MULTIPLEX

Prepared by

Multiplex Constructions Pty Ltd

Construction Environmental Management Plan

Redcliffe Hospital Expansion

Revision 5

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1. Introduction

1.1 Purpose

This Construction Environmental Management Plan (CEMP) is an integral component of the Environmental Management System prepared by the Multiplex team to ensure regulatory, policy, contractual and continual improvement requirements are met for the delivery of the Redcliffe Hospital Expansion (the Project). Multiplex has primary responsibility for the performance of the Contractors responsibilities.

This plan forms part of Multiplex Constructions Management System which is certified to AS/NZS IS0 9001:2015 – Quality Management, AS/NZS ISO 14001:2015 – Environmental Management System, and AS/NZS 4801:2001 – Occupational Health and Safety Management System.

1.2 Project Overview

The Redcliffe Hospital Expansion (RHE) (the project) is within the existing live and operational Redcliffe Hospital precinct. The scope consists of site investigations, services diversions, demolition works, design, engineering, procurement, construction, installation, testing, commissioning, and operational readiness of the new Clinical Services Building (CSB), Generator Building, Chiller Building and Building B01 Refurbishment.

The enabling and early works includes site investigations, services relocations, a new Generator building, services long lead time items and services authority procurement.

Post the completion of CSB and staff/Department relocation; parts of the existing Building B01 basement – level 01, L02 fit out finishes and services will be demolished and replaced with new clinical departments.

1.3 Project Location

The Redcliffe Hospital Expansion (RHE) is in Redcliffe, a suburb of the Morten Bay Region. The project is situated in between ANZAC Avenue and Recreation Street. The project consists of existing carparks and hospital facilities. Brisbane CBD is approximately 38km away. With the nearest hospital being the existing Redcliffe hospital.

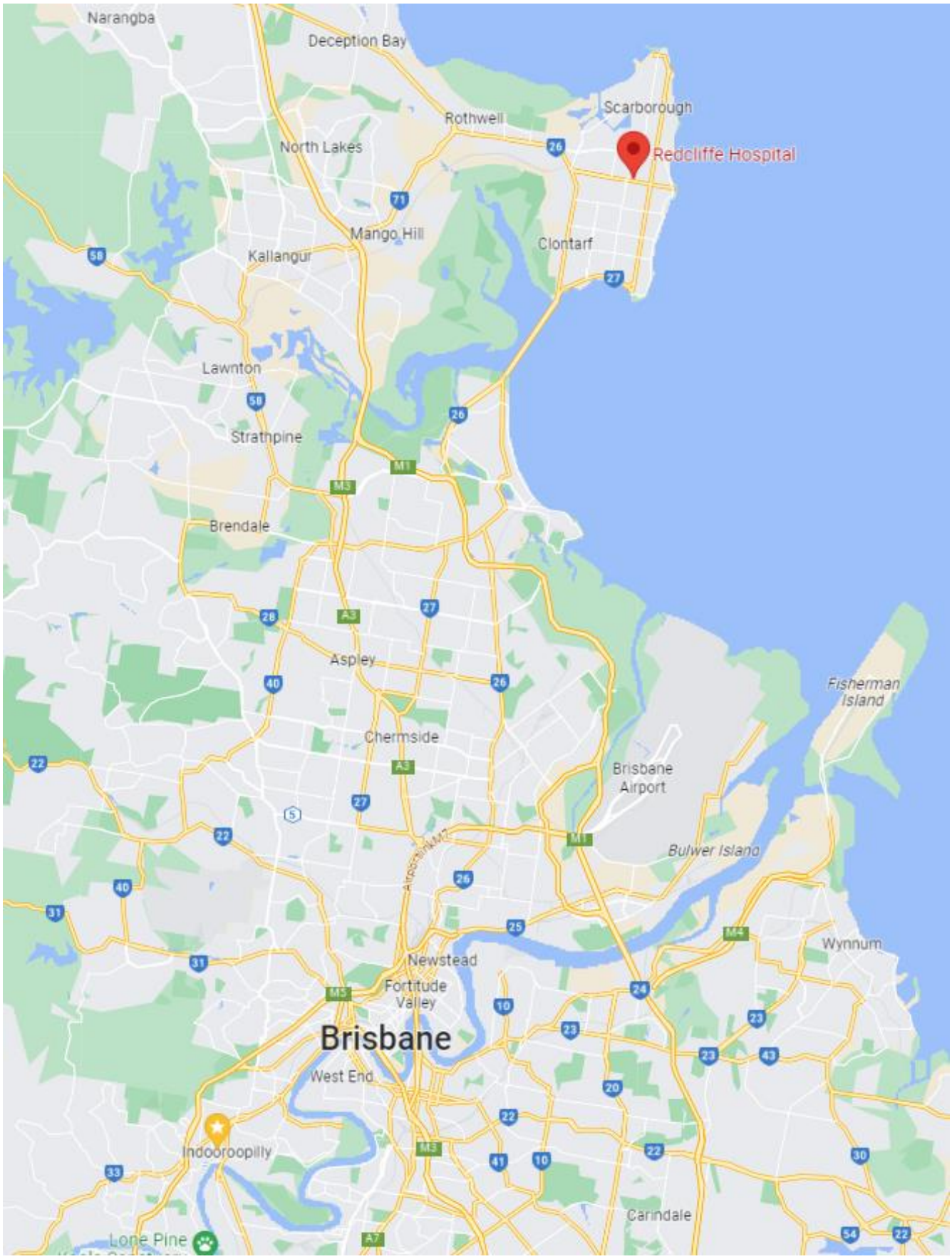


Figure 1: Project location in proximity to Brisbane city

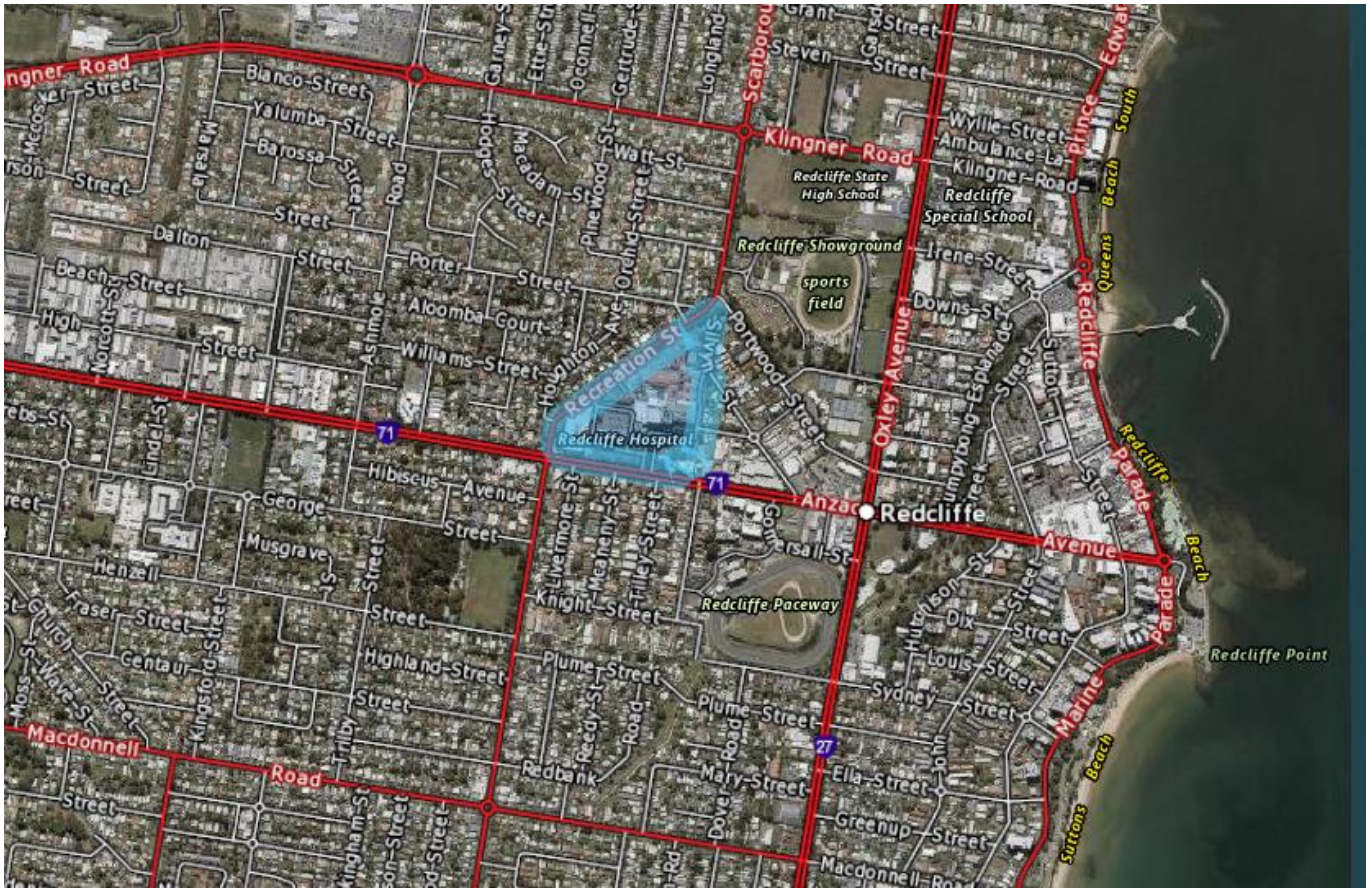


Figure 2: Project location in Redcliffe

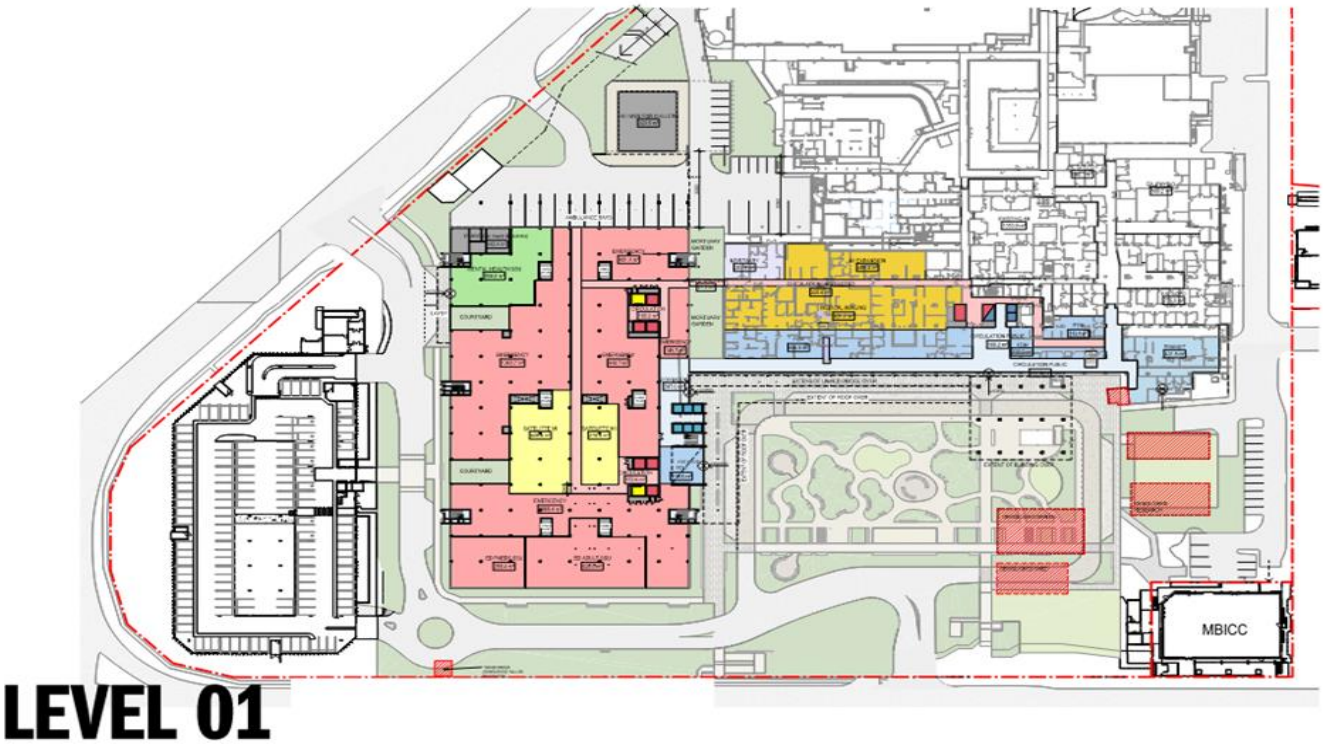


Figure 3: General arrangement of project

1.4 Scope of Works

The works is to be completed in various stages;

1. Stage 1: Enabling & Early Works
2. Stage 2: CSB Construction and Commissioning (including building and carpark link construction)
3. Stage 2: External Works
4. Stage 3: External Works (Green Heart)
5. Stage 4.1: External Works (Green Heart)
6. Stage 4.2: External Works (Green Heart)
7. Stage 3/ 4 B01 Refurbishment

1.5 Scope of this Plan

This CEMP applies to the construction works associated with the Project and includes a description of:

- The environmental management system.
- The organisational structure for environmental management.
- Application of legislative requirements.
- Control measures developed to manage environmental aspects of the project.
- Reporting processes.
- Environmental incident management processes; and
- Processes to monitor and evaluate environmental performance.

1.6 Precedence

Where ambiguity is detected between the procedures and requirements in this plan and the Multiplex Constructions Management Systems, the procedures nominated in this plan shall take precedence.

1.7 Interface with other Operational Procedures and Project Plans

The Construction Environmental Management Plan forms part of an integrated set of Project Management Plans and should be read in conjunction with all other Management Plans – specifically the Construction Management Plan.

1.8 Document Control

Amendments and updates to this Plan will be made if the strategies and actions described no longer meet the desired outcomes, or if improvements to existing measures can be made.

Distribution of this Plan will be to those detailed on the distribution listing on Aconex and will be an electronic copy.

Uncontrolled copies of this plan may be distributed to Multiplex personnel. These copies are not subject to automatic amendment and the receiver should verify currency of the document.

Revision	Date	Description	Page	Reviewed By	Approved By
01	24.07.2023	Plan Development	All	Eddie White	Stuart Smith
02	17.08.2023	Review & updated	11, 30, 31, 38	Eddie White	Stuart Smith
03	23.11.2024	Updated aspects and impacts and impact register	50 & 52	Eddie White	Stuart Smith

		7.4 Construction Noise and Vibration Management Sub-Plan updated Addition of Appendix 8 Addition of Appendix 9			
04	17.01.2024	7.3 Dust and Air Quality Management Sub-Plan updated 7.4 Construction Noise and Vibration Management Sub-Plan updated Addition of Appendix 8 Addition of Appendix 9	29-30, 32-33, 75-76	Eddie White	Konrad Wosny
05	17.04.2024	7.3 Dust and Air Quality Management Sub-Plan updated	29-30	Eddie White	Konrad Wosny

2. Management System Framework

Multiplex has a management framework which is applied throughout the business and on all projects it undertakes. The EMS documentation forms part of this System Framework and maintained in electronic format on the Multiplex Operating System. Additionally, Multiplex's CEMP with encompass all other management plans including but limited to Asbestos in soil, Asbestos Removal, Remediation and Acid Sulfate Soils Management plans and the Sediment and Erosion Management Plan, if required.

The structure of the overall Management System is explained below.

ELEMENT	CONTENT	
Internal Control Framework	▪ Operating Environment ▪ Risk Assessment ▪ Control Activities	▪ Information and Communication ▪ Monitoring Activities
Polices	▪ Health, Safety Environmental and Quality ▪ Risk ▪ Drugs and Alcohol	▪ Injury and Rehabilitation ▪ Indigenous Engagement ▪ Diversity
Operational Procedures	▪ Risk Management ▪ Integrated Management ▪ Quality Management ▪ Design Management ▪ Construction Management ▪ Health and Safety Management	▪ Environmental Management ▪ Project Administration ▪ Bid Management ▪ Human Resources Management ▪ Planning and Programming
Management Plans	▪ Project ▪ Quality ▪ Design ▪ Work Health and Safety ▪ Environmental ▪ Emergency	▪ Construction ▪ Stakeholder ▪ Risk ▪ Commissioning and Testing
Risk Management	▪ Project Risks	▪ Trade/Element Risks
Forms and Guides	▪ As per Document and Forms Library	

Figure 3 Management Framework

3. Environmental Objectives and Targets

3.1 Health, Safety, Environmental and Quality Policy

The Multiplex Health, Safety, Environmental and Quality Policy (HSEQ Policy) [refer Appendix 1] describes Multiplex commitment to providing a working environment and culture where the environmental protection and sustainability is a core value.

The HSEQ Policy is displayed at the site office and communicated to staff and other interested parties via inductions and ongoing awareness programs.

3.2 Objectives, Targets and programs

As a means of assessing environmental performance during construction of the project, environmental objectives and targets have been established.

The performance of the project against the objectives and targets will be given a status and reviewed by project senior management.

The key project environmental objectives and targets of Multiplex on the project are outlined below and included in each of the relevant sub-plans:

Core Objective	Key Strategies and Targets	Measure	Responsibility
Maintaining a critical risk and critical opportunity focus	Implementation of monthly environmental risk workshops	Number of Risk Workshops conducted	System Representative
To continuously improve our environmental performance (and implementation of environmental practices) through increased employee knowledge and development of a positive attitude.	Develop and maintain a program of ongoing environmental training	Training register	Project Manager Site Manager WHSE Manager Enviro Manager
To implement a rigorous and comprehensive environmental management system (EMS) that meets the requirements of ISO 14001.	Maintain the EMS such that it achieves no non-conformances in each external audit	Number of NCR in external audits	System Representative WHSE Manager Enviro Manager
	Continuously monitor and improve environmental performance through a program of inspections, audits and management reviews	Number of Internal Audits Number of Site Inspections Number of Management Reviews	System Representative WHSE Coordinator Site Manager
To comply with applicable legal requirements (environmental laws, regulations, statutory requirements and 'instruments of approval').	Establish and maintain a register of legal requirements	Register available and up to date	WHSE Coordinator Enviro Manager
	Communicate requirements applicable to local operations	MPX team aware of changes to legal and other obligations	WHSE Manager Enviro Manager
	No instances of non-compliance with environmental statutory requirements	Number of non-compliances	All
To minimise water and soil pollution caused as a result of our works.	No release of pollutions on site or offsite via soil movements	Dust monitoring Water sampling	Site Manager All
	Treating water in sediment basin and testing water before realising into neighbouring waterways	Surface water samples	Enviro Manager

Environmental Targets

Core Objective	Key Strategies and Targets	Measure	Responsibility
To adopt waste minimisation principles throughout construction.	To recycle 80% of non-contaminated materials.	% Recycled	Site Manager
To manage construction noise to minimize disruption to the community and local fauna.	Less than 5 complaints related to noise disruption per year.	Number of complaints	Project Manager
	Adhere to all license and approval conditions.	Number of fines and notices	Project Manager
Ensure that dust or odour emissions do not adversely affect the health or visual amenity of surrounding communities.	Less than 3 complaints from adjoining neighbours in relation to dust emissions from the Works.	No. of public complaints from the public related to dust.	Site Manager
	Introduce best practice dust management practice, including plastic covered stockpiles and dust suppression on exposed.	Visual dust monitoring during early works.	Site Manager
Compliance State and Local regulatory requirements in relation to dust management.	No visual evidence of deposited dust or suspended particulate matter.	Results from environmental inspections.	Site Manager
	Minimised dust produced whilst operating in asbestos contaminated soils.	Visual dust monitoring during early works.	Site Manager

Organisational responsibility for achieving the project Environmental Objectives and Targets ultimately rest with senior management. For further detail on key strategies and core objectives please refer to key sub-plans and developed Management Plans.

Reference Documents
Management Standards and Procedures
Management Standard 2 Objectives and Targets
BA AUS IMS P DIV 030 Planning and Performance Measurement

Forms and Guides
OHSE Performance Status Chart
Monthly Report

4. Planning and Legislative Requirements

4.1 Legal and Other Requirements

A procedure has been developed to identify all environmental legal and other requirements that are applicable to Multiplex operations and to ensure the accessibility of information.

A schedule which summarises applicable legislation and associated regulative requirements relating to environmental management is outlined in the schedule of environmental legislation maintained in the site filing system.

Multiplex personnel have access to these schedules and it provides information how to access the legislation and other requirements listed in the schedule. These schedules will be made available to subcontractors upon request.

This schedule is reviewed and updated annually and on significant changes to Multiplex

operations. Multiplex will:

- Ensure current and new obligations are recognised and captured in the schedule of legislation as they arise, and ensure that subsequent amendments to Operational Procedures, CEMP or other management forms are made to ensure relevancy and compliance.
- Ensure that superseded and outdated requirements are removed from the respective Operational Procedures, CEMP and management forms.
- Be responsible for communicating and implementing means to demonstrate compliance with current and new legal and other requirements to members of the team who are accountable for, or can influence, Multiplex's ability to comply with those requirements.

The relevant legislative requirements for the project are outlined below:

Legislative Title	Application	Relevant Authority
Work Health and Safety Act 2011	Dangerous Goods	WHSQ
Environment Protection and Biodiversity Conservation Act 1999	Environmental Management	Department of Agriculture, Water and Environment
Environmental protection Act 1994	Environmental protection	Department of Environment and Science
Planning Act 2016	Development conditions	Department of Energy and Public Works
Environmental Offset Act 2014	Environmental offsets	Department of Environment and Science
Fire and Emergency Services Act 1990	Emergency management	Queensland Fire and Emergency Services
Biosecurity Act 2014 & Biosecurity Act 2016	Fire Ant management	Dept Agriculture, Water and Environment
Nature Conservation Act 1992	Vegetation management	Department of Environment and Science

When operating adjacent to the project's easements, council/state owned land or with utility providers, Multiplex will coordinate with the relevant authorities as outlined below, however all permits will be managed by QLD Health.

- Permits from Morten Bay council and Transport and Main roads as required for works along council or state owned roads.
- Permit for works associated with Energex assets.
- Obtain Morten Bay permit for connection to the city sewer and water services.

5. Responsibility and Accountability

5.1 Organisational Structure

The organisational chart is available as part of the Construction Management Plan and specifies the Multiplex personnel responsible for the implementation of the Construction Environmental Management Plan.

5.2 Roles and Responsibilities

Multiplex has identified appropriate levels of individual responsibility and accountability for managing the environment across all roles within the Project Team. Due to the nature of the project and high focus around environmental management and compliance. Our environmental coordinator on site will organise any additional resources should they be necessary for environmental management of items such as Asbestos, unexpected finds, contamination. The Multiplex team will ensure the project is delivered in a manner that doesn't adversely affect the environment.

In addition to the individual position descriptions, the general responsibilities, and accountabilities of key project personnel in relation to environmental management are outlined in the Environmental Roles and Responsibilities Matrix contained in Appendix 2.

Reference Documents

Management Standards and Procedures

Management Standard 1 Commitment and Accountability
BU AUS IMS P DIV 140 Management Review
BU AUS IMS P DIV 010 Responsibility and Accountability

6. Environmental Management Strategies

Environmental strategies have been prepared and form the key controls within this Plan to provide operational controls to minimise the potential impact to the environment from construction activities.

The Environmental Strategies are designed to protect environmental values, identify controls for construction activities, and provide monitoring and reporting requirements for the project works.

An assessment of the consequence and likelihood of risks and opportunities is conducted by competent persons with the relevant knowledge and experience**.**

To provide perspective on the significance of risk or opportunity a realistic assessment of how likely a risk or opportunity event may occur in terms of yearly events is required to rate the likelihood of each risk or opportunity occurring.

Similarly, a realistic assessment of the worst-case exposure to loss should the risk or opportunity event occur in terms of cost is required to rate the consequence of each risk or opportunity occurring.

The assessment shall consider:

» Existing planned controls where applicable, providing that these controls are verifiable in project documentation.

» New planned controls

» The other risks related to the establishment, implementation, operation and maintenance of the management system.

The following or similar rating tables shall be used to determine the likelihood and consequences of each risk or opportunity occurring:

LIKELIHOOD	DESCRIPTION
A. Almost Certain	The event/impact is common and expected to occur in most circumstances *(will occur regularly / 10 times per year)*
B. Likely	The event/impact has happened before and will probably occur again *(will occur often / 5-10 times per year)*
C. Possible	This event/impact could occur at some time *(is likely to occur few / 2-3 times per year)*
D. Unlikely	This event/impact is not likely to occur *(is unlikely to occur more than once per year)*
E. Rare	This event/impact may occur in exceptional circumstances only *(is unlikely to occur during a year)*

In determining the consequence of a particular risk or opportunity, both the number of people involved and the possible cost to the organisation (e.g., in terms of financial liability, damage to reputation, and cost of mitigation) should be considered using the following or similar scales.

CONSEQUENCE	DESCRIPTION
1. Extraordinary (Significant)	» Serious impact or opportunity on project. » Serious incident involving fatalities or permanent disability. » Serious risk of financial loss and public image. » Very serious long term environmental impairment of eco-system
2. Major	» Major opportunity or negative impact on project. » Major incident involving serious injury. » Major risk of financial loss, legal or industrial action. » serious medium term environmental effects
3. Moderate	» Moderate opportunity or negative impact on project. » Moderate incident required offsite medical treatment. » Moderate financial loss, legal or industrial action. » Moderate short-term effects but not affecting eco-system

CONSEQUENCE	DESCRIPTION
4. Minor	» Minor opportunity or negative impact on project. » Minor financial loss, legal or industrial action. » Minor incident involving a first aid treatment. » Minor effects on biological or physical environment
5. Insignificant	» Insignificant opportunity or negative impact on project. » No injuries. » Low or zero financial loss, legal or industrial action. » Limited damage to minimal area of low significance

6.1 Environmental Risk Management

6.1.1 Level of Risk

Having considered the likelihood and consequence of individual risks, and the effect of existing controls, the level of risk can be determined using the following matrix:

		Likelihood				
		Almost certain A	Likely B	Possible C	Unlikely D	Rare E
Consequence	Extraordinary 1	1	2	4	7	11
	Major 2	3	5	8	12	16
	Moderate 3	6	9	13	17	20
	Minor 4	10	14	18	21	23
	Insignificant 5	15	19	22	24	25

6.1.2 Environmental Aspects and Impacts

All activities, products and services carried out by or on behalf of Multiplex in connection with the Project are identified in the Environmental Aspects, Impacts Risk Register (below).

For each activity, the environmental aspects and associated actual and potential environmental impacts are identified for normal operations and uncommon events (refer Appendix 3). All aspects are assessed for risk based on standard controls being in place. All aspects with a risk rating of high will be considered a significant aspect and require additional controls / plans to minimise the risk.

Table 1 - Environmental Aspects, Impacts Risk Register

Aspect	Impact	Consequence	Likelihood	Risk Rating
Water Quality	Pollution / contamination of atmospheric, ground or surface water bodies through degradation of water quality.	2	D	12
Erosion & Sediment Control	Soil loss to environment causing loading and potentially affecting water quality subsequently impacting ecological values.	2	D	12
Site Contamination	Mobilisation of chemicals above the level which they are normally found in nature potentially having an adverse effect on the surrounding environment.	3	E	20
Air Quality	Pollution/ contamination of atmosphere from dust, exhaust emissions, odour, and friable asbestos and air-born chemicals.	3	C	13
Noise & Vibration	Disturbance/ Nuisance caused from 'unreasonable' or excessive levels of noise to public/ environment.	3	C	13
Hazardous Chemicals	An acute event where hazardous chemicals have the potential to spill and released to the environment causing adverse effects.	3	B	9
Cultural Heritage	Damage or disturbance to archaeological/cultural artefacts including skeletal remains, shell middens or other artefacts.	3	E	20
Flora and Fauna	Direct / Indirect impact (stress- death) on an individual or species of flora/ fauna.	2	C	8
Waste Management	Degradation of aesthetic values due to ineffective waste management. Build-up of chemical and organic waste.	4	E	23
Office Resources	Depletion of resources as a result of construction and office operations	5	D	24

6.1.3 Environmental Risk Management

The Project shall incorporate a process of environmental risk identification, assessment and monitoring into all activities. Typically, this shall be implemented through one or more of the following as appropriate:

Risk Management Activity	Frequency/Requirement	Responsibility
Completion of a Risk Register to identify aspects and impacts	Commencement and reviewed quarterly	Multiplex
Completion of Project Risk Workshops	Commencement and reviewed monthly	Multiplex
Development of Construction Environmental Management Plans and sub-plans	Prior to commencement and reviewed bi-annually	Multiplex and selected subcontractors
Development of Environmental Work Method Statements	Prior to commencement	Selected subcontractors
Environmental Site Inspections	Weekly during high risk works	Multiplex
Implementation of the Construction Environmental Management Plan and Sub plans	During construction	Multiplex and all subcontractors

Reference Documents
Management Standards and Procedures
Management Standard 3 Risk Management
Management Standard 11 Environmental Management
BU AUS IMS P DIV 020 Risk and Opportunity Management
BU AUS IMS P DIV 060 Contractor Management
BU AUS IMS P DIV 070 Inspection Testing and Monitoring
Risk Management Plan
Environmental sub-plans

Forms and Guides
Environmental Aspects and Impacts Register
Environmental Management Plan Review Checklist
Environmental Work Method Statement Review Checklist
Environmental Work Method Statement Template
Environmental Site Inspection

6.1.4 Traffic management

To manage construction vehicle traffic and its potential disruption to local traffic, Multiplex will engage a suitably qualified professional to develop the Traffic Management Plan (TMP). Temporary footpath closures, crossovers and bus stop alterations will be managed by Multiplex in accordance with the TMP. Prior to these works commencing, Multiplex will obtain the required approvals through the relevant authorities.

Environmental Controls Map

An Environmental Control Map will be prepared for the project to include key information from the sub-plans and other sources including the following where relevant (See Appendix 5):

- The worksite layout and boundary
- Location of the nearest noise sensitive receivers
- Sediment and erosion control measures
- Stockpiles
- Noise barriers (where applicable)
- Site Offices (if located on site)
- Car parking
- Construction traffic routes within and adjacent to the worksite
- Dust control measures
- Monitoring equipment (e.g., Dust monitors, Noise)
- Location of environmentally sensitive areas (e.g., Threatened species, critical habitat)
- Vegetation and trees to be protected.
- Location of heritage (indigenous and non-indigenous) items if applicable
- Location of spill containment and clean-up equipment
- Stormwater drainage and watercourses
- Location of worksite waste management facilities

6.2 Subcontractor Management

All subcontractors are required to operate within the requirements of this Construction Environmental Management Plan and associated documents.

Based on an Environmental Risk Assessment, Multiplex shall establish whether a subcontractor is required to develop a project specific Construction Environmental Management Plan or Environmental Work Method Statement to confirm that their process and procedures conform to the Multiplex CEMP, Sub-plans or internal procedures. The risk assessment shall consider:

- The potential environmental impacts of the subcontractors' activities.
- The environmental sensitivity of the area(s) in which the subcontractors shall be working.
- The nature and scope of the subcontractors' activities.
- The scale of the subcontractors' activities.
- The subcontractor's capacity to manage its own environmental performance effectively; and
- The subcontractors' previous environmental performance.

Where the Environmental Risk Assessment rates a subcontractor works as high for potential to impact the environment under standard industry controls, a Construction Environmental Management Plan / Environmental Work Method Statement is required from subcontractors, to address the specific work package(s) awarded and be submitted for approval to Multiplex prior to commencement of work on site. The plan must assess the level of environmental risk and implement appropriate management controls for the subcontractor's full scope of work.

Monitoring of work activities shall be undertaken by Multiplex to establish that subcontractors are carrying out work in accordance with the environmental documentation provided to Multiplex. Monitoring may be achieved by one or more of the following:

- Ongoing visual inspections by supervisors.
- Inspections; or
- Subcontractor audits of the CEMP or EWMS.

Reference Documents
Management Standards and Procedures
Management Standard 11 Environmental Management
Management Standard 10 Consultants, Subcontractor and Suppliers
BU AUS IMS P DIV 060 Contractor Management
BU AUS IMS P DIV 020 Risk and Opportunity Management

Forms and Guides
Environmental Management Plan Review Checklist
Environmental Work Method Statement Review Checklist
Environmental Work Method Statement Template
Environmental Subcontractor Documentation Status Chart

6.3 Purchasing

Multiplex personnel responsible for letting contracts or supply agreements shall ensure that subcontractors and suppliers are evaluated to meet the Multiplex environmental requirements prior to being placed on a final tender list.

Prior to awarding a contract package, the potential service provider, i.e., contractor or supplier, shall be evaluated for compliance with WHSE requirements of the Contract Conditions and capability to deliver the works under scope based on past performance and the nature of their work, i.e., High Risk Work, Medium Risk Work, Low Risk Work. This assessment will be completed in the WHSE Prequalification Checklist.

Multiplex's procurement processes ensure that all contractors engaged must meet the Environmental Management requirements.

Reference Documents
Management Standards and Procedures
Management Standard 10 Consultants, Subcontractors and Suppliers
BU AUS IMS P DIV 060 Contractor Management
PAM P DIV 030 Tendering Subcontracts

6.4 Consultation and Communication

Multiplex shall ensure meaningful and effective consultation and communication processes are established and maintained throughout the life of the project with relevant stakeholders using effective available methods of communication, please refer to communications management plan.

Multiplex aims to ensure that the environmental management processes effectively use available methods of communications, both internally and externally, that allows all individuals to be aware of environmental issues, participate in environmental management activities, identifying risks, and assist in developing corrective and preventative actions.

Consultation and communication on environmental matters shall occur through one or more of the following mechanisms:

Event	Frequency/Requirement	Participants	Record/Evidence
Project specific induction	Prior to commencement of contracted work	All personnel	Project induction
Work activity Induction (in EWMS or equivalent)	Prior to commencing any building/construction work	Personnel carrying out specific work activities	Record of training – listed on the EWMS or Toolbox Talk Record
Toolbox Meetings	Generally, when there is the introduction of a new process (EWMS) or when discussing Environmental issues/topics	Supervisors and their employees including contractors, their employees, suppliers and service providers.	Toolbox Talk Record or other
Subcontractor Meetings	Weekly or as required	Project team/contractors, their employees, suppliers and others as required	Minutes of meeting
Project team meetings	Weekly or as required	Project team	Minutes of meeting
PCG Meetings	Monthly	Principal and Project Manager.	PCG Report
Environmental Report	Monthly	Project Team	Monthly Environmental Reports
Project Notice Board and general signage	As required	All personnel	Project Notice board

Event	Frequency/Requirement	Participants	Record/Evidence
Site Inspections	Weekly or as required	Project team	Site Inspection Report
Audits	As per schedule	Project team	Audit Report
Enquiries and Complaints	As required	As per Communications Management Plan	Complaints Register
External stakeholders	As required	As per Communications Management Plan	

Reference Documents
Management Standards and Procedures
Management Standard 7 Communication and Consultation
Management Standard 11 Environmental Management
BU AUS IMS P DIV 040 Communication and Consultation
BU AUS IMS P DIV 130 Reporting
Communications Management Plan

Forms and Guides
Complaints Register
Meeting Minutes
Environmental Site Inspection

6.5 Induction and Training

Several levels of training activities are managed within the project. Training will be developed to incorporate the requirements of the contract and will include:

- Site induction (including subcontractors and, where applicable, visitors). The induction will contain content on the environmental aspects, risks, management, and mitigation measure for the project. The induction will include appropriate information on the significant environmental risks for the project.
- Emergency and incident response training.
- Ongoing training and awareness activities throughout the Project.
- Competency based training (e.g., erosion sediment control for construction work).
- On-the-job training (e.g., toolbox talks, training in system procedures, environmental work method statements particularly those which include significant environmental risks for the project); and
- Multiplex specific training (e.g., training to use Reporting System, non-compliance, monitoring, reporting and auditing obligations).

Multiplex has defined its minimum environmental competencies for management, supervisors and workers on its Environmental Competency Matrix contained in Appendix 4. Environmental competency requirements are dependent on role and responsibilities.

Reference Documents
Management Standards and Procedures
Management Standard 5 Awareness, Competency and Behaviour
Management Standard 11 Environmental Management
BU AUS IMS P DIV 040 Communication and Consultation
BU AUS IMS P DIV 110 Training and Competency

Forms and Guides
Induction training handout
Training Attendance Register
Training Evaluation
Training Matrix

6.6 Incidents and Investigations

Environmental incidents on the project shall be communicated to the appropriate internal personnel, formally recorded and where appropriate reported to regulatory authorities. Where required incidents are investigated, and any lessons learned for future prevention will be made available and distributed.

Reference Documents
Management Standards and Procedures
Management Standard 12 Incidents, Investigation and Reporting
Management Standard 11 Environmental Management
BU AUS IMS P DIV 100 Incident Management
BU AUS IMS P DIV 130 Reporting

Forms and Guides
Environmental Incident Report
Environmental Investigation Report

6.7 Emergency Management

Emergency incidents and emergency situations shall be managed in accordance with the Emergency Management Plan which has been developed for the Project. The plan provides guidance in the event of any environmental or safety related emergency affecting the project.

Relevant details of the Emergency Management Plan shall be provided to all personnel during the site induction and information posted on notice boards.

Reference Documents
Management Standards and Procedures
Management Standard 13 Emergency Management
BU AUS IMS P DIV 090 Emergency Management
Emergency Management Plan

6.8 Environmental Monitoring and Inspections

Monitoring to ensure environmental management/compliance shall be undertaken by Multiplex in accordance with the monitoring requirements outlined in the environmental management sub-plans. Where required, specialist consultants shall be engaged to help establish monitoring Site supervisory staff and Environmental Manager shall manage corrective actions arising from inspection.

In addition to formal environmental monitoring, the Project shall ensure that regular environmental inspections are undertaken of all work activities being carried out at the project. Inspection shall be carried out in conjunction with personnel responsible for a particular work area and shall include the following:

- Daily Inspections – site supervisory staff as part of their daily duties shall conduct daily inspections of the site (incl. all subcontractor activities), and issues noted in daily diaries if applicable, and
- Weekly Inspections – Weekly (during high risk works) inspections recorded on the Site Inspections
- Environmental monitoring – Dust, Noise, Waste. Water quality

Reference Documents
Management Standards and Procedures
Management Standard 11 Environmental Management
Management Standard 10 Consultants, Subcontractor and Suppliers
BU AUS IMS P DIV 070 Inspection Testing and Monitoring
Environmental Sub-Plans

Forms and Guides
Environmental Site Inspection

6.9 Hazardous Substances

Hazardous substances supplied to the project shall be approved for use and accompanied by a current SDS. All hazardous substances shall be registered, correctly stored, decanted, used and disposed in accordance with the SDS and regulatory requirements. Employees shall be trained in the SWMS based on the SDS and provided with the appropriate PPE. Multiplex will minimize the quantities of hazardous chemicals stored on site at any one point of the project to reduce the risk and consequence of incidents.

Reference Documents
Management Standards and Procedures
Management Standard 6 Health and Safety
Safe Work Procedures

Forms and Guides
Hazardous Materials and Dangerous Goods Register
Hazardous Materials and Dangerous Goods Risk Assessment

6.10 Non-Conformances

Deficiencies identified during audits and site inspections shall be recorded on the audit report or inspection report/checklist and actioned. In the event of a non-conformance being raised, Multiplex shall document this on the Non-Conformance Report.

When non-compliance is identified, the recipient and/or Multiplex Construction shall identify strategies in order to rectify the non-conformance. Where appropriate, the recipient and/or Multiplex Construction shall also develop measures to prevent recurrence of the non-conformance. The measures to rectify and to prevent recurrence of the non-conformance shall be documented on the Non-Conformance Report and a time frame established. The instigator shall carry out a follow up review and closeout of the Non-Conformance to verify completion of measures taken to rectify and to prevent recurrence.

Reference Documents
Management Standards and Procedures
Management Standard 14 Monitoring, Audit and Review
BU AUS IMS P DIV 080 Control of Non Conformances

Forms and Guides
Non-Conformance Report

6.11 Environmental Audits

An environmental auditing programme shall be established based on risk, but not exceeding every 6 months and consist of:

- Internal systems audits which shall focus on those sections of the Construction Environmental Management Plan that are relevant to current operations.
- Audits by external organisations.

Results of the audits shall be documented and brought to the attention of personnel having responsibility for the area audited and reported to the Project Manager. For any deficiencies or non-compliances found, correction action shall be initiated using the 'Non-Conformance Report' or detailed as 'Observations' in the audit report. Observations raised need to be completed with corrective actions similar to Non-Conformances.

Reference Documents
Management Standards and Procedures
Management Standard14 Monitoring, Audit and Review
BU AUS IMS P DIV 080 Control of Non Conformances
BU AUS IMS P DIV 130 Reporting
BU AUS IMS P DIV 120 Internal / External Auditing

Forms and Guides
Environmental Subcontractor Audit Report
Environmental Internal Audit Checklist

6.12 Document and Records Management

Multiplex shall establish a uniform system of document management and record keeping that maintains currency of information and is able to demonstrate compliance to the Construction Environmental Management Plan, regulatory requirements and retains all required documents for commercial protection.

Reference Documents
Management Standards and Procedures
Management Standard 4 Documentation and Legal Requirements
BU AUS IMS P DIV 050 Document and Records Management

6.13 Reporting

The project management team shall establish and maintain a uniform system of record keeping enabling accurate reporting of environmental matters. Reporting on environmental matters on the project shall include the following:

Type of Report	Report By	Frequency	Recipient/s
PAM Monthly Report	Construction Manager/Site Manager	Monthly	Regional Director
PAG Monthly Report	Construction Manager/Site Manager	Monthly	Principal, Principal's Representative and Regional Director.
Environmental Incident Report	Construction Manager/Site Manager	As required	Managing Director, Directors, Environmental Manager and DEHP where reqd.
Environmental Investigation report	Construction Manager/Site Manager or others nominated by PM/SM	As required	Managing Director, Directors, Environmental Manager and DEHP where reqd.

The project will also ensure reporting required by law is provided to all regulatory authorities.

Reference Documents
Management Standards and Procedures
Management Standard 14 Monitoring, Audit and Review
BU AUS IMS P DIV 130 Reporting

Forms and Guides
PAM Monthly Report
Project Control Group Report
Environmental Incident Report
Environmental Investigation report

6.14 Management Review

Management Review is to take place to ensure that the Management Systems suitability and effectiveness in meeting the specified statutory legislation, policies, objectives, and procedures with the corporate and project levels. The review will also include assessing opportunities for improvement and the need for changes to the CEMP, the HSEQ policy, objectives, and targets.

Management Review meetings will be scheduled and carried out at least every 12 months at a corporate level.

Reference Documents
Management Standards and Procedures
Management Standard 14 Monitoring, Audit and Review
BU AUS IMS P DIV 140 Management Review
Forms and Guides
Management Review Meeting

7. Construction Environmental Management Sub Plans

7.1 Water Quality Management Sub-Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
Avoid the release of sediment laden water into waterways / drainage systems	All water discharged complies with minimum water quality criteria.	Water Quality records conforming to minimum water quality criteria.

Management Strategies, where applicable.

Parameter	Action	Timing	Responsibility
Erosion and Sediment Control Plan	For sites with a soil disturbance less than 2500m2 and with slopes <10%, an Erosion and Sediment Control Plan is to be prepared in accordance with MPXC minimum requirements (refer Section 7.2). For sites with a soil disturbance greater than 2500m2 or on a site with a slope of >10%, an Erosion and Sediment Control Plan is to be prepared by a Certified Practitioner in Erosion and Sediment Control.	Establishment	Multiplex
Sediment Basin and Ponded Water	All de-watered surface water is directed to sediment basin. This will be achieved through a series of lay flat pumps, poly pipe and open-air swales directing water to site sediment retention basins. The basin will be a hold and release basin, water is to be tested prior to every release.	Establishment	MPX / All subcontractors
Acid Sulfate Soil	All excavation with potential to expose acid sulfate soils shall be determined prior to commencement and an Acid Sulfate Soil Management Plan is to be prepared to be prepared by an Appropriately Qualified external Consultant and attached to this CEMP.	Establishment	Multiplex
Trade Waste	Installation of a 3 x 1m3 settlement system for wet-trade washout in accordance with MPXC minimum requirements. Ensure a Trade Waste Permit is obtained by MPXC from the local water authority if required.	Establishment	Hydraulic Subcontractor
Toolboxes talk	All construction personnel undertaking discharge of water to on-site or off-site areas shall undergo a toolbox talk to ensure the correct controls are in place.	Establishment	Excavation Subcontractor
Static Concrete Pumping	A designated washout area and purpose built bunded structure shall be provided for concrete pumps and their attachments and connected to wet-trade treatment system in accordance with MPXC minimum requirements.	Establishment	Concrete Subcontractor
Mobile Concrete Pumping	An impervious catch tray shall be placed below the pump's hopper to contain any possible spillage or droppings. No washing out is to be undertaken on-site unless in accordance with static concrete pumping procedure above.	Construction	Concrete Subcontractor
Concrete Truck Washout	No concrete truck washout will occur on-site unless a specific designated and controlled area is provided.	Construction	Concrete Subcontractor
Spills	All spills on site of hazardous chemicals should be cleaned up immediately to minimise pollution of stormwater.	Construction	MPX
Chemical Storage	All liquid chemicals (Paint, form oil, solvents and fuels etc.) shall be stored correctly and bunded in accordance with Chemicals Management Sub-plan.	Construction	All Subcontractors
Paint Washout	Unless covered by a trade waste permit, the painting subcontractor shall be required to wash out into purpose-built tanks that shall be removed by the painting contractor through a licensed liquid waste facility with an arrangement to attain verifiable proof of disposal.	Construction	Painting Subcontractor
Trenching	All groundwater encountered during trenching will be tested prior to release.	Construction	Hydraulic Subcontractor

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Dewatering Process and Water Quality Results	Weekly	Hydraulic subcontractors, civil contractor	Water Quality Records
Trade Waste and Washouts	Weekly	MPX	Weekly Environmental Site Inspections

7.2 Erosion and Sediment Control Management Sub-Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
Prevent clay, silt or sand from entering stormwater drains and waterways.	All disturbed stormwater to pass through primary erosion and sediment controls listed below.	Environmental Inspection records of no uncontrolled release of disturbed stormwater.

Management Strategies, where applicable.

Parameter	Action	Timing	Responsibility
Erosion and Sediment Control Plan	All works by Civil SC and MPX are to adhere to the Erosion and Sediment Control Plan prepared by Qualified engineer that is CPESC approved.	Establishment	Multiplex
Minimum Requirements for all sites	1. Evaluate Site Limitations • Identify highly erodible soils with advice from geotech. • Identify up-slope drainage catchments to be diverted around works. • Identify work areas allow for erosion and sediment controls. 2. Stabilise all Site Entry / Exit Points in accordance with MPXC minimum requirements. Inspect all vehicles for residual mud and remove before leaving the site. Street sweeping (never hosing down) is to be carried out to reduce sediment on roads. 3. Install sediment fence(s) down-slope of the site. Silt fences to be installed as per ESCP. 4. All stockpiles are to be located away from drainage areas and surrounded with sediment fence or covered with a product that will prevent erosion if in an area where it has the potential to enter the stormwater system. Refer to ASSMP and Remediation plan if applicable. 5. Commence building activities. 6. Ensure all clean stormwater from concreted and roof areas are immediately connected to the stormwater. 7. Regularly inspect all drainage, erosion and sediment controls and maintain. 8. Progressively revegetate / stabilise the site if possible. 9. Remove any remaining temporary drainage, erosion and sediment control measures upon complete stabilisation of the site.	Establishment / Construction / Completion	Multiplex

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Inspect erosion and sediment controls are effective and maintained	Weekly or after a shower / rain event.	MPX	- Weekly Environmental Inspection - Training for responsible staff - Tool Box Talks - Subcontractor EWMS
Sediment sampling of down gradient areas	Significant breach after rain event.	MPX	- Field notes - Environmental inspections

7.3 Dust and Air Quality Management Sub-Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
Manage dust or odour emissions do not adversely affect the health or visual amenity of surrounding communities.	No complaints from adjoining owners in relation to dust emissions from the Works.	No. of public complaints from the public related to dust.
Compliance State and Local regulatory requirements in relation to dust management.	No visual evidence of deposited dust or suspended particulate matter.	Results from environmental inspections.

Management Strategies where applicable.

Parameter	Action	Timing	Responsibility
Induction	All construction staff shall be inducted on dust control measures and instructed on management actions required under the CEMP (i.e., speed limits, access tracks, hose points, maintenance logs, stockpile maintenance & variable wind conditions) and will includes awareness of latent site conditions and areas where asbestos is identified, PPE and personal hygiene.	Establishment	Multiplex / All Subcontractors
DA Conditions	All DA conditions relating to dust and or the monitoring of dust shall be taken into account and managed as part of this Sub-Plan.	Establishment	Multiplex
Stabilised Driveways	A stabilised driveway in accordance with Erosion and Sediment Control Sub-Plan is to be installed to minimise the tracking of dirt on the roadways.	Establishment	Multiplex
Dust Control Method – Physical Barriers	All stockpiled materials must be covered to prevent the creation of dust. On any remaining open boundaries, fences/hoarding are to be erected to create a physical barrier. Fences can be standard hoarding panels / fence or a fence with a screening material with a porosity of 50% or less.	Establishment	All Subcontractors
Dust Control Method - Chemical Stabilisation	Where an exposed area or stockpile is located away from traffic and needs to sit for up to 3 months or where an area needs immediate stabilisation, a chemical soil stabiliser can be used such as gluon or similar to control soil transportation	Construction	Civil subcontractor
Dust Control Method – Vegetative Stabilisation	Prevent windblown dust erosion by mulching areas or other controls that have achieved final levels but are not ready for landscape works immediately, for completed areas ensure appropriate controls are implemented.	Construction	Bulk Earthworks / Landscape / Multiplex
External Roads	If any sediment is deposited onto the roads adjoining the site, the roads are to be swept regularly and including prior to any rainfall. No hosing is to be undertaken external to the site.	Construction	Multiplex
Haul roads	Haul roads shall be chip sealed/sealed or covered with gravel / road base to minimise dust production or at best regularly swept concrete.	Construction	Multiplex
Speed limits	The speed of all vehicles on-site shall be restricted to 20 km/hr. This speed shall be further reduced if large amounts of dust are still being generated.	Construction	All Subcontractors
Windy Conditions	Dust generating activities shall be assessed during periods of excessively windy conditions (>40km/h). Additional controls of dust generation are to be implemented during these periods.	Construction	All Subcontractors

<table>
<tr><th>Parameter</th><th>Action</th><th>Timing</th><th>Responsibility</th></tr>
<tr><td>Complaints</td><td>Where a complaint is received regarding dust, dust monitoring is to be undertaken to confirm the levels of dust / particulates. Either of the following is applicable depending on the nature of the complaint.
1. Maximum dust fallout rates of 120mg/m2/day over any 30-day measurement period.
2. Maximum of 50ug/m^3 for PM_{10} (expressed as a 24-hour average not to be exceeded for more than 5 days in a year).
Where a complaint is received or evidence of further compounds being present, additional monitoring is to be undertaken to confirm the levels of compounds measured as a time weighted average over a shift.
<table>
<tr><th>Compound</th><th>Maximum Exposure</th></tr>
<tr><td>Respirable Crystalline Silica</td><td>.1 mg/m^3</td></tr>
<tr><td>Carbon Monoxide</td><td>9.0 ppm</td></tr>
<tr><td>Nitrogen Dioxide</td><td>.12 ppm</td></tr>
<tr><td>Arsenic</td><td>.05 mg/m^3</td></tr>
<tr><td>Cadmium</td><td>.01 mg/m^3</td></tr>
<tr><td>Chromium</td><td>.5 mg/m^3</td></tr>
<tr><td>Copper</td><td>1 mg/m^3</td></tr>
<tr><td>Lead</td><td>.15 mg/m^3</td></tr>
<tr><td>Nickel</td><td>1 mg/m^3</td></tr>
<tr><td>Zinc</td><td>10 mg/m^3</td></tr>
<tr><td>Mercury</td><td>.025 mg/m^3</td></tr>
</table></td><td>Construction</td><td>Multiplex</td></tr>
<tr><td>Water Sprays</td><td>Water carts, sprinklers or hoses are to be used for specific process activities that may cause dust and can be used to assist in the dust control on access tracks. Consideration should be given to water efficiency and the possible use of a dust control method above. Water sprays will not be utilised in overabundance to ensure no uncontrolled run off of contaminated water.</td><td>Construction</td><td>Excavation / Demolition Subcontractor</td></tr>
<tr><td>Mold growth</td><td>Inspect organic materials and surfaces for any visible mold growth. If found contact qualified hygienist, remediation will be complete in accordance with hygienist findings and recommendations. Monitor surfaces over the coming weeks to ensure no mold returns.
In compliance with the SDS for these respective products the appropriate PPE must be worn (gloves, goggles/ safety glasses and P2 facemask)</td><td>Construction</td><td>Multiplex / All Subcontractors</td></tr>
<tr><td>Housekeeping</td><td>During construction the site shall be kept clean to reduce dust lift off during windy days</td><td>Construction</td><td>All Subcontractors</td></tr>
<tr><td>Plant and Equipment Maintenance</td><td>All construction plant and equipment with access to the site shall be properly maintained and serviced in accordance with the manufacturer’s specification.
During the works, maintenance logs will need to be maintained by the hirer and made available for inspection.</td><td>Construction</td><td>All Subcontractors</td></tr>
</table>

Parameter	Action	Timing	Responsibility
Exhaust Fumes	Operating machinery and vehicles shall be visually checked to ensure exhaust fumes are not discharged to adjoining buildings air intakes.	Construction	All Subcontractors
Emissions	Machinery and vehicles found emitting visible smoke for longer than 10 seconds while operational on-site shall be removed from site and serviced to ensure smoke is no longer visible.	Construction	All Subcontractors
Truck Transportation	Trucks transporting materials such as sand, soil, landscape materials and gravel shall have covered loads and tailgates secured. Trucks transporting hazardous materials, for both on site disposal and off site, must be appropriately licenced and adequately covered.	Construction	All Subcontractors
Paint-Spraying	Water Based Paint-spraying activities shall not be undertaken in adverse weather conditions. Any enamel-based paint spraying must be checked with the state government for any specific requirements.	Construction	All Subcontractors
Exposed Areas	Measures including watering down exposed areas and access will be undertaken to reduce dust generation.	Construction	All Subcontractors
Treatment of Stockpiles	Stockpiles that are exposed to windy conditions shall be treated with a Dust Control Method(s) to prevent nuisance dust emissions.	Excavation	Excavation subcontractor
Disturbed areas	Disturbed areas are to be controlled immediately with a Dust Control Method(s).	Construction	All Subcontractors
Asbestos	If asbestos product is assumed/ determined during investigation/ demolition/ construction works, refer to section 12.4 of the WHS Management plan for management strategies.	Construction	All Subcontractors
Lead Dust	If lead dust is assumed/ determined during demolition/ construction, sampling and testing must be completed by a suitable qualified hygienist to confirm the products material. The area immediately adjacent to the find is to be excluded as delineated by the hygienist. Once test results are complete, and if positive, a suitable qualified hazmat contractor must remove from site and dispose of by the appropriate measures. The hygienist must attend site to confirm that the lead dust has been removed and is safe for works to continue.	Construction	All Subcontractors
Sweeping	Where applicable, sealed roads shall be sprayed with water prior to sweeping and then swept to remove deposited material that could generate dust.	Demolition, Excavation and Construction	All Subcontractors

Site Specific Controls

Parameter	Action	Status	Responsibility
Dust Control (Temporary Measure) - Critical Outside Air Intake - L1.5 AHU (ED) L2 AHU (OT)	Temporary pre filter media to be installed on inside face of AHU air intake at Level 1.5 AHU - Emergency Department (ED) and Level 2 AHU Operational Theatre (OT). Control to be in place until replacement filters are procured and installed.	Established	Multiplex / AG Coombs
Dust Monitoring	Air monitoring station to be established outside ED within MPX Site Boundary (Location 4 – Appendix 8 - RHE-MPX-PM-MPL-CWD-00011 SK_4-1-24). Monitoring Report to be issued Monthly to MNHHS / Johnstaff.	Established	Multiplex

Parameter	Action	Status	Responsibility
	If dust exposure levels exceed specified parameters, alert notification is sent via text to MPX representatives for immediate action.		
Dust Control – Critical Outside Air Intake - L1.5 AHU (ED) L2 AHU (OT)	**Level 1.5 AHU (ED etc) plantroom** - replacement filters to be installed to the existing western outside intake plenums - new filters to be installed behind existing southern outside air intake **Level 2 AHU (OT etc) plantroom** - replacement filters to be installed to the existing ducted outside air intake plenum (ducted to AHU serving Level 1) - replacement filters to be installed behind outside air intake louvre serving outside air plenum plantroom. **Inspections/Monitoring** Level 1.5 AHU (ED) and Level 2 AHU (OT) intake filters to be monitored and inspected monthly with service report to be completed and submitted to MNHHS. Intake filters are scheduled to be exchanged monthly to Level 2 and quarterly within ED plantroom, however if filters are identified as being and/or becoming dirty or clogged during monthly inspections, they will be changed.	Established	Multiplex / AG Coombs
Water Sprays	Water carts, sprinklers or hoses to be in place for dust control/suppression of open excavations and stockpiles.	Established	All Subcontractors
Stockpiles	All stockpiled materials must be covered to prevent the creation of dust. Stockpiles to be covered with plastic and weighted down.	Established	All Subcontractors
Sweeping	Street sweeper to be utilised to remove any deposited material from works associated with excavation.	Established	All Subcontractors

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Inspect dust control measures are in place and implemented	Weekly	MPX	Weekly Environmental Inspection
Inspection of Outside Air Intake - L1.5 AHU (ED) L2 AHU (OT)	Weekly	AG Coombs	Service Report
Air Monitoring	Monthly	MPX	Report
Dust monitoring exceeds specified levels	Immediate Action	MPX	Aconex Correspondence to MNHHS / Johnstaff
Dust monitoring in response to community complaints or in accordance with DA / regulatory requirements.	As Required	MPX	Dust monitoring records

7.4 Construction Noise and Vibration Management Sub-Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
To manage any works causing noise or vibration do not affect nearby structures or residents.	No complaints from the community regarding noise or vibration.	No. of complaints from residents / businesses related to noise
Compliance with State and Local requirements as applicable.	Compliance with Development approval conditions.	Noise/vibration monitoring records.

Management Strategies where applicable.

Parameter	Action	Timing	Responsibility
Construction Work	All construction work shall take place during the hours as determined by the Development Approval. Construction activities to be restricted to Monday to Saturday (excluding public holidays) between 6.30am and 6.30pm. Operation of regulated devices such as chainsaws, mulchers and electrical, mechanical or pneumatic power tools is restricted to Monday to Saturday (excluding public holidays) between 7.00am and 7.00pm	Construction	All Subcontractors
Construction Work – Out of Hours	As needed, an application will be lodged with the Morten Bay Regional Council to conduct works out of the consented DA hours. Client will also be informed where required. These works will be managed in such a way as to avoid disruption to any surrounding residents or businesses.	Construction	Multiplex
Noise Monitoring	Noise monitoring shall be undertaken if required by council conditions or if complaints are received due to unreasonable levels of noise in a noise sensitive area. As an alternative, consideration is to be given to undertaking works at more suitable times to the complainant.	Construction	Multiplex
Plant and Equipment	Plant and equipment noise control equipment to be maintained in accordance with manufacturer's specification to reduce noise levels.	Construction	All Subcontractors
Plant and Equipment Noise Control	All mobile machinery and stationary equipment shall be fitted with noise control equipment as per the manufacturer's specifications.	Construction	All Subcontractors

<table>
<tr><th>Parameter</th><th>Action</th><th>Timing</th><th>Responsibility</th></tr>
<tr><td>Vibration - Monitoring</td><td>During operation, if equipment is likely to cause excessive vibration, sensitive structures including heritage buildings shall be monitored for vibration levels.

The vibration criteria for ‘soundly constructed structures’ under BS5228-4 should be applied for adjoining buildings that are structurally sound.

BS 5228-4 criteria, in PPV (mm/s)

<table>
<tr><th rowspan="2">Structure</th><th colspan="3">Intermittent</th><th colspan="3">Continuous</th></tr>
<tr><th><10 Hz</th><th>10-50 Hz</th><th>> 50 Hz</th><th><10 Hz</th><th>10-50 Hz</th><th>> 50 Hz</th></tr>
<tr><td>Soundly constructed structures</td><td>5</td><td>10</td><td>20</td><td>2.5</td><td>5</td><td>10</td></tr>
</table>

Regardless of the criteria above, constant observation of vibration levels and any effects on adjoining structures will be monitored closely during construction, as this may alter vibration monitoring trigger levels.</td><td>Construction</td><td>Multiplex</td></tr>
<tr><td>Noise / Vibration – Control Measures</td><td>If noise and / or vibration complaints are received, the following techniques should be considered to reduce impact to adjoining owners.

- Undertaking works outside of adjoining building operating hours / peak hours
- Isolate structure by concrete sawing and back-propping
- Ring Saw instead of hammering column / beams.
- Use smaller machinery.
- Use static rolling where possible</td><td>Construction</td><td>Multiplex</td></tr>
<tr><td>Communication and Notification</td><td>A contact list will be prepared to enable nearby residents and owners to be notified regarding works that may impact them because of potential noise and vibration.</td><td>Construction</td><td>Multiplex</td></tr>
</table>

Site Specific Controls

Parameter	Action	Status	Responsibility
Noise / Vibration Monitoring	Vibration monitors to be established outside ED within MPX Site Boundary and within existing multi-storey carpark (Location 1 & 4 – Appendix 8 - RHE-MPX-PM-MPL-CWD-00011 SK_4-1-24). Monitoring and reporting to be in accordance with Appendix 9 - RHE (MNHHS) Construction Noise and Vibration Management Statement. Monitoring Report to be issued Monthly to MNHHS / Johnstaff. If noise exposure levels exceed specified parameters, alert notification is sent via text to MPX representatives for immediate action.	Established	Multiplex / Acoustic Logic

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Noise / Vibration Monitoring	Monthly	MPX	Report

Noise/Vibration monitoring exceeds specified levels	Immediate Action	MPX	Aconex Correspondence to MNHHS / Johnstaff
Vibration monitoring if required by Development Authority and in response to complaints	At commencement and during excessive vibration	MPX	Vibration monitoring records
Noise monitoring if required by Development Authority and in response to complaints	At commencement and during excessive Noise	MPX	Noise monitoring records

7.5 Chemicals Management Sub-Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
Avoid contamination of soil and water from chemicals.	No release of any of chemicals from site.	No instances of uncontrolled spills.

Management Strategies where applicable

Parameter	Action	Timing	Responsibility
Hazardous Chemicals	Safety Data Sheets which outline the procedures for handling, storage and emergency response for all hazardous chemicals stored or used on the project shall be available in the first aid facility.	Establishment	Multiplex
Induction	All site personnel to be inducted in storage and handling of chemicals and emergency procedures.	Establishment	All subcontractors
Spill Kits	Spill kits are to be established at locations adjacent to where chemical spills have the potential to occur. The spill kits are to be maintained and readily available in the event of a spill.	Establishment	Multiplex All Subcontractors
Toolbox Talks	Toolbox talks will be undertaken in the use of spill kits and the steps taken in the event a spill or an Environmental Emergency Incident.	Construction	Multiplex / All subcontractors
Tank and Mobile Tankers	Tank and mobile tankers to be fitted with a screw fitting or overflow protection connected to prevent leaks.	Construction	All subcontractors
Bunds	Bunds capable of storing 110% of the largest container volume shall be installed around areas where chemicals are stored. The bund is to be impervious, chemically resistant and fire resistant. Further, the bund is to be protected from weather to avoid rain reducing the bund capacity. For any hazardous substances and dangerous goods, refer AS 1940.	Construction	All subcontractors
Labelling of Chemicals	All chemicals and dangerous goods used on site shall be appropriately labelled.	Construction	All subcontractors
Fuel Tankers	Fuel tankers shall be equipped with an appropriate device to prevent overfilling. An emergency shut off valve is also to be installed.	Construction	All subcontractors
Handling of Chemicals	Handling of chemicals is to take place in a designated area where there is no potential that spills, or contaminated run-off could reach the stormwater.	Construction	All subcontractors
Fuelling of Vehicles or Construction Plant	Refuelling is to take place in a designated area where there is no potential that spills, or contaminated run-off could reach the stormwater.	Construction	All subcontractors
Fluid Leaks	Trucks that leak any sort of mechanical fluid shall not be permitted on or adjacent to the site.	Construction	All subcontractors
Oil Contaminated Stormwater	Oil contaminated water shall be disposed of to a licensed waste facility.	Construction	All subcontractors

Parameter	Action	Timing	Responsibility
Minor Spills (<20L)	In the event of a minor spill, the spill kit is to be utilised and the cleaned-up material taken to a licensed facility as trackable waste. If spill occurs on permeable ground validation sampling/analysis after clean-up is to be completed	Construction	All subcontractors
Major Spills (>20L)	In the event of a major spill, the procedures contained in the Emergency Management Plan shall be followed and an Environmental Incident Report completed. If spill occurs on permeable ground validation sampling/analysis after clean-up is to be completed.	Construction	All subcontractors
Volume of Fuel and Chemicals	Volumes of fuels and chemicals kept on site are to include only those volumes necessary to complete the works within a reasonable delivery schedule.	Construction	All subcontractors
Solvent Based Paints	Containers of solvent based paints shall be returned to solvent recycling depot by the sub-contractor and a verifiable receipt or docket retained on file by the sub-contractor and produced upon request to the Site Management.	Construction	All subcontractors

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Check all bunds are the appropriate size and functioning.	Weekly	Sub-Contractors / MPX	Weekly Environmental Inspection
Check all chemicals are labelled, stored in a container in good condition and in a bunded area.	Weekly	Sub-Contractors / MPX	Weekly Environmental Inspection
Check equipment is free from faults and leaks.	Weekly	Sub-Contractors / MPX	Weekly Environmental Inspection
Check the spill kit is adequately stocked.	Weekly	Sub-Contractors / MPX	Weekly Environmental Inspection
Major spill incident report	When required	Sub-Contractors / MPX	Environmental Incident Report

7.6 Waste Minimisation and Management Sub Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
Solid and liquid waste to be disposed of as per regulatory requirements.	All waste to be disposed of by a licensed waste contractor	Onsite waste disposal facilities confirmed and documented
MPX aim to maximise landfill diversion.	Recycle 80% of demolition and construction waste.	Waste reporting by waste contractors

Management Strategies where applicable.

Parameter	Action	Timing	Responsibility
Waste Management Plan	Demolition and Excavation subcontractors will be required to develop a Waste Management Plan for their Scope of Work detailing the type of waste generated, waste avoidance / reduction / reuse / recycling strategies.	Establishment	Demolition and Excavation Subcontractors
Storage Area	A storage area allocated for the separation, collection and recycling of wastes shall be established.	Establishment	Multiplex
Waste Contractors	Licensed contractors shall be engaged to remove construction waste. An agreement shall be entered into requiring reporting on quantities diverted from landfill.	Establishment	Multiplex
Putrescibles Waste (Organic Waste)	All putrescibles waste to be placed in a lidded bin and removed separately.	Establishment	Multiplex
Site Office	The site office shall implement the following office waste minimisation techniques: • Organising recycling paper bins in the office for wastepaper • Recycle toner cartridges pick-ups. • Using electronic storage to reduce use of paper. • Purchasing products in bulk to reduce packaging.	Establishment	Multiplex
Package Minimisation	Subcontractors shall be required to minimise the packaging they bring onto the site and to reuse off-cuts of materials where possible.	Construction	All Subcontractors
Pallets and Reels	Pallets and reels shall be separated and stored by subcontractors for return to the suppliers with other reusable packaging.	Construction	All Subcontractors

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Waste budget	Monthly	MPX	Waste Budget Report
Putrescibles waste to be separated and placed in a lidded bin.	Weekly	MPX	Site Inspection
Segregated waste and appropriate waste placement	Weekly	MPX	Waste contractor reports

Waste Minimisation Plan

Stage: Demo and Excavation Phase

MATERIALS ON SITE	DESTINATION		
	Reuse and Recycling		Disposal
	ON-SITE	OFF-SITE	
Type of Materials	**Specify proposed reuse or on-site recycling methods**	**Specify contractor and recycling outlet**	**Specify contractor and landfill site**
Demolition			
Concrete, Masonry, Brick& Tile	Separate in designated bin.	Transfer for reprocess or recycle/Demolition Contractor	Subcontractor
Timber	Separate in designated bin.	Transfer for re-use and re-sale/Demolition Contractor	Nil
Metal	Separate in designated bin.	Transfer for reprocess or recycle/Demolition Contractor	Nil
Mixed waste	Separate in designated bin.	Transfer for Landfill/Demolition Contractor	Landfill
Asbestos	Separate in designated bin.	Transfer & disposal @ hazardous Landfill/Demolition Contractor	Hazardous Landfill
Bitumen	Separate in designated bin	Transfer for reprocess or recycle/Demolition Contractor	Subcontractor
The demolition contractor prior to commencement will develop a waste minimisation plan for the project. Material will be separated on site and removed in separate trucks for recycling, re-use and landfill.			
Excavation			
Clean Fill	Assess, excavate & remove	Transport & fill	Subcontractor
The excavation phase is to be conducted by a licensed contractor. Soil will be tested prior to excavation to determine the presence of any hazardous material and contaminated soils. All environmental precautions will be taken during the process as specified by Multiplex CEMP including full environmental management of the site for the DA requirements including dust, erosion and sediment control with monitoring and reporting initiatives in place. Any hazardous waste will be isolated and managed as per the Qld legislation for hazardous waste and in line with appropriate sub-plans.			

Stage: Construction Phase

MATERIALS ON SITE	DESTINATION		
	Reuse and Recycling		Disposal
	ON-SITE	OFF-SITE	
Type of Materials	Specify proposed reuse or on-site recycling methods	Specify contractor and recycling outlet	Specify contractor and landfill site
Construction			
Concrete	General waste bin.	Transfer for reprocess or recycle/Waste contractor	General waste
Masonry, Brick& Tile	General waste bin.	Transfer for reprocess or recycle/Waste contractor	
Timber	General waste bin.	Transfer for reprocess or recycle/Waste contractor	
Metal	General waste bin	Transfer for reprocess or recycle/Waste contractor	
Plasterboard	General Waste	Transfer for reprocess or recycle/Plasterboard Contractor	
Mixed waste	General Waste	Transfer for reprocess or recycle/Waste contractor	
Cardboard	General Waste	Transfer for reprocess or recycle/Contractor to be confirmed	
Pallets	Separated	Transfer for Re-use/Re-Sale/All Subcontractors	Recycled
Reels	Separated	Transfer for Re-use/Re-Sale/All subcontractors	
Office Paper	Paper Recycle Bin	Transfer for reprocess or recycle/Waste contractor	
Toner Cartridge	Toner Cartridge Recycle Bin	Transfer for reprocess or recycle/Waste contractor	

During the construction phase the project will be operated according to the site-specific waste management plan. Waste will be minimized by the design choice of modular components and pre-cast. The waste stream will be separated into four parts: Metal, plasterboard, cardboard and mixed waste. Separation may occur off site if necessary. Subcontractors are required to return packaging (i.e. pallets & reels) to the suppliers and suppliers are encouraged to reuse, returnable stackable packaging. All subcontractors' that are awarded will be required to provide a site-specific construction environmental management plan that will be reviewed in coordination with our waste minimisation plan.

7.7 Land Contamination Management Sub-Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
To manage contamination in accordance with regulatory requirements and remediation plan	Manage contamination in a manner that doesn't add risk to human health or the environment.	No release of contaminants to the environment as confirmed by monitoring/validation sampling after excavation

Management Strategies where applicable.

Parameter	Action	Timing	Responsibility
Unexpected Contamination	If unexpected contaminated soils are identified, all excavation activities shall be ceased, and a reassessment of the soil shall be undertaken by a Suitably Qualified and Experienced Environmental Consultant.	Excavation	Multiplex / Subcontractor
Contaminated Water	Where water is proposed to be discharged from areas that has the potential to come in contact with contaminates identified during the works, a full suite of contamination analysis is to be undertaken on the water prior to works commencing and prior to discharge. Where water is found to be contaminant free in accordance with the WQO, water is to be discharged into nearby waterway	Excavation	Multiplex
Acid Sulfate Soils	An Acid Sulfate Soil Investigation is required where excavation of more than 100m3 of material is required below 5m AHD where the natural ground is below 20m AHD. All acid sulfate soil management will be completed in accordance with the ASSMP provided by suitably qualified and experienced environmental consultant.	Establishment	Excavation Subcontractor
Excavated Materials	All identified contaminated excavated materials removed from the site shall be removed in accordance with the approved plan for the management of contamination and disposed of to a facility licensed to take that level of contamination.	Excavation	Excavation Subcontractor
Waste Transport Certificate	A Waste Transport Certificate for all contaminated material shall be required from the responsible contractor.	Excavation	Excavation Subcontractor
Topsoil	Topsoil to be scraped and stockpiled to be reused once development is completed.	Excavation	Excavation Subcontractor
Remediation	All remediation of contaminated land will be completed in accordance with the Remediation Plan, provided by a suitably qualified and experienced consultant.	Construction	Multiplex / Subcontractor

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Management of Contaminated Material	Construction	MPX	- Weekly Environmental Inspection - Water Quality Records - Waste tracking records

7.8 Flora and Fauna Management Sub-Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
To reduce the impact of construction on native flora and fauna.	No damage / injury to preserved flora and fauna.	Weekly Environmental Checklist results.

Management Strategies where applicable.

Parameter	Action	Timing	Responsibility
Site survey	• The site will be surveyed for potential and actual breeding places by a suitably qualified professional. If breeding places are identified within clearing boundaries, a Species Management Plan (SMP) will be submitted to Department of Environment and Science. • The site will be surveyed for invasive fauna and flora species. If invasive species are identified, they will be removed in accordance with legislative requirements.	Prior to clearing	Arcadious
Induction	Undertake a site induction addressing the management of flora and fauna including: • No employee of the project will intentionally injure native fauna including snakes. • Construction personnel are not to handle fauna. • No pets, traps or firearms will be allowed on the site. • All rubbish and food scraps must be placed in lidded bins that will be serviced regularly. • Native fauna is not to be fed by project employees. • Minimise the area of disturbance. The State Environmental Agency is promptly advised of significant discoveries.	Establishment	Multiplex/ All Subcontractors
Tree Protection Zones (TPZ)	TPZ's are to be established to protect vegetation identified for retention within the works area. If required, protected vegetation that is not required to be cleared will be protected in accordance with the AS4970-2009 Protection of trees on Development Sites.	Establishment	Multiplex
Vegetation Clearing	Vegetation removal shall be minimised wherever possible by clearly defining designated work areas and creating clearly designated exclusion zones with secure fencing and or bunting around areas of retained vegetation.	Construction	Clearing and Grubbing Subcontractor
Arborist	All works carried out on either foliage or root systems will be carried out as per the Australian Standard 4970-2009 Protection of trees on development sites and will be undertaken in consultation with a qualified Arborist.	Construction	Multiplex
Wood Chip	• Utilise wood chip for erosion protection during construction. Not to be used in concentrated flows. • Utilise for final landscaping in completed areas. Important to note that wood chip should only be used on ameliorated soils and further can cause nitrogen drawdown.	Construction	Multiplex

Parameter	Action	Timing	Responsibility
Excavation	• Excavation personnel to maintain watchful eye over ground penetration points. • All trenches / excavations are to be inspected each morning by designated construction personnel. • All open excavations/ trenches are to have fauna escape structures installed (battered edge, geofab installed on stepper batters) These trenches, and open excavations are to be inspected daily prior to works commencing. • Where flora and fauna are discovered, personnel are to cease work in the subject area and notify the Environmental Manager / Qualified Wildlife Spotter / Catcher.	Construction	Excavation Subcontractor
Unidentified Flora or Fauna	If any previously unidentified flora or fauna is discovered on-site, personnel shall be required to notify the Site Manager.	Construction	All Subcontractors
Spotter Catcher (required where semi-mature / mature trees are to be felled)	• A Qualified Wildlife Spotter / Catcher will be employed to assess the presence of fauna prior to commencement of vegetation clearing. • Contractors must liaise with the Qualified Wildlife Spotter / Catcher during clearing operations. • Trees identified by the spotter catcher as housing an animal or thought to contain roost sites are to be clearly marked and left overnight and the area surrounding the tree cleared. This will encourage nocturnal species to move from the site on their own accord. The spotter will inspect the tree in the morning to confirm presence of the animal. If the animal has not moved on its own accord, the tree will be 'soft felled' into the existing canopy / undergrowth / green-waste stockpile. Once felled, the tree is to be carefully inspected for any fauna, which should be released if trapped and relocated by the fauna spotter. • If fauna has been identified prior to clearing, steps are taken to safely remove the fauna in consultation and agreement with the appropriate government / authorities. • Where any native fauna is injured as a result of construction, a rescue volunteer is to be contacted. Following this, the EAM is to be notified immediately.	Construction	Clearing and Grubbing Subcontractor / Multiplex
Stockpile Areas / Machinery	No materials or machinery is to be stockpiled within the 'drip-line' of retained vegetation.	Construction	All Subcontractors
Active Nests of Native Birds	Any trees or shrubs to be removed from the site shall be checked for the presence of active nests of native birds (i.e., those containing fertile eggs or nestlings) and arboreal mammals (e.g., possums) prior to removal or relocation by a Qualified Wildlife Spotter / Catcher.	Construction	All Subcontractors
Rehabilitation	• Monitor disturbed areas for weed invasion and undertake control measures as necessary. • Regularly water, weed and fertilise rehabilitated areas to ensure their success.	Construction	Landscaper / Multiplex

Parameter	Action	Timing	Responsibility
Weed Management	All declared weeds within the site will be removed in accordance with the below procedures. • The use of pesticides and herbicides shall be restricted, have specific application, storage and clean up procedures, and shall meet requirements of relevant agencies. • Herbicides shall be administered by contractors licensed in accordance with the provisions of State Legislation. • Herbicides containing surfactants harmful to amphibians will not be used. • Herbicides and other chemicals shall not be used with 30m of waterways / stormwater wherever possible. Within this area chemicals must be accredited as being environmentally acceptable in terms of impacts on aquatic fauna. • Chemical products should always be used as per manufacturers recommendations. • Only qualified personnel should undertake chemical control of weeds. • Minimise the disturbance to the soil on the steep banks along the remaining riparian vegetation areas during weed removal. • Erosion control measures should be placed below any areas where the soil will be greatly disturbed. • Rehabilitate areas of exposed soil immediately with native or other suitable vegetation. • The following options are provided for the removal of pasture weeds, these are based on economic costs: o Kill all weeds and grasses by glyphosate-based herbicide and then apply mulch directly onto dead grass and weeds. Plant trees through the mulch. o Mechanically scrape / remove the top surface (including grasses and weeds) and remove from site and then apply mulch directly onto the bare soil. Plant trees through mulch. o Apply spot applications of a broad-leaf herbicide where a tree will be located and plant tree after the weeds have died. o Apply mulch directly onto the grasses and weeds and plant trees through the mulch. • Correct disposal of weeds shall be undertaken ensuring accidental spread of weeds through incorrect disposal shall not occur. Weeds or material containing weed matter will be transported to a landfill under covered load. The cover must seal the top and sides of the load to prevent any weed material being transported by wind.	Construction	Landscaper / Multiplex

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Environmental Controls Map	Weekly (where necessary)	MPX	Environmental Controls Map revisions
Spotter Catcher / Arborist Records	Daily during works	MPX / Clearing Subcontractor	Inspection Records
Clearing Monitoring	Daily during clearing works	MPX / Clearing Subcontractor	Weekly Environmental Inspection
Rehabilitation Areas	Weekly	MPX	Weekly Environmental Inspection

7.9 Heritage, Indigenous and Archaeological Management Sub-Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
The Heritage, Indigenous and Archaeological value of the site including heritage buildings, skeletal remains, shell middens or other artefacts identified shall be recognised, respected and managed.	No damage to protected heritage values or artefacts.	No incidents involving heritage values or artefacts.

Management Strategies where applicable.

Parameter	Action	Timing	Responsibility
Induction	Site induction shall address the protection of identified heritage values or artefacts including the likelihood of encountering unidentified heritage values or artefacts and the procedures to follow if encountered.	Establishment	Multiplex
Unexpected finds of Heritage Values / Artefacts	Where an unexpected heritage, indigenous or archaeological artefact is discovery, the below steps are to be followed: 1. Work is to immediate stop within the adjacent area. 2. Exclude the area. 3. Contact relevant stakeholders (RHE,MPX management, Cultural officers) 4. Test Samples 5. Remediate under the supervision of the relevant stakeholder or continue with works.	Construction	All Subcontractors
Monitoring	Excavation personnel shall be required to maintain a watchful eye over ground penetration points with a view to limiting damage on significant items if uncovered.	Excavation	Excavation Subcontractor

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Heritage Management	Construction	Multiplex	Heritage Report
Daily Site Inspection	During Demolition of Heritage Items	Demolition Contractor	Weekly Checklist
Daily Site Inspection	During Excavation within proximity to Heritage Items	Excavation Contractor	Weekly Checklist

7.10 Site Office Environmental Management Sub-Plan

Objectives and Targets

Objective	Target	Key Performance Indicator
Maximise the efficient use of resources within the office environment.	Recycle 100% office paper	Recycling reports
	Recycle 100% of bottles and cans where available	Recycling reports

Management Strategies where applicable.

Parameter	Action	Timing	Responsibility
Use of Resources	Recycle office paper and cardboard cans, bottles and printer cartridges.	Commencement to completion	Multiplex
Use of Energy	Place office and site shed energy supply on timers and turn off after use.	Commencement	Multiplex
Use of Resources	Use office paper with recycled content.	Commencement to completion	Multiplex
Use of Chemicals	Use low emitting chemicals for cleaning.	Commencement to completion	Multiplex
Double Sided Printing	Use double sided printing on photocopiers.	Commencement to completion	Multiplex
Monitor Energy Use Onsite	Monitor all energy use on the project.	Commencement to completion	Multiplex / Sub Contractor

Monitoring and Reporting

Type of Monitoring / Reporting	Timing	Responsibility	Record
Percentage of diversion from landfill	Monthly	Waste Contractor	Monthly Recycling Report.

8. Appendices

Appendix 1 – Health, Safety, Environmental and Quality Policy

MULTIPLEX

HEALTH, SAFETY, ENVIRONMENTAL AND QUALITY POLICY STATEMENT

This Policy applies to all employees, contractors, and other people at workplaces managed by Multiplex.

OUR COMMITMENT

Multiplex and its senior management are committed to:

- Protecting the health, safety and wellbeing of everyone within our workplaces including employees, contractors, visitors, public, neighbours and the community.
- Ensuring that our activities place minimal impact on the environment including pollution.
- Delivering projects that add economic, social and environmental value to our clients, our community and those who invest in us.

OUR STRATEGIES

Multiplex works collaboratively with key stakeholders, including our clients, regulators, industry peers, suppliers and contractors, to exceed our legal, contractual and other compliance obligations through the following key strategies:

- Managing risks and opportunities through early intervention in planning and design.
- Monitoring constantly the changing landscape over the project lifecycle and develop rigorous controls in response.
- Creating an outlook and culture in which our commitments are front of mind and part of everyday business.
- Valuing the competency (skills, knowledge and experience) of all persons to perform and find better ways of doing the work.
- Providing employees and other stakeholders the opportunity and expectation to acquire the appropriate competency to enable them to carry out their work safely without risk to themselves, fellow workers and the public.
- Focusing on open conversations between our employees, our clients and the people we work with not just paperwork.
- Creating a culture that encourages the reporting of incidents and occurrences to enable knowledge sharing, learning and information to facilitate improvements in performance.
- Promoting strategies that are driven and embedded by senior management who encourage ownership and continuous improvement in behaviours, practices and outcomes by all persons.
- Aligning our behaviour to our values with an emphasis on teamwork and recognition for innovation and initiative.

John Flecker
CEO – Multiplex
November 2022

Built to outperform.

Appendix 2 – Environmental Roles and Responsibilities Matrix

Role and Responsibility	CEO	Group Sustainability/EDS/WOL Manager	Australasian/Regional Managing Director	Regional Director	Environmental Manager	Project Manager	Site Manager	Project Engineer	Admin	Engineer	Supervisor/foreman	WHSE Coordinator	Construction Workers
Provide **resources** including personnel, time and finances to ensure compliance with Environmental legislation and the Construction Environmental Management System.	✓	✓	✓	✓									
Ensure MPX operations identifies, **monitors and evaluates the compliance with the current legislation** for Environmental Management	✓	✓	✓	✓	✓								
Ensure that the **MPX Management System**, risk assessment and procedures reflect the requirements of current environmental, legislation, guidelines and standards		✓		✓	✓								
Identify by way of subscription, all **environmental legislation**, standards, codes of practices and guidelines pertinent to our works.					✓								
Promote a positive workplace **environmental culture**	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engage in **risk workshops** to identify, assess and determine appropriate controls for all potential risk and opportunity where required.				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Establish realistic project specific measurable **targets.** Monitor and report.					✓	✓	✓						
Have a working **knowledge** of the MPX Environmental Management System	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Complete project specific **environmental documents** utilising templates.					✓	✓	✓					✓	
Establish the environmental requirements for the projects **site establishment and planning** requirements					✓	✓	✓					✓	
Establish a schedule of **environmental legislation**, Communicate and monitor for change.					✓								
Establish records filing system and maintain **environmental records**												✓	
Establish and maintain **environmental registers including legislation, training and quantifiable targets**					✓							✓	
Establish and organise the environmental component of the **induction programme**					✓		✓					✓	
Identify and assess **competency** of employee's incl. any unforeseen workforce requirements. Undertake training needs analysis and facilitate any **training** requirements				✓	✓	✓	✓						
Determine and assess requirements for **environmental monitoring** (i.e., noise, air and dust) and implement. Review results to determine compliance.					✓		✓					✓	
Assess subcontractor's ability to comply with the project environmental requirements and environmental contract requirements.					✓	✓	✓		✓			✓	
Provide SCs with relevant **environmental documents** templates, CEMPS, EWMS relevant parts of the site specific MPX CEMP												✓	
Obtain **Environmental documentation** from each SC prior to commencing. Register and review adequacy and request changes prior to accessing the site					✓		✓					✓	

Role and Responsibility	CEO	Group Sustainability/EDS/WOL Manager	Australasian/Regional Managing Director	Regional Director	Environmental Manager	Project Manager	Site Manager	Project Engineer	Admin	Engineer	Supervisor/foreman	WHSE Coordinator	Construction Workers
Monitor subcontractors' activities and report on performance against EWMS's and CEMP					✓		✓				✓	✓	
Conduct **inductions** for all persons attending site and maintain records												✓	✓
Complete an **Environmental Aspects, Impacts and Risk Assessment** at commencement of the project and update as required to reflect current site conditions					✓	✓	✓					✓	
Identify and maintain a register of all onsite **hazardous materials and dangerous goods**												✓	
Obtain **SDS's** no greater than 5 yrs. old and provide adequate hazardous substances and dangerous goods **storage facilities** onsite							✓				✓	✓	✓
Conduct **Environmental inspections** distribute for action, obtain signoffs from SC and close out					✓							✓	
Attend projects to **monitor and discuss Environmental issues** with project management, supervisors and workers		✓	✓	✓	✓								
Monitor, resolve and prevent significant **Environmental issues** and share lessons learnt	✓	✓	✓	✓	✓								
Schedule and conduct environmental **audits** of Subcontractors. Distribute report and monitor status.					✓							✓	
Conduct Environmental **consultation and communication** on environmental matters where required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Implement **emergency response procedures and outlined in the site Emergency Response Plan**,						✓	✓				✓	✓	✓
Record, report and investigate environmental **incidents**. Monitor corrective actions and distribute any lessons learnt				✓	✓	✓	✓					✓	
Report and distribute **non-conformances** and implement corrective and preventative actions. Review effectiveness of corrective actions.					✓	✓	✓			✓	✓	✓	✓
Implement **environmental sub-plans** and procedures					✓	✓	✓	✓	✓	✓	✓	✓	✓
Prepare **monthly report** on the status of the environmental management system						✓	✓					✓	
Review **Environmental performance** including adequacy of resources	✓	✓	✓	✓	✓	✓	✓					✓	
Obtain feedback for both internal/external training conducted and evaluate the effectiveness of the **training programs**		✓			✓								
R**eview** environmental objectives and targets annually and provide clear direction of the Environmental management system for the next 12 months.		✓	✓	✓	✓								
Acquire and disseminate **Environmental and related information** incl. alerts and lessons learnt		✓			✓								

Role and Responsibility	CEO	Group Sustainability/EDS/WOL Manager	Australasian/Regional Managing Director	Regional Director	Environmental Manager	Project Manager	Site Manager	Project Engineer	Admin	Engineer	Supervisor/foreman	WHSE Coordinator	Construction Workers
Review procedures and forms resulting from any changes in legislation, regulation, standards, codes of practices and incidents.					✓								
Attend **collaborative post project review** meeting to assess environmental performance, identify and document lessons learnt					✓	✓	✓	✓			✓	✓	✓
Develop and adhere to the ESD and WOL plans for the project		✓			✓								

Appendix 3 – Aspects and Impacts Register – to be updated during project stages.

Risk Assessment Matrix

		Likelihood				
		A. Almost certain	B. Likely	C. Possible	D. Unlikely	E. Rare
Consequence	5. Extraordinary	1	2	4	7	11
	4. Major	3	5	8	12	16
	3. Moderate	6	9	13	17	20
	2. Minor	10	14	18	21	23
	1. Insignificant	15	19	22	24	25

RISK RATING	DESCRIPTION	ACTION
High / 1-6	Those risks or opportunities with a relatively high likelihood and large impact.	Risks are unacceptable. These will require close management attention at project management level and development of risk control measures to reduce their risk to a tolerable level.
Medium / 7-15	Risks or opportunities with a medium likelihood or impact.	These will be managed in consultation with the respective Manager or Supervisor (who will decide whether management attention is required) and risk control measures developed to a level of risk that is As Low as Reasonably Practicable (ALARP).
Low / 16-25	Those risks or opportunities with a relatively low likelihood and impact.	These are regarded as acceptable within normal business activities and are to be managed effectively by existing procedures and controls.

Consequence	Description	Likelihood	Description
Extraordinary	Catastrophic impact on key performance indicators. Major environmental disaster that is severe and likely to spread beyond the immediate site and will remain a serious problem over a prolonged period (greater than 1 year)	Almost Certain	The event/impact is common and expected to occur in most circumstances *(will occur regularly / 10 times for year)*
Major	Major negative impact on key performance indicators. An environmental impact that is severe and likely to impact beyond the immediate site and remain a problem in the medium term (less than one year).	Likely	The event/impact has happened before and will probably occur again *(will occur often / 5-10 times per year)*
Moderate	Significant negative impact on key performance Indicators. Off-site releases with no detrimental effects. Environmental impact that localised and has short term effects (less than one month).	Possible	This event/impact could occur at some time *(is likely to occur few / 2-3 times per year)*
Minor	Minor negative impact on key performance indicators. On-site release immediately contained, a minor and transient environmental impact.	Unlikely	This event/impact is not likely to occur *(is unlikely to occur more than once per year)*
Insignificant	Insignificant negative impact on key performance indicators. No environmental impact occurring.	Rare	This event/impact may occur in exceptional circumstances only *(is unlikely to occur during a year)*

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
1.0	**Early Works / Establishment**								
1.1	Installation of site sheds On site traffic	Generation of Dust	Air pollution	A	2	10	Refer to the Air Quality Sub-plan in CEMP. Detail includes: • Wet down exposed areas. Caution is to be taken not to create surface water runoff. • Visual dust monitoring. • Induct all construction staff in dust control measures. • Dampen exposed areas and access tracks, as necessary. • Use hand-held water sprays, as necessary. • All vehicles leaving the site shall enter and exit the site via cattle grid and or temporary sealed roads. • Where a complaint is received (re dust) visual monitoring will be undertaken and activities will be reviewed.	MPX	Ongoing
1.2	Installation of site sheds On site traffic	Generation of Noise	Noise pollution	C	3	13	Refer to the Noise Sub-Plan in CEMP. Detail includes: • Conduct noise monitoring if required by Council and notify Site Manager when noise peaks. • Complete a dilapidation report to adjoining property. • Limit hours of work to permit hours. • Maintain machinery and use standard noise mufflers. • Monitor equipment if there is excessive vibration. • Erect signs stating permit hours. • Identify plant and equipment generating excessive noise. • Communicate and notify nearby residents and owners if peaks in noise will occur. • Respond to community complaints as per the Communication Management Plan	MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
1.3	Operation of Machinery	Fumes	Air Pollution	C	2	18	Refer to the Air Quality Sub-Plan in CEMP. Detail includes: • All construction plant and equipment with access to the site will be properly maintained. • Equipment emitting visible smoke for longer than ten seconds will be taken out of service. • All vehicle wheels (where required) shall be cleaned before leaving the site.	Subcontractors	TBC
1.4	General – All Stages	Tobacco Smoke	Air Pollution	B	3	9	Prohibit the use of tobacco products inside the building and within 8 meters of the building entrance during construction	Subcontractors	Ongoing
1.5	Exposing soils	Erosion and Sediment run-off, hazardous dust	Storm water/ Ground water, soil and air pollution	C	4	8	All site operations must be completed in a manner that reflects the CPESC certified sediment and erosion control plan.	Subcontractor MPX	TBC
1.6	Non destructive digging/potholing	Incorrect disposal of contaminated spoil	Pollution to Waterways	D	3	17	Obtain waste disposal dockets from licensed waste facilities	Subcontractor	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
1.7	Dewatering horizontal directional drilling pit	Contaminated groundwater	Water Pollution	A	3	6	• Obtain permission from authorities before pumping water out. • Set up tank/pond to allow settlement of turbid water. • Test water before every release • Monitor water for turbidity and PH before pumping out, record in site inspection report. • Release water (after testing) prior to any rain events • Visually check pump out area for turbidity; and	Subcontractors	Ongoing
2.0	**Demolition**	Demolition Contractor to provide Environment Management Plan including Environmental Work Method Statement							
2.1	Removal of demolition materials	Generation of noise	Annoyance to local community	B	3	9	Refer to the Noise Sub-Plan in CEMP • Conduct noise monitoring if required by Council and notify Site Manager when noise peaks. • Limit hours of work to permit hours. • Maintain machinery and use standard noise mufflers. • Noise monitoring and notification when peaks in noise levels by SMS • Identify plant and equipment exceeding 85 DBA and remove for service.	Subcontractor MPX	Ongoing
2.2	Removal of Asbestos Material	Release of asbestos to the atmosphere	Soil water and air contamination	E	4	16	Refer to the WHSE Management plans sub-plan on asbestos removal. • Install air monitors. • Notify relevant parties prior to work. • Demarcate Zone and install Asbestos Removal signage. • Wear correct PPE. • Diligent operation by qualified and trained personnel • Take care when removing sheets so as not to break. • Water sheets to reduce airborne dust. • Dispose of overalls prior to entering clean zone. • Bags for removal to be tightly sealed. • Careful handling of waste bags. • Remove asbestos to licensed landfill. • Clearance Certificate obtained.	Subcontractor MPXC	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
2.3	Generation of waste due to removal	Generation of waste and inappropriate disposal of waste	Waste to landfill	A	2	10	Refer to Waste Management Sub-plan. • Prepare a Waste Management Plan for the site. • Avoid, Reuse and Recycle waste. • Allocate storage areas for the onsite recycling, • Return pallets and reels to the suppliers. • Provide bins for office recycling including paper, cardboard, glass, toner cartridges. • Use licensed contractors to remove construction waste. • Retain and maintain register of all waste dockets detailing types and quantities for materials being removed from site.	Subcontractor MPX	Ongoing
2.4	Generation of dust during demolition	Dust	Air pollution	B			Refer to the Air Quality Sub-plan in CEMP. • Wet down exposed areas. Caution is to be taken not to create surface water runoff. • Visual dust monitoring. • Induct all construction staff in dust control measures. Dampen exposed areas		

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
2.5	Removal of flora and fauna due to demolition and excavation	Damage to flora and fauna due to demolition	Loss of Biodiversity	C	3	13	Refer to species management sub-plan. • Complete a detailed survey prior to any works, identified trees to be retained. • Stop all activities if threatened species or endangered ecological communities listed are discovered. • Induct demolition and excavation personnel not to handle fauna. • Do not store material, machinery, fuel or waste near protected trees. • Include tree protection in the site induction. • Install adequate TPZ. • Minimise vegetation removal. • Clearly define work areas and create exclusion zones with secure fencing around areas of significant vegetation that is to be retained. • Do not stockpile materials near retained vegetation. • Induct construction personnel not to handle fauna. • All rubbish and food scraps are too placed in the appropriate lidded waste bin which will be serviced regularly. • If any flora or fauna is discovered, personnel are to notify the Site Manager. • Any trees or shrubs to be removed from the site will be checked for the presence of active breeding places. • Injured animals will be taken to a local veterinarian, or the local wildlife rescue service notified.	Subcontractor MPX	Ongoing
3.0	**Excavation**	Contractor to provide an EMP							

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
3.1	Plant refuelling	Discharge of hydrocarbons	Contamination of soils, ground water, water courses	C	3	13	Refer to Water Management Sub-plan and or Contaminated Land Management Sub-plan • Prepare an Environmental Emergency Plan implement in an event of a chemical spill. • Register Safety Data Sheets and include information on cleaning up spills. • All chemicals and dangerous goods used on site will require a safety data sheet. • Establish spill kits on site and make readily available. • Conduct toolbox talks in how to use spill kits. • Construct bund walls and floors with impervious materials and in accordance with legislation • Clean up any chemical or fuel spills as quickly as possible and place in suitable receptacles for reclamation or disposal, in a manner that does not cause pollution. • Carry out fuelling of vehicles or construction plant in areas from which fuel or oil will not be discharged to waters/street gutters or stormwater drainage systems. • Trucks that leak any sort of mechanical fluid will not be permitted on or adjacent to the site. • Oil contaminated stormwater will be disposed of to a licensed disposal site. • Any construction personnel storing or using hazardous chemicals or dangerous goods must provide a Construction Environmental Management Plan specifically addressing handling and storage of the product. • Appropriately bund storage area for refuelling of authorised vehicles on site. • Keep minimal volumes of fuel on site. • Label oil, fuel and chemicals and store in bunded area. • Report hydrocarbon spills of over 20 litres to Council.	Subcontractor MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
3.2	Dewatering the site	Discharge of polluted stormwater from site	Water pollution	B	3	9	Refer to Water Quality Management Sub-plan. • Obtain permission from authorities before pumping water out. • Set up tank/pond to allow settlement of turbid water. • Test water before every release • Monitor water for turbidity and PH before pumping out, record in site inspection report. • Release water (after testing) prior to any rain events • Visually check pump out area for turbidity; and	Subcontractor MPX	Ongoing
3.3	Excavation of soil and exposure of soil	Generation of Dust and fumes.	Nuisance to nearby property owners Aesthetic impact Reduce Visibility Air quality Water quality	A	2	10	Refer to the Air Quality Sub-plan in CEMP. Detail includes: • Wet down exposed areas, being cautious of creating surface water runoff. • Visual dust monitoring. • Induct all construction staff in dust control measures. • Dampen exposed areas and access tracks as necessary. • Use hand-held water sprays as necessary. • All vehicles leaving the site shall enter and exit the site via cattle grid and or temporary sealed roads. • Place shade cloth/hoarding around the site perimeter. • Where a complaint is received (re dust) visual monitoring will be undertaken and activities will be reviewed. • Air quality monitors installed. • Pre-treatment of surface water • Sediment and erosion measures	Subcontractor MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
3.4	Excavation and stockpile of spoil	Stockpiled soil on site	Contamination of storm water Generation of dust	B	3	9	• Prepare an Erosion and Sediment Control Plan. Refer section 7.2. • Water Spray and dust retardant on exposed areas. • Implement an Erosion and Sediment Control Plan and maintain during construction. • Install sediment fencing where sediment has the potential to move. • Reseed and landscape as soon as possible.	Subcontractor MPX	Ongoing
3.5	Cutting and filling	Erosion and sediment	Water pollution	D	3	17	Prepare an Erosion and Sediment Control Plan. Refer section 7.2. • Install clean water diversion channels. • Inspect erosions and sediment controls prior and post rain events. • Spray geopolymer on exposed areas are expected to be left exposed for more than ten (10) working days. • Limit exposed soils through staged clearing. • Inspect basin regularly and release water once compliant. • Inspect receiving waterway for sediment build up	Subcontractors MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
3.6	Piling	Generation of noise and vibration	Noise pollution	B	3	9	Refer to the Noise Sub-Plan in CEMP. Detail includes: • Conduct noise monitoring if required by Council and notify Site Manager when noise peaks. • Complete a dilapidation report to adjoining property. • Limit hours of work to permit hours. • Maintain machinery and use standard noise mufflers. • Monitor equipment if there is excessive vibration. • Erect signs stating permit hours. • Identify plant and equipment generating excessive noise. • Communicate and notify nearby residents and owners if peaks in noise will occur. • Respond to community complaints as per the Communication Management Plan. .	Subcontractor MPX	Ongoing
4.0	**Construction**								
4.1	All construction Activities	Noise and Vibration Generation	Noise pollution	B	3	9	Refer to the Noise Sub-Plan in CEMP • All construction work to take place as determined by local council conditions. • Noise monitoring will be undertaken if required by council conditions or if complaints are received due to unreasonable levels of noise in a noise sensitive area. • Identify plant and equipment exceeding 85-db (A) and implement strategies to minimise noise levels. • Assess items or adjoining properties that may be affected by construction activity and manage risk via monitoring. • Prepare a communication plan/strategy when work is outside normal operating hours or vibration is a likely for extended periods,	Subcontractor MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
4.2	Use of crane, forklift, mobile scissor lifts, concrete pump, trucks, formwork	Discharge of contaminated water	Stormwater pollution	C	3	13	Refer to Water Quality Management Sub-plan. • Preparation of appropriately bunded storage area for refuelling authorised vehicles only onsite. • To reduce the impact of a spill, minimum volumes of fuel will be kept onsite. • Ensure sub-contractor label's waste oil and store in a bunded area on-site for collection by a licensed disposal contractor. • Report all hydrocarbon spills greater than 20 litres to council. • Prepare an emergency response plan. • Shut down machinery when not in use. • Service records for all machinery.	Subcontractor MPX	Ongoing
4.3	Everyday Housekeeping	Contamination of Ventilation Systems	Poor indoor air quality	D	2	21	1. Minimize dust: Methods of minimizing dust from cut- off saws, drywall sanders, etc. shall be used. This means using dust collection systems on these tools and emptying them into receptacles located outside the building. Use damp rags, mops or vacuum cleaners to clean up dust as necessary within the job site. 2. Minimize dirt: Sweeping compounds shall be used to keep floors clean of dirt and dust. Floors shall be swept daily in the work areas or more frequently if required. 3. Keep work area clean and dry: If water leaks occur, promptly mop areas dry. 4. Seal the containers containing VOCs: Containers of fuel, paints, finishes, and solvents shall be kept tightly sealed when not in use. These containers shall be stored outside the building and remain outside the building to the greatest extent possible. •	Subcontractor MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
4.6	Painting	Generation of contaminated water	Pollution to sewer system Pollution to stormwater system	B	3	9	Refer to Contaminated Land Management Sub-plan. • Paint subcontractors to provide an Environmental Work Method Statement. • Apply for a Trade Waste Permit before discharge to sewer. • Paint Contractor to remove all paint washouts by a liquid waste removalist company if a Trade Waste Permit is not in place. • Store paints and chemicals in a bunded area where they can be contained if spills occur. • For solvent based paints, return solvent to a solvent recycling depot. • Store paints and chemicals in a bunded area where they can be contained if spills occur. • Keep Safety Data Sheets (SDSs) on site at all times. • Keep clearly marked booms and/or absorbent material on site to contain spills if they occur. • If a spill occurs, stop the source, contain it, clean up in accordance with the SDSs and notify relevant authorities. • Do not undertake paint spraying activates in adverse weather conditions.	Subcontractor MPX	TBC
4.7	Plaster boarding, block laying, rendering, waterproofing, concreting	Generation of contaminated water	Water pollution	B	3	9	• Wet trades to use the triple rinse system, to be installed and maintained by plumbing sub-contractor.	Subcontractor MPX	TBC
4.8	Use of crane, forklift, mobile scissor lifts, concrete pump, trucks.	Generation of Dust and fumes	Air pollution	C	3	13	• Keep floor areas clean from dust and mud. • Keep site entrance and exit free of mud and dirt. • Wet down areas before cleaning the site.	Subcontractor MPX	TBC
4.9	All construction activities on-site	Erosion and Sediment into stormwater	Contamination of turbid water to storm water. Contamination of storm water.	C	3	13	Refer to Erosion and Sediment Control Plan • Install sediment fences around upper parts of the site and other areas where sediment has the potential to move before commencing landscaping. • Install sediment fences around the toe of stockpiles where material from the stockpile has the potential to move. • If cutting pavement, ensure all necessary environmental controls are in place to prevent contaminated water runoff into stormwater drains.	Subcontractor MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
4.10	Installation of Finishes	Generation of Dust and fumes	Poor indoor air quality	D	2	21	During installation of carpet, paints, furnishings, and other VOC-emitting products, provide supplemental (spot) ventilation for at least 72 hours after work is completed. Preferred HVAC system operation uses supply air fans and ducts only; exhaust provided through windows. Use exhaust fans to pull exhaust air from deep interior locations. Stair towers and other paths to exterior can be useful during this process. Require VOC-safe masks for workers installing VOC-emitting products (interior and exterior) defined as products that emit 150 gpl or more UNLESS local jurisdiction's requirements are stricter, in which case the strictest requirements shall be followed for use of VOC-safe masks.	Subcontractor MPX	Ongoing
5.0	Cleaning during construction and prior to occupancy	Generation of Dust and fumes	Poor indoor air quality	E	2	23	Use low-toxic cleaning supplies for surfaces, equipment, and worker's personal use. Options include several soybean-based solvents and cleaning options and citrus-based cleaners.	Subcontractor MPX	Ongoing
5.1	Installation of Dry Wall Finishes	Generation of Dust and fumes	Poor indoor air quality	D	2	21	Use wet sanding for gypsum board assemblies. Exception: Dry sanding allowed subject to Architect's approval of the following measures: 1. Full isolation of space undergoing finishing. 2. Plastic protection sheeting is installed to provide air sealing during sanding. 3. Closure of all air system devices and ductwork. 4. Sequencing of construction precludes the possibility of contamination of other spaces with gypsum dust. 5. Worker protection is provided.	Subcontractor MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
5.2	Installation and storage of materials	Introduction of air pollutants	Poor indoor air quality during construction and during occupancy.	D	2	21	1. Protect material stored on-site or installed absorptive materials from moisture damage: All absorptive building materials (including but not limited to carpet, drywall, ceiling tiles, and furnishings) shall be stored in a dry location and kept dry at all times. 2. Do not use moisture-damaged materials: Any porous or absorptive building materials that have been exposed to moisture shall be thoroughly dried before being installed. Any porous material that has remained wet longer than 48 hours or shows any sign of mould shall be discarded and replaced. 3. Mitigate moisture intrusion: If it begins to rain or groundwater is coming into the building, please notify superintendent immediately and relocate, cover, or protect all absorptive materials. 4. Use low-emitting products: No adhesive, sealant, caulking, primer, paint or other wet product substitution from the specifications is allowed unless authorized by Architect. All products used shall comply with volatile organic compound (VOC) requirements of the SCAQMD and Green Star 5. Do not introduce pollutants into work areas: 6. Once stud framing and drywall begin as well as the installation of the mechanical equipment, access to the building interior shall be limited to reduce the likeliness of contaminants entering the building. 7. Allow materials to off-gas prior to installation: Plastic, fabric, laminates, furnishings, millwork and assembled materials that are packaged or rolled-up shall be opened up and ventilated for a minimum of four days outside of the building. If feasible, Sub-contractors shall off-gas VOC laden products off-site.	Subcontractor MPX	Ongoing
5.3	Sequencing of installation	Introduction of air pollutants	Poor indoor air quality during construction and during occupancy.	D	2	21	Sequencing Work 1.Porous materials (drywall, carpet, ceiling tiles, etc.) should be installed after building is fully closed in. 2. Carpeting and furnishings shall not be installed until after interior paints and finishes have fully cured.	Subcontractor MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
5.4	Tree protection	Damage to trees due to construction activity	Reduced Biodiversity	E	2	23	Refer to Flora and Fauna Management Sub-plan. • Protect trees using slats, bunding and hording. • Complete a detailed survey prior to any works. • Minimise vegetation removal. • Clearly define work areas and create exclusion zones with secure fencing around areas of significant vegetation that is to be retained. • Rehabilitate disturbed areas. • Do not stockpile materials near retained vegetation. • Induct construction personnel not to handle fauna. • Any works required to trees will need to be completed by a tree surgeon. • Include tree protection in the site induction. • All rubbish and food scraps are too placed in the appropriate lidded waste bin which will be serviced regularly. • If any flora or fauna is discovered, personnel are to notify the Site Manager. • Any trees or shrubs to be removed from the site will be checked for the presence of active nests of native birds prior to removal. • Injured animals will be taken to a local veterinarian, or the local wildlife rescue service notified. • Tree protection zones are in place and maintained. • Water trees daily for one hour • Provide mulch to remaining trees	Subcontractor MPX	Ongoing
5.7	Use of concrete Static Line	Discharge of contaminated water due to blow out of static line.	Pollution to sewer system Pollution to stormwater system.	C	4	8	• Discharge of contaminated water due to blow out of static line. • Check certification of static line monthly, before pouring complete pre checklist of pipeline and clips.	Subcontractor MPX	Ongoing
5.8	All construction activities on-site	Sediment into stormwater from construction activities	Contamination of storm water	**C**	3	9	• Place geo tech fabric over drains, Geo Tech sock on the large stormwater drains. • Check and maintain geotec socks and fabric around the site. • Utilise existing stormwater diversions to retain water within site boundary.	Subcontractor MPX	Ongoing

	Activity	Hazard/Aspect	Impact	Likelihood	Consequence	Risk Rating	Control Measures	Responsibility	Close Out Date
5.9	All Construction activities on site	Waste Generation	Waste to landfill	E	4	16	Refer to Waste Management Sub-plan. • Prepare a Waste Management Plan for the site. • Avoid, Reuse and Recycle waste. • Allocate storage areas for the onsite recycling, • Return pallets and reels to the suppliers. • Provide bins for office recycling including paper, cardboard, glass, toner cartridges. • Use licensed contractors to remove construction waste.	Subcontractor MPX	Ongoing
5.10	Landscaping	Sediment into stormwater from landscaping activities	Water pollution	C	3	13	Refer to Flora and Fauna Management Sub-plan. • Ensure sediment control measures are in place until all vegetation is established. • Regularly check all sediment control structures to ensure they are working effectively. • Do not disturb the nature strip between the site and the roadway. • Do not locate stockpiles within 2 metres of hazard areas such as spoon drains or areas of high flow Damp down stockpiles. • Cover stockpiles as needed to minimise dust Use landscaping materials that are free from weeds and weed seeds. • Retain topsoil and reuse in project landscaping.	Subcontractor MPX	Ongoing

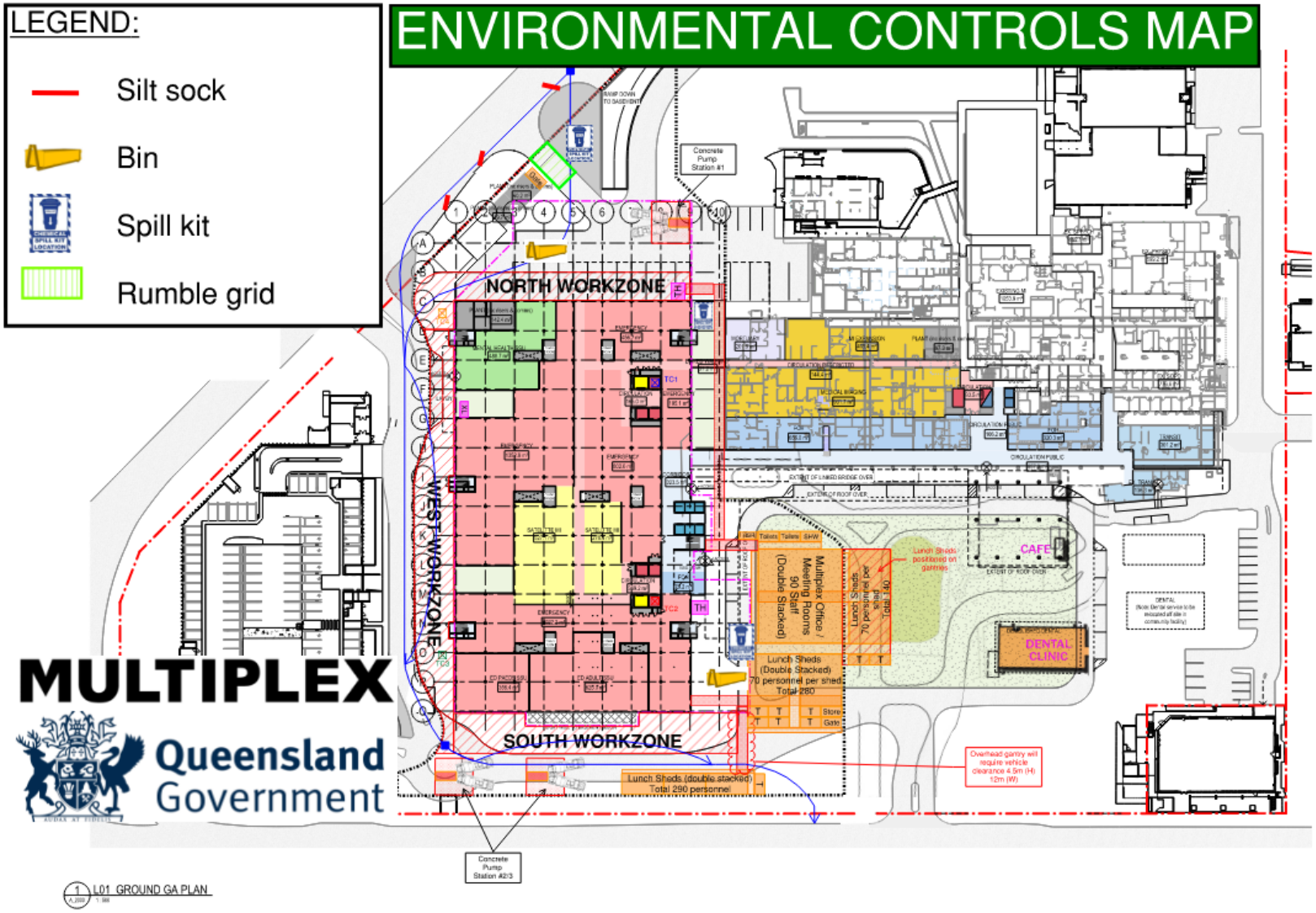
Appendix 4 – Environmental Competency Matrix

Element of Competency	Competency	Group Sustainability Manager	Managing Director	Regional Director	Environmental Manager	Project Manager	Site Manager	Project Engineer	Contracts Manager	Engineer	Supervisor/Foreman	WHSE Coordinator	Construction Workers	Evidence of Competence Required
Environmental impact	Has knowledge of the project activities and the potential aspects and impacts on the environment resulting from those activities.				✓	✓	✓				✓	✓		1 or 3 or 4 or 7 or 8
Environmental risk	Ability to understand the environmental risks onsite to ensure the environmental impacts are prioritised and appropriately managed				✓	✓	✓				✓			1 or 3 or 4 or 7 or 8
Understanding CEMP	Understands the procedures outlined in the CEMP and the ability to implement and maintain the environmental controls outlined in the plan.				✓	✓	✓			✓	✓	✓	✓	1 or 3 or 7 or 8
Understanding documentation	Ability to understand and cross reference to other environmental management documents (e.g., landscape plans, soil and water management plans, statements of heritage significance and incident management.)				✓	✓	✓			✓	✓	✓		1 or 3 or 7 or 8
Legislative - codes, procedures, guidelines	Understanding of relevant legislation and ability to plan and manage compliance with the legislation	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		1 or 3 or 7 or 8
Legislation & Regulations	Understanding of when approvals are required under the relevant legislation.	✓	✓	✓	✓	✓	✓			✓				1 or 3 or 7 or 8
Reporting of inspections	Ability to conduct and record inspections at appropriate stages to determine compliance with the CEMP. Distribute for action and obtain signoffs from subcontractors				✓		✓				✓	✓		1 or 3 or 7 or 8

Element of Competency	Competency	Group Sustainability Manager	Managing Director	Regional Director	Environmental Manager	Project Manager	Site Manager	Project Engineer	Contracts Manager	Engineer	Supervisor/Foreman	WHSE Coordinator	Construction Workers	Evidence of Competence Required
Environmental monitoring	Understands the environmental monitoring processes outlined in the CEMP that need to be implemented on the project.				✓	✓	✓			✓	✓	✓		1 or 3 or 7 or 8
Waste management	Ability to implement a waste management plan.				✓	✓	✓				✓	✓	✓	3 or 8
Investigative skills	Demonstrates investigative abilities in order to gather information needed for records and reports relating to environmental incidents				✓	✓	✓				✓			1 or 3 or 6 or 7
Stakeholders	Ability to ensure appropriate systems is in place for ongoing communication with all stakeholders.	✓	✓	✓	✓	✓	✓							1 or 3 or 6 or 7
Objectives and targets	Has an understanding on the targets of a project and how they are to be reported to ensure the targets are being achieved			✓	✓	✓	✓					✓		1 or 3
Sustainable Material Selection	Ability to interpret manufacturer's data sheets to determine if the correct materials are being used on a site.									✓	✓	✓		3 or 8
Environmental Rating	Understand the requirements of the Environmental Rating Tools including Greenstar and NABERS in the construction process	✓	✓	✓	✓	✓	✓	✓		✓				3 or 8

Ref#	Evidence of Competence Required	Training Source	Ref#	Evidence of Competence Required	Training Source
1	Certificate of Workplace Environmental Responsibilities	External	5	Environmental or another Auditor course	External
2	Implement and monitor environmentally sustainable work practices - Certificate	External	6	10 years' experience in the construction industry	External
3	Internal training in the MPX Environmental Management System	Internal	7	Degree or Diploma with Environmental as an element.	External
4	Internal training in the MPX Risk Management System	Internal	8	Statement of Attainment in Environmental disciplines	External

Appendix 5 – Environmental Control Map



Appendix 6 – ISO14001 Certification

Certificate of Conformity

Multiplex Pty Ltd

ABN: 66 147 631 472

Multiplex Constructions Pty Ltd
Multiplex Constructions Qld Pty Ltd

To certify that their

Environmental Management System

has been assessed and registered as complying with the requirements of
ISO 14001:2015 – *Environmental management systems – Requirements with guidance for use.*

Scope of works covered by certification and locations
Refer to the Certification Schedule for further details.

Certification Number 20181
Issue Date 14/12/2021
Issue Number 12

Period of Registration
16/12/2021 to 16/12/2024

John Edwards, Operations Director
dlcs international

This certificate and certification mark remains the property of dlcs international - www.dlcsi.com.au
St Kilda Rd Towers, 1 Queens Road, Level 6, Suite 625, Melbourne, VIC 3004

Accredited by the Joint Accreditation System of Australia and New Zealand
Acc. No. MS250513AM

Certification is subject to ongoing surveillance assessments
The validity of this certificate can be verified at www.jas-anz.org/register

Certification Schedule

Multiplex Pty Ltd
Multiplex Constructions Pty Ltd
Multiplex Constructions Qld Pty Ltd

Certification Number 20181

Scope of works covered by certification

Project management, design, design development, procurement, manufacture, construction, installation and commissioning of multidisciplinary projects.

At the following locations

Level 23, 135 King St, Sydney, NSW 2000
Level 3, 499 Swanston Street, Melbourne, VIC 3000
Level 3, 63 Pirie Street, Adelaide, SA 5000 *(supported by Vic office)*
Level 6, 240 Queen St, Brisbane, QLD 4000
Brookfield Place Tower 2, Level 1, 123 St Georges Terrace, Perth, WA 6000
Level 1, 72 Townshend St, Phillip, ACT 2606 *(supported by NSW office)*

Issue Date	14/12/2021
Issue Number	12
Page	01/01

Appendix 7 – Contractor Environmental Risk Rating

CONTRACTOR ENVIRONMENTAL RISK RATING

The intent of the following contractor environmental risk rating table (pages 2-3) is to assess the environmental aspects and impacts specific contractors could have on the project. The risk rating is used to determine the extent of what documentation/systems required by the contractor to submit to Multiplex.

Risk Assessment Matrix

Risk Ranking Table Installation

High 1-5 **Medium 6-16** **Low 17-25**

Consequence	Likelihood: Almost certain	Likely	Possible	Unlikely	Rare
Extraordinary	1	2	4	7	11
Major	3	5	8	12	16
Moderate	6	9	13	17	20
Minor	10	14	18	21	23
Insignificant	15	19	22	24	25

Risk Class

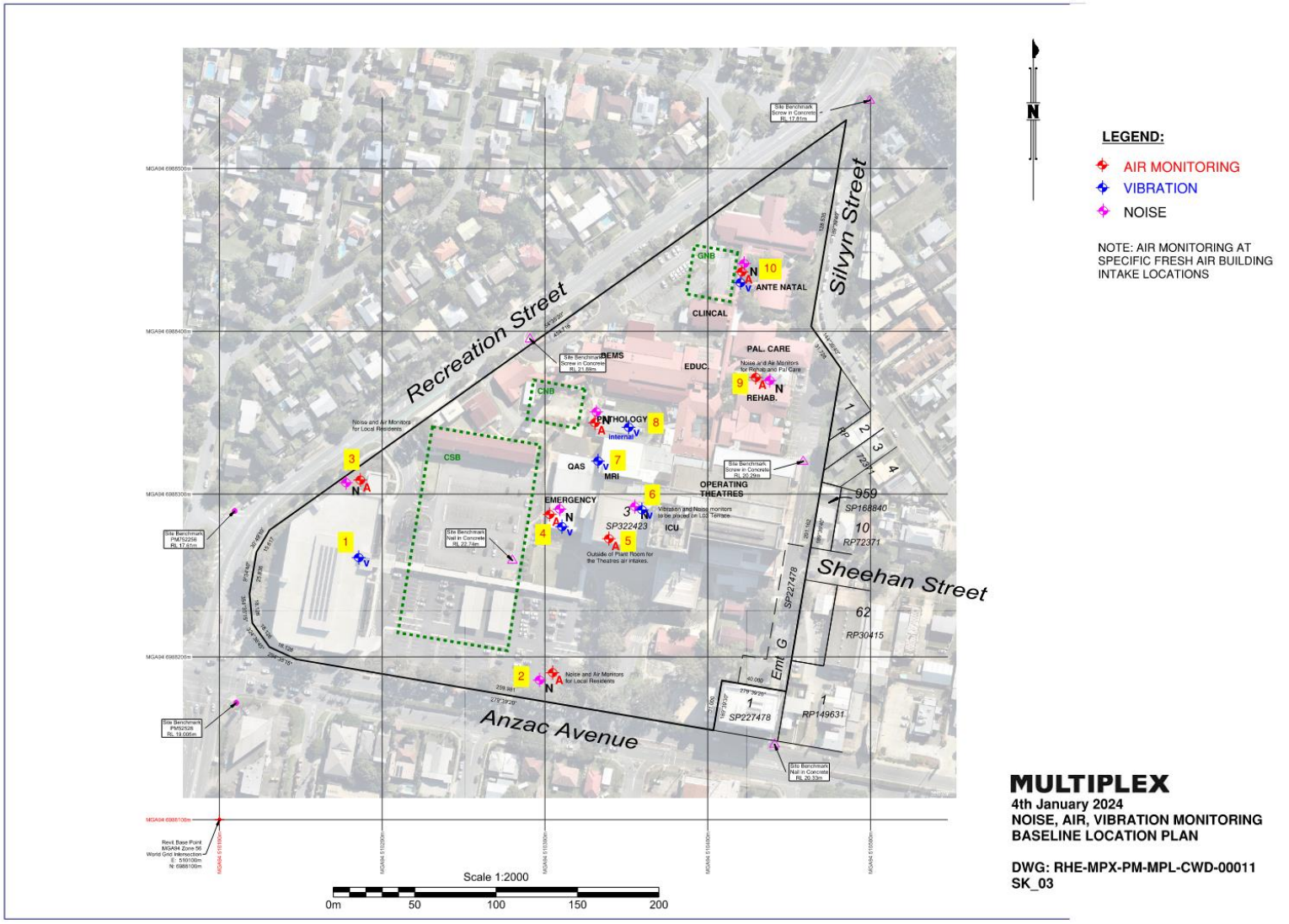
Environment	Risk = Likelihood x Consequence
High / 1-5	Those risks with a relatively high likelihood and large impact
Medium / 6-16	Risks with a medium likelihood or impact.
Low / 17-25	Those risks with a relatively low likelihood and impact.

Consequence	Description	Likelihood	Description
Extraordinary	Catastrophic impact on key performance indicators. Major environmental disaster that is severe and likely to spread beyond the immediate site and will remain a serious problem over a prolonged period (greater than 1 year)	Almost Certain	The event/impact is common and expected to occur in most circumstances *(will occur regularly / 10 times for year)*
Major	Major negative impact on key performance indicators. An environmental impact that is severe and likely to impact beyond the immediate site and remain a problem in the medium term (less than one year).	Likely	The event/impact has happened before and will probably occur again *(will occur often / 5-10 times per year)*
Moderate	Significant negative impact on key performance Indicators. Off-site releases with no detrimental effects. Environmental impact that localised and has short term effects (less than one month).	Possible	This event/impact could occur at some time *(is likely to occur few / 2-3 times per year)*
Minor	Minor negative impact on key performance indicators. On-site release immediately contained a minor and transient environmental impact.	Unlikely	This event/impact is not likely to occur *(is unlikely to occur more than once per year)*
Insignificant	Insignificant negative impact on key performance indicators. No environmental impact occurring	Rare	This event/impact may occur in exceptional circumstances only *(is unlikely to occur during a year)*

Contractor	Environmental Exposure	Risk Rating	Documentation & Other Expectations
Demolition	Dust, noise, debris and pollution, water contamination, stormwater, air quality, disturbance of contaminated materials/substances, heritage and artefacts.	4	Environmental Management Plan. Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Excavation	Erosion and sediment, dust, noise, stormwater contamination, disturbance of contaminated materials/substances, chemical use and storage, heritage and artefacts.	4	Environmental Management Plan. Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
De-water	Erosion and sediment, dust, noise, stormwater contamination, disturbance of contaminated materials/substances, chemical use and storage.	4	Environmental Management Plan. Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Piling / Sheet piling	Erosion and sediment, dust, noise stormwater contamination, disturbance of contaminated materials/substances, chemicals storage.	5	Environmental Management Plan. Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Waterproofing	Wastewater, wash out contamination, chemical use and storage.	13	Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Concreting	Wastewater, wash out contamination, stormwater, chemical use and storage, fuel storage.	8	Environmental Management Plan. Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Concrete Pumping	Wastewater, wash out contamination, stormwater, chemical use and storage, air quality, waste, fuel storage.	8	Environmental Management Plan. Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Formwork	Dust, noise, chemicals use and storage	18	Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Plumbing	Wastewater, wash out contamination, stormwater, chemical use and storage.	13	Environmental Work Method Statement or Safe Work Method Statement with environmental sections.

Plastering	Wastewater, wash out contamination, stormwater, chemical use and storage.	18	Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Painting	Wastewater, wash out contamination, stormwater, chemical storage.	13	Environmental Management Plan. Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Tower Crane/s	Chemical use and storage, air quality, waste, fuel storage.	18	Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Mobile Crane/s	Chemical use and storage, air quality, waste.	18	Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Personnel & Material Hoist/s	Chemical use and storage, air quality, noise, waste.	22	Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Forklift and other Powered Mobile Plant	Chemical use and storage, air quality, waste, fuel/gas storage, noise.	18	Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Landscaping	Erosion and sediment, wastewater, wash out contamination, stormwater, chemical use and storage, fuel storage.	8	Environmental Management Plan. Environmental Work Method Statement or Safe Work Method Statement with environmental sections.
Fire spray	Wastewater, wash out contamination, stormwater, chemical use and storage, air quality.	13	Environmental Work Method Statement or Safe Work Method Statement with environmental sections.

Appendix 8 – RHE-MPX-PM-MPL-CWD-00011 SK_4-1-24



Appendix 9 – RHE (MNHHS) Construction Noise and Vibration Management Statement

ACONEX DOCUMENT NUMBER – RHE-ALC-AC-RPT-CWD-00001

MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

Redcliffe Hospital Expansion (MNHHS)

Construction Noise and Vibration Management Statement

ACONEX DOCUMENT NUMBER
RHE-ALC-AC-RPT-CWD-00001

BRISBANE
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ABN 98 145 324 714
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Project ID	20230584.1
Document Title	Construction Noise and Vibration Management
Attention To	Multiplex Constructions Qld Pty Ltd

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	27/09/2023	20230584.1/2709A/R0/TS	TS		TS
1	4/12/2023	20230584.1/0412A/R1/TS	TS		TS
2	15/12/2023	20230584.1/1512A/R2/TS	TS		TS

TABLE OF CONTENTS

1 INTRODUCTION

Acoustic Logic have been engaged to provide a project construction noise and vibration management risk statement ("**CNVMP**" or the "**Plan**") that will be used to determine and manage noise and vibration emissions associated with the proposed works at the Redcliffe Hospital Expansion Project (MNHHS). The intent of the management plan is to assist in planning for works, however, further detailed equipment and work method specific noise and vibration management is required to the satisfaction of the project specific limits.

The Plan:

- Identifies sensitive receivers that are likely to be potentially impacted by the proposed works.
- Proposes project specific noise and vibration management levels. These will be used to indicate whether additional impact mitigation, beyond normal "good practice", is indicated. Achieving the final approved levels will be the responsibility of the contractors who must carry out additional site and equipment specific reviews as required.
- Identifies the major typical noise and vibration sources that are expected to be present on the construction site, and additional construction-related traffic generated by the development. Additional site-specific equipment and work procedures may require further review by the contractor to ensure that the limits are adhered to.
- Predicts the likely noise and vibration levels during the phases of construction of the abovementioned typical expected processes and assesses these against the established management levels. Where the predicted impacts exceed the management levels, the Plan identifies and assesses potential measures to minimise these impacts.
- Provides specific and general recommendations for the monitoring, assessment and management of noise and vibration emissions as the works progress in response to additional information and site conditions, and the updating of the Plan to reflect additional information obtained during the main construction period.

Where the term "construction" is used in this Plan, it includes demolition, excavation and any other site activity related to the construction of the development being assessed.

This Plan has been prepared for the sole purpose as stated above and should not be used or relied on for any other purpose.

2 REFERENCED DOCUMENTS AND PROPOSED TRIGGERS

The assessment is based on the following references:

- Redcliffe Hospital Expansion – Concept Design Report, dated 22 November 2022 (ref: 301050178), Section 14 Acoustics
- MNHHS – Construction Vibration Management Statement – Pathology (ref: 20230584.1/1210A/R0/TS, dated 12/10.2023)
- Preliminary baseline noise, air and vibration monitoring mapping.
- Advice provided to us by Multiplex regarding likely activities to be carried out.

2.1 NOISE TRIGGER CONSIDERATIONS

It is specifically noted in the Concept Design Report that Construction Noise shall be managed to meet the relevant requirements outlined by Section 440R of the Queensland Environmental Protection Act 1994. The Act does not specify any noise limits and only states that the construction works must not make audible noise

- On a business day or Saturday, before 6.30am or after 6.30pm; or
- Any other day, at any time.

Multiplex has not requested to assess any works outside of the normal EPA1994 hours and on that basis, the works shall be managed in accordance with the EPA1994 440R.

The Australian Standard AS2436 "Guide to noise control on construction, maintenance and demolition sites" states that where all reasonable and available measures have been taken to reduce construction noise, mitigation strategies may be put in place to reduce levels noise levels to within a reasonable and acceptable level.

For the control and regulation of noise from construction sites the following is noted:

a. That a noise assessment trigger is established.

b. That all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes to locations of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours, and

c. The undertaking of noise monitoring to assist in the management and control of noise emission from the construction site.

The guideline reflects on feasible and reasonable mitigation strategies, management controls to reach realistic comprises between construction sites and potential noise affected receivers.

Based on these the following procedure will be used to assess noise emissions:

- Predict noise levels produced by typical construction activities at the sensitive receivers.
- Adopt additional management conditions as per AS 2436 in the event of exceedances of proposed noise targets.

In reference to other projects, we note:

1. Within existing hospital buildings, noise and vibration impacts are managed with the relevant Stakeholders.

2. Surrounding residential sites:

    a. EPA1994 440R with limits on audible noise outside of normal EPA1994 hours;

    b. In reference to DTMR CoP Vol2, whilst considering site specific RBL, 70dB(A)$L_{eq,adj,15min}$ is referenced as a trigger level during standard hours and RBL+5 during non-standard hours. This level is just established as a trigger level for assessment of activities, given EPA1994 does not set any specific noise targets during normal construction hours.

We note that AS2107 indoor noise limits are also too restrictive for other hospital areas given the short term nature of the construction activities. Such notes are also in the PPR documents. NSW Guidelines are referenced, and we also note that based on our experience with hospitals in NSW, in the assessment of construction noise, it is common to adopt a noise target which is 5dB(A) to 10dB(A) more relaxed than the strict application of AS2107 noise levels for permanent noise.

The existing hospital façade performance is not shown in the schematic design reports and the noise reduction across the façade for various construction activities can't be measured prior to works starting. On that basis, the preliminary external noise trigger level is based on 25dB(A) noise reduction across the façade which shall be determined and adjusted based on site measurements.

This being the case, management noise levels are as follows:

Table 1 – Construction Noise Management Limits for Typical Internal Areas within Existing Hospital Areas (Normal EPA1994 Hours)

Room Use	Proposed Construction NMLi Internally – dB(A)$L_{eq,15min}$	Proposed Interim NMLe Externally – dB(A)$L_{eq,15min}$
Existing Hospital Use		
Consulting Room, Treatment Room	50	75
Open Plan Office	55	80
Private Office	50	75
Hospital Ward Rooms	45	70
Laboratories and work rooms	60	85
ICU	50	75
Others	AS2107+10	NMLi + 25
Surrounding Residential		
Residential	-	65-67[1]

Note 1: considering adj for tonality/impulsiveness of 3-5dB(A).

It is noted that the above values are not ultimate levels and only represent values after which investigations and feasible and reasonable management controls are carried out. Construction noise impacts within the hospital site would be directly managed between the contractor and the hospital management where the

exceedance of the above trigger values are predicted. The intent of the noise management is the identification of activities likely to exceed the noise management levels, and the implementation of feasible and reasonable mitigation strategies to minimise emissions. Strategies include physical and management controls, liaising with the public and stakeholders, monitoring, etc. It is recognised that each site will have a particular set of circumstances to be addressed, and that it is typically not possible to fully mitigate impacts. The review is intended as a pathway to determining a realistic compromise between construction sites and the surrounding receivers.

2.2 VIBRATION TRIGGER CONSIDERATIONS

The Concept Design Report does not provide a full list of construction phase construction vibration triggers, however, the vibration requires consideration for the following:

1. Amenity and operational requirements of the existing hospital (e.g. sensitivity of equipment and amenity)

2. Structural damage risks (existing hospital and residential buildings and infrastructure).

In the absence of specific criteria for various existing hospital equipment VC curve

2.2.1 Amenity Management

Vibration goals for the amenity of nearby land users are those recommended by the NSW EPA document *Assessing Vibration: A technical guideline*. These levels (extracted from Tables 2.2 and 2.4 of the guideline) are presented below for various types of vibration:

Table 2 - Preferred and Maximum Weighted RMS Values for Continuous and Impulsive Vibration Acceleration (m/s2) 1-80Hz

Location	Assessment Period [1]	Preferred values		Maximum Values	
		z-axis	x- and y-axes	z-axis	x- and y-axes
Continuous Vibration					
Critical areas[2]	Day or night-time	0.0050	0.0036	0.010	0.0072
Residences	Daytime	0.010	0.0071	0.02	0.014
	Night-time	0.007	0.005	0.014	0.010
Commercial offices, schools, educational institutions and places of worship	Day or night-time	0.020	0.014	0.040	0.028
Impulsive Vibration					
Critical areas[2]	Day or night-time	0.0050	0.0036	0.010	0.0072
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Commercial offices, schools, educational institutions and places of worship	Day or night-time	0.64	0.46	1.28	0.92

1 Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am.

2 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate task require more stringent criteria than the human comfort criteria specified above. Stipulation of such criteria is outside the scope of this policy, and other guidance documents (e.g. relevant standards) should be referred to. Source: BS6472-1992 or ISO/TS10811-2 and shall be established by the contractor.

Table 3 - Acceptable Vibration Dose Values for Intermittent Vibration (m/s1.75)

Location	Daytime[1]		Night-time[1]	
	Preferred value	Maximum Value	Preferred value	Maximum Value
Critical areas[2]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

1 Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am.
2 Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas. Source: BS6472-1992.

2.2.2 Structure Damage Risk Criteria

2.2.2.1 Generally

German Standard DIN 4150-3 (2016) provides a guideline for acceptable levels of vibration velocity in building foundations, to assess the effects of vibration on structures. The table give guidance on the maximum accepted values of velocity at the foundation and in the plane of the highest floor of various types of buildings, to prevent any structural damage.

The table below lists the peak particle velocity, which is the maximum absolute value of the velocity signals for the three orthogonal components. This is measured as a maximum value of any of the three orthogonal component particle velocities when measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

It is noted that if measured vibration levels are below the guidelines listed below, damage that will reduce the serviceability of the building will not occur and if damage to the building does occur, it is assumed that the damage is related to other activities or sources. Furthermore, the DIN4150-3 guideline states the following regarding the limits presented in Table 1 of the standard:

"Exceeding the guideline values does not necessarily lead to damage. Should they be exceeded, however, further investigations may be necessary, such as determining and evaluating the stresses as detailed in 4.3 and 4.4.".

Table 4 -(Table 1 – DIN 4150-3 (2016)) – Guideline Values for Vibration Velocity, $v_{i,max}$, for Evaluating the Effects of Short-Term Vibration on Structures

	TYPE OF STRUCTURE	Guideline values for $v_{i,max}$ in mm/s				
		Foundation, all directions, i = x, y, z, at a frequency of			Topmost floor, horizontal direction, i = x, y	Floor slabs, vertical direction, i = z
		1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz [a]	All Frequencies	All Frequencies
L/C	1	2	3	4	5	6
1	Buildings used for commercial purposes, industrial buildings, and buildings of similar design	20	20 to 40	40 to 50	40	20
2	Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 **and** are of great intrinsic value (e.g. listed buildings) buildings that are under a preservation order)	3	3 to 8	8 to 10	8	20[b]

NOTE Even if guideline values as in line 1, columns 2 to 5, are complied with, minor damage cannot be excluded.

a At frequencies above 100 Hz, the guideline values for 100 Hz can be applied as minimum values.

b It may be necessary to lower the guideline value markedly to prevent minor damage

2.2.3 Recommended Vibration Limits

The table below presents the recommended structural vibration limit at the nearest vibration sensitive receivers.

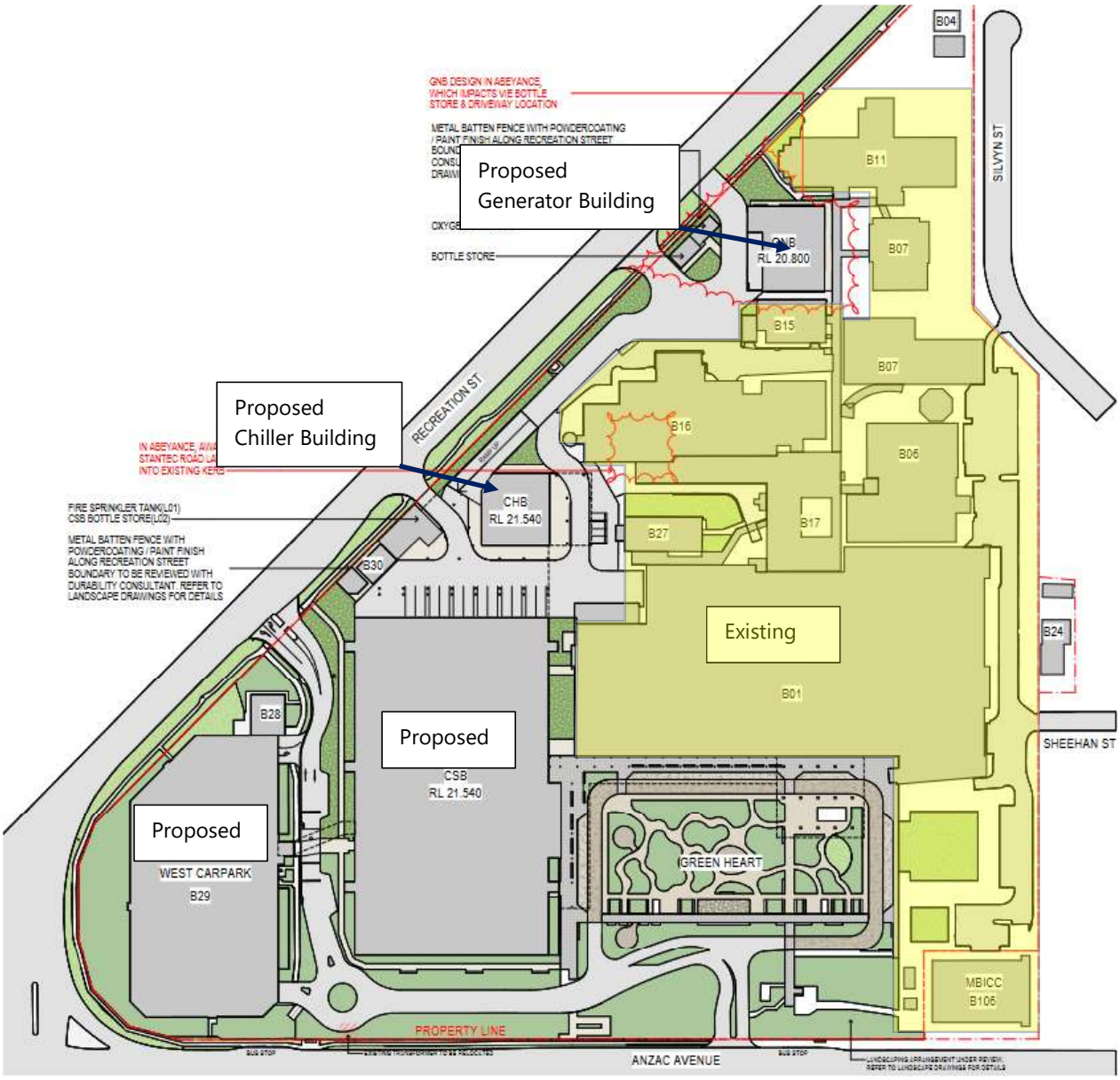
Table 5 – Recommended Vibration Limits

Receiver	Recommended Vibration Limit PPV (mm/s)
Residents Surrounding the Project Site	≤ 5mm/s PPV
Existing Hospital Buildings	≤ 20mm/s PPV
Pathology	Refer to Section 2.2.4

2.2.4 Pathology Specific Notes

Stakeholder meeting with representatives from Pathology have been held on the 4th of October 2023. We were advised that the specific equipment of concern is the dosing/sampling equipment and not the microscopes. No supplier data is available on the vibration sensitivity of the equipment. However, it is expected that these would not have adverse impacts below impacts which may generally be associated with human annoyance in typical instances for short term impacts (1mm/s PPV), given that some of the sampling equipment is located on wheeled trolleys and include storage shelving below, thus being susceptible to occasional impacts which can likely higher than 1mm/s PPV. Long term impacts and impacts on more sensitive equipment require lower levels of RMS velocities, however, given the short duration of works occurring adjacent to Pathology a different management strategy is proposed based on the discussions with the staff.

3 SITE PLAN AND SURROUNDING RECEIVERS



The nearest/potentially most impacted sensitive receivers surrounding the site representative of noise catchments are located across Recreation Street with separation distance of at least 42 metres at the closest point of the proposed buildings.

The following separation distances from the existing buildings within hospital sites are noted

Table 6 – Preliminary Identification of Receivers within Hospital

Closest Receiver	Source	Approximate Separation Distance (m)
Paediatric Block (B11)	GNB	6
	CHB	140
	CSB	175

Closest Receiver	Source	Approximate Separation Distance (m)
Skills Centre and Antenatal Clinic (B07 North)	GNB	16
	CHB	130
	CSB	160
Palliative Care Unit (B07 South)	GNB	12
	CHB	109
	CSB	162
Clinical Measurements (B15)	GNB	4
	CHB	87
	CSB	121
Education Centre and Kitchen (B16)	GNB	30
	CHB	13
	CSB	56
Offices Café (B17)	GNB	58
	CHB	32
	CSB	57
Pathology (B27)	GNB	82
	CHB	26
	CSB	36
Main Building (B01) - General Areas - MRI/CT - Emergency	GNB	97
	CHB	35
	CSB	10

The remaining receivers within the hospital site are further away from the main construction activities.

4 SUMMARISED AMBIENT NOISE SUMMARY

Redcliffe Hospital Expansion – Concept Design Report, dated 22 November 2022 (ref: 301050178), Section 14 Acoustics provides noise measurement values which are summarized below.

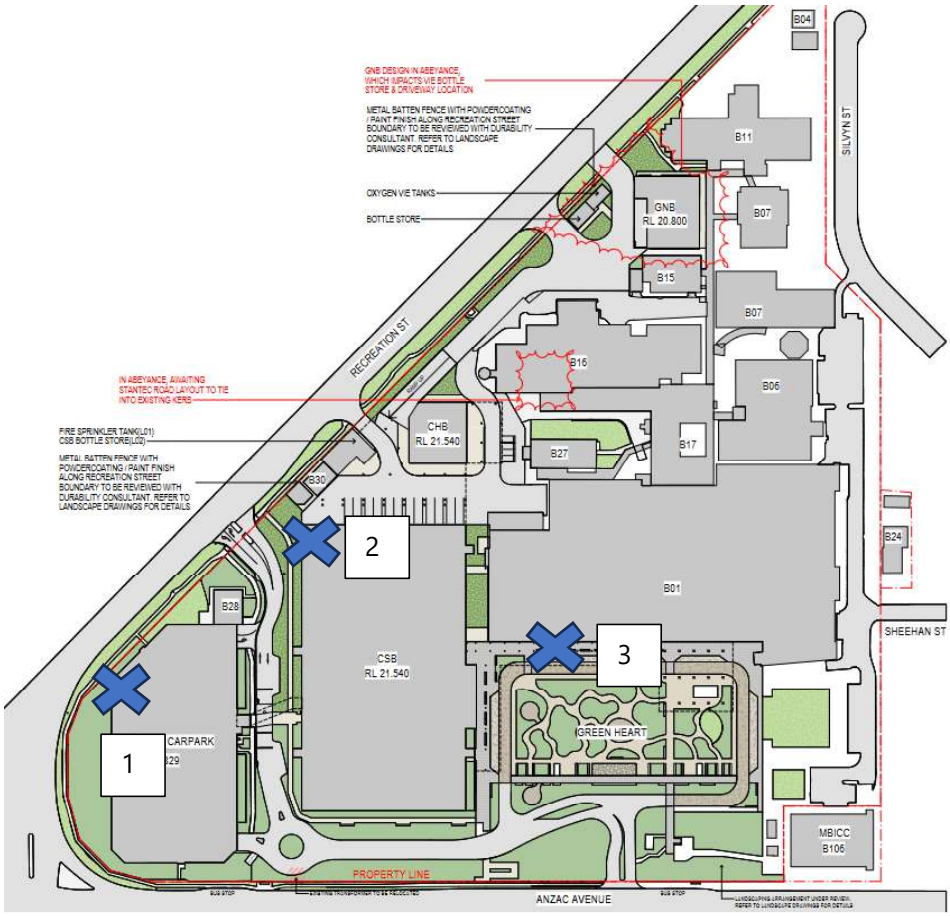


Table 7 – Background Noise Level Summary

Location	Time of day	Background Noise Level dB(A)$_{L90(Period)}$	dB(A) $L_{eq,(period)}$	dB(A) $L_{10,(period)}$
1	Day (7am – 6pm)	53	63	67
	Evening (6pm – 10pm)	48	59	63
	Night (10pm – 7am)	46	55	57
2	Day (7am – 6pm)	46	53	56
	Evening (6pm – 10pm)	42	49	52
	Night (10pm – 7am)	39	47	49
3	Day (7am – 6pm)	51	55	57
	Evening (6pm – 10pm)	49	52	54
	Night (10pm – 7am)	47	51	53

5 DETERMINING CONSTRUCTION NOISE LEVELS

This Section presents evaluation of potential noise emissions from the potential noise emissions from the construction works.

The aim of this study is to undertake an analysis of noise impact arising from site activities.

The activities will be carefully managed, and appropriate noise mitigate measures will be strictly implemented where required. The formulation of noise management plans for the various activities will arise from the assessment carried out in this report and the strict enforcement of all determined control measures.

The level of noise generated by a construction site is largely dependent on the activities, which are in progress. It cannot be categorically stated that all construction sites emit the same level of noise no matter what stage or part of the construction programme they are at.

The generalisation, that all construction work is noisy is fallacious. The levels of noise generated are dependent on the activities occurring. In addition, it is possible to undertake construction work in a controlled manner so that noise is minimised. This requires the formulation of noise control strategies, and stringent supervision.

5.1 SITE DESCRIPTION AND POTENTIALLY AFFECTED RESIDENTIAL LOCATIONS

Refer to Section 4.

5.2 DETERMINATION OF EXPECTED CONSTRUCTION ACTIVITY NOISE IMPACT

5.2.1 Project Phases

It is noted that the impacts vary during the construction period due to sequencing of works (e.g. changing of building height) as well as different processes used. As such, the noise impacts generated have been considered for various stages of the project works (noting that internal works occur at all levels which are enclosed), namely:

Phase 1

Demolition, Excavation, Piling

Phase 2

Ground Slab + construction of basements and ground level slabs, and general structure

Phase 3

Completion of construction of buildings, fitout works and completion of landscape work

5.2.2 Proposed Construction Hours

Construction of the works is proposed to occur during EPA 1994 “standard” work hours, these being

- On a business day or Saturday, from 6.30am to 6.30pm

Works on any other day (incl. public holidays) and times have not been proposed.

5.2.3 General Considerations for Calculations

All construction noise sources are assumed to be located at a typical expected point on the construction site. In this way the expected typical noise level situations are determined.

The calculations determine the A-Weighted noise levels, from typical loudest activity. Depending on work practises, equipment etc, the noise levels estimated to likely occur at the affected premises could differ. Refer to this report regarding management and activities should an exceedance at the affected premises occur.

5.2.4 Sound Power Levels

Noise impact will be determined from all major processes and major noise emitting equipment, which are involved in the activities outlined below by defining the levels of sound, which they generate. It is noted that other processes/equipment which are associated with the given construction activity are generally emitting lower noise levels and therefore, if the provided processes in table do not cause adverse impact on amenity, the other processes are not expected to do so either.

The A-weighted sound power levels for all the component parts of the above-described activities are outlined in the tables below.

5.2.4.1 Phase 1 - Demolition, Excavation, Piling

The main noise/vibration producing plant items likely to be used in this phase are summarised in the following table.

Table 8 – Primary Phase 1 Noise Sources

Phase/Activity	Plant	Sound Power Level dB(A)
Services strip out	Electric Hand Tools	104
	Bobcat	105
	Truck	105
Structure Demolition	20t Excavator mounted hydraulic hammer	122
	Excavator with bucket loading truck	107
	Truck@ 20 km/hr	110
	Truck Idling	105
	Pneumatic Jack Hammer	113
	Electric Hand Tools	104
Piling	Piling Rig (Auger). No impact or vibratory, impact sheet piling considered	112
	Excavator loading truck	107
	Pneumatic Jack Hammer	113
	Truck@ 20 km/hr	110
	Truck	105

Phase/Activity	Plant	Sound Power Level dB(A)
Excavation	Excavator	107
	20t Excavator mounted hydraulic hammer	122
	Rock Saw	118
	Truck@ 20 km/hr	110
	Truck Idling	105
	Hand tools	104
	Dewater pump (Truck water cart)	107

5.2.4.2 Phase 2 and Phase 3 – Construction

Table 9 – Primary Phase 2 and Phase 3 Noise Sources

Phase/Activity	Plant	Sound Power Level dB(A)
Construction	Hand Tools	104
	Truck	105
	Elevated work platforms	97
	Forklifts/Materials handling	85
	Concrete Pump	109
	Concrete Truck	109
	Concrete Vibrator	113
	Tower Crane (Electric)	105
	Hoist	100

5.2.5 Site Plans

Site coverage is indicated in Section 4.

5.2.6 Predicted Baseline Noise Impacts Without Any Engineering Controls

Noise from the construction activity have been predicted to the nearest most affected sensitive residential receivers based on the sound power levels expected from typical activities as indicated in Tables above.

It is noted that the impacts vary during each period due to sequencing of works as well as different processes used. Construction noise emissions to nearby development/existing hospital building depend on the activities being undertaken at the time, and where on the site the activities occur.

Construction noise levels at the surrounding receivers have been predicted based on the following inputs.

- The plant sound power levels indicated in APPENDIX A. These have been corrected for estimated typical operation duty indicated in the table using 10 x log(% duty/100).

- Corrections for source to receiver distance attenuation including air absorption (20ºC , 70% RH, neutral wind conditions).
- Predictions assume there are no barriers (hoardings or natural).
- Source heights – 1.5m above the ground/building level of the noise source location, unless noted otherwise.

5.2.7 Predicted Noise Impacts

The predicted noise levels for each phase are summarised in the following tables below.

Table 10 – Predicted Noise Impacts – Demolition, Excavation and Piling

Location/Receiver	Highest Predicted Level dB(A) L_{eq} (From Building Construction)[1]	NMLe Externally – dB(A)$L_{eq,15min}$	Requires Assessment of Additional Management
Residential	54-80	67	Yes
Paediatric Block (B11)	71-97 (GNB) 44-70 (CHB) 42-68 (CSB)	75	Yes No No
Skills Centre and Antenatal Clinic (B07 North)	62-88 (GNB) 44-70 (CHB) 42-68 (CSB)	75-85	Yes No No
Palliative Care Unit (B07 South)	65-91 (GNB) 44-70 (CHB) 42-68 (CSB)	70	Yes No No
Clinical Measurements (B15)	74-100 (GNB) 48-74 (CHB) 44-70 (CSB)	85	Yes No No
Education Centre and Kitchen (B16)	57-83 (GNB) 64-90 (CHB) 57-83 (CSB)	80	Yes Yes Yes
Offices Café (B17)	51-77 (GNB) 56-82 (CHB) 51-77 (CSB)	80	No Yes No
Main Building (B01)	47-73 (GNB) 56-82 (CHB) 67-93 (CSB)	70-85	Yes Yes Yes

* Assessed at 1.5m above ground level.
Note 1: assuming that all of the listed activities are carried out at all sites, GNB, CHB and CSB

The predictions indicate that the NML's at the most impacted residence as well as internal hospital receivers will be exceeded. We note that the impacts present the impacts from closest point of the construction site and not the average across the site which provides additional distance reductions and respite periods.

Table 11 – Predicted Noise Impacts – Construction Phase

Location/Receiver	Highest Predicted Level dB(A) L_{eq} (From Building)	NMLe Externally – dB(A)$L_{eq,15min}$	Requires Assessment of Additional Management
Residential	43-72	67	Yes
Paediatric Block (B11)	62-89 (GNB) 35-62 (CHB) 33-60 (CSB)	75	Yes No No
Skills Centre and Antenatal Clinic (B07 North)	53-80 (GNB) 35-62 (CHB) 33-60 (CSB)	75-85	No No No
Palliative Care Unit (B07 South)	56-83 (GNB) 35-62 (CHB) 33-60 (CSB)	70	Yes No No
Clinical Measurements (B15)	65-92 (GNB) 39-66 (CHB) 35-62 (CSB)	85	Yes No No
Education Centre and Kitchen (B16)	48-75 (GNB) 55-82 (CHB) 48-75 (CSB)	80	No Yes No
Offices Café (B17)	42-69 (GNB) 47-74 (CHB) 42-69 (CSB)	80	No No No
Main Building (B01)	48-65 (GNB) 47-74 (CHB) 58-85 (CSB)	70-85	No No No

* Assessed at 1.5m above ground level.

We note that the impacts present the impacts from closest point of the construction site and not the average across the site which provides additional distance reductions and respite periods. In case of Phase 2 and Phase 3 Construction phases, the impacts will be further reduced by the building shell which is being constructed.

During Phase 2 and Phase 3 construction, the higher impacts noted are mainly associated with the concrete trucks, concrete pumps and concrete vibrator, whereas during excavation and demolition phases the highest impacts are predicted during hydraulic hammering, piling and excavator operation.

6 CONSTRUCTION VIBRATION

6.1 VIBRATION SOURCES

The following sources in general have been identified as potentially producing significant ground vibration:

- Vibratory rollers
- Vibratory plate compactor
- Bore piling (in rock). Note, currently impact, vibratory sheet piling, impact piling are not proposed and therefore, these activities have not been addressed.
- Ripping (excavator with claw) and excavator movements
- Pneumatic jack hammer
- Hydraulic hammer (rock)

The remaining activities are not expected to produce significant ground vibration and/or are lower from the above sources. Vibration from these other activities are expected to be significantly below damage risk management levels at all receivers.

6.2 ASSESSMENT OF VIBRATION

A precise assessment of vibration emissions from the proposed works is not possible due to the large number of unknowns including the actual equipment employed, how it is operated, site conditions, location on the site, sensitive uses within buildings, etc. Such analysis must be carried out by the contractor to ensure that the limits are not exceeded and impacts are managed.

In the absence of any specific equipment the generic minimum safe working distances are presented in the following table for the purposes of cosmetic damage and human response. These should be used with caution for guidance and be further addressed by structural engineer, dilap.report etc to ensure no project limit is exceeded.

Vibration levels from machinery and processes should be verified on site prior to each stage of works as soil conditions may be different from the basis sources, particularly in respect of the hospital as this is the receiver most likely to be impacted by vibration. The site testing would verify the safe working distances and inform any management measures that may be required to mitigate any adverse impacts.

Table 12 – Recommended Base Minimum Working Distances for Vibration Intensive Plant from Sensitive Receivers

Plant item	Rating / Description	Minimum Working Distance			
		Cosmetic Damage			Human Response
		Light-Framed Structure (BS 7385)	Residential Structures (DIN 4150)	Heritage and Other Sensitive Structures (DIN 4150)	NSW EPA's Vibration Guideline
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	5 m	18.5	14 m	15m
	< 100 kN (Typically 2-4 tonnes)	6 m	17.8	16 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	43	33 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	51.5	41 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	-	54 m	100 m
	> 300 kN (> 18 tonnes)	25 m	-	68 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	-	5 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	-	19 m	23 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 m	-	60 m	73 m
Vibratory Pile Driver	Sheet piles	20 m	-	50 m	100 m
Pile Boring	≤ 800 mm	2 m (nominal)	-	5 m	7 m
Jackhammer	Hand held	1 m (nominal)	-	2 m	3 m
Profiler	Wirtgen W210	4 m	-	-	-
Asphalt Paver	Vogele Super 1800-3	1 m	-	-	-
Steel Drum Roller	Hamm HD70 (Oscillating Mode)	2 m	-	-	-
Steel Drum Roller	Hamm HD70 (Static Mode)	1 m	-	-	-

Based on the distances of the major works on GNB, CHB and CSB identified in Section 3m the highest risks for cosmetic damage occur:

- GNB impacts to Paediatric Block B11 and Skills Centre (B07 North), Palliative Care (B07 South), Clinical Measurements (B15) and Education Centre (B16).
- CHB impacts to Education Centre (B16)
- CSB impacts to Main building (B01)

On the above basis, we recommend contractors to observe these preliminary working distances and select processes on that basis:

1. Firstly, avoid exceeding cosmetic damage risk distances (note: vibration monitoring shall be carried out to measure site specific impacts also);
2. Secondly, observe human response limits and the associated distances for typical vibration intense activities. Note: some sensitive equipment can be more sensitive to vibration levels and must therefore include a management plan (monitoring, respite periods discussed with hospital etc). Pathology impacts have been addressed in detail with the operators, however, other sensitive equipment are present such as MRI etc.

7 COMMUNITY AND EXISTING HOSPITAL ENGAGEMENT

In order for any construction noise and vibration management programme to work effectively, communication is required between all parties which may be potentially impacted upon, the builder and the regulatory authority. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

In accordance to general requirements, the following minimum procedures are required:

- Erect a signage in accordance to Permit.
- Provide written notification of the commencement of any building work carried out outside the typical EPA1994 hours, not less than 48 hours prior to the commencement
- Deal with complaints as per management plan.

In addition to that, where relevant, the builder may likely need to carry out a community consultation to:

- Inform and educate the groups about the project and the noise controls being implemented.
- Increase understanding of all acoustic issues related to the project and options available; and advise on the long term benefits of the extended work hours.
- Identify group concerns generated by the project, so that they can be addressed; and
- Ensure that concerned individuals or groups are aware of and have access to a Constructions Complaints Register which will be used to address any construction noise related problems should they arise.

The following strategies are initially recommended to manage impacts with the local community which have been incorporated into this sub-plan:

- Works identified as noisy will have additional time restriction to provide respite. Such respite periods will be investigated as required but typically for most noise intense works, the following is applied:

  (a) 9am to 12pm, Monday to Friday;

  (b) 2pm to 5pm Monday to Friday; and

  (c) 9am to 1pm, Saturday.

- Barriers will be erected to screen the works from the most impacted receivers to the east of the Hospital and other receivers around the site.

- Monitoring of noise based on complaints lodged, and monitoring of vibration at the most impacted buildings during most intense works as indicated in vibration assessment review.

- Regular and ongoing community engagement including a 24 hour contact number to the site. The purpose of this engagement is to:

  - *inform the local community of the works progress*
  - *to provide the community a chance to feedback on any non-urgent issues and to highlight to the construction team any potential issues so that they can be addressed in advance*
  - *to provide a direct contact to the site to provide the team with more urgent feedback or community feedback outside the regular meetings.*

Ongoing community engagement is proposed. The following additional engagement is proposed to be undertaken by Multiplex to address the consent conditions relating to community engagement:

- The project team has procedures in place to advise the community of all construction activities where there will be extended periods of time with high levels of noise. Regular project newsletters, emails and notifications in the local newspaper will occur throughout the construction of the new hospital. In addition, local residents will be notified of any out of hours works.

- A dedicated project email address and 1800 (or alternative) number to provide the community 24/7 access to communication channels.

Lastly, communication with existing hospital is critical in successfully managing the noise and vibration impacts and provide respite periods and additional controls as required and possible. In addition to the general complaint managements from the existing hospital, it is critical to ensure that various vibration sensitive equipment and devices (e.g. CT, MRI, microscopes) can operate. Additional vibration monitoring may be required on the floor of the sensitive equipment, unless the vibration intense activities are scheduled with the hospital.

8 NOISE AND VIBRATION MANAGEMENT AND CONTROL

Project specific mitigation should be implemented to manage noise and vibration impacts. These measures should be revised as the works proceed in response to changing or latent conditions and to incorporate the results of additional analysis, monitoring or modified work practices implemented to minimise impacts.

Management includes:

- Identification of sensitive receivers and applicable noise and vibration management levels
- A description of the main noise or vibration producing activities, processes and equipment that will be employed and an indicative construction programme.
- Proposed construction hours.
- A prediction of likely noise/vibration levels at the most impacted receivers.
- The assessment and recommendation of mitigation methods to be applied where the predicted levels exceed the management levels, as indicated below.
- A monitoring plan including the type and extent of monitoring, reporting procedures.
- Recommended management procedures including complaints handling, response to monitoring exceedances, reporting, site training, etc.
- Community engagement/liaison.

The flow chart that follows illustrates the process followed to assess construction activities prior to the start of work on site, and for the ongoing investigation of noise, dust and vibration impacts during the construction period.

8.1 GENERAL NOISE CONTROL METHODS AND MANAGEMENT

The determination of appropriate additional noise control measures will be dependent on the particular activities and the construction equipment and plant identified as requiring future acoustic treatments to those already identified in this report. This section provides an outline of available methods which have previously been used on similar construction sites and may be possible on this site.

8.1.1 Selection of Alternate Appliance or Process

Where a particular activity or plant and equipment is found to generate noise levels that exceed the management levels, it may be possible to select an alternative approach or plant and equipment. For example; the use of excavator mounted hydraulic hammers of the site may potentially generate high levels of noise. By carrying this activity by using concrete saws or smaller plant here practical, construction noise levels and/or length of exposure to construction noise levels may be reduced.

8.1.2 Acoustic Barriers

The placement of barriers at the source is generally only effective for static plant. Placing barriers at the source cannot effectively attenuate equipment which is on the move or working in rough or undulating terrain.

The degree of noise reduction provided by barriers is dependent on the amount by which the line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15 dB(A) can be effected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8 dB(A) may be achieved. Where the barrier does not obstruct line of sight, generally no noise reduction will occur.

Barriers are used to provide shielding and do not act as an enclosure. The material they are constructed from should have a noise reduction performance which is approximately 10dB(A) greater than the maximum reduction provided by the barrier screening. In this case, the use of a material such as 15mm plywood (or equivalent material) would be acceptable for the barriers.

8.1.3 Silencing Devices

Where construction methodologies or plant and equipment permit, investigate the use of silencing devices. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts, for example.

8.1.4 Treatment of Specific Equipment

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted.

8.1.5 Establishment of Site Practices

This involves the formulation of work practices to reduce noise generation. This includes, for example, investigating the possibility of locating fixed plant items as far as possible from residents, rotating plant and activities to provide respite to receivers, scheduling activities after the construction of buildings that will screen receivers, avoiding noise sensitive periods for receivers, identify "safe" working distances, etc.

This involves also the education of site personnel regarding work practices and general behaviours in and around site to reduce noise generation.

All construction staff on site, as part of the site induction process, will be informed of the surrounding sensitive receivers on site and the site specific recommendations to reduce noise impacts to these receivers (late starts, respite period, vehicle noise control etc. – refer to sections in this report).

Any complaints received by construction staff must be immediately reported to the site foreman or the relevant person assigned to deal with complaints, followed by completion of incident report form and steps detailed in this report.

8.2 VIBRATION MANAGEMENT

The following principles should be considered to manage adverse vibration impacts identified:

- Obtaining separate structural or specialist advice for critical or fragile structures as to the level of damage risk.
- Selection of processes that minimise structure and ground vibration – generally avoiding percussive methods.
- Use smallest plant that is able to efficiently undertake the work activity.
- Lay vibration absorbing mats to cushion impacts from falling debris, if possible.
- Application of vibration dampening pads to metal surfaces subject to impacts.
- When demolishing, cut control joints in structures to form vibration "breaks", or work away from sensitive receiver locations to form natural vibration breaks in propagation path.
- Monitoring of structures using attended and/or unattended monitors with alarms.
- Time scheduling works to minimise amenity impacts.

- Communicating with affected receivers.

- Identify "safe" working distances to sensitive receivers/structures for various activities by conducting site simulation tests, and limiting activities within those distances to those that are not likely to exceed vibration goals. Vary locations/equipment/techniques used as determined by the simulation testing. The preliminary review in Section 6 provides an initial guide to working distances that should be confirmed by site measurement.

8.2.1 Specific Pathology Notes

Acoustic Logic attended at a meeting with Multiplex and Pathology centre employees on the 4th of October 2023 and was advised that the specific equipment of concern is the dosing/sampling equipment and not the microscopes. No supplier data is available on the vibration sensitivity of the equipment. However, it is expected that these would not have adverse impacts below impacts which may generally be associated with human annoyance in typical instances for short term impacts (1mm/s PPV), given that some of the sampling equipment is located on wheeled trolleys and include storage shelving below, thus being susceptible to occasional impacts which can likely higher than 1mm/s PPV. Long term impacts and impacts on more sensitive equipment require lower levels of RMS velocities, however, given the short duration of works occurring adjacent to Pathology a different management strategy is proposed based on the discussions with the staff.

Review of Vibration risks and Management of Vibration Impacts

Vibration impacts onto the Pathology depend largely on activities, ground/earth conditions as well as the building response to the vibration levels. Based on the proposed main works in the vicinity, the following impacts at the building façade are anticipated (to be confirmed with site measurements):

1. Bored piling (no impact, no impact sheet or vibratory piling): 0.8-1mm/s PPV. These lead to low risk for vibration level exceedances.
2. Excavator: at least 2mm/s. Excavator usage will lead to medium to high risk of vibration levels exceeding initial trigger level, however, no structural damage level exceedance is predicted. Increased sample QA is required at such times.
3. Vibrating plates/Roller at CHB: the impacts depend on the size. Based on typical units, the rollers can't exceed 1-2tonne (must remain less than 50kN) and even then, the risks of exceeding limits remain very high. We suggest communicating with Pathology staff regarding times of vibratory plates and rollers and increase the manual QA of the samples at the time of such activities. Other strategies may be required for such activities should the impacts influence the samples. In reference to BS7385, the cosmetic damage limit is within 5metres for light framed structures and NSW EPA Vibration Guideline sets 15m separation for human response limit. On that basis, we anticipate adverse impacts from vibration plates/rollers and recommend vibration monitoring as well as considering other methods when possible.
4. Compactors/vibrating plates/rollers adjacent to building should be avoided or be carried out with smallest hand driven 60kg plate compactors as the close proximity leads to substantial exceedances of the proposed limits as well as leading to risks of structural vibration limit exceedances. Increased sample QA is required at such times.
5. Excavator usage is predicted to lead to around 2mm/s PPV response at the Pathology façade when used at the new Chiller building site. Excavator is not allowed to be used adjacent to the building and any stripping of surface must be carried out by small bobcats. Increased sample QA is required at such times.
6. Hydraulic hammering is proposed at min 10metres from the Pathology building. Exceedance of structural and proposed limit for equipment is predicted. With small hydraulic hammering, 2mm/s PPV is expected whereas the larger hammers can lead to 18-22mm/s or higher at worst cases. On

that basis, we anticipate adverse impacts from hammering and recommend vibration monitoring as well as considering other methods when possible. Increased sample QA is required at such times.

7. Demolition works with jackhammers or using concrete saw within 10metres is not predicted to lead to exceedances of the initial trigger level of 1mm/s. Jackhammers would unlikely require sample QA increases.

Management, Monitoring and Sample QA

Due to the unavoidable works and also the requirement to operate the pathology for 24/7, we recommend the following initial management strategies in addition to the alternative methods for vibration generating activities where possible. The management and engineering controls shall be reviewed subject to measured values and QA feedback from Pathology staff.

1. Respite periods provided by construction personnel in consultation with Pathology staff as far as feasible and practical.
2. Vibration monitoring to be carried out on the floor of the pathology laboratory;
3. Increased manual sample QA by staff during vibration intense works as agreed with pathology representatives which can be reduced subject to the measured vibration levels during the works;
4. Vibration monitor to include a warning (SMS) for initial 1mm/s PPV exceedances which can be increased to higher values or lower values, subject to the Pathology staff QA feedback on samples.
5. Sample QA requirements outside of construction hours can be reduced to normal QA procedures as no impacts occur from construction site outside of construction hours.
6. Multiplex site contact and phone number to be provided to Pathology supervisor for continuous communication and availability.
7. Baseline measurements to commence on 23rd of October 2023 for 4 weeks (2 weeks baseline, 2 weeks for demountable works). Pathology staff to provide a suitable location for monitoring with access to GPO to allow the monitor continuous power supply (batteries last for 2 weeks) unless Multiplex will change batteries as requested by Acoustic Logic. Ongoing monitoring post initial 4 week period will be determined based on the feedback received from Pathology staff and the measured vibration limits.
8. The monitoring and QA outcomes may lead to additional management solutions by MPX, including the changes in work methods and halt some activities during delicate operations and sampling.

8.3 NOISE AND VIBRATION MONITORING, REPORTING AND RESPONSE PROCEDURES

Noise and vibration monitoring may either consist of manned and/or unmanned measurements. Active monitoring may be undertaken during the construction work phase of the project if required in the event complaints are received from neighbours. Vibration monitoring during the Phase 1 works would be important due to the proximity to buildings and possible sensitive equipment within existing hospital. Phase 2 and Phase 3 impacts have lower vibration risks and would typically be only addressed where vibration intense activities are being carried out.

In the event that complaints are received from neighbours the following process should be considered:

1. Assessing impacts and determining the offending plant/equipment/process and.
2. Locating the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implementing additional acoustic treatment in the form of localised barriers, silencers etc.
4. Selecting alternative equipment/processes

Where monitoring is required and indicates exceedances of the predicted noise impacts immediate action should be taken to identify any further controls as required to reduce noise emissions so that the noise limits are complied with. Monitoring of the activities following the implementation of these additional controls will be undertaken to confirm compliance.

Refer below for site specific recommendations for this project.

8.3.1 Reporting Requirements

The following is an example of reporting which may be kept on site:

1. A register of complaints received/communication with the local community shall be maintained and kept on site with information as detailed below.
2. Where noise/vibration complaints require noise/vibration monitoring, results from monitoring shall be retained on site at all times.
3. Any noise exceedances occurring including, the actions taken and results of follow up monitoring.
4. A report detailing complaints received and actions taken shall be presented.
5. All monitoring and reporting shall be conducted in conjunction with the conditions of consent.

8.3.2 Response Procedures

Complaints associated with noise and vibration generated by site activities shall be recorded on a Noise Complaint Form. The person(s) responsible for complaint handling and contact details for receiving of complaints shall be established on site prior to construction works commencing. A sign shall be displayed at the site indicating the Site Manager and the general public and their contact telephone number.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form may list:

- The name and address of the complainant (if provided).
- The time and date the complaint was received.
- The nature of the complaint and the time and date the noise was heard.
- The name of the employee who received the complaint.
- Actions taken to investigate the complaint, and a summary of the results of the investigation.
- Indicate what operations were occurring on site at the time of the complaint.
- Required remedial action, if required
- Validation of the remedial action.
- Summary of feedback to the complainant.

8.3.3 Notification

Notification of affected receivers of the progress of works, particularly when short-term activities likely to create higher noise levels occur, can in many cases minimise community reaction.

8.3.4 Monitoring Sites

Refer to Section 8.5.2.

8.4 COMMUNITY ENGAGEMENT

Community engagement is an important aspect of construction noise and vibration management to:

- Identify stakeholders, sensitive receivers and their particular concerns.
- Assist in co-ordinating construction activities to address concerns and avoid sensitive periods (during school exams, for example).

- Provide ongoing information to the community about the progress of works, timing of "noisy" works, etc so that feedback can be obtained. In many cases, community concerns can be minimised by providing advance knowledge of construction activities and the period over which those activities will occur.

- Obtaining feedback and suggestions from the community.

The following measures are recommended:

- Have procedures in place to advise the community of all construction activities where there will be extended periods of time with high levels of noise.

- Provide regular project newsletters, emails and notifications in the local newspaper throughout the construction of the new hospital in addition to notifying local residents of any out of hours works.

- Establish a dedicated project email address and 1800 number to provide the community 24/7 access to the team.

- Engagement with Hospital management, given that it is unlikely that noise emissions can be fully ameliorated by minimising noise emissions by adopting the recommended noise management and control methods mentioned above, and to determine locations to be monitored during construction for noise and/or vibration.

8.5 SUMMARY OF SITE-SPECIFIC MITIGATION

In addition to the general strategies nominated above, and the additional time management of activities required by the consent, the project specific mitigation and management recommended to be adopted are summarised below.

8.5.1 Physical Controls

To mitigate noise emissions to surrounding residences and ground level pedestrian circulation areas, hoarding is recommended to be installed

8.5.2 Recommended Monitoring

Preliminary recommended long-term monitoring locations are outlined below for Phase 1 with Phase 2 and Phase 3 monitoring requirements determined later, and are subject to preliminary measurements, complaints and staging. Additional monitoring may be required in response to complaints, location of sensitive areas within the hospital (e.g., operating theatres, MRI scanning rooms, etc.), site conditions, etc. Noise monitoring is proposed based on complaints and will be determined at a later stage. The map is include din Appendix B.

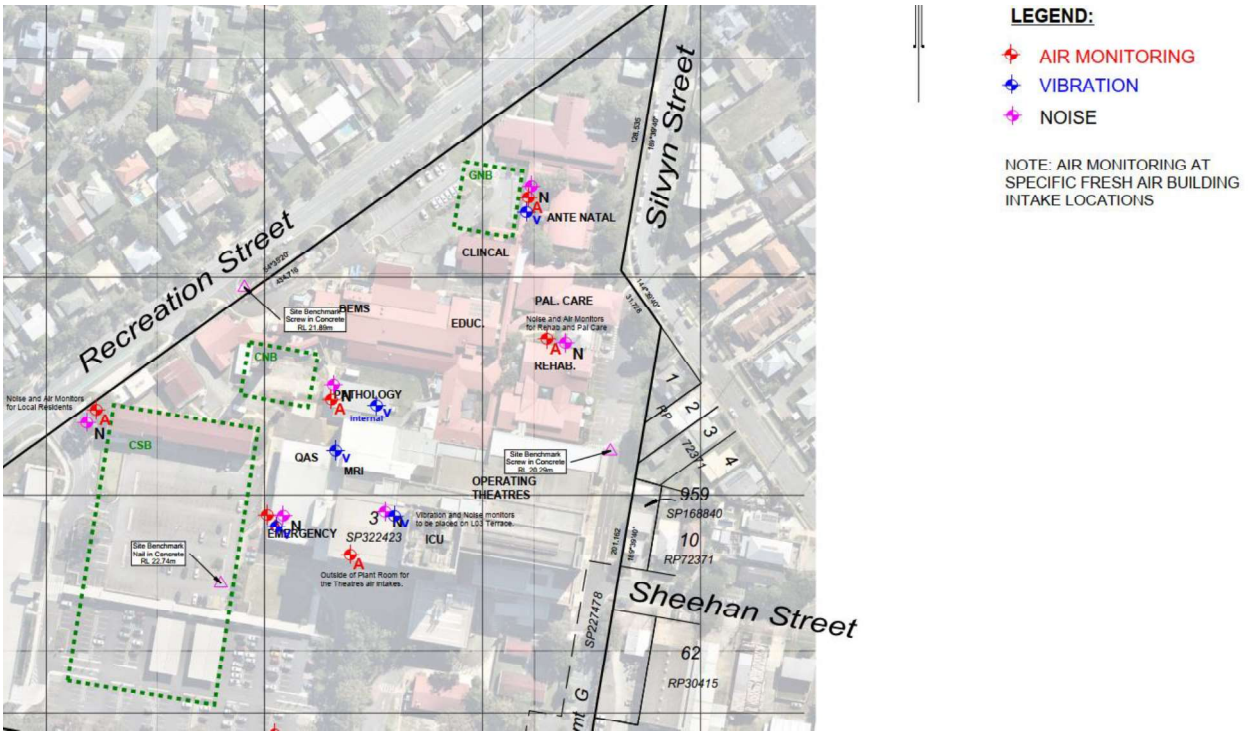


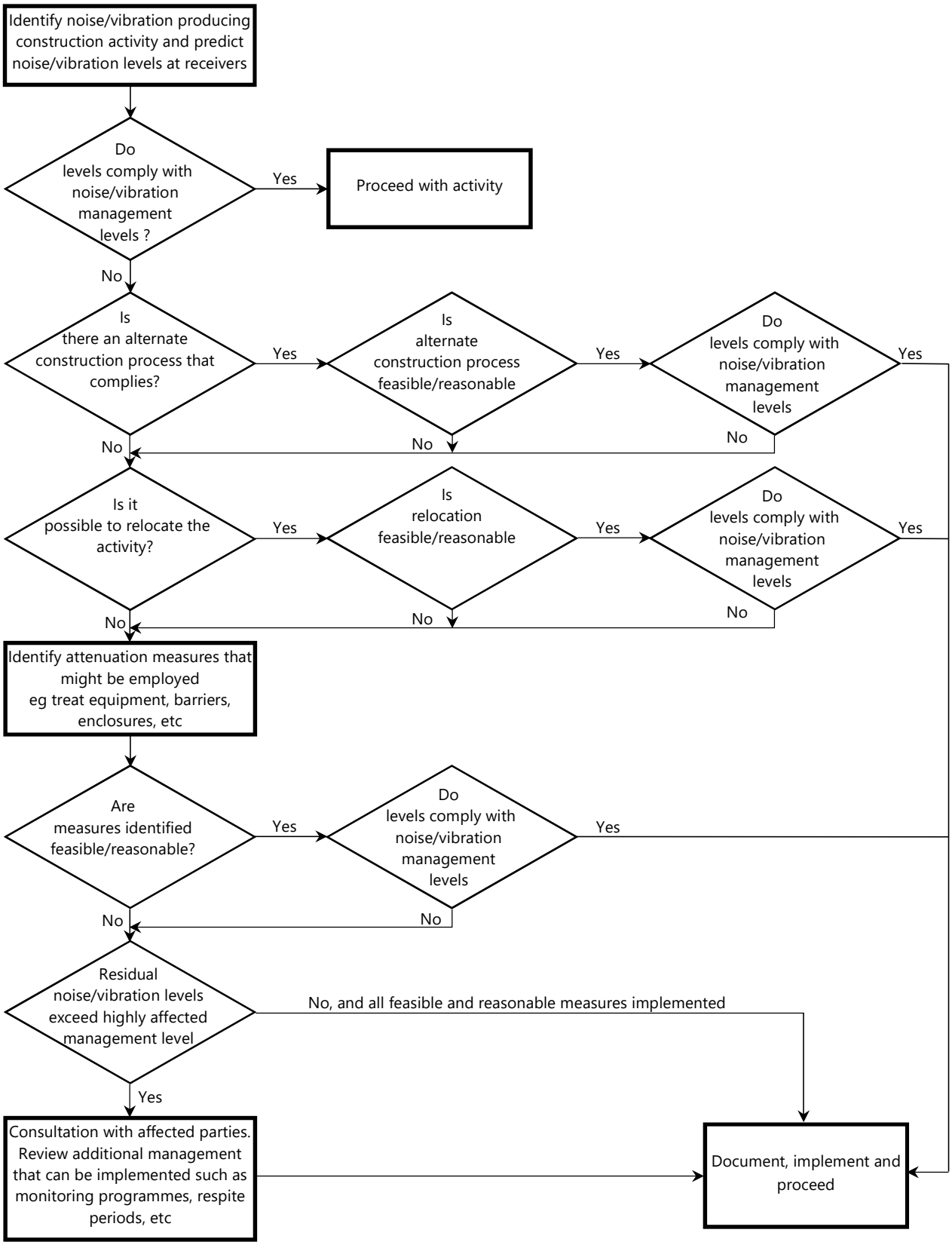
Figure 1 – Recommended Vibration Monitoring Locations (Preliminary)

8.5.3 Ongoing Assessment and Advice

Ongoing assessment and advice is recommended in response to:

- Changes in work methods and equipment in response to site conditions, staging of works.
- Response to complaints.
- Additional site investigations including vibration safe work distance confirmations, mitigation treatment investigations, etc.

These investigations may result in changes to the plan which should be implemented as additional site information becomes available.



Noise and Vibration Management Flow Chart

9 CONCLUSION

This report assesses potential noise and vibration impacts from the construction of the proposed development at the Redcliffe Hospital Expansion Project (MNHHS). The outcomes of the assessment have been used to prepare a management plan that should be adopted and refined as works proceed to minimise impacts to the extent that it is feasible and reasonable.

The assessment indicates that:

- There will be receivers around the site (as identified in the assessment) that will be exposed to noise levels exceeding investigation initial trigger levels and mitigation of these impacts has been recommended in the Plan. The trigger levels have been set to use as a level after which investigation of feasible and reasonable noise controls are required. It is noted, however, that the project PPR Acoustic Schematic Design report has not set any absolute noise limits other than EPA1994 440R which does not allow any audible noise on a business day or Saturday before 6.30 am or after 6.30pm; or on any other day at any time.

- There will be receivers around the site that will be exposed to vibration levels exceeding the relevant vibration management levels for amenity and possible for limits set for sensitive equipment within existing hospital, and on that basis, mitigation of these impacts together with vibration monitoring have been recommended. Vibration limits for damage risk have also been set and the impacts are dependant on specific site conditions and equipment, etc. Dilap.report of surrounding structures and services are required together with specific equipment assessment by conctractors.

It is concluded that with the implementation of the mitigation and ongoing assessment recommended in this report, construction noise and vibration emissions from the proposed development will be managed.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Pty Ltd
Tarmo Saar
Principal Engineer
MSc Eng (Acoustics), MSc Eng (Mech), BSc Eng (Mech)

APPENDIX A CONSTRUCTION PLANT NOISE EMISSION LEVELS

This section provides the plant noise and vibration emission levels adopted in the assessment.

B.1 NOISE

The following table presents typical sound power levels for construction plant used in this assessment.

The following have been considered to establish typical plant A-weighted sound power levels:

- Transport for NSW Construction Noise and Vibration Strategy (April 2018).
- Previous measurements undertaken by Acoustic Logic.
- AS 2436-2010 "Guide to noise and vibration control on construction, demolition and maintenance sites (Appendix A).

The equipment sound power spectra are based on information in the DEFRA database, and when not available from that source, from manufacturer's data or from measured spectra taken by this office of similar machinery.

Items identified as having annoying characteristics have been penalised by adding 5dB to the levels in the Transport for NSW's noise data base.

The emission levels in the table assume that machinery operates continuously (i.e. 100% duty), which is not always be the case. For example, excavators may load trucks intermittently for 5 minutes in every 15-minute assessment period so their duty would be 33%. The duty correction used in the assessment is indicated in the table.

Construction, Demolition and Civil works Machinery Effective Sound Power Levels based on Continuous operation (100% duty)

Equipment	Approx. Size/ Weight/Model	Sound Power Level (dBA) 100% Duty (inc Penalties)	Duty	Unweighted Octave Band Sound Power Levels, dB (includes Applicable Penalties)							
				63	125	250	500	1000	2000	4000	8000
Asphalt - Truck & Sprayer	-	106	100%	112	110	104	102	99	97	100	92
Backhoe	-	111	66%	113	107	103	111	104	103	98	94
Chainsaw – petrol*	4-5hp	114	50%	92	106	103	111	113	114	112	109
Compactor	-	106	100%	99	101	97	100	100	100	96	93
Compressor	-	109	25%	127	116	107	102	100	98	101	90
Crane - Fixed	-	113	50%	120	115	116	112	106	99	93	87
Crane - Franna	20 tonne	98	50%	108	104	99	91	92	91	84	78
Crane - Mobile	-	113	25%	115	114	108	109	108	108	99	90
Crane - Truck mounted	20 to 60 tonne	108	25%	112	109	107	105	103	100	95	87
Crusher – Rock*	-	118	100%	135	128	121	123	117	113	108	101
Dozer	CAT D9	116	75%	112	116	114	114	111	108	102	94
Dozer	CAT D10	121	75%	130	131	122	114	115	111	109	105
Elevated work platform - scissor lift	-	98	10%	100	97	94	94	94	91	85	83
Elevated work platform	-	97	10%	108	106	92	93	90	89	88	79
Excavator - tracked	3 tonne	90	75%	101	91	88	88	85	83	78	72
Excavator - tracked	6 tonne	95	75%	102	104	95	89	89	87	82	77
As above + hydraulic hammer*	6 tonne	115	75%	110	113	110	114	117	113	111	106
Excavator - tracked	10 tonne	100	100%	104	100	99	97	95	92	86	81
As above + hydraulic hammer*	10 tonne	118	75%	124	124	121	116	118	116	114	109
Excavator - tracked	20 tonne	105	75%	107	114	106	101	98	97	93	90
Excavator - tracked	30 tonne	110	75%	113	113	107	107	105	102	97	91
As above + hydraulic hammer*	-	122	75%	125	123	119	123	121	121	118	114
Excavator - tracked	40 tonne	115	75%	111	114	113	110	110	109	104	97
Grader	-	113	100%	114	113	109	105	110	104	100	91
Generator - diesel/petrol	6kW	103	100%	115	110	102	98	97	95	92	80

Generator - attenuated	30kW	92	100%	95	95	93	86	85	86	82	79
Grinder*	-	105	50%	86	80	81	89	99	106	102	102
Jackhammer	-	113	50%	108	97	93	96	96	101	109	110
Lighting Tower	-	80	100%	73	73	73	73	73	73	73	73
Lighting - Daymakers	-	98	100%	110	105	97	93	92	90	87	75
Light Vehicle - 4WD	-	103	10%	96	96	96	96	96	96	96	96
Line Marking Truck	-	108	100%	114	112	106	104	101	99	102	94
Loader - Front-end (wheeled)	23 tonne	112	75%	118	118	107	109	105	103	102	94
Loader - Skidsteer	1/2 tonne	107	75%	112	115	104	106	101	98	92	92
Loaders - Skidsteer	1 tonne	110	75%	113	104	108	108	104	103	97	91
Loader - Tracked	0 to 50 kW	115	75%	108	108	108	108	108	108	108	108
Loaders- Tracked	200 to 300 kW	121	75%	114	114	114	114	114	114	114	114
Pavement Laying Machine	-	114	100%	117	114	111	110	109	106	104	95
Pavement Profiler	-	117	100%	116	122	114	112	112	109	105	102
Pile Driver – Vibratory*	-	121	50%	121	120	117	120	122	120	115	105
Piling Rig - Bored	-	112	75%	112	120	109	108	106	104	96	89
Piling Rig Lmax – Impact*	-	151	n/a	137	138	143	152	152	148	143	138
Piling Rig Leq- Impact*	-	134	75%	124	125	128	135	135	132	127	121
Pump - Concrete	-	109	100%	115	107	101	102	104	104	97	89
Rattle gun (hand held)	-	104	50%	82	81	81	87	96	98	98	98
Roller - smooth drum	-	107	100%	114	112	102	100	102	100	96	90
Roller - large pad foot	-	109	100%	120	111	103	107	105	98	95	89
Roller – Vibratory*	10 tonne	109	100%	125	116	108	112	110	103	100	94
Saw – Concrete*	-	118	75%	120	122	114	114	113	114	118	116
Scraper/Grader	-	113	100%	120	122	113	107	107	105	100	95
Truck - Concrete	-	109	100%	112	103	95	98	99	107	89	84
Truck - Dump	15 tonne	110	10%	114	111	111	107	104	103	97	90
Truck - Medium rigid	20 tonne	103	10%	109	107	101	99	96	94	97	89
Truck - road truck/ truck and dog	30 tonne	108	10%	123	109	101	100	104	99	98	91

Truck - Vacuum (NDD or non-destructive digger)	-	109	75%	111	112	97	102	101	104	103	96
Tub Grinder/Mulcher	40-50hp	116	100%	105	106	110	110	112	111	105	96
Vibrator – Concrete*	-	113	100%	122	120	120	113	109	112	110	105
Water Cart	-	107	50%	106	107	101	105	99	100	96	91
Welding equipment	-	110	50%	104	105	106	105	106	103	98	93
Wrench - Impact	-	111	50%	81	84	89	91	95	101	107	107

APPENDIX B - MONITORING LOCATIONS

LEGEND:

- AIR MONITORING
- VIBRATION
- NOISE

NOTE: AIR MONITORING AT SPECIFIC FRESH AIR BUILDING INTAKE LOCATIONS

MULTIPLEX

27th NOVEMBER 23
NOISE, AIR, VIBRATION MONITORING BASELINE LOCATION PLAN (POST SITE MTG; 4/10 WITH PATHOLOGY)

DWG: RHE-MPX-PM-MPL-CWD-00011 SK_01