waReport on

ONGOING SITE MANAGEMENT PLAN
LOTS 88, 491, & 9008 GRINDLEFORD DRIVE
BALCATTA

Submitted to:
ABN Developments No. 1
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WAG210152 006 R Rev0

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1. INTRODUCTION

1.1 Overview

This report presents the ongoing site management plan (OSMP) prepared by Galt environmental Pty Ltd (Galt) for the proposed residential lots comprising Lots 88, 481, and 9008 Grindleford Drive, Balcatta (the site).

1.2 Background

The site is irregular in shape and approximately 4.25 ha in size. The proposed development includes 65 residential lots (approximately 308 m^2 to 539 m^2 in size), associated services, road reserves, 4 public open space lots totalling approximately 0.55 ha.

The site comprises the Parkside Precinct within Mosaic Estate, a Residential Land Development by ABN Developments No. 1 Pty Ltd.

Previous environmental investigations undertaken by Galt identified that organic sand below the groundwater table contained uncontrolled fill. The uncontrolled fill was noted to contain minor quantities of asbestos containing material (ACM). Given that the organic sand and uncontrolled fill was unable to be feasibly removed without extensive dewatering, it was determined by the geotechnical engineers (Structerre) that a limestone raft should be constructed for ground improvement beneath the residential lots. The construction of the raft (about 300 mm above the groundwater table) included a geogrid for geotechnical stability. Imported fill, verified as being free from contaminants, was placed above the raft to finished levels ensuring a minimum depth of 1.8 m of cover.

Given that some uncontrolled fill remains below the limestone raft, this OSMP has been developed to ensure that any excavation of this material is conducted in an appropriate manner.

1.3 Current Site Condition

Following completion of the bulk earthworks, all residential lot and road reserves are underlain by a limestone raft and as such, will be classified as ‘Remediated for restricted use’. All public open space areas which also function as drainage, have had all organic sand and uncontrolled fill removed and as such, will be classified as ‘Decontaminated’.

A typical profile of the material beneath the residential lots and road reserves is shown in inline image 1 below. As constructed drawings of site are provided in Appendix A.

Inline Image 1: Typical Site Profile

1.4 Purpose of this Plan

The purpose of this OSMP is to provide a framework for the management of subsurface contamination constraints so that the health and safety of the future land users is protected from adverse impacts that could eventuate from unmanaged subsurface disturbances.

1.5 Objectives

The objectives of this OSMP are as follows:

- prevent uncontrolled exposure to residual contaminated soil;
- maintain the integrity of the limestone raft and geogrid;
- ensure that if subsurface works have the potential to disturb contamination, the works are appropriately managed; and
- satisfy regulatory requirements for the preparation and implementation of an OSMP.

1.6 Applicability of This Management Plan

The OSMP shall be implemented where any excavation beneath the site is required, especially where excavation depth may exceed 1.8 m.

1.7 Purpose

This OSMP is intended to be a user-friendly guide of the nature and extent of deeply buried residual soil contamination for the lots. Detailed scientific information documenting the final site condition has been presented in the reports (referenced in Section 3) which should be referred to where Specific information pertaining to previous investigations is required.

1.8 Duration

Given the nature of the site conditions following remediation, this OSMP will be applicable in perpetuity.

1.9 Update of OSMP

Whilst it is intended that this OSMP will be applicable in perpetuity, there may be circumstances in which the plan may need to be revised. These may include, but not be limited to:

- redevelopment of the estate for any purpose other than residential;
- change in density of the lots overlying the containment cells; and/or
- change in the nature of the land use within the containment cells.

In these instances, and any other, where the OSMP may need to be updated, the proponent of the proposed development will be responsible for updating the plan.

1.10 Definitions

The primary contaminant of potential concern (COPC) in the lots is considered to be asbestos. The Department of Health (DoH) (2009) *Assessment, Remediation and Management of Asbestos-contaminated Sites in Western Australia* guideline document has defined three main forms of asbestos as described below:

- Asbestos containing materials (ACM): Products or materials that contain asbestos in an inert bound matrix such as cement or resin. Taken to be sound material, even as fragments, and not fitting through a 7 mm x 7 mm sieve;
- Asbestos fines (AF): Includes asbestos free fibres, small fibre bundles and also ACM fragments that can pass through a 7 mm x 7 mm sieve; and
- Fibrous asbestos (FA): Friable asbestos materials, such as severely weathered ACM, and asbestos in the form of loose fibrous material such as insulation products. Asbestos material in a condition such that it can be broken or crumbled by hand pressure.

The definitions outlined above have been applied throughout this document.

2. SITE IDENTIFICATION

The site location and boundary coordinates are shown in Figure 1 and summarised in

Table 1: Site Identification

Site Identification	
Street Address	Lots 88, 491, and 9008 Grindleford Drive
Location	Balcatta, WA
Legal Identification (diagrams)	Lot 491 on Plan 412061 Lot 88 on Plan 027769 Lot 9008 on Plan 425773
Certificate of Title (volume/folio)	2945/814 2950/703 4036/146
Local Government	City of Stirling

Boundary Coordinates (Easting/Northing):	Northeastern corner: 388747, 6471563 East central segment (1): 388742, 6471523 East central segment (2): 388730, 6471523 East central segment (3): 388730, 6471483 East central segment (4): 388762, 6471483 Southeastern corner: 388762, 6471443 Southwestern corner: 388399, 6471440 Western segment: 388390, 6471538 Northwestern segment: 388390, 6471561
Area	4.25 ha
Current Landowners	ABN Development No. 1 Pty Ltd
Proposed Land Use	Residential
Current Zoning	Development zone

3. SITE REMEDIATION AND CONTAMINATION STATUS

3.1 Previous Studies

Galt has undertaken previous environmental studies across the lots. The findings relating to the environmental condition of the lots and Lot 9001 are presented below:

- Preliminary Site Investigation and Sampling Analysis and Quality Plan – Lots 88, 129, and 491 Grindleford Drive, Balcatta (WAG210152-02 002 R Rev1)
- Detailed Site Investigation – Lots 88, 491, and 9008 Grindleford Drive, Balcatta (WAG210152-02 005 R Rev0).

Copies of these reports are available from ABN Development No.1 Ptd Ltd upon request or via a detailed summary of records (DSR) search of the Department of Water and Environmental Regulation (DWER) contaminated sites database.

3.2 Contamination Status

Upon completion of the remediation program, all residential lots and road reserves comprise a limestone raft over organic sand and uncontrolled fill with a minimum of 1.8 m of clean fill above the raft.

The location of the limestone raft is shown in Appendix A.

4. HAZARD IDENTIFICATION

This section of the OSMP identifies potential hazards associated with subsurface contamination in relation to site users nearby off-lot communities and the environment.

For exposure to occur, a complete pathway must exist between the source of contamination and the receptor (i.e. the person potentially affected by the contamination). The relationship between source, receptor and pathway in the context of residual lot contamination and uncontrolled subsurface disturbance related hazards are summarised in Table 2.

Table 2: Potential Exposure Pathways

Source	Contaminants of potential concern	Pathways	Receptors
Asbestos-impacted fill below lots	Asbestos	Inhalation	Lot residents and workers
			Lot residents and workers

5. ROLES AND RESPONSIBILITIES

The responsibilities under the OSMP of parties involved in subsurface works in contaminated areas or depths are summarised in Table 3. These responsibilities do not replace any other regulatory responsibilities of the parties in undertaking works at the lots and do not include all responsibilities.

Table 3: Roles and Responsibilities

Role	Responsibility
Contractors conducting subsurface works	• Acknowledge and adhere to the requirements of the OSMP. • Refrain from any act that could put them or any other person at risk of exposure to contamination. • Obtain approval from lot owner to undertake works. • Manage works to ensure they are carried out in accordance with OSMP protocols. • Confirm to lot owner that works are being undertaken in accordance with procedures set out in the OSMP. • Notify lot owner of any non-conformance with the OSMP and corrective actions. • Provide to lot owner and maintain survey plans of excavations and as-constructed drawings.
ABN Development No. 1 Pty Ltd	• Form 6 (as available from the DWER website) and a copy of the OSMP will be provided to relevant parties as required under the *Contaminated Sites Act* 2003
Future Lot Owners	• Form 6 (as available from the DWER website) and a copy of the OSMP will be provided to relevant parties as required under the *Contaminated Sites Act* 2003. • Agreement (in writing) to the OSMP and associated management measure proposed.[1] • Ensure implementation of OSMP. • Provision of the OSMP to any subcontractors engaged to undertake ground disturbance on the lots. • Ensure a suitably qualified and experienced environmental consultant and engineer is engaged to provide environmental supervision where ground disturbing works are required below the limestone raft. • Notify DWER of any damage or unplanned breach of limestone raft.

[1] It should be noted that where lots are currently under contract, the existing sales contract will be varied and the OSMP will be provided prior to settlement of the land. The varied contract will be explicit in noting that acceptance of annexure implies that the future lot owner has read and will implement the OSMP.

6. SUBSURFACE ACCESS PROCEDURES

6.1 Notification

The permission of the lot owner must be obtained by the contractor, as applicable, prior to undertaking subsurface activities. The owner must provide a copy of this OSMP to any contractors engaged to undertake excavation works within the site irrespective of depth or nature of excavation.

6.2 Plan Preparation

Prior to any intrusive activities the method of works shall be pre-planned so that risks to workers, residents, the public and the environment are minimised. Appropriate site preparations will include, at a minimum, the development of a safe work method statement (SWMS) and a job hazard analysis (JHA) by the contractor.

Minimum requirements for the SWMS and JHA are summarised below.

- The SWMS and JHA shall be in accordance with regulatory and industry institutional standards including but not limited to those standards contained under the Australian Standard series and International Organisation for Standardisation (ISO).
- The SWMS shall discuss the objectives and order of the works, the equipment and procedures to be adopted and the potential for exposure.
- The JHA shall take into consideration the health risks associated with the hazard and will include as a minimum the supply of appropriate personal protective equipment (PPE) for personnel undertaking the work (including respirators/dust masks). The JHA shall also include dust control measures to protect site users and the public.

The above documents should be consistent with the minimum requirements proposed in the following sections of this OSMP.

6.3 Site Induction

Prior to intrusive works on the lot, all personnel involved with site works shall be given a site induction by a suitably qualified person or as a minimum have read and understood this OSMP and the associated risks at the site.

The work site shall be cordoned-off if there is a risk to the public from entering the site. As a minimum, unauthorised personnel must be restricted from entering the boundaries of the intrusive work area, and any temporary stockpiles of contaminated soil where applicable. All barriers are to remain in place until intrusive works have been completed and all contaminated soil has been reinstated or removed off site and containment/capping has been completed.

The number of personnel working in an impacted area shall be kept to a minimum.

6.4 Clean Fill Excavating and Stockpiling

Excavation of 1.8 m or less will result in only clean fill being excavated. Clean fill material should be excavated and stockpiled in a designated area. Any clean fill that appears visually cross-contaminated should be segregated and treated as contaminated soil until verification testing demonstrates otherwise.

Clean fill stockpiles should be clearly labelled to identify it as clean fill and covered or wet down to minimise dust generation.

6.5 Penetrating Limestone Raft

It should be noted that excavation below the limestone raft is a significant undertaking as the raft performs a key engineer function in providing ground improvement for the dwellings and roads constructed above. In addition to the instructions below, any penetration of the limestone raft will need to be done in accordance with project-specific engineering plans provided by a certified engineer to ensure that the raft is appropriately managed & reconstituted. Engineering plans may require approval by City of Stirling in some circumstances.

The following measures should be implemented in penetrating below the limestone raft:

- Excavation within a nominal depth of 1.8 m can be undertaken using conventional equipment (e.g. bobcat, excavator, etc).
- Excavation below 1.8 m shall be conducted in accordance with a task specific management plan prepared by a qualified engineer and environmental consultant to minimise the risk of damage to the limestone raft and cross-contamination of clean fill.
- Where localised excavation below the limestone raft is required (e.g. for a deep swimming pool), all material from below the limestone will be transported to a licenced landfill facility.
- Once the target depth is achieved, the excavation will be lined with a geotextile material compliant with the specifications shown in Appendix B.
- Following backfill to the underside of the limestone raft, a new raft section must be constructed including the geogrid as specified in Appendix C. **NOTE: This must be designed and signed off by an engineer to ensure the final raft structure meets the necessary engineering requirement.**
- All backfill above the raft must be done using a certified clean fill sand product.
- Any works requiring excavation and management of contaminated materials below the limestone raft should not lead to its redistribution outside of the lot boundaries, above or outside of the containment cells.

The location of limestone raft is shown in Appenidx A. A typical detail for the raft construction is provided in the drawings, however these are not intended to serve as design drawings for raft reinstatement for isolated penetrations below the raft, as described above. These must be done in accordance with project-specific engineering plans provided by a certified engineer.

6.6 Contaminated Soil Excavation and Stockpiling

The following minimum requirements apply to the excavation and stockpiling of contaminated soils:

- Contaminated soil stockpiles must be temporary in nature only.
- Contaminated soil must be stockpiled on hardstand or an impermeable liner, such as high-density polyethylene (HDPE).
- Contaminated soil stockpiles must be sign posted (clearly labelling it as contaminated soil).
- Contaminated soil stockpiles must be covered and/or wet down to minimise dust generation until removed from site.

6.7 Excavation Reinstatement

Once works in the impacted soils have been completed, the limestone raft and any clean fill cover shall be completely restored to original levels and the work area left clean. Contaminated soil may only be reinstated below the limestone raft where there are no underground utilities present.

6.8 Installation or Maintenance of Underground Utilities

If the purpose of subsurface works is to install an underground utility, and the proposed method of installation is trenching, the utility shall be laid in clean fill to limit any long-term repeated disturbance of contaminated soil. In addition to excavation procedures listed above, the following earthworks shall be undertaken to accommodate new underground utilities:

- The utility trench shall be boxed out so that at least 0.5 m of separation exists between the utility and any contaminated soil.
- All contaminated soil surfaces within the utility trench shall be lined with a warning barrier to demarcate the presence of contaminated soil.
- The utility trench shall be backfilled with clean fill to the finished level.

6.9 Dust and Air Quality Control

Dust control should act to minimise dust creation and its movement off the site. For the purpose of dust control the following measures should be implemented:

- Wetting down soils where safe to do so.
- Wetting down and/or coverage of temporary contaminated soil stockpiles.
- Dust stabilisation products, such as hydromulch, should be considered where wetting down is unsafe and stockpile coverage is impractical.
- Monitoring meteorological conditions and halting works if adverse weather conditions are predicted.
- The placement of wind barriers depending on the scale and duration of subsurface disturbance.

6.10 Waste Management

Excavated contaminated soil that surplus to the site requirements or cannot otherwise be reused shall be disposed offsite at facility licensed to receive such waste. Material shall be classified according to the DWER (2019) *Landfill Waste Classification and Waste Definitions 1996 (As amended 2019)* guideline document.

7. CONTINGENCIES

With the careful implementation of subsurface control measures outlined in this OSMP, environmental incidents are unlikely to occur. However, environmental incident response measures have been defined should any incidents arise. The minimum environmental incident response measures are summarised in Table 4. Additional corrective actions may be necessary depending on the exact nature of the incident.

Table 4: Contingency Actions

Incident	Response
Unregistered subsurface disturbance occurs	• Stop work immediately. • Where the OSMP control measures are confirmed as applicable, ensure such control measures are implemented prior to proceeding with works. • Document the unregistered subsurface disturbance through the completion of an Environmental Incident Form and identify and rectify root cause factors.
Subsurface contamination becomes incidentally exposed	• Identify location of subsurface contamination relative to the containment cell. • Engage a contractor (if deemed necessary) to repair the area of subsurface contamination in accordance with the OSMP.

Incident	Response
	• An assessment should be undertaken to identify why subsurface contamination has become exposed and the root cause rectified. • Custodian of the OSMP at the time of the incident should notify DWER within 24 hours of the event.
Non-conformance with OSMP control measures	• Stop work immediately. Confirm worker is aware of the OSMP and its requirements. • Ensure worker completes work in accordance with the OSMP or engage an alternative contractor to complete works. • Document the OSMP non-conformance through the completion of an incident report form. • An assessment should be undertaken to identify why the OSMP non-conformance occurred, depending on which identify whether OSMP improvement is warranted. • Custodian of the OSMP at the time of the incident should notify DWER within 24 hours of the event.

8. ACCEPTANCE OF MANAGEMENT PLAN

8.1 Current Landowner

This OSMP has been provided to the landowner (ABN Developments No. 1 Pty Ltd) for comment as part of the community consultation process. The landowner has accepted the plan in its entirety and without comment. A written copy of the acceptance is provided in Appendix D.

8.2 Future Landowners

Where lots are currently under contract, the future landowner has acknowledged the presence of the memorial and the OSMP in respect of the restrictions which may relate to the respective property. Once formally approved, the OSMP will be provided to the future landowner, prior to settlement, for the landowner to review & acknowledge prior to settlement of the property. Concurrently, a 'Form 6 –Landowners Disclosure Before Completion of Land Transaction' (Form 6) will be provided to the future landowner at least 14 days before settlement. A copy of each Form 6 will be provided to DWER.

Where lots are not currently under contract, the OSMP will be provided as part of the initial sales contract. The sale contract will include a condition by which the landowner explicitly acknowledges the OSMP and execution of the contract implies that they will implement the OSMP as required. Concurrently a Form 6 will be completed and provided to the future landowner at least 14 days before settlement. A copy of each Form 6 will be provided to DWER.

9. CLOSURE

We draw your attention to Appendix E of this report, "Understanding your Report". The information provided within is intended to inform you as to what your realistic expectations of this report should be. This information is provided not to reduce the level of responsibility accepted by Galt, but to ensure that all parties who rely on this report are aware of the responsibilities each assumes in so doing.

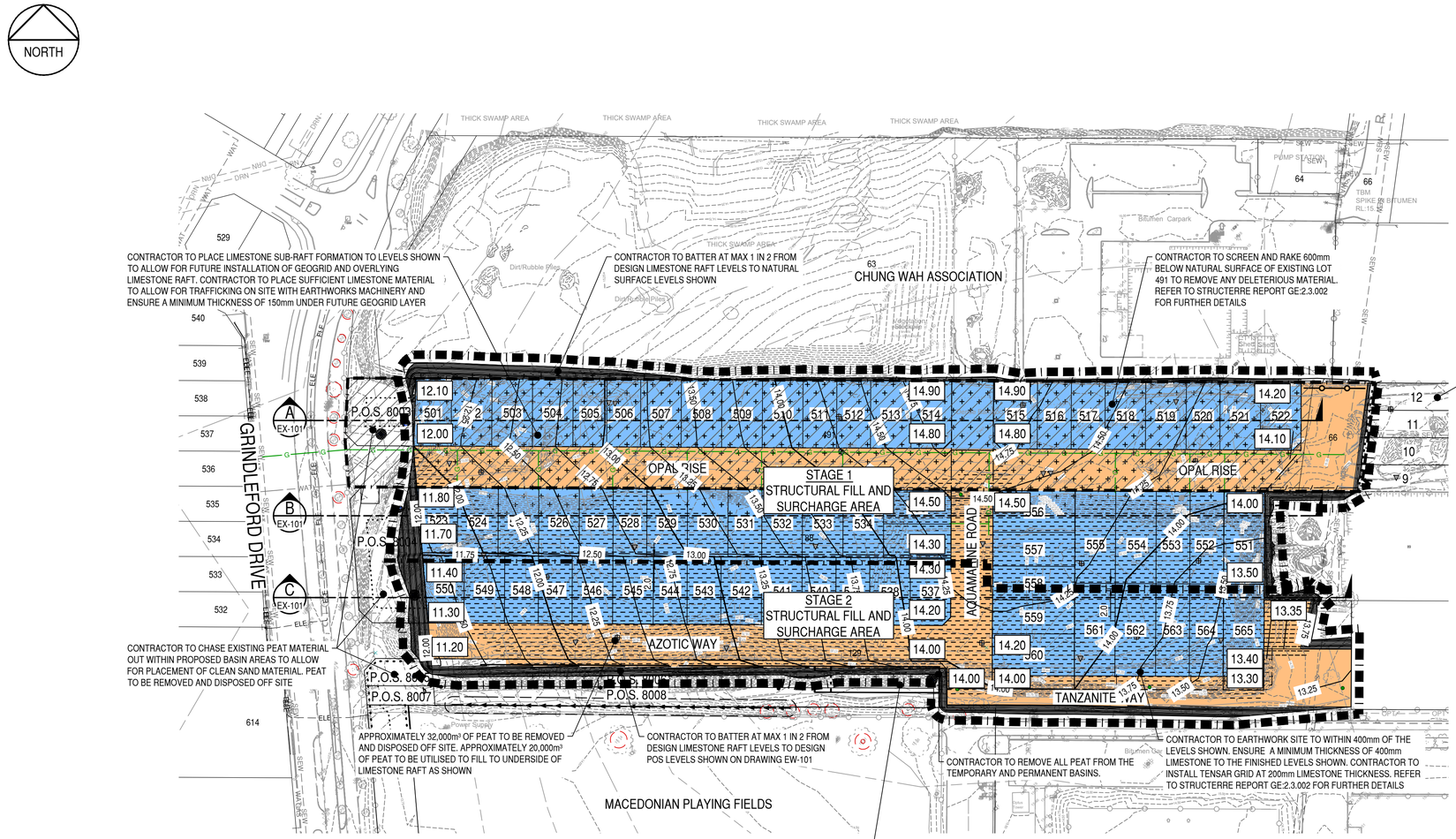
Yours Faithfully,

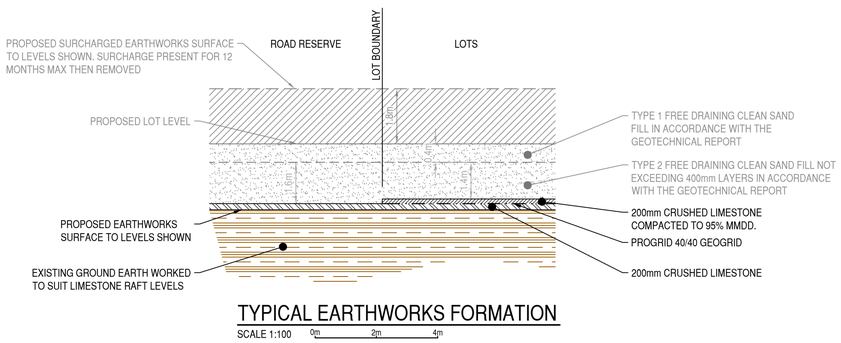
GALT ENVIRONMENTAL PTY LTD

Brad Palmer
Environmental Scientist

https://galtgeo.sharepoint.com/sites/WAG210152/Shared Documents/02 Parcel SI Res Subdiv/03 Correspondence/WAG210152-02 006 R Rev0.docx

Appendix A: Lots Underlain by Limestone Raft





TYPICAL EARTHWORKS FORMATION

SCALE 1:100 0m 2m 4m

REMEDIATION NOTES:

- CONTRACTOR TO PROVIDE VERIFICATION OF WEIGHT AND VOLUME OF LIMESTONE MATERIAL IMPORTED FOR REVIEW AND APPROVAL BY SITE SUPERINTENDENT
- EXISTING SURVEY INFORMATION BASED ON MNG SURVEY PROVIDED 10/01/2022 AND URBAN RESOURCES EARTHWORKS AS-CON PICK UPS PROVIDED 22/09/2021. IT IS NOTED THAT WORKS HAVE OCCURRED ON SITE SINCE THIS TIME, WITH CLEARING AND STRIPPING IMPACTING LEVELS. THE CONTRACTOR SHALL REVIEW AND VERIFY LEVELS ON SITE TO ENSURE LIMESTONE SUB-RAFT LEVELS ARE ACHIEVED.
- PROPOSED LIMESTONE LEVELS ON SITE MAY BE LOWER THAN EXISTING NATURAL SURFACE LEVELS IN SOME AREAS. THE CONTRACTOR SHALL IDENTIFY THESE AREAS AND LOCALLY CUT TO FILL EXISTING MATERIAL WHERE POSSIBLE TO ALLOW FOR A REASONABLY UNIFORM AND WELL GRADED SURFACE. THIS MAY REQUIRE SOME MIXING OF LIMESTONE MATERIAL TO PROVIDE A WORKABLE MIXTURE. SHOULD THIS NOT BE POSSIBLE, THE CONTRACTOR SHALL ADVISE OF INTENDED METHODOLOGY.
- THE CONTRACTOR SHALL GENERALLY ACHIEVE A TRAFFICABLE AND REASONABLY UNIFORM LIMESTONE SUB-RAFT PAD OF VARYING THICKNESS GRADING FROM EAST TO WEST AND TOWARDS AN INDICATIVE VALLEY LINE WITHIN THE FUTURE ROAD RESERVE AREA AS SHOWN ON THE DRAWING, CORRELATING WITH FUTURE SUBSOIL DRAINAGE INSTALLATION.

NOTES

1. ALL DIMENSIONS SHOWN ARE IN METRES U.S.O.
2. ALL CO-ORDINATES AND LEVELS SHOWN ON THIS DRAWING SHALL BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT WITHIN SEVEN DAYS.
3. SURVEY INFORMATION SUPPLIED BY MNG.
   SITE CONTROLS TO BE PROVIDED BY MNG.
3. GEOTECHNICAL INFORMATION SUPPLIED BY GALT GEOTECHNICS. THE CONTRACTOR SHALL ENSURE THAT ALL SITE WORKS ARE UNDERTAKEN IN ACCORDANCE WITH THE GEOTECHNICAL RECOMMENDATIONS.
4. ALL HEIGHTS ARE TO AUSTRALIAN HEIGHT DATUM (AHD) AND ALL LEVELS SHALL BE DERIVED FROM ESTABLISHED BENCHMARKS.
5. ALL BENCHMARKS ARE TO BE PROTECTED AND PRESERVED UNLESS NOTED ON PLANS.
6. FINISHED CONTOURS AND VOLUMES ARE TO ROAD BOXOUT.
7. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE SPECIFICATION AND ALSO THE REQUIREMENTS OF THE CITY OF STIRLING.
8. THE CONTRACTOR SHALL LIAISE WITH ALL RELEVANT AUTHORITIES TO LOCATE ALL EXISTING SERVICES WITHIN THE CONTRACT AREA PRIOR TO THE COMMENCEMENT OF WORK. SERVICES INFORMATION SHOWN ON THE DRAWINGS IS INDICATIVE ONLY AND MAY NOT BE COMPLETE. WHERE EXISTING AND PROPOSED WORKS CONFLICT, LEVELS ARE TO BE TAKEN AND SUPPLIED TO THE SUPERINTENDENT IMMEDIATELY.
9. CONTRACTOR SHALL OBTAIN COUNCIL APPROVAL AND PAY ALL FEES/BONDS PRIOR TO COMMENCEMENT OF WORKS.
10. CONTRACTOR SHALL NOTE THAT NON-TRAFFICABLE SUBTERRANEAN STRUCTURES (SOAKWELLS ETC.) MAY EXIST ON SITE. PRIOR TO EARTHWORKS COMMENCING, CONTRACTOR SHALL LOCATE ANY SOAKWELLS, SEPTIC TANKS, DELETERIOUS MATERIALS AND OTHER SUBTERRANEAN STRUCTURES. THESE MATERIALS AND STRUCTURES ARE TO BE REMOVED AND THE LOCATION BACKFILLED IN ACCORDANCE WITH PROCEDURES SET OUT IN SPECIFICATION (IF APPLICABLE). THE SUPERINTENDENT IS TO BE ADVISED OF ANY UNUSED PIPE WORK ENCOUNTERED.
11. THE CONTRACTOR SHALL PROVIDE TEMPORARY FENCING TO EXISTING LOTS AS REQUIRED.
12. THE CONTRACTOR SHALL PREPARE A DUST MANAGEMENT PLAN IN ACCORDANCE WITH THE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (D.E.C.) GUIDELINES SITE CLASSIFICATION 3 AND OBTAIN APPROVAL FROM THE LOCAL AUTHORITY FOR THE DUST MANAGEMENT PLAN.
    DUST SUPPRESSION METHODS SHALL BE APPLIED BY THE CONTRACTOR DURING EARTHWORKS OPERATIONS IN ACCORDANCE WITH THE APPROVED MANAGEMENT PLAN.
13. NO CLEARING TO OCCUR UNTIL SUPERINTENDENT HAS IDENTIFIED TREES TO BE RETAINED.
    13.a. ALL TREES TO BE RETAINED SHALL BE FENCED OFF FOR THE DURATION OF THE WORKS.
    13.b. ALL TREES AND VEGETATION NOT FOR RETENTION SHALL BE MULCHED AND STOCKPILED FOR REUSE OR REMOVAL AS NOTED.
14. THE CONTRACTOR SHALL MAINTAIN PROPER SITE DRAINAGE TO ALL AREAS THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL BE RESPONSIBLE FOR MAINTAINING EXCAVATIONS IN A SAFE AND STABLE CONDITION AT ALL TIMES.
15. TOPSOIL IS TO BE STRIPPED AND MANAGED IN ACCORDANCE WITH THE SPECIFICATION OR AS NOTED ON THE DRAWINGS.
16. ALL ROOTS, BOULDERS AND ANY OTHER DELETERIOUS MATERIAL SHALL BE TOTALLY REMOVED TO A DEPTH OF 600mm BELOW THE LOWER OF THE NATURAL/CUT SURFACE.
17. MINOR AMENDMENTS TO THE EXTENT OF EARTHWORKS MAY OCCUR TO PRESERVE IDENTIFIED TREES.
18. ALL BATTERS TO BE NOMINALLY 1 IN 6, OR FLATTER, UNLESS SHOWN OTHERWISE (U.S.O.).
19. ALL FILL SHALL BE CLEAN AND BE FREE FROM DELETERIOUS AND/OR ORGANIC MATERIAL.
20. FILL MATERIAL TO BE TESTED BY A REGISTERED MATERIALS TESTING LAB AND RESULTS PROVIDED TO THE SUPERINTENDENT PRIOR TO THE IMPORTATION AND PLACEMENT OF MATERIAL.
21. PENETROMETERS USED FOR TESTING MUST BE CALIBRATED FOR SITE AND RECALIBRATED FOR IMPORTED FILL AS REQUIRED.
22. ALL FILL SHALL BE PLACED IN UNIFORM LAYER NOT EXCEEDING 300mm THICKNESS AND COMPACTED TO A DENSITY NOT LESS THAN 95% M.M.D.D. REFER TO SPECIFICATION FOR DETAILED INFORMATION.
23. CONTRACTOR TO COMPLETE ALL BACKFILLING AND EARTHWORKS REQUIRED TO ACHIEVE LEVELS SHOWN.
24. THE SITE IS TO BE LEFT CLEAN AND FREE OF RUBBISH/DEBRIS UPON COMPLETION OF WORKS.
25. TIE INTO ADJACENT BOUNDARIES AND FEATURES TO BE SEAMLESS.
26. 'AS CONSTRUCTED' DRAWINGS ARE TO BE PREPARED IN ACCORDANCE WITH THE SPECIFICATION AND PROVIDED TO THE SUPERINTENDENT PRIOR TO PROCEEDING TO THE NEXT STAGE OF WORKS.

LEGEND

- WORKS / STAGE BOUNDARY
- 6.80 — PROPOSED EARTHWORKS LEVEL (UNDERSIDE OF LIMESTONE RAFT)
- EXTENT OF PROPOSED LIMESTONE RAFT (200mm THICK LIMESTONE)
- EXTENT OF PROPOSED LIMESTONE RAFT (200mm THICK LIMESTONE / PROGRID 40/40 GEOGRID AND 200mm THICK LIMESTONE)
- EARTHWORKS AREA TO BE SCREENED AND RAKED 600mm BELOW NATURAL
- EARTHWORKS AREA OF PEAT FILL (TO UNDERSIDE OF LIMESTONE)
- EARTHWORKS AREA OF PEAT CUT (TO UNDERSIDE OF LIMESTONE)
- 15.00 — PROPOSED EARTHWORKS CONTOUR (1.0m)
- 15.25 — PROPOSED EARTHWORKS CONTOUR (0.25m)
- EDGE OF BATTER
- 15.0 — EXISTING SURFACE CONTOUR
- EXISTING GROUNDWATER LEVEL CONTOUR
- 6.80 — ULTIMATE/FUTURE LOT LEVEL
- EXISTING KERBING
- SEW — EXISTING SEWER LINE AND ASSOCIATED INFRASTRUCTURE
- WAT — EXISTING WATER MAIN AND ASSOCIATED INFRASTRUCTURE
- DRN — EXISTING STORMWATER SYSTEM AND ASSOCIATED INFRASTRUCTURE
- GAS — EXISTING GAS LINE AND ASSOCIATED INFRASTRUCTURE
- OF — EXISTING OPTIC FIBRE CABLE AND ASSOCIATED INFRASTRUCTURE
- COM — EXISTING COMMUNICATIONS CONDUIT AND ASSOCIATED INFRASTRUCTURE
- PWR — EXISTING POWER CABLE AND ASSOCIATED INFRASTRUCTURE

SCALE 1:1000 0m 20m 40m

DIAL BEFORE YOU DIG www.1100.com.au
The Essential First Step.

REV	DATE	DESCRIPTION	BY	CHKR
4	31/05/24	CADASTRAL BOUNDARIES UPDATED	BP	CC
3	26/03/24	SOUTHERN EXTENT OF PEAT AND RAFT AMENDED	JS	CNC
2	18/10/23	REISSUED FOR CONSTRUCTION	YK	CNC
1	09/10/23	ISSUED FOR CONSTRUCTION	JS	MRi
C	06/10/23	COUNCIL APPROVAL	JS	CNC
B	05/07/23	ISSUED FOR PRICING	JS	MRi

pritchard francis
430 Roberts Road
Subiaco WA 6008
PO Box 2150
Subiaco WA 6904
Telephone: (08) 9382 5111
admin@pfeng.com.au

DRAWING STATUS: FOR CONSTRUCTION
DATE: SEPTEMBER 2022 | GRID: PCG94 | DATUM: AHD
DESIGNED: CNC | DRAWN: JS | CHECKED: CNC | APPROVED: MRi
W.A.P.C.: 161199 | SCALE U.N.O.: 1:1000 @ A1

CLIENT & JOB: PARCEL PROPERTY - MOSAIC PARKSIDE
LOTS 88, 129, & 491 GRINDLEFORD DRIVE

TITLE: EARTHWORKS REMEDIATION PLAN
PEAT REMOVAL AND LIMESTONE RAFT

SHEET SIZE: A1 | DRG No.: 15029-C1-ER-101 | REVISION: 4

Appendix B: Geotextile Material Specification

www.galtenv.com.au
50 Edward Street OSBORNE PARK WA 6017
ABN: 96 520 810 622

GEOFIRMA™

POLYESTER CONTINUOUS FILAMENT PUNCHED NONWOVEN GEOTEXTILE FABRICS

TYPICAL PROPERTIES

GRADE	TEST METHOD	UNITS	AS150A	AS200B	AS270C	AS300C	AS350D	AS400D	AS500E	AS540E
TYPICAL MECHANICAL PROPERTIES										
Trapezoidal Tear Strength	AS3706.3	N	310	400	480	550	620	740	900	1050
CBR Burst Strength	AS3706.4	kN	1.8	2.5	3.5	4	4.8	5.5	6.3	6.8
Drop Cone H_{50}	AS3706.5	mm	1700	1950	2280	2500	3000	3400	4100	4400
G-Rating	Austroads	-	1750	2210	2825	3160	3795	4325	5080	5470
Grab Tensile Strength	AS2001.2.3	N	780	1070	1330	1600	1870	2130	2400	2870
TYPICAL HYDRAULIC PROPERTIES										
Pore Size (EOS)	AS3706.7	microns	110	110	100	100	80	80	75	75
Nominal Flow Rate	AS3706.9	l/m2/s	210	180	150	140	130	120	110	100
Permittivity	AS3706.9	s-1	2.1	1.8	1.5	1.4	1.3	1.2	1.1	1.0
TYPICAL PHYSICAL PROPERTIES										
Standard Roll Size	-	m	6x250	6x175	6x150	6x125	6x100	6x85	6x75	6x75
Typical Mass Per Roll	-	kg	230	230	230	230	230	230	230	235

GEOFIRMA is a trademark of Global Synthetics Pty Ltd.

GEOFIRMA geotextiles are manufactured under ISO 9001 quality assurance procedures. GEOFIRMA Geotextiles are made from 100% virgin polyester polymer filaments that are highly durable and resistant to all naturally occurring soil acids and alkalis. Polyester geotextiles are unaffected by bacteria and fungi. Properties of GEOFIRMA textiles are typical values and correspond to average values derived from in house and NATA accredited independent laboratory testing.

DISTRIBUTORS OF :

Geotextiles
Geogrids
Dewatering Tubes
Subsoil Drainage
Wick Drains
Erosion Control
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Appendix C: Geogrid Specification

www.galtenv.com.au
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ABN: 96 520 810 622

PROGRID® Composite Geogrid

GEOGRIDS – BIAXIAL STRENGTH POLYPROPYLENE SOIL REINFORCEMENT & SEPARATION GEOGRIDS

DESCRIPTION

ProGrid composite geogrid is formed by punching holes and stretching a stiff polypropylene sheet to form a geogrid with uniform openings which then has a nonwoven geotextile heat bonded to one side. The transfer of implied loads to the geogrid is by way of a combination of friction and interlocking with the surrounding granular particles. ProGrid composite geogrids provide stiff, high modulus reinforcement with the added benefit of separation. These featrues combine to allow the construction of roads and other amenities over weak, low bearing subgrades.

APPLICATION

ProGrid - Sub Base reinforcement
- Raft reinforcement construction
- Soil reinforcement

TYPICAL PROPERTIES

	Test Method	Units	30/30	40/40
Geogrid				
Polymer	-	-	Polypropylene (PP), Black	
Ultimate Tensile Strength (MD/CD)	ASTM D 6637	kN/m	30	40
Strain @ Ultimate Strength (MD/CD)	ASTM D 6637	%	13	13
Tensile Strength @ 2% Strain (MD/CD)	ASTM D 6637	kN/m	10.5	14
Tensile Strength @ 5% Strain (MD/CD)	ASTM D 6637	kN/m	21	28
Junction Efficiency (MD/CD)	GRI GG2	%	93	93
Aperture Stability	COE Method	m-N/deg	0.75	2.1
Damage Factor		%	1.02	1.02
Geotextile				
Pore Size (EOS)	ASTM D 4751	microns	110	110
CBR Burst Strength	ASTM D 6241	kN	1.8	2.5
Mass per unit area	ASTM D 5261	g/m2	150	200
Dimensions				
Roll width	-	m	3.95	3.95
Roll length	-	m	50	50

APRIL.16

DISTRIBUTORS OF :

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Wick Drains
Erosion Control
Gabions & Rock Mattresses
Industrial Fabrics
Lining Systems

Global Synthetics
Australian Company – Global Expertise

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Appendix D: Acceptance of Management Plan

Appendix E: Understanding Your Report

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UNDERSTANDING YOUR REPORT

GALT FORM PMP29 Rev3

1. EXPECTATIONS OF THE REPORT

This document has been prepared to clarify what is and is not provided in your report. It is intended to inform you of what your realistic expectations of this report should be and how to manage your risks associated with the conditions on site.

Geotechnical engineering and environmental science are less exact than other engineering and scientific disciplines. We include this information to help you understand where our responsibilities begin and end. You should read and understand this information. Please contact us if you do not understand the report or this explanation. We have extensive experience in a wide variety of projects and we can help you to manage your risk.

2. THIS REPORT RELATES TO PROJECT-SPECIFIC CONDITIONS

This report was developed for a unique set of project-specific conditions to meet the needs of the nominated client. It took into account the following:

- the project objectives as we understood them and as described in this report;
- the specific site mentioned in this report; and
- the current and proposed development at the site.

It should not be used for any purpose other than that indicated in the report. You should not rely on this report if any of the following conditions apply:

- the report was not written for you;
- the report was not written for the site specific to your development;
- the report was not written for your project (including a development at the correct site but other than that listed in the report); or
- the report was written before significant changes occurred at the site (such as a development or a change in ground conditions).

You should always inform us of changes in the proposed project (including minor changes) and request an assessment of their impact.

Where we are not informed of developments relevant to your report, we cannot be held responsible or liable for problems that may arise as a consequence.

Where design is to be carried out by others using information provided by us, we recommend that we be involved in the design process by being engaged for consultation with other members of the project team. Furthermore, we recommend that we be able to review work produced by other members of the project team that relies on information provided in our report.

3. DATA PROVIDED BY THIRD PARTIES

Where data is provided by third parties, it will be identified as such in our reports. We necessarily rely on the completeness and accuracy of data provided by third parties in order to draw conclusions presented in our reports. We are not responsible for omissions, incomplete or inaccurate data associated with third party data, including where we have been requested to provide advice in relation to field investigation data provided by third parties.

4. SOIL LOGS

Our reports often include logs of intrusive and non-intrusive investigation techniques. These logs are based on our interpretation of field data and laboratory results. The logs should only be read in conjunction with the report they were issued with and should not be re-drawn for inclusion in other documents not prepared by us.

5. THIRD PARTY RELIANCE

We have prepared this report for use by the client. This report must be regarded as confidential to the client and the client's professional advisors. We do not accept any responsibility for contents of this document from any party other than the nominated client. We take no responsibility for any damages suffered by a third party because of any decisions or actions they may make based on this report. Any reliance or decisions made by a third party based on this report are the responsibility of the third party and not of us.

6. CHANGE IN SUBSURFACE CONDITIONS

The recommendations in this report are based on the ground conditions that existed at the time when the study was undertaken. Changes in ground conditions can occur in numerous ways including anthropogenic events (such as construction or contaminating activities on or adjacent to the site) or natural events (such as floods, groundwater fluctuations or earthquakes). We should be consulted prior to use of this report so that we can comment on its reliability. It is important to note that where ground conditions have changed, additional sampling, testing or analysis may be required to fully assess the changed conditions.

7. SUBSURFACE CONDITIONS DURING CONSTRUCTION

Practical constraints mean that we cannot know every minute detail about the subsurface conditions at a particular site. We use professional judgement to form an opinion about the subsurface conditions at the site. Some variation to our evaluated conditions is likely and significant variation is possible. Accordingly, our report should not be considered as final as it is developed from professional judgement and opinion.

The most effective means of dealing with unanticipated ground conditions is to engage us for construction support. We can only finalise our recommendations by observing actual subsurface conditions encountered during construction. We cannot accept liability for a report's recommendations if we cannot observe construction.

8. ENVIRONMENTAL AND GEOTECHNICAL ISSUES

Unless specifically mentioned otherwise in our report, environmental considerations are not addressed in geotechnical reports. Similarly, geotechnical issues are not addressed in environmental reports. The investigation techniques used for geotechnical investigations can differ from those used for environmental investigations. It is the client's responsibility to satisfy themselves that geotechnical and environmental considerations have been taken into account for the site.

Geotechnical advice presented in a Galt Environmental report has been provided by Galt Geotechnics under a sub-contract agreement. Similarly, environmental advice presented in a Galt Geotechnics report has been provided by Galt Environmental under a sub-contract agreement.

Unless specifically noted otherwise, no parties shall draw any inferences about the applicability of the Western Australian state government landfill levy from the contents of this document.

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