ENGINEERING

Construction environmental management plan

Mount Lofty Golf Estate SA

JOB NUMBER:	S53897 - 282604
CLIENT:	Venture Capital Developments Pty Ltd
SITE:	Mount Lofty Golf Estate, 35 Golf Links Road, STIRLING, SA 5152
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Abbreviations

ACRONYM	DESCRIPTION
CEMP	Construction and Environmental Management Plan
CMS	Construction Method Statements
CT	Certificate of Title
DP	Deposited Plan
EIN	Environmental improvement notice
EMR	Environmental Management Representative
EPA	Environment Protection Authority
ESCPs	Erosion and sediment control plans
FMG	FMG Engineering
HSE	Health, safety and environment
HSEP	Health, safety and environment plan
HSR	Health and Safety Representatives
IR	Issue Resolution
OHS	Occupational health and safety
PPE	Personal protective equipment
PM	Project Manager
SA	South Australia
SEDMP	Soil Erosion and Drainage Management Plans
SEP	Side Entry Pit
SWMA	Safe work method statement
WMP	Waste Management Plan

Introduction

Background

FMG Engineering was engaged by Venture Capital Developments Pty Ltd (the client), to produce a construction environmental management plan (CEMP) for the construction and redevelopment of the Mount Lofty Golf Estate, 35 Golflinks Road, STIRLING, SA 5152 (the site).

Designers, clients/superintendents and contractors involved in the project have an ongoing commitment to protect the environment. The purpose of this CEMP is to identify the environmental protection measures, systems, and tools to be implemented by the appointed construction contractors during the development and construction works. These measures are aimed at preventing or minimising potentially adverse environmental impacts arising from the redevelopment and construction activities, and achieving compliance with environmental regulatory requirements. Additionally, the CEMP demonstrates a system for hazard and risk identification and determines appropriate management strategies to be adopted by appointed construction contractors to mitigate or eliminate these risks.

This CEMP has been prepared in accordance with the Guidelines for Environmental Management of On-site Remediation (SA EPA, 2019) and Guidelines for the Preparation of a Development Report, Mount Lofty Golf Estate (State Planning Commission, Department for Trade and Investment, 2002). This CEMP may be revised as the project progresses to ensure all conditions are adequately addressed.

Throughout this CEMP, all documents (i.e. drawings, diagrams, specifications, etc.) which have been developed as part of the design process, approved by the relevant authorities and issued for construction shall be broadly referred to herein as design documentation.

Objectives of the CEMP

The key performance objectives set by the CEMP are to ensure compliance with all environmental legislation and approvals, minimise the potential for pollution, reduce waste, and implement effective controls to mitigate environmental impacts. Table 1 below details specific environmental objectives and targets relevant to the redevelopment project.

Table 1 - Objectives and targets

NUMBER	OBJECTIVE	TARGET
1	To employ best management practices to ensure that the construction project meets environmental legislative requirements.	No breach of environmental legislative or regulatory requirements. No significant environmental incidents.
2	To employ best environmental management practice to ensure compliance with all planning approvals and environmental authorisations	No non-compliance with planning approvals or applicable legislative requirements.
3	To employ best environmental management practice to minimise noise and vibration impacts.	Maintain noise levels to comply with Environment Protection (Noise) Policy 2007. Maintain vibration levels within human comfort and structural damage criteria.
4	To apply best environmental management practice to soil and water (surface water and groundwater) quality management.	No breach of environmental legislative or regulatory requirements.

NUMBER	OBJECTIVE	TARGET
5	To minimise air pollution from construction and associated activities.	Levels to comply with Environment Protection Regulation 2005.
6	To protect any vegetation adjacent to the construction zone.	No impacts on trees or other native vegetation outside the construction zone.
7	To avoid pollution of the environment caused by fuels, oils or chemicals stored or used on the Project.	No major spills of fuel, oil or chemicals.

Site details

The site currently comprises the Mount Lofty Golf Estate comprising of a golf course, multiple courtyards with open grassed areas and paved areas, and an administration building in the western portion of the site. The site details are summarised in Table 2 below.

Table 2 - Site details

SITE DETAIL	RESULT
Site Address	Mount Lofty Golf Estate, 35 Golflinks Road, Stirling, SA 5152
Land Parcel	Allotment 53 in Deposited Plan (DP) 59212 Hundred of Onkaparinga
Certificate of Title (CT)	CT5891/805
Land Use	Golf Course
Zoning	Recreation
Size of Project Area	Approximately 4 hectares (Ha)
Local Government Authority	Adelaide Hills Council

Site location and surrounding land use

The site is situated approximately 13km southeast of the Central Business District of Adelaide, located in the Adelaide Hills region and is bounded by the following:

- **North**: Old Carey Gully Road and rural residential properties and vineyards beyond
- **East**: Mount George Conservation Park
- **South**: Mount George Conservation Park, Golflinks Road and residential properties, and
- **West**: Golflinks Road and residential and rural residential properties.

The regional setting and site boundaries are presented in Appendix A.

Project description

The proposed development is summarised as follows:

- Hotel – 3 to 5 level hotel building comprising:
  - 56 hotel suites
  - 15 x two bedroom serviced apartments
  - 15 x three bedroom serviced apartments
  - 2 penthouse serviced apartments
  - Back of house, plant storage and maintenance areas
  - 537m^2 function room
  - 212m^2 restaurant with 89m^2 external terrace
  - 186m^2 sports bar
  - 189m^2 gallery and cafe
  - 94m^2 wellness centre with 125m^2 gym and spa/massage treatment rooms
- Private retreats – 'Pods'
  - 17 x one bedroom units

    - 1 x back of house Service Pod
- Adaptive reuse of the existing perfumery:
    - Refurbishment of the existing local heritage place to accommodate a multipurpose space for use as café, retail or functions
    - Extension to the Perfumery to include a covered outdoor dining area
    - Orchard and perfumery garden plantings to reimagine the former use of the building as a "Scent Factory"
    - Note: the perfumery building will temporarily house the golf club whilst construction is occurring
- Golf Course Facilities Building – 2 to 5 level building comprising:
    - Retention of 18-hole golf course with improvements
    - Refurbished function facilities, cart storage and 138m^2 clubhouse in new building
    - New 97m^2 pro-shop, administration areas, gym and change rooms
- Car parking, access and waste management
    - A total of 200 car parking spaces in two car parking areas
    - Emergency vehicle access via western entry from Golflinks Road
    - Main access point via Golflinks Road
    - Designated service bay for waste collection and service vehicles
    - Porte cochere and valet area for guests and buses
    - A separate entry from Old Carey Gully Road to provide maintenance vehicle access and public access to the perfumery building
    - Designated waste storage areas
- Subdivision – following construction of the proposed development, it is proposed to divide the site into three (3) allotments:
    - Allotment 532, with an approximate area of 9,924m^2 together with a right of way 'A', comprising the hotel building and pods
    - Allotment 533, with an approximate area of 5,056m^2 together with a right of way 'B', comprising the golf club and facilities building, and
    - Allotment 531, with an approximate area of 38.4 hectares, comprising the balance of the golf course, subject to easements 'A' and 'B'.

Scope of works

The scope of works includes but is not limited to:

- Prior to the commencement of works, the Contractor shall submit to Council, owners and occupants of adjoining properties written notice of their intention to commence work, expected duration of the works and a description of the type and extent of work.
- Where the works are adjacent to existing properties / structures, the Contractor shall undertake a condition report (dilapidation) to record the condition of the existing structures prior to commencement of works. The report shall also include coverage of existing roads, kerbs, crossovers etc. adjacent the site, as a baseline of the condition of Council infrastructure. A copy of the condition report shall be forwarded to the client/superintendent prior to the commencement of works.
- Prepare and maintain a Waste Management Plan (WMP) to track all possible waste streams.
- Identify all existing authorities and internal services prior to commencing works. If decommissioning of an authority service is required, the decommissioning and removal shall be coordinated and allowed for by the Contractor. If a service to remain is damaged during the works, it is the responsibility of the Contractor to make good the damage to the satisfaction of the service authority at the Contractor's cost.
- Establish any Soil Erosion and Drainage Management Plans (SEDMP) measures required
- Establish an appropriate perimeter fence and signage to prevent public access to the site for the duration of the works. It is the Contractor's responsibility to safeguard and ensure the safety of any person who may enter or trespass upon any part of the works.
- Locate all existing services and if live, arrange for their decommissioning and removal. Services (structures and pipes/cables) are to be completely removed and service trench excavations shall be backfilled with existing excavated material. If there is a shortfall of material and the finished level of the trench backfill is lower than the surrounds, the edges shall be battered to make safe and remove any trip hazards. Services may include:
    - Stormwater Side Entry Pits (SEP), grates and pipes
    - Sewer structures and pipe
    - Electrical including lighting, security cameras
    - Communications, and
    - Water services and/or irrigation.
- Clearing, grubbing and levelling of the site prior to beginning construction works (i.e. removal of tree/root ball resulting in open excavation to be reinstated).
- Demolition of six existing buildings.
- Document the fate, transport and destination of any removed materials and volumes.
- General tidy/levelling post clearance/grubbing to remove any sharp elevation changes or trip hazards.
- Undertake bulk earthworks (including stormwater basins) to prepare site as outlined in the design documentation.
- Construction of concrete retaining structures and associated earthworks infrastructure as outlined in the design documentation.
- Construction of pavements, drainage and associated civil infrastructure as outlined in the design documentation.
- Construction of concrete slabs as outlined in the design documentation.
- Construction of the following and all associated infrastructure
    - 3-5 level hotel building
    - 17 private retreats (pods) and one service pod
    - New golf course facilities building incorporating a pro-shop, administration areas, gym and change rooms, and
    - Two car parking areas with a total of 200 car parking spaces.
- Conservation works and adaptive reuse of the existing perfumery, a local heritage place, to accommodate a multipurpose café, retail, and function space.

- Retention and improvements to the 18-hole golf course including relocating Hole 17's green and Hole 18's tee.
- Installation of services (i.e. electrical, communications, water, sewer) as outlined in the design documentation.

The above scope of works and the plans provided in Appendix B have been prepared with due care and identify and highlight the known works required. The contractor is to carry out a detailed site inspection in order to determine the complete scope of works, including demolition, clearing and grubbing. Any omissions to this scope that are obvious onsite shall be deemed to have been included unless they are not reasonably identifiable.

Planning

Method statements

Detailed work method statements will be developed where there is a significant risk to the environment. Work method statements will be provided for final approval prior to commencing work. Method statements will include the following as a minimum (but not limited to):

- Procedures for managing the environment
- Labour requirements including subcontractors
- Permit requirements
- Signs, labels and markers, and
- Storage and transport.

South Australia's waste strategy

South Australia's Waste Strategy 2005–2010 sets the overall framework and aims for sustainable waste management in the State. It aims for the diversion of waste in accordance with the waste hierarchy (Figure 1) to more sustainable options. This means that the recycling and reuse of waste should be an alternative to disposal (the least preferable option) but should not be at the expense of more preferable options.

Figure 1 - The waste hierarchy

Regulations and Legislative requirements

The proposed works to be undertaken will comply with applicable environmental regulatory and legislative requirements. The following provides a summary of the general requirements for the proposed works.

Table 3 - Applicable Legislation relevant to the development

LEGISLATION/REGULATION/POLICY	KEY PROJECT REQUIREMENTS
Occupational Health Safety and Welfare Act 1986	Clearance work notices given under the Occupational Health Safety and Welfare Act 1986 will continue to be recognised under the Work Health and Safety legislation (r711) where the work is scheduled to commence on or after 1 January 2013; and where they involve: · A loadbearing structure (or part of) > 6m in height

LEGISLATION/REGULATION/POLICY	KEY PROJECT REQUIREMENTS
	• Load shifting machinery on a suspended floor, and • Explosives.
Work Health and Safety Act 2012; Work Health and Safety Regulation 2012	All works undertaken onsite shall be undertaken in such a manner as to prevent harm to site workers and the general public.
Environment Protection Act 1993 (the Act) and Environment Protection Regulations 2009 Handbook for Pollution Avoidance on Commercial and Residential Building Sites, second edition, SA EPA.	Undertake all activities so as to minimise harm to the environment (in particular pollution of air and water and noise emissions) and not cause an offence under the Act. Some transporters of waste are required to be licensed under the Act. Some waste disposal/processing facilities are required to be licensed under the Act.
EPA Guidelines for Environmental Management of On-Site Remediation (2006) ASC NEPM (2013) Guideline on Investigation Levels for Soil and Groundwater. National Environment Protection (Assessment of Site Contamination) Measure Schedule B(1). National Environment Protection Council.	Works onsite associated with any disturbance of soils shall be undertaken in such a manner as to meet the mandatory requirements and expectations of the SA EPA to ensure the ongoing protection of human health and the environment.
Environment Protection (Waste to Resources) Policy 2010 Waste Disposal Information Sheet, SA EPA (2010), Current Criteria for the Classification of Waste – Including Industrial and Commercial Waste (Listed) and Waste Soil. SA EPA Guideline: Wastes containing asbestos – removal, transport and disposal [EPA414/14, April 2014] Standard for the production and use of Waste Derived Fill (WDF), dated October 2013	The project should aim to achieve sustainable waste management by applying the waste management hierarchy consistently with the principles of ecologically sustainable development set out in Section 10 of the Environment Protection Act 1993 (the Act).
ASC NEPM (1999), Schedule B(9) Guideline on Protection of Health and the Environment during the Assessment of Site Contamination National Environment (Ambient Air Quality) Protection Measure 1998 enHealth (2012), Environmental Health Risk Assessment—Guidelines for assessing human health risks from environmental hazards	Offensive vapours / hazardous ground gases that may be encountered during the works will be managed in accordance with the stated documents.
Environment Protection (Water Quality) Policy 2003 Code of Practice—Industrial, Retail and Commercial Stormwater Management (in draft at date of publication)	Ensure that all environmental values are protected during the development works, including: • maintenance of aquatic ecosystems • drinking water

LEGISLATION/REGULATION/POLICY	KEY PROJECT REQUIREMENTS
	· agriculture and aquaculture (including irrigation and livestock) · recreational uses (eg swimming or boating) and aesthetics (visual appearance and enjoyment) · industrial uses.
AS 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites General Environmental Noise (May 2013), EPA Information Sheet 424/13 EPA Information Sheet Handbook for Pollution Avoidance on Building Sites (2nd ed. June 2004)	Noise levels during construction works will be managed in accordance with the policies.

Hours of operations

Standard working hours of 7am to 7pm Monday to Saturday apply in accordance with the SA EPA regulations, unless negotiated otherwise with Council. Sundays and Public Holidays 9am-7pm (if work is essential).

Site establishment and security

Site establishment shall include:

- Fencing the site to prevent public access and installation of shade cloth to assist with control of dust
- The establishment of site contractors' offices and mess and associated toilet facilities
- Designated car parking areas, vehicle access and vehicle loading, unloading and lay down areas, commissioning of equipment, plant and operations and establishment, and
- Maintenance of on-site work areas.

Signage, whilst important, is a relatively unsatisfactory way of communicating information to people about the Site and in general, its use would appear limited. Potential safety measures include:

- Secure fencing around the entirety of the Site to restrict view of and access by the public and provide protection from physical hazards particularly adjacent the nearby Sturt Highway and residential properties. Any unsupervised excavations (including pits) should never be left open or unfenced as they present a hazard to site personnel and unauthorised visitors.
- *Warning Deep Excavation* signs shall be placed around the external perimeter as appropriate and where any excavation works are required
- Requirement for all visitors to report to the site office to receive further instructions
- Site induction for all workers and visitors to the Site, and
- Records of those who attend the site.

Roles and responsibilities

The responsibility and authority pertaining to environmental performance of the project is specified below.

All personnel

All personnel (including sub-contractors) have a general environmental duty of care (as defined in the Environmental Protection Act 1993) and are responsible for their own environmental performance whilst on the project.

As a minimum, personnel are required to:

- Comply with the requirements of applicable environmental legislation and environmental authorities including the specific requirements of the project approvals and supporting documentation
- Undertake all activities in an environmentally responsible manner
- Undertake all activities in accordance with this CEMP, procedures and any subsequent work method statements
- Identify and report any non-conformances with environmental management, legislative or approvals requirements
- Ensure that they are aware of the contact person regarding environmental matters and report any activity that has resulted in, or has the potential to result in an environmental harm
- Ensure that they attend any environmental training provided relevant to their role and responsibilities, and
- Support the construction team in planning and implementing environmental requirements.

Key personnel

Environmental management representative (EMR)

The EMR is an individually appointed and independent third party, with experience and qualifications in environmental management. The EMR has primary responsibility for managing all aspects of environmental management and compliance for the construction phase of the Project. The key responsibilities of the EMR are to:

- Develop and implement this CEMP and provide updates/revisions to the CEMP as necessary
- Conduct (or assist the PM in) environmental briefings and toolboxes to construction staff
- Conduct environmental site inspections
- Identify and report non-conformances to the client/superintendent
- Monitor the implementation and effectiveness of the CEMP
- Complete environmental reporting requirements
- Provide advice and direction on environmental matters, incident response and corrective actions
- Review statutory compliance and ensure check all approvals are complied with, and
- Monitor and ensure compliance with all applicable legal, approvals and project environmental obligations including but not limited to this CEMP.

Project manager (PM)

The Project Manager (PM) is responsible for delivery of the construction phase of the Project to ensure that environmental impacts are minimised, and obligations are met. The PM will be working in conjunction with the Environmental Management Representative (EMR), as required to ensure that the construction team delivers the prescribed environmental outcomes.

Key tasks include:

- Ensure compliance with all applicable legal, approval and project environmental obligations including but not limited to this CEMP

- Ensure all project staff have a clear understanding of the environmental requirements relevant to their area/scope of work
- Ensure all project staff are competent to undertake their duties including fulfilment of the general environmental duty, with regard to appropriate education, training and experience
- Ensure the necessary resources and processes are in place for implementation of required environmental controls
- Ensure all site superintendents /supervisors are familiar with environmental obligations, project approvals, CEMP and site level plans, relevant environmental management plans and associated documents, and their responsibilities within them
- Participate and provide guidance in the regular review of the CEMP and any associated documents
- Act in the event of an emergency and allocating the required resources to minimise environmental impact
- Ensure non-conformances are identified, recorded and reported and that required corrective and remedial actions are implemented, and
- Report any activity that has resulted in an environmental incident to the EMR and the client.

Site supervisor/Foreman

Supervisors/Foreman report to the PM. They will have a direct role in the compliance with identified environmental procedures and controls. They will also be responsible for checking the site on a regular basis and ensuring that regular maintenance is undertaken to minimise environmental impacts and that personnel are provided with appropriate environmental "toolbox" training, prepared by the EMR. Where applicable the Supervisor/Foreman will be responsible for ensuring that any work performed by external parties meets with the requirements of this CEMP, including identifying and documenting the environmental risks of the proposed works.

Key tasks include:

- Ensure all personnel and subcontractors are made aware of the requirements for compliance with this CEMP, environmental obligations and site-specific environmental issues
- Implement all environmental requirements as outlined in this CEMP as required to avoid and minimise actual or potential environmental harm
- Support the Environment Management Representative in planning and implementing environmental requirements
- Ensure non-conformances are identified, recorded and reported
- Ensure implementation of preventative and corrective actions
- Co-ordinate the implementation and maintenance of environmental control measures
- Provide necessary resources required for implementation of the CEMP
- Co-ordinate action in emergency situations and allocating required resources accordingly, and
- Ensure that instructions are issued, and adequate information is provided to field-based employees that relates to environmental risks on site including via regular toolbox meetings that address environmental issues and controls including the requirements of this CEMP.

Construction personnel

In addition to the key positions outlined above, with respect to environmental management, all staff working on the project including but not limited to construction workers, personnel involved in preparatory works for construction, surveyors, geotechnical consultants and any other persons undertaking investigations or works for preparatory works have responsibility for environmental performance of the project.

The responsibilities of these personnel include:

- Attend all environmental training required and adhere to and remain familiar with the principles covered in the training session(s)
- Undertake all activities in accordance with agreed procedures and work methods

- Ensure that they are aware of the contact person for environmental matters
- Ensure that any clearances are obtained from the EMR where required, and
- Report any activity that has resulted in an environmental incident.

General Site Personnel

In addition to the key positions outlined above, with respect to environmental management, all staff working on the project including but not limited to clearance workers, personnel involved in bulk earthworks construction, general concrete works, pavement construction, service contractors, mechanical plant specialists, surveyors, engineers and any other persons undertaking investigations or works for the construction of the project have responsibility for environmental performance of the project. The responsibilities of these personnel include:

- Attend all environmental training required and adhere to and remain familiar with the principles covered in the training session(s)
- Undertake all activities in accordance with agreed procedures and work methods
- Ensure that they are aware of the contact person for environmental matters
- Ensure that any clearances are obtained from the EMR where required, and
- Report any activity that has resulted in an environmental incident.

Sub-contractors

It is recognised that often sub-contractors present the greatest environmental risks to a project due to:

- Their detachment from the main construction delivery teams, and therefore the potential for poor communication regarding environmental risks
- Sub-contractors having different certification standards for quality assurance and environment
- The potential for large number of subcontractors on site, and
- Sub-contractors operating under a different management system from the rest of the construction team.

It is the PM responsibility to ensure that all persons on the Project including sub-contractors and their employees are notified on their need to comply with the relevant environmental requirements. As a minimum, sub-contractors and their employees will be required to comply with the CEMP in full.

All sub-contractors' personnel are considered equivalent to the construction team personnel in all aspects of environmental management and control, and their responsibilities in this respect mirrors those of the construction team personnel.

Sub-contractors working on the Project will be required to:

- Observe sub-contract and statutory requirements relating to environmental protection and other environmental legislation and to follow instructions issued by the Project Manager and supervisory personnel
- Nominate Site representatives to liaise with the construction team with respect to, and take responsibility for, environmental requirements for the Site activities
- Adhere to the Site management system as it applies to their operations on the site
- Co-operate fully with Site emergency incident procedures and consultative arrangements, and
- Follow procedures incorporated in this CEMP.

The PM will ensure that the work of sub-contractors is monitored through the Site inspection process. Observations will be made by relevant personnel to assess the effectiveness of the environmental protection measures being used on site by the sub-contractor and to determine compliance with the requirements of the CEMP.

Environmental aspects, impacts and risks

Environmental aspects, as referred to in this document, are those activities associated with the project that have the potential to cause, or result in, adverse environmental impacts. Due to the nature of the development, different aspects of the Project would present different degrees of environmental risk which need to be managed accordingly.

Effective environmental management should be proactive rather than reactive. In order to facilitate a proactive style of environmental management, a risk management style of assessment has been utilised to identify and assess environmental aspects associated with the Project, and to implement appropriate mitigation strategies to minimise the likelihood of environmental risks associated with each aspect. This process involves:

- Identifying the risk/aspect
- Analysing the risk/aspect (determining likelihood and consequence)
- Evaluating the risk/aspect, and
- Treating the risk.

All identified aspects are assessed based on the risk assessment matrix displayed in Table 4. Risk assessment is based on:

- The likelihood of an impact occurring as a result of the aspect, and
- The consequences of the impact if the event occurred.

Following this assessment, each impact is assigned a risk category which range from "low" (low likelihood and consequence) to "extreme" (high likelihood and consequence). A risk category identified as having an extreme or high risk (a significant impact) may be downgraded if appropriate environmental controls and measures are implemented and maintained. Proactive planning, installation and maintenance of appropriate environmental controls and ongoing monitoring will reduce the risks associated with each environmental impact identified for the project.

Table 4 - Risk Matrix and Qualitative Measures of Likelihood Scale

		CONSEQUENCES				
LEVEL	**LIKELIHOOD**	**1**	**2**	**3**	**4**	**5**
		Negligible Discharge	Uncontrolled Discharges in minor quantities	Moderate breach of environmental statutes	Major breach of environmental statutes	Shutdown of project due to environmental breach
A	Almost Certain	H	H	E	E	E
B	Likely	M	H	H	E	E
C	Moderate	L	M	H	E	E
D	Unlikely	L	L	M	H	E
E	Rare	L	L	M	H	H

LEVEL	CATEGORISATION OF LIKELIHOOD	DESCRIPTION
A	Almost Certain	Is expected to occur during the project, 90% or > probability
B	Likely	Will probably occur during the project, ~50% probability
C	Moderate	Might occur at some time during the project, ~10% probability
D	Unlikely	Could occur at some time during the project, ~1% probability
E	Rare	Only occur in exceptional circumstances, < 1% probability

Table 5 details the environmental aspects identified for the Project, the initial risk category prior to appropriate management strategies, the proposed management strategy, and a revised risk category. Control measures and safeguards to minimise and manage environmental risks are also presented following in Table 5.

Table 5 - Key Aspects, Potential Impacts and Risk Analysis for the Project

ITEM	POTENTIAL IMPACT	POTENTIAL RECEPTORS / TRANSPORT MECHANISM	UNTREATED RISK CATEGORY	MITIGATION MEASURE	REVISED RISK CATEGORY
Soil and Groundwater Impact	Spills and leaks during plant maintenance / operation resulting in soil / groundwater contamination.	Future site users, all onsite workers and Biota (particularly relevant to the upper 2 m of the soil profile), / downward leaching through soils and infiltration to groundwater, exposure (dermal contact) during piling works and excavation works	(C2) Medium	The use of dangerous substances at the site should be undertaken in accordance with the requirements of the SA Dangerous Substance Act and Regulations. Refuelling of vehicles should be undertaken off-site. No fuel should be stored on site other than small jerry can-like containers used to top up portable pumps such as flex-drives. If any re-fuelling and emergency servicing is required, it is to be undertaken on a quarry rubble hardstand area created for this purpose. The quarry rubble is to be underlain by an impervious plastic membrane. At the end of the works, the hard stand is to be scraped up and disposed of in accordance with SA EPA requirements. The cleaned surface under the hardstand is to be inspected and validated by the Environmental Consultant. The potential for loss of chemical substances on site, be it through deliberate or accidental means, and the type and toxicity of the chemical substances to be used, should be considered when management procedures and emergency response plans are formulated. Chemical substances should be separated according to their respective class and should not be stored in the vicinity of sensitive structures. The storage and refuelling areas are to be equipped with emergency spill kits appropriate to the level of risk and potential volume of any potential spill. If a spill occurs it is to be responded to and cleaned up immediately. A non-conformance is to be raised. If necessary, Emergency Services shall be notified, and any required Regulatory Notifications made in consultation with the Environmental Consultant. Specified personnel will be provided with spill management and emergency response training including the location and application of spill kits and associated remediation products.	(E2) Low
	Soil contamination as a result of the importation of contaminated fill material for backfilling or site preparation		(B4) Extreme	Only fill material that meets the physical and chemical requirements of waste derived fill (WDF) in accordance with the *Standard for the production and use of Waste Derived Fill* (WDF), dated October 2013 can be imported onto the site for backfilling or site levelling purposes. The supplier of the material (virgin and waste fills) is to provide certification that material is chemically and aesthetically suitable and not contaminated prior to acceptance by the authorisation holder. Records of all imported material shall be maintained on site and made available to the EMR for review prior to delivery of the material to site. All soils intended for importation and reuse onsite must firstly be approved by the environmental consultant.	(E1) Low
	Cleaning of trucks resulting in ground contamination and/or water pollution, particularly the coastal and marine environment		(C3) High	Trucks, pumps and equipment must not be washed down in roadways, footpaths or reserves. Suppliers shall be informed that where practical, wash-down must be delayed and carried out at their respective depots. Where absolutely necessary these vehicles and equipment should be washed down within the designated contained vehicle wash-down area within the site.	(D2) Low
	Surface water/ waste water being incorrectly disposed offsite resulting in off-site contamination	Storm water, construction workers / dermal contact.	(D4) Extreme	Surplus wastewater, including that from brick cutting activities should be recycled, disposed to sewer (with SA Water Trade Waste approval) or discharged into the nominated on-site soakage area for drying by soakage. Site mixing of concrete, either by hand or by mechanical means, shall be carried out in the designated vehicle, plant and equipment cleaning area of the site which is capable of containing all excess water for disposal by a licensed contractor. If dewatering processes are required, personnel conducting dewatering activities must be provided with adequate instruction. The area dewatering processes may be controlled using a variety of sheet piles, containment berms, cut off trenches, sand bags, hay bales, clean rock, geotextile, etc. All persons carrying out dewatering activities (in any form) shall take all reasonable and practical measures to ensure: • dewatering wastewater is treated to meet requirements and is discharged or disposed in a way that does not cause environmental harm or environmental nuisance, • all water treated offsite is done so in accordance with relevant legislation, and • no offensive odours or nuisance noise are released as a result of dewatering.	(E2) Low

ITEM	POTENTIAL IMPACT	POTENTIAL RECEPTORS / TRANSPORT MECHANISM	UNTREATED RISK CATEGORY	MITIGATION MEASURE	REVISED RISK CATEGORY
Stormwater, site erosion and sedimentation	Tracking of sediment onto public roads from fleet leaving site.	Storm water, construction workers, off-site users, biota / impact on water quality and biota due to off-site migration pathways, dermal contact, inhalation, ingestion	(B3) High	The Contractor Project Manager is to ensure that all exiting vehicles are to be inspected; where mud or debris is found, the vehicle is to be turned back for cleaning and reinspection. If there is a breakdown of the environmental management controls and excess dirt, dust, debris that may cause a nuisance is trafficked into the public roadway, the Contractor Project Manager will immediately arrange for the roadway to be cleaned using a street sweeper.	(D2) Low
	Increased rates of erosion and sedimentation of hardstand areas and unsealed surfaces.		(B4) Extreme	Establish appropriate sediment and erosion control onsite, which complies with applicable state and council legislative requirements, namely *Environment Protection (Water Quality) Policy 2003* and *Local Government Act 1999*. Sediment control planning shall incorporate the usage of hay bale barriers, silt fences and side inlet pit sediment traps as per the requirements of the Stormwater Pollution Prevention, Code of Practice for the Building and Construction Industry, SA EPA, March 1999 (SA EPA, 1999). Regular inspections during construction activities and after significant rain events (>10mm/24h) to ensure they are operational and undertake maintenance repair works as required. Stormwater Management Plans for the site will be prepared prior to commencement of works and may include site grades, temporary perimeter bunding and temporary drainage channels and retention basins. During excavation works and as necessary, temporary drainage channels and detention pondage may be installed to appropriately manage stormwater. If required, diversion drains will be constructed to minimise runoff from rainfall flowing into the works area and the flow of waters from stockpiles. All liquids encountered on site displaying a visible sheen or odour whether they be pooled rainwater or perched groundwater must be retained on-site (unless assessed and approved for off-site disposal by appropriately licensed waste haulage personnel) or released to the stormwater system following approval from SA Water.	(D2) Low
	Erosion and sedimentation of potentially contaminated and natural soils resulting in pollution off site to adjacent storm water and coastal and marine environment		(A5) Extreme		(D2) Low
	Poorly maintained or inadequate erosion and sediment control measures not effectively treating construction run-off on site resulting in a pollution event.		(B5) Extreme		(D2) Low
	Inappropriate management of sediment trap discharge resulting in storm water pollution.		(B4) Extreme		(D2) Low
	Inappropriate stockpiling of material potentially resulting in a pollution event.		(C3) High		(D1) Low
Asbestos	Discovery of asbestos materials identified onsite.	Construction workers, adjacent sensitive site users / inhalation of fibres	(D5) Extreme	All asbestos containing materials must be identified and removed by a *Class A* licensed asbestos removalist contractor prior to commencement of demolition works. Under regulation 475 air monitoring must be conducted at all licensed asbestos removals by an independent licensed asbestos assessor. This requirement also applies to Class B removals via transitional regulation 726.	(D1) Low
Wind	Excessive dust emissions during clearance works resulting in a community complaint.	Construction workers, adjacent site users / direct dermal contact, inhalation, accidental ingestion	(B4) Extreme	Dust may cause potential health and environmental impacts if generated at unacceptable levels adjacent to sensitive receptors, with finer dust particles able to be transported offsite for considerable distances in prevailing winds. Small dust particles are respirable and thus can cause serious respiratory health problems by entering the lungs, whilst larger particle sizes are generally caught in the respiratory tract and may result in less serious conditions such as sinus congestion, sneezing or coughing. Dust dispersion may also impact the surrounding area, particularly where dust becomes wet and/or enters the stormwater system. Construction activities, with a particular focus on demolition and earthworks exercises, will be undertaken in a manner which minimises the generation of dust emission on site. This includes utilising water carts for dust suppression, restricting vehicle speeds on site, modifying construction activities during high wind period, stabilising hardstand areas, and covering vehicle loads prior to leaving site. Stockpiles of material, if not correctly managed, can represent a considerable source of dust, due to their height and un-compacted nature. Additional information relating to the management of stockpiles is provided in Section 5.2. Dust levels during works shall be monitored (visually) by the Contractor during all external works.	(C1) Low
	Exposed areas/surfaces contributing to increased dust emissions on site.		(B4) Extreme		(C1) Low
Protection of trees and vegetation	Inadvertent removal of trees during works.	Biota	(D3) Medium	There are a small number of trees which will require demolition, particularly to facilitate the new access road, the contractor shall ensure trees to be demolished are inspected and approved with a suitably qualified arborist/representative from Council prior to demolitions. Trees to be demolished or protected are to be clearly marked prior to demolition works beginning. If damage to native vegetation occurs, the contractor on behalf of the owner of the land, will be responsible for obtaining approval for their removal if required.	(E1) Low

ITEM	POTENTIAL IMPACT	POTENTIAL RECEPTORS / TRANSPORT MECHANISM	UNTREATED RISK CATEGORY	MITIGATION MEASURE	REVISED RISK CATEGORY
Noise and Vibrations	Excessive noise and vibration construction works resulting in a community complaint.	Surrounding residents, adjacent site users, buildings, and structures	(C2) Medium	Construction activities will occur in a manner which minimises the potential for noise and vibration impacts on sensitive receivers, recreational users, heritage structures etc. This includes operating during the approved weekend construction hours, turning off machinery and equipment when not in use, minimising reversing and horn signals, ensuring plant and equipment are operated and maintained in a satisfactory manner and abiding by proximity limits. Vibration from the use of heavy machinery at the site can cause structural damage to nearby structures. The zone that will be potentially affected by vibration shall be determined prior to the commencement of site works. The selection of equipment shall take account of the degree of vibration compatible with adjacent structures. If vibration becomes excessive, the offending machine/ work will cease operation until appropriate vibration levels can be achieved. Where potential for damage to occur exists, construction trials including vibration monitoring at structures at risk are to be carried out. Appropriate measures should be undertaken by the contractor to maintain the integrity of the surrounding infrastructure. In the event that public complaints are received, methodologies will be reviewed, and alternate methods implemented. Involvement and communication with the neighbouring residential site occupants is necessary to prevent undue concerns regarding management of the initial earthworks and risks associated with the works. A complaints register will be established by the Project Environmental Manager. The register will comprise a system or protocol for the receipt, recording and response to community complaints, and methods for dealing with complaints. Complaints about environmental matters associated with earthworks activities will be treated as non-conformances.	(D2) Low

Health, safety and environment plan (HSEP)

A detailed Health Safety and Environment Plan (HSEP), which will include a health and safety risk assessment for the planned construction works will be prepared by the Contractor for the Site.
The HSEP shall include, but not be limited to:

- Naming key personnel responsible for Site safety
- Describing the risks associated with each operation conducted
- Confirming that on-site personnel are adequately trained to perform their job responsibilities
- Describing the protective clothing and equipment (i.e. gloves, boots and hard hats) to be worn by personnel during various Site operations
- Describing the actions to be taken to mitigate existing hazards to make the work environment less hazardous
- Describing the type of emergency equipment to be available during the works, and
- Setting out a contingency plan for safe and effective response to emergencies.

The plan would include telephone numbers for emergency services and a map showing the route to the closest hospital.

Traffic control

All traffic to and from the Site will be through the main Site entry point. Parking for Site workers and visitors will be provided on-site at a designated area.

Transportation of "over-sized" equipment will be performed outside peak hours with appropriate signage and in accordance with DPTI regulations.

In addition to the above:

- Only designated transport routes will be used over the duration of the proposed works which will be communicated to haulage contractors
- No vehicles are to arrive at the Site outside the Site working hours
- Site workers are to utilise local public transport system and car sharing wherever possible, and
- Trucks will only leave the Site when they have reached their capacity loads wherever possible.

Project specific OHS and environmental procedures

Occupational health safety (OHS)

The Construction Manager should prepare and administer an Occupational Health and Safety (OHS) plan in accordance with the Work Health and Safety Act 2012 and the Work Health and Safety Regulations 2012. Reference shall also be made to approved codes of practice and standards.

The plan shall take into account all potential safety issues highlighted in or arising from the General Specification, the CEMP and site specific OHS plans including the following:

- Specific OHS requirements such as vapour monitoring
- Personal protective equipment (PPE)
- Engagement of a qualified occupational hygienist, and
- Contractor responsibilities.

The following issues should be addressed as part of the development of the plan in order to ensure appropriate health and safety conditions exist for workers and the general public:

- Evaluation of hazards
- Assessment of risks
- Determination of safety equipment and procedures, and
- Determination of measures to ensure general public health.

All personnel involved in site works inducted by the site OHS representative, will read and understand the OHS requirements and sign a compliance agreement. Copies of the plan shall be available and accessible to site personnel for reference and review. The construction manager should ensure that regular OHS meetings with site workers are conducted to review safety requirements and ensure any non-conformance issues are adequately addressed.

The OHS plan would include details of:

- Site specific hazards
- Exposure risks
- Site control procedures
- Contaminants and hazard identification and precautions
- Warning symptoms from exposure to contaminants
- Protective equipment requirements and usage
- Decontamination facilities and procedures
- Prohibitions, and
- Emergency response procedures.
- Responsible persons
- Nearest medical facilities
- Appropriate supervision
- Safe operating procedures
- Procedures for confined space entry
- Safety equipment and procedures for First Aid, and
- Training and education of employees and supervision.

The Contractor will ensure that at least the minimum number of Designated First Aiders (in accordance with SafeWork SA Approved Code of Practice for First Aid in the Workplace), including the OHS representative, holds a current accredited first aid certificate and will supply a specified area (First Aid Room) for treatment/assessment purposes.

Personal Protective Equipment

Earthmovers, contractors and others involved in the redevelopment earthworks must be equipped with safe work clothes and PPE including items such as:

- Eye protection for example, safety goggles and glasses
- Foot protection for example, safety shoes and boots
- Head protection for example, hard hats, helmets and broad brimmed hats
- Body protection for example, long-leg trousers, overalls, gloves, long-sleeved shirts and high visibility clothing
- Hearing protection for example, ear plugs and earmuffs, and
- Any substance used to protect health, for example, sunscreen.

In the event that dust is generated by the works, appropriate mitigation measures will be implemented, ensuring the risk level is mitigated to safe working levels (i.e. dust masks etc. are not required) in the first instance.

Management strategies

General approach

The timing of installation of control measures will be critical to ensuring that environmental obligations are met within the required timeframe and that controls are effective in achieving their purpose.

Control measures and safeguards to minimise and manage environmental risks identified in the sections below. A program of routine maintenance will be conducted on environmental controls. Daily inspections of work areas will be undertaken by PM and Site Foreman and inspections will be undertaken by the EMR as required. These inspections will provide a means for identifying maintenance requirements before they reach a critical stage.

Vehicular access

Traffic movements from the site should be limited where possible, including allocating dedicated site vehicles/machinery (water trucks, excavators, tipper trucks etc.) that shall remain on site during the program rather than traversing to and from site each day.

The transport route should be subject to the same levels of management as the site, including hours of operation/use, dust, noise and sedimentation management.

All vehicles should have loads covered (where applicable) and should be appropriately washed-down before leaving the site to limit transport (drag-out) of material/dust off-site. The Construction Manager should provide a specified area for the wash-down and construct a "shaker" if conditions warrant.

All vehicle movements to and from the site, within the near vicinity of the site, should be strictly within site operating hours.

Erosion and sediment control plans (ESCPs)

The PM and Superintendents will be responsible for the development and implementation of ESCPs on site as required. This will ensure that erosion and sediment management is incorporated into the planning phase of construction activities. Erosion and sediment controls are outlined in Table 6 and in the ESCP provided in Appendix C. However, it is expected that minor adjustments to ESCPs will be required on site to complement construction activities.

Noise

Noise should be managed to ensure impacts to onsite workers and neighbouring residences are minimised. This can be achieved through selection of appropriate equipment and timing of use, noise suppression equipment (mufflers, etc.) on any excessively noisy machinery (eg. compressors, air scrubbers) and keeping machinery in good repair. Specific noise controls are outlined in Table 7.

Reference should be made by the Project Manager to the SA EPA *The Environment Protection (Noise) Policy 2007 and its impact on existing and proposed developments 2007*.

Vibration control

The use of large excavators, rollers etc. should be kept to a minimum along boundaries to reduce the impacts of vibration on neighbouring properties.

Appropriate measures should be undertaken by the Project Manager to maintain the integrity of the surrounding infrastructure.

In the event that complaints are received methods should be reviewed by the Project Manager and alternate methods implemented.

Air quality (dust)

Dust control measures should be implemented during any upgrade works. For the purposes of this CEMP, dust refers to particulate matter including airborne dust, and organic solids.

Dust dispersion may cause problems with impacting the surrounding area, particularly where dust becomes wet and/or enters the stormwater system.

Dust suppression, as part of all site works, should be adequate at all times during and outside of normal working hours. Dust suppression mechanisms should be applied by the Contractor when:

- Unsealed access routes and exposed ground surfaces are dry, and wind and vehicle movements result in visible dust generation
- Exposed surfaces of potential material stockpiles are dry and wind or handling activities result in dust generation
- Dust generation is visible during excavation activities on the site, and
- Dust is generated from loads in trucks.

Stockpiles are to be managed to limit the emission of and exposure to particulates (dust). Stockpiles will be managed with consideration given to the following:

- The height of a stockpile should not exceed 3m, or not exceed the average height of surrounding structures (whichever is the lesser)
- The height of a stockpile should be reduced if in close proximity to the site boundary. The height of a stockpile should be below the fence line within 5m of the boundary
- Stockpiles will be covered with an appropriate material dependent on the content of the stockpile, and
- Stockpiles/soils will contain a significant level of moisture before handling.

Specific dust controls are outlined in Table 8. A detailed dust management and monitoring procedure shall be provided by the PM prior to the commencement of works.

Water used for dust control may be sourced from on-site and of a suitable quality that it meets SA EPA irrigation quality guidelines.

Surface water- Stormwater

The PM should implement a surface storm water management strategy that effectively controls surface runoff entering and leaving the site.

Stockpiles constructed in un-bunded areas should be lined beneath with a HDPE liner and bunded with hay bales may be used to minimise the potential for sediment run off.

During excavation works, a temporary sump/stormwater basin should be constructed at the base of the excavation to collect perched water seepage and rainfall. The location of the proposed stormwater basin at the site is presented in Appendix C. The water in this basin should be disposed of by a suitably licensed waste disposal contractor to be engaged by the PM.

Excavations

Excavation work should be undertaken in stages to limit potential impacts and disruptions to site boundaries, in particular the shared access roads.

Where necessary, special precautions shall be undertaken to ensure safe working conditions exist and to protect neighbouring properties. These may include construction of appropriate batters to address potential soil collapse.

Where necessary the PM shall take precautionary action in order to minimise potential risk of damage to structures or vegetation on adjoining properties in close proximity to the excavation works.

The contractor should seek direction from the PM to ensure necessary action is taken to limit potential damage to any adjoining buildings, properties and services. For example, this may require the preparation of a dilapidation survey prior to commencing site works. Suitable stabilisation and retention techniques will be employed as required to manage potential collapse of material.

In addition to the sidewall treatment, other precautionary requirements may be required in some areas and shall be at the direction of the PM and may include soil stabilisation and/or underpinning.

A detailed excavation and slope stability management procedure should be provided by the Construction Manager and approved by the Superintendent prior to the commencement of works.

Contingencies and 'discovery'

Work should cease following the identification of any unanticipated areas of contamination and the Environmental Consultant should be contacted.

The unanticipated areas of contamination will be subject to further environmental investigation to confirm the remediation strategy and validation required of the remediated area. This could be as simple as excavating out contaminated material and validating the excavated area.

Waste management

Various waste streams will be generated during the upgrade works. The PM shall prepare a Waste Management Plan (WMP).

The waste management hierarchy of reduce, reuse and recycle is to be adopted for waste management at the site. No burial or burning of wastes is to occur on site.

Waste management controls are outlined in Table 13. The PM is responsible for monitoring and enforcing the site WMP. General waste resulting from site development works (ie. domestic wastes) will be collected in bins and disposed of off-site.
Litter is to be controlled and regularly picked up from site and prevented from entering surrounding areas and stormwater systems.

Waste receptacles (bins) must be provided at the site and marked to show their expected contents (recyclables, general waste). All site workers are to be made aware of the location of site bins.

Waste storage areas will be protected from wind and rain to minimise impact to the surrounding environment.

Transport and disposal to licensed landfill

Prior to the offsite disposal of any surplus material, it must be classified in accordance with SA EPA requirements.

The Construction Manager will engage an Environmental Consultant to undertake the waste classification works.

Surplus soil intended for transport and offsite disposal including 'Waste Fill' will then be disposed of at a licensed landfill in accordance with its classification and SA EPA requirements.

Transporters carrying the surplus material will be appropriately licensed by the EPA. Licensed transporters will comply with all of their conditions of licence including transporting the material to a licensed waste depot and completing 'Waste Transporters Certificates' in accordance with EPA Regulations.

The load must be wetted down and covered to ensure dust suppression.

Any fill materials removed from site for the full duration of the construction works will be tracked, identifying areas of origin and disposal locations.

All loads (including 'Waste Fill') will be tracked, and the quantities tallied by the PM.

Specific project control

Erosion and sediment control

Objective:

To minimise the potential for soil erosion on-site and the off-site transport of sediment.

Target:

No erosion and/or sedimentation impacts during the construction phase.

Table 6 - Erosion and sediment controls

EROSION & SEDIMENT CONTROL			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Minimise Erosion	• Areas of land cleared and the period of time that they remain cleared will be kept to a minimum. • As appropriate, works will be undertaken in phases designed to minimise land disturbance. • Upstream stormwater run-off will be directed around the site where practical. • All vehicles will be kept to well defined access roads where possible. Areas where ground cover is not to be disturbed will be identified and enclosed by bunting, therefore prohibiting construction traffic. • A stabilised entry/exit point will be constructed to minimise the tracking of sand, soil and clay off site. If required, regular clean-ups will occur throughout the construction phase. • Sediment control measures will be installed along identified natural and constructed drainage lines before construction commences where applicable. • Sediment control devices will be installed downstream of areas of disturbed soils when applicable. • Disturbed topsoil will be stockpiled and maintained for use in rehabilitation if suitable. • Stockpiles will be located at least 10 metres from drainage lines and natural waterways. • The number of stockpiles, areas and time stockpiles that are exposed will be minimised. • Stockpiles and batters that remain bare for more than 30 days shall be stabilised by whatever means. • Sediment controls will be established around excavations and stockpiles as per the ESCP and as necessary.	Contractor	During construction

EROSION & SEDIMENT CONTROL			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Monitoring	• All construction activities will be monitored for compliance with the CEMP. • The effectiveness of the CEMP will be reviewed on a regular basis.	Contractor	During construction
	• All erosion and sediment control devices shall be visually inspected on a regular basis. • Adjoining roadways shall be visually inspected on a regular basis for evidence of sediment carted from the site.	Contractor	Daily and during and after heavy rainfall events
Reporting	• A log of the effectiveness of the erosion and sediment control devices will be prepared, including recommended improvements to the system where appropriate.	Contractor	During construction
Corrective Action	• Erosion and sediment control devices will be cleared, repaired or replaced whenever inspections show signs of non-compliance or ineffective capability or capacity. • Where erosion and sediment control devices are found to not be in accordance with the CEMP, work in the affected area will cease and corrective actions taken prior to recommencing works.	Contractor	During construction

Noise

Objective:

To minimise nuisance noise emissions during construction activities.

Target:

Zero noise complaints for the duration of the construction phase.

Table 7 - Noise controls

NOISE			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Minimise impact on surrounding environment	• The hours of operation should not detract from the amenity of any residential zone. Work hours shall be restricted to those stated in *Hours of Operation* • Approval shall be sought from the Administering Authority for all works that are proposed outside of these hours. • Fit and maintain appropriate noise attenuation equipment to on-site plant in accordance with manufacturer's specifications. • Noise generated from construction should not exceed 75 dB(A), at the site of a sensitive receptor – Reg 2.02 s (Environment Protection) Regulations 1997	Contractor	During construction
Monitoring	• No routine qualitative noise monitoring is required. However, if noise complaints are received, qualitative or quantitative monitoring may be required to confirm complaint.	Contractor	If required
Reporting	• Non-conformances and complaints shall be logged and include the date, time, name and contact number (where relevant) subject of complaint or non-compliance and weather conditions.	Contractor	Weekly
	• The date, time and nature of high noise activities shall be logged.		
	• Non-conformance and complaint details shall be forwarded to the Administering Authority as soon as practicable.	Contractor	During construction
	• In the event that qualitative noise monitoring is required, the results shall be kept in the office of the Project Manager and available for inspection at any time during normal working hours.	Contractor	As required
Corrective Action	• In the event that nuisance noise becomes the basis for consistent complaints that are not considered frivolous or vexatious, strategies for noise abatement as outlined in the Guide to Noise Control on Construction, Maintenance and Demolition Sites (AS 2436-2010) shall be considered and implemented where practicable.	Contractor	During construction
	• AS 1055 to be utilised in determining the amount of noise generated from construction, maintenance or demolition of a building or other structure at an – Reg 4.01 (Environment Protection) Regulations 1997.		

Dust

Objective:

To minimise dust during construction activities.

Target:

Zero dust complaints for the duration of the construction phase.

Table 8 - Dust controls

DUST			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Minimise impact on surrounding environment	• Lining of chain mesh fences around portions of the site to help shield surrounding properties from dust • All dust generating areas shall be watered as required to suppress dust throughout the construction phase. • Watering equipment shall be readily available and used on-site as required during construction. Other dust suppressants such as chemical foams, resins and polymers if considered necessary • Pre-wet material to limit dust generation • Sealing of all associated roadways, site entrances and main traffic area to minimise adverse effects of dust on the amenity of an area. • Dust generating activities shall be avoided or minimised, wherever practical, during windy conditions. • Drivers are to obey the on-site speed limit and adopt a driving practice where dust generation is minimised. • Cover loose excavation faces at the end of each day or as required on high wind days with suitable cover material. • Locate and manage stockpiles with consideration to prevailing wind directions, and • Traffic speeds kept below 15 km/hour to minimise dust generation.	Contractor	During construction
Monitoring	• Dust emissions and potential dust generating activities and areas shall be monitored visually during construction activities.	Contractor	Daily during construction
	• Monitor and review activities for non-compliances or complaints.	Contractor	During construction
Reporting	• Non-conformances and complaints shall be logged and include the date, time, name and contact number (where relevant) subject of complaint or non-compliance and weather conditions. • The date, time and nature of dust suppression activities shall be logged.	Contractor	Weekly

DUST			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
	• Non-conformance and complaint details shall be forwarded to the Contractor as soon as practicable.	Contractor	As soon as practicable during construction
Corrective Action	• Dust generating areas shall be watered to achieve compliance targets. • If necessary, dust generating activities shall cease until corrective actions result in achievement of targets or wind conditions are such that targets are achieved.	Contractor	During construction

Water Quality Management

Objective:

To ensure that the quality of surface water leaving the site is acceptable during the construction phase.

Target:

Maintain or improve pre-construction surface water quality.

Table 9 - Water quality management controls

WATER QUALITY MANAGEMENT			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Minimise impact on surrounding waterways	• Construction should not commence until adequate and coordinated drainage of the land is assured. • Stormwater shall be diverted around the site wherever practical. • Stormwater generated within the development should be managed by a minor system and a major system for the gap flows between the minor system.	Contractor	Prior to construction.
	• The volume of stormwater run-off flowing from the site to the adjacent drainage lines and waterways shall be minimised, as far as practical.	Contractor	During construction
	• Groundwater from dewatering activities will not be directed to stormwater drains. Contractor to obtain all necessary approvals/permits prior to the commencement of dewatering/pumped groundwater activities.	Contractor	As required
	• Treated stormwater to be discharged either: o Into grass swales, vegetation strips adjacent to carparks o Into stone filled trenches either open to surface or underground o By a method approved by a hydrological specialist • Plant (including concrete trucks) shall not be washed down within 15 metres of drainage networks/watercourses. • Refuelling of vehicles shall not be undertaken on-site. • All fuel, oil, chemicals, and hazardous chemicals generated or used during the construction process shall be stored and ultimately disposed of off-site in accordance with current regulatory requirements. • Safety precautions and contingency plans shall be developed and maintained to ensure accidental spills will not escape into groundwater, stormwater, and waterways.	Contractor	During construction

WATER QUALITY MANAGEMENT			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Monitoring	• No routine water quality monitoring is proposed. However, if complaints are received or the client/superintendent believes that the stormwater quality is being affected by construction activities, qualitative monitoring may be required to confirm any impact.	Contractor	If required
Reporting	• Should monitoring be required a suitably qualified person/organisation shall review the water quality data as it becomes available and advise the Contractor regarding compliance with quality targets.	Contractor	As required
Corrective Action	• Corrective action shall be undertaken in accordance with the outcomes and recommendations of the water quality-monitoring program (if required).	Contractor	As required

Flora

Objective:

To minimise negative impacts on significant, protected or natural areas of vegetation on or adjacent to the site.

Targets:

To ensure that the significant and protected area of vegetation that has been identified, is retained and not adversely affected by the construction works.

Table 10 - Flora protection controls

FLORA			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Minimise impact on flora and surrounding environment	Areas of significant and protected vegetation, if present, shall be identified prior to the commencement of works. • The area identified as significant and protected shall be surrounded by bunting to ensure that there is no access to this area. • All construction traffic shall be confined to designated access roadways. • No vehicle or pedestrian traffic shall be permitted beyond the boundary of the construction site unless along approved roadways or authorised to do so. • Stockpiles shall be located no closer than 10 metres from designated or constructed drainage lines	Contractor	Prior to construction.
Monitoring	• Routine monitoring shall be undertaken to check the integrity and positioning of the bunting surrounding any protected vegetation.	Contractor	Weekly
Reporting	• Non-conformance and complaint details shall be forwarded to the Project Manager as soon as practicable.	Contractor	During construction
Corrective Action	• Corrective action shall be undertaken in accordance with the outcomes of the inspections or notification by other project personnel.	Contractor	During construction

Fauna

Objective:

To minimise the negative impacts on fauna during construction.

Targets:

Carry out construction activities with no disruption to wildlife corridors or destruction of native species.
Zero fauna injuries or deaths during construction.

Table 11 - Fauna protection controls

FAUNA			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Minimise impact on fauna and surrounding environment	• Restrict work to standard working hours. • The Project Manager will be contacted in the unlikely event that sick, injured or orphaned fauna are found during construction.	Contractor	During construction
Monitoring	• Spotting of fauna shall occur during vegetation clearance works.	Contractor	During vegetation clearance
Reporting	• A record shall be made of all species injured or killed during construction works. • The Project Manager, HSE Advisors shall be contacted regarding all fauna related incidents.	Contractor	As required during construction
Corrective Action	• Corrective action shall be in accordance with advice from the Project Manager, HSE Advisors and Regulatory Agencies.	Contractor	On advice

Land contamination

Objective:

To minimise the potential for the contamination of the site.

Targets:

No contamination of the site during the construction phase.

The containment, collection, and appropriate disposal of all solid, chemical and fuel wastes generated on the site.

Table 12 - Contamination controls

LAND CONTAMINATION			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Minimise impact on surrounding environment	• Proof that all fill is free of contamination must be provided prior to the fill being brought onto site. • No waste products shall be disposed of on-site other than selected soil, rock and cleared vegetation that has come from the site. • If any known or suspected contaminated soil or waste is encountered, contact the PM and cease work until instructed otherwise by the PM and HSE Advisors. • All equipment maintenance and cleaning shall preferably be carried out at an off-site location. Where this is not practical, equipment maintenance and cleaning shall be carried out on a bunded low permeability surface to ensure soil contamination does not occur. • Emergency or breakdown maintenance will be conducted in such a manner as to minimise the potential for spills. • Leaking vehicles or containers (fuel, chemical) will not be allowed on site, and if found will be removed or repaired immediately. • All necessary spill response materials shall be made available and readily accessible. • All staff shall be made aware of the location, composition and use of spill response materials.	Contractor	During construction
Monitoring	• All vehicles shall be serviced and maintained to the manufacturer's specifications.	Contractor	During construction
Reporting	• All vehicle maintenance activities, inspection logs, spills, outcomes of clean-up activities and any emergency or incidents involving spills or land contamination shall be logged by the Contractor. • In the event of a chemical/fuel spill, the Contractor will notify the PM as soon as possible.	Contractor	During construction

LAND CONTAMINATION			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
	• Non-conformance and complaint details shall be forwarded to the HSQE Department as soon as practicable.	Contractor	As soon as practicable during construction
Corrective Action	• In the event of a chemical/fuel spill, containment and clean up action will be undertaken immediately. • Negatively impacted areas shall be remediated to pre-spill or incident conditions, in accordance with the Environment Protection Regulations 1997 and other relevant regulations.	Contractor	During construction

Waste management

Objective:

To minimise the potential for environmental impact of wastes generated on site.

Targets:

No contamination or environmental impact of the site by waste during the construction phase.

Table 13 - Waste management controls

WASTE MANAGEMENT			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Minimise impact on surrounding environment	• No waste products shall be disposed of on-site other than selected soil, rock and cleared vegetation originating from the site.	Contractor	During construction.
	• Designated waste bins will be on-site to ensure no litter is on site. All bins will have a secure fitted lid, capable of receiving all waste from building and construction activities. • Bins are to be emptied regularly to ensure waste does not overflow the provided skips.	Contractor	During construction, emptied as required.
	• All waste materials from the construction phase shall be regularly cleaned from the site and disposed of off-site in accordance with current regulatory requirements.	Contractor	During construction, once per week as a minimum
	• All waste materials to be removed off-site shall be contained on-site prior to disposal, using appropriate storage containers or facilities until removed off-site, including the covering of containers/facilities to prevent litter escaping from the site. Waste containers shall be kept screened from the public's view to the reasonable satisfaction of Council. • Maintain a high quality of housekeeping and ensure that materials are not left where they can be washed or blown away to become litter.	Contractor	During construction
	• Provide bins for construction workers and staff at locations where they consume food. • Regular inspection of the property boundary shall be undertaken to ensure litter or waste does not escape from the site into neighbouring properties.	Contractor	Weekly during construction and daily during windy conditions

WASTE MANAGEMENT			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
	• All staff shall be trained in waste clean-up procedures.	Contractor	During construction
Monitoring	• Property boundaries shall be inspected regularly.	Contractor	Weekly during construction and daily during windy conditions
	• All waste containment and disposal activities shall be logged, including type and volumes of materials and location of licensed receiving facility.	Contractor	As required during construction
Reporting	• Non-conformance and complaint details shall be forwarded to the Project Manager as soon as practicable.	Contractor	During construction
Corrective Action	• In the event of a non-conformance, containment and clean up action will be undertaken as soon as practicable. • If litter has escaped from the site or is negatively impacting the boundary, the litter shall be immediately collected and appropriately contained for disposal off-site.	Contractor	During construction

Cultural heritage

Objective:

To minimise impacts arising from site activities on items or areas of cultural heritage significance.

Targets:

No impact from site activities on areas of cultural heritage significance identified during the course of the project.

Table 14 - Cultural protection controls

CULTURAL HERITAGE			
MANAGEMENT REQUIREMENT	**ACTION**	**RESPONSIBILITY**	**TIMING**
Minimise impact on areas of cultural heritage significance	• Where artefacts or areas of potential cultural heritage significance are found or suspected, works shall cease until further investigation or assessment is conducted.	Contractor	During construction.
Monitoring	• Operational staff shall remain vigilant during excavation and treatment operations.	Contractor	During construction
Reporting	• The Contractor shall notify the Project Officer of finds or potential finds immediately and stop all work until the area has been inspected. • The AEM shall be contacted for management advice immediately.	Contractor Contractor	Immediately on discovery Immediately
Corrective Action	• Corrective action shall be in accordance with advice from the Project Manager, HSE Advisors and relevant Regulatory Agencies.	Contractor	On advice

Training, awareness, and competence

General

Three main forms of training will be provided on site:

- Site induction
- Environmental management training, and
- "Toolbox" training.

Site induction

Prior to working on site, all personnel and sub-contractors will undertake an induction incorporating Environmental and OHS requirements. The induction will address a range of environmental awareness issues including, but not limited to:

- The CEMP (purpose, objectives and key issues)
- Legal requirements including due diligence, duty of care and potential consequences of infringements
- Environmental responsibilities under State and Federal legislation
- Conditions of licences, permits and approvals
- Significant environmental issues and areas of the Site including identification of boundaries for location of refuse bins, washing, refuelling and maintenance of vehicles, plant and equipment
- Incident management and emergency plans, and
- Reporting process for environmental harm/ incidents.

All 'one-off' visitors (unlikely to return) to the workplace are accompanied at all times by a person that has undertaken the workplace induction. All visitors sign a Daily Pre-Start Meeting form which shall include the visitor sign in record upon arrival and departure (including time of entry and exit).

"Toolbox" Training

"Toolbox" training will help to ensure that relevant information is communicated to the workforce and that feedback can be provided on issues of interest or concern. "Toolbox" training will generally be prepared and delivered by the EMR or by their delegate. These toolboxes can be integrated into Construction Method Statements (CMSs) delivered to personnel prior to commencing specific high-risk activities or can be used as a stand-alone training tool.

"Toolbox" training topics may include:

- Efficient use of plant and materials
- Waste management, minimisation and recycling
- Noise and vibration minimisation
- Dust control
- Wastewater control
- Installation and maintenance of erosion and sediment control devices
- Storm management procedures, and
- Other general site issues.

Consultation, communication and reporting

Consultation and issue resolution are managed in accordance with the relative contractors and project contract Consultation and Issue Resolution (IR) documentation. The consultation procedure and relevant OHS/IR legislation requires project personnel to consult, share and supply project information with all workers or their representatives and provide the opportunity for workers to respond and contribute to Environmental issues that affect them through the workplace toolbox meetings, health, safety and environment (HSE) Committee and/or Health and Safety Representatives (HSR).

The meetings which shall communicate environmental matters at this workplace are listed below:

- Pre-start and Toolbox meetings
- Site Meetings, and
- Client/Superintendent meetings.

The Site Manager or nominated representative retains a record that demonstrates workers, including employees and subcontractors, were consulted on the method of environmental consultation agreed at the workplace consultation includes the requirement for all employees, subcontractors and other workers to report hazards and incidents.

Workers and their supervisors conduct toolbox talk meetings, pre-start talks or other consultative arrangements with those employees or workers under their direct supervision and record the meetings on the relevant forms.

Each workplace/subcontractor supervisor are to discuss environmental matters from the previous day, the current day's activities, interfacing trade activities, changes to emergency access and related control measures, conducts the pre-start talk daily.

Other HSE related meetings are recorded formally where required, e.g., where discussing a HSEP, safe work method statement (SWMS) for high-risk construction work or equivalent for a specific work task or other relevant HSE matters. Toolbox talks are undertaken at intervals that keep employees and other workers informed of conditions and changes to the workplace and recorded.

Consultation includes the requirement for all employees, subcontractors and other workers to report environmental hazards and incidents as follows:

- Report hazards by speaking directly to their supervisor, and
- Report all incidents immediately on becoming aware of the incident and not later than 24 hours after the incident.

Further details on HSE consultation, communication and reporting shall be outlined in the contractor's HSE Management System.

Incident and emergency planning, preparedness, and response

Any environmental or health and safety issues that arise should be reported immediately to the PM so that specific management measures can be implemented.

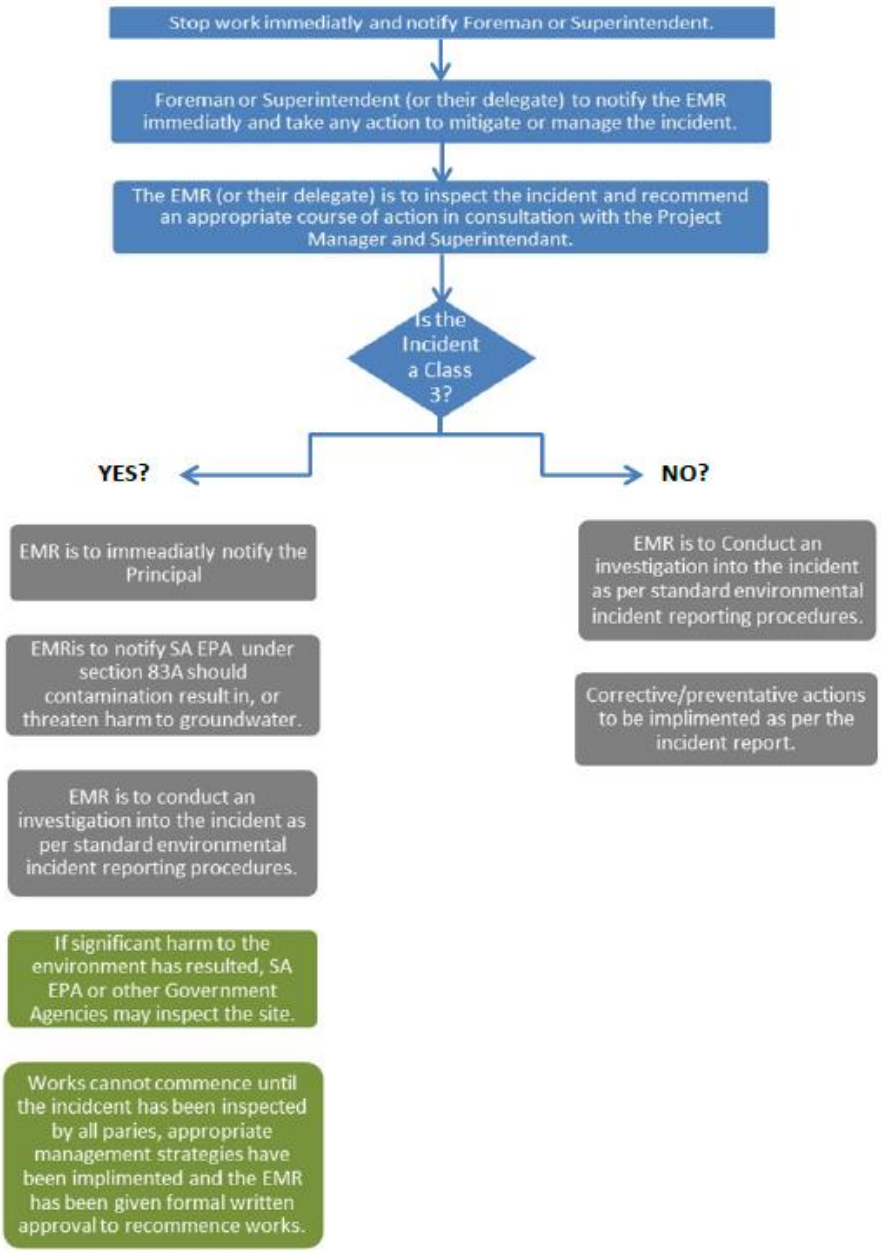
Emergency planning

Emergency planning and incident management procedures are included in Table 15, Table 16 and Table 17. Included is a list of emergency contact details and various specific management procedures for potential emergencies. Prior to any action, identify materials involved and obtain appropriate PPE.

Figure 2 refers to environmental incident classes. The classes are defined as follows:

- Class 1 – Causes or has the potential to cause permanent environmental damage and results in remediation costs of >$100,000
- Class 2 – Causes or has the potential to cause damage to the environment which can be rectified and in results in remediation costs of >$5,000 to $100,000
- Class 3 – Causes or has the potential to cause damage to the environment which can be easily rectified and results in remediation costs of <$5,000.

Figure 2 - Procedures in dealing with environmental incidents



Notes:
*An unexpected event may result in harm to the environment and requires some action to minimise the impact or restore the environment.
* All site complaints/incidents shall be reported to the superintendent in the first instance. Following this, all escalation of complaints shall be directed to the respective contractor's executive.

Although the potential exists for a number of minor incidents to occur onsite, the following three generalised examples of potential minor incidents details the procedures that should be implemented and the responsibilities of the reporting person.

Table 15 - Environmental incident management procedure for minor chemical spills

	ACTION	RESPONSIBILITIES	COMMENTS
1	Stop further leak	Person causing/ finding leak	If leak from drum take action to stop the leak. For example, roll drum so that leak area is uppermost. If leak from pipe close valve.

	ACTION	RESPONSIBILITIES	COMMENTS
2	Inform Project/Supervisor	Project Manager/ Supervisor	Stop human and vehicular traffic and isolate area.
3	Determine the magnitude and destination of the leak	Supervisor	For major spills on site or If spill has escaped off site contact the EMR immediately.
4	Form a barrier around leak/spill to contain	Project Manager/ Supervisor	Soil or sand can be utilized. Absorbent booms (usually provided within spill kits) are effective.
5	Empty the spill source	Project Manager/ Supervisor	Transfer fuel/ oil from failed container into another drum etc.
6	Place barriers around drains and outlets	Project Manager/ Supervisor	Seal drain entry points by blocking with sandbags or other available material.
7	Obtain oil spill kit and apply absorbent material	Project Manager/ Supervisor	Use 'absorbent' or equivalent.
8	Clean up and remove absorbent material to waste bin	Project Manager/ Supervisor	Either shovel or use bob cat loader for larger quantities.
9	Clean up surface soil by excavating	Project Manager/ Supervisor	Stockpile contaminated material in designated area. Validate remediation by sampling.
10	Inform EMR and complete incident log	Project Manager/ Supervisor	Record incident and investigate.

Table 16 - Environmental incident management procedure for impending wet weather

	ACTION	RESPONSIBILITIES	COMMENTS
1	Keep aware of weather conditions and impending significant storm events and inform all supervisors.	Project Manager/ Supervisor	Forecasts from Weather Bureau
2	Inspections to be undertaken of sediment control devices in critical areas	Supervisor	Assessment of their condition or status
3	Ensure silt fences/hay bales/ sandbagging repairs performed	Supervisor	Sediment build-up removed, controls in good condition.
4	Sumps to be able to function at full capacity and diversion drains are in place.	Supervisor	It should be assumed all surface water is contaminated. Onsite storage and removal of waters must be by licensed waste transport company.
5	Ensure stockpiles are in a state of stability and not in a position to impact on public thoroughfares/watercourses	Supervisor	Sealed/covered with plastic, surrounded on low side with sediment fencing.
6	Ensure that hazardous substances storage areas/ bunds are in order	Supervisor	Stored appropriately

	ACTION	RESPONSIBILITIES	COMMENTS
7	Ensure adequate supplies of control devices are on hand	Supervisor	Supplies sediment fencing/sandbags/hay bales.
8	Personnel to be on hand for emergency work during storm event	Supervisor	Pumping of excavations, handling of excess potentially contaminated surface water.

Table 17 - Environmental incident management procedure for finding asbestos containing materials

	ACTION	RESPONSIBILITIES	COMMENTS
1	All activities in the area should cease	Person finding asbestos containing material	
2	Inform Project Manager /Supervisor	Project Manager/ Supervisor	Stop human and vehicular traffic and isolate area.
3	A suitably qualified Environmental Consultant or Occupational Hygienist requested to attend site to provide guidance and sample the material to confirm the presence of asbestos (otherwise the material must be assumed to contain asbestos).	Supervisor	Where adjacent works have the potential to be affected by the presence of asbestos, these works shall cease and continue in unaffected areas until the Environmental Consultant or Occupational Hygienist details the conditions under which works can recommence
4	Erection of temporary barricades to isolate the hazardous area(s) and to restrict access by unauthorized personnel	Project Manager/ Supervisor	this may be physical barriers, bunting or flagging that provides a continuous physical barrier
5	Installation of signage along the barriers in accordance with AS 1319-1994 Safety Signs for the Occupational Environment, clearly identifying the area as a danger zone accessible by authorized personnel only	Project Manager/ Supervisor	
6	Minimize dust generation by covering or wetting excavations or stockpiles containing exposed ACM fragments	Project Manager/ Supervisor	
7	Notify all site personnel and instructing them to remain clear of the area until further notice	Project Manager/ Supervisor	
8	Implement a permit to work system to prevent unnecessary or uncontrolled access by unauthorized persons and therefore minimise the exposure risk.	Project Manager/ Supervisor	

Notification

In the event that an incident has caused, is causing, or is likely to cause material or serious environmental harm, whether the harm occurs on or off the site, the construction team will follow the procedure in dealing with environmental incidents (Figure 2).

In addition to notifying key government agencies in accordance with the procedure detailed in Table 15 to Table 17 the Construction/ Project Manager and Environmental Consultant will also liaise closely to ensure the EPA and any other responsible agencies are kept well informed.

Emergency contact details are presented in Table 18.

Table 18 - Emergency contact list

ORGANISATION	NAME	NUMBER
Project Manager	Trice: • Sonia Mercorella, and • Tiana Della Putta	TBA
Site Foreman	TBA	
SA EPA/Emergency (After Hours)	Pollution Line	1800 623 445
SA Police		000 Mobile 112
Adelaide Metropolitan Fire Brigade		000 Mobile 112
SA Ambulance Services		000 Mobile 112
Poisons Information		131 126
Nearest Hospital	Stirling Hospital	(08) 8339 0200
Local contractor services (eg. waste collection, spill clean-up)	TBA	

Incident investigation and reporting

All incidents will be documented, investigations conducted, and action plans established in order that the event does not occur again.

Where lessons are learnt from the investigation or current procedures are identified as being ineffective, the CEMP, and any associated documentation, will be revised, to include the improved procedures or requirement.

In complying with EPA's expectations regarding incident reporting, an environmental investigation report is expected to include the following basic elements:

- Incident or activity that has caused contamination or environmental harm
- Nature of contamination and chemicals of concern
- Area affected (on or off site)
- Aspects of the environment affected, and
- Any other relevant information.

Further to this, an environmental investigation will also include:

- Identifying and implementing the necessary corrective action
- Identifying the personnel responsible for carrying out the corrective action
- Implementing or modifying controls necessary to avoid a repeat occurrence of the incident, and
- Recording any changes in written procedures required.

All Incident Investigation Reports and associated documentation will be forwarded to the client and the Project Manager. The findings, outcomes and corrective actions required will be communicated back to the construction team as to the outcomes of lessons learnt.

Compliance

Environmental monitoring, inspections and auditing

Site checklists

The site Foremen and/or Superintendents will be required to track activities on the construction site. Information recorded will include, but not be limited to:

- The general conditions on the Site including weather conditions and status of environmental controls, and
- Activities carried out on the Site.

Environmental site inspection checklist

The effectiveness of environmental protection measures will be assessed from time to time by Superintendents, or their nominated delegate, unless otherwise specified. The purpose of the checklist is to:

- Provide a surveillance tool to ensure that safeguards are being implemented
- Identify where issues might be occurring and
- Facilitate the early resolution and action of issues.

Any actions that are identified in these site inspections and recorded on these checklists are prioritised. The checklist will remain "open" until:

- The issue has been resolved / closed out
- A new or revised procedure has been established and implemented, and
- Training has been provided to relevant personnel/ sub-contractors.

Environmental monitoring

Environmental monitoring will involve monitoring the CEMP to assist in the auditing of safeguard measures to ensure they achieve their objectives and to facilitate modification where necessary.

Monitoring would address the following aspects:

- Air quality monitoring (if and when required)
- Water quality
- Erosion and sediment control
- Implementation of Construction Method Statements (CMS)
- Wastes and hazardous substances, and
- Marine environment.

Monitoring technique and frequency

Irrespective of the type of monitoring conducted, the results will be used to identify potential or actual problems arising from construction processes. Where monitoring methods permit, results will be obtained at the time of the assessment and analysed by the EMR.

Generally, monitoring by the EMR will be undertaken on an as needs basis, and may include but not be limited to the following specific tasks/events:

- Prior to off-site disposal of any surplus soils (stockpiled or direct loaded), and
- After any significant rain events (surface water and erosion control).

Monitoring non-conformances

Where a non-conformance is detected, or monitoring results are outside of the expected range:

- The results will be analysed by the EMR in more detail with the view of determining possible causes for the non-conformance
- A site inspection will be undertaken by the Project Manager or EMR
- Relevant personnel will be contacted and advised of the situation, and
- An agreed action plan will be identified, or an action will be implemented to rectify the problem.

An environmental incident report (EIR) or an environmental improvement notice (EIN) may be issued by the Project Manager/ EMR to the non-conforming party in response to the problem if it is found to be construction related. The timing for any improvement will be agreed between the Project Manager and the EMR based on the level of risk. For example, a significant risk will require immediate action.

Review and improvement of CEMP

The CEMP, its operation and implementation should be reviewed from time to time. Between the reviews, a register of issues will be maintained to ensure that any issue raised are recorded for later inclusion into the CEMP. The purpose of the review is to ensure that the system is meeting the requirements of the standards, policies and objectives and, if not, to amend the CEMP to facilitate continuous improvement. The review will consider:

- Client/Superintendent comments
- Site personnel comments
- Authority comments
- Audit findings
- Environmental monitoring records
- Complaints
- Details of corrective and preventative actions taken
- Environmental non-conformances
- Incident reports
- Changes in organisation structures and responsibilities
- The extent of compliance with objectives and targets, and
- The effect of changes in Standards and Legislation.

Limitations

This CEMP is the subject of copyright and shall not be reproduced either wholly or in part without the prior written permission of FMG Engineering. This CEMP is intended for the sole use of the client/superintendent, contractor and associated sub-contractors and should not be relied upon by any other party.

It has been prepared to meet the objectives of the client and associated sub-contractors with reference to the proposed earthworks, services and infrastructure construction as understood by FMG Engineering. Those objectives may not necessarily be the objectives desired by any other third party.

This report relies on Principal-supplied information and information gather by The Principal and relayed to FMG.

References

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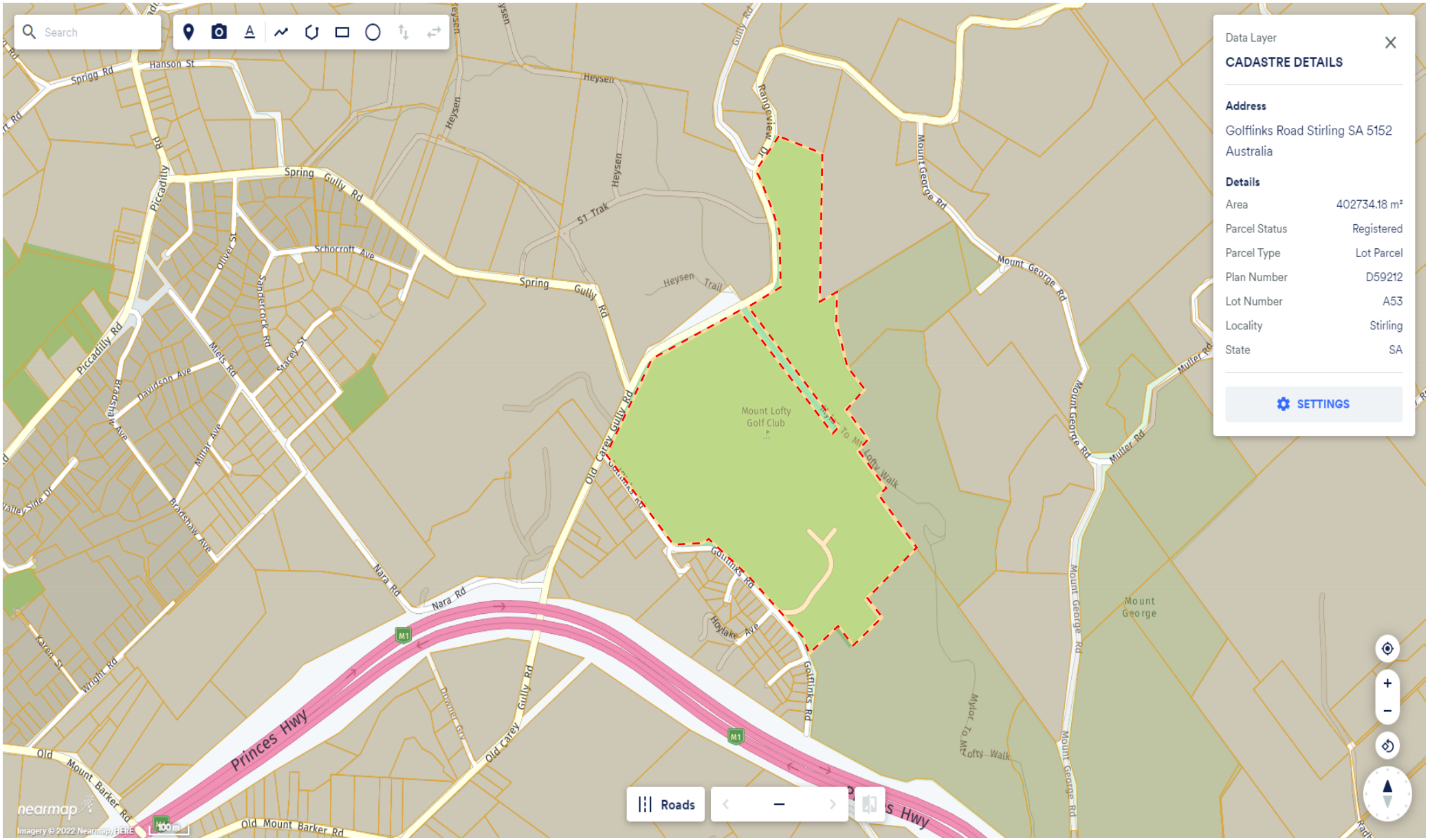
Appendix A

Regional setting and site location plan



REV	DESCRIPTION	DATE	INIT	APP

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CLIENT	Venture Capital Developments Pty Ltd
TITLE	CEMP
SITE ADDRESS	Mount Lofty Estate, 35 Golflinks Road, STIRLING, SA 5152
DRAWING TITLE	Regional setting and site location plan

DESIGNED K.A.	DRAWN K.A.
CHECKED D.G.	No. OF SHEETS
SCALE NTS @ A4	DATE STARTED
SITE ID & JOB No.	REV.
DRAWING No. Figure 1	

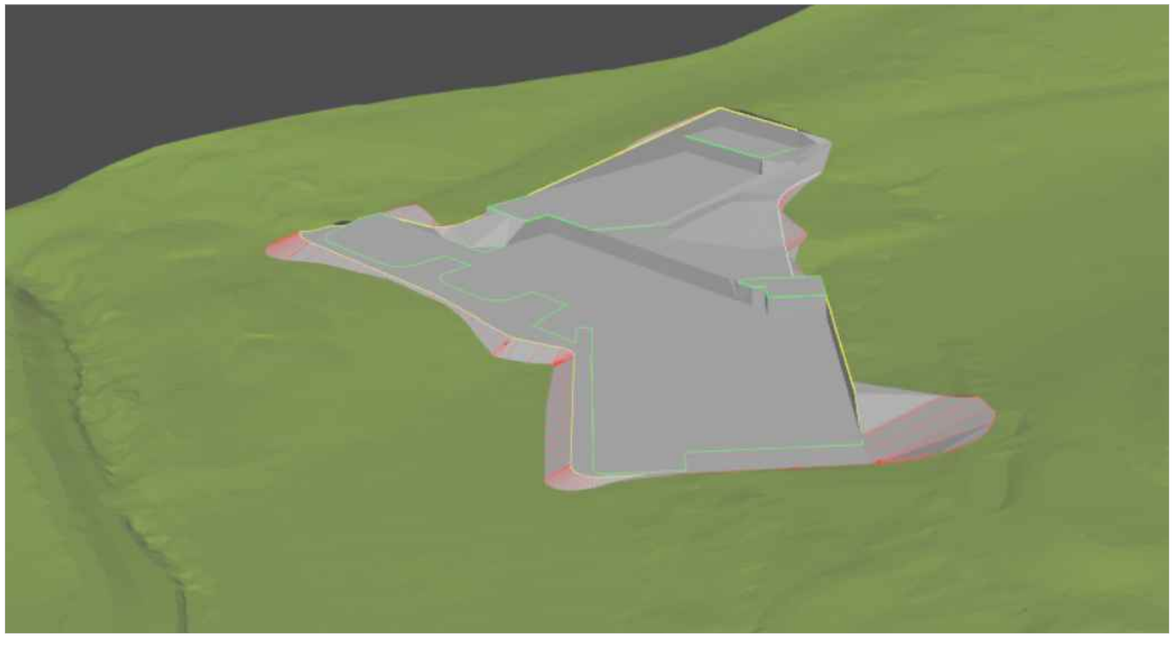
Appendix B

Civil work plans

NORTH ELEVATION
SCALE NTS

SOUTH ELEVATION
SCALE NTS

EAST ELEVATION
SCALE NTS



WEST ELEVATION
SCALE NTS

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ENGINEERING

SIGNATURE

CLIENT: VENTURE CAPITAL DEVELOPMENTS PTY LTD

PROJECT TITLE: MOUNT LOFTY GOLF ESTATE

SITE ADDRESS: 35 GOLFLINKS RD, STIRLING SA

DRAWING TITLE: PERSPECTIVE IMAGES

DESIGNED: JS	DRAWN: JS
CHECKED: JC	No. OF SHEETS: -
SCALE: NTS	DATE STARTED: 23.09.2022
SITE ID & JOB No: S53897_282604	REV:
DRAWING No: C110	A

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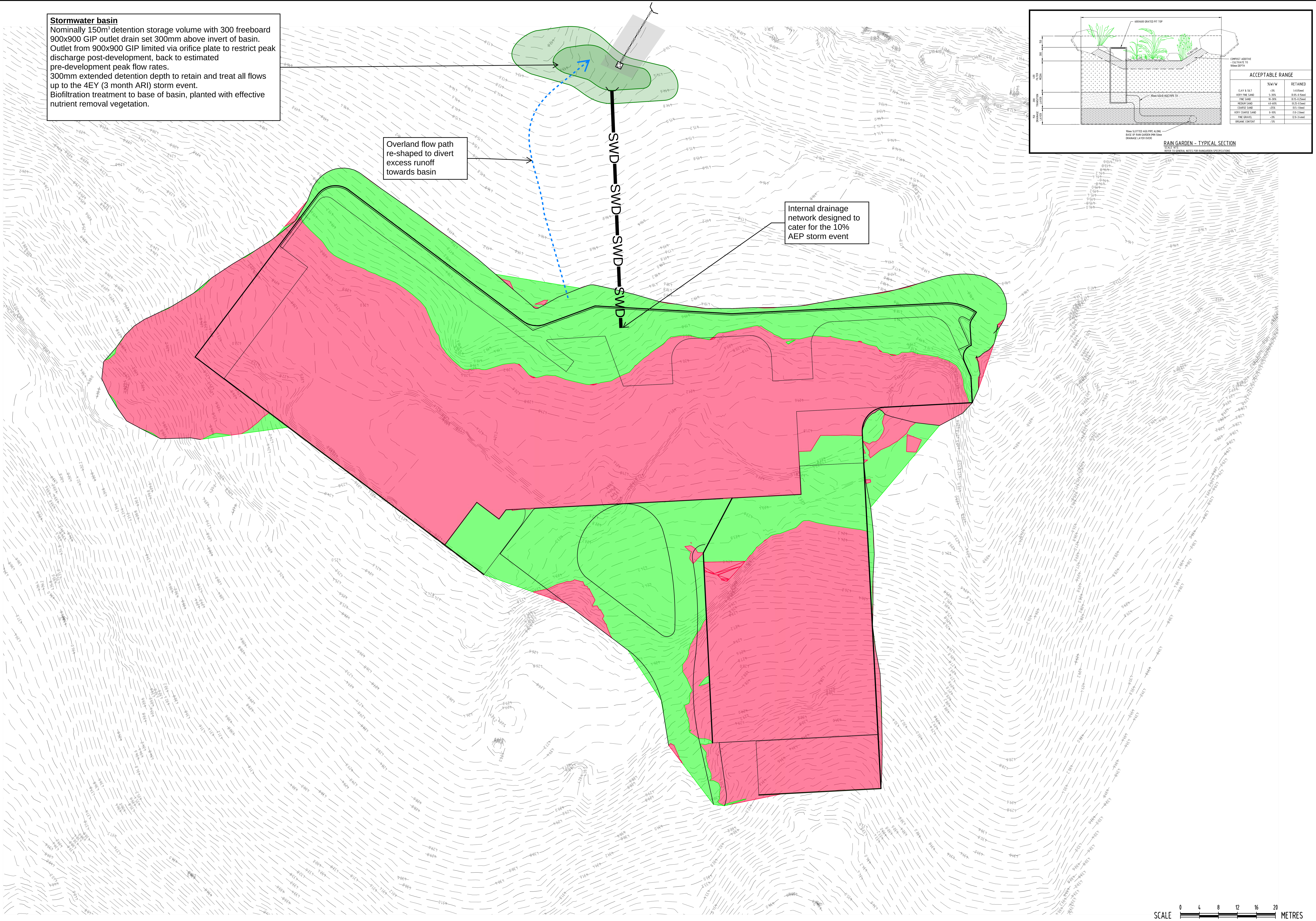
INDICATIVE EARTHWORKS VOLUMES:
CUT = -15838m3
FILL = 3008m3
NET = 12829m3 EXCESS OF CUT OVER FILL

ASSUMPTIONS:
- 100mm TOPSOIL STRIP
- COMPACTION/EXPANSION FACTORS IGNORED
- VOLUMES TO FINISHED LEVELS
- STRUCTURAL FOOTINGS NOT CONSIDERED AT THIS TIME.

NOTE:
CUT/FILL VOLUMES ARE UNRELIABLE & CONTRACTOR SHALL UNDERTAKE THEIR OWN DUE DILIGENCE TO DETERMINE SUITABLE EARTHWORKS ALLOWANCES.

EARTHWORKS LEGEND

- EXTENT OF EARTHWORKS CUT
- EXTENT OF EARTHWORKS FILL



SCALE 0 4 8 12 16 20 METRES

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CLIENT: VENTURE CAPITAL DEVELOPMENTS PTY LTD
PROJECT TITLE: MOUNT LOFTY GOLF ESTATE
SITE ADDRESS: 35 GOLFLINKS RD, STIRLING SA
DRAWING TITLE: EARTHWORKS PLAN

DESIGNED	DRAWN
JS	JS
CHECKED: JC	No. OF SHEETS: -
SCALE: 1:400 AT A1	DATE STARTED: 23.09.2022
SITE ID & JOB No.: S53897_282604	REV.: A
DRAWING No.: C120	

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Appendix C

Soil erosion and sediment control plan (SECP)

N

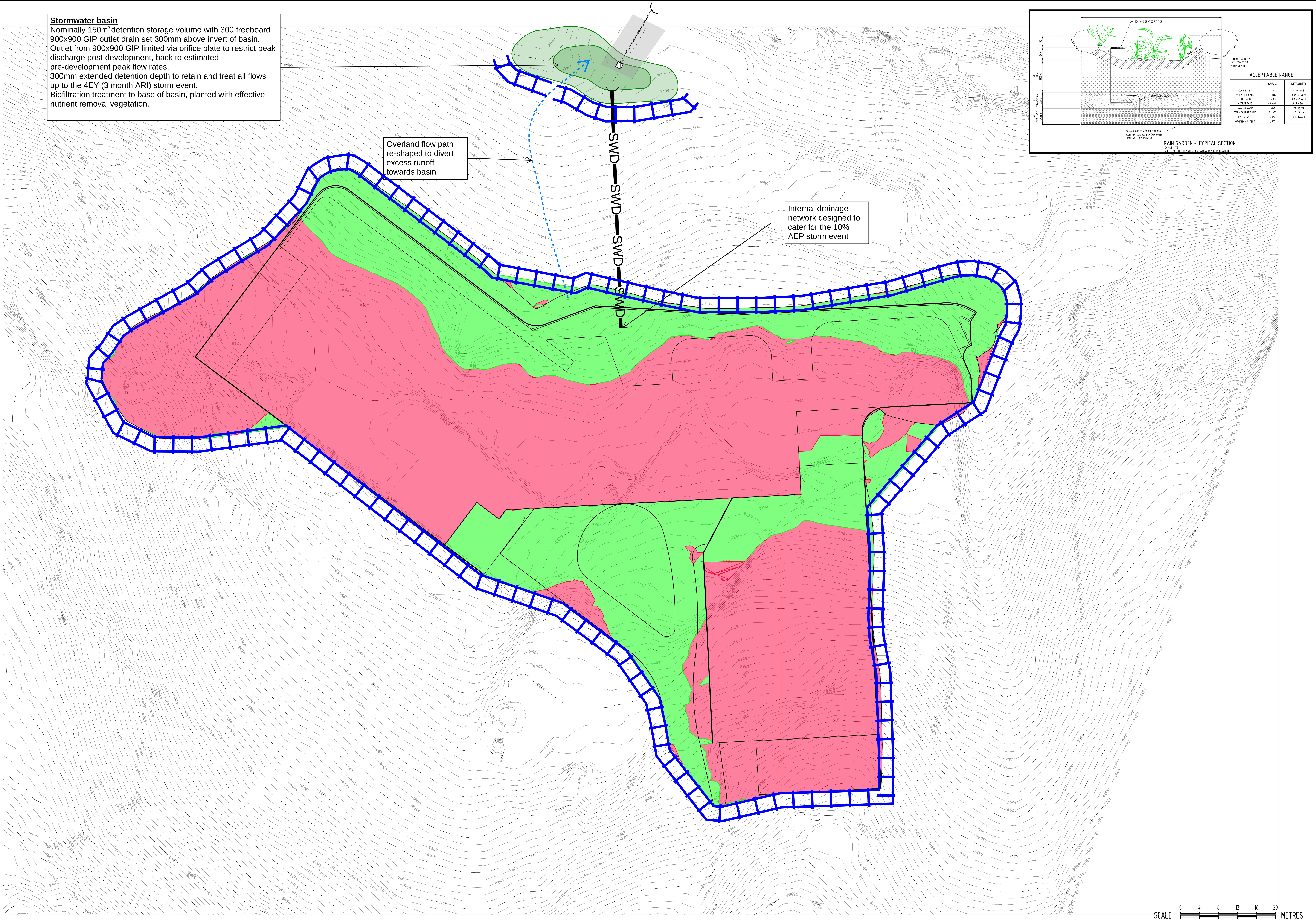
INDICATIVE EARTHWORKS VOLUMES:
CUT = -15838m3
FILL = 3008m3
NET = 12829m3 EXCESS OF CUT OVER FILL

ASSUMPTIONS:
- 100mm TOPSOIL STRIP
- COMPACTION/EXPANSION FACTORS IGNORED
- VOLUMES TO FINISHED LEVELS
- STRUCTURAL FOOTINGS NOT CONSIDERED AT THIS TIME.

NOTE:
CUT/FILL VOLUMES ARE UNRELIABLE & CONTRACTOR SHALL UNDERTAKE THEIR OWN DUE DILIGENCE TO DETERMINE SUITABLE EARTHWORKS ALLOWANCES.

EARTHWORKS LEGEND

🟥	EXTENT OF EARTHWORKS CUT
🟩	EXTENT OF EARTHWORKS FILL
╪	PROPOSED LOCATIONS OF SILT FENCES



Stormwater basin
Nominally 150m³ detention storage volume with 300 freeboard
900x900 GIP outlet drain set 300mm above invert of basin.
Outlet from 900x900 GIP limited via orifice plate to restrict peak discharge post-development, back to estimated pre-development peak flow rates.
300mm extended detention depth to retain and treat all flows up to the 4EY (3 month ARI) storm event.
Biofiltration treatment to base of basin, planted with effective nutrient removal vegetation.
Overland flow path re-shaped to divert excess runoff towards basin
Internal drainage network designed to cater for the 10% AEP storm event
SWD
600X600 GRATED PIT TOP
1:5 BATTER
COMPOST ADDITIVE - CULTIVATE TO 100mm DEPTH
150
300
400 FILTER MEDIA
200 TRANSITION LAYER
150 DRAINAGE LAYER
90mm SOLID AGG PIPE TO
90mm SLOTTED AGG PIPE ALONG BASE OF RAIN GARDEN (MIN 50mm DRAINAGE LAYER OVER)
RAIN GARDEN - TYPICAL SECTION
SCALE NTS
REFER TO GENERAL NOTES FOR RAINGARDEN SPECIFICATIONS

ACCEPTABLE RANGE

	%W/W	RETAINED
CLAY & SILT	<3%	(<0.05mm)
VERY FINE SAND	5-30%	(0.05-0.15mm)
FINE SAND	10-30%	(0.15-0.25mm)
MEDIUM SAND	40-60%	(0.25-0.5mm)
COARSE SAND	<25%	(0.5-1.0mm)
VERY COARSE SAND	0-10%	(1.0-2.0mm)
FINE GRAVEL	<3%	(2.0-3.4mm)
ORGANIC CONTENT	≤5%	

SCALE 0 4 8 12 16 20 METRES

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CONTRACTORS MUST SET OUT ALL WORK AND VERIFY ALL CONDITIONS, LEVELS AND DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY WORK OR MAKING OF ANY SHOP DRAWINGS WHICH MUST BE SUBMITTED AND APPROVED PRIOR TO ANY MANUFACTURE.

ALL WORK MUST BE EXECUTED IN ACCORDANCE WITH THE RULES, REGULATIONS, BY LAWS AND REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION OVER ANY PART OF THE WORK.

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SIGNATURE

CLIENT: VENTURE CAPITAL DEVELOPMENTS PTY LTD
PROJECT TITLE: MOUNT LOFTY GOLF ESTATE
SITE ADDRESS: 35 GOLFLINKS RD, STIRLING SA
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN

DESIGNED: JS	DRAWN: JS
CHECKED: JC	No. OF SHEETS: -
SCALE: 1:400 AT A1	DATE STARTED: 23.09.2022
SITE ID & JOB No.: S53897_282604	REV.: A
DRAWING No.: C120	

DRAWING M:\FMG\ID2\B20B1909-4257-4414-8350-1A82A9751CEE\0\29536000-29536999\29536443\L\L\S53897_282604_C001 (ID 29536443).DWG (LAST SAVED ON 21/09/2022 11:33:38 AM). PLOTTED ON 21/09/2022 11:38:01 AM BY JASON SEARLE

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