

Project Environmental Management Plan

PROJECT DETAILS

Contract Number	155-11
Project Title	Intersection Upgrade – Murdoch Drive South Street Intersection
Client	Main Roads WA
Project Manager	Cameron Lochran
Management Systems Rep.	Chris Cheng

REVISION HISTORY

On receipt of a Revision:

- (a) Insert each new/revised page in its correct position,
- (b) Remove and destroy any superseded pages,

VERSION No.	SECTION	DETAILS	APPROVED	SIGNATURE	DATE
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CLIENT APPROVAL

VERSION No.	SECTION	DETAILS	CLIENT APPROVAL	SIGNATURE	DATE
1.0	All	ISSUED FOR USE			

This Project Specific Management Plan conforms with relevant statutory, regulatory and other specified requirements and has been approved to be "Issued For Use".
Signed:

Rob Kurthi – HSEQ Manager

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1 INTRODUCTION

This Environmental Management System manual has been prepared, in accordance with AS/NZS ISO 14001:2004, to document the system used to provide effective environmental management on Highway Constructions 155-11 – Murdoch Drive and South Street Intersection Upgrade worksite.

An effective Environmental Management System requires the involvement of all employees, supervisors and managers through consultation, co-operation and participation to ensure that the identification and implementation of practical solutions to environmental issues are achieved in the workplace.

AECOM undertook an Environmental Impact Assessment for the 155-11 – Murdoch Drive and South Street Intersection Upgrade on behalf of Main Roads Western Australia (MRWA). The detailed EIA was undertaken in 2012 examined the area around South Street and Murdoch Drive intersections.

1.1 Scope

1.1.1 Scope of Certification

Highway Construction Environmental Management System has current third party certification through **BVQI Australia to Environmental Standard AS/NZS ISO 14001:2004**. The scope of certification is as follows:

Management of Design and Construction for Civil Engineering Projects

All subcontractors will agree to abide by Highway Construction Environmental Management System requirements through the **C-SUB-002-PF - Subcontractor Agreement Form**.

1.1.2 Scope of Environmental Management System

This manual draws together the key elements of an effective environmental management system and should be used as a reference by all personnel within Highway Construction for all processes and activities required for the delivery of all Highway Construction projects.

1.1.3 Specification Reference Table

Specification 204 Reference		Environmental Management Plan Reference	
Clause	Heading	Reference	Heading
204.06	Environmental Policy	2.1	Policy
		4.2.1	Induction
204.07	Environmental Commitment Statement	2.2	Environmental Commitment Statement
		4.2.1	Induction
204.16	Environmental Aspects	3.1	Environmental Aspects & Impacts
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1.1.4 Description of Main Elements

The project comprises modification of the intersection by widening the pavement to accommodate additional and longer turning lanes and vehicle queuing capacity. The Project consists of the following elements;

- Construction of amenity walls along the extent of the project works.
- Installation of additional right turning lane on the eastern approach on South Street.
- Installation of additional 2 right turning lanes on the southern approach on Murdoch Drive.
- Increase lengths of all other turning lanes to accommodate the expected increased vehicle demand in 2021.
- Provision of a two lane access from South Street eastbound onto the Kwinana Freeway northbound on ramp.
- The centre lane on the eastbound carriageway will become a split lane with the option of an exit to the ramp or continuation to the east.
- Increase Murdoch Drive northbound carriageway to the south of the South Street intersection from two lanes to three lanes, just before the entry to the St John of God Hospital access road.
- Relocation or modification of all services which are affected by the works;
- Testing and commissioning of all equipment prior to opening the works to traffic.



2 MANAGEMENT RESPONSIBILITY

2.1 Policy

Highway Construction recognises that its business has an impact on the environment principally through the use of energy and water and the generation of waste. Additional impacts include the consumption of paper, water erosion and generation of dust. Highway Construction is committed to ensuring that the environmental impact resulting from our activities is reduced where practicable. Highway Construction has defined and documented its environmental policy which sets out the overarching objectives of environmental management, within the context of AS/NZS ISO 14001:2004 Management shall ensure that this policy:

- Is communicated, implemented and maintained at all levels in the organisation through prominent display in site offices and during site induction.
- Supports the use of consultative processes.
- Is signed by the Managing Director.
- Is reviewed at Management Review Meetings at least every twelve months.

A copy of this document is available as [C-ENV-006-PO - Environmental Policy](#).

2.2 Environmental Commitment Statement

Highway Construction has developed an Environmental Commitment Statement which will be signed by the Project Manager and EMR and will be prominently displayed on the site notice board. This statement demonstrates the

commitment that Highway Construction management has for the environmental management on this project and is available at [155-11-ENV-014-PO Enviro Commitment Statement](#).

3 PLANNING

3.1 Environmental Aspects and Impacts

3.1.1 Definitions

Environmental Aspect:	An activity that can interact with the environment.
Environmental Impact:	Any change to the environment that occurs because of Highway Construction's activities.
Environmental Objectives:	The environmental goals that Highway Construction seeks to achieve.
Environmental Targets:	Targets detailing the performance requirements for achieving environmental objectives.

3.1.2 General

Due to the varied nature of Highway Construction civil construction projects, environmental aspects and impacts are identified and detailed on a per project basis and form part of the project specific Environmental Management Plan. Identified aspects and impacts will be assessed and appropriate management control techniques will be implemented.

Specific environmental aspects shall be identified and assessed and shall consider the identification of potential regulatory, legal and business exposures that may impact on activities. Aspects shall be identified by:

- Identifying activities associated with the project that may have influence on the environment;
- Identifying the environmental aspects of the activity (cause);
- Identifying the associated environmental impact (effect);
- Applying risk management principles to determine the significance of the impacts;
- Developing control techniques to minimise the environmental impacts;
- Monitoring and measuring.

Highway Construction maintains [155-11-ENV-001-DB Environmental Aspects and Impacts Register](#) that is located on the shared server.

3.1.3 Assessing Significance of Impacts

Assessment of impacts shall be undertaken in accordance with the risk assessment processes articulated in AS/NZS 4360:1995. For each activity undertaken by Highway Construction the following assessment shall be made.

Step 1 Identify the Aspects

All aspects likely to affect the environment shall be identified and recorded. Aspects shall be identified by considering the various operations that are associated with the project works, identifying and recording the activities associated with the operation, and identifying and recording the aspects associated with the activity.

Step 2 Identify Impacts

Impacts associated with each aspect shall be identified and recorded. Identification shall consider the following:

- Positive and Negative environmental impacts;
- Actual and Potential environmental impacts;
- Part of the environment that may be affected;
- Characteristics of the location that may affect the impact;
- The nature of the changes to the environment.

Step 3 Assess Risks

Risks associated with each impact shall be assessed in terms of likelihood and consequence using Highway Construction's Risk Assessment procedure.

3.2 Legal and Other Requirements

Highway Construction is required by law to comply with environmental legislation and regulations. The following list shall form the basis of compliance for all projects undertaken by Highway Construction.

Compliance with legal requirements is to be monitored for each project using **C-ENV-001-PF - Environmental Legal Requirements**. This checklist is to be completed noting if compliance has been achieved and any details of breaches of the requirements.

Highway Construction has identified applicable legislation through contract documentation, liaison with regulatory authorities, external consultants, industry bodies and review of government and other legislation. The following list of legislation is not definitive; however it identifies the key legislation applicable to the project. Highway Construction will maintain either current hardcopies of the relevant legislation or have access to the required legislation via an internet portal to the State Law Publisher (www.slp.wa.gov.au).

Relevant State Environmental Legislation

- Aboriginal Heritage Act 1972 – 1984.
- Bushfires Act 1954.
- Conservation and Land Management Act 1984.
- Contaminated Sites Act 2003.
- Environmental Protection Act 1986.
- Environmental Protection Regulations 1987.
- Environmental Protection (Liquid Wastes) Regulations 1987.
- Environmental Protection (Noise) Regulations 1997.
- Heritage of Western Australia Act 1990.
- Soil and Land Conservation Act 1945.

- Swan River Trust Act 1988;
- Waterways Conservation Act 1976.
- Wildlife Conservation Act 1950.

3.3 Objectives, Targets and Programmes

3.3.1 Establishing Objectives and Targets

Taking into consideration the varied and seasonal nature of Highway Construction civil construction projects it is not possible to set specific yearly measurable targets, therefore targets are set dependent upon projects.

To establish objectives and targets, Highway Construction will consider:

- Legal and other requirements;
- Significant environmental aspects;
- Technological options;
- Financial, operational and business considerations;
- Views of interested parties; and,
- Contractual requirements.
- Objectives and targets specifically will address:
- Control of environmental aspects;
- Improvement in systems; referenda
- Minimisation of impacts; and,
- Improvement in environmental performance.

3.3.2 Establishing Programmes

Objectives and targets shall be addressed and managed through management control implemented as detailed in each individual projects Environmental Aspects spreadsheet. The spreadsheet will define required management strategies, processes, work instructions or procedures, and timeframes for completion, performance criteria and responsibilities for implementation and review.

3.3.3 Objectives and Targets

Objectives and targets have been set and are to be monitored for each project using the [*C-ENV-002-PF - Environmental Objectives and Targets Monitoring*](#) form. Objectives and targets are to be reviewed at each Environmental Management Review meeting to ensure that objectives and targets are being met and that they are still current and relevant to the business.

4 IMPLEMENTATION AND OPERATION

4.1 Responsibility & Authority

Personnel engaged on the project have a responsibility for environmental management as outlined below. Highway Construction will ensure that responsibilities and authorities are communicated to personnel and are documented on job statements for each relevant position. Highway Construction will provide the resources essential to the implementation and control of the environmental management system.

Managing Director

- Ultimately accountable and responsible for ensuring that the environmental management system requirements are established, implemented and maintained in accordance with this manual.
- Required to ensure that appropriate management structures are in place and working and that resources are provided to enable the organisation to comply with legislation, regulations, codes of practice and national standards.
- Promote environmental awareness generally.

Project Manager

The Project Manager reports to the Managing Director and is responsible for:

- Assessment of aspects and impacts, risk rating and objectives and targets for the projects;
- Overall environmental performance and ensuring the environmental management plan is implemented, maintained and reviewed;
- Reporting on the performance of the environmental management plan to the Principal and the Managing Director for review and as a basis for improvement of the environmental management system;
- Reviewing documentation produced by subcontractors to verify its compliance with the Environmental Management Plan.
- Determining training needs and arranging appropriate training;
- Arranging or undertaking inspections and audits as required.

Environmental Manager Representative (EMR)

The EMR reports to the Project Manager and is responsible for:

- Assessment of aspects and impacts, risk rating and objectives and targets for the projects;
- Ensuring the environmental management plan is implemented, maintained and reviewed;
- Reporting on the performance of the environmental management plan to the Project Manager for review and as a basis for improvement of the environmental management system;
- Reviewing documentation produced by subcontractors to verify its compliance with the Environmental Management Plan;
- Arranging appropriate training;
- Undertaking inspections and audits as required;

- Ensuring Sub-contractor compliance with the approved environmental management plan.

Site Supervisors

The Site Supervisor reports directly to the Project Manager and is responsible for the following:

- Monitoring and reporting on the environmental management plan;
- Consulting with the Project Manager and EMR on environmental matters;
- Ensuring that the requirements of the environmental management plan are implemented and maintained;
- Liaison with personnel on environmental matters;
- Ensuring Sub-contractor compliance with the approved environmental management plan;

Sub-contractors

- Responsible for ensuring that the requirements of Highway Construction's environmental plan are understood and satisfied.
- Responsible for reporting any environmental incidents to Highway Construction's Project Manager or EMR.

4.2 Training Awareness and Competence

4.2.1 Induction

The management of training, awareness and competencies of all employees and sub-contractors will be managed in accordance with Highway Construction's [C-TRN-001-PR Training Procedure](#).

Highway Construction will ensure that:

- Only appropriately qualified individuals are recruited on the basis of training and experience;
- New employees undergo an induction process that includes an explanation of our commitment to Safety, Environment and Quality;
- The need for training and/or retraining of all personnel is identified and provided as necessary;
- Assessment of employee competency against Highway Construction's & national competency standards is maintained;
- Training and competency records are maintained.

Environmental training specific to this project will be undertaken through the site induction process. The site induction will include the following environmental elements:

- Highway Construction Environmental Policy;
- Environmental Commitment Statement
- Roles & Responsibilities
- Environmental Impacts of Works
- Overview of environmental key issues;
- Specific requirements of the plan;

- Hydrocarbon management and waste management procedures;
- Noise management;
- Site dust management;
- Control of vegetation damage;
- Fire and pest control;
- Emergency Response;
- Incident reporting.

4.2.2 Records

Induction records will be maintained on site in accordance with **C-IMS0002-PR Corporate Records Management Procedure** with induction & competencies being recorded in the project specific Induction Register.

At the completion of the project all induction records will be managed by Head Office.

4.3 Consultation and Communication

4.3.1 Internal

Highway Construction will ensure that internal communication between the various levels of the organisation is achieved, that stakeholders are communicated with prior to works commencing and that communication from interested external parties is received, documented and responded to. This will be achieved through the following mechanisms.

Method	Frequency	Participants	Record.
Induction	Prior to commencement of work.	All personnel and sub-contractors.	Induction – training records.
Site meetings (toolbox) meetings	Weekly or fortnightly depending on site requirements.	Project Manager, sub-contractors (as required), Project personnel.	Minutes of meeting.
Notice board.	Date posted / removed.	Site supervisor.	Prominent display.
Consultation with stakeholders including: Industry advisors; Government agencies; Industry and community groups.	As required.	Project Manager, Site Supervisor.	Meeting minutes.

4.3.2 External

Highway Construction have documented procedures and processes for receiving, recording and responding to relevant communication from external interested parties. For further information please refer to **155-11-ENV-003-MA Community and Stakeholder Engagement Management Plan**.

4.4 Document Control

Highway Construction has established a system for recording the core elements of the environmental management system and maintaining information contained therein.

The Managing Director has the responsibility and authority to control forms, documentation and instructions associated with the management system.

The Project Manager/Management Representative has the responsibility and authority to control forms, documentation and instructions associated with project environmental management plans.

All documents shall be controlled as per the [*C-IMS0001-PR Document Control Numbering System*](#).

The Project Manager shall ensure that the following is controlled:

- Maintenance of non-conformance records;
- Ensuring documentation is available at locations where it is needed;
- Removal of obsolete documents;
- Issuing and recording amendments.

4.5 Operational Control

Highway Construction has identified operations and activities that are associated with the identified significant environmental aspects and has developed documented procedures to cover situations where their absence could lead to deviations from the environmental policy, management plan and the objectives. Operational controls are detailed in the [*155-11-ENV-001-DB - Environmental Aspects and Impacts Register*](#).

4.6 Emergency Preparedness and Response

Highway Construction has established an emergency response plan for the following events:

- Fire
- Motor Vehicle Accident
- Medical Emergencies
- Bomb Threats
- Extreme Weather Conditions (Wind, Water & Lightning)
- Hazardous Material & Dangerous Goods Spills;

These response plans are detailed in the [*155-11-OHS-015-PF Emergency Response Plan*](#) and communicated during the site induction.

4.7 Vehicle Servicing

Vehicle servicing shall only take place in workshops except for daily servicing. Daily services shall only be conducted in designated and approved service locations where there is the potential for minimal environmental impact. All service locations are to be approved by the client representative at the commencement of site operations.

5 CHECKING AND CORRECTIVE ACTION

5.1 Monitoring and Measurement

Highway Construction has developed a basis for monitoring and measuring key characteristics of its operation and activities that have a significant impact on the environment.

Monitoring and measurement requirements for environmental aspects and impacts typically associated with engineering construction works have been identified and are detailed in the [155-11-ENV-001-DB - Environmental Aspects and Impacts Register](#).

Highway Construction will develop a performance report and submit the report to the client representative within 7 days of the end of each month.

Records shall be kept of all monitoring and measurement. All inspection, measuring and testing equipment used for environmental monitoring purposes shall be controlled and calibrated and a register of equipment maintained on each project site.

5.1.1 Definitions

Monitor: To check observe and record without interfering with the operation.

Measurement: Set of operations having the object of determining the value of a quantity.

5.1.2 General

Highway Construction has developed a basis for monitoring and measuring key characteristics of its operation and activities that have a significant impact on the environment.

Records shall be kept of all monitoring and measurement.

All inspection, measuring and testing equipment used for environmental monitoring purposes shall be controlled and calibrated and a register of equipment maintained.

5.2 Non-Conformance

5.2.1 Definitions

Non-conformance: Non-fulfillment of a specified requirement.

Corrective Action: Action taken to eliminate the causes of an existing non conformity.

Preventative Action: Action taken to eliminate the causes of a potential nonconformity.

5.2.2 Management of Non-Conformances

Highway Construction shall manage in accordance with the requirements as outlined in the project Quality Management Plan.

5.2.3 Identification of Incidents

Non-conformances and complaints relating to environmental incidents may be identified by the following methods:

- An environmental emergency or near miss;
- Complaints;

- Result of inspections and audits.

5.2.4 Procedure for Reporting

Where environmental incidents or near misses occur the incident shall be reported as follows:

- Discuss the incident with the supervisor and any related parties and record all relevant details;
- Propose corrective action;
- Comment on the root cause. Where unknown, write “further investigation required” or similar;
- Suggest any preventive action;
- Close out where possible before sending copies to appropriate people;
- Record all actions on the incident report form.

5.2.5 Incident Reporting

When an environmental incident is identified the Environmental Management Representative will immediately notify the client representative. The preferred method of notification is in writing through email.

All incidents are to be investigated in accordance with the [C-IMS-007-PR Incident Reporting](#) procedure and recorded on the [C-IMS-003-PF Incident Report Form](#).

Highway Construction shall submit to the Client Representative a completed Incident Report form within the timeframe stipulated by the client’s system requirements.

5.3 Records

Project environmental management records relating to the following shall be kept:

- Environmental aspects and impacts;
- Legislative and regulatory requirements;
- Objectives and targets and action plans;
- Training activities;
- Internal and external communications;
- Inspection outcomes;
- Monitoring data;
- Details of non-conformance incidents and accidents; and,
- Environmental audit and review outcomes.

The Project Manager is responsible for ensuring that records are kept in accordance with Highway Construction’s [C-IMS-002-PR Corporate Records Management Procedure](#).

5.4 Environmental Inspections

Workplace environmental inspections of all work areas shall be conducted as scheduled within the **C-ADT-003-PF Audit and Inspection Schedule**. They will be carried out by the supervisor, EMR or Project Manager using **C-ENV-003-PF - Environmental Inspection Checklist**.

The inspections will be conducted to comprehensively investigate the performance of the environmental control measures. Corrective actions identified during workplace environmental inspections shall be actioned promptly.

5.5 Audits

5.5.1 Client Representative Surveillance and Auditing

Highway Construction acknowledges the right of the Client Representative to conduct surveillance and second party audits. Any documentation, records or assistance that may be required by the Client Representative during the surveillance or audit activity will be promptly provide upon request.

Auditing shall be undertaken following the procedure detailed in **C-ADT-001-PR Internal Auditing Procedure**. This procedure describes how and when the Integrated Management System (IMS) shall be audited to determine whether it complies with relevant Standards, has been properly implemented and maintained, and is effective in meeting the requirements of the organisation's policy, objectives and targets for continual improvement.

5.5.2 Client Representative Surveillance and Auditing

Highway Construction acknowledges the right of the Client Representative to conduct surveillance and second party audits. Any documentation, records or assistance that may be required by the Client Representative during the surveillance or audit activity will be promptly provide upon request.

5.5.3 Certification Audits

To maintain 3rd party certification, Highway Construction is required to enable external bodies, such as Bureau Veritas access to sites to carry out reaccreditation and surveillance audits. Where this is the case, documentation pertaining to the site and company may be supplied to the auditor for supporting evidence. Documentation which is released will be approved by the HSEQ Manager and will not contain commercially sensitive information relating to this project.

5.5.4 Audit Schedule

The Integrated Management system is audited at frequencies as detailed in the **C-ADT-003-PF Audit & Inspection Schedule**. Audits may also be performed where the Managing Director, Client or Certifying Body consider that an independent review of the system would assist with maintenance or improvements.

5.5.5 Audit Reporting

The object of an audit is to provide an unbiased, open assessment of the system and application of the system to confirm compliance and assist with collecting information for improvements. All deficiencies found during audits will be rectified in an appropriate time frame, unless deemed critical and an immediate response is warranted.

Highway Construction will produce a documented audit report presenting scope of audit, audit questions and audit findings. The Client Representative will be provided a copy of reports to show all matters raised have been appropriately addressed. Auditing will be conducted using **C-ADT-004-DB Internal Audit Register**, **C-ADT-005-PF Internal Audit Checklist** and **C-ADT-006-PF Internal Audit Report**. Identified deficiencies will be reported using **C-ADT-007-PF Continuous Improvement Report**.

5.6 Management Review

Highway Construction aims to continually improve the Environmental Management System by reviewing environmental performance and identifying opportunities for improvement at annual Management Review meetings.

During the Management Review the project EMP Management Plan will be reviewed to demonstrate continual improvement and to assess whether it is being fully implemented, its continuing suitability, adequacy and effectiveness to achieve the organisation's Environmental policy and stated objectives.

The Management Review shall be undertaken at intervals as detailed in *C-ADT-003-PF Audit & Inspection Schedule* and shall be conducted as detailed in *C-IMS-009-PR – Management Review Procedure*. Any opportunities for improvement detected during the Management Review shall be documented and implemented in a timely manner in accordance with the *C-IMS-008-PR IMS Action Plan Procedure*.

5.7 Environmental Management Plan Review

Where any of the following events occur, Highway Construction will conduct a review of the Environmental Management Plan and submit any amendments to the client in accordance with the contractual requirements:

- Detection of a non-conformance
- The work practices no longer reflect the approved management plan
- An incident occurs.

In addition to these requirements the Highway Construction Environmental Management Representative will conduct a review of the Environmental Management Plan 3 months after the commencement of the project and at least every 6 months thereafter for the duration of the contract.

6 ABORIGINAL HERITAGE

Highway Construction have developed an Aboriginal Heritage Management plan for the project based on the report supplied to Main Roads WA by Brad Goode and Associates Pty Ltd & AECOM.

This report has identified two previously recorded Aboriginal heritage sites have been recorded either within or adjacent to the project area. These sites are:

- Site ID 3397 'Murdoch Drive Camp' (Interim register – Camp site)
- Site ID 3630 'Murdoch University' (Permanent register – Artifacts scatter)



For further details regarding Aboriginal Heritage refer to the [155-11-ENV-002-MA Aboriginal Heritage Management Plan](#).

7 NON-ABORIGINAL HERITAGE

There are no places of Commonwealth, State or local heritage significance within or adjacent to the project area based on information provided by DSEWPac 2012; State Heritage Office & the City of Melville.

If any potential places of Commonwealth, State or local heritage significance are discovered within the project boundaries will not be disturbed and the client immediately notified for appropriate action.

8 DUST MANAGEMENT

This plan sets out management strategies aimed at assessing and minimising the potential for dust lift-off as a result of the construction activities, and to ensure dust generation is minimised and external stakeholders are not adversely affected.

The main potential sources of airborne dust have been determined as being:

- Lift-off during clearing operations;
- Lift-off from exposed, dry surfaces (eg cleared area and soil stockpiles);
- Earth-moving by loaders, excavators and other machinery; and

- Heavy vehicle movements;

The following site classification has been determined from the "Site Classification Assessment Chart" contained in the Department of Environment guideline "Land Development Sites and Impacts on Air Quality".

Part A. Nature of site

Item	Score options				Allocated score
1. Nuisance potential of soil, when disturbed	Very low.....1	Low.....2	Medium.....4	High.....6	4
2. Topography and protection provided by undisturbed vegetation	Sheltered and screened.....1	Medium screening.....6	Little screening.....12	Exposed and wind prone.....18	6
3. Area of site disturbed by the works	Less than ha.....1	Between 1 and 5ha.....3	Between 5 and 10ha.....6	More than 10ha.....9	9
4. Type of work being done	Roads or shallow trenches.....1	Roads, drains and Medium depth Sewers.....3	Roads, drains, sewers and partial earthworks.....6	Bulk earthworks and deep Trenches.....9	1
Total score for Part A					20

Part B. Proximity of site to other land uses

Item	Score options				Allocated score
1. Distance of other land uses from site	More than 1km.....1	Between 1km and 500m.....6	Between 100m and 500m.....12	Less than 100m.....18	18
2. Effect of prevailing winds (at time of construction) on other land uses	Not affected.....1	Isolated land uses affected by one wind direction.....6	Dense land uses affected by one wind direction.....9	Dense/sensitive land uses, highly affected by prevailing winds...12	9
Total score for Part B					27

Score A x B = 540

Site is considered a low to moderate dust risk.

8.1 Management Measures

In accordance with the recommended initiatives for a site classification of 2, the following procedures will be implemented to minimise the potential for dust lift-off associated with the construction works:

- Vegetation will be cleared only when necessary
- Areas due for soil stabilisation will be treated as soon as practicable;
- Water tankers will be available to dampen exposed surfaces within construction and laydown areas, particularly during ground disturbing activities;
- Dust generating activities will be minimised during days with high winds or when the wind direction is towards sensitive areas;
- The adjoining community will be informed about planned activities that might cause significant dust;
- Respond rapidly to complaints by nearby residents, businesses and institutions;
- Undertake daily visual monitoring of excessive dust during ground disturbance and construction vehicle activities;

- Vehicle movements will be restricted to approved areas and routes;
- Road sweeping will be undertaken as required;
- All soils and other dusty materials will be covered in accordance with the Road Traffic Code (1975) during transportation; and,
- No burning of any vegetation will be permitted.

8.2 Reporting

Any complaints relating to dust or occurrence of excessive dust plumes will be reported to MRWA

9 WATER CONSERVATION

The Project Manager and the Site Supervisor shall ensure that the Water Conservation Plan is implemented and all personnel comply with the plan. Existing drainage patterns will be protected and the potential for contaminants such as sediments and hydrocarbons reaching drainage systems will be minimised by:

- Prior to the commencement of construction, temporary site drainage aimed at containing sediment within the project area will be considered
- Disturbed areas will be protected with sediment silt controls and rip-raps used as appropriate to reduce runoff velocities
- Permanent protection measures will be installed as soon as possible
- Vegetation removal and disturbance will be minimised
- Disturbed areas will be stabilised soon after work is completed
- Existing drainage paths and drainage channels along the road will not be unnecessarily restricted or blocked during construction
- Drainage sumps will be inspected regularly for sediment and other contaminants. Drainage sumps and other control measures will be cleaned and /or repaired if they are considered to be ineffective
- Any control measures not required as part of the completed works shall be removed at completion of the works
- Vehicle and equipment wash-down areas will be located away from environmentally sensitive areas
- Hazardous materials will be used and stored appropriately
- Liquid and solid waste will be disposed of appropriately

Groundwater quality will be maintained by:

- Groundwater abstraction will be minimised wherever practicable
- All spills will be contained immediately and removed within 24 hours to minimise the potential for contaminants reaching the water table

9.1 Management Measures

The following techniques shall be employed to ensure water loss/usage is minimised.

- Water truck operators shall be instructed to ensure trucks are located directly under the standpipe before operating water pump
- Discharge hose to be placed on standpipe to minimise water splash on discharge
- All equipment to be inspected and maintained to ensure leaks are identified and fixed expediently
- Spray Bars, Dribble Bars, Fans to be adjusted to ensure no spray overlap and no unnecessary areas are watered.
- No unnecessary watering will occur on the project
- Any rework kept to an absolute minimum by ensuring good construction practices
- Stockpiles and loads to be covered to minimise dust generation
- Disturbed areas will be kept to a minimum to alleviate potential for dust
- All vehicles to obey speed limits to minimise dust generation
- Pre wet material will be used (as appropriate) to ensure consistent moisture prior to construction

9.2 Reporting

- Any observed incident resulting in pollution of a water course will be recorded on an Incident Report Form and the client representative notified.
- Results of inspection/audit reports shall be recorded on the monthly audit checklist

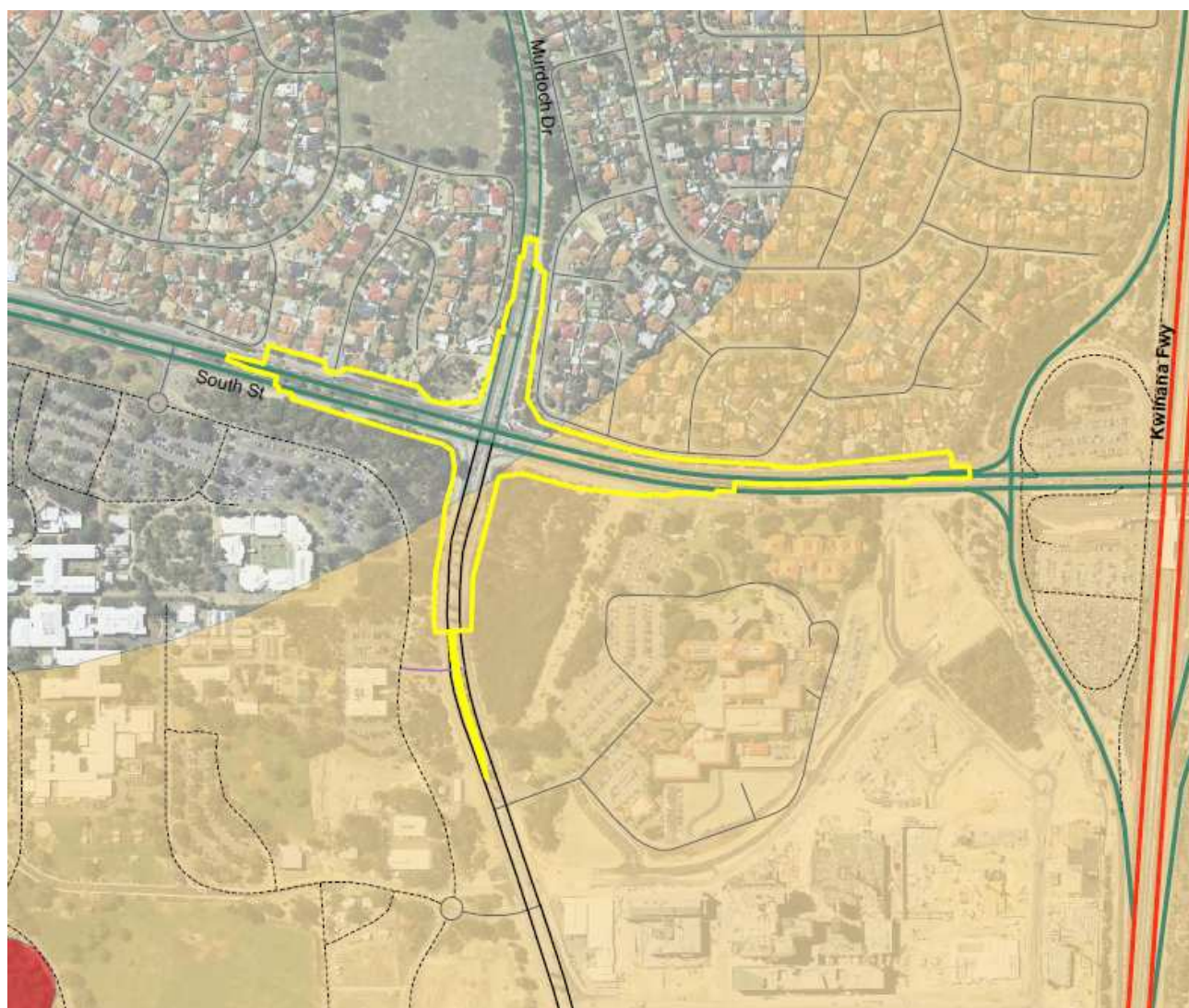
10 SOIL CONTAMINANTS

10.1.1 Acid Sulphate Soils

An environmental impact assessment was commissioned on behalf of Main Roads by AECOM prior to the commencement of the project. In this report it identifies the project boundaries as being a Low to Moderate Risk of containing Acid Sulphate Soil contamination.

Although ASS and PASS are not likely to be present within three metres of natural ground level, the following measures will be applied during construction:

- During excavation, field observations will be made of the soil profile to detect the presence of ASS
- Workforce induction will include instructions on identifying ASS including
 - Wet, grey or dark coloured soils
 - A hydrogen sulphide (rotten egg) smell



Any potential contamination which is identified will be immediately reported to the client representative for further investigation.

10.1.2 Asbestos

An environmental impact assessment was commissioned on behalf of Main Roads by AECOM prior to the commencement of the project. In this report it does not identify any friable asbestos contaminated deposits within the project boundaries.

There were 2 known non-friable asbestos deposits located within the project boundaries. These are:

Location (Slk or N/E Coordinates of Area)		Nature of Deposit	Comments
Easting	Northing		
52435	250922	Telstra Asbestos Conduits	Conduits may be exposed during pavement/drainage construction. Conduits are currently encased in concrete however actual

			dimensions of the concrete encasement are unknown.
52392	250819	Telstra Asbestos Conduits	Telstra asbestos conduits may be exposed during drainage installation.

Highway Construction Project Management shall ensure that all works carried out within these work areas are conducted in accordance with Western Australian legislative and client requirements.

In the event that other deposits, suspected deposits containing asbestos-bearing materials or naturally occurring asbestos are encountered during the works, all work shall immediately cease and the Highway Construction Project Manager shall immediately report the occurrence to the client.

11 DIEBACK AND WEED MANAGEMENT

11.1 Dieback

Road construction, drain construction and other construction operations have the potential to spread *P.cinnamomi* (Dieback) as activities usually involve the deliberate and /or accidental movement of soil, water and vegetation and operations involve the use of large machinery and equipment which can be moved between many sites in a relatively short period.

An environmental impact assessment was commissioned on behalf of Main Roads by AECOM prior to the commencement of the project. In this report it states there were no *Phytophthora Cinnamomi* (dieback) infestation apparent within the project area based on visual inspection of the health of the vegetation and no further dieback assessments are considered necessary.

11.2 Weeds

The environmental impact assessment which was commissioned on the request of Main Roads by AECOM prior to the commencement of the project identifies fifty six (56) introduced plant species in the project boundaries of which forty eight (48) are Environmental Weeds with one(1) being a declared weed (*Asparagus Asparagoides* – *Bridal Creeper*).

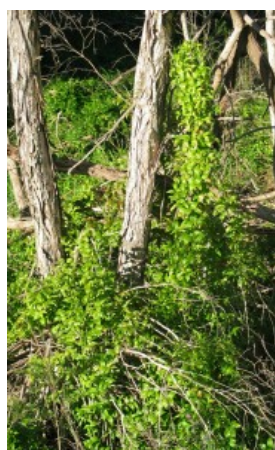


Image of Bridal creeper infestation



Image of Bridal creeper foliage

Locations of *Asparagus Asparagoides* (Bridal Creeper) throughout the project are:

Co-ordinates (North/East) or Chainage (include LHS/RHS or both)		Weed species
MCOS 400 – 420	LHS	<i>Asparagus asparagoides</i> –disposed of offsite at suitable disposal facility
MCOS 110 – 310	RHS	<i>Asparagus asparagoides</i> –disposed of offsite at suitable disposal facility
MCOS 380 – 540	RHS	<i>Asparagus asparagoides</i> –disposed of offsite at suitable disposal facility
MCMU 180-380	LHS and RHS	<i>Asparagus asparagoides</i> –disposed of offsite at suitable disposal facility
MCMU 450-610	LHS and RHS	<i>Asparagus asparagoides</i> –disposed of offsite at suitable disposal facility
MCMU 610-990	LHS	<i>Asparagus asparagoides</i> –disposed of offsite at suitable disposal facility

11.3 Management & Prevention

To prevent the introduction of dieback and the spread of weeds, the following management practices will be implemented during construction process.

11.3.1 Clearing

- Earth moving machinery will be cleaned of soil and vegetation prior to entering and leaving the area to be cleared
- The movement of soil in wet conditions will be avoided wherever possible
- The movement of machines and other vehicles will be restricted to the areas to be cleared;
- The required control of Declared Plants throughout the Project Area will be undertaken according to the guidelines of the WA Department of Agriculture and Food
- Minimise clearing in areas of better quality native vegetation, particularly vegetation community
- Prior to the commencement of any clearing the area is to be inspected by a suitably qualified person to identify any potential declared or controlled weeds
- All areas requiring are to be clearly identified and clearing to be restricted within the clearing boundaries only
- Clearing areas to be kept to a minimum to reduce the area of impact
- Mulch, woodchips and material stockpiles are to be stored away from all drainage and contaminated sections of the project to minimise the potential for contamination
- Ensure no contaminated road building materials, mulches or fill are brought into the project area
- Avoid movement of soil in wet conditions

11.3.2 Vehicle Movements & Cleaning

- Restrict movement of machines and other vehicles to the limits of the areas to be cleared.
- All construction machinery brought to site will be washed and inspected within a contained area for any weeds and seeds remaining

- Cleaning shall be undertaken on a site with a hard, well-drained surface (e.g. a road) that is well away from remnant vegetation.
- The amount of water used will be minimised and where possible soil and mud will be removed when it is dry.
- All wash material is to be disposed of as deep fill or in a suitable landfill
- Clean earth-moving machinery of soil and vegetation prior to leaving the project area

11.3.3 Disposal

Highway Construction project management shall ensure that all topsoil and vegetation containing declared and invasive weeds are disposed of appropriately at an approved offsite location.

Under no circumstances will Highway Construction reuse soil which has potentially been contaminated by declared and invasive weeds in landscaping or revegetation.

11.4 Reporting

Records will be maintained of:

- The inspection of earthmoving machinery prior to entry and departure from the site;
- The control of Declared Plants within the Project area
- The disposal of weedy topsoil

12 FLORA AND FAUNA

12.1 Flora

There are no Threatened Ecological Communities (TECs) within the projects boundaries however three Priority Ecological Communities (PECs) in the vicinity of the project area (AECOM 2012).

There are eighteen (18) Threatened and Priority Flora species having the potential to occur within the project area, of which seven (7) species are listed as threatened under both the WC Act and the EPBC Act. The remaining eleven (11) species are listed as priority species under the WC Act with the exception of *Centrolepis Caespitose*, which is also listed as endangered under the EPBC Act. Of these, only four (4) of the species may occur within the project boundaries due to the environmental conditions of the project area. These include:

- *Acacia Lasiocarpa* var. *Bracteolata* Long Peduncle Variant
- *Dampiera Triloba*
- *Jacksonia Gracillima*
- *Tripterococcus Paniculatus*

12.1.1 Management

During construction activities, Highway Construction will minimise the effects on adjacent vegetation and topsoil by implementing the following practices prior to construction:

- Minimise clearing in areas of better quality, native vegetation, particularly vegetation community


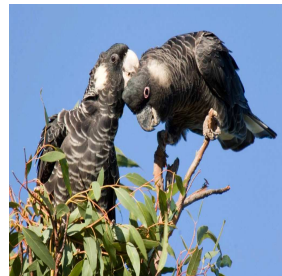

- Areas to be cleared will be clearly marked and not clearing vegetation outside these areas
- Reduce the area of impact by only clearing the minimum area necessary; this applies to the construction of the amenity walls as well as retaining walls and batters adjacent to Quenda Wetland
- Retain existing native flora species where possible, including isolated trees and shrubs that provide foraging habitat for black-cockatoos
- All weedy topsoil and vegetation will be disposed of and not re-used in landscaping revegetation
- All native vegetation will be chipped and stockpiled for later rehabilitation purposes; where larger trees are removed consideration should be given to recycling timber for landscape improvement works e.g. benches, fencing
- Mulch and woodchip stockpiles will be stored away from drainage areas, particularly adjacent to Quenda Wetland
- Land outside the project area will not be disturbed
- Rehabilitation and landscaping will be planned for adjacent areas post construction.

12.2 Fauna

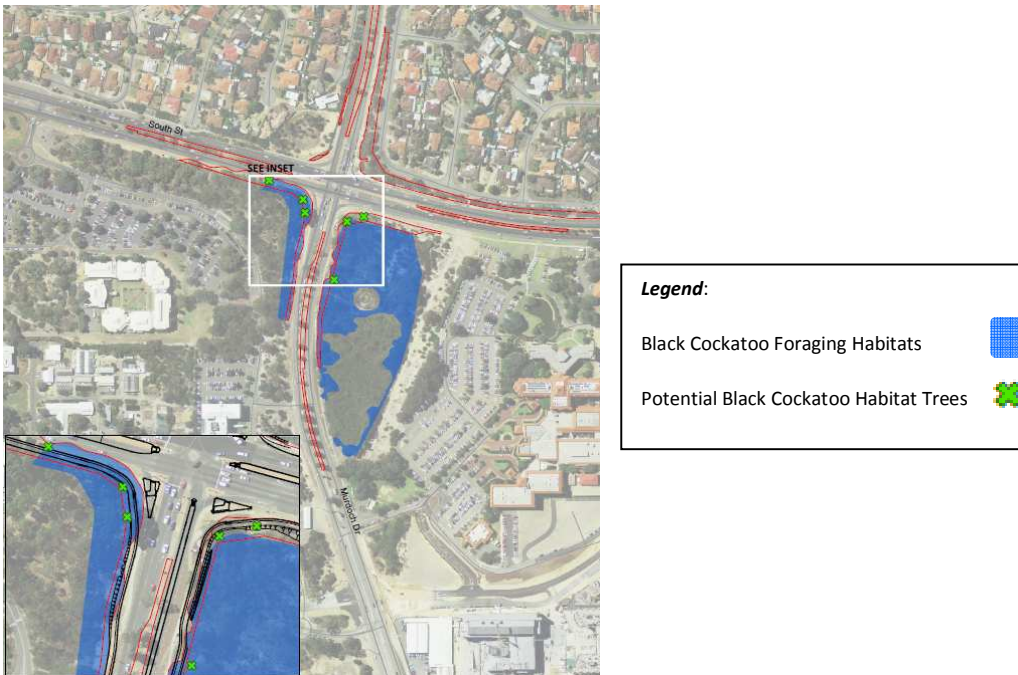
There are twenty (20) species of protected fauna having the potential to occur within the project area. Due to the proximity of the project area to the Swan and Canning Rivers, several large wetlands and the coast, the EPBC Protected Matters Search identified several marine species as well as the potential occurrence of migratory marine and wetland birds. Migratory birds may be occasional visitors to the project area but it is unlikely to provide significant habitat for them.

Based on specimen records and preferred habitat, the following species are likely to occur in the project area:

- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) – Vulnerable (EPBC Act) and Threatened (WC Act)
- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) – Endangered (EPBC Act) and Threatened (WC Act)
- Quenda – also known as Southern Brown Bandicoot (*Isobon obesulus* subsp. *fusciventer*) – Priority Five
- Rainbow Bee-eater (*Merops ornatus*) – Migratory (EPBC Act)
- Perth Lined Lerista (*Lerista lineata*) – Priority Three.
- Native Bee (*Leioproctus contrarius*) – Priority Three
- Graceful Sun Moth (*Synemon gratiosa*) – Endangered (EPBC Act) and Threatened (WC Act)
- Cricket (*Throscodectes xiphos*) – Priority One.

Species	Habitat	Image
Forest Red-tailed Black Cockatoo <i>Calyptorhynchus banksii naso</i>	Requires tree hollows to nest and breed, occurs in forests of Karri (<i>Eucalyptus diversicolor</i>), Jarrah (<i>E. marginata</i>) and Marri (<i>Corymbia calophylla</i>), with flocks moving out onto the Swan Coastal Plain in search of food from exotic trees such as White Cedar.	
Carnaby's Black Cockatoo <i>Calyptorhynchus</i>	Forages in woodland and kwongan heath dominated by proteaceous species. Nests in hollows in large eucalypts, primarily Salmon Gum (<i>Eucalyptus salmonophloia</i>) and Wandoo.	
Southern Brown Bandicoot /Quenda <i>Isoodon obesulus subsp. fusciventer</i>	Dense understory vegetation, particularly around swamps and along watercourses.	

The locations of Black Cockatoo habitat trees and are demarked below:



12.2.1 Management

Management measures for reducing impacts on native vegetation will also reduce the risk of impacts to native fauna; however the following specific measures will also be implemented:

- Consult with DEC regarding the potential impacts to Quenda Wetland and strategies for minimisation and management of impacts, plus contingencies if appropriate
- Avoid or minimise clearing of vegetation associated with the Quenda Wetland
- Minimise impacts on areas of vegetation where conservation significant fauna have may occur
- No pets, traps or firearms to be allowed within the project area
- Venomous snakes and other fauna should not be killed unless as a last resort, and then should only be done by a trained professional.

12.3 Reporting

In the event of any unauthorised removal or damage to vegetated areas an Incident Report shall be completed and reported to the Main Roads' Representative.

If a site of possible rare flora and / or fauna is discovered, works shall immediately cease in the area and the Main Roads' Representative shall be notified. The area shall be barricaded and all site staff made aware of the site so that the site is not damaged.

13 APPENDICES TABLE

Appendix No.	Reference Documentation
<u>Certifications</u>	
01	BVQI Australia to Environmental Standard AS/NZS ISO 14001:2004
<u>ADT – Auditing Related Documents</u>	
02	C-ADT-001-PR Internal Auditing Procedure
03	C-ADT-003-PF Audit and Inspection Schedule
04	C-ADT-005-PF Internal Audit Checklist
05	C-ADT-006-PF Internal Audit Report
06	C-ADT-007-PF Continuous Improvement Report
<u>ENV- Environmental Related Documents</u>	
07	C-ENV-006-PO - Environmental Policy
08	C-OHS-013-PO OHS Commitment Statement
09	155-11-ENV-001-DB Environmental Aspects and Impacts Register
10	C-ENV-001-PF - Environmental Legal Requirements
11	C-ENV-002-PF - Environmental Objectives and Targets Monitoring
12	155-11-ENV-003-PF - Environmental Inspection Checklist
<u>IMS – General IMS Documents</u>	
13	C-IMS0001-PR Document Control Numbering System
14	C-IMS0002-PR Corporate Records Management Procedure
15	C-IMS-007-PR Incident Reporting
16	C-IMS-008-PR IMS Action Plan Procedure
17	C-IMS-009-PR – Management Review Procedure
18	C-IMS-003-PF Incident Report Form
19	155-11-IMS-005-PF Risk Context
<u>OHS- OHS Related Documents</u>	
20	155-11-OHS-015-PF Emergency Response Plan
<u>SUB - Subcontractors & Suppliers Related Documents</u>	
21	C-SUB-002-PF - Subcontractor Agreement Form
<u>TRN – Training Related Documents</u>	
22	C-TRN-001-PR Training Procedure
23	155-11-TRN-002-DB Training and Competency Register
24	155-11 Induction Presentation- Draft