Water Corporation

Dawesville 1B, 4A & 5B Sewer Infill Works
Construction Environmental Management Plan

9 November 2012

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Appendix A Acid Sulfate Soils and Dewatering Management Plan

1. Overview

1.1 Project Outline

The Western Australian State Government announced the recommencement of the Statewide Infill Sewerage Program in May 2010. The WA Government in consultation with Water Corporation and the Department of Health identified the suburb of Dawesville as a priority for the Infill Sewerage Program. The Dawesville 1B, 4A, and 5A project (the Project) will complete the provision of reticulated sewerage to properties on the Peel Inlet side of Dawesville.

The Water Corporation is to construct a gravity-fed reticulated sewer system in the suburb of Dawesville, south of Mandurah. The reticulated sewer system will enable sewerage to gravitate from residential buildings to either pump station 7 or 13. The reticulated sewerage system will be connected to the existing sewerage scheme, whereby sewerage is to be pumped back to the Caddadup Wastewater Treatment Plant (WWTP).

1.2 Construction Environmental Management Plan Objectives

This document is provided as an indicative Construction Environmental Management Plan (CEMP) to assist the construction contractor(s) in identifying potential environmental impacts associated with the Project and management actions to be implemented to minimise these impacts.

This document has been prepared by GHD Pty Ltd (GHD) on behalf of the Water Corporation to outline the minimum expected environmental management requirements to be adopted during the construction phase of the Project. This CEMP is based upon a desktop assessment of existing reports provided by other parties, which GHD has not independently verified or checked.

This document is designed to assist all parties involved in the Project to manage potential environmental impacts during construction activities. This document will be used in as a benchmark for contractors and in conjunction with contractor specific management plans for particular construction activities.

The objectives of this CEMP are to:

- Identify key construction environmental issues that require management in order to achieve the construction outcomes at the site;
- Provide environmental management actions that are consistent with the intent of relevant state and national environmental legislation;
- Allocate responsibility for management actions to appropriate personnel;
- Identify the potential for monitoring, maintenance and/or auditing programmes to assess management measures; and
- Provide guidance with respect to relevant Local and State government legislation.

1.3 Responsibilities, Authorities and Resources

There are multiple positions mentioned in this document. The construction of the Project will be managed by the Water Corporation.

During construction, environmental accountabilities within the management framework will be as follows:

- Project Manager (Water Corporation) – Overall responsibility for the ongoing environmental performance of the Project.
- Construction Manager (construction contractor) – Responsible for the day to day overall environmental performance and the implementation of all requirements of this CEMP.
- Environmental Coordinator (construction contractor) – Responsible for the day to day verification that the environmental performance of the site complies with the CEMP.

All contractors and site personnel associated with the construction phase of the Project are responsible for environmental management with respect to their day to day activities in accordance with this CEMP.

The Environmental Coordinator shall provide training to all personnel during an initial safety and environment induction course, which will include management protocols addressing the management actions outlined in Section 4.

2. Environmental Regulatory Requirements of the Project

2.1 Environment Protection and Biodiversity Conservation Act 1999

The Project does not impact any Matters of National Environmental Significance. The Water Corporation has, therefore, not referred the Project under the EPBC Act.

2.2 Part IV of the Environmental Protection Act 1986

The Project has been referred to the EPA under Section 38 of the *Environmental Protection Act 1986* (EP Act). The outcome of this assessment process was not known at the time of producing this document, but any conditions applied by the EPA will also need to be complied with.

2.3 Part V of the Environmental Protection Act 1986

No clearing of native vegetation is anticipated for the Project works. If necessary, any clearing will be carried out under the Water Corporation's Statewide Clearing Purpose Permit (CPS185/1) under the EP Act for project activities, or utilising an exemption available to the Water Corporation under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

2.4 Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992

The Peel-Yalgorup Ramsar System is classified as a Wetland of International Importance as listed under the Ramsar Convention. The system was listed under the Ramsar Convention in 1990.

The Peel-Harvey Inlet is managed in accordance with the *Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992* (EPP). The EPP was introduced in 1992 to target phosphorus reductions within the Peel-Harvey Catchment. The EPP sets out the Environmental Quality Objectives (EQOs) for the Peel-Harvey estuary and the means by which the EQOs are to be achieved and maintained.

3. Description of Construction Works

The Water Corporation proposes to construct a gravity-fed sewer system in Dawesville Areas 1B, 4A & 5A, south of Mandurah. The sewer will be part of the Water Corporation's Infill Sewerage Program whereby established areas using septic tanks for domestic waste water disposal are connected to the existing sewerage scheme.

The Project involves the construction and installation of a reticulated sewer system with a total length of approximately 13 km. The sewer pipes will be 150 mm and 225 mm in diameter and will be installed using a combination of open trenching and trenchless technology.

Open trenching will involve installing pipes (both sewer and pressure mains) into trenches left open for a period of time. Installation of pipes (both sewer and pressure mains) by trenchless tunnelling is a 'no dig' method whereby pipes are installed using a micro-tunnelling boring machine in 60 m to 100 m linear sections.

Dewatering will be required during construction works, in particular for open trench excavations for pipelines, access chambers, and both pump stations. To limit excavations and dewatering operations for this infrastructure, circular caissons (4.2 m diameter and up to 6.0 m depth) will be used. Construction of the two pump stations will involve Caissons, therefore limiting the amount of excavations and dewatering required.

Excess water from pipe and caisson installation works will be pumped back into the existing sewerage system via temporary pipes and pumped to the Caddadup WWTP.

Additionally, three temporary pump stations and their associated pressure mains are to be decommissioned upon completion of the Project. Decommissioning of the temporary pressure mains will involve flushing the pipes with clean water prior to being disconnected from the sewerage scheme. The internal systems of each temporary pump station will be removed (including above ground electrical boxes) with the voids backfilled with clean sand fill.

The majority of the Project will be installed in the Water Corporation easement on private properties or in Road Reserves.

4. Environmental Management, Monitoring and Contingencies

4.1 Flora and Native Vegetation

The Project is primarily contained within road reserves and private properties. The condition of the vegetation across the site is primarily disturbed or introduced (e.g. cleared road reserves and lawns).

A Threatened Ecological Community (TEC) (ID 1347) covers the entire Project area, however it is assumed the TEC is associated with the Yalgorup National Park, situated 2 km south-west of the Project.

Table 1 Flora and Native Vegetation Management

CEMP - 1	Flora and Native Vegetation
Responsibilities	Implementation – Construction Manager
	Compliance – Environmental Coordinator
Management Objectives	

- To minimise disturbance to native vegetation; and
- To protect conservation significant flora populations consistent with the provision of the *Wildlife Conservation Act 1950* (WC Act) and the EPBC Act.

Management Actions

- Prior any vegetation clearing, appropriate authorisation shall be attained;
- Clearing boundaries shall be marked out before any clearing and/or ground disturbance begins;
- Where possible, mature native trees (> 3 years) shall be retained and not to be removed until approval is gained from the Environmental Coordinator in writing;
- Overburden shall be returned to the trench in layers, with each layer compacted in the trench in accordance with appropriate Water Corporation specifications. This will minimise future soil consolidation; and
- Lawn areas shall be stripped and stockpiled for future reuse (if practical) and trees and shrubs adjacent to trench excavations are to be protected during construction activities.

Performance Indicators

- No unauthorised vegetation clearing or ground disturbance.

Monitoring

- All clearing activity is to be recorded by the Construction Manager in an environmental management system to aid any potential audit compliance reporting; and
- Periodic inspection of cleared areas, project operations and overburden storage to assess compliance with the management actions.

Contingency

Trigger	Action
Non-compliance with the management actions detailed above.	1. Immediately investigate the cause of the non-compliance. 2. Implement contingency actions which may include: – Review management measures practicality or relevance; – Improve training and education for all personnel; – Improve and implement increased protective measures as necessary; – Improve methods for marking clearing boundaries; and – Install additional temporary fencing or signs. 3. Monitor the success of these actions. 4. Initiate rehabilitation of effected flora and vegetation areas.

4.2 Hygiene

The Project area is located within an already disturbed/cleared area, highly accessible to people and vehicle movement. Weeds and diseases may lead to the degradation of the environment by competing with native vegetation for resources.

Hygiene management refers to the isolation and treatment of detrimental environmental characteristics. The objective of hygiene management is to minimise the spread of weeds and diseases.

Table 2 Hygiene Management

CEMP - 2	Hygiene
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • To prevent the introduction and spread of weed species and diseases.	
Management Actions • Excavated soils shall be placed as close as possible to their source area; • Construction materials (e.g. soil, revegetation material) shall not be sourced from areas known to contain diseases or high weed infestations; • Construction vehicles shall be kept within the clearing/construction areas; and • Where possible, top up soil shall be sourced locally and shall be free of weeds or diseases.	
Performance Indicators • No new weed infestation associated with construction works.	
Monitoring • Visual inspections for weed infestation shall be undertaken by the Environmental Coordinator as part of routine site environmental inspections, including prior to and after clearing in any area.	
Contingency	
Trigger	**Action**
Signs of significant weed and/or pathogen introduction during construction associated with construction activities.	1. Notify Environmental Coordinator. 2. Undertake remedial works to control and eradicate introduced weeds. 3. Investigate possible introduction pathway and determine measures to prevent re-occurrence.

4.3 Terrestrial Fauna

Native fauna is protected under the WC Act, with it being an offence to harm, capture or kill native fauna unless licences held under the WC Act permit otherwise. Threatened and endangered fauna are protected at the Federal level by the EPBC Act as matters of 'National Environmental Significance'. Trapped and/or injured fauna can also pose a danger to on-site personnel.

The Project area is contained within a highly disturbed and modified residential area and construction is unlikely to significantly impact native fauna populations. However, majority of the Project area is adjacent the Peel-Harvey Inlet and immediately south of Reserve R2851, both important habitat and refuge for a variety of bird species. It is therefore recommended that general fauna management be considered during the construction phase of the Project.

Table 3 Terrestrial Fauna Management

CEMP - 3	Terrestrial Fauna
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • Minimise and manage impacts to fauna; and • Protect fauna consistent with the provisions of the WC Act and the EPBC Act.	
Management Actions • Trenches and other pits shall be kept open for the minimal period required to undertake works; • Trenches shall be constructed in a manner to allow fauna to escape (e.g. open trenches or pits shall be ramped to allow fauna egress); • The Environmental Coordinator shall develop and implement a procedure that outlines the requirements for safe relocation of fauna (such as snake relocation). The procedure shall include an internal and/or external contacts list for the purposes of fauna management, handling and removal; • Trenches and excavations that have been open overnight shall be inspected for fauna immediately prior to work commencing on open trenches or excavations, and any trapped fauna will be removed by a person authorised (for handling fauna) by the Department of Environment and Conservation (DEC). Any fauna removed will be recorded in the Fauna Removal Log (Figure 1), which shall be retained at the site office; • Pipes shall be inspected for fauna prior to handling and joining. Under no circumstances shall the disturbance of the fauna occur to encourage leaving the pipe; • Fauna encountered during pre-construction and/or construction activities shall be allowed to make their own way from the site. If this is not possible or is likely to hold up work for some time, the fauna may be relocated to a safe location by a person authorised (for handling fauna) by the DEC; • Any injured fauna shall be left alone and observed until fauna-rescue personnel can attend to the animal; • Maintain a clean work environment to avoid attracting fauna to hiding places or	

garbage; • Construction personnel shall not feed native fauna; • Dead animals shall be removed immediately from the trench to avoid attracting scavengers into the trench. They shall be disposed of as putrescible waste (to landfill); and • Potential impacts to water quality and aquatic fauna will be managed in accordance with Section 4.4.	
Performance Indicators • No significant negative[1] interactions with terrestrial fauna attributable to construction works.	
Monitoring • Visual inspections for trapped fauna in open trenches or any other work area which has the potential to entrap fauna shall be done prior to commencement of works and within two hours post sunrise and pre-sunset.	
Contingency	
Trigger	**Action**
Injury or death of native fauna due to construction activity	1. Notify Environmental Coordinator. 2. Arrangements to be in place and implemented to treat the animal or euthanase it by approved methods as required. 3. Investigate cause and determine measures to prevent re-occurrence.

[1] Negative impacts include attracting, trapping, injuring and/or killing and native fauna.

Figure 1 Fauna Removal Log

Name

Page …… of …..

Date of Entry	Location and Property Reference	Fauna Description (e.g. snake, lizard)	No. Removed	Alive (Y/N)	Method of Removal	Name and Position	Initial

4.4 Surface Water and Drainage

The Project is situated adjacent the Peel-Harvey Inlet, which forms part of the larger Peel-Yalgorup Ramsar System. Poorly managed construction operations have the potential to generate impacts on surface water at both a local and regional scale.

Table 4 Surface Water Management

CEMP - 4	Surface Water
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • Maintain natural hydrological flow paths within the Project area; and • Minimise the risk of significantly impacting local and/or regional water quality.	
Management Actions • All surface run-off from construction activities shall be contained through appropriate drainage requirements and include erosion / degradation controls; • Any evidence of erosion or disturbance to natural drainage flow is to be reported to the Environmental Coordinator and be remediated as required; • Construction material shall not obstruct drainage lines / surface water flow paths; • If practically possible, excavated material shall be stockpiled on the upslope side of excavation works such that run-off will revert back into the excavation, limiting the possibility of eroded soils being transported into the Peel-Harvey Inlet; and • All potential hazardous materials and other contaminants require appropriate storage and handling procedures. Management of Hazardous materials is covered in Section 4.9.	
Performance Indicators • No alteration of existing drainage pathways; and • No evidence of runoff from construction areas into the adjacent surface waters.	
Monitoring • Daily inspection when rainfall is predicted of materials and stockpiles to ensure they are appropriately located and constructed, without interfering with existing drainage pathways; • Daily inspection when rainfall is predicted of erosion within construction areas shall be undertaken by the Environmental Coordinator as part of routine site environmental inspections; and • Daily and opportunistic (especially during/after rain events) inspection for sediment run-off from construction areas.	
Contingency	
Trigger	**Action**
Direct discharge of surface water runoff from construction areas into adjacent wetland and watercourses (in particular Peel-Harvey Inlet).	1. The cause shall be immediately investigated. 2. If the change is attributable to the

	presence of the sewerage infill program preventative action shall be identified and implemented to prevent the re-occurrence, possibly including: – realigning diversion bunds; and – extending diversion bunds. 3. The effectiveness of preventative action shall be monitored.

4.5 Acid Sulfate Soil

Acid Sulfate Soils (ASS) are naturally occurring soils, containing iron sulfides and are generally benign when in their natural state, which is generally a waterlogged environment. However, exposure of these soils to air results in oxidation processes which produce sulfuric acid. These acids can cause the breakdown of soil structure through the release of metals, precipitates and nutrients from the soil. This release can be detrimental to the environment.

The Construction Manager shall refer to the Acid Sulfate Soil and Dewatering Management Plan (ASSDMP) (Appendix A) for details of the required ASS treatment and management for the Project.

4.6 Dewatering

Dewatering will be required during construction of the proposed open-cut sewerage network and in-site precast concrete caissons. The Water Corporation is not required to obtain either a Section 5C or Section 26D licences under the Rights in Water and Irrigation Act 1914 (RIWI Act) in regards to dewatering. The power given to the Water Corporation by Section 83(2)(b) of the Water Agencies (Powers) Act 1984 overrides the generic requirements of Sections 5C and 26D of the RIWI Act and therefore the Water Corporation is exempt from the requirement to obtain a dewatering licence.

An Acid Sulfate Soil and Dewatering Management Plan (ASSDMP) has been prepared by GHD (2012) which outlines strategies and procedural information on management controls for key groundwater and surface water risks resulting from dewatering and excavation (and other construction activities) outlined within this CEMP.

The Construction Manager shall refer to the ASSDMP (Appendix A) for dewatering management and treatment guidelines associated with the Project.

4.7 Waste

It is anticipated that there will be some general construction waste and excess excavated soil during the construction and installation of the proposal. All wastes generated will be disposed of at an appropriate waste disposal facility.

The construction of the Project will inevitably produce some waste products such as litter and general construction waste. All wastes from construction activities must be disposed of in a lawful and environmentally acceptable manner. Inappropriate waste disposal has the potential to have detrimental impacts on the environment, including contamination of soil, surface water and groundwater, and landscape amenity.

Table 5 Waste Management

CEMP - 5	Waste
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • Minimise the generation of wastes within the Project area; • Remove all waste materials from the Project area at the completion of the construction phase of the Project; • Adopt the waste management hierarchy of reduce, reuse, recycle; and • Ensure that all waste materials generated and/or stored onsite will not have any adverse health and environmental impacts.	
Management Actions • All domestic rubbish or waste generated by personnel shall be appropriately disposed of in the facilities provided (i.e. waste bins with lids); • Controlled waste (including hydrocarbons, chemicals and contaminated soil) shall be handled and disposed of in accordance with the *Environmental Protection (Controlled Waste) Regulations 2004*; • All construction waste shall be disposed of to an appropriate licenced facility; • All construction wastes shall be removed from the Project site following the completion of construction works; and • All liquid waste, resulting from dewatering works, shall be pumped back into the nearest existing sewerage scheme.	
Performance Indicators • No uncontrolled waste leaving the Project area; and • No adverse residual environmental or human impacts to site personnel, nearby residents or the public due to wastes.	
Monitoring • Monitoring the presence of litter within and adjacent to the Project area which is attributed to construction activities shall be undertaken by the Environmental Coordinator as part of routine site environmental inspections. • Daily and opportunistic inspection to ensure correct usage of recycle and refusal bins, shall be undertaken by the Environmental Coordinator as part of routine site	

environmental inspections.	
Contingency	
Trigger	**Action**
Presence of significant uncontrolled waste around the construction site.	1. Initiate appropriate clean-up / remedial works. 2. Investigate cause and implement appropriate corrective actions (provision of additional bins or skips, undertake further education etc.).

4.8 Indigenous Heritage

The status of Site ID's 3239 and 3242 indicate these Indigenous Heritage sites need not be referred to the Aboriginal Cultural Material Committee for assessment. The status of Site ID's 3288 and 3287 indicate that information lodged with the Registrar does not have sufficient information to complete an assessment; however the provisions of the *Aboriginal Heritage Act 1972* still apply to these places until they are assessed as not applicable.

Table 6 Indigenous Heritage Management

CEMP – 6	Aboriginal Heritage
Responsibilities	Implementation – Construction Manager
	Compliance – Environmental Coordinator
Management Objectives • Minimise impacts on Indigenous Heritage, both known and unknown; and • Comply with the requirements of the *Aboriginal Heritage Act 1972*.	
Management Actions • The Construction Manager shall provide training to all personnel during an initial safety and environment induction course, which will include education in relation to Aboriginal Heritage, staff obligations with regards to the protection of unknown Aboriginal Heritage sites and values pursuant to the *Aboriginal Heritage Act 1972*; • If during Project works, the Construction Manager uncovers any materials that could be considered significant to Aboriginal people, the Construction Manager will immediately cease works within 50 m of the artefacts and notify the Water Corporation Project Manager, who in turn will contact the DIA as soon as possible; and/or • If any human skeletal material is uncovered, work shall cease within 50 m of the material and it shall be reported to the WA Police immediately and the Water Corporation Project Manager as soon as possible. • Works will not resume until the Police, DIA and archaeologists have come to an agreed solution. Works in areas not impacted by the find can continue; • If skeletal/artefact remains found are to be an Aboriginal Heritage matter and not a police matter, they will be managed according to the wishes of the local indigenous communities and left as is until a decision is made about how to proceed. Works in areas not impacted by the find can continue; • The location and details of any newly discovered artefacts or remains shall be reported to the Project Manager (Water Corporation), WA Museum and DIA; and • Consultation with the DIA prior to ground disturbance within the registered Aboriginal Heritage Site IDs 3288 and 3287. If the registered Aboriginal Heritage sites are anticipated to be impacted by the Project, Approval under Section 18 *Aboriginal Heritage Act WA 1972* will be required prior to commencement of ground disturbing activities on any registered Aboriginal heritage sites. All works must be undertaken in accordance with the conditions stipulated in any Section 18 and other approvals granted for the Project.	
Performance Indicators • No unauthorised disturbance to any registered Aboriginal Heritage site.	

Monitoring • Ongoing visual observations during ground disturbing activities, by all site personnel for the presence of Aboriginal artefacts and human skeletal remains.	
Contingency	
Trigger	**Action**
Identification of potential heritage site during excavation works, or other construction activity.	1. Works shall cease in the immediate area. 2. Advice shall be sought from a cultural monitor. 3. Works shall only re-commence when the go-ahead is received from the cultural monitor.
Skeletal material found during excavation	1. Works shall cease in the immediate area. 2. Find shall be reported to WA police and the DIA 3. Advice and recommendations shall be taken from the Police and DIA. 4. Works shall only resume when the go-ahead is received from the Police and DIA and the local indigenous community.

4.9 Use of Hazardous Materials

Hazardous materials, such as chemicals and dangerous goods, have the potential to cause harm to people, property or the environment if they are not stored or handled correctly. It is not known which hazardous materials, if any, will be present on site, and it is therefore proposed that the construction management measures are generic, noting that all hazardous materials will need to be managed in accordance with the relevant Material Safety Data Sheet (MSDS).

Possible hazardous materials used and stored during construction works such as hydrocarbons, fuels, and lubricants, if spilled, have the potential to:

- Contaminate soil, surface water and groundwater;
- Impact personnel and public safety; and
- Create an ignition source.

Table 7 Hazardous Materials Management

CEMP – 7	Hazardous Materials
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • Manage the storage and containment of all hazardous materials; • Minimise the potential for accidental spills of hazardous materials; and • Manage any spills to minimise the risk of adverse environmental and human health outcomes.	
Management Actions • A Licence issued by the Chief Officer of the Department of Commerce under the *Dangerous Goods Safety Act 2004 (WA)* and *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007* (section 26), shall be obtained prior to any storage of dangerous goods; • All chemicals shall be transported, handled, stored and disposed of correctly (in accordance with their MSDS); • Storage tanks shall be bunded (or self-bunded) with sufficient capacity to store 110% of the tank volume; • Hazardous materials shall be stored in minimum practicable quantities to minimise the environmental impact if spillage occurs; • Hazardous materials shall be segregated to ensure incompatible dangerous goods are not stored together; • All chemical and fuel containers shall be correctly labelled; • No storage of hydrocarbons or chemicals shall be permitted within 50 m of a watercourse or waterbody (in particular Peel-Harvey Inlet); • All vehicles and plant machinery must be serviced and refuelled at least 50 m away from any watercourse or waterbody; • Ignition sources (e.g. welding equipment, cigarettes, lighters) shall be prohibited within any compound used for the storage of hazardous materials; • Suitable clean-up materials shall be located at chemical storage areas and	

personnel are to be adequately trained in clean-up procedures. Spill response kits are to be installed at strategic locations to ensure clean-up and containment of spills, occur as soon as practicable following the event. As a minimum spill response kits are to include:

  - Universal absorbent pads or pillows or blankets;
  - A containment boom (for containing discharges to water);
  - Labelled plastic contaminated waste bags; and
  - Safety gloves.
- Clean-up procedures in the event of a spill will include, if required, excavation, validation and disposal of contaminated soil. All substantial spills are to be reported to the Environmental Coordinator;
- A Hazardous Materials (Manifest) shall be maintained of all hazardous materials held on the construction sites. The Log will be stored in a secure location at the site office. The Log will identify the:
  - Date on which the goods were received;
  - Location(s) at which the goods are stored;
  - Volume/quantity stored at each location;
  - Date and volume/quantity removed from storage when used; and
  - Name of the person(s) receiving/removing goods to/from storage on each occasion.
- FESA shall be notified of any incident involving hazardous material/s that has had, or has the potential to have, a significant impact on the environment or human safety; and
- The DEC shall be notified of any incident involving hazardous material/s that has had, or has the potential to have, a significant impact on the environment.

Performance Indicators

- No contamination of soil, surface water and groundwater as a result of hazardous material spills associated with construction.

Monitoring

- Storages of hydrocarbons and hazardous substances shall be regularly visually inspected to ensure management requirements are being met;
- Spill response kits shall be checked on a weekly basis to ensure they are appropriately stocked and accessible;
- Refuelling areas shall be inspected by the Environmental Coordinator on a regular basis to ensure management requirements are being met; and
- The Environmental Coordinator is to maintain a record of all hydrocarbons, chemicals, pesticides, herbicides or other chemicals spills that occur and subsequent actions taken (see Section 5.1).

Contingency

Trigger	**Action**
Spill or leak of hazardous goods during construction	1. Contain the spill and initiate appropriate clean-up / remedial works. 2. Investigate cause and implement

	appropriate corrective actions (repair faulty equipment, upgrade 3. The following causes shall be investigated: – Spills greater than 20 litres; and – Inform relevant authorities of a spill greater than 1000 litres. 4. An appropriate remedy shall be implemented, possibly including: – Repairing defective equipment. – Upgrading fuel storage and handling procedures. The effectiveness of the remedy shall be monitored.

4.10 Public Safety and Traffic

Construction works will be conducted within a residential area, and all work will be carried out in the safest possible manner. The construction works will interfere with local traffic movements. Traffic management is, therefore, required to minimise the potential impacts on local residents and the public in general.

Table 8 Public Safety and Traffic Management

CEMP - 8	Public Safety and Traffic
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • Manage potential conflicts between users of local roads and construction vehicles; • Manage potential conflicts between the public and construction activities; • Minimise any inconvenience to local residents caused by the construction works, such as road blockages and slow traffic movement; and • Ensure safe and controlled traffic movements onsite.	
Management Actions • The Contractor shall advertise the impending works and routes to be used by construction vehicles to the local community two weeks prior to the commencement of works, followed by a letter-box drop to affected residents one week prior to commencement of works; • The Construction Manager shall ensure that all light vehicles, construction vehicles and plant and machinery access the project site via existing roads and tracks. If oversize mobile crane or construction plant need to access to the project site, a pilot vehicle if required will be used to guide such oversize vehicles on the road / track to the project site; • Road signage shall be displayed within all construction areas in accordance with *Australian Standard 1742.3 – 2009 Manual of Uniform Traffic Control Devices, Part 3 – Traffic Control Devices for Works on Roads*; • Road access in the construction area shall be maintained by the use of signed detours and/or a single lane. Advisory signs shall be installed sufficiently in advance of the construction works to allow road users to take alternative routes; • Trenchless construction techniques shall be used during construction to reduce the duration and impact upon the nearby public recreational area (Major boat ramp); • Local residents shall be regularly informed of traffic disturbance and provided with a contact phone number for any traffic disturbances queries; • No construction traffic movements shall be permitted beyond designated construction roadways and access ways; • All site personnel shall be informed of the location of existing limestone caves situated toward the southern extent of the Project area, which will be signposted and/or flagged if necessary; • At the end of each day, equipment materials are to be secured and holes covered when unattended;	

- Where practicable, prevent unauthorised persons from entering within the boundaries of the construction site by fencing, signs and other means. Public should be prevented from entering the construction site or approaching construction activities; and
- Any complaints received relating to the construction activities for the Project will be notified to the site representative and entered in a database to ensure that each complaint is logged. Once the complaint is registered, the Construction Manager or a designated representative will respond to the complaint as soon as practicable, whether in writing or phone call. The Construction Manager will report complaints to the Water Corporation Project Manager at no less frequent than once a month.

Performance Indicators

- No non-compliances with the above management actions;
- Any complaints received will be investigated and responded to within one working day;
- No accidents on and/or offsite involving construction site vehicles; and
- No major disruptions to local traffic.

Monitoring

- Construction Manager to record complaints with respect to public safety / conflict and local traffic conflicts associated with the construction activities; and
- Regular and opportunistic review of signage, fencing and management actions by Environmental Coordinator.

Contingency

Trigger	**Action**
Non-compliance with the management actions detailed above.	1. Immediately investigate the cause of the non-compliance; 2. Implement contingency actions which may include: – Review management measures practicality or relevance; and – Improve training and education for all personnel; 3. Initiate a feed-back loop to review the management actions to ensure that all possible steps are taken to prevent further reoccurrences.

4.11 Recreation

The Peel-Harvey Inlet holds cultural value and is widely viewed as a commercial and recreational waterway with significant development in the tourism industry (SEWPaC, 2012). A major boat ramp which services the area is also situated adjacent the proposed pipeline alignment. Management actions are to be implemented to reduce any potential impact to recreation in the region.

Table 9 Recreation Management

CEMP - 9	Recreation
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • Minimise and manage the nuisance factor to nearby residents and fauna due to lighting, visual, vibration, noise, dust and odours; and • Prevent structural damage to nearby properties due to vibrations attributable to construction works.	
Management Actions • The construction site shall be adequately fenced where required and clearly sign posted; • Trenchless techniques shall be used during construction to reduce the duration and impact upon the nearby recreational area; and • Construction activities around the boat ramp area shall be restricted during holiday periods. *Visual Amenity* • Vegetation removal and disturbance shall be limited as far as practicable; and • The area of disturbed sites shall be minimised, with progressive rehabilitation and landscaping undertaken, where possible. *Vibration* • Construction activities within Main Roads road reserve shall be undertaken in accordance with Main Roads specifications to control the disturbance and damage to property caused by vibratory compaction equipment. Specifications are available at https://www.mainroads.wa.gov.au/BuildingRoads/TenderPreparation/Specifications/Pages/specifications.aspx. *Noise* • Where construction works are to occur outside of normal operating hours (as dictated by regulations) all stakeholders, including the City of Mandurah, are to be consulted. Standard operating hours may be considered to be between 0700 and 1900, Monday to Saturday with no construction works to be carried out on Sundays or public holidays; • A Construction Noise Management Plan is required if work is to be undertaken outside of daylight hours; and • Any complaints regarding noise levels are to be registered by the Construction	

Manager and appropriate action will be taken in consultation with the City of Mandurah, to investigate and rectify the problem.

Dust

- Dust generating activities shall not be undertaken during unfavourable weather conditions where practicable, e.g. high wind speeds, unfavourable wind directions relative to sensitive premises and environments;
- The extent of cleared and other disturbed areas shall be minimised as far as is practicable for construction requirements;
- Dust emissions shall be visually monitored on a constant basis, with appropriate dust suppression measures, such as watering down, hydro-mulching or wind fencing to be implemented if necessary on stockpiles and trenches;
- Progressive rehabilitation of disturbed areas shall be undertaken to reduce the total exposed area;
- Any community complaints regarding dust levels or any dust levels that are deemed excessive are to be reported as an environmental incident; and
- Vehicles transporting soils off-site shall be covered to minimise dust generation during transport.

Odours

- Connections to the existing sewer line should be made as quickly and efficiently as practically possible.

Performance Indicators

Visual Amenity

- No significant visual impact related complaints due to poor housekeeping.

Noise and Vibration

- No significant noise and vibration related complaints.
- No unapproved construction outside of the standard operation hours, without prior consultation.

Dust

- No visible dust leaving the Project area as a result of construction activities.
- No visible dust settling on native vegetation in or outside the Project area as a result of construction activities.
- No dust impact related complaints.

Odour

- No odour impact related complaints.

Monitoring

- Any complaints, inspections and resulting actions taken shall be recorded in the complaints register.
- Daily and opportunistic visual assessment (or other monitoring methods) of dust lift shall be undertaken by the Construction Manager as part of routine site environmental inspections.
- Daily inspection of vehicles, plants and machinery to ensure that noise and

vibration is not excessive.	
Contingency	
Trigger	**Action**
Non-compliance with the management actions detailed above.	1. Immediately investigate the cause of the non-compliance; 2. Implement contingency actions which may include: – Review management measures practicality or relevance; and – Improve training and education for all personnel; 3. Initiate a feed-back loop to review the management actions to ensure that all possible steps are taken to prevent further reoccurrences.

4.12 Decommissioning

Three temporary pump stations and their associated pressure mains will be decommissioned upon completion of the Project.

Table 10 Decommissioning Management

CEMP - 10	Decommissioning
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • To minimise environmental impacts from decommissioning.	
Management Actions • All residual waste (e.g. residual sludge, liquid wastes including chemicals) is to be disposed of appropriately at a licensed facility; • Temporary pressure mains will be flushed using clean water prior to being disconnected from the sewerage scheme; • Internal systems of each pump station will be dismantled, recycled, or disposed of at a licensed waste facility; • Reusable components will be reconditioned or recycled for future use; • After each temporary pump station has been removed (including above ground electrical boxes), the empty voids will be backfilled with clean sand fill (locally sourced fill preferred); • Disturbed land surfaces will be re-contoured to ensure no voids or uneven surfaces; and • Topsoiling and planting of the site with native, locally sourced plants or grasses to prevent soil erosion.	
Performance Indicators • No hazardous structures and/or surfaces remaining after decommissioning works.	
Monitoring • Visual inspection of the decommissioned temporary pump station and pressure mains to be undertaken by the Environmental Coordinator upon completion of decommissioning works.	
Contingency	
Trigger	**Action**
Non-compliance with the management actions detailed above.	1. Immediately investigate the cause of the non-compliance; 2. Implement contingency actions which may include: – Review management measures practicality or relevance; and – Improve training and education for all personnel;

	3. Initiate a feed-back loop to review the management actions to ensure that all possible steps are taken to prevent further reoccurrences

4.13 Rehabilitation

Rehabilitation of the Project area is important to ensure that any visual and environmental impacts of the works are short term. The following rehabilitation procedures will be carried out during and after construction works.

Table 11 Rehabilitation Management

CEMP - 11	Rehabilitation
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator Project Manager
Management Objectives • Restore disturbed trafficable areas and road verges to the requirements of Main Roads *Specification No. 304 Revegetation & Landscaping*, in consultation with the City of Mandurah and affected landholder; • Restore disturbed area on residential properties to a condition as near as practical to the original condition; and • Support and protect existing structures adjacent to the works from the effects of construction and to compact and reinstate trenches to prevent future damage or effects to adjacent structures.	
Management Actions • If any trees or shrubs have to be removed, they will be replaced and if lawns, driveways or paving are disturbed they will also be restored. Advanced trees (matured to at least 3 years) will replace any mature trees that are unavoidably removed or destroyed. Water Corporation will ensure gardens are rehabilitated, as near as possible, to original condition; • Lawn areas are to be stripped to the depth of the root zone, stockpiled and kept moist for future replacement if practical. Otherwise the lawn is to be disposed of and the area returfed with the same lawn type; • Trafficable areas shall be backfilled, compacted and the wearing surface restored in accordance with Main Roads (2009) *Specification No. 304 Revegetation & Landscaping*, in consultation with the City of Mandurah and affected landholder; • Topsoil shall be removed to a depth of approximately 150 mm and stockpiled for use during rehabilitation; • Following installation of the sewer, and backfilling of the trench, stockpiled topsoil shall be returned and evenly respread without delay; and • Following the respreading of topsoil along the trench excavation, if soil subsidence occurs, the depression shall be 'topped up' with imported approved soil.	
Performance Indicators • Achieve agreed rehabilitation completion criteria for revegetated road reserve and private property upon completion of the Project.	
Monitoring • Take photographic evidence of Project areas likely to be disturbed to ensure rehabilitation to an appropriate standard; and • The Environmental Coordinator (or delegate) shall visually inspect the progress of	

rehabilitation post-construction every 3 months or until an acceptable stabilisation/condition is observed.	
Contingency	
Trigger	**Action**
Non-compliance with the management actions detailed above.	1. Immediately investigate the cause of the non-compliance. 2. Implement contingency actions which may include: – Review management measures practicality or relevance; and – Improve training and education for all personnel. 3. Initiate a feed-back loop to review the management actions to ensure that all possible steps are taken to prevent further reoccurrences.

5. Environmental Incidents and Compliance

5.1 Environmental Incident Management

For the purposes of this CEMP, an Environmental Incident is any event or impact on the environment involving actions or assets associated with the Project that is capable of:

- Causing harm to the environment or any person;
- Causing pollution; and/or
- Coming to the attention of the public or an environmental regulatory agency (including non-compliance with any conditions of environmental approvals).

Environmental incidents include matters such as:

- Spills of any chemicals or dangerous goods (including hydrocarbons);
- Any fires, including wildfires generated outside the Project area, which threaten the Project area;
- Contaminating materials released into the environment;
- Death or injury of any native fauna within the Project area or offsite resulting from collisions with construction vehicles; and
- Environmental monitoring results or observations indicating an impact to the environment or any person (water quality, dust, noise, etc.).

Significant environmental incidents are defined as events that cause or could potentially cause harm to the environment, as defined in Section 3A (2) of the EP Act. Environmental incidents do not include matters where there is no impact on the environment or do not cause concern for external groups, for example, a routine variance to compliance with this CEMP.

All environmental incidents will be reported and investigated promptly, enabling effective actions to be implemented without delay.

Table 12 Environmental Incident Management

CEMP - 12	Environmental Incidents
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • Identify, appropriately manage and report (as required) all environmental incidents; and • Identify management actions to prevent or, in the event that the incident cannot be avoided, to mitigate future similar environmental incidents	
Management Actions • All suspected environmental incidents shall be reported to the Environmental Coordinator. The Environmental Coordinator shall assess the impact site and make a determination (based upon professional experience) on whether the suspected environmental incident is confirmed; • If a confirmed environmental incident occurs, the Environmental Coordinator shall	

report the incident as soon as reasonably practicable to the persons listed in Table 13 below:

Table 13 The Water Corporation's Environmental Incident Contact List

Name	Position	Organisation	Telephone	
Tony D'Ascanio	Project Manager	Water Corporation	Work A/H / Mobile	(08) 9420 2395 0418 904 246
Suzanne Brown	Manager Environment Branch	Water Corporation	Work A/H / Mobile	(08) 9420 2894 0413 569 956
Gordon Groth	Environmental Operations Manager	Water Corporation	Work A/H / Mobile	(08) 9420 2796 0409 941 758

- The Environmental Coordinator shall determine, in consultation with the Water Corporation's Environmental Branch, if the incident is likely to have a continued environmental impact, or high risk of impact, if construction work continues;
- If the Environmental Coordinator determines that the incident is likely to have a continued environmental impact, or high risk of impact if construction work continues, then the Environmental Coordinator shall require that such work will temporarily cease. Other construction works not related to the environmental incident and environmental impact will continue;
- Construction works at the affected area will only recommence on the approval of the Environmental Coordinator;
- The Environmental Coordinator shall investigate the incident and complete an Incident Report (Figure 2) as soon as reasonably practicable (generally within 24 hours of the incident). The Incident Report shall clearly identify the responsibility and deadlines for approved closeout actions. The Environmental Coordinator will provide the Incident Report to the persons listed above in Table 13;
- The Environmental Coordinator shall make himself/herself, or an appropriate representative, contactable outside of their usual working hours and ensure that incident report summaries are carried out within 24 hours of an incident;
- The Environmental Coordinator will log and retain all Incident Reports on a file located at the construction site office;
- Any environmental incident which has caused or is likely to cause pollution, or material or serious environmental harm (in accordance with s72(1) of the EP Act), shall be reported by the Environmental Coordinator to the Director General and Environmental Services Branch of the DEC immediately by phone ((08) 6467 5000) and formally in writing as soon as reasonably practicable following the environmental incident;
- The Environmental Coordinator will report environmental incidents to the City of Mandurah, FESA and the Police as required in accordance with the Water Corporation's Standard *SG110 Incident Management Corporate Planning Model*;
- The Environmental Coordinator will report all environmental incidents involving dangerous goods in accordance with Department of Mines and Petroleum

requirements (at http://www.dmp.wa.gov.au/6643.aspx);

- The Environmental Coordinator shall determine any requirement to undertake remediation works and the manner in which remediation works will be undertaken; or training or other measures to resolve the environmental incident. The Environmental Coordinator will seek advice from the Water Corporation's Environmental Branch, who may in turn seek advice from the DEC, Department of Water (DoW), and any other appropriate agency in providing advice to the Environmental Coordinator;
- The Environmental Coordinator shall provide a briefing to all site personnel following the investigation of a confirmed environmental incident. The briefing shall include any identified construction process improvements that could prevent reoccurrence of the same environmental incident; and
- The Environmental Coordinator shall update this CEMP (as appropriate) to reflect process improvements.

Performance Indicators

- Compliance with prescribed management actions; and
- No environmental incidents occurring.

Monitoring

- Incident trends will be monitored and evaluated by the Environmental Coordinator, with remedial action undertaken and, where appropriate, standard works procedures revised and publicised.

Figure 2 Water Corporation's Incident Report Form

WATER

INCIDENT REPORT

From: _____ Branch/Region: _____

Description: _____

REPORT

WHAT HAPPENED: _____

WHY: _____

WHEN: _____

WHERE: _____

EXTENT OF IMPACT - Actual _____

Potential - *(Consider; Secondary Effects, Environment, Customer, Community, Corporation's System)* _____

THOSE INFORMED OF THE INCIDENT *(Internal & External) (When?)* _____

PROGNOSIS - *(Consider; Action Taken, Action Planned, Time to Resolution)* _____

DECISION and NOTIFICATION by BRANCH/REGION

IS THE INCIDENT REPORTABLE? ☐ NO ☐ YES (provide details) ☛

IS IT? ☐ MINOR ☐ SIGNIFICANT ☐ MAJOR

(Seek advice from senior management or the CIMC if unsure)

Decisions made by (Name): *(print)* _____

Designation: _____

Notified Control Centre/CIMC
Customer Contact & Scheduling/Manager

Report to (Name): _____

Date: ..../..../.... Time: _____

Agreed report back *(who & when)*

Report By: _____

Signed: _____ Date: _____ Contac: Phone (24 *hr*) _____

Branch/Region: _____ Time: _____ Contact Fax (24 *hr*) _____

Contac: Callsign (24 *hr*) _____

A copy of this form must be faxed/phoned to the Corporate Incident Management Coordinator Fax (09) 420 2656 Mobile 0417 180 677

5.2 Compliance Management

This CEMP outlines the objectives and management actions to be implemented and achieved during construction. Regular audits of the CEMP will confirm that management actions prescribed in this document have been successfully implemented. If for any reason the objectives or management actions are not implemented, or do not achieve satisfactory environmental performance, a response process is required to correct those matters within an appropriate timeframe, providing notification to the appropriate personnel.

Table 14 Compliance Management

CEMP - 13	Compliance
Responsibilities	Implementation – Construction Manager Compliance – Environmental Coordinator
Management Objectives • Identify, communicate and correct non-conformity with the management actions detailed within this CEMP; and • Identify potential improvements in the environmental performance of the construction of the Project and CEMPs for future projects.	
Management Actions • Non-conformity with any of the objectives or management actions detailed within this CEMP may be identified informally by observation, or more formally during an audit by site personnel or Water Corporation. All potential non-conformities are to be reported by any person, as soon as practicable, to the Environmental Coordinator; • The reported issue will be investigated by the Environmental Coordinator within 48 hours of notification to confirm its validity. If the report is validated the Environmental Coordinator must provide advice to the Construction Manager, who will inform the Project Manager. The Project Manager may issue an Improvement Notice to the Construction Manager (see Figure 3); • The Improvement Notice to be issued by the Project Manager shall detail: – The nature of the non-conformity; – Environmental impact assessment; – The corrective action(s) required. This may include revision of the action(s), criteria or objectives identified in the CEMP; – Timeframes for corrective actions; – Any requirements to inform site personnel of the corrective actions to prevent reoccurrence of the non-conformity; and – Close-out of corrective actions; • The Project Manager shall issue the Improvement Notice to the Construction Manager, addressing all actions specified in the Improvement Notice within the timeframe provided; • The Environmental Coordinator shall provide notification to the Construction Manager that the corrective actions have been completed; • The Construction Manager shall review the actions taken, confirm that the corrective actions have been implemented in accordance with the Improvement Notice, complete the close-out section of the Improvement Notice, and send a copy	

of the report and closeout to the Project Manager, and provide details of all actions taken to the appropriate authorities;

- The Construction Manager shall retain a copy of all completed Improvement Notices on a file retained at the construction site office. Once the construction project has been completed and the Construction Manager has demobilised from site, the Construction Manager shall provide all records of Improvement Notices issued and closed out to the Water Corporation.

Performance Indicators

- Resolution of non-conformity with the management actions contained within the CEMP in accordance with the actions contained in this section

Monitoring

- All monitoring processes, information and results will be recorded and maintained by the Construction Manager and/or Environmental Coordinator.

Figure 3 Water Corporation's Improvement Notice

A copy of the completed Improvement Notice is to be forwarded to the Site Management Team.

Report - On-site environmental scientist and responsible construction personnel to complete	
Date:	
Location:	
Contractor:	
Nature of Non-Compliance Reported:	
Is the Reported Non-Compliance Valid?	**Yes / No (please circle)**
Assessment of Environmental Impact:	
Corrective Actions to be Implemented:	
Timeframe for completion:	**Immediately 24hrs 48hrs 7 days (please circle)**
Contractor to Inform Staff:	**Yes/No (please circle)**
Issue Date and Time:	
Issued to (Name and Position):	
Close-out - Responsible construction personnel to complete	
Describe the corrective actions implemented:	
Name:	**Signature:** **Date:**
Close-out - On-site environmental scientist to complete	
Corrective actions have been implemented?	**Yes / No (please circle)**
Are additional corrective actions required?	**Yes / No (please circle)** **If Yes – complete a new Improvement Notice with the new corrective actions**
Name:	**Signature:** **Date:**

6. References

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2012) Peel Inlet and Harvey Estuary. Available from: http://www.environment.gov.au/water/policy-programs/nwqms/wqip/wa/peel-harvey.html.

Main Roads Western Australia (2009) *Specification 304 Revegetation & Landscaping*. Available at https://www.mainroads.wa.gov.au/BuildingRoads/TenderPreparation/Specifications/Pages/specifications.aspx

Appendices

Appendix A Acid Sulfate Soils and Dewatering Management Plan

GHD (2012)

GHD

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	M Erskine	D Farrar		D Farrar		9/11/2012

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