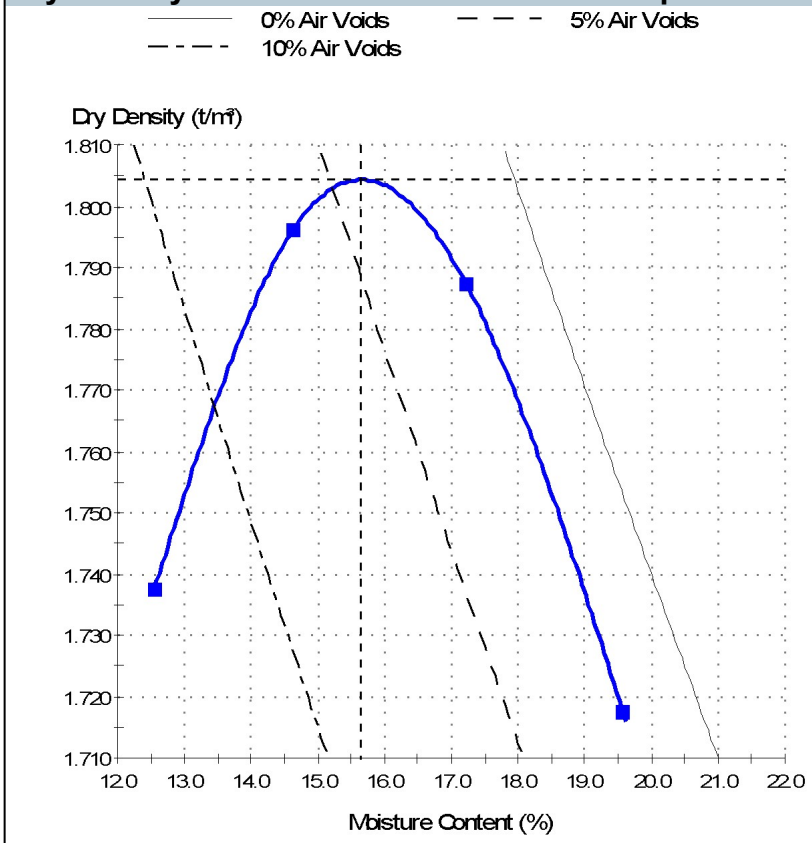
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 8/04/2019

Sample Details

Sample ID:	BRIS19S-01294	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	5/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH254, 0.7-1.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.80

Standard OMC (%): 15.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01294

NATA Accredited laboratory Number: 431

Date of Issue: 23/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH254, 0.7-1.2m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00533	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01294	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.8**	**Specimen Dry Density**	**t/m3**	**1.77**
Specimen OMC	**%**	**15.7**	**Specimen Wet Density**	**t/m3**	**2.04**

LABORATORY DENSITY RATIO	**%**	**98.1**
LABORATORY MOISTURE RATIO	**%**	**99.3**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**4.6×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**4×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01293
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

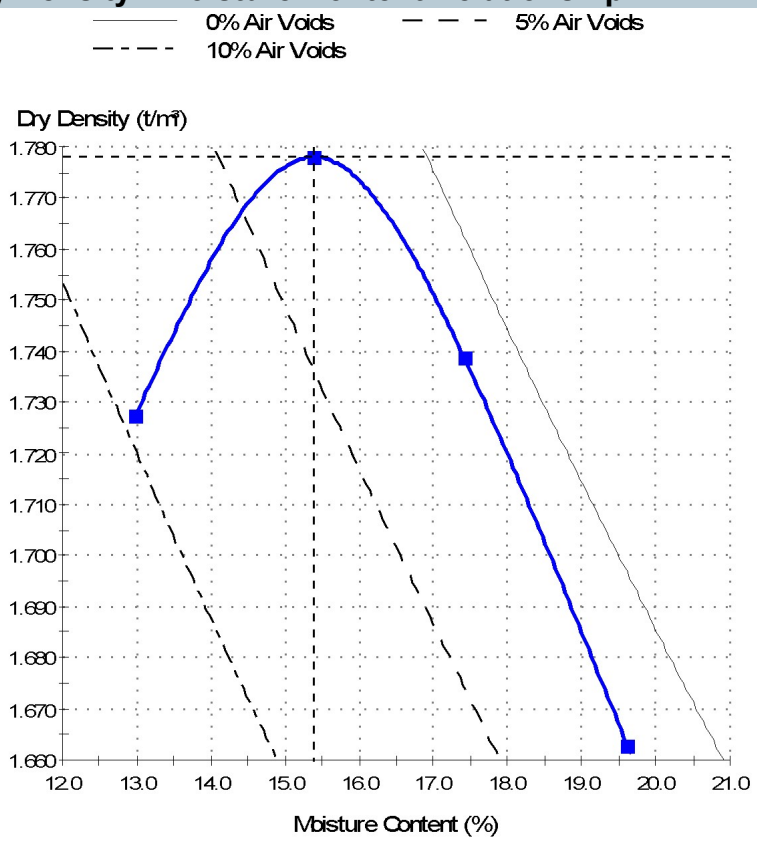
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 4/04/2019

Sample Details

Sample ID:	BRIS19S-01293	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	3/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH255, 0.7-1.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.78

Standard OMC (%): 15.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01293

NATA Accredited laboratory Number: 431

Date of Issue: 16/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH255, 0.7-1.2m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00532	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01293	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.78**	**Specimen Dry Density**	**t/m3**	**1.74**
Specimen OMC	**%**	**15.4**	**Specimen Wet Density**	**t/m3**	**2.01**

LABORATORY DENSITY RATIO	**%**	**97.9**
LABORATORY MOISTURE RATIO	**%**	**100.7**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.2×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**1×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS19S-01285
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

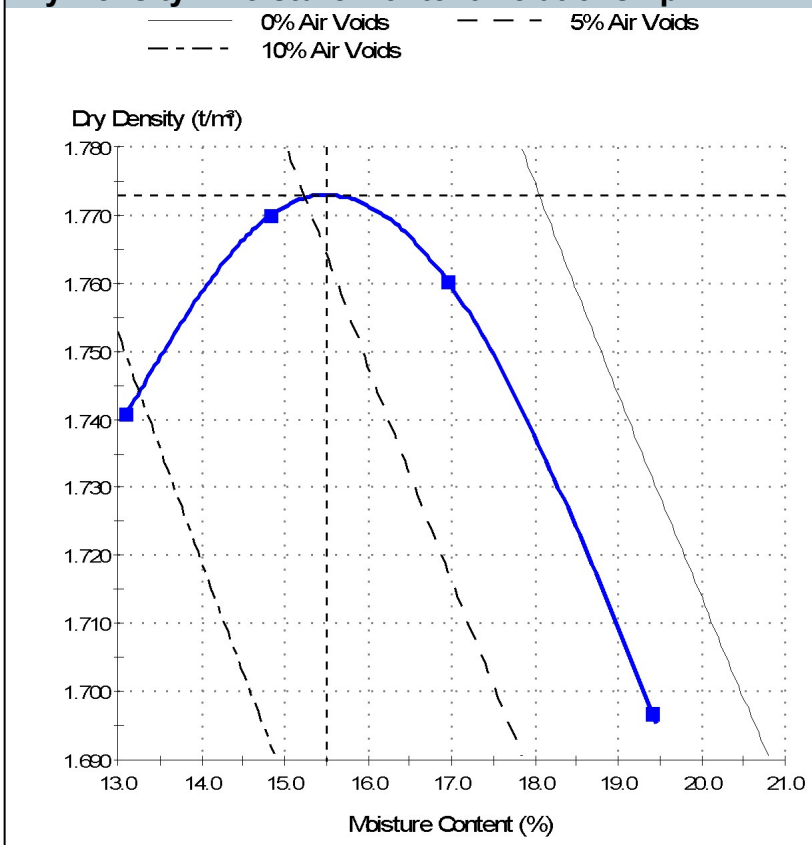
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 3/04/2019

Sample Details

Sample ID:	BRIS19S-01285	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	2/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH256, 0.6-1.1m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.77

Standard OMC (%): 15.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01285

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH256, 0.6-1.1m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00531	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01285	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.77**	**Specimen Dry Density**	**t/m3**	**1.74**
Specimen OMC	**%**	**15.5**	**Specimen Wet Density**	**t/m3**	**2.00**

LABORATORY DENSITY RATIO	**%**	**98.2**
LABORATORY MOISTURE RATIO	**%**	**98.4**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.9×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**2×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01286
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

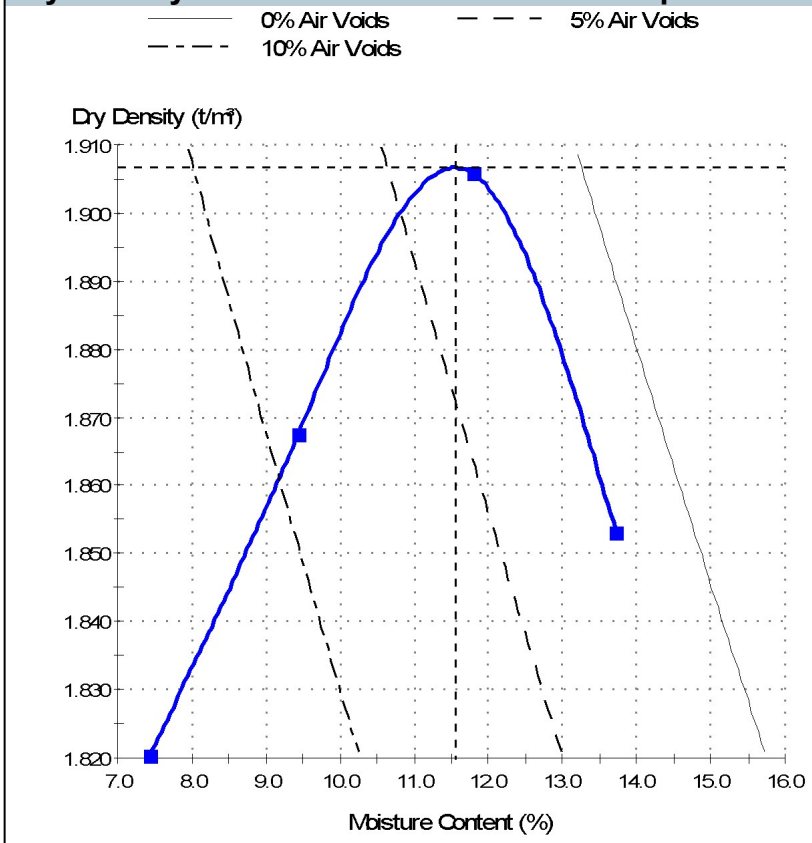
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 3/04/2019

Sample Details

Sample ID:	BRIS19S-01286	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	2/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH257, 0.5-1.0m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): **1.91**

Standard OMC (%): **11.5**

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01286

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH257, 0.5-1.0m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00531	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01286	**Material Description:**	Sandy Gravelly CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.91**	**Specimen Dry Density**	**t/m3**	**1.88**
Specimen OMC	**%**	**11.5**	**Specimen Wet Density**	**t/m3**	**2.09**

LABORATORY DENSITY RATIO	**%**	**98.3**
LABORATORY MOISTURE RATIO	**%**	**96.7**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**3.7×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**4×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01291
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

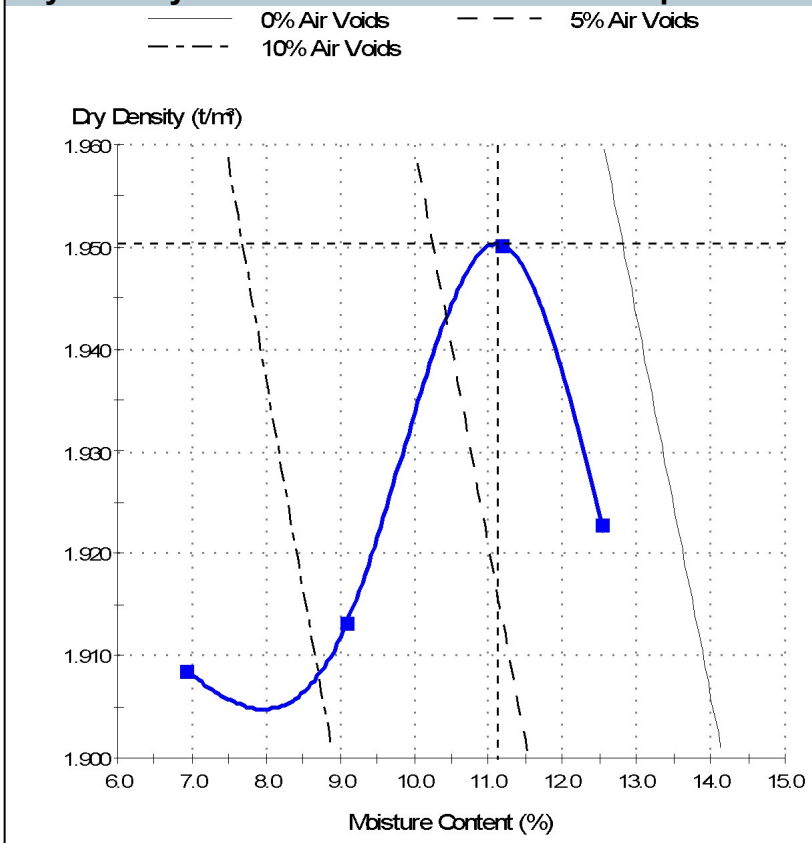
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 4/04/2019

Sample Details

Sample ID:	BRIS19S-01291	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	3/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH258, 1.0-1.5m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.95

Standard OMC (%): 11.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01291

NATA Accredited laboratory Number: 431

Date of Issue: 16/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH258, 1.0-1.5m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00532	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01291	**Material Description:**	Gravelly Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.95**	**Specimen Dry Density**	**t/m3**	**1.91**
Specimen OMC	**%**	**11.1**	**Specimen Wet Density**	**t/m3**	**2.12**

LABORATORY DENSITY RATIO	**%**	**98.0**
LABORATORY MOISTURE RATIO	**%**	**100.5**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.2×10^{-8}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**1×10^{-8}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS19S-01292
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

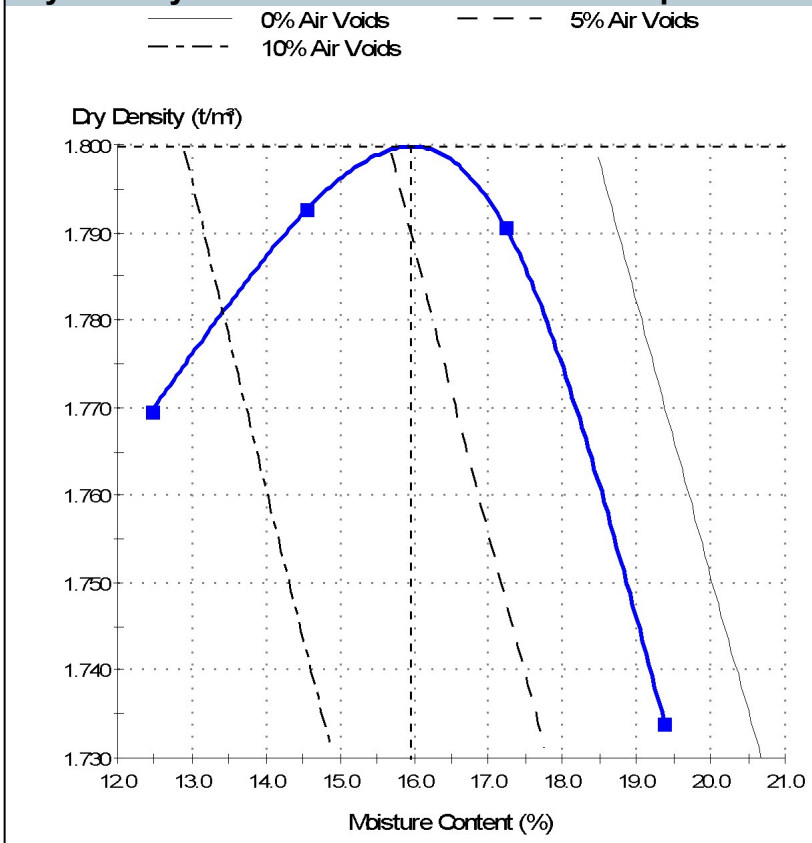
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 4/04/2019

Sample Details

Sample ID:	BRIS19S-01292	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	3/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH259, 1.0-1.5m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.80

Standard OMC (%): 16.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01292

NATA Accredited laboratory Number: 431

Date of Issue: 16/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH259, 1.0-1.5m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00532	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01292	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.8**	**Specimen Dry Density**	**t/m3**	**1.76**
Specimen OMC	**%**	**16**	**Specimen Wet Density**	**t/m3**	**2.05**

LABORATORY DENSITY RATIO	**%**	**98.0**
LABORATORY MOISTURE RATIO	**%**	**99.9**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.2×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**1×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01287
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

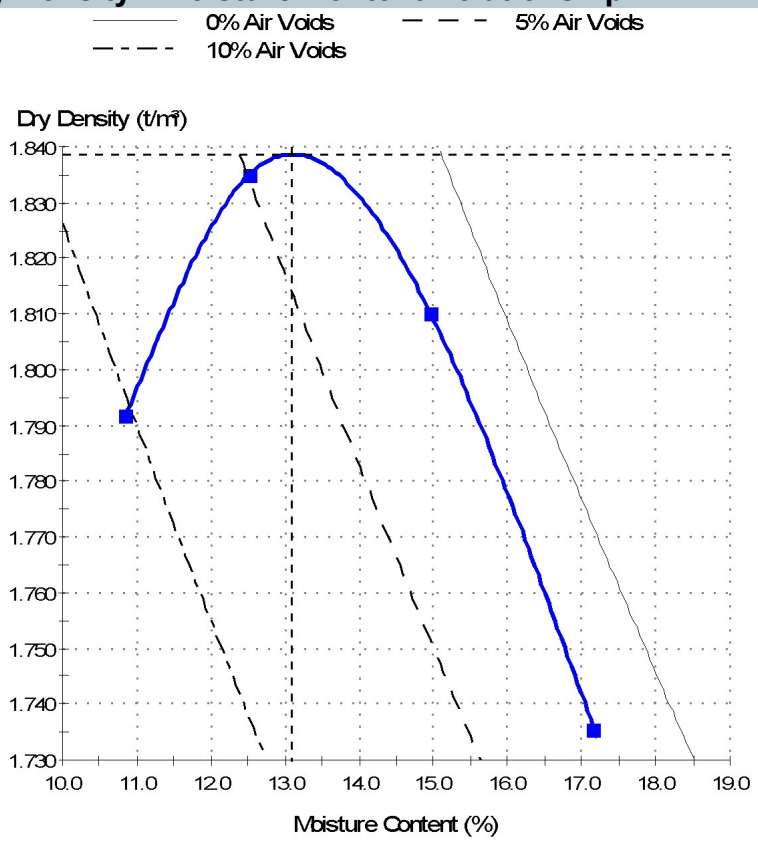
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 3/04/2019

Sample Details

Sample ID:	BRIS19S-01287	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	2/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH260, 0.5-1.0m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.84

Standard OMC (%): 13.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01287

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH260, 0.5-1.0m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00531	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01287	**Material Description:**	Sandy Gravelly CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.84**	**Specimen Dry Density**	**t/m3**	**1.81**
Specimen OMC	**%**	**13**	**Specimen Wet Density**	**t/m3**	**2.04**

LABORATORY DENSITY RATIO	**%**	**98.1**
LABORATORY MOISTURE RATIO	**%**	**99.1**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**5.1×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**5×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

A TETRA TECH COMPANY

Maximum Dry Density Report

Report No: MDD:BRIS19S-01290
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

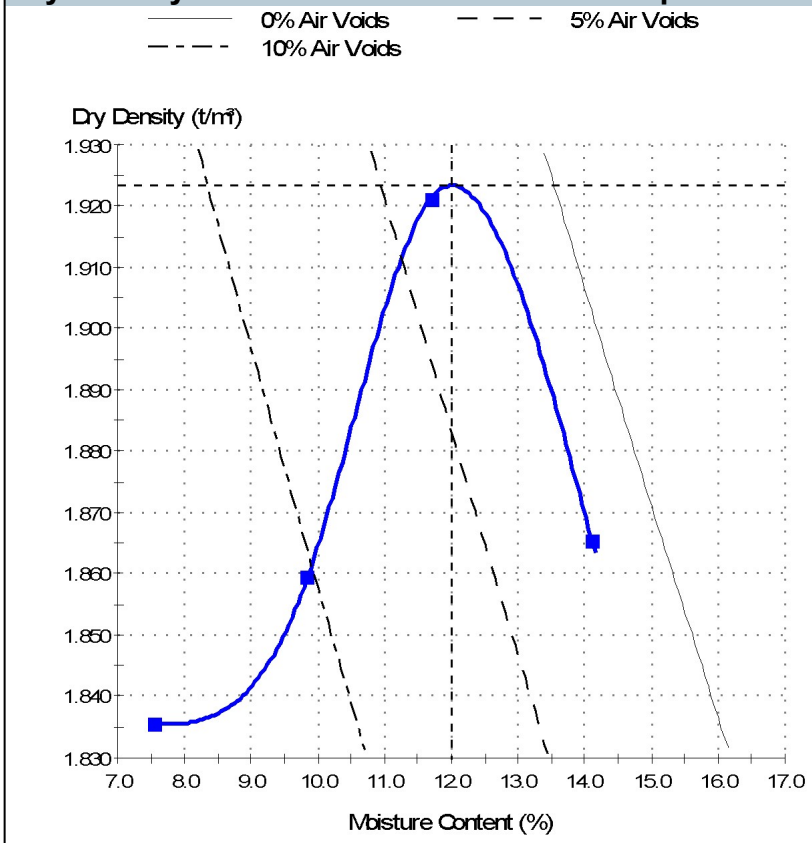
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 4/04/2019

Sample Details

Sample ID:	BRIS19S-01290	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	3/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH261, 0.8-1.3m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.92

Standard OMC (%): 12.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01290

NATA Accredited laboratory Number: 431

Date of Issue: 16/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH261, 0.8-1.3m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00532	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01290	**Material Description:**	Gravelly Sandy CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.92**	**Specimen Dry Density**	**t/m3**	**1.89**
Specimen OMC	**%**	**12**	**Specimen Wet Density**	**t/m3**	**2.11**

LABORATORY DENSITY RATIO	**%**	**98.3**
LABORATORY MOISTURE RATIO	**%**	**97.1**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**1.4×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**1×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01289
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

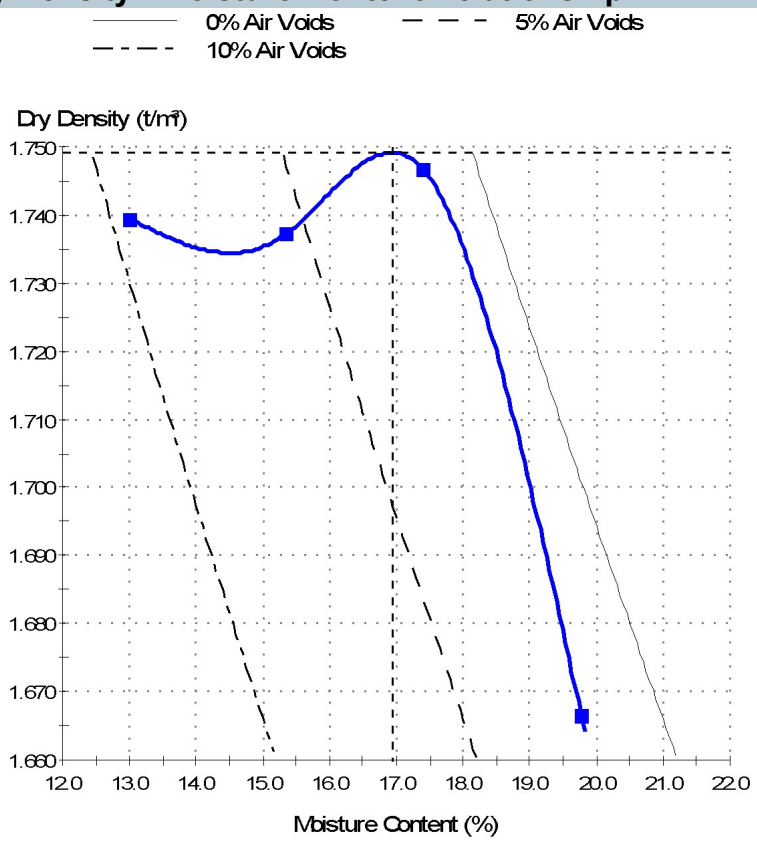
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 4/04/2019

Sample Details

Sample ID:	BRIS19S-01289	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	3/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH262, 0.7-1.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.75

Standard OMC (%): 17.0

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01289

NATA Accredited laboratory Number: 431

Date of Issue: 16/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH262, 0.7-1.2m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00532	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01289	**Material Description:**	Gravelly Sandy CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.75**	**Specimen Dry Density**	**t/m3**	**1.71**
Specimen OMC	**%**	**16.9**	**Specimen Wet Density**	**t/m3**	**2.00**

LABORATORY DENSITY RATIO	**%**	**97.9**
LABORATORY MOISTURE RATIO	**%**	**100.6**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**2.9×10^{-9}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**3×10^{-9}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place
Virginia QLD 4014

Phone: +61 7 3608 2500
Fax: +61 7 3852 2805

Maximum Dry Density Report

Report No: MDD:BRIS19S-01288
Issue No: 1

Client:	ATC Williams Pty Ltd Level 2, 16-20 Emondstone Street Newmarket QLD 4051
Principal:	
Project No.:	754-BRIS00066AA
Project Name:	McPhillamy's Gold Project
Lot No.:	**TRN:**

Accredited for compliance with ISO/IEC 17025 - Testing.

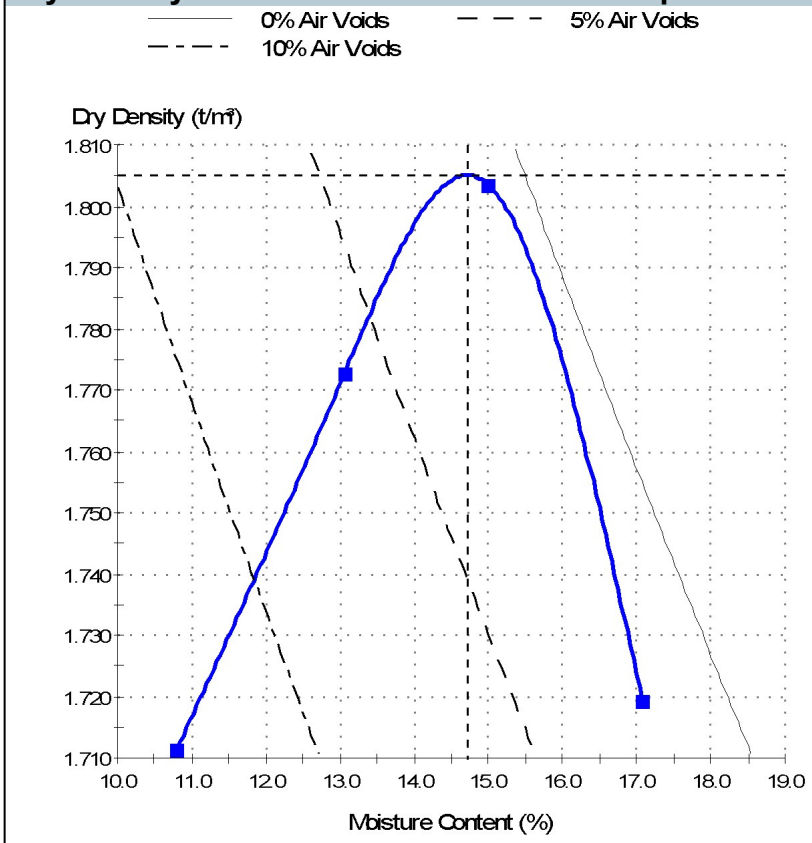
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Joseph Langley
(Laboratory Manager)
NATA Accredited Laboratory Number:431
Date of Issue: 3/04/2019

Sample Details

Sample ID:	BRIS19S-01288	**Sampling Method:**	Submitted by client
Date Sampled:	19/03/2019	**Material:**	In Situ
Date Submitted:	27/03/2019	**Source:**	On site
Date Tested:	2/04/2019	**Specification:**	
Project Location:	McPhillamy's Gold Mine		
Sample Location:	BH263, 0.7-1.2m		

Dry Density - Moisture Content Relationship



Test Results

AS 1289.5.1.1

Standard MDD (t/m³): 1.81

Standard OMC (%): 14.5

Comments

© 2000-2016 QESTLab by SpectraQEST.com

Brisbane Laboratory

Coffey Services Australia Pty Ltd
ABN 55 139 460 521
86A Yarraman Place, Virginia, QLD 4014

FALLING HEAD PERMEABILITY TEST REPORT

(This Document cannot be reproduced except in full).

Approved Signature: Joseph Langley

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 / International standards.

Report No.: PERM: BRIS19S-01289

NATA Accredited laboratory Number: 431

Date of Issue: 12/04/2019

Tested by: GM Checked By: JEL

PROJECT

Client	ATC Williams Pty Ltd	**Location:**	BH263, 0.7-1.2m
Principal:	Regis Resources	**Issue No.:**	1
Job No.:	754-BRIS00066AA	**Project:**	McPhillamy's Gold Project
Work Order No.:	BRIS19W-00531	**TRN:**	113272.02

SAMPLE

Sample ID:	BRIS19S-01288	**Material Description:**	Sandy Silty CLAY
Client Sample ID:	See Location	**Sampling Method:**	Submitted by Client
Date Sample:	19/03/2019	**Source:**	Insitu

TEST RESULTS

Test Type	**A.S 1289 6.7.2**		**Temperature at Test**	**°C**	**22**
Compactive effort specified	**% of MDD**	**98**	**Surcharge applied**	**kPa**	**3.0**
Specimen MDD	**t/m3**	**1.81**	**Specimen Dry Density**	**t/m3**	**1.77**
Specimen OMC	**%**	**14.5**	**Specimen Wet Density**	**t/m3**	**2.03**

LABORATORY DENSITY RATIO	**%**	**98.1**
LABORATORY MOISTURE RATIO	**%**	**99.6**
COEFFICIENT OF PERMEABILITY $k_{22\,°C}$	**m/s**	**2.1×10^{-10}**
COEFFICIENT OF PERMEABILITY $k_{20\,°C}$	m/s	**2×10^{-10}**

Coefficient of permeability **k (m/s)** is determined by using: (AS 1289 6.7.2-2001, Clause 8(a) Page 5)

Form Number: NEWS_040 Falling Head Perm Report Issue Date: 03/04/2018

APPENDIX B

Determination of the Soil Particle Density of a Soil

ATC Williams

TEST IN ACCORDANCE WITH AS 1289.3.5.1

Client: Regis Resources Limited ..... **NATA Report No.: R02919** .....

Address: Level 2, 516 Hay Street ..... **Job No.:** 113272.02 .....

Subiaco WA 6008.....

Project: McPhillamy's Gold..... **Location:** NSW .....

Register Number	Sample Description	Test Temperature (°C)	% of Sample >2.36 mm	Particle Density (g/cm^3)
26418	Discovery Ridge Tailings Slurry	22.9	None	2.77 #
26518	McPhillamy's Gold Tailings Sample	22.6	None	2.96 #

Notes:

☐ Sampled by ATC Williams Pty Ltd in accordance with AS 1289.1.2.1

☒ Sample provided by the client

* = apparent average soil particle density - particle size less than 2.36 mm

X = apparent average soil particle density - particle size greater than 2.36 mm

= soil particle density of the total sample

The test results relate only to the items tested.

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA ACCREDITED LABORATORY NUMBER: 3372

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory ..... Date Tested: 04 to 08/01/2019

Name of Signatory John Walker Date Reported: 29/01/2019

ATC Williams Pty Ltd
19 Beach Avenue, Mordialloc Vic 3915
T +61 3 9590 9222 F +61 3 9590 9228
melb@atcwilliams.com.au www.atcwilliams.com.au ABN 64 005 931 288

Form RSN 003.7
Date of Issue: August 2018

Determination of the pH value
Soil chemical test

ATC Williams

TEST IN ACCORDANCE WITH AS 1289.4.3.1 ELECTROMETRIC METHOD

Client: Regis Resources Limited ..... **Laboratory Report No.: R02819**

Address: Level 2, 516 Hay Street ..... **Job No.:** 113272.02 .....

Subiaco WA 6008.....

Project: McPhillamy's Gold..... **Location:** NSW .....

Register Number	Sample Description	Soil - Suspension / Groundwater	pH
26418	Discovery Ridge Tailings Slurry	Tailings Slurry	7.4
26518	McPhillamy's Gold Tailings Slurry	Tailings Slurry	7.0

Notes:

☐ Sampled by ATC Williams Pty Ltd in accordance with AS 1289.1.2.1

☒ Sample provided by the client

The test specimen was prepared from the tailings slurry samples.

The test results relate only to the items tested.

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA ACCREDITED LABORATORY NUMBER: 3372

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory ..... Date Tested: 4/01/2019.....

Name of Signatory John Walker Date Reported: 29/01/2019 .....

ATC Williams Pty Ltd
19 Beach Avenue, Mordialloc Vic 3915
T +61 3 9590 9222 F +61 3 9590 9228
melb@atcwilliams.com.au www.atcwilliams.com.au ABN 64 005 931 288

Form RSN 017.2
Date of Issue: August 2018

Solids Concentration of Tailings

ATC Williams

TEST IN ACCORDANCE WITH AS 1289.2.1.1 (with modification)

Client: Regis Resources Limited ..... **Laboratory Report No.: R02619**

Address: Level 2, 516 Hay Street ..... **Job No.:** 113272.02 .....

Subiaco WA 6008.....

Project: McPhillamy's Gold..... **Location:** NSW .....

Sample Register Number	Sample Description	Condition	Solids Concentration (%)
26418	Discovery Ridge Tailings Sample	As Received	83.8
26518	McPhillamy's Gold Tailings Sample	As Received	88.5

Notes:

☐ Sampled by ATC Williams Pty Ltd in accordance with AS 1289.1.2.1.

☒ Sample provided by the client

The test results relate only to the items tested.

No salt correction of the solids concentration was required as conductivity readings were less than 2000 µS/cm

This document is issued in accordance with the laboratory quality system requirements of ATC Williams Pty Ltd.

Signatory ..... Date 29/01/2019 .....

Name of Signatory John Walker .....

ATC Williams Pty Ltd
19 Beach Avenue, Mordialloc Vic 3915
T +61 3 9590 9222 F +61 3 9590 9228
melb@atcwilliams.com.au www.atcwilliams.com.au ABN 64 005 931 288

Permeability - Constant Head Method

TEST IN ACCORDANCE WITH IN-HOUSE PROCEDURE 7.1.1
SAMPLE PREPARATION IN ACCORDANCE WITH
PROCEDURE 7.1.1 - CONSOLIDATED SLURRY

ATC Williams

Client: Regis Resources Limited ..... **NATA Report No.: R03319** .....

Address: Level 2, 516 Hay Street ..... **Job No.:** 113272.02 .....

Subiaco WA 6008.....

Project: McPhillamy's Gold..... **Location:** NSW .....

Sample Register No.	00319	00319	00319
Sample Description	Discovery Ridge - Laboratory Flocculated Tailings		

Sample as Prepared

Consolidation Stage Number	1	2	3
Degree of Saturation (%)	100	100	100
Consolidated Void Ratio	0.68	0.64	0.63

Test Conditions

Consolidation Pressure (kPa)	200	400	600
Sample Thickness (mm)	92.0	89.9	89.0
Test Loading (kN)	6.21	12.75	19.28
Water Used	Melbourne Tap	Melbourne Tap	Melbourne Tap
Conductivity of Water (µS/cm)	68	68	68
Hydraulic Gradient	9.02	9.22	9.33

Test Results

Permeability @ 20°C (m/s)	3.9×10^{-07}	3.4×10^{-07}	3.1×10^{-07}
Final Moisture Content (%)	NA	NA	22.6

Test Notes:

☐ Sampled by ATC Williams Pty Ltd in accordance with AS 1289.1.2.1

☒ Sample provided by the client

The test results relate only to the items tested.

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA ACCREDITED LABORATORY NUMBER: 3372

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory ..... Date Tested: 16 to 21/01/2019

Name of Signatory John Walker Date Reported: 29/01/2019

ATC Williams Pty Ltd
Laboratory
19 Beach Avenue, Mordialloc Vic 3915
T +61 3 9590 9222 F +61 3 9590 9228
melb@atcwilliams.com.au www.atcwilliams.com.au ABN 64 005 931 288

Form RSN 013.8
Date of Issue: August 2018

Permeability - Constant Head Method

TEST IN ACCORDANCE WITH IN-HOUSE PROCEDURE 7.1.1
SAMPLE PREPARATION IN ACCORDANCE WITH
PROCEDURE 7.1.1 - CONSOLIDATED SLURRY

ATC Williams

Client: Regis Resources Limited ..... **NATA Report No.: R03419** .....

Address: Level 2, 516 Hay Street ..... **Job No.:** 113272.02 .....

Subiaco WA 6008.....

Project: McPhillamy's Gold..... **Location:** NSW .....

Sample Register No.	00419	00419	00419
Sample Description	McPhillamy's Gold - Laboratory Flocculated Tailings		

Sample as Prepared

Consolidation Stage Number		1	2	3
Degree of Saturation	(%)	100	100	100
Consolidated Void Ratio		0.73	0.69	0.67

Test Conditions

Consolidation Pressure	(kPa)	200	400	600
Sample Thickness	(mm)	90.0	88.0	87.0
Test Loading	(kN)	5.21	12.76	19.29
Water Used		Melbourne Tap	Melbourne Tap	Melbourne Tap
Conductivity of Water	(µS/cm)	68	68	68
Hydraulic Gradient		7.13	7.30	7.38

Test Results

Permeability @ 20°C (m/s)	1.5×10^{-07}	1.2×10^{-07}	1.0×10^{-07}
Final Moisture Content (%)	NA	NA	22.7

Test Notes:

☐ Sampled by ATC Williams Pty Ltd in accordance with AS 1289.1.2.1

☒ Sample provided by the client

The test results relate only to the items tested.

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA ACCREDITED LABORATORY NUMBER: 3372

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory ..... Date Tested: 16 to 23/01/2019

Name of Signatory John Walker Date Reported: 29/01/2019

ATC Williams Pty Ltd
Laboratory
19 Beach Avenue, Mordialloc Vic 3915
T +61 3 9590 9222 F +61 3 9590 9228
melb@atcwilliams.com.au www.atcwilliams.com.au ABN 64 005 931 288

Form RSN 013.8
Date of Issue: August 2018

Particle Size Distribution Results

TEST IN ACCORDANCE WITH AS 1289

☑ Method 3.6.1 ☑ Method 3.6.3

☑ Oven Drying Method 2.1.1

ATC Williams

Client: Regis Resources Limited

Address: Level 2, 516 Hay Street
Subiaco WA 6008

Project: McPhillamys Gold

NATA Report No.: R03119

Job No.: 113272.02

Register No.: 26418

Location: NSW

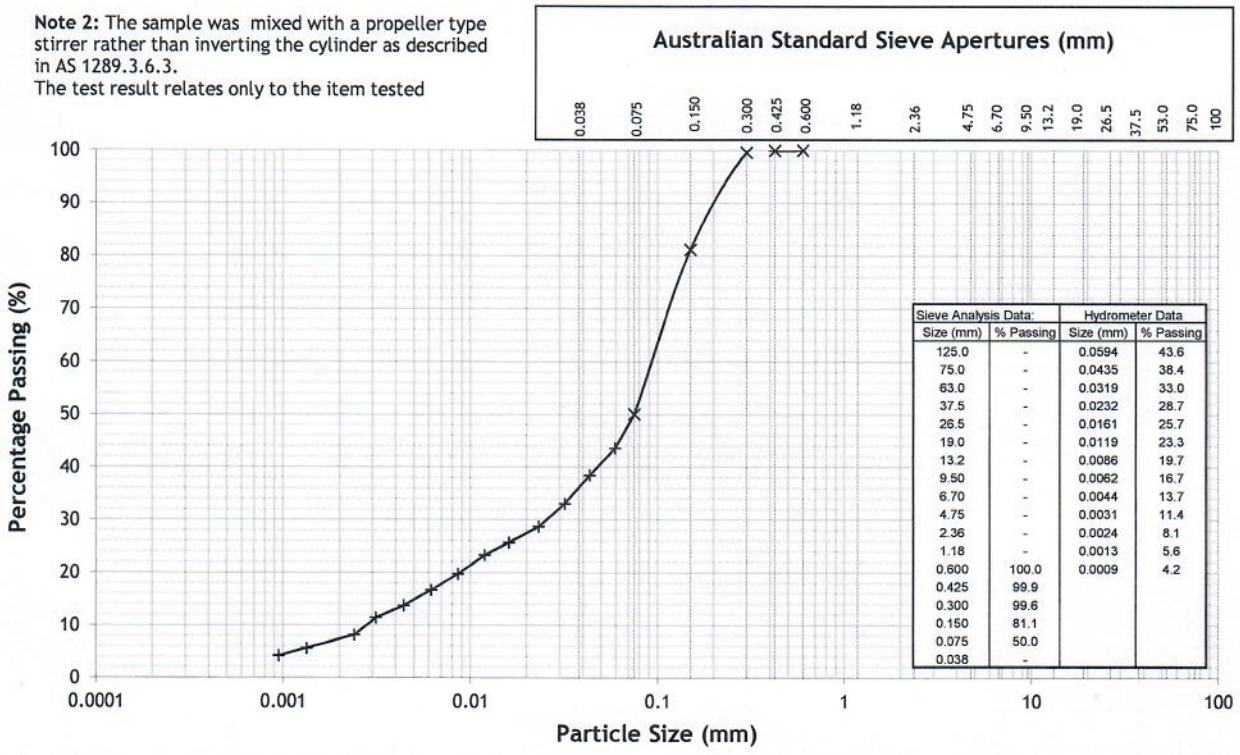
Sample Description: Discovery Ridge Tailings Slurry	Borehole No: ☐	Test Pit Depth: ☐

Dispersion Method used: Mechanical Stirrer for 1 minute **Hydrometer Type Used:** ASTM 152H

☐ Sampled by ATC Williams Pty Ltd in accordance with AS 1289.1.2.1 Clause 6.5.4 ☑ Sample provided by the Client

Note 1: The sample was oven-dried during sample preparation and not air-dried as stated in AS 1289.3.6.3

Note 2: The sample was mixed with a propeller type stirrer rather than inverting the cylinder as described in AS 1289.3.6.3.
The test result relates only to the item tested



Sieve Analysis Data:		Hydrometer Data	
Size (mm)	% Passing	Size (mm)	% Passing
125.0	-	0.0594	43.6
75.0	-	0.0435	38.4
63.0	-	0.0319	33.0
37.5	-	0.0232	28.7
26.5	-	0.0161	25.7
19.0	-	0.0119	23.3
13.2	-	0.0086	19.7
9.50	-	0.0062	16.7
6.70	-	0.0044	13.7
4.75	-	0.0031	11.4
2.36	-	0.0024	8.1
1.18	-	0.0013	5.6
0.600	100.0	0.0009	4.2
0.425	99.9		
0.300	99.6		
0.150	81.1		
0.075	50.0		
0.038	-		

CLAY	SILT			SAND			GRAVEL			COBBLES
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
0.002	0.006	0.02	0.06	0.2	0.6	2	6	20	60	

NATA ACCREDITED LABORATORY NUMBER: 3372

NATA ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: John Walker

Name of Signatory: John Walker

Date Tested: 04 to 11/01/2019

Date Reported: 29/01/2019

ATC Williams Pty Ltd
Laboratory
19 Beach Avenue, Mordialloc Vic 3915
T +61 3 9590 9222 F +61 3 9590 9228
melb@atcwilliams.com.au www.atcwilliams.com.au ABN 64 005 931 288

Particle Size Distribution Results

TEST IN ACCORDANCE WITH AS 1289

☑ Method 3.6.1 ☑ Method 3.6.3

☑ Oven Drying Method 2.1.1

ATC Williams

Client: Regis Resources Limited

Address: Level 2, 516 Hay Street
Subiaco WA 6008

Project: McPhillamys Gold

NATA Report No.: R03219

Job No.: 113272.02

Register No.: 26518

Location: NSW

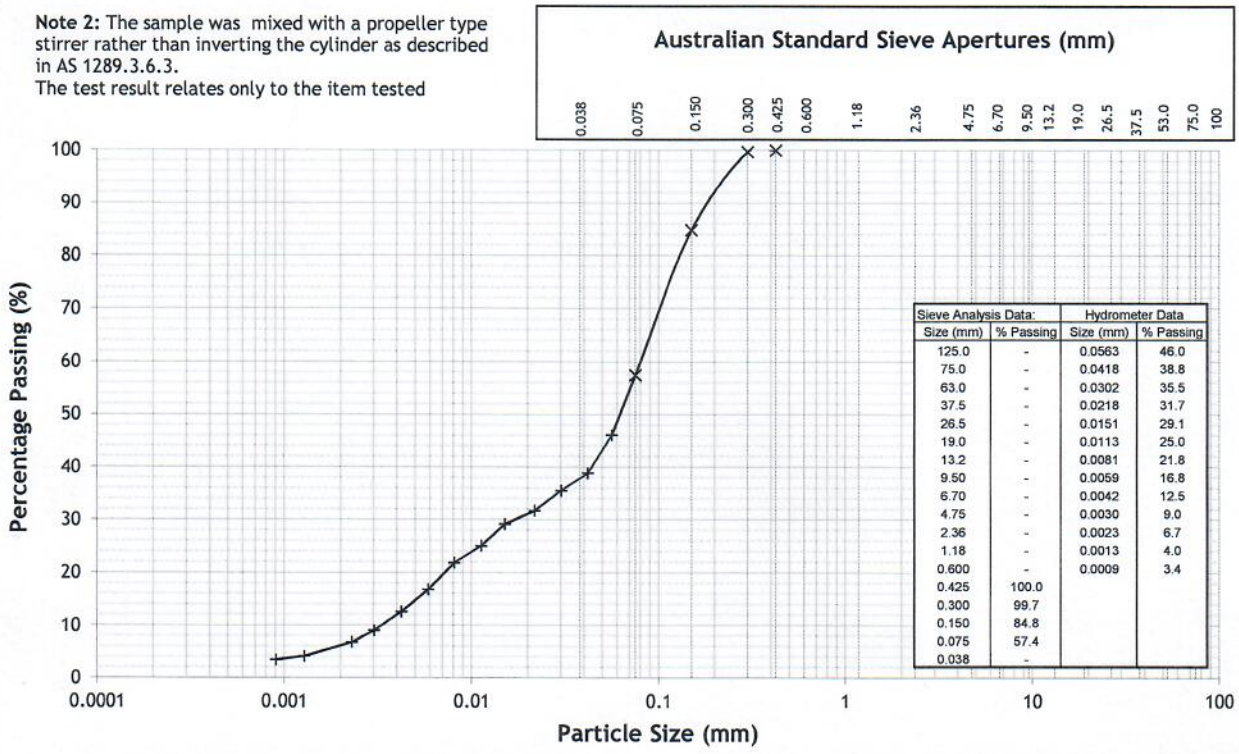
Sample Description: McPhillamy's Gold Tailings Slurry	Borehole No: ☐	Test Pit Depth: ☐

Dispersion Method used: Mechanical Stirrer for 1 minute **Hydrometer Type Used:** ASTM 152H

☐ Sampled by ATC Williams Pty Ltd in accordance with AS 1289.1.2.1 Clause 6.5.4 ☑ Sample provided by the Client

Note 1: The sample was oven-dried during sample preparation and not air-dried as stated in AS 1289.3.6.3

Note 2: The sample was mixed with a propeller type stirrer rather than inverting the cylinder as described in AS 1289.3.6.3.
The test result relates only to the item tested



Sieve Analysis Data:		Hydrometer Data	
Size (mm)	% Passing	Size (mm)	% Passing
125.0	-	0.0563	46.0
75.0	-	0.0418	38.8
63.0	-	0.0302	35.5
37.5	-	0.0218	31.7
26.5	-	0.0151	29.1
19.0	-	0.0113	25.0
13.2	-	0.0081	21.8
9.50	-	0.0059	16.8
6.70	-	0.0042	12.5
4.75	-	0.0030	9.0
2.36	-	0.0023	6.7
1.18	-	0.0013	4.0
0.600	-	0.0009	3.4
0.425	100.0		
0.300	99.7		
0.150	84.8		
0.075	57.4		
0.038	-		

CLAY	SILT			SAND			GRAVEL			COBBLES
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
0.002	0.006	0.02	0.06	0.2	0.6	2	6	20	60	

NATA ACCREDITED LABORATORY NUMBER: 3372

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: John Walker Date Tested: 04 to 11/01/2019

Name of Signatory: John Walker Date Reported: 29/01/2019

ATC Williams Pty Ltd
Laboratory
19 Beach Avenue, Mordialloc Vic 3915
T +61 3 9590 9222 F +61 3 9590 9228
melb@atcwilliams.com.au www.atcwilliams.com.au ABN 64 005 931 288

Classification (Atterberg Limits)

ATC Williams

TEST IN ACCORDANCE WITH AS 1289 - CONE PENETROMETER

Client: Regis Resources Limited ..... **NATA Report No.: R03019** .....

Address: Level 2, 516 Hay Street ..... **Job No.:** 113272.02 .....

Subiaco WA 6008.....

Project: McPhillamy's Gold..... **Location:** NSW .....

Register Number	Sample Description	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Classification Group Symbol
26418	Discovery Ridge Tailings Slurry	23	18	5	NA	CL-ML
26518	McPhillamy's Gold Tailings Slurry	26	17	9	NA	CL

☐ Sampled by ATC Williams Pty Ltd in accordance with AS 1289.1.2.1

☒ Sample provided by the client

The test results relate only to the items tested.

Test Methods:

☐	Liquid Limit	AS 1289.3.9.1 (Standard - Penetrometer Method)
☒	Liquid Limit	AS 1289.3.9.2 (One Point - Penetrometer Method)
☒	Plastic Limit	AS 1289.3.2.1
☒	Plasticity Index	AS 1289.3.3.2 (Cone Plasticity Index)
☐	Linear Shrinkage	AS 1289.3.4.1
☒	Moisture Content	AS 1289.2.1.1

Sample Preparation:

☐	Natural Moisture	☒	Air Dried	☐	Oven Dried	☐	Unknown
☐	Wet Sieved	☒	Dry Sieved	☐	Unsieved		

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA ACCREDITED LABORATORY NUMBER: 3372

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory ..... Date Tested: 04 to 10/01/2019

Name of Signatory: John Walker Date Reported: 29/01/2019

ATC Williams Pty Ltd
19 Beach Avenue, Mordialloc Vic 3915
T +61 3 9590 9222 F +61 3 9590 9228
melb@atcwilliams.com.au www.atcwilliams.com.au ABN 64 005 931 288

Form RSN 002.9 (Atterbergs-Soils)
Date of Issue: August 2018

Determination of Conductivity
Soil chemical test

ATC Williams

TEST IN ACCORDANCE WITH IN-HOUSE TEST METHOD IHM 11.0

Client: Regis Resources Limited ..... **NATA Report No.: R02719** .....

Address: Level 2, 516 Hay Street ..... **Job No.:** 113272.02 .....

Subiaco WA 6008.....

Project: McPhillamy's Gold..... **Location:** NSW .....

Register Number	Sample Description	Soil - Suspension / Groundwater	Electrical Conductivity (µS/cm)
26418	Discovery Ridge Tailings Sample	Tailings Slurry	675
26518	McPhillamy's Gold Tailings Sample	Tailings Slurry	1545

Notes:

☐ Sampled by ATC Williams Pty Ltd in accordance with AS 1289.1.2.1

☒ Sample provided by the client

The test specimen was prepared from the tailings slurry samples.

The test results relate only to the items tested.

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA ACCREDITED LABORATORY NUMBER: 3372

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory ..... Date Tested: 04/01/2019

Name of Signatory John Walker Date Reported: 29/01/2019

ATC Williams Pty Ltd
19 Beach Avenue, Mordialloc Vic 3915
T +61 3 9590 9222 F +61 3 9590 9228
melb@atcwilliams.com.au www.atcwilliams.com.au ABN 64 005 931 288

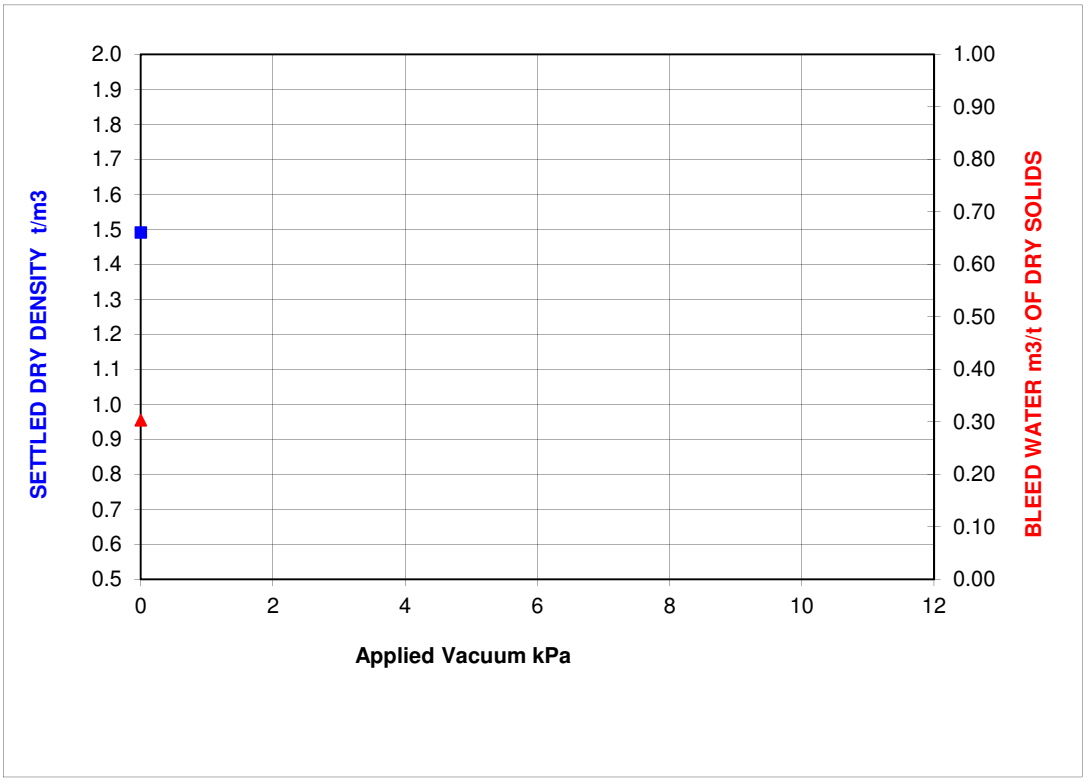
Form RSN 018.2
Date of Issue: Augustl 2018

113272.02
McPhillamy's Gold

SUMMARY OF RESULTS
Vacuum Drained Settlement Tests

Sample No. 00319 **Flocculated with Magnafloc 10 Dose Rate 40/g/t**

Flocculant SNF	APPLIED VACUUM kPa	SOLIDS CONTENT % INITIAL	SOLIDS CONTENT % FINAL	SAMPLE DEPTH mm INITIAL H_0	SAMPLE DEPTH mm FINAL H_F	SAMPLE DEPTH mm DH	$(H_F/H_0)x100$	SETTLED DRY DENSITY t/m^3	BLEED WATER % OF INITIAL WATER*	BLEED WATER m^3/t OF DRY SOLIDS
Magnaflocc 10	0	62.00	76.38	96.3	65.3	31.0	67.8	1.492	49.51	0.30



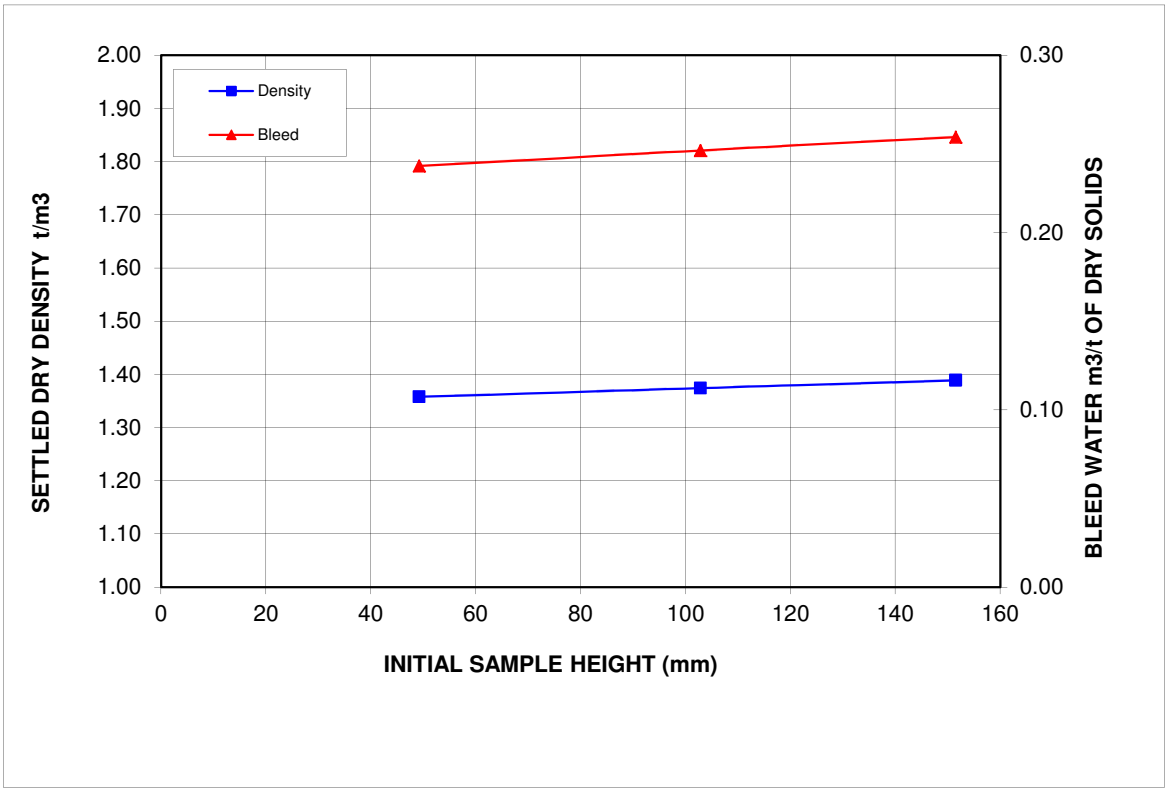
113272.02

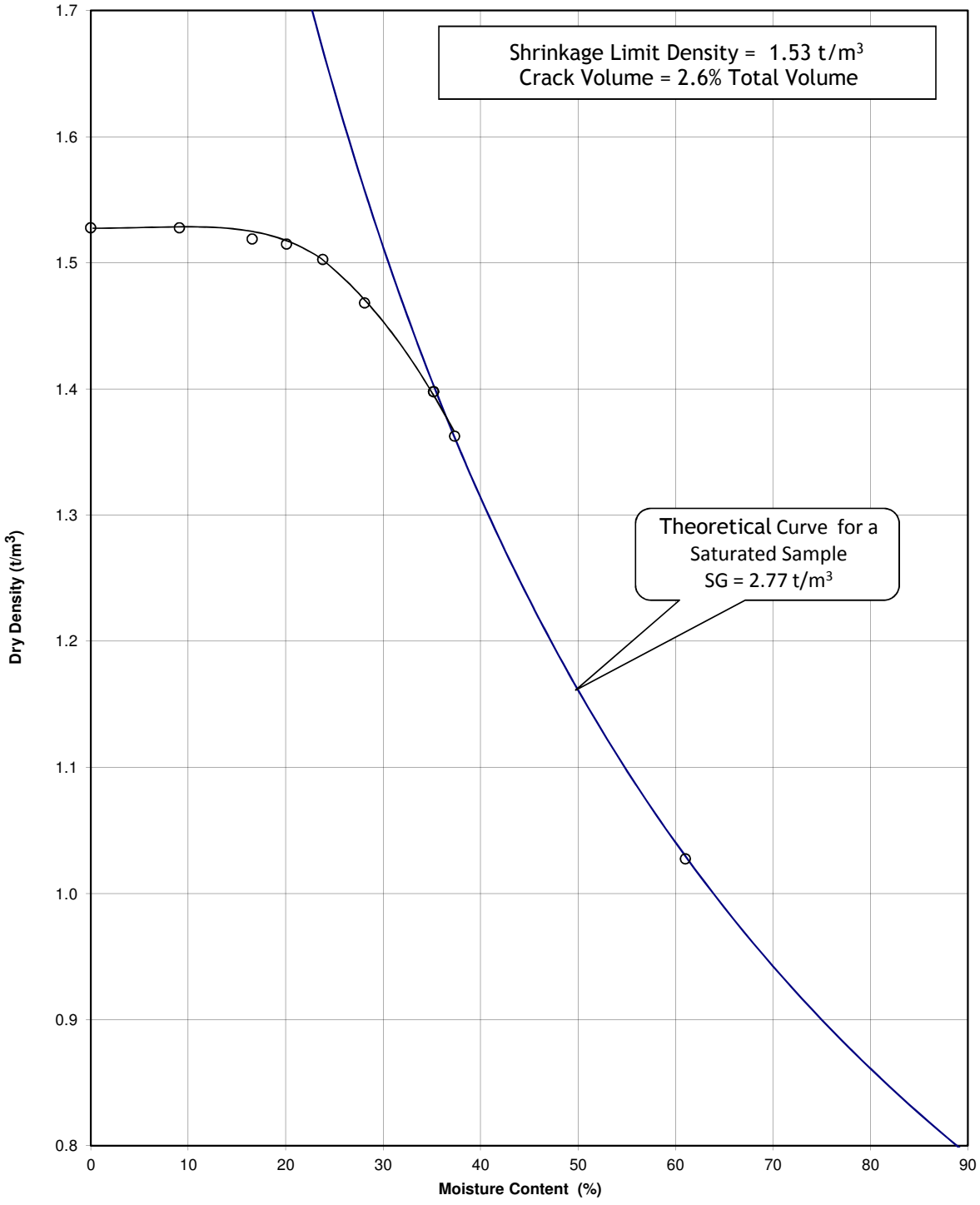
McPhillamy's
Regis Resources Ltd
Flocculated Tailings

SUMMARY OF RESULTS
Tray Settlement Tests

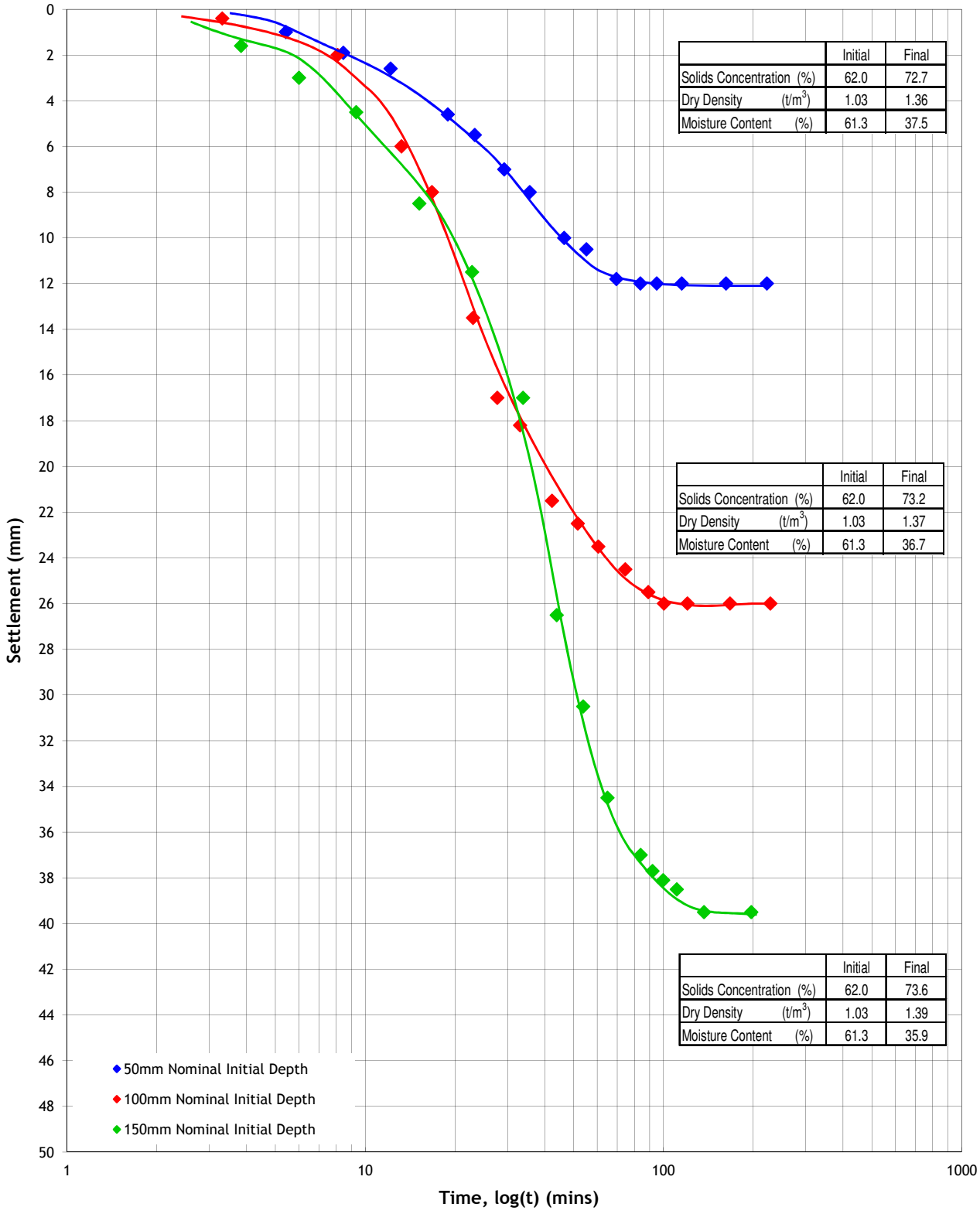
Sample No: **00319**

SOLIDS CONTENT %		SAMPLE DEPTH mm			$(H_F/H_0)x100$	SETTLED	BLEED WATER	
INITIAL	FINAL	INITIAL H_0	FINAL H_F @t_{100}	DH		DRY DENSITY t/m^3	% OF INITIAL WATER	m^3/t OF DRY SOLIDS
62.00	72.71	49.2	37.2	12.0	75.61	1.358	38.76	0.238
62.00	73.18	102.8	76.8	26.0	74.71	1.374	40.19	0.246
62.00	73.59	151.5	112.0	39.5	73.93	1.389	41.43	0.254





Regis Resources Ltd **McPhillamy's Gold** **Discovery Ridge - Laboratory Flocculated Tailings**	**Shrinkage Limit Density** **Sample No:00319**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019 **FIGURE 1**



	Initial	Final
Solids Concentration (%)	62.0	72.7
Dry Density (t/m^3)	1.03	1.36
Moisture Content (%)	61.3	37.5

	Initial	Final
Solids Concentration (%)	62.0	73.2
Dry Density (t/m^3)	1.03	1.37
Moisture Content (%)	61.3	36.7

	Initial	Final
Solids Concentration (%)	62.0	73.6
Dry Density (t/m^3)	1.03	1.39
Moisture Content (%)	61.3	35.9

Regis Resources Ltd

McPhillamy's Gold

Discovery Ridge - Laboratory Flocculated Tailings

Undrained Settled Density

Settlement vs Time

Flocc'd Tails (Sample No. 00319)

ATC Williams

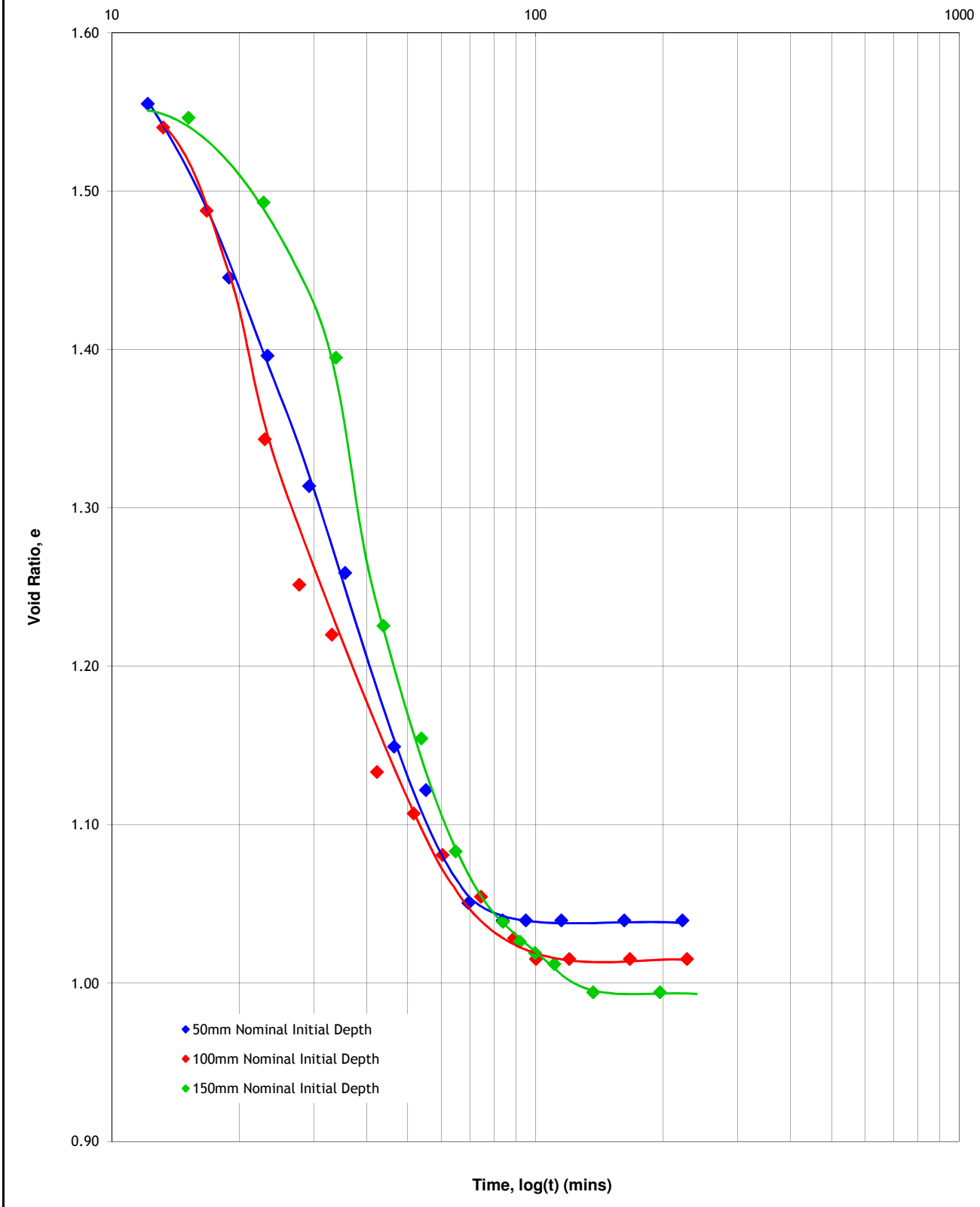
www.atcwilliams.com.au

Job No: 113272.02

Date: 30/01/2019

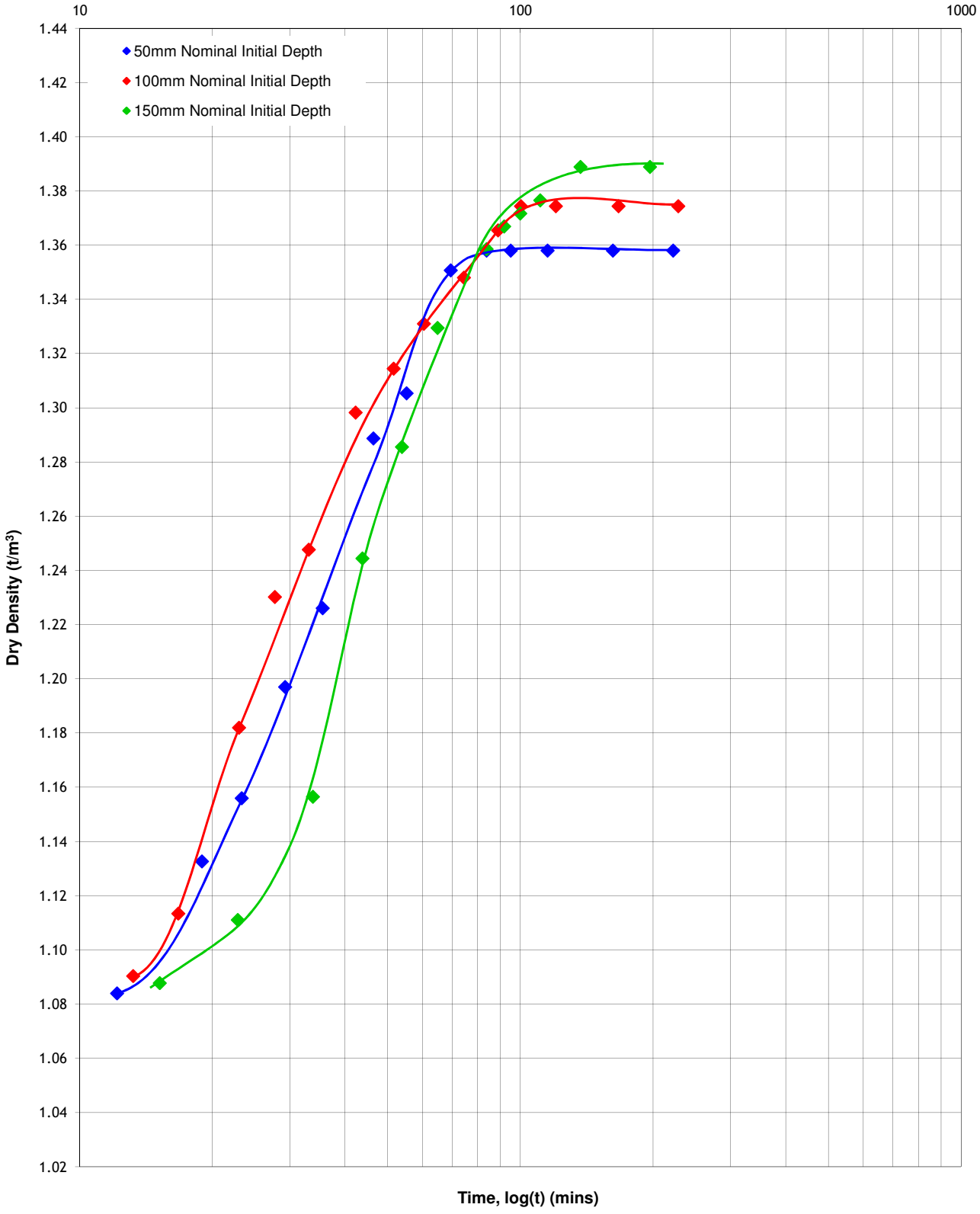
FIGURE 2

..:\2013\113272.02 - McPhillamys Gold\00319 ISD with density and solids concentration ATC Report (Settlement)



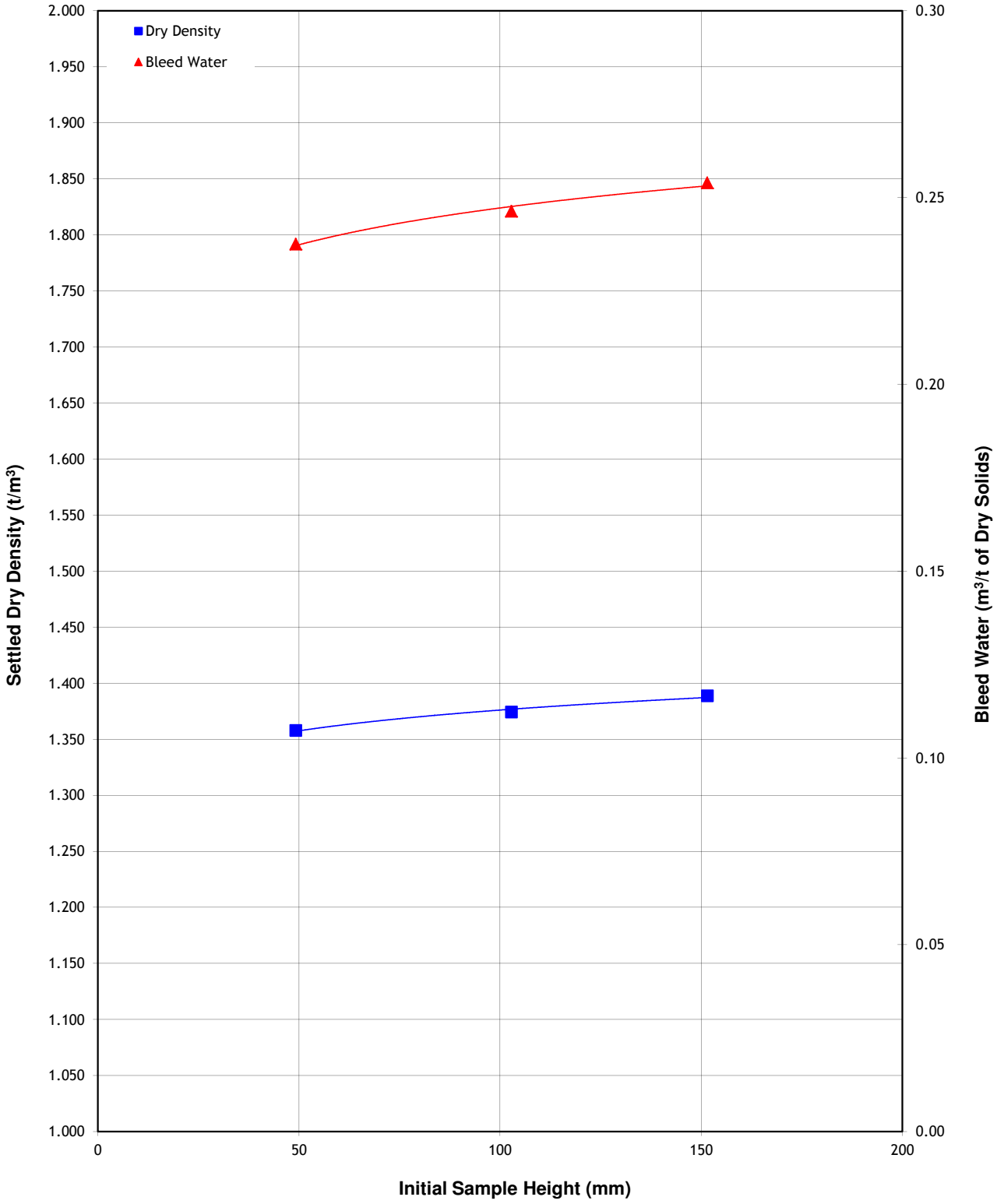
Regis Resources Ltd **McPhillamy's Gold** **Discovery Ridge - Laboratory Flocculated Tailings**	**Undrained Settled Density** **Void Ratio vs Time** **Flocc'd Tails (Sample No. 00319)**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019
	FIGURE 3

..\2013\113272.02 - McPhillamys Gold\00319 ISD with density and solids concentration ATC Report (Voids Ratio)



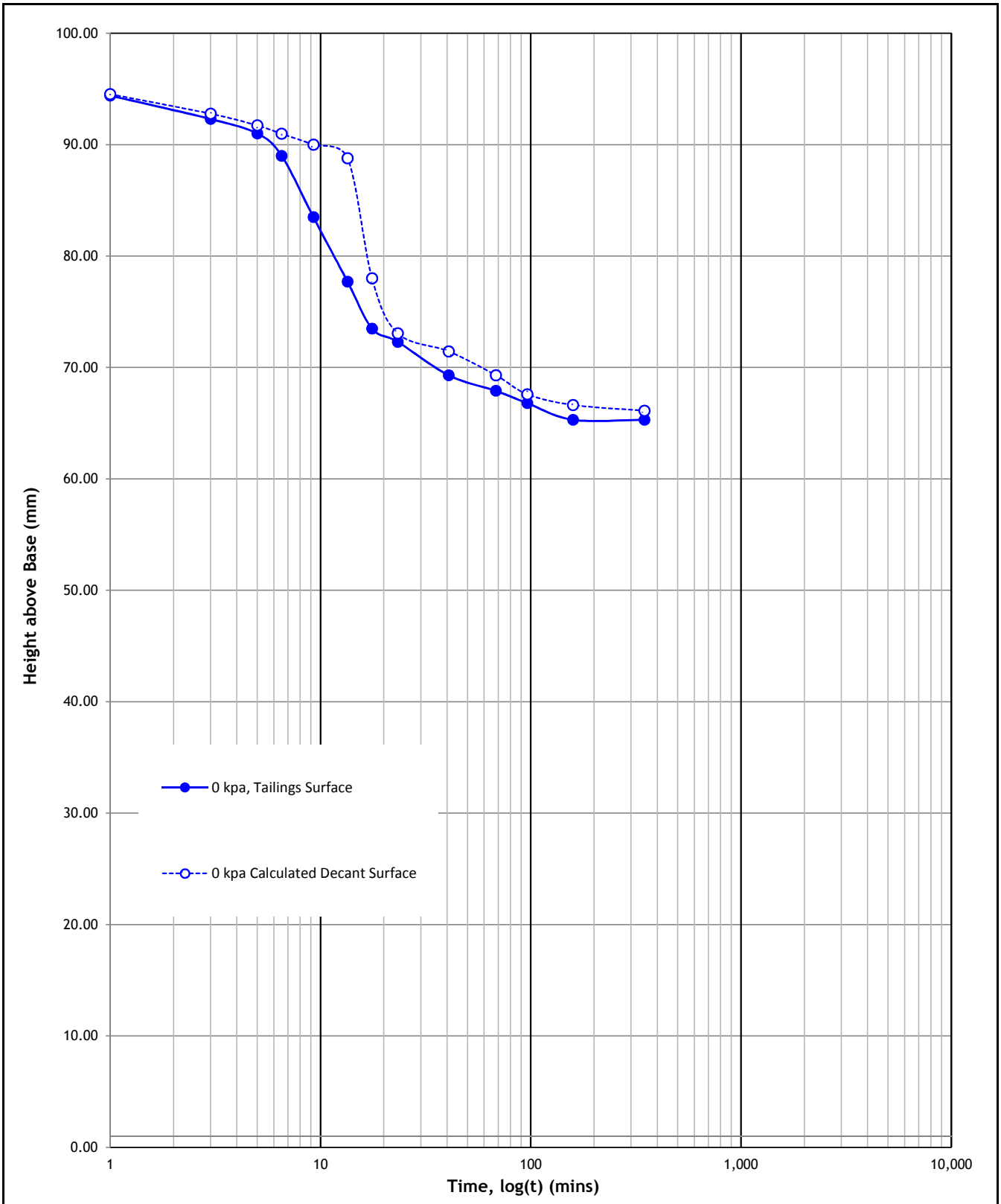
Regis Resources Ltd **McPhillamy's Gold** **Discovery Ridge - Laboratory Flocculated Tailings**	**Undrained Settled Density** **Dry Density vs Time** **Flocc'd Tails (Sample No. 00319)**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019
	FIGURE 4

..\2013\113272.02 - McPhillamys Gold\00319 ISD with density and solids concentration ATC Report (Dry Density)



Regis Resources Ltd **McPhillamy's Gold** **Discovery Ridge - Laboratory Flocculated Tailings**	**Undrained Settled Density** **Dry Density, Bleed vs Height** **Flocc'd Tails (Sample No. 00319)**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019 **FIGURE 5**

..\2013\113272.02 - McPhillamys Gold\00319 ISD with density and solids concentration ATC Report (Bleed)



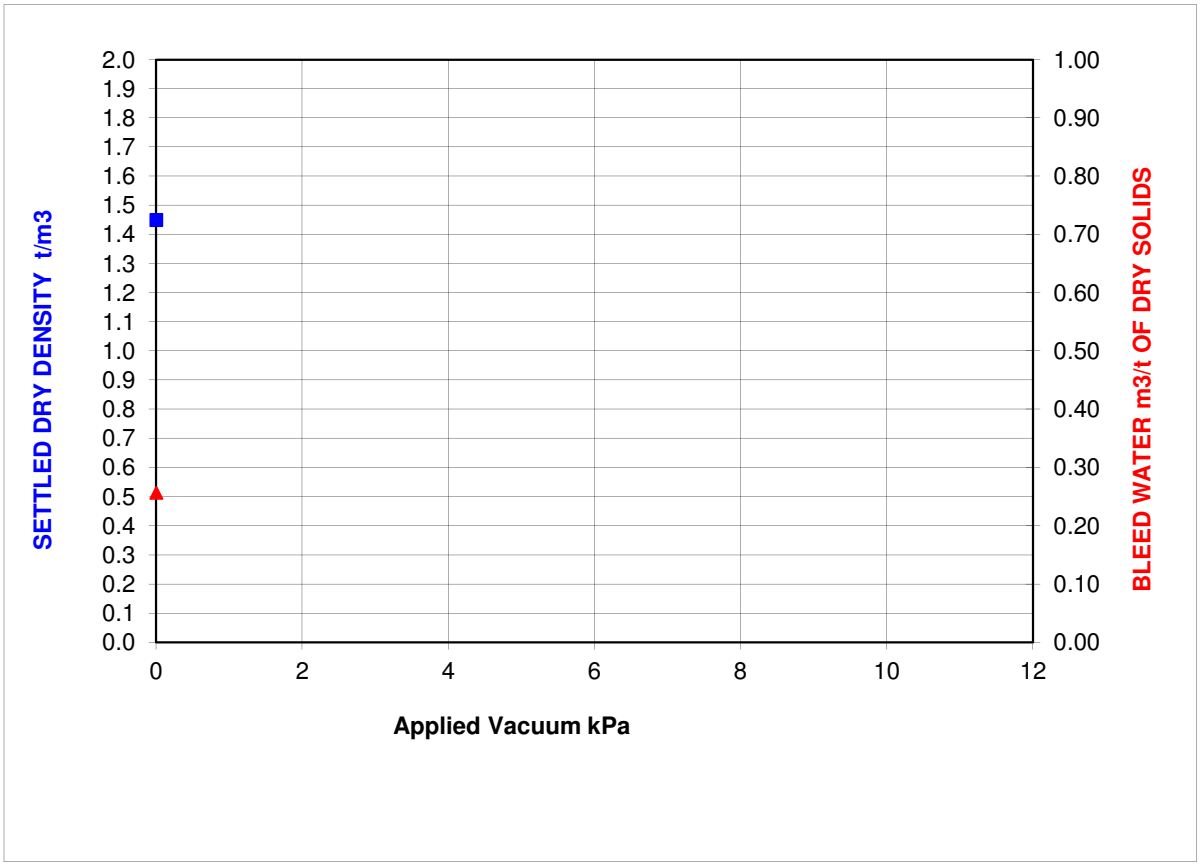
Regis Resources Ltd **McPhillamy's Gold** **Discovery Ridge - Laboratory Flocculated Tailings**	**Drained Settled Density** **Height vs Time** **Flocc'd Tails (Sample No.00319)**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019
	FIGURE 6

113272.02
McPhillamy's

SUMMARY OF RESULTS
Vacuum Drained Settlement Tests

Sample No. **00419** **Flocculated with Magnafloc 10 Dose rate 40g/t**

Flocculant SNF	APPLIED VACUUM kPa	SOLIDS CONTENT %		SAMPLE DEPTH mm			$(H_F/H_0)x100$	SETTLED DRY DENSITY t/m^3	BLEED WATER	
		INITIAL	FINAL	INITIAL H_0	FINAL H_F	DH			% OF INITIAL WATER*	m^3/t OF DRY SOLIDS
Magnaflocc	0	62.00	73.95	71.4	65.0	6.4	91.0	1.450	42.16	0.26



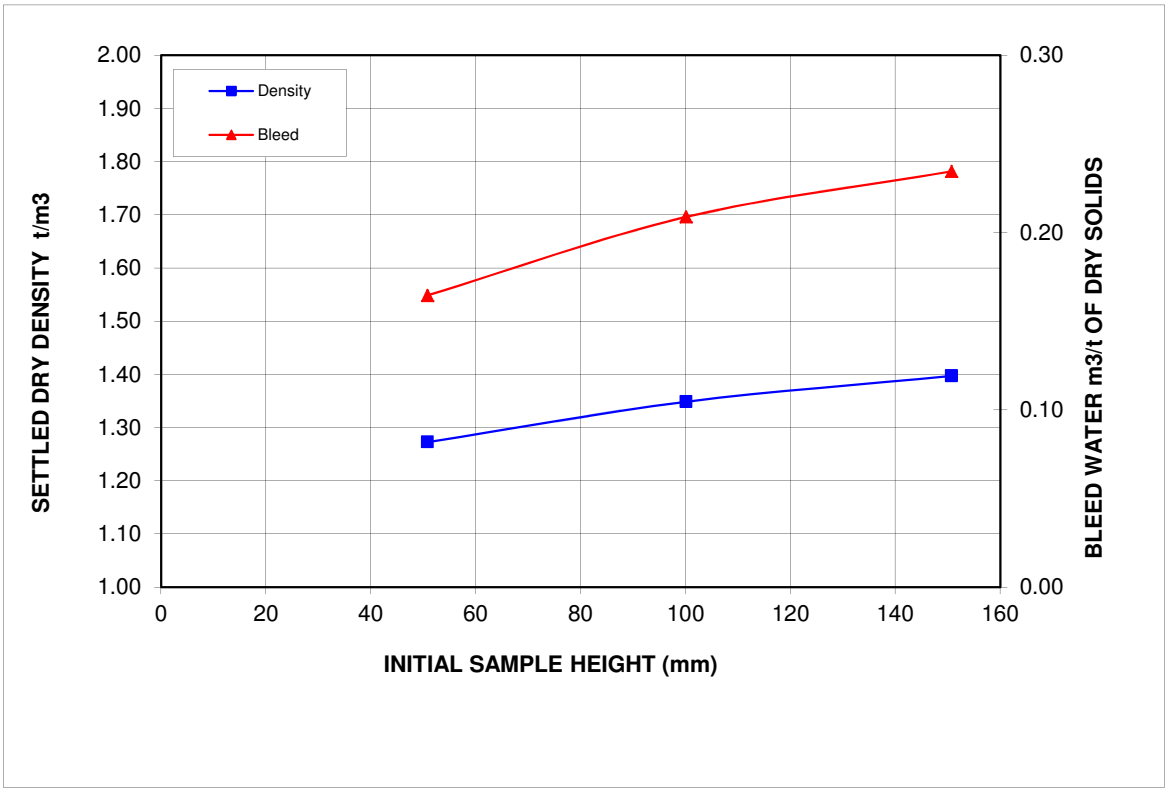
113272.02

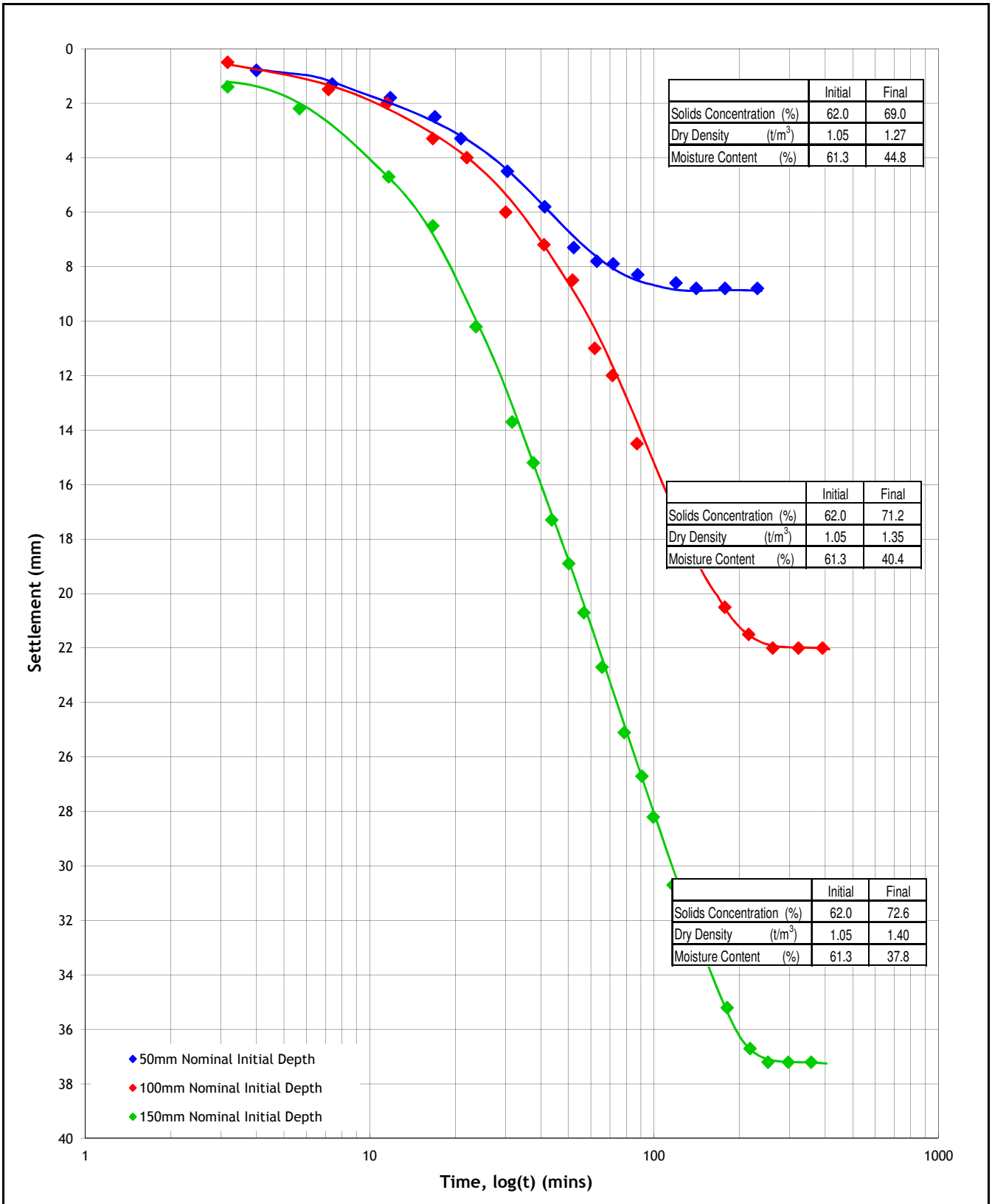
McPhillamy's Gold
Regis Resources Ltd
Flocculated Tailings

SUMMARY OF RESULTS
Tray Settlement Tests

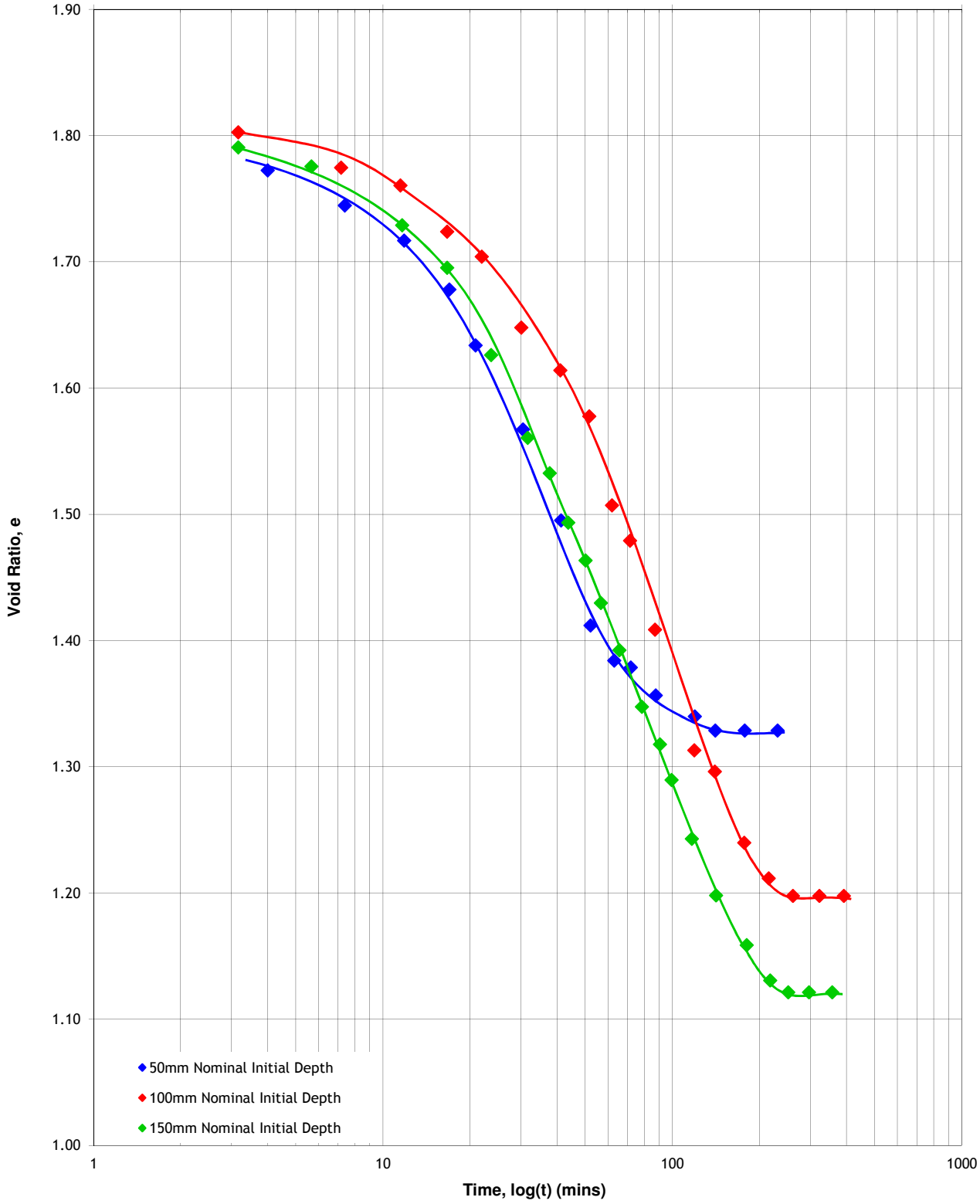
Sample No: **00419**

SOLIDS CONTENT %		SAMPLE DEPTH mm			$(H_F/H_0)x100$	SETTLED	BLEED WATER	
INITIAL	FINAL	INITIAL H_0	FINAL H_F @t_{100}	DH		DRY DENSITY t/m^3	% OF INITIAL WATER	m^3/t OF DRY SOLIDS
62.00	69.05	50.8	42.0	8.8	82.68	1.273	26.86	0.165
62.00	71.22	100.1	78.1	22.0	78.02	1.349	34.08	0.209
62.00	72.55	150.7	113.5	37.2	75.32	1.397	38.27	0.235



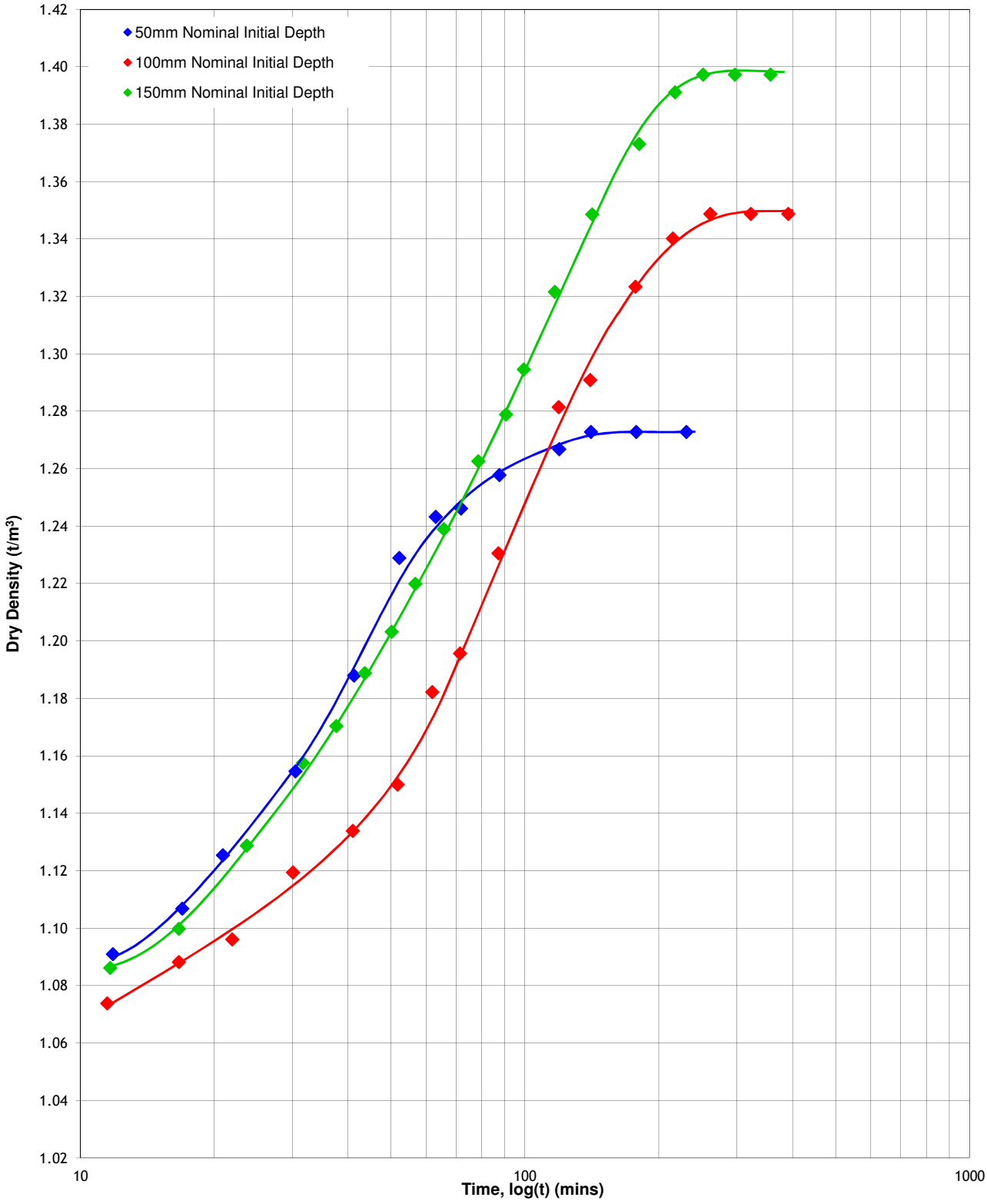


Regis Resources Ltd **McPhillamy's Gold** **McPhillamy's Gold - Laboratory Flocculated Tailings**	**Undrained Settled Density** **Settlement vs Time** **Flocc'd Tails (Sample No. 00419)**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019 **FIGURE 2**



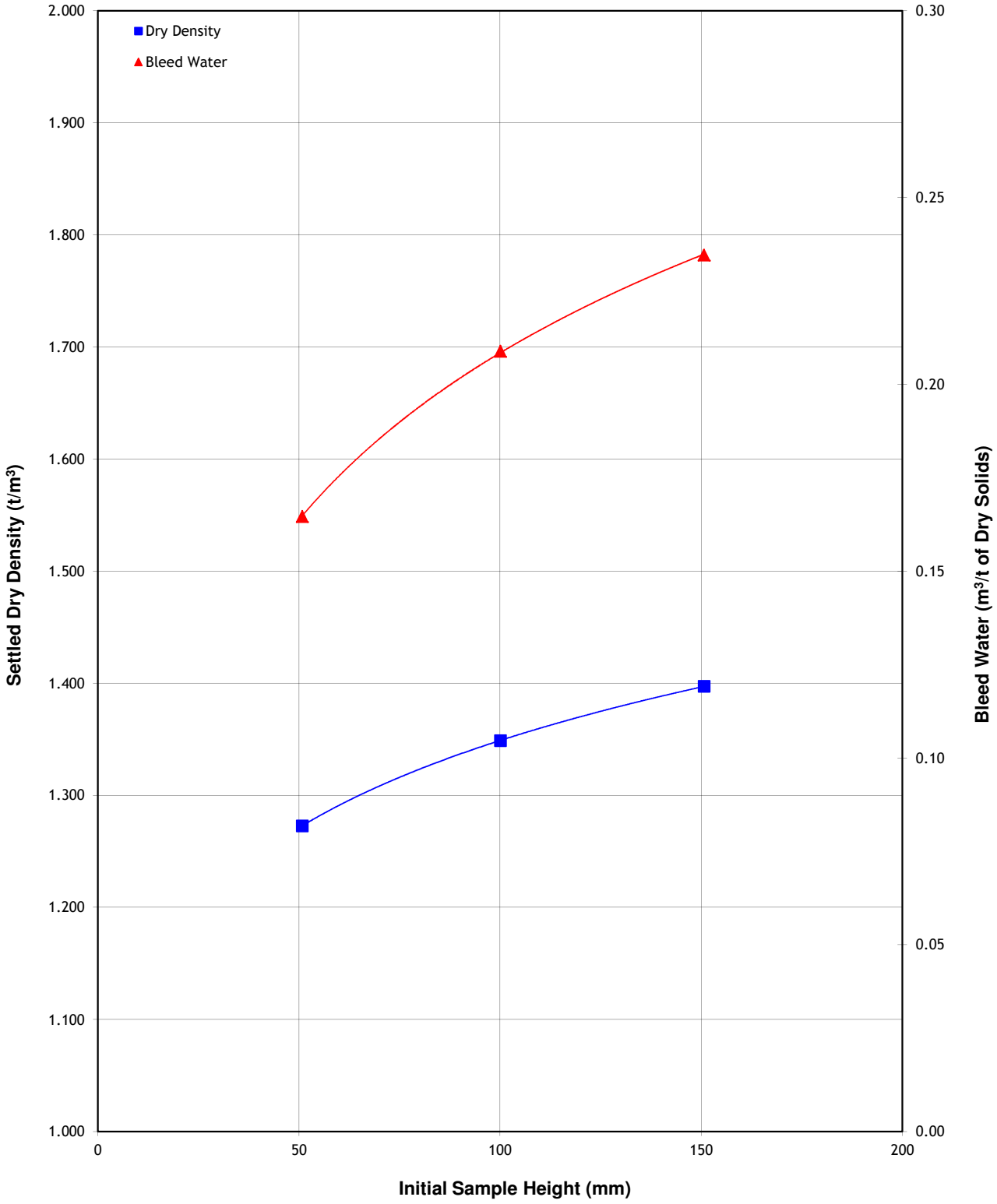
Regis Resources Ltd **McPhillamy's Gold** **McPhillamy's Gold - Laboratory Flocculated Tailings**	**Undrained Settled Density** **Void Ratio vs Time** **Flocc'd Tails (Sample No. 00419)**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019
	FIGURE 3

..\2013\113272.02 - McPhillamys Gold\00419 ISD Undrained with density ATC Report (Voids Ratio)



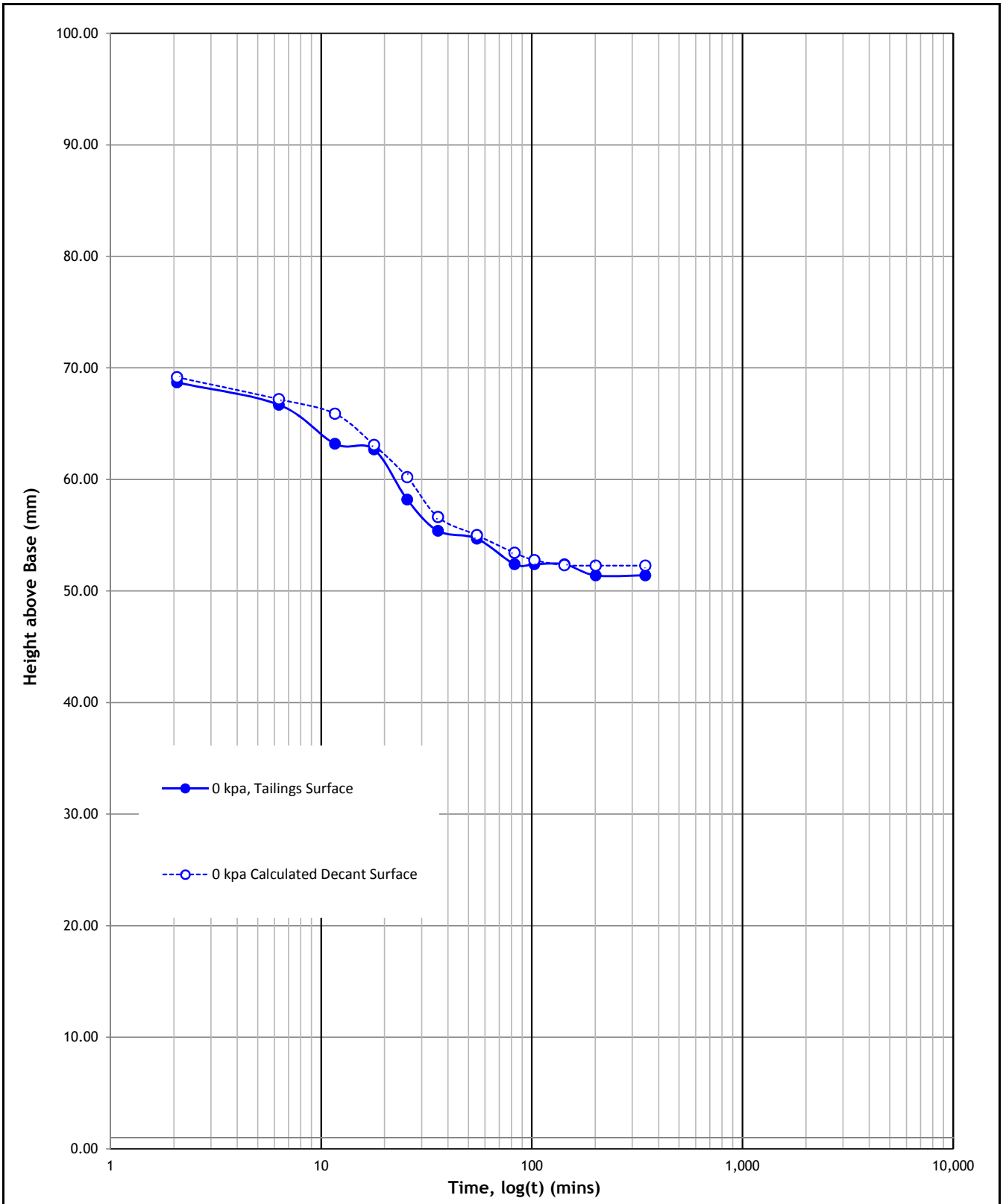
Regis Resources Ltd **McPhillamy's Gold** **McPhillamy's Gold - Laboratory Flocculated Tailings**	**Undrained Settled Density** **Dry Density vs Time** **Flocc'd Tails (Sample No. 00419)**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019 **FIGURE 4**

..\2013\113272.02 - McPhillamys Gold\00419 ISD Undrained with density ATC Report (Dry Density)



Regis Resources Ltd **McPhillamy's Gold** **McPhillamy's Gold - Laboratory Flocculated Tailings**	**Undrained Settled Density** **Dry Density, Bleed vs Height** **Flocc'd Tails (Sample No. 00419)**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019 **FIGURE 5**

..\2013\113272.02 - McPhillamys Gold\00419 ISD Undrained with density ATC Report (Bleed)

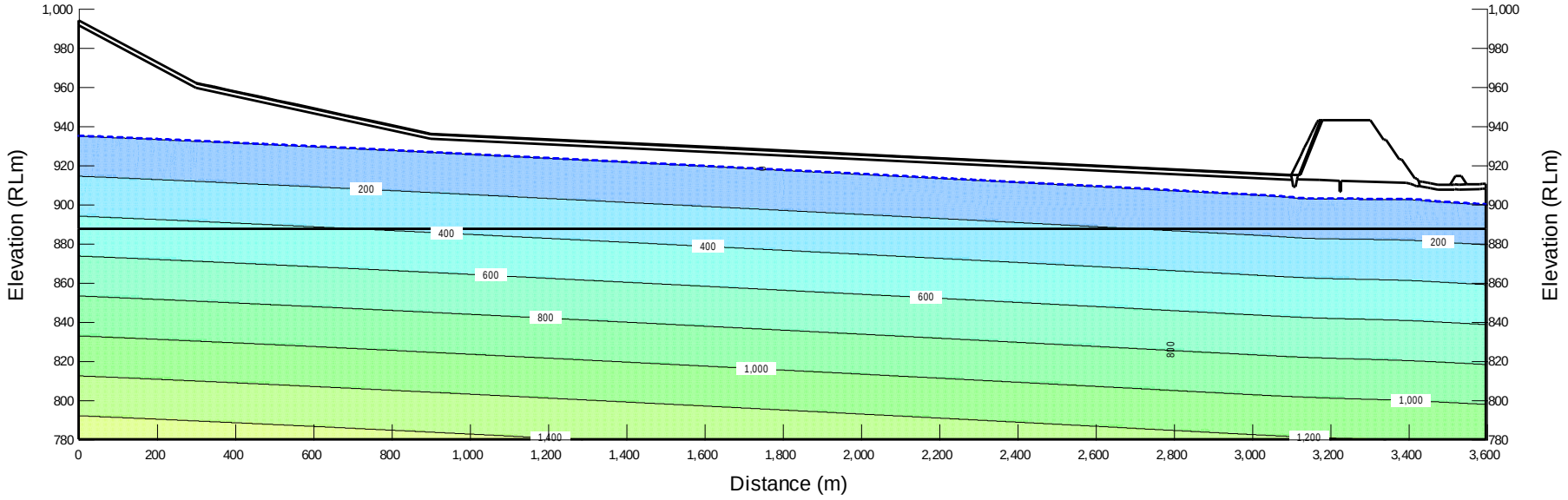


Regis Resources Ltd **McPhillamy's Gold** **McPhillamy's Gold - Laboratory Flocculated Tailings**	**Drained Settled Density** **Height vs Time** **Flocc'd Tails (Sample No. 00419)**
ATC Williams www.atcwilliams.com.au	**Job No:** 113272.02 **Date:** 30/01/2019
	FIGURE 6

APPENDIX C

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

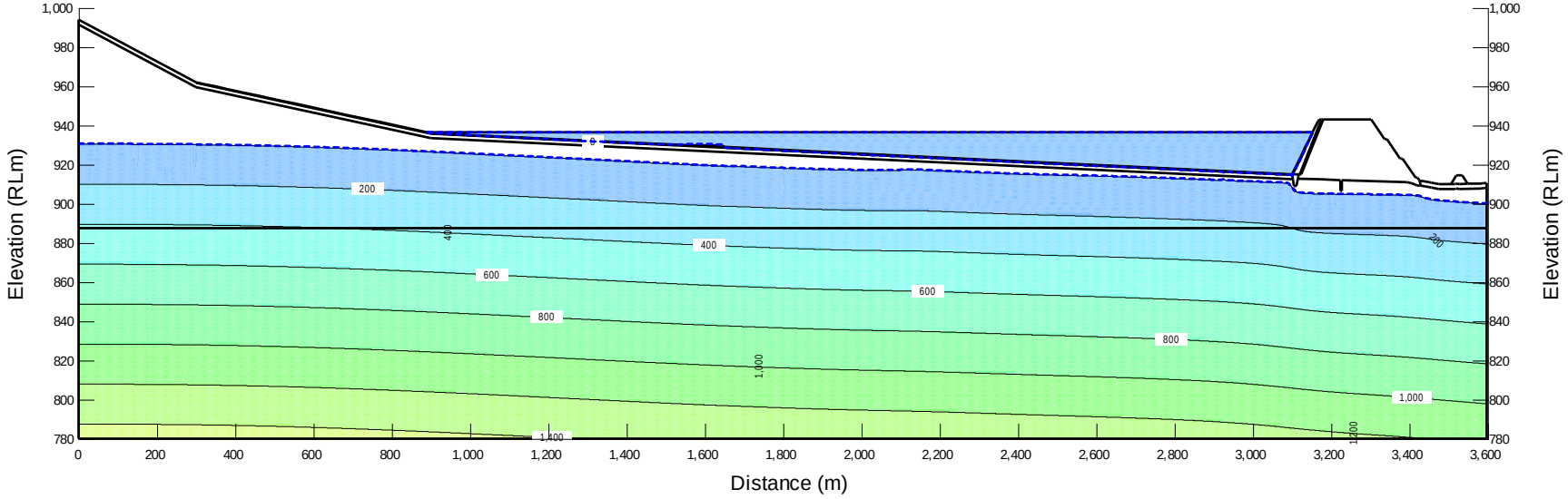
TSF – Seepage Analysis

In-Situ

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-1**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

TSF- Seepage Analysis

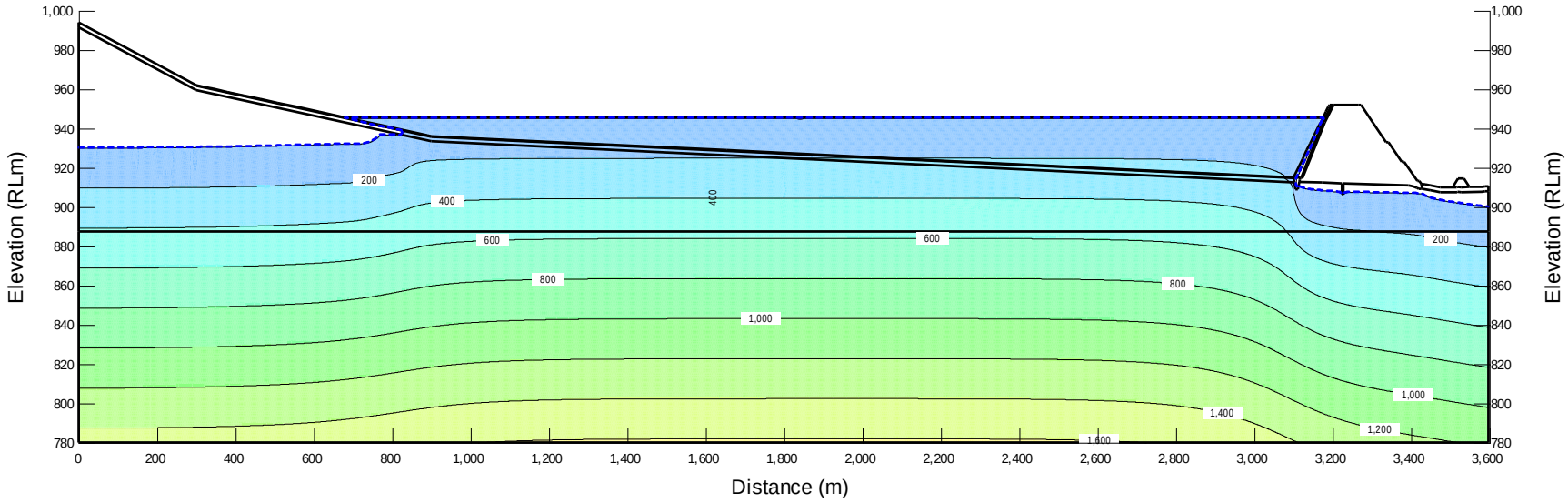
Year 1 - Production

Date: 02 Apr 2019 **Job No. 113272.02**

APPENDIX C-2

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

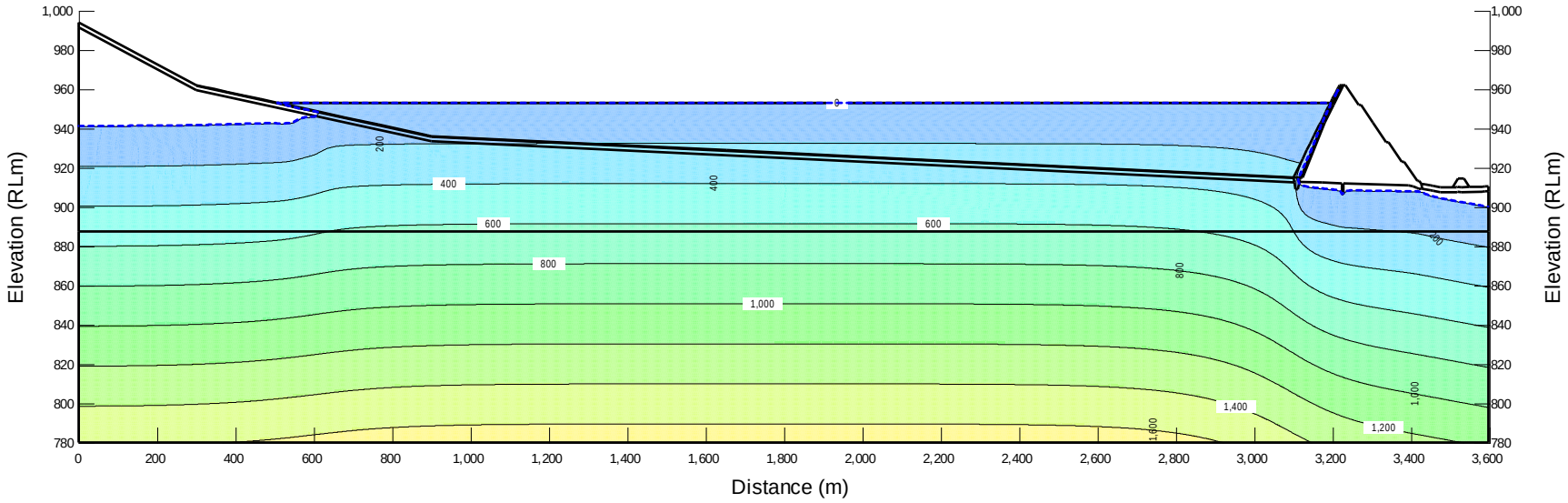
TSF- Seepage Analysis

Year 3 - Production

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-3**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

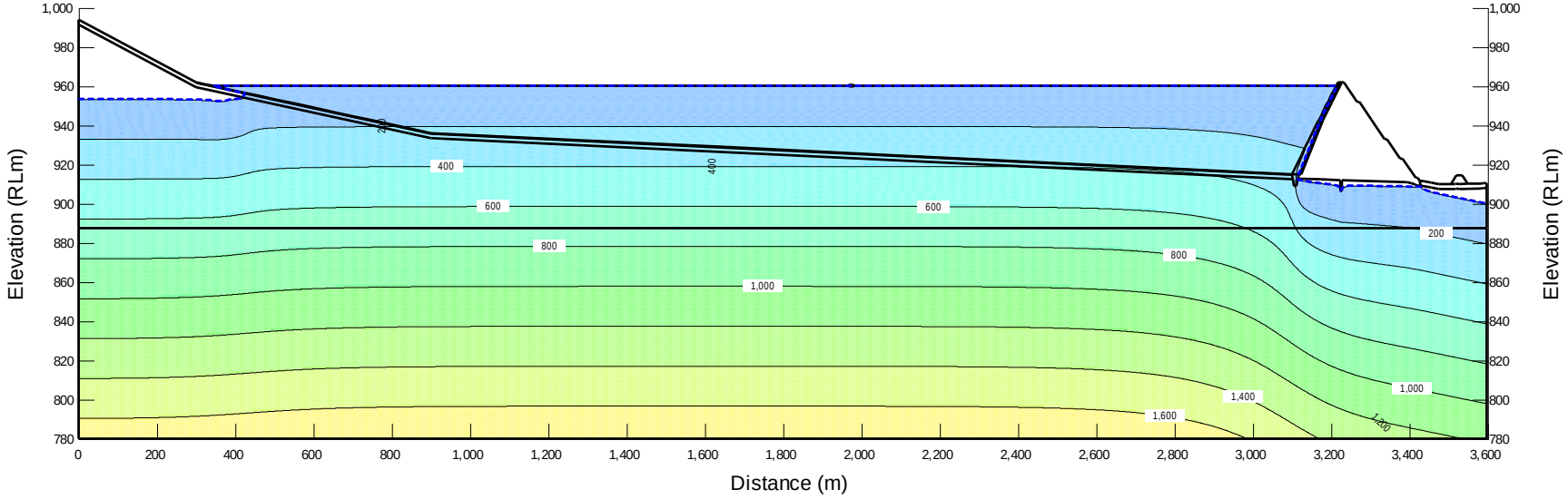
TSF- Seepage Analysis

Year 6 - Production

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-4**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams

ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

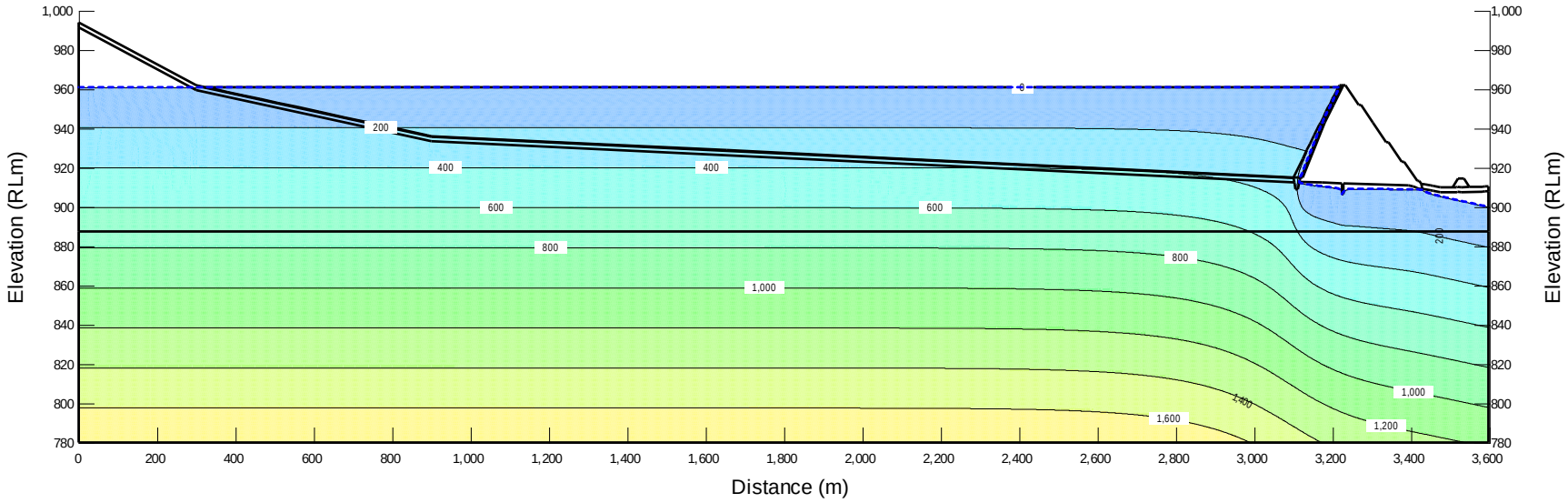
TSF- Seepage Analysis

Year 10 - Production

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-5**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

TSF- Seepage Analysis

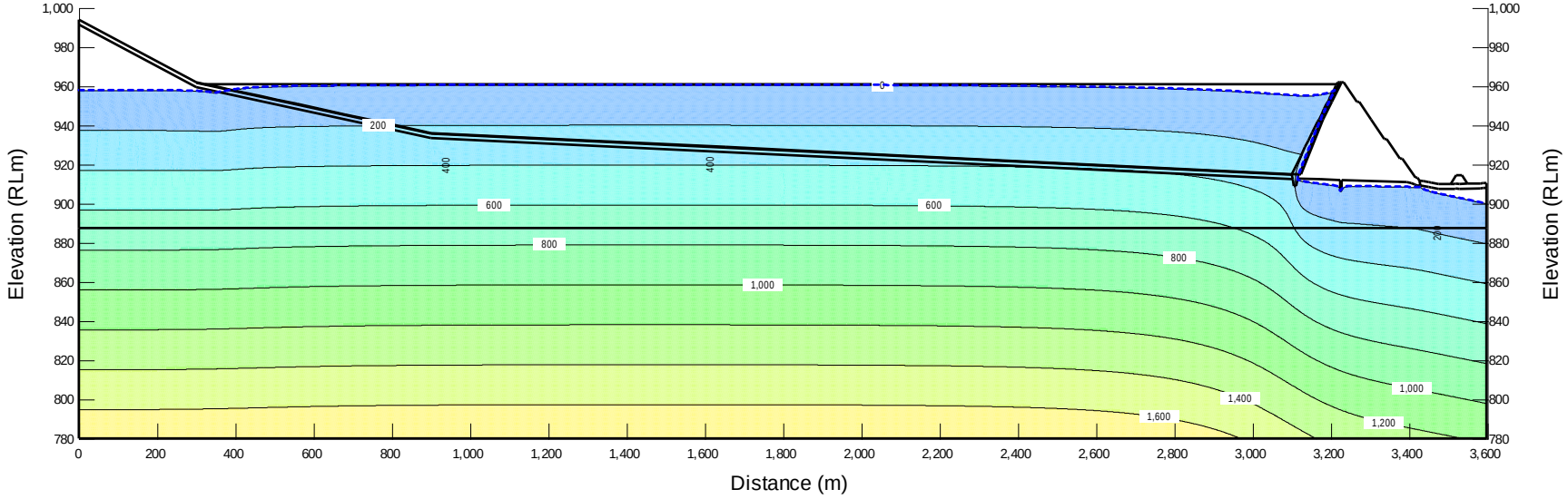
Steady State

Date: 02 Apr 2019 **Job No. 113272.02**

APPENDIX C-6

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

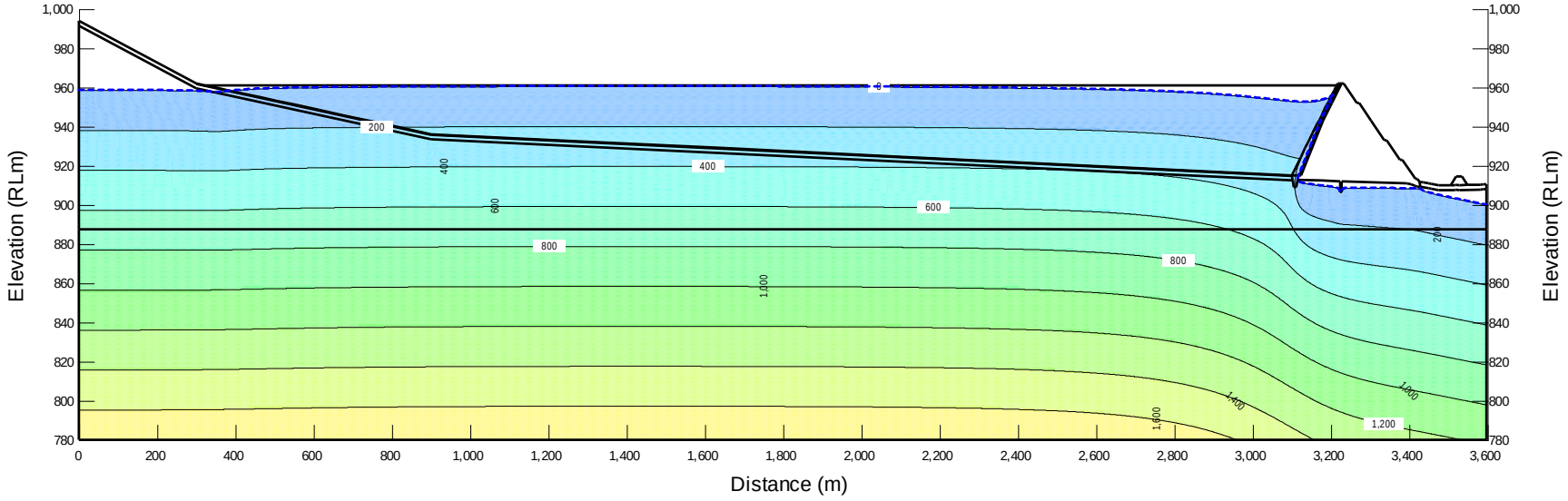
TSF- Seepage Analysis

Closure - No Flux - Year 15

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-7**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

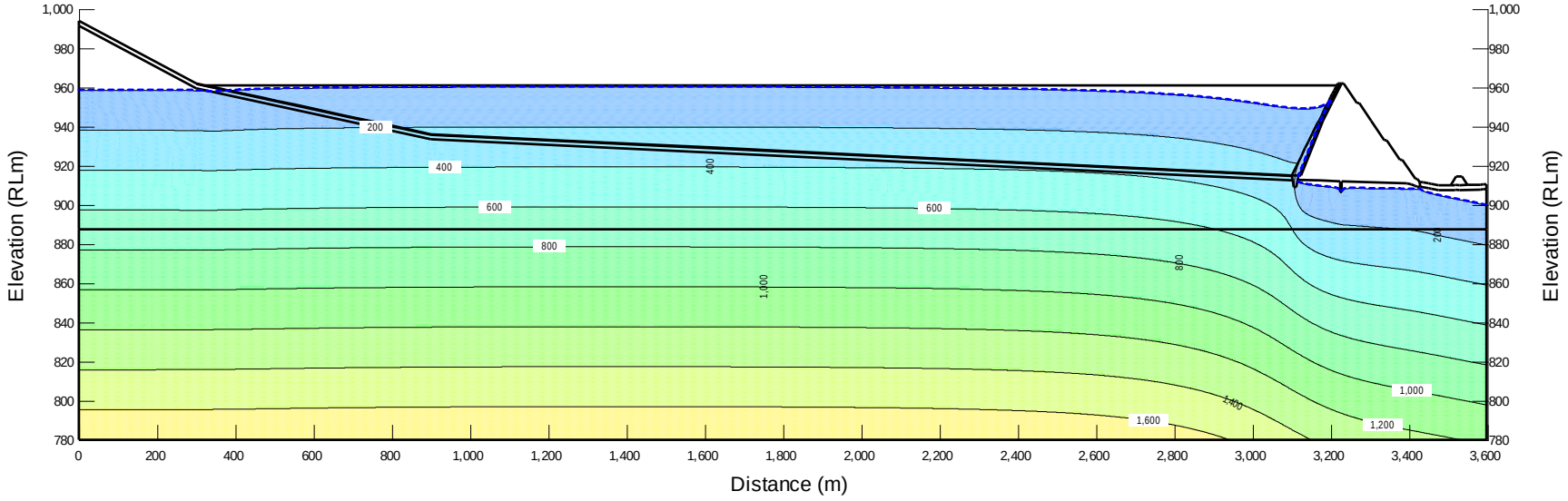
TSF- Seepage Analysis

Closure – No Flux – Year 20

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-8**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

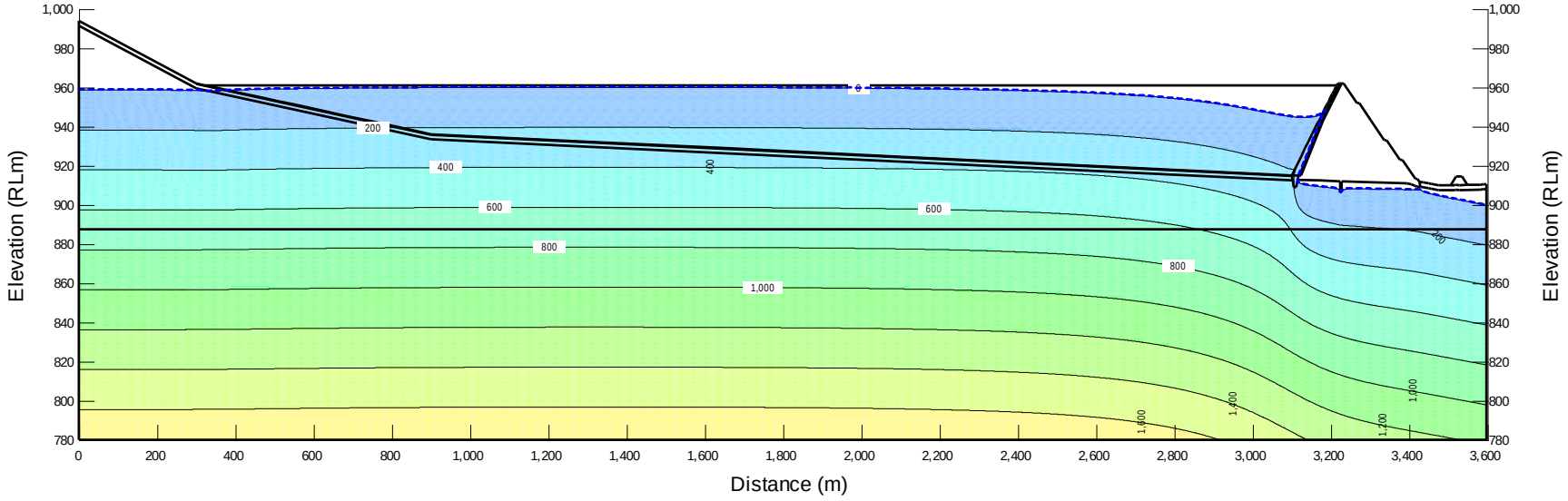
TSF- Seepage Analysis

Closure – No Flux – Year 30

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-9**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

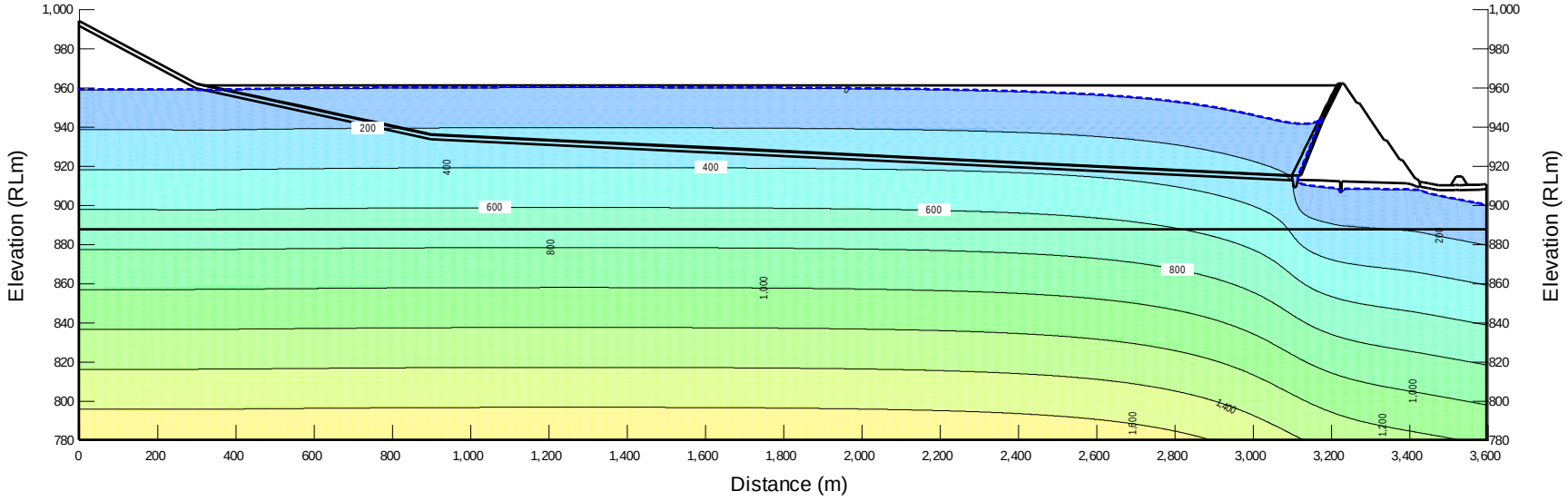
TSF- Seepage Analysis

Closure - No Flux - Year 45

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-10**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

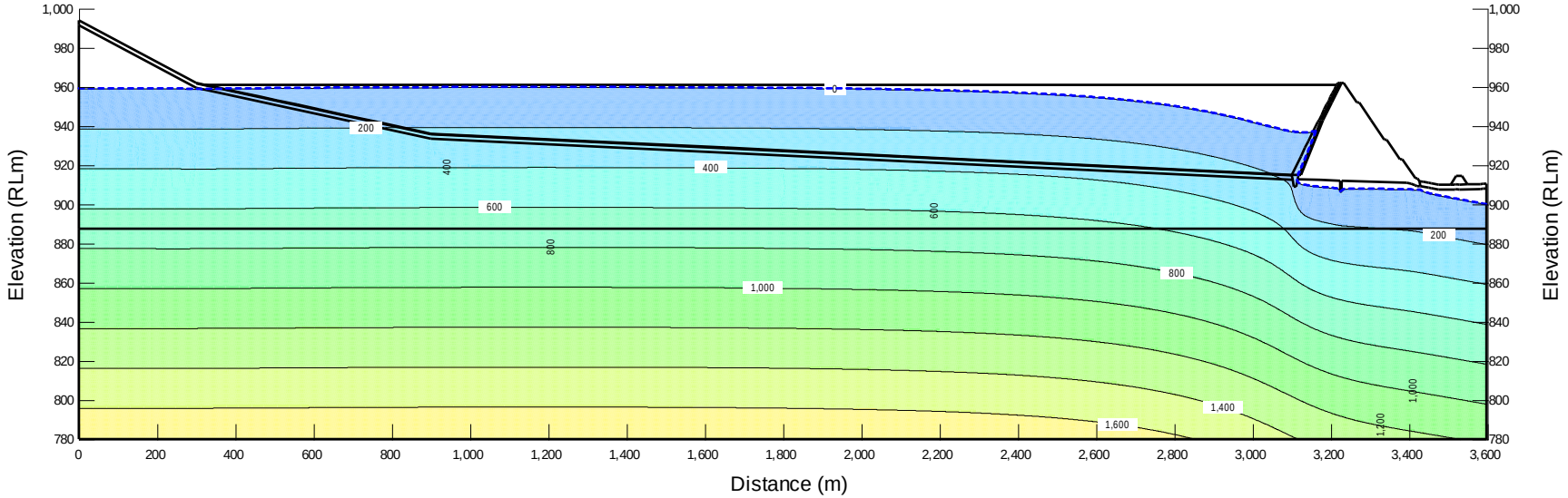
TSF- Seepage Analysis

Closure - No Flux - Year 60

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-11**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

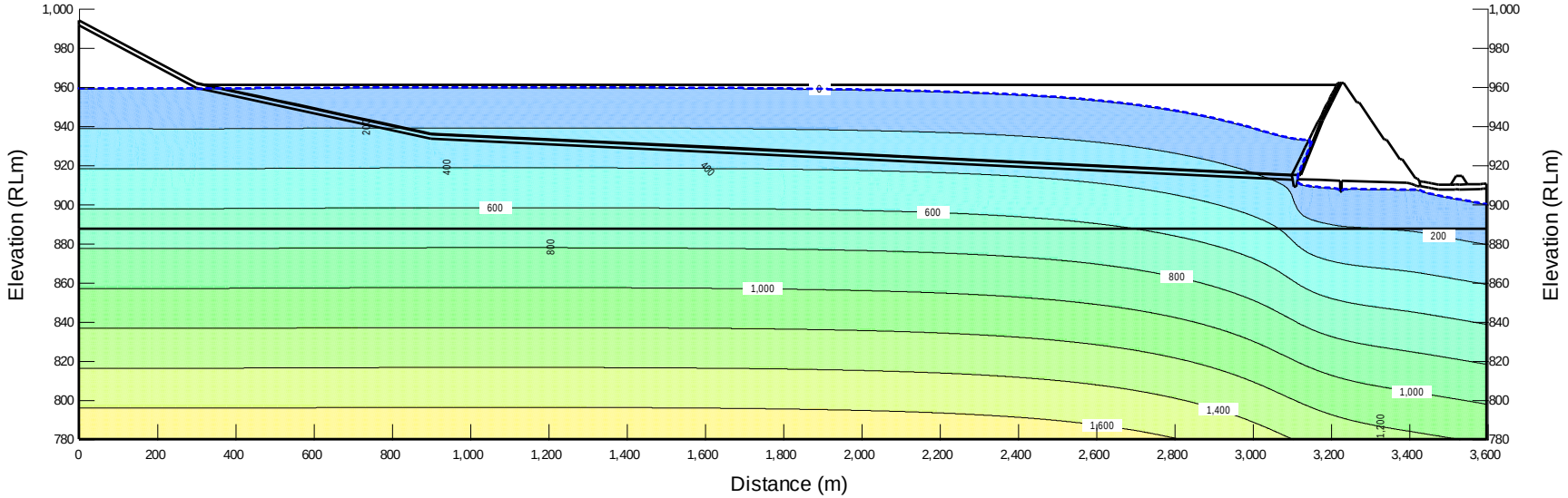
TSF- Seepage Analysis

Closure - No Flux - Year 85

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-12**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Sat Kx (m/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Rotation (°)	Volumetric Water Content	Compressibility (/kPa)
	Eff Clay Core	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Cut-Off Key	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Fresh Rock (Anson Formation)	Saturated Only	2.31e-08			0.5	0	0.2	0
	Eff Liner Layer	Saturated / Unsaturated		Clay Earthfill	Clay k = 1e-09m/s	1	0		
	Eff Rock Fill	Saturated Only	1e-06			1	0	0.3	0
	Eff Surface Soils	Saturated / Unsaturated		Surface Soils	Surface Soils k = 5e-08m/s	1	0		
	Eff Tailings	Saturated / Unsaturated		Tailings	Tailings k = 1e-07m/s	0.1	0		
	Eff Transition Zone	Saturated Only	1e-06			1	0	0.3	0
	Eff Weathered Rock	Saturated Only	1e-08			1	0	0.2	0



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

TSF- Seepage Analysis

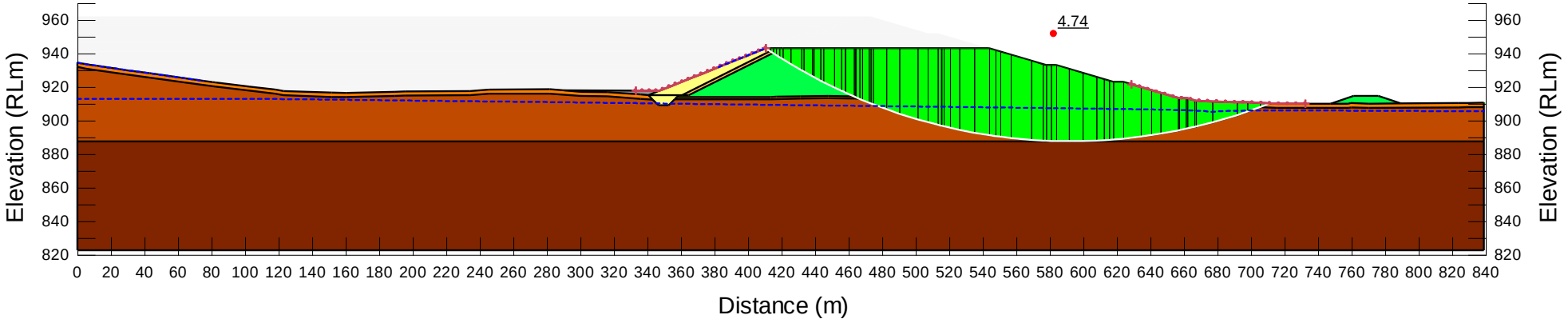
Closure - No Flux - Year 110

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-13**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Clay Core	Mohr-Coulomb	18	1	32	0
	Eff Cut-Off Key	Mohr-Coulomb	18	1	32	0
	Eff Fresh Rock (Anson Formation)	Mohr-Coulomb	26	10	45	0
	Eff Rock Fill	Mohr-Coulomb	20	0	42	0
	Eff Surface Soils	Mohr-Coulomb	18	0	28	0
	Eff Tailings	Mohr-Coulomb	17	0	25	0
	Eff Transition Zone	Mohr-Coulomb	20	0	42	0
	Eff Weathered Rock	Mohr-Coulomb	22	0	32	0

Note:
- Morgenstern-Price Analysis Method



ATC Williams

ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

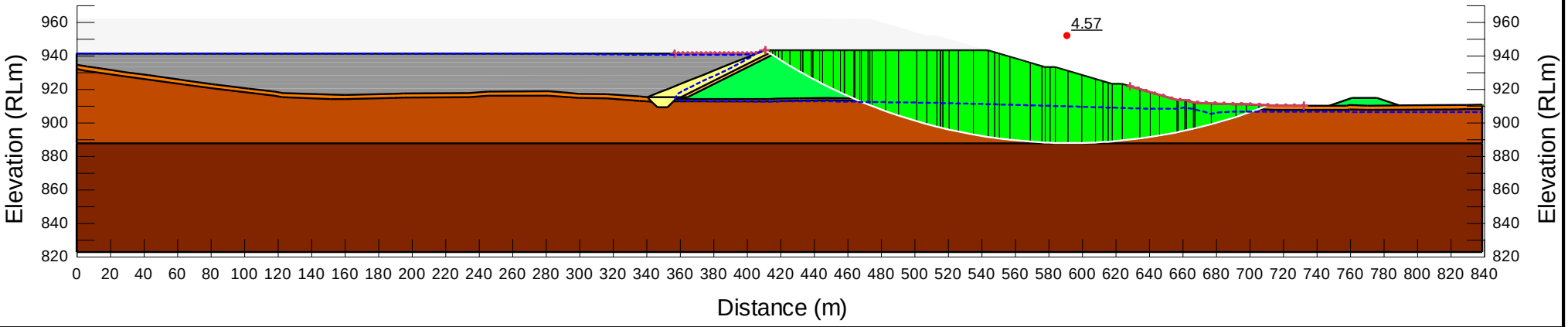
YEAR 1 – LONG TERM STABILITY ASSESSMENT

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-14**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Clay Core	Mohr-Coulomb	18	1	32	0
	Eff Cut-Off Key	Mohr-Coulomb	18	1	32	0
	Eff Fresh Rock (Anson Formation)	Mohr-Coulomb	26	10	45	0
	Eff Rock Fill	Mohr-Coulomb	20	0	42	0
	Eff Surface Soils	Mohr-Coulomb	18	0	28	0
	Eff Tailings	Mohr-Coulomb	17	0	25	0
	Eff Transition Zone	Mohr-Coulomb	20	0	42	0
	Eff Weathered Rock	Mohr-Coulomb	22	0	32	0

Note:
- Morgenstern-Price Analysis Method



ATC Williams

ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

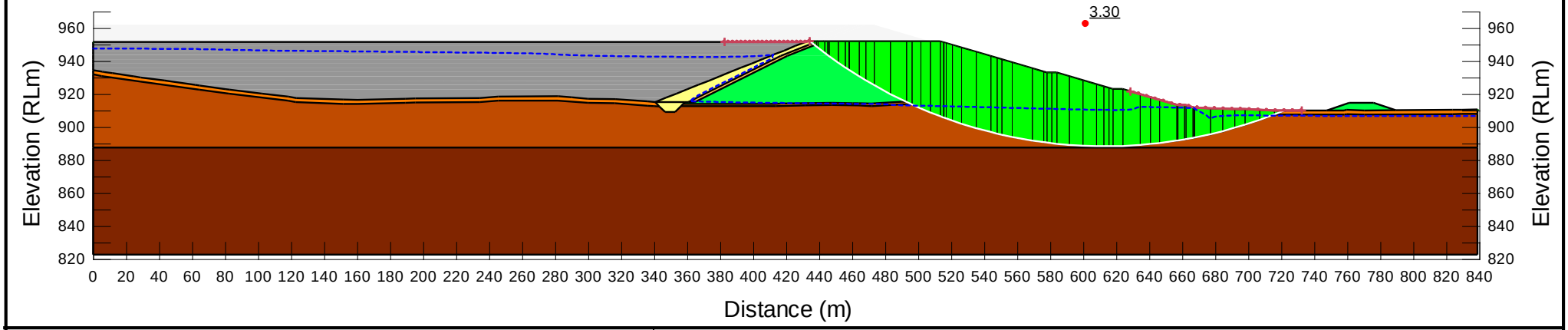
YEAR 10 – LONG TERM STABILITY ASSESSMENT

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-15**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Clay Core	Mohr-Coulomb	18	1	32	0
	Eff Cut-Off Key	Mohr-Coulomb	18	1	32	0
	Eff Fresh Rock (Anson Formation)	Mohr-Coulomb	26	10	45	0
	Eff Rock Fill	Mohr-Coulomb	20	0	42	0
	Eff Surface Soils	Mohr-Coulomb	18	0	28	0
	Eff Tailings	Mohr-Coulomb	17	0	25	0
	Eff Transition Zone	Mohr-Coulomb	20	0	42	0
	Eff Weathered Rock	Mohr-Coulomb	22	0	32	0

Note:
- Morgenstern-Price Analysis Method



ATC Williams

ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

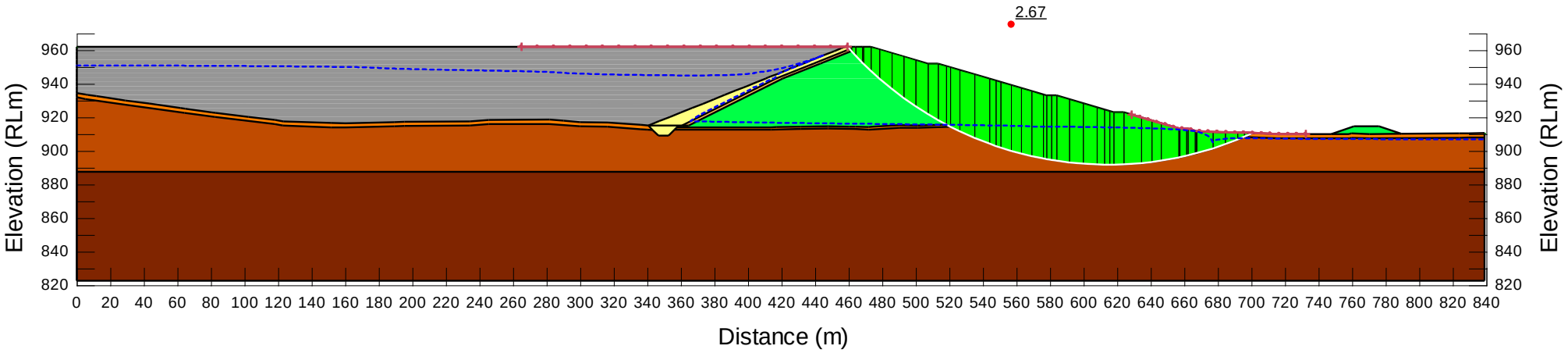
YEAR 14 – LONG TERM STABILITY ASSESSMENT

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-16**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Clay Core	Mohr-Coulomb	18	1	32	0
	Eff Cut-Off Key	Mohr-Coulomb	18	1	32	0
	Eff Fresh Rock (Anson Formation)	Mohr-Coulomb	26	10	45	0
	Eff Rock Fill	Mohr-Coulomb	20	0	42	0
	Eff Surface Soils	Mohr-Coulomb	18	0	28	0
	Eff Tailings	Mohr-Coulomb	17	0	25	0
	Eff Transition Zone	Mohr-Coulomb	20	0	42	0
	Eff Weathered Rock	Mohr-Coulomb	22	0	32	0

Note:
- Morgenstern-Price Analysis Method



ATC Williams

ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

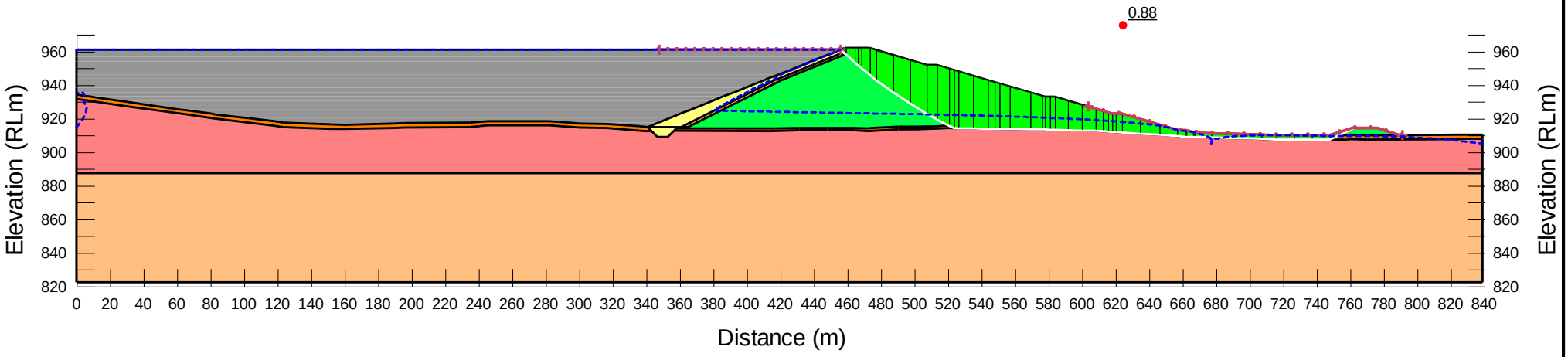
YEAR 18 – LONG TERM STABILITY ASSESSMENT

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-17**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Note:
- Morgenstern-Price Analysis Method
- 100% PGA = 0.4g (1 in 10,000 AEP)

Color	Name	Model	Unit Weight (kN/m³)	Minimum Strength (kPa)	Tau/Sigma Ratio	Cohesion (kPa)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Fresh Rock (Anson Formation) (Impenetrable)	Bedrock (Impenetrable)							
	Eff Rock Fill	Mohr-Coulomb	20				0	42	0
	Eff Surface Soils	Mohr-Coulomb	18				0	28	0
	Eff Transition Zone	Mohr-Coulomb	20				0	42	0
	Eff Weathered Rock (Impenetrable)	Bedrock (Impenetrable)							
	UD Clay Core	Undrained (Phi=0)	18			110			
	UD Cut-Off Key	Undrained (Phi=0)	18			110			
	UD Tailings	SHANSEP	17	5	0.2				



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

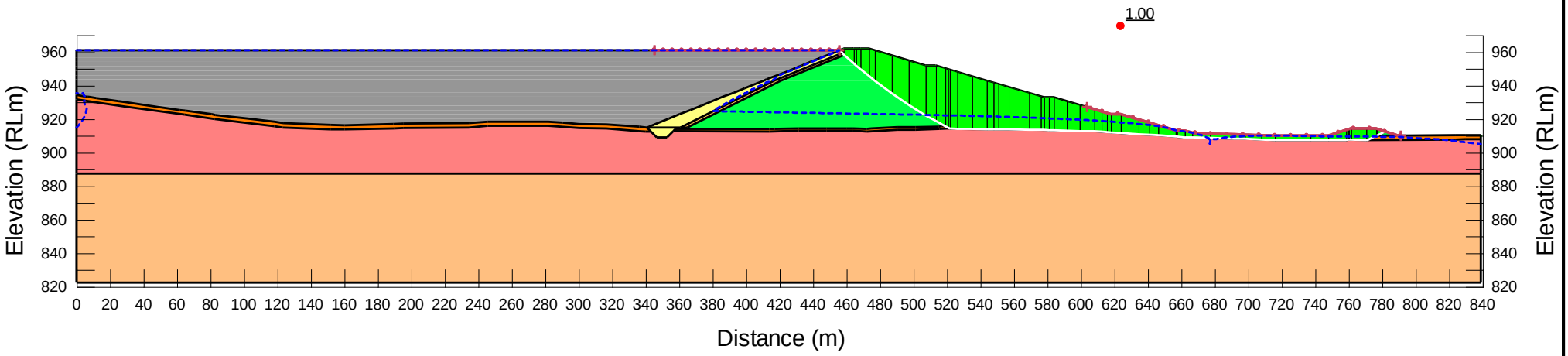
STABILITY ANALYSIS – SEISMIC MDE (NON-CIRCULAR FAILURE SURFACE)

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-18**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Unit Weight (kN/m³)	Minimum Strength (kPa)	Tau/Sigma Ratio	Cohesion (kPa)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Fresh Rock (Anson Formation) (Impenetrable)	Bedrock (Impenetrable)							
	Eff Rock Fill	Mohr-Coulomb	20				0	42	0
	Eff Surface Soils	Mohr-Coulomb	18				0	28	0
	Eff Transition Zone	Mohr-Coulomb	20				0	42	0
	Eff Weathered Rock (Impenetrable)	Bedrock (Impenetrable)							
	UD Clay Core	Undrained (Phi=0)	18			110			
	UD Cut-Off Key	Undrained (Phi=0)	18			110			
	UD Tailings	SHANSEP	17	5	0.2				

Note:
- Morgenstern-Price Analysis Method
- Yield acceleration to achieve FOS 1.0, ky = 0.335g for MDE



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

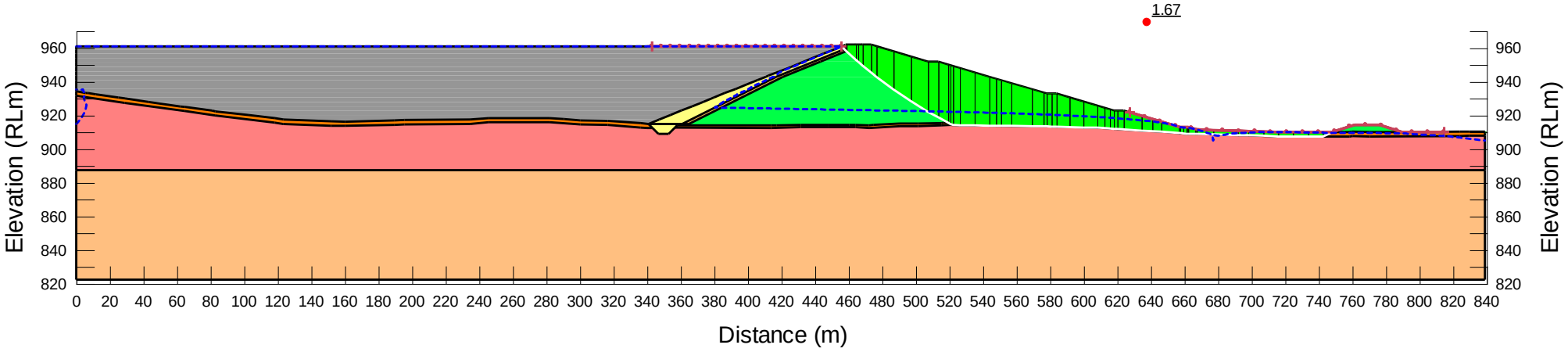
STABILITY ANALYSIS – SEISMIC MDE YIELD ACCELERATION (NON-CIRCULAR FAILURE SURFACE)

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-19**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Note:
- Morgenstern-Price Analysis Method
- 100% pga = 0.13g (1 in 1,000 AEP)

Color	Name	Model	Unit Weight (kN/m³)	Minimum Strength (kPa)	Tau/Sigma Ratio	Cohesion (kPa)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Fresh Rock (Anson Formation) (Impenetrable)	Bedrock (Impenetrable)							
	Eff Rock Fill	Mohr-Coulomb	20				0	42	0
	Eff Surface Soils	Mohr-Coulomb	18				0	28	0
	Eff Transition Zone	Mohr-Coulomb	20				0	42	0
	Eff Weathered Rock (Impenetrable)	Bedrock (Impenetrable)							
	UD Clay Core	Undrained (Phi=0)	18			110			
	UD Cut-Off Key	Undrained (Phi=0)	18			110			
	UD Tailings	SHANSEP	17	5	0.2				



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

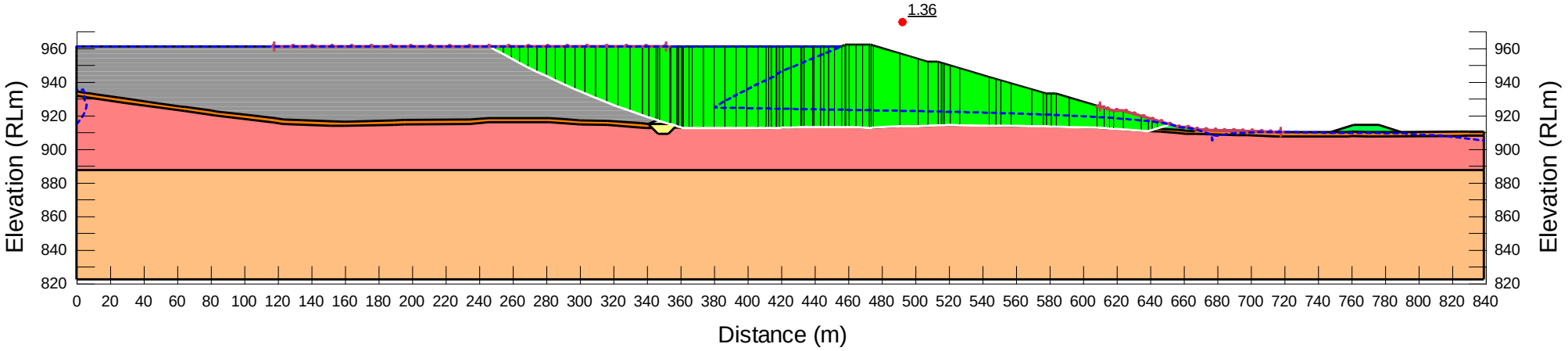
STABILITY ANALYSIS – SEISMIC OBE (NON-CIRCULAR FAILURE SURFACE)

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-20**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Note:
- Morgenstern-Price Analysis Method
- Liquified Tailings Tau/Sigma = 0.04

Color	Name	Model	Unit Weight (kN/m³)	Cohesion (kPa)	Minimum Strength (kPa)	Tau/Sigma Ratio	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Fresh Rock (Anson Formation) (Impenetrable)	Bedrock (Impenetrable)							
	Eff Rock Fill	Mohr-Coulomb	20				0	42	0
	Eff Transition Zone	Mohr-Coulomb	20				0	42	0
	Eff Weathered Rock (Impenetrable)	Bedrock (Impenetrable)							
	LIQ Tailings	SHANSEP	17		0	0.04			
	UD/SR Clay Core	Undrained (Phi=0)	18	88					
	UD/SR Cut-Off Key	Undrained (Phi=0)	18	88					
	UD/SR Surface Soils	Undrained (Phi=0)	18	80					



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

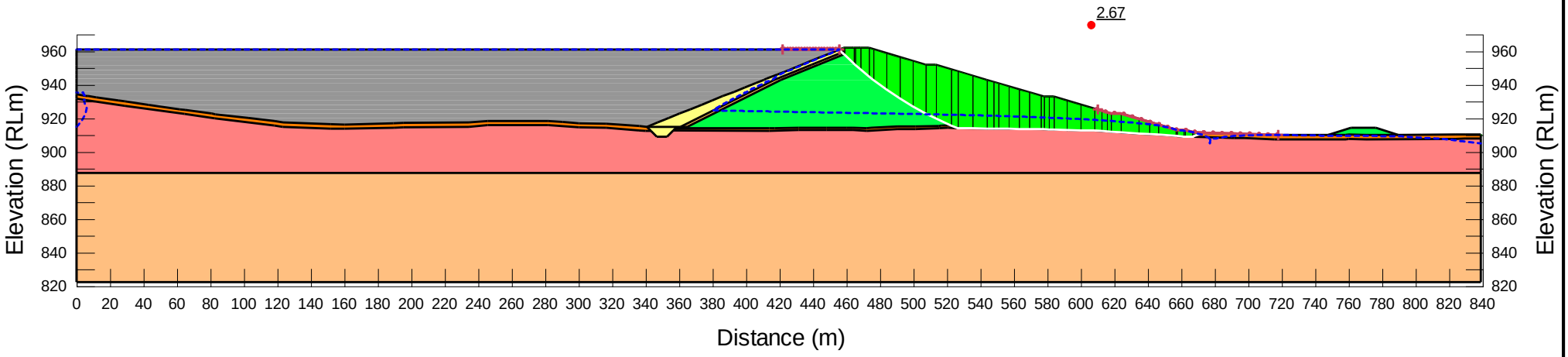
STABILITY ANALYSIS - POST EARTHQUAKE LIQUEFACTION IMPENETRABLE BEDROCK (NON-CIRCULAR SLIP SURFACE)

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-21**

COPYRIGHT © This drawing remains the property of ATC Williams and may not be copied in any way without prior approval from ATC Williams.

Color	Name	Model	Unit Weight (kN/m³)	Minimum Strength (kPa)	Tau/Sigma Ratio	Cohesion (kPa)	Cohesion' (kPa)	Phi' (°)	Phi-B (°)
	Eff Fresh Rock (Anson Formation) (Impenetrable)	Bedrock (Impenetrable)							
	Eff Rock Fill	Mohr-Coulomb	20				0	42	0
	Eff Surface Soils	Mohr-Coulomb	18				0	28	0
	Eff Transition Zone	Mohr-Coulomb	20				0	42	0
	Eff Weathered Rock (Impenetrable)	Bedrock (Impenetrable)							
	UD/SR Clay Core	Undrained (Phi=0)	18			88			
	UD/SR Cut-Off Key	Undrained (Phi=0)	18			88			
	UD/SR Tailings	SHANSEP	17	4	0.16				

Note:
- Morgenstern-Price Analysis Method
- Strength reduction of 20% applied to non-free draining materials above existing ground surface



ATC Williams Pty Ltd
Level 2, 16-20 Edmondstone Street
P.O Box 3309
Newmarket, QLD, 4051
AUSTRALIA
T: +61 3352 7222
Brisbane@atcwilliams.com.au
www.atcwilliams.com.au

REGIS RESOURCES LTD

McPhillamys Gold Project

STABILITY ANALYSIS - POST-EARTHQUAKE IMPENETRABLE BEDROCK (NON-CIRCULAR FAILURE SURFACE)

Date: 02 Apr 2019 **Job No. 113272.02** **APPENDIX C-22**