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Biodiversity and Environmental Studies for BBNP, BBTP and BBHNP

Volume II: Environmental Management and Monitoring Plan

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Biodiversity and Environmental Studies for BBNP, BBTP and BBHNP

Volume II: Environmental Management and Monitoring Plan

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ACRONYMS

ACMV	Air-conditioning and Mechanical Ventilation
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
ECB	Erosion Control Blanket
ECM	Earth Control Measures
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
L	litre
mg	milligram
NEA	National Environment Agency
NParks	National Parks Board
pACM	potential asbestos containing materials
PCO	Pest Control Officer
PM	Particulate Matter
PME	Power Mechanical Equipment
PUB	Public Utilities Board
QECP	Qualified Erosion Control Professional
RWH	Restricted Working Hours
TPZ	Tree Protection Zone
TSS	Total Suspended Solids

1. Introduction

1.1 Overview

This document outlines the biodiversity and environmental requirements to be performed by the Contractor during the construction phase and the Project Owner, National Parks Board (NParks or "the Board") during the operational phase in order to fulfil the specified requirements for the development of the Bukit Batok Nature Corridor (BBNC), namely for Bukit Batok Nature Park (BBNP), Bukit Batok Town Park (BBTP), and Bukit Batok Hillside Nature Park (BBHNP).

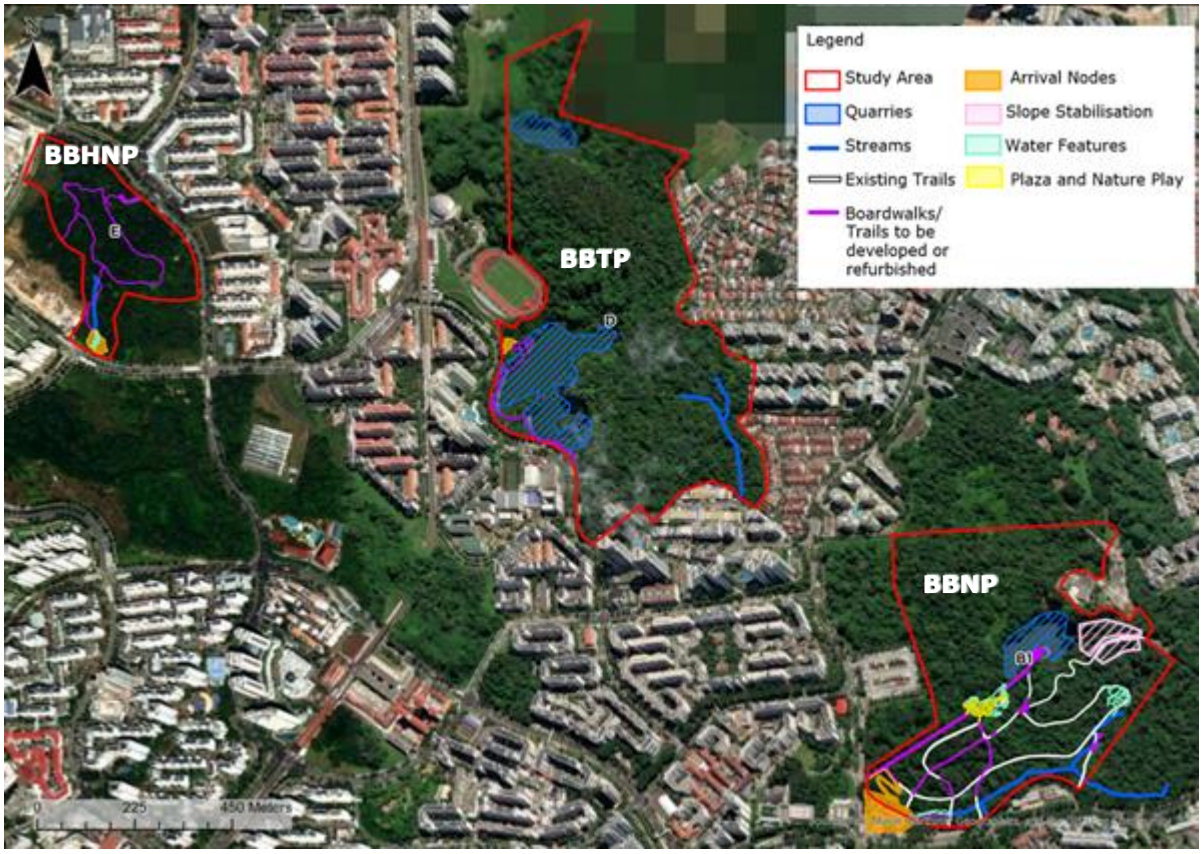

Figure 1-1: Overall Study Area and Their Developments

The Contractor and Project Owner shall comply with the requirements of this document and the recommendations of the Environmental Impact and Mitigation Register shown in Appendix 1. In the event of differences between the Environmental Management and Monitoring Plan (EMMP) recommendations and other relevant authorities' requirements, the Contractor and Project Owner shall adopt the more stringent requirements or as approved by the relevant Authorities.

The Contractor is required to produce and continually review a contract-specific EMMP that covers the Project activities during the construction phase. The purpose of the contract-specific EMMP is to serve as a manual for implementing appropriate biodiversity and environmental controls and monitoring procedures during the construction and operational phases of the Project. It aims to ensure that the construction of the Project complies with relevant biodiversity and environmental legislation, license conditions, and accepted good practice and that appropriate mitigation measures are implemented.

In particular, the Contractor shall, during the construction phase:

a) Carry out an objective assessment of the various impacts on the biodiversity and environment as a result of the Project construction activities, in compliance with the latest relevant biodiversity and environmental legislations, standards and guidelines;
b) Propose mitigation measures to minimize the adverse biodiversity and environmental impacts and a suitable monitoring plan to be undertaken during the course of the construction of the Project; and
c) Implement suitable mitigation and monitoring requirements to minimize the adverse biodiversity and environmental impacts during the course of the construction of the Project and report to the Board.

The Contractor shall take note that strict compliance with the biodiversity and environmental requirements, including all necessary biodiversity and environmental mitigation measures, is their full responsibility. The Contractor shall, at their own cost, improve or take additional environmental mitigation measures if, arising from the Contractor's construction activities, the regulatory and specific biodiversity and environmental requirements are not met.

1.2 Contract-Specific EMMP

At the commencement of the Contract, the Contractor shall prepare review a contract-specific EMMP which is explicit, illustrative, action-oriented, time-bound and definitive to document biodiversity and environmental management and monitoring activities during the construction phase. The purpose of the contract-specific EMMP is to serve as a manual for implementing appropriate biodiversity and environmental controls and monitoring procedures during the construction phase of the Project.

The contract-specific EMMP shall be a live document that will be reviewed and updated as additional information becomes available and in the light of further consultation with regulatory authorities.

The **objectives of the contract-specific EMMP** are to have in place a documented plan to:

a) Ensure that the biodiversity and environmental management practices and mitigation measures required by the Contract are sufficiently implemented;
b) Monitor the actual biodiversity and environmental impact levels and provide prompt corrective actions to ensure the impacts are within the respective control limits;
c) Ensure compliance with statutory requirements, codes of practice, the Board's requirements, etc.;
d) Provide regular documentation on the biodiversity and environmental performance of the Project to the Board and relevant agencies to ensure no deterioration of biodiversity and environmental controls.

The **contract-specific EMMP** shall consist of, as a minimum:

a) Roles and Responsibilities, including a list of key team members, organisation charts and description of roles and responsibilities;
b) Construction Site Layout and General Arrangements, including a site management plan, with location of eating areas, chemical /waste storage plan, chemical inventory, emergency spill response etc.;
c) Biodiversity and environmental management practices and mitigation measures;
d) Biodiversity and environmental monitoring scope and parameters, equipment and quality assurance;

e) Communication, Training and Awareness;
f) Environmental Incident Contingency Plans;
g) Fauna Response Plans;
h) Grievance and Complaint Handling Plan; and
i) EMMP inspection checklists, monthly report format, monitoring record templates, etc.

The implementation of the EMMP by the Contractor shall include, where necessary, the engagement of qualified specialists, subcontractors, and service providers to supply labour, equipment, materials and professional services for the biodiversity and environmental management and monitoring works, in compliance with the relevant acts, standards, guidelines and procedures.

1.3 Environmental Policy

The Contractor shall establish an environmental policy that affirms their commitment to the EMMP. The environmental policy shall cover the following:

a) Commitment from the company's management;
b) Establish, implement, maintain an EMMP;
c) Identify and document clear and concise biodiversity and environmental objectives and targets;
d) Comply with applicable regulations and other requirements including industry best practices;
e) Monitor, audit and review the EMMP to identify areas of continual improvement; and
f) Ensure environmental protection to the maximum extent with no pollution arising from the construction and site clean up after completion of the project.

1.4 Biodiversity and Environmental Impact Assessment

A Biodiversity and Environmental Impact Assessment (EIA) was conducted on behalf of the Board. Relevant sections will be shared with the Contractor on award.

2. Responsibilities of the Contractor during Construction Phase

2.1 Contractor's Responsibilities

The Contractor shall be responsible for identifying, managing, and mitigating all biodiversity and environmental impacts arising from the construction works. Such impacts include any form of pollution and excessive noise affecting those outside the site boundary.

The EMMP shall be implemented by the Contractor during the delivery of the Contract. The Contractor shall take note that strict compliance with the biodiversity and environmental requirements, including all necessary biodiversity and environmental mitigation measures, is their full responsibility. The Contractor shall, at their own cost, improve or take additional biodiversity and environmental mitigation measures if, arising from the Contractor's construction activities, the regulatory and specific biodiversity and environmental requirements are not met.

The Contractor will also be responsible for emergency planning as well as identifying the principal person amongst their site staff who has overall responsibility for ensuring and recording compliance with the EMMP, and a deputy who will act in the capacity when the principal person is not on site.

The Contractor must also ensure that their staff are familiar with the relevant parts of the EMMP.

The Contractor shall comply with all relevant Acts, Regulations, Codes of Practice or amendments or re-enactment thereto including but not limited to:

a) Requirements of the Environmental Protection and Management Act and all subsidiary regulations, relating but not limited to control of air pollution, water pollution and noise pollution;
b) Requirements of the Environmental Public Health Act and all subsidiary regulations, relating but not limited to employment of competent person to act as Environmental Control Officer (ECO);
c) Requirements of the Sewage and Drainage Act and all subsidiary regulations, relating but not limited to the prohibition of discharge of silt into stormwater drainage systems;
d) Requirements of the Wildlife Act and all subsidiary regulations;
e) Code of Practice on ECO;
f) Code of Practice on Environmental Health;
g) Code of Practice for Noise Control on Construction and Demolition Sites;
h) Code of Practice on Pollution Control;
i) Code of Practice on Surface Water Drainage;
j) Public Utilities Board (PUB)'s Guidebook on Erosion & Sediment Control at Construction Sites;
k) National Environment Agency (NEA)'s Guidebook on Prevention of Mosquito Breeding; and
l) NEA's Handbook of Scope of Works for Mosquito Control.

The Contractor shall adopt the following best environmental practices listed in the Development Plan Submission Requirements handbook. Some of the key guidelines, requirements and legislation are listed below:

a) Guidelines on Minor Ancillary Structures within the green buffer and planting strip along common boundaries;
b) Technical Requirements on Conservation of Trees;
c) Technical Requirements on Greenery Provision within premises; and
d) All other relevant environmental guidebooks and guidance.

The Contractor shall:

a) Comply with the recommended mitigation measures in the Environmental Mitigation Register Appendix 1 and adopt the more stringent requirement should there be differences between the EIA Report and the other relevant authorities' requirements, in addition to supplementary guidelines provided in Annex A on Tree Protection Guidelines and Annex B on Tree Transplanting;
b) Provide justification and alternative measures to reduce the impacts to as low as reasonably practical for mitigation measures which could not be adhered to;
c) Maintain a Contract-Specific EMMP for execution of the EMMP requirements.

2.2 Contractor's Environmental Manager

The Contractor shall note the following responsibilities when carrying out the EMMP:

a) Appoint an Environmental Manager who shall be responsible for carrying out the recommendations of the EMMP;
b) Provide the necessary resources to the Environmental Manager to carry out the EMMP;
c) Provide relevant information and advice to the Board on potential activities that may potentially create adverse environmental conditions;
d) Submit regular biodiversity and environmental monitoring reports to the Board for review;
e) Submit proposals for mitigation measures should there be exceedances or incidents; and
f) Implement approved mitigation measures to reduce the potential impact from exceedances or incidents.

The Environmental Manager shall have five (5) years of post-registration as an ECO and relevant experience of managing biodiversity and environmental issues at sensitive sites. He/she shall oversee and manage the biodiversity and environmental impacts of all work sites throughout the project duration and to ensure all works comply with the biodiversity and environmental requirements.

The Environmental Manager shall be responsible for the following duties:

a) Oversee and ensure the implementation of the biodiversity and environmental management requirements in accordance with the environmental specifications, the contract-specific EMMP, and the Authorities' requirements;
b) Conduct daily reviews of all work activities and their surroundings to ensure compliance with the EMMP;
c) Recommend improvements in case of non-compliance/non-conformity and/or violation in order to improve site conditions, which shall be made within 24 hours for the Contractor to take immediate remedial actions and for reference;
d) Recommend to the Board / Board's EMMP Specialist any further biodiversity and environmental data collection if deemed necessary, for example, to investigate non-compliance or damage caused by construction/workers' activities;
e) Attend regular meetings between the Board and the Contractor to report on the status of the EMMP implementation (at least once per month);
f) Prepare and submit weekly monitoring reports to the Board / Board's EMMP Specialist, including weekly ECO inspection records, monitoring results, findings, recommended actions for improvement, and Contractor's close out action as well as effectiveness of corrective actions;
g) Notify the Board / Board's EMMP Specialist should any environmental incidents, complaints or grievances occur on site; and

h) Advise additional recommendations that will ensure good biodiversity and environmental management of the site work in accordance with good practices and local legislation.

2.3 Contractor's Arboriculture Contractors

The Contractor shall note the following responsibilities when carrying out the works:

a) The Contractor shall engage an International Society of Arboriculture (ISA) certified Tree Arborist to supervise and coordinate all tree planting, protection and transplanting operations. His/her curriculum vitae shall be submitted together with the Tender. The Contractor's Arborist is required to be on-site at all times during all stages of plantings, transplanting, and tree protection to supervise and direct the work at all times. Qualifications and field supervision experience shall be detailed and submitted for approval by the Superintending Officer (SO);
b) All arboriculture works should be carried out by skilled and trained arboriculture teams with at least 8 years working experience in developments of similar size or complexity. Arboriculture contractors should meet the Board's safety requirements for work at height, Land Transport Authority's requirements for temporary works along roadsides (where necessary) and have a certified arborist to supervise the pruning/felling/planting works.
c) All arboriculture workers engaged in tree climbing and chainsaw work shall possess a valid basic tree climbing certification base upon demonstrated competence in the Workforce Skills Qualifications (WSQ) module conducted by Centre for Urban Greenery and Ecology (CUGE) or an equivalent WSQ approved training organization.
d) Each Arboriculture crew shall possess the following VALID competences:
    i. Operation of chainsaw for ground work (LS-MT-103E-1);
    ii. Chainsaw safety and maintenance (LS-MT-102E-1);
    iii. Perform formative pruning of young trees (LS-MT-114E-1);
    iv. Provide Arboriculture support on site (LS-MT-116E-1);
    v. Workplace safety and health – operators (ES-WSH-101G- 1);
    vi. Respond to Emergency (LS-HM-208E-1);
    vii. Perform advance rigging and climbing techniques (LS- HM-308S-1);
    viii. Perform aerial tree access and aerial rescue skills (Ls-HM- 204S-1);
    ix. Implement and apply appropriate risk and safety management to sector practices (LS-BP-301S-1);
    x. Prepare risk assessment report (LS-HM-406S-1); and
    xi. Operate and work from an elevated work platform (CUGE- ARB-3501).

2.4 Board's EMMP and Biodiversity Specialists

The Contractor's performance in complying with the EMMP will be supervised by the Board's EMMP and Biodiversity Specialists, engaged by the Board for the construction phase of the Project.

The EMMP and Biodiversity Specialists will verify and monitor the mitigation measures process, such as the noise mitigation during construction, the proper management of waste to prevent land and water-body contamination and measures to protect flora and fauna on site etc. The EMMP and Biodiversity Specialists shall review monthly monitoring reports submitted by the Contractor and carry out investigations on major environmental incidents / infringements, and report thereon.

3. Biodiversity and Environmental Management Requirements during the Construction Phase

3.1 General

During the construction phase, the Contractor shall take note and strictly adhere to the restrictions below:

a) No traversing through the streams or works within waterlogged areas;
b) No bathing or washing in any water body;
c) No throwing, depositing or leaving behind any refuse, litter, object or article except in a litter bin provided for that purpose. Food waste bins and bin centres must be wildlife-proof. All litter and debris must be removed and disposed off-site daily;
d) No food consumption or resting/non-work-related activities outside designated eating and resting areas. Designated areas, where food and beverage are allowed to be consumed, must be enclosed and provided with wildlife-proof bins;
e) No soiling or defacing any building, structure, furniture, ornament, equipment or other property;
f) No smoking within any part of the site;
g) No hanging or affixing any light, bill, placard, notice or other thing on any plant, tree or structure;
h) No affixing, setting up or erecting any sign, shrine, altar, religious object, shelter structure or building;
i) No climbing of any wall, fence, barrier, railing, hedge, tree, post, or other structure;
j) No cutting, damaging, displacing, or marking (e.g., spray paint) any tree or plant or any part thereof;
k) No collecting, removing or wilfully displacing of any other organism;
l) No use of any animal, firearm, explosive, net, trap, hunting device or instrument or means whatever for the purpose of capturing any animal;
m) No carrying or have in the person's possession any explosive, net, trap or hunting device;
n) No bringing or introducing any animal;
o) No setting of fires;
p) No musical instrument, apparatus or thing producing sound or noise in such a manner as to cause annoyance, inconvenience or offence to people or animals;
q) No damage to the saplings or branches when carrying out the works;
r) No camping or staying overnight; and
s) No feeding of any terrestrial or aquatic animals (e.g., long-tailed macaque, Eurasian wild boar, red junglefowl, other birds, fish, terrapins).

3.2 Restricted Working Hours

The Contractor shall ensure that general construction activities are confined to daytime (0800 – 1800 hours) only, Monday to Saturday for all parks, while noisy activities are only limited to 1000 – 1700 hours for BBNP and BBTP, on weekdays only for both parks. No works shall be taken at night or on Sundays/Public Holidays for worksites located within 150-m of residential and/or noise sensitive premises without the prior approval of the Board.

3.3 Noise Control

The Contractor shall ensure the following minimum controls are implemented for the project during the construction phase to reduce noise pollution:

Work Activities	Minimum Controls
Soil Investigation Site clearance Demolition and removal of existing building or structure Earthworks, including excavations, slope forming and slope stabilization General construction activities, including site preparation works, superstructure, finishing works	• Restricted Working Hours (RWH): The Contractor shall ensure that general construction activities are confined to daytime (0800 – 1800 hours) only, Monday to Saturday for all parks, while noisy activities are only limited to 1000 – 1700 hours for BBNP. • The noise levels should not exceed the maximum permissible noise levels for construction set out in the Schedule to the Environmental Protection and Management (Control of Noise at Construction Sites) Regulations, and the project-specific maximum permissible noise levels of 75 dB (Leq 1 hour) and 90 dB (Leq 5 min) at the boundary. • The Contractor shall ensure that hoarding is installed around the Project site or work areas to reduce noise propagation to surrounding area. • The Contractor shall ensure that workers are trained in noise-reduction behaviours such as reducing the drop height of materials and turning off equipment and vehicle engines when not in use. • Daily toolbox briefings should include reminders on the need to implement noise-reduction behaviours, in particular during demolition activities.
Movement and operation of machinery, equipment and heavy vehicles	• The Contractor shall select quieter construction equipment and construction methods in accordance with Singapore Standard SS 602:2014 Code of Practice for Noise Control on Construction and Demolition Site, Annex G where necessary to achieve the permissible noise limits. • The Contractor shall deploy quiet models of construction equipment i.e., generators, compressors, excavators. Where there are no quieter models, the Contractor shall demonstrate so under the submission of Quiet Machine/ Equipment List. Quieter models are defined as those having sound pressure levels at least 5 dB quieter than other models readily available locally, when measured 1 m from the equipment body while the equipment is operating at its rated load. • Provide acoustic shed / enclosure for construction equipment, where viable. • Site noisy machinery or equipment Plant away from the nearby noise sensitive receptors, where possible. • All machines and equipment shall be labelled with weatherproof stickers clearly showing its noise specification i.e., noise levels at 1m from source. The Contractor shall verify the performance using a Class 1 (Type 1) sound meter on all machines monthly at 1 m distance from source. • The Contractor shall ensure that vehicles and equipment are not left idling when not in use. • The Contractor shall ensure that all equipment and machinery is maintained and operated in a manner such that it does not give rise to excessive noise emissions. A list of equipment shall be submitted demonstrating consideration of alternatives.

Work Activities	Minimum Controls
Piling / Substructure Works	• The Contractor shall use quieter (non-percussive) piling methods, for example bored, jack-in or micropiling methods. • The Contractor shall install noise barriers around the work areas before any work commences assessment show that the stipulated noise criteria will be breached by the works. Noise barriers shall be in accordance with Singapore Standard SS 602:2014 Code of Practice for Noise Control on Construction and Demolition Site, Annex F Noise Control Techniques, Section F3.3 and the any specific noise mitigation measures to be stipulated by the Board. The noise barriers shall be designed to achieve a minimum reduction of 5 dB(A). • Daily toolbox briefings should include reminders on the need to implement noise-reduction behaviours, in particular during piling activities.

The proposed hoarding plan for BBNP, BBTP and BBHNP are presented in Figure 3-1**.**

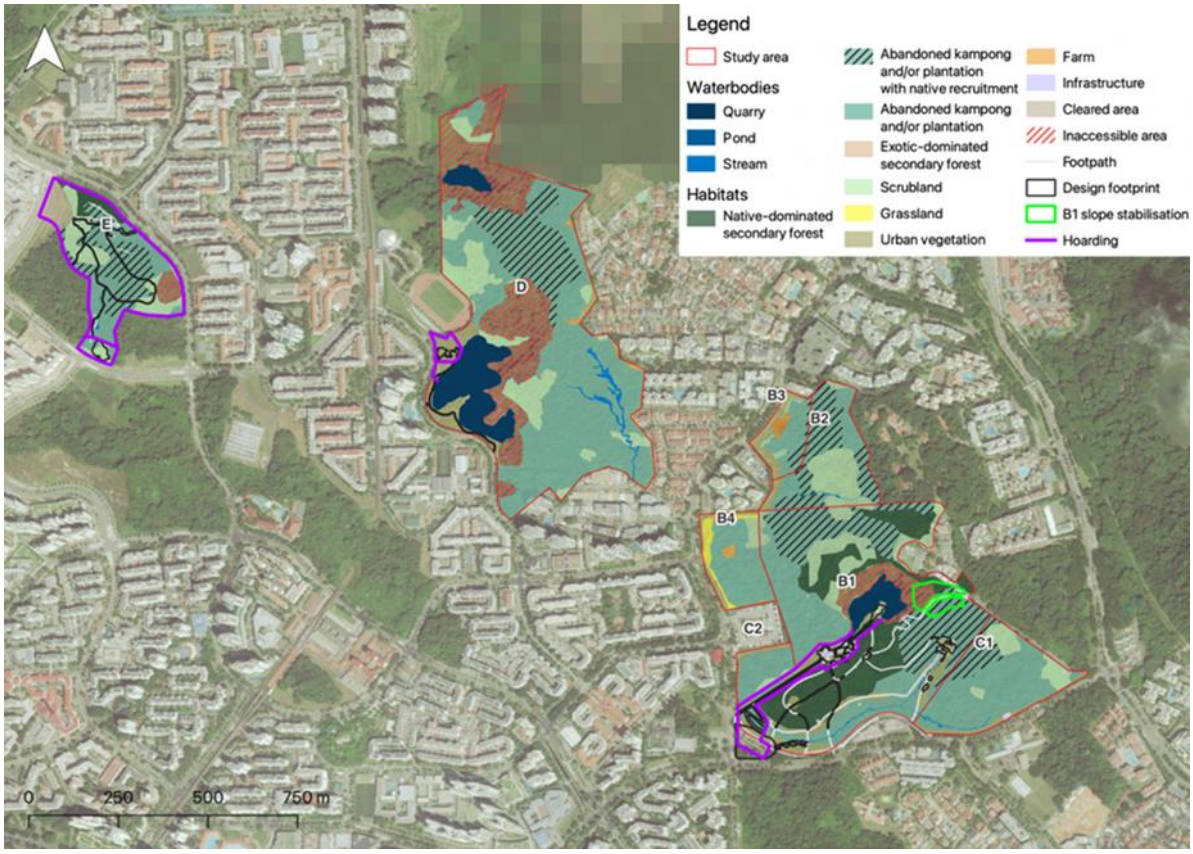

Figure 3-1: Proposed Hoarding Plan

Hoarding to be used for the project will generally meet the requirements of BCA's Guidelines on Hoarding Provisions for Landed Development. The hoardings will be least 1.8-m high, made of hard materials and will be embedded at least 300 mm into the ground.

The Contractor shall also implement noise pollution mitigation measures in line with the *Singapore Standards Code of Practice for Noise Control at Construction Sites, 2014 (SS602:2014)*, where practicable.

3.4 Air Pollution Control

The Contractor shall ensure the following minimum controls are implemented for the project during the construction phase to reduce air pollution:

Work Activities	Minimum Controls
General construction activities, including site preparation works, finishing works	• Ensure that hoarding is installed around the Project site or work areas to control the dispersion of dust. • Perform earthworks in phases to reduce the extent of exposed footprint at one time.
Demolition and removal of existing building or structure	• Ensure effective water suppression is used during demolition operations. • Minimize drop height. • Avoid crushing or screening of demolished construction material on-site.
Site clearance / tree removal Earthworks, including excavations, slope forming and slope stabilization	• Prepare an Earth Control Measures Plan.
Operation of construction machinery, heavy vehicles and equipment	• Ensure that vehicles and equipment are not left idling when not in use. • Maintain and operate all equipment and machinery in a manner such that it does not give rise to smoke emissions, and ensure emissions comply with the Environmental Protection and Management (Vehicular Emissions) Regulations or Environmental Protection and Management (Off-Road Diesel Engine Emissions) Regulations 2012, if applicable. • A list of equipment shall be submitted demonstrating consideration of alternatives.
Movement of construction machinery, heavy vehicles and equipment	• Ensure that truck loads carrying dry materials (such as cement, sand, aggregate, soil etc.) into the construction area will be covered. • Periodically wet the unpaved temporary access roads to prevent dust propagation. • Ensure that workers clean up any spoil/earth spillage onto the haulage routes immediately and undertake proper housekeeping of the construction site, as well as roadways linked to the entrances of the worksites, to ensure that roadways, vehicle wheels and equipment tracks are clear of dust or mud, and that appropriate barriers, tarpaulin covers/erosion blankets (fully biodegradable, wildlife-friendly) have been repaired and/or reinstated. • Impose a maximum-speed-limit of 10 kilometres per hour (km/hr) as per Vehicular Entry Permit in publicly accessible areas of the parks, 25km/hr on non-publicly accessible areas on paved or surfaced haul roads and 15 km/hr on unpaved haul roads and work areas.
Stockpiling on the construction site	• Ensure all stockpiles of demolished items, debris or good earth / aggregates are covered under canvas sheets or erosion control blankets (fully biodegradable, wildlife-friendly).

Work Activities	Minimum Controls
	• Minimise the volume of spoil stockpiled and potential for dust generation and erosion/runoff, schedule removal of spoil from the contract area at least once every five (5) days.

The Contractor shall also develop a site-specific Air Pollution Control Plan (APCP) should be developed to put in place measures such as establishing communications, implementation of site management measures, monitoring, etc.

3.5 Surface Hydrology and Water Pollution Control

The Contractor shall ensure the following minimum controls are implemented for the project during the construction phase to reduce impacts to surface hydrology and water quality.

Work Activities	Minimum Controls
Phase: Site preparation and construction • Vegetation clearance/removal • Earthworks • Construction (sub- and super-structure) • Finishing works	**Main**: All work must comply to the PUB's *Code of Practice on Surface Water Drainage*, particularly Section 6 – *Requirements for Construction Activities*. The key relevant requirements are highlighted below: <u>General</u> • The execution of any work shall not change, disrupt, fill, block, divert or disturb the existing overland flow or the existing system of drains unless an alternative drainage system has been approved by PUB. • The runoff within, upstream of and adjacent to the worksite shall be effectively drained away without causing drainage problems within the worksite or in areas outside the worksite. • Bunds of stockpiled materials such as earth from trench work shall not be longer than 10 m and gaps of at least 1 m width shall be provided between the bunds to allow the free flow of surface runoff. • Material from any stockpile shall not be allowed to fall or be washed into the drain. <u>Earth Control Measures</u> • Water quality parameter compliance: The discharge from any construction / earthwork sites into storm water drainage system shall not contain Total Suspended Solids (TSS) in concentrations greater than, the prescribed limits under Regulation 4(1) of the Sewerage and Drainage (Surface Water Drainage) Regulations. • Minimal or no discharge: Wherever possible, a construction / earthwork site should practise recycling of water. The recycled water could be used for non-potable purposes to minimise discharge into the stormwater drainage systems. • Design criteria: The Erosion Control Measure (ECM) shall be designed to cope with a minimum design rainfall intensity of a return period of 1 in 5 years storm. • ECM installation before commencement of work: The ECM shall be installed by the site operator / contractor according to the endorsed plans and the

Work Activities	Minimum Controls
	completed ECM at site shall be approved by the Qualified Erosion Control Professional (QECP) before commencement of construction and earthworks. • The site operator/contractor shall ensure that the ECM designed and installed shall be continuously reviewed by the QECP for every stage of the earthworks and construction. The ECM shall remain effective throughout the whole duration of works. The site operator/contractor shall add or amend the ECM at the site according to the design of the QECP. <u>Guidelines of effective ECM</u> An effective ECM requires 2 components which shall include, but is not limited to, the following minimum measures in order to meet the legal requirements cited under Regulation 4(1) of the Sewerage and Drainage (Surface Water Drainage) Regulations: • Erosion Control Measures: The erosion control measures shall minimise the extent and duration of any exposed /bare / erodible surfaces by proper work sequencing, covering up of all bare/erodible surfaces and progressive and timely revegetation and stabilisation. • Sediment Control Measures: The sediment control measures shall trap, contain and treat the silty discharges from within a construction / earthworks site (including rain, runoff, water from wash bay, underground water at basement, etc) by providing: perimeter cut-off drain, perimeter silt fence, intermediate silt trap, sedimentation basin or storage pond/tank, treatment system, turbidity curtains, wheel wash.

The Contractor shall also implement earth control measures to comply to the Public Utilities Board's (PUB) *Code of Practice on Surface Water Drainage*, particularly Section 6 – *Requirements for Construction Activities*.

3.6 Soil and Sediment Pollution Control

The Contractor and the Board shall respectively ensure the following minimum soil and sediment pollution controls are implemented for the project during the construction phase to reduce impacts to soil (and potentially groundwater) and sediment.

Work Activities	Minimum Controls
Storage, use and refuelling of equipment and machinery	• Practice due diligence in proper storage and handling of machinery to prevent release of chemicals, fuels, or other potentially harmful materials. • Transfer of fuel shall be done over contaminant trays and mats to prevent spillage into the ground. • Ensure oil-containing equipment or machineries are inspected for leaks before being put into use. • Provide emergency spill kits on site in the event of any fuel spillages. The emergency response team shall also be competent in the use of these spill kits.

Work Activities	Minimum Controls
Chemical and fuel storage	• Chemical and fuel in drums, carboys, containers, etc shall be stored in a designated storage area within a building or covered shed with concrete floors and containment facilities to contain any leak or spillage. • A full containment should be provided for bulk storage oil tanks, including skid tanks. • Ensure all hazardous substance and chemical containers are labelled as per the requirement of SS 586 - 2: 2022. • Ensure a chemical inventory is maintained to track the movement of all hazardous substance and chemicals. • Return the chemicals back to its designated storage areas when not in use. • Transfer of chemicals shall be done over contaminant trays and mats to prevent spillage into the ground. • All leaks and spillages in the storage area or construction site shall be collected and sent to a licensed toxic waste collector for proper disposal. • Provide emergency spill kits on site in the event of any chemical spillages. The emergency response team shall also be competent in the use of these spill kits.
Toxic waste storage and disposal	• Ensure toxic industrial wastes (TIWs) are stored in a designated storage area within a building or covered shed with concrete floors and containment facilities to contain any leak or spillage. • Maintains a TIW register, which is to be updated on a weekly basis. • TIW shall be collected regularly by a licensed TIW collector for off-site disposal. • Ensure leaks and spillages in the TIW storage area or construction site are collected and sent to a licensed toxic waste collector for proper disposal.

3.7 Soil Sampling Requirement

The Contractor shall take note and strictly adhere to the requirement below:

a) Soil to be excavated and reused on the site shall be subject to a sampling and laboratory analysis programme to determine soil quality and suitability for reuse, to a depth of at least the desired rooting depth for chemical, physical and biological sampling and analysis shall be conducted per location/theme (e.g., nature, turf, wetland, etc.), in accordance with the requirements of the Landscape Architecture;
b) Any top up soil intended to be brought onto the site shall be tested for the presence of any contamination prior to its transportation to the site so as to ensure new contaminants are not inadvertently brought into the site. The Contractor shall ensure to the best of its ability that the top up soil is free of construction debris, rubbish, or concrete. Where planting is required, Approved Soil Mix (ASM) shall be added. The number of samples shall depend on the number of sources and quantity to be imported, subject to the approval of the Board. The imported soil should be tested for the full suite analysis under the Dutch Soil Remediation Circular 2013. The suite of parameters shall include as a minimum: Metals, inorganic compounds, aromatic compounds, polycyclic aromatic hydrocarbons, chlorinated hydrocarbons, pesticides, and other pollutants; and

c) Soil to be excavated and removed off-site for disposal at designated Staging Grounds shall be subject to the requirements listed under the published user manuals of the respective Staging Grounds (e.g., External User manual for East Staging Grounds: Aviation Park Staging Ground and Tanah Merah Staging Ground).

3.8 Asbestos and Rubbish Clearance

The Contractor shall take note and strictly adhere to the requirement below:

a) Rubbish/waste material may be present across the project area as a result of historical activities and present-day illegal dumping. Materials include potential asbestos containing materials (pACMs) (e.g., potentially asbestos containing roofing sheets observed near to the stream at BBHNP), building rubble, plastic items, clothing and a variety of household items;
b) An Asbestos Survey Report for the site shall be carried by Contractor prior to construction activities to identify the presence and locations of the pACMs in the vicinity of the proposed development footprint;
c) Based on the findings of the Asbestos Survey Report, the Contractor shall be required to appoint an Accredited Asbestos Removal Contractor (AARC) for removal of any identified asbestos materials prior to conducting the construction works at that area. The Contractor shall be responsible for installation of hoarding at the area to be cleared of asbestos as deemed necessary by the AARC and the regulatory authorities;
d) The Contractor shall be responsible for removing all rubbish from the site at minimum 2 m either side of trails or boardwalks, and at least 5 m radius of the proposed development. Rubbish removal shall be carried out using manual works ONLY. No heavy machinery, including mini-excavators, are allowed without prior approval from consultant team and/or NParks; and
e) Any materials salvaged during the asbestos and rubbish clearance such as old pottery, bricks, decorative items, etc shall be kept on site for the Board's and design team's inspection for potential incorporation into the project design.

3.9 Vector Control

Fogging treatment and use of anti-malarial oil or equivalent chemicals is not permitted except in exceptional circumstances on approval of the Board (e.g., disease outbreak).

For mosquito control, the Contractor shall obtain approval from the Board prior to implementing *Bacillus thuringiensis israelensis* (Bti) programmes in consultation with a pest control vendor. The primary means of vector control should be prevention of mosquito breeding via proper housekeeping.

3.10 Works in/near Waterbodies

The Contractor shall ensure that the flow of watercourses remain unchanged as far as possible during works in/near waterbodies so that the movement of aquatic fauna will not be impeded during the construction phase. The Contractor shall submit method statements for such works for review by the Biodiversity Specialist.

3.11 Biodiversity Management

The Contractor shall ensure the following minimum controls are implemented for the project during the construction phase to reduce impacts to the biodiversity.

Work Activities	Minimum Controls
General construction activities, including site preparation works, finishing works	• Install hoarding that is embedded at least 300 mm into the ground to delineate worksites involving the frequent use of heavy machinery (i.e., BBNP slope stabilisation works, BBNP Main Entrance and Quarry Trail, BBTP Main Entrance, BBHNP Arrival Node and Wetland; Figure 3-1). • Avoid fogging by implementing preventive measures for mosquito to remove sources of stagnant water or water-bearing receptacles (e.g., provide well-maintained pitched roof, clear discarded items daily, store materials appropriately, level up ground depression/uneven surfaces, ensure effective drainage flow). • Daily checks by ECO on site for integrity of site hoarding, trapped fauna, road kills, etc. • Execute Fauna Response Plan (Section 3.14) when a trapped/ injured/ dead/ dangerous animal is encountered around or within the worksite according to Section 10 of Wildlife Act (Singapore Statutes Online, 1965).
Vegetation Clearance	• Set up Tree Protection Zones (TPZs) around trees or other plant specimens to be retained within the worksites, within which no construction works are allowed. This should be advised by certified arborists and in accordance with NParks' guidelines (NParks, 2018). • Conduct inspections of fauna prior to felling or removal of vegetation. This should be done by an ecologist who is able to identify wildlife and/or active nesting structures, such as bird nests, tree hollows and/or burrows, and bamboo clusters. • Implement soil ECM prior to vegetation clearance. The ECM plan should be formulated by QECP.
Earthworks (excavation, aboveground construction)	• Implement soil erosion control measures. • Ensure proper storage of materials likely to leach harmful chemicals and fuel-powered equipment by storing them away from waterbodies and/or sensitive habitats. • Implement dust control measures. • Ensure noise levels are within approved limits, and to implement noise barriers where required.
Setting up of worksite, stockpiling	• Locate facilities other than the proposed construction worksites (e.g., site offices, storage yards, rest areas, access routes) within the worksite itself or on existing built-up areas/agreed working spaces; no clearing of additional habitats.

In addition to the above minimum control measures, the Contractor shall implement the following mitigation measures to avoid and minimise biodiversity impacts.

a) For worksites involving manual work only (i.e., trails and boardwalks), ensure the extent of the working space is clearly demarcated on-site and cross-checked by the Board's Flora Specialist to avoid unnecessary vegetation clearance;
b) Contractor's Arborist shall determine suitable TPZs for any trees that will be retained within the worksites;
c) Transplant or salvage saplings of conservation significance, in consultation with the Board's Flora Specialist. The transplantation location shall be determined in consultation with the Board and its Flora Specialist;

d) Adjust the construction footprint of boardwalks and trails to avoid plant species of conservation significance, in consultation with the Board's Flora Specialist;
e) Carry out landscaping and enhancement planting at areas that are cleared, at existing gaps in forested areas, and along the sides of newly constructed trails and boardwalks, in consultation with the Board's Flora Specialist; and
f) Where the use of erosion control blankets (ECBs) is necessary, use only fully biodegradable wildlife-friendly ECBS to avoid trapping fossorial fauna such as snakes.

3.12 Site Layout

In carrying out the Works due regard shall be paid to the sensitivity of the environment and the amenities of adjacent property and to the interests of owners, tenants, and occupiers.

The Contractor shall establish and submit a site layout plan for acceptance by the Board before commencement of work on site to ensure that the worksite is minimised to the extent possible, designed to minimise biodiversity and environmental impact to the surroundings, as well as promote efficiency of operations, safe work environment, worker safety and productivity. The relevant biodiversity and environmental requirements and considerations for the layout, planning and organisation of the site shall be described in detail. The Contractor shall resubmit for approval the updated typical site layout plan whenever conditions in the current approved plan have changed.

The typical site layout plan shall depict the proposed locations of temporary facilities within the construction site boundary – portable toilets, material storage areas, machinery parking areas, active work areas, tool, and equipment areas, washing points, worker rest areas, vehicular access routes and pedestrian walkways.

The size and location of the above areas shall take into consideration project needs, site conditions and applicable regulations to mitigate safety and health risks. The temporary facilities as stated below shall be clearly demarcated with signage and barricaded where possible.

3.12.1 Working Area

The Contractor shall keep the working area to the minimum necessary to complete the work. They shall at all times keep the working area free from accumulation of machinery not in regular use, waste materials, rubbish and stagnant water.

The Contractor shall take adequate steps to prevent trespass by their employees and shall be wholly responsible for making good any loss or damage caused by such trespass. The Contractor shall take all necessary steps to ensure that the activities of his employees (and those of their subcontractors) do not encroach into the adjacent properties or have any detrimental effect on the surrounding environment. Worksites involving manual work only (i.e., trails and boardwalks) shall be clearly demarcated on-site to avoid unnecessary vegetation clearance. Worksites involving the frequent use of heavy machinery (i.e., BBNP slope stabilisation works, BBNP Main Entrance and Quarry Trail, BBTP Main Entrance, BBHNP Arrival Node and Wetland) are enclosed by hoardings that are at least 1.8-m high, made of hard materials, embedded at least 300 mm into the ground, and have no gaps to ensure that ground-dwelling fauna do not enter the worksite (Figure 3-1).

3.12.2 Site Access/Routes

Site access/egress and internal routes shall be restricted to those shown on the Site Plan. Appropriate signage should be put up to alert drivers to the speed limit. In addition, a maximum-speed-limit of 10 km/hr as per Vehicular Entry Permit in publicly accessible areas of the parks, a maximum-speed-limit of 25 km/hr on paved or surfaced haul roads and 15 km/hr on unpaved haul roads and work areas should be imposed.

3.12.3 Storage Areas

Proper locations shall be identified for material storage on site. The amount and type of material to be stored shall be indicated on the layout plan. The storage area shall by the minimum necessary to complete the works. No additional vegetation clearance should be done to accommodate permanent or temporary storage facilities. No storage of diesel or petrol is allowed on site at any time except within designated material storage area with appropriate secondary containment system. When refuelling of machinery is required, diesel or petrol cans are to be transported within secondary containment to the location of the machinery with caution. No pouring or diesel or petrol directly from cans is allowed during refuelling. The Contractor is required to use a rotary pump fitted with stop valve or equivalent during transfer of diesel or petrol from the cans to the machines. Spill kits are to be always available at the storage areas and refuelling locations.

3.12.4 Welfare Facilities

Rest areas, meal areas and adequate portable toilets shall be provided and indicated on the layout plan. Sanitary facilities (portable toilets) shall be located at least 50 m away from streams. The Contractor shall make provision for the portable toilet(s) to be emptied regularly by a Licensed Waste Contractor. Rest areas where food and beverage are consumed must be enclosed and provided with wildlife-proof bins.

3.12.5 Machinery Parking Areas

Designated parking areas must be located on firm surfaces of reasonable level, of suitable safe size, profile and gradient with minimum turning radius for safe machinery movement and parking.

3.12.6 Vehicle Washing Facilities

Vehicle washing facilities shall be provided and indicated on the layout plan for construction worksites involving earthwork for sediment, pollution, and erosion control to adjacent public roads. The vehicle washing facility shall be of adequate width and length such that it completes a full rotation of wheel washing on both sides of the vehicle. The vehicle washing point shall be located such that vehicle wheels are cleaned the moment the vehicle travels on public road and no overflowing of water from the washing point to the public road shall be allowed. The wheel washing facilities shall also have adequate drainage and appropriate measure to prevent standing water and breeding of mosquitoes.

3.13 Environmental Incident Contingency Plan

The Contractor shall provide an Environmental Incident Contingency Plan to facilitate coordinated response actions by the Contractor and the Agencies to protect the environment from damaging effects of unauthorised and accidental release of pollutants.

The plan shall provide:

a) The assignment of duties and responsibilities among involved stakeholders in relation to the responsibilities of the party, or parties, responsible for the pollution incident;
b) A reporting system suitable for the rapid receipt of pollution reports and for notifying other jurisdictions as warranted;
c) The establishment of a focal point to provide coordination and direction for the implementation of this Plan;
d) The identification of expertise and response resources that may be of assistance for the implementation of this Plan; and
e) Policies with respect to emergency provisions applicable to the handling, treatment, or disposal of certain pollutants.

In the event of an incident with minor to moderate significance, the Contractor shall identify the source of pollution, and notify the Board accordingly. Additional monitoring will be conducted to investigate the causes of exceedance and report the investigation results to the Board, and if exceedance is due to the construction works. The Contractor shall increase monitoring frequency until exceedance stops if exceedances are considered related to the Contractor's construction works and report the results.

In the event of an incident with risk of major significance, the Contractor shall stop work immediately and take immediate action to avoid further exceedance and rectify any unacceptable practice. He shall submit the mitigation plan and actions undertaken if the Environmental Team has indicated that exceedance is related to the construction works and amend the construction methodology if appropriate. The Contractor shall also ensure the handling of environmental complaints follows the established environmental complaint reporting channel as defined within the contingency plan.

During the grievance investigation work, the Contractor shall cooperate with the Board in providing all necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation works. The Board's EMMP and Biodiversity Specialists shall ensure that the measures have been carried out by the Contractor.

3.14 Fauna Response Plan

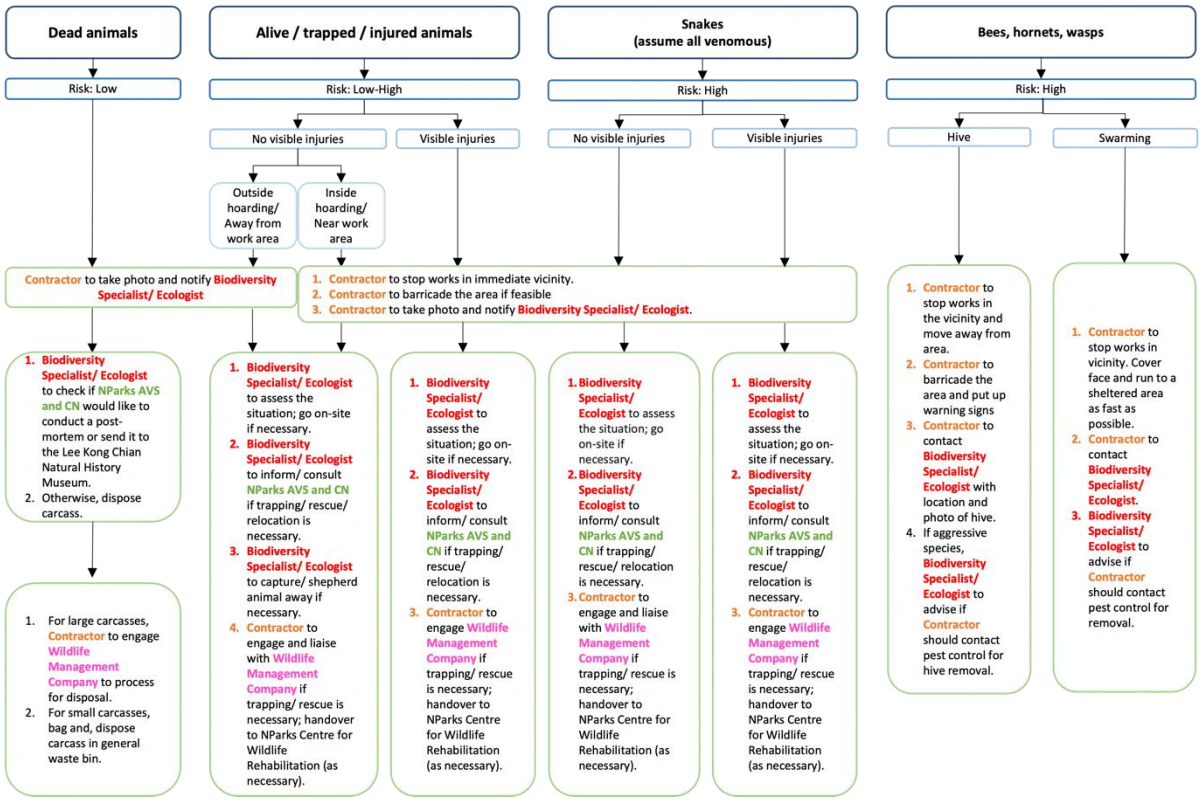

Figure 3-2: Flowchart of the Fauna Response Plan

The Fauna Response Plan will be activated whenever a trapped/injured/dead/dangerous animal is encountered around or within the worksite. The objective of the Fauna Response Plan is to minimise

animal injury and mortality by responding appropriately to the different fauna encounter scenarios in Figure 3-2. This will be emphasized during the Biodiversity and Environmental Awareness Trainings (Section 3.16). All wildlife incidents shall be reported and documented in a Wildlife Incident Form (Appendix 3).

Where fauna is trapped on-site, species-specific methods (e.g., one-way flap doors) shall be formulated to remove them, in consultation with the Board.

The Contractor shall engage a Wildlife Management Company to carry out trapping, rescue, and/or relocation of trapped or injured fauna in accordance with S10 directives. The Wildlife Management Company shall be listed under NParks' public register of certified Wildlife Management Contractors.

Where Eurasian wild boars (*Sus scrofa*) are sighted around or within the worksite, the Board shall be notified as soon as possible at nparks_wildlife_management@nparks.gov.sg. Wild boar removal operations shall be carried out by the Wildlife Management Company, in consultation with the Board.

3.15 Emergency Preparedness

The Contractor shall ensure that all necessary precautions are taken for the safety and health of their working crew at all times.

The Contractor shall use fresh water for mitigating fire hazards rather than chemical suppressants.

The Environmental Manager shall be required to monitoring the weather conditions. He shall inspect the work area after a heavy rainfall event or storm. He is to advise on the continuation of the work activities or cease of all work activities if the weather conditions are not suitable to carry out the works.

An emergency preparedness plan shall be prepared to address all foreseeable emergency scenarios at the site and plan for appropriate response.

3.16 Biodiversity and Environmental Training

The Contractor shall provide Biodiversity and Environmental Briefing sessions to all staff and construction workers, including sub-contractors prior to the commencement of their work activities, with mandatory refresher sessions at least every six (6) months and regularly during daily toolbox briefings. Literature utilised for the briefing session shall be shared with the personnel involved. The briefing session shall provide details on various components on the EMMP and shall minimally cover the following topics:

a) Sensitivities of the site surroundings;
b) Protection of Biodiversity;
c) Preventing human-wildlife conflict (e.g., strictly no feeding of wildlife);
d) Preventing Siltation and Water Pollution;
e) Housekeeping – litter prevention, vector control, etc.; and
f) F&B Control.

In addition, the relevant key messages on the above topics should be communicated to all visitors to the site in one briefing session (e.g., concurrent with Health and Safety on-site induction).

4. Biodiversity and Environmental Monitoring during the Construction Phase

4.1 Overview of Biodiversity and Environmental Monitoring Regimes

The Contractor shall have in place monitoring and inspection regimes to check if the specified biodiversity and environmental mitigation measures are effective throughout the construction phase. They shall take note that strict compliance with the biodiversity and environmental requirements, including all necessary biodiversity and environmental mitigation measures, is their full responsibility.

Any specialist subcontractor engaged by the Contractor to undertake the works under the EMMP shall be adequately experienced, with relevant certification or accreditation from local statutory bodies if required. Equipment of instrument used shall be maintained/ calibrated with manufacturer recommended frequencies. All the certifications, accreditation and quality assurance records shall be gathered and documented if and when required by the Board.

The final monitoring plan to be implemented over the course of the construction phase will be developed as part of the contract-specific EMMP by the Contractor, for submission to the Board.

4.2 Biodiversity and Environmental Monitoring Requirements

4.2.1 Biodiversity and Environmental Inspections

4.2.1.1 Routine Biodiversity and Environmental Inspections

The Environmental Manager shall carry out routine weekly biodiversity and environmental site inspections. These inspections should cover the biodiversity and environmental situation, pollution control and implementation of mitigation measures within the site and any off-site areas which are likely to be affected, directly or indirectly, by the site activities. The site inspection shall be carried out using standardised reporting methodologies, such as a Weekly Checklist, including issues such as tree and biodiversity protection, storage of hazardous chemicals, waste reduction and management, pollution management, vector control etc.

Inspection results and associated recommendations for improvements to the protection and pollution control shall be submitted to the Contractor's Site Supervisor within 24 hours for reference and for taking immediate action. The Contractor shall follow the procedures and timeframe stipulated in the biodiversity and environmental site inspection and the deficiency and action reporting system formulated by the Environmental Manager, and report on any remedial measures subsequent to the site inspections.

4.2.1.2 Ad Hoc Biodiversity and Environmental Inspections

The Environmental Manager shall also carry out ad hoc site inspections if significant biodiversity and/or environmental problems are identified as a result of findings from the regular site inspections. Inspections may also be required subsequent to receipt of a biodiversity and/or environmental complaint.

4.2.2 Flora, Vegetation and Trees

4.2.2.1 Review of Tree Felling and Site Clearance Plans

The Contractor's appointed Certified Arborist is to determine the trees to be retained or felled before the commencement of construction activities. This is to be carried out using the arboriculture data from the Baseline Study, which includes the assessment of tree physiological health, vigour, and structural stability, photographs, as well as the geographic locations of each specimen. This should apply to trees within the development footprint, including working spaces, construction access roads, and hoarding boundaries.

Any horticultural waste resulting from vegetation clearance should be disposed of on the same day so as to reduce the likelihood of fauna seeking shelter among the horticultural waste.

4.2.2.2 Establishment of Tree Protection Zones

TPZs are to be erected for tree specimens recommended for retention by the Contractor's appointed Certified Arborist. These specimens could be within the development footprint and/or very close to but are outside the worksite boundary. Proper TPZs with a designated access for monitoring purposes should be established by the Contractor according to guidelines provided in Annex A. If there are design plans or site access issues), the Contractor's Arborist should propose measures to shield them from being damaged. This should be executed in consultation with the structural engineers and in accordance with the guidelines established by the NParks. Construction works, such as tree felling and work in the 'no-go zone' for laying of trails (avoidance of tree roots), would require the Contractor's Arborist to oversee the works.

In the event of observed damage to flora and trees, the Contractor shall carry out the following steps:

1. Take immediate action to avoid further damage to the surrounding flora and trees;
2. Notify the Board / Board's EMMP and Biodiversity Specialists for further assessment and determine the retention value of affected trees; and
3. Implement the proposed mitigation measures as recommended by the Board / Board's EMMP and Biodiversity Specialists.

4.2.2.3 Verification and Review of Footprints for Hoarding, Worksite Boundaries, and Access Roads

Following the pegging of the hoarding alignment or worksite boundaries, as well as setting out for areas required for access roads, site offices, storage yards etc., the alignment and footprints are to be verified by the Board's Flora Specialist via ground-truthing. This is to be carried out with the aid of a Global Positioning System (GPS) receiver and cross-checked with the development footprint drawings. The Flora Specialist should ensure there is no excessive vegetation and/or tree removal. Where plant specimens of conservation significance will be affected, the Flora Specialist should work with the Contractor to adjust the footprint of the area to be cleared so as to avoid direct or indirect impacts to plant specimens of conservation significance as much as possible. The Flora Specialist should also review the proposed locations for access roads, site offices, storage yards, etc., to ensure vegetation removal is kept minimal.

4.2.2.4 Monthly Arboriculture Inspection

The Contractor's appointed Certified Arborist is to carry out the following during the monthly arboriculture inspections:

1. Assess the conditions of the trees within 10 m along the new forest edges, i.e., physiological health, vigour, and structural stability, and recommended mitigation measures where necessary;

2. Assess the conditions of retained trees:
    a. Ensure they have not deteriorated and that there are no mechanical damages;
    b. Carry out rehabilitation and remediation measures of the trees exhibit signs of stress (e.g., implement a watering schedule to prevent plants from drying out);
    c. Implement long-term mitigation solutions or recommend additional tree removal where necessary;
3. Determine if more trees need to be removed after site clearance based on the construction activities happening in proximity to the retained trees;
4. Ensure that there is no water ponding as a result of soil level changes and/or improper drainage within the designated TPZs;
5. Assess the site conditions and propose solutions if there are design changes, changes in working spaces, or TPZ dimensions, etc., to minimise conflicts with the original work protocols; and
6. Inspect the integrity of the TPZs.

4.2.2.5 Monthly Flora Inspection

The Board's Flora Specialist is to carry out the following during the monthly flora inspections:

1. Identify any unauthorised removal of vegetation beyond the agreed worksite boundaries;
2. Identify any habitat degradation (e.g., soil erosion, pollution, unauthorized dumping of waste material, construction debris, or oil/chemical leakage) to sensitive habitats as a result of construction activities;
3. Identify and monitor for forest edge effects and recommend appropriate mitigation measures, where applicable;
4. Identify exotic fast-growing plants and provide recommendations for their removal, where applicable; and
5. Monitor the health of plant specimens retained within the worksites, if any.

4.2.3 Fauna

4.2.3.1 Pre-felling Fauna Inspection

The Board's Ecologist is to carry out the following for pre-felling fauna inspections:

1. Conduct pre-site clearance fauna inspections for trees and non-tree vegetation to be removed. The pre-site clearance fauna inspection includes the identification and reporting of the following:
    a. Active bird nests, including hollows, and other forms of nesting structures utilised by birds;
    b. Active mammal nests/burrows/roosts;
    c. Other less-mobile animals that are at risk of injury/mortality during tree felling or vegetation removal (e.g., Sunda pangolin);
    d. Animals that may be implicated in human-wildlife conflict (e.g., snakes);
2. Check tree trunks, branches and canopy with binoculars from multiple angles and distances. Any cavities in tree trunks that may be utilised as nesting/roosting structures are to be noted for closer inspection if deemed potentially active. If a nest is potentially identified and activity level is uncertain, the Ecologist will conduct or supervise the closer investigation of the nest site utilising elevating equipment where required;
3. Produce a pre-felling fauna inspection report, indicating any relevant information collected during the inspection, including Tree Tag ID (and/or flora location coordinates if not tagged), animal observations, recommended actions, and photographic evidence;
4. Pre-felling fauna inspection is valid for seven days, i.e., if the inspected trees or vegetation are not removed within seven days of the Ecologist's inspection, the inspection will be repeated;

5. If animals or active nests are found, the Contractor shall:
    a. Not disturb the animal and allow them to move away on its own before tree felling or vegetation removal, unless the Ecologist deems it necessary to relocate it;
    b. Allow nesting birds to fledge and leave the nests on their own before tree felling or vegetation removal;
6. Where bamboo clusters are to be removed, the following steps will be carried out:
    a. The Ecologist will determine if the affected bamboo clusters are potential roosting sites for bamboo bats (*Tylonycteris* spp.);
    b. If determined to be a potential roosting site, the Ecologist will carry out a bamboo bat roost emergence survey to determine the presence of bamboo bats. The roost emergence survey will be carried out at least once for each bamboo cluster. The surveys will occur between 1830 – 2100 h, during which two to three Ecologists will be stationed around each bamboo cluster to observe for bamboo bat activity, and to identify slits in the bamboo stems that are used as roosts. Torches will be used to aid in the detection. Stems bearing active slits will be marked, and the number of bats residing within each slit will be documented;
    c. Bat detectors will be deployed to detect the ultrasonic echolocation calls to aid in species identification;
    d. If bamboo bats are determined to be present in the affected bamboo cluster, they will be rescued and translocated. Prior to the removal of the bamboo clusters, the Ecologist will seal the holes of identified roosts with mesh and tape if feasible, and the section of the bamboo stem bearing the roost will be cut with a chainsaw or hand saw and lowered in a controlled manner, ensuring that the section remains intact. The bamboo bats will be held in the extracted bamboo stems if they are still intact. If not, the bamboo bats will be vacated into cloth bags or cloth-lined plastic tanks. Bamboo bats obtained from the same roost will be placed in the same bag/tank;
    e. The remaining stems of the bamboo cluster will be cut stem by stem manually (e.g., chainsaw, hand saw, parang). The stems will be kept as intact as possible during felling. Each felled stem will be inspected immediately by the Ecologist for holes that are possibly entrances to roosts of the bamboo bats. All bamboo bats found occupying the bamboo stems will be held within the bamboo stems if they are still intact. Mesh and tape will be used to seal the holes of the roosts. If bamboo stems are too damaged to be sealed, the bamboo bats will be vacated into cloth bags or cloth-lined plastic tanks;
    f. If bamboo bats are not determined to be present during the roost emergence survey, the Ecologist may also recommend for the Ecologist to be present during the removal of the bamboo cluster to inspect each stem for roosting bamboo bats, as a precautionary measure;
    g. After the bamboo clusters and felled stems have been completely removed from the worksite or destroyed, any rescued bamboo bats will be translocated *ex situ* to another bamboo cluster within the Project. The location of the receptor site will be determined based on the location of the affected bamboo clusters and in consultation with the Board. The bamboo cluster at the proposed receptor site should:
        i. Not be expected to be affected by upcoming developments;
        ii. Have an existing colony of bamboo bats; and
        iii. Be within the expected home range of bamboo bats (approximately 2 km) that may be roosting within the affected bamboo cluster.
    h. If the felling of the bamboo clusters within the same worksite cannot be completed by the end of the day (i.e., 1800 h), any rescued bats will be translocated *ex situ*

to another location beyond its expected home range to reduce the likelihood of bats returning to the yet-to-be cleared bamboo stems and repeatedly being subjected to the risk of injury or mortality during subsequent bamboo felling sessions. The proposed receptor site is Bukit Batok Nature Corridor;

i. The extracted bamboo stems containing rescued bamboo bats will be attached to the stems of the receptor bamboo cluster using cable ties;
j. Bamboo bats that were vacated into cloth bags or plastic tanks will be allowed to enter the newly attached bamboo stems, if any, or allowed to fly away;
k. The newly attached bamboo stems will be monitored for at least seven consecutive weekdays by means of a camera probe to determine the presence/absence and condition of the translocated bamboo bats. The monitoring will be conducted during the daytime (0700 – 1800 h);
l. Should trapped/injured/dead bats be encountered, the Fauna Response Plan (Section 3.14) will be activated;
m. Bat handling will be performed by experienced personnel properly trained in bat handling techniques. At least one personnel will be a Certified Animal Handling Specialist (Mammals) under the CUGE Animal Management Professional Certification Programme; and
n. A translocation operation report will be generated within five working days for each operation, including the details and roles of the personnel involved, location of the receptor bamboo cluster, number of extracted bamboo stems, estimated number of bats translocated, as well as any injuries or deaths observed.

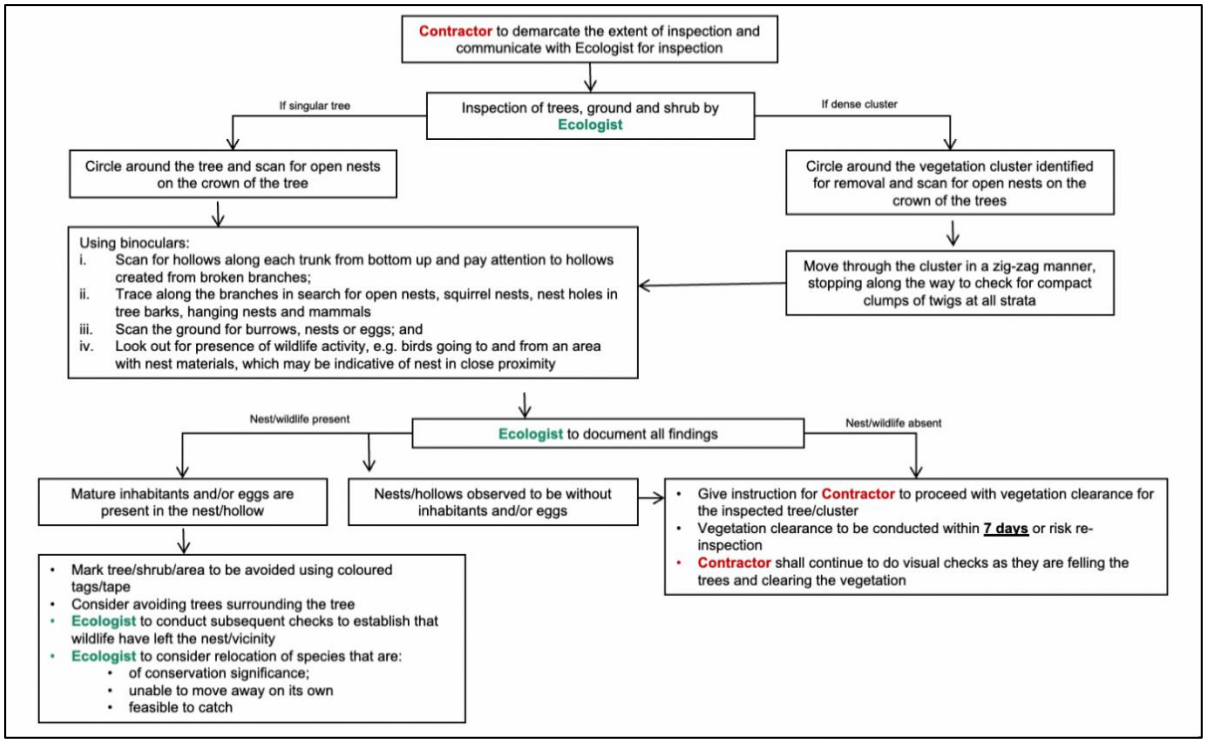

Figure 4-1: Pre-felling Fauna Inspection Protocol

4.2.3.2 Daily Fauna Inspection

The Contractor's Environmental Manager shall ensure that daily inspections including the following are carried out:

1. Visual inspections for integrity of the site hoarding to check for gaps which would allow wildlife to enter the construction works areas involving heavy machinery;
2. Visual inspections for signs of any disturbances or other violations leading to impacts on wildlife. This includes, but is not limited to, signs of trapping of animals, road kills, etc.; and
3. Check for fauna prior to daily start of works and record inspection on the Board's Fauna Inspection Form; implement Board's Fauna Response Plan (Section 3.14), where necessary; and record wildlife incidents on Board's Fauna Incident Form.

4.2.3.3 Monthly Fauna Inspection

Monthly fauna inspections will be conducted by the Board's Ecologist within the worksite boundaries. The following will be noted during the inspections:

1. Presence of trapped/injured/dead fauna;
2. Potential fauna entrapments (e.g., ECBs, TPZs, pits, drains, ponds, trenches, tanks);
3. Gaps in hoarding around worksites involving heavy machinery that may allow entry of ground-dwelling fauna; and
4. Improperly disposed/stored food and food packaging.

4.2.3.4 Monthly Fauna Monitoring

Fauna monitoring surveys will be conducted by the Board's Ecologist and will comprise terrestrial transect surveys, camera trapping, and aquatic point count. The sampling methods and locations shall closely correspond to those undertaken during the Baseline Study and/or the proposed future trails/boardwalks. For the aquatic sampling points, the locations proposed considers the proposed construction works in the vicinity/upstream. A comparison of species presence can be made with the Baseline Study, where appropriate, to indicate any changes in fauna diversity. Details of the surveys will consider construction phases, final construction footprint, and final hoarding alignment. Table 4-1 shows a summary of the survey methods for each fauna group.

Table 4-1: Summary of Survey Methods for each Faunal Group

Faunal Group	Survey Timing (h)	Description
Herpetofauna (amphibians and reptiles)	0700–1000, 2000–0000	Diurnal and nocturnal visual and auditory encounter surveys along the terrestrial sampling route
Birds	0700–1000, 2000–0000	Diurnal and nocturnal visual and auditory encounter surveys along the terrestrial sampling route
Non-volant mammals	0700–1000, 2000–0000	Diurnal and nocturnal visual and auditory encounter surveys along the terrestrial sampling route Terrestrial camera traps
Aquatic fauna (odonates, freshwater decapod crustaceans, fish, amphibians, reptiles)	0700–1000	20-min diurnal visual point count surveys at aquatic sampling points
Minnow trapping	Overnight	Traps inside aquatic sampling points along streams

Terrestrial Transect Surveys

Faunistic surveys will be conducted along terrestrial sampling routes (Figure 4-2). This will include one diurnal and one nocturnal survey per month. The survey will be conducted in the reverse transect direction on alternate months. All fauna encountered will be identified to species, or the

lowest taxonomic level possible. The locations of all fauna sightings will be recorded using a handheld GPS receiver. Important behavioural observations (e.g., displaying guarding, mating, ovipositing) and plant species that the animal was observed to be feeding, laying eggs, or nesting on, will be recorded.

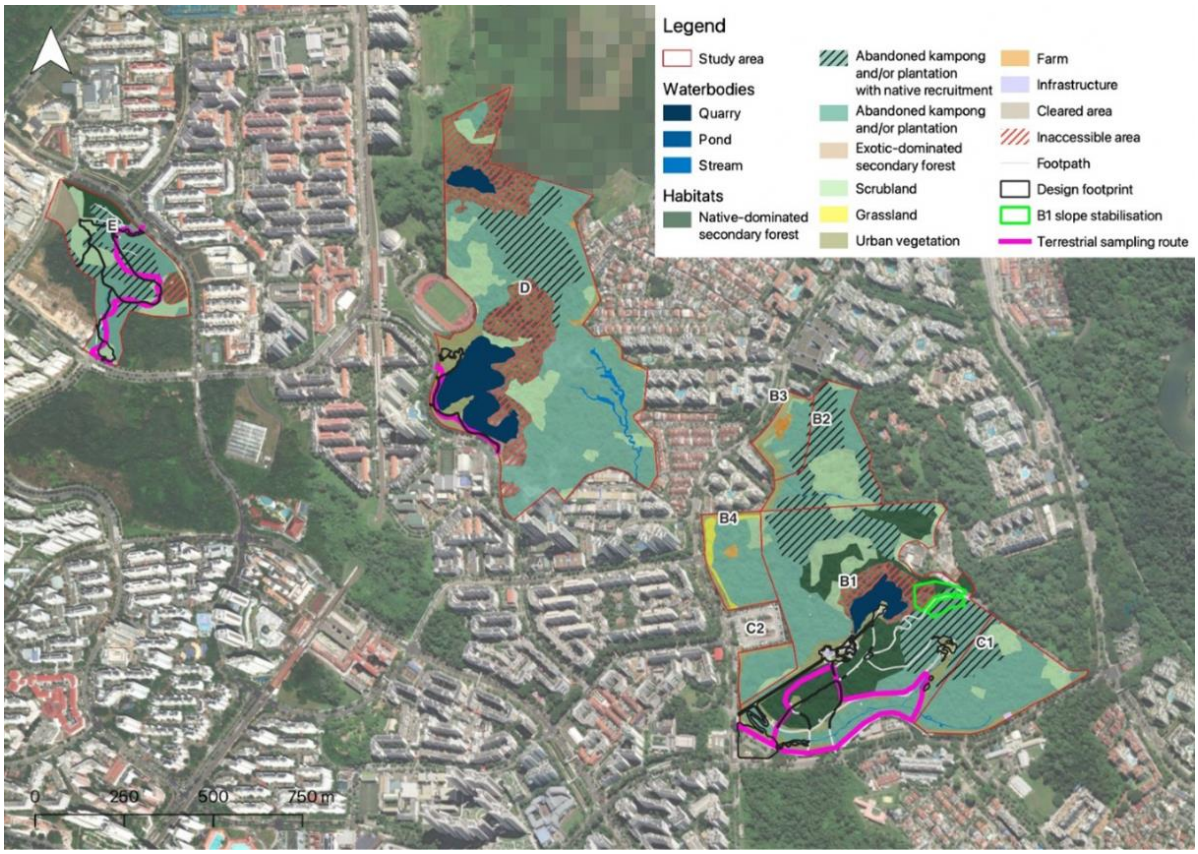

Figure 4-2: Terrestrial Fauna Survey Routes

Terrestrial Camera Trapping

Camera traps as shown in Figure 4-3 shall be deployed and maintained for the purpose of monitoring non-volant mammals during the construction phase. A total of at least 35 camera traps shall be deployed across BBNP, BBTP, and BBHNP at locations close to those deployed during the Baseline Study and that are in proximity to the proposed developments. The minimum number of camera traps that shall be deployed in each Study Area is shown in Table 4-2. The camera traps shall be deployed at approximately 20–30 cm above ground. They shall be operational 24 h a day and programmed to record a 10-s footage per trigger with a 10-s quiet period following each trigger. Camera trap maintenance and data retrieval shall be carried out once a month.

Table 4-2: Minimum Number of Camera Traps that will be deployed at each Study Area

	Study Area	No. of Camera Traps
B1	Bukit Batok Nature Park	18
D	Bukit Batok Town Park	4
E	Bukit Batok Hillside Nature Park	13
	Total	**35**

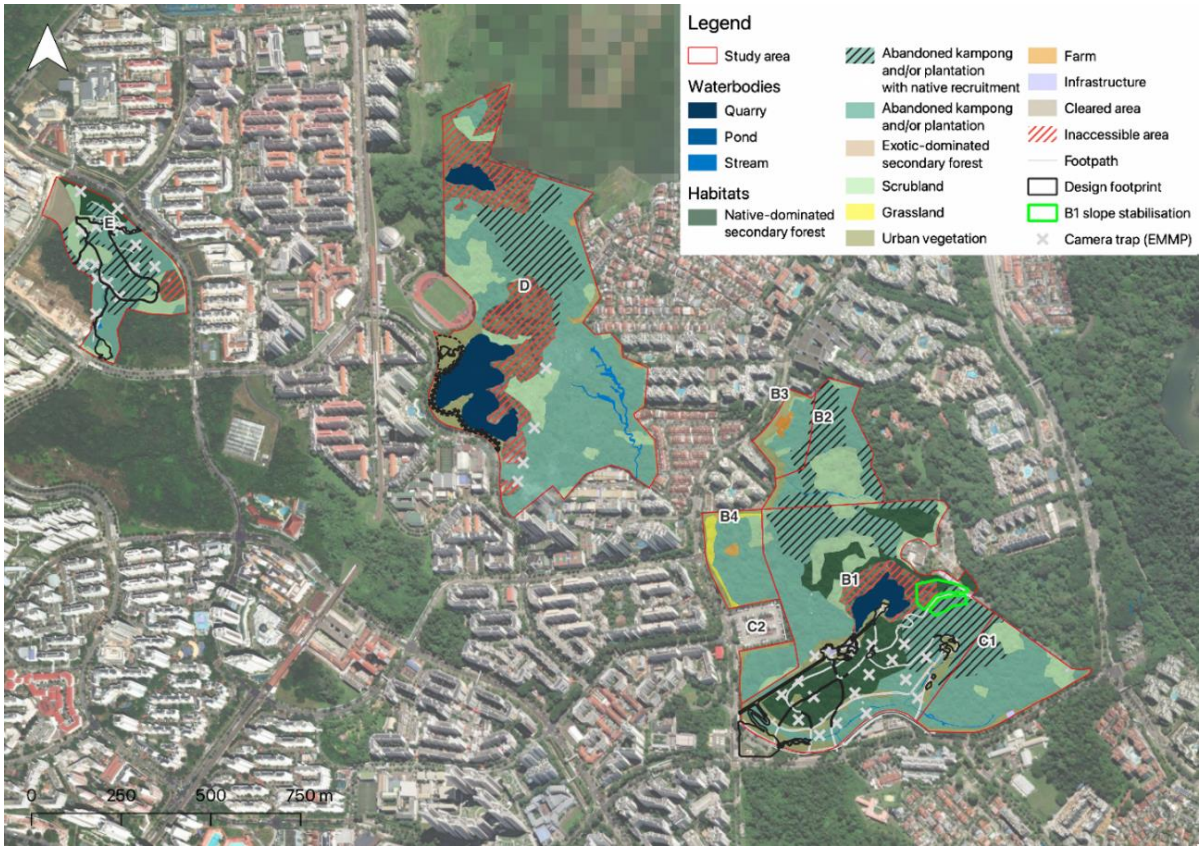

Figure 4-3: Locations of Terrestrial Camera Traps

Aquatic Sampling Points and Minnow Trapping

Aquatic fauna will be sampled at eight points in the vicinity of the proposed developments as shown in Figure 4-4. Twenty-minute diurnal and nocturnal visual point count surveys will be conducted at each aquatic sampling point. A visual inspection on the clarity of the water as well as any impacts arising from the developments will be noted.

Minnow traps baited with halal meat (e.g., sausage or liver) will be deployed at the aquatic sampling points along streams (excluding quarries) (Figure 4-4). The traps will be left overnight, then checked and removed the following morning. All caught individuals will be released immediately upon identification.

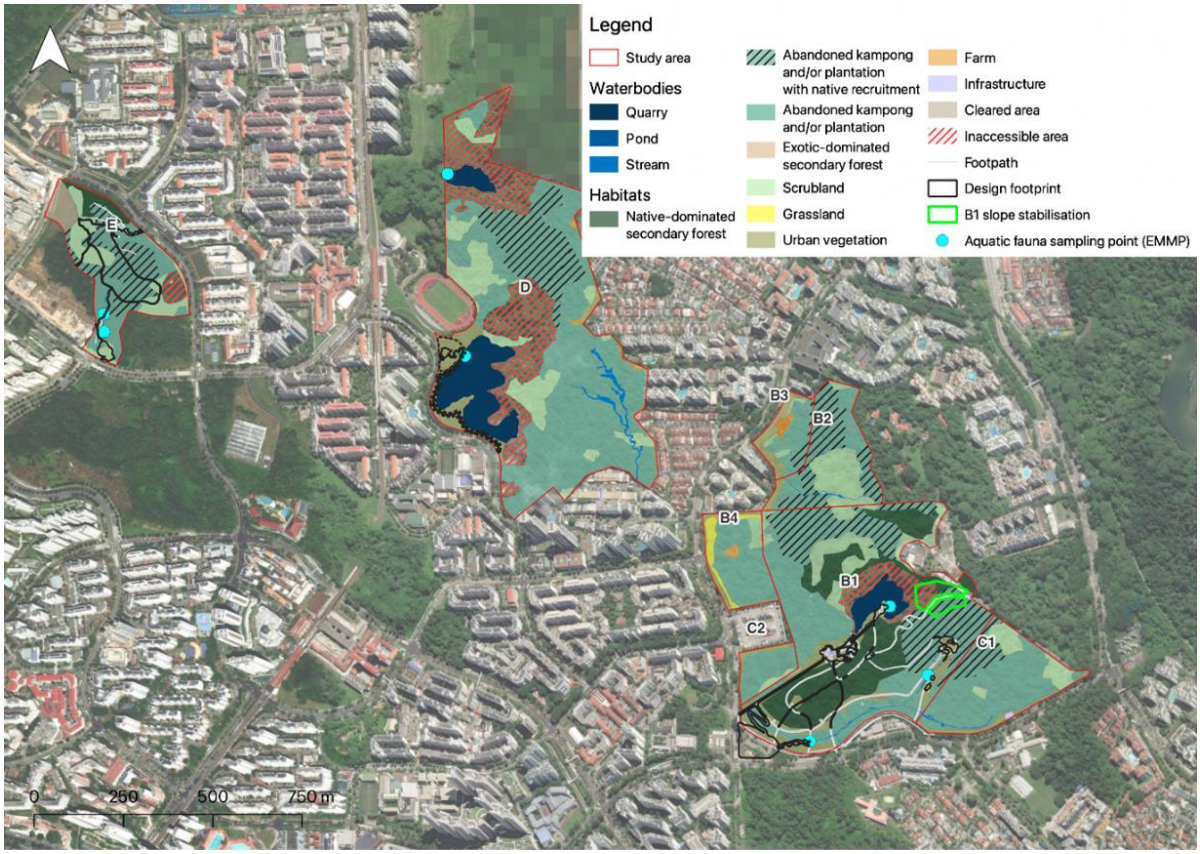

Figure 4-4: Locations of Aquatic Fauna Sampling Points

4.2.4 Water Quality

4.2.4.1 Earth Control Measures (ECM)

The Contractor shall engage a registered QECP to design erosion and sedimentation control measures in construction sites, and preparing, submit and obtain approval from PUB for the erosion and sedimentation control plans.

The Contractor shall:

a) Implement and execute effective ECM during the construction stage at all times. The ECM shall be implemented according to PUB's Code of Practice on Surface Water Drainage;
b) Implement and execute specific ECM and monitoring during the in-steam and near-stream works at all times, in accordance with PUB's Code of Practice on Surface Water Drainage and the project-specific requirements;
c) Ensure the QECP reviews the effectiveness of the ECM regularly during the course of the construction work. The Contractor shall revise the ECM as and when advised by the QECP;
d) Ensure the records of the ECM operation and maintenance are regularly updated and available on-site for review by the Board / Board's EMMP and Biodiversity Specialists; and
e) Ensure the ECM are not removed until all works are completed and upon advice from the QECP, as agreed with the Board / Board's EMMP and Biodiversity Specialists.

The Contractor shall ensure only 100% biodegradable ECBs are deployed at the site.

4.2.4.2 Surface Water Pollution

The Contractor shall:

a) Monitor surface water run-off from the site for the presence of suspended solids / siltation of the water impacting on downstream surface waterbodies during the construction phase. Prior to discharge, the surface water will be collected on-site and treated to reduce silt levels to a concentration of TSS below 50 milligram per litre (mg/L) of discharge, as stated in the Sewerage and Drainage (Surface Water Drainage) Regulations;
b) The Contractor shall report the monitoring results to the PUB who can issue a 'stop work' order if concentrations reach unacceptable levels;
c) The Contractor shall utilise a calibrated and validated TSS sensor/analyser, silt meter or turbidity sensor (for conversion into TSS concentrations in mg/L), or equivalent. The location of the instrument is to be proposed by the QECP and shall be subjected to the approval of the Consultant and Client. Continuous 24-hour TSS measurements will be taken and fed to the Contractor via a real-time monitoring system for water discharged from the construction / work site to the public / on-site drainage network or water bodies at all surface water discharge points;
d) In addition to the real-time TSS monitoring, the Contractor shall monitor water quality at the natural stream and quarry lakes on-site on a monthly basis during the period of **in-water or near-water** construction work activities. The specific sampling locations are to be proposed by the contractor and shall be subjected to the approval of the Consultant and Client. The period of appliable work and the water monitoring locations shall be advised to the Contractor on commencement of the Contract;
e) Water quality parameters shall be as follows:
    i. Monthly water quality monitoring (upstream and downstream):
        <u>In-situ (in the field)</u>
        i. Temperature;
        ii. pH;
        iii. Turbidity;
        iv. Conductivity;
        v. Salinity;
        vi. Dissolved Oxygen (DO); and
        vii. Total Dissolved Solids (TDS);

        <u>Ex-situ (Laboratory Analysis)</u>
        i. Biochemical Oxygen Demand (BOD);
        ii. Chemical Oxygen Demand (COD);
        iii. Total Suspended Solids (TSS);
        iv. Total Nitrogen (TN);
        v. Total Phosphorous (TP);
        vi. Oil and Grease (total); and
        vii. Heavy metals (cadmium, copper, zinc and lead).
    ii. Weekly water quality monitoring during Stream / Quarry Works (upstream and downstream):
        i. Oil and Grease (total); and
        ii. Total Suspended Solids (TSS).
    iii. Daily water quality monitoring during Stream Works, if required by the Board:
        i. Total Suspended Solids (TSS).
f) Submit a comparison of the water quality levels recorded against the allowable limits for trade effluent discharge to controlled watercourse as stipulated by the Environmental Protection and Management (Trade Effluent) Regulations, for the month in the EMMP Monthly Report; and

g) Ensure that the water quality levels do not exceed the allowable limits. For any exceedance of the stated limit, the Contractor shall investigate the cause of exceedance and take immediate steps to arrest source of pollution. Additional water quality monitoring and mitigation measures shall be deployed if requested by the Board.

As part of the weekly EMMP site inspection, the Contractor shall also observe if there has been any non-compliance to any of the minimum controls i.e., on measures related to housekeeping, waste and chemical management.

4.2.5 Noise Monitoring Requirements

Noise can affect an animal's physiology and behaviour, and if it becomes a chronic stress, noise can be injurious to an animal's energy budget, reproductive success, and long-term survival. Research has shown that noise pollution has an adverse impact on wildlife, though no noise limits for reducing the impact has been established. As much as possible, noise generated at the site shall be minimised.

An effective noise monitoring regime facilitates the understanding of noise sources and time periods which are of concern which can then adopt necessary mitigation measures. The Contractor shall:

a) Conduct pre-construction noise baseline monitoring for seven (7) days, one (1) month before commencement of construction work and conduct continuous monitoring throughout the construction phase by installing real time continuous 24-hour "live" monitoring devices to monitor the noise levels at different locations. This system shall be equipped with a SMS "alert" feature when allowable limits are exceeded. Access to the system shall be made available to the Board's EMMP Specialist;
b) Continuous monitoring devices shall be located at the following locations or other works area if the requested by the Board, and any other location deemed necessary by Contractor to ensure compliance with the EPM (Control of Noise at Construction Sites) Regulations;

Table 4-3: Recommended Airborne Noise Monitoring Program

No.	Study Area	Location	Parameter	Frequency and duration
1	BBNP	Located towards the southwestern corner of BBNP (Area B1), near to the St Mary of the Angels Church and BLK 266 HDB Bukit Batok East	$LAeq_{(12\ hour)}$, $LAeq_{(1\ hour)}$, and $LAeq_{(5\ min)}$	Pre-construction baseline for seven (7) days; and Continuous monitoring throughout the construction phase
2		Located near to the entrance of the Heritage Trail near Lor Sesuai		
3	BBTP	Located at the proposed arrival node from Bukit Batok West Ave 5, near to BLK 524 HDB Bukit Batok		
4	BBHNP	Located at the proposed arrival node from Bukit Batok West Ave 5, near to West Plains@Bukit Batok		
5		Located at the second entrance from Bukit Batok West Ave 2, near to BLK 315 HDB Bukit Batok and Dazhong Primary School		

Figure 4-5: Locations of Noise Monitoring Units

c) Submit a graphical comparison of the noise levels recorded against the permissible noise levels for the month in the EMMP Monthly Report; and
d) Ensure that the noise levels do not exceed the maximum permissible noise levels for construction set out in the Schedule to the Environmental Protection and Management (Control of Noise at Construction Sites) Regulations at the boundary. For any exceedance of the stated limit, the Contractor shall investigate the cause of exceedance and take immediate steps to arrest source of pollution. Additional noise monitoring and mitigation measures shall be deployed if requested by the Board.

As part of the weekly EMMP site inspection, the Contractor shall also:

- Observe if there has been any non-compliance to any of the minimum control or mitigation measures related to noise control measures;
- Observe if complaints are received due to the project activity related to noise; and
- Observe the conditions of the on-site noise mitigation equipment e.g., noise barriers or acoustic enclosures.

4.2.6 Air Quality Monitoring

Air pollution from construction works can have an adverse impact on wildlife and human receptors. As much as possible, air emissions generated at the site shall be minimised.

The Contractor shall:

a) Conduct pre-construction ambient air baseline monitoring for seven (7) days, one (1) month before commencement of construction work by installing real time continuous 24-hour "live" monitoring devices to monitor the PM_{10} and $PM_{2.5}$ levels at different locations;

b) The air monitoring devices shall be located at the following locations or other works area if the requested by the Board, and any other location deemed necessary by Contractor to ensure compliance with the limits of the Singapore Air Quality Targets:

Table 4-4: Recommended Ambient Air Monitoring Program

No.	Study Area	Location	Parameter	Frequency and duration
1	BBNP	Located towards the southwestern corner of BBNP (Area B1), near to the St Mary of the Angels Church and BLK 266 HDB Bukit Batok East	PM_{10}, and $PM_{2.5}$	Pre-construction baseline for seven (7) days, one (1) month before the construction works; and In the event of a valid complaint, once a month for as long as the particular complaint related construction activity continues.
2		Located near to the entrance of the Heritage Trail near Lor Sesuai		
3	BBTP	Located at the proposed arrival node from Bukit Batok West Ave 5, near to BLK 524 HDB Bukit Batok		
4	BBHNP	Located at the proposed arrival node from Bukit Batok West Ave 5, near to West Plains@Bukit Batok		
5		Located at the second entrance from Bukit Batok West Ave 2, near to BLK 315 HDB Bukit Batok and Dazhong Primary School		

Figure 4-6: Proposed Locations of Air Monitoring Units

c) In the event of a valid complaint, the Contractor shall conduct a 7-day continuous monitoring of PM_{10} and $PM_{2.5}$ once a month for as long as the particular complaint related construction activity continues;
d) Should continuous monitoring be activated due to a valid complaint, submit a graphical comparison of the PM_{10} and $PM_{2.5}$ levels recorded against the Singapore Air Quality Targets and the pre-construction baseline air monitoring data in the EMMP Monthly Report. The Contractor shall ensure that the PM_{10} and $PM_{2.5}$ levels do not exceed the Singapore Air Quality Targets of 50 microgram per cubic metres ($\mu g/m^3$) (24 hour averaging time) for PM_{10} and 25 $\mu g/m^3$ for $PM_{2.5}$. For any exceedance of the stated limit, the Contractor shall investigate the cause of exceedance and take immediate steps to arrest source of pollution; and
e) Additional dust monitoring and mitigation measures shall be deployed if requested by the Board.

As part of the weekly EMMP site inspection, the Contractor shall also:

- Observe if there has been any non-compliance to any of the minimum control or mitigation measures related to air pollution control measures; and
- Observe if complaints are received due to the project activity.

4.2.7 Vector Control Monitoring

The Contractor shall:

a) Take precautionary measures to eradicate breeding sites on-site;
b) Appoint a Pest Control Officer (PCO) to conduct regular checks;
c) Ensure all mosquito breeding areas found on the site are destroyed. All potential breeding habitats should be removed (e.g. remove ponded water, cover/seal up breeding sites); and
d) Ensure vector control checks are incorporated into Site Inspections by the Environmental Manager and ECO/PCO. Checks for mosquito breeding shall include the following places, where applicable:
    i. Discarded receptacles and building wastes in the worksite and site offices;
    ii. Building materials, canvas sheets, equipment and machinery;
    iii. Puddles on the ground;
    iv. Puddles on the concrete floors of all upper levels and basement;
    v. Water storage drums, tanks and containers;
    vi. Bulk waste containers;
    vii. Trenches;
    viii. Safety barriers;
    ix. Rooftop and water tanks;
    x. Treatment plants;
    xi. Any other water-bearing receptacles.

5. Biodiversity and Environmental Reporting during the Construction Phase

5.1 Reporting Requirements

The below reports should be submitted in a format approved by the Board.

5.1.1 Weekly Reporting

The Contractor shall maintain a weekly written report documenting the compliance of the Construction Works against EMMP requirements and this document shall be made available to the Board when requested.

5.1.2 Monthly Reporting

The Contractor shall prepare and submit monthly EMMP Reports within the first week of each month, to report on different aspects of the EMMP implementation in the preceding month for the whole construction phase. Non-conformities shall be highlighted in the reports.

The contents of the EMMP Monthly Reports shall include but is not limited to the following:

a) Types of relevant mitigation and management works implemented, corresponding to the specific project stage/activities;
b) Performance of the mitigation and management works;
c) Biodiversity and environmental monitoring results and findings, corresponding to the specific project stage/activities;
d) Incidents on site including incident investigation, root cause and corrective actions;
e) Assessment of results against environmental standards; and
f) Further recommendations and corrective measures, if any.

The frequency of the EMMP Monthly Report may be adjusted to the corresponding construction stage or post-construction monitoring scopes required in the EMMP measures.

The Environmental Manager is required to attend regular construction progress meetings between the Contractor and the Board (at least once a month) to present the monitoring results and observations, as well as recommendations where necessary.

5.1.2.1 Incidental Reporting

Should the monitoring activities identify actual and/or potential non-conformities, the Environmental Officer shall implement or ensure implementation of corrective and preventive actions to deal with the identified non-conformities. This shall include and shall not be limited to the following:

a) Identifying and investigating non-conformities to determine their causes(s);
b) Correcting non-conformities and taking measures to mitigate their biodiversity and environmental impacts as appropriate;
c) Evaluating the needs for actions(s) to prevent non-conformities and implementing appropriate actions designed to avoid their recurrence;
d) Recording the results of corrective actions, preventative actions and any decisions made on the EMMP; and
e) Reviewing the effectiveness of actions and decisions.

Major environmental incidents / non-conformances shall be reported to the Board's EMMP Specialist.

5.2 Submission of Monitoring Reports

The following Table 5-1 below lists the submissions requirements for the Monitoring Reports.

Table 5-1: Submissions Requirements for EMMP Monitoring Reports

S/N	Type of Report	Schedule of Delivery	Submission Requirements
1.	Submission of EMMP (Draft)	Minimum 1 month prior to mobilisation to site	1 soft copy + 1 hard copies
2.	Submission of EMMP (Final approved copy)	Prior to physical works commencement	1 soft copy + 2 hard copies
3.	Monthly Progress Reports	By the 4th working day of the month for the preceding month	1 soft copy + 2 hard copies
4.	Incident Compliance Reports	By 5 pm of the day after the incident	1 soft copy
5.	Other reports (Final approved copy)	As required	1 soft copy + 2 hard copies

Note:
Softcopy - Digital format in email or CD; and
Hardcopy - Coloured printed and bound.

The Contractor shall ensure that all reports and documentation are prepared in a concise, accurate and professional manner with supporting diagrams, illustrations, and drawings.

6. Biodiversity and Environmental Management during the Operational Phase

6.1 Responsibilities of the Board during Operational Phase

As the Project Owner, the Board is responsible for overseeing and managing the biodiversity and environmental monitoring detailed in the EMMP for the operational phase. NParks is required to:

a) Ensure resources and appropriate personnel are available to achieve the requirements of the EMMP;
b) Provide leadership in the implementation of the EMMP;
c) Ensure all environmental incidents and near misses are promptly investigated and reported;
d) Resolve any non-compliance issues;
e) Record, respond to, and action any complaints from members of the public, if any.

6.2 Noise Pollution Control

During the operational phase, the Board shall ensure that the following minimum controls are implemented:

Work Activities	Minimum Controls
Noise from increased traffic Noise from the park visitors and/or park maintenance workers Noise from landscaping and maintenance works at the parks (e.g., use of lorry cranes, grass cutter, chainsaws, leaf blowers, etc.)	• The Board or its Contractor shall select quieter landscaping and maintenance related equipment. • The Board or its Contractor shall ensure that all landscaping and maintenance-related equipment and machinery is maintained and operated in a manner such that it does not give rise to excessive noise.
Operations of the park Air-conditioning and mechanical ventilation (ACMV) and Mechanical and Electrical (M&E) equipment	• Use low noise air-conditioning compressors. • While expected to only operate over a short period / only during emergencies, the fire hosereel pumps and emergency diesel generator shall be sited as far away as practical from the noise-sensitive and residential buildings. • Noise abatement measures, if required, shall be provided to comply with the allowable boundary noise levels.

6.3 Air Pollution Control

During the operational phase, the Board shall ensure that the following minimum controls are implemented:

Work Activities	Minimum Controls
Emissions from park M&E equipment (backup diesel generator), and landscaping and maintenance equipment (e.g., lorry cranes,	• The Board shall ensure that the park backup diesel generator and all landscaping and maintenance-related equipment, machineries and vehicles are maintained and operated in a manner such that it does not give rise to excessive smoke emissions, and ensure emissions comply with the Environmental Protection and Management (Vehicular Emissions)

Work Activities	Minimum Controls
grass cutter, chainsaws, leaf blowers, etc.)	Regulations or Environmental Protection and Management (Off-Road Diesel Engine Emissions) Regulations 2012, if applicable.

6.4 Surface Hydrology and Water Pollution Control

During the operational phase, the Board shall ensure that the following minimum controls are implemented:

Work Activities	Minimum Controls
General	• Strategically allocate garbage bins to minimise the likelihood of littering into water bodies • Put up signs to remind park users to not litter into the water bodies and the environment

6.5 Soil and Sediment Pollution Control

The Board shall respectively ensure the following minimum soil and sediment pollution controls are implemented for the project during the operational phase to reduce impacts to soil (and potentially groundwater) and sediment.

Work Activities	Minimum Controls
Storage, use and refuelling of equipment and machinery	• Practice due diligence in proper storage and handling of machinery to prevent release of chemicals, fuels or other potentially harmful materials. • Transfer of fuel shall be done over contaminant trays and mats to prevent spillage into the ground. • Ensure oil-containing equipment or machineries are inspected for leaks before being put into use. • Provide emergency spill kits on site in the event of any fuel spillages. The emergency response team shall also be competent in the use of these spill kits.

Work Activities	Minimum Controls
Chemical and fuel storage	• Chemical and fuel in drums, carboys, containers, etc shall be stored in a designated storage area within a building or covered shed with concrete floors and containment facilities to contain any leak or spillage. • A full containment should be provided for bulk storage oil tanks, including skid tanks. • Ensure all hazardous substance and chemical containers are labelled as per the requirement of SS 586 - 2: 2022. • Ensure a chemical inventory is maintained to track the movement of all hazardous substance and chemicals. • Return the chemicals back to its designated storage areas when not in use. • Transfer of chemicals shall be done over contaminant trays and mats to prevent spillage into the ground. • All leaks and spillages in the storage area or construction site shall be collected and sent to a licensed toxic waste collector for proper disposal. • Provide emergency spill kits on site in the event of any chemical spillages. The emergency response team shall also be competent in the use of these spill kits.
Toxic waste storage and disposal	• Ensure toxic industrial wastes (TIWs) are stored in a designated storage area within a building or covered shed with concrete floors and containment facilities to contain any leak or spillage. • Maintains a TIW register, which is to be updated on a weekly basis. • TIW shall be collected regularly by a licensed TIW collector for off-site disposal. • Ensure leaks and spillages in the TIW storage area or construction site are collected and sent to a licensed toxic waste collector for proper disposal.

6.6 Biodiversity Management

During the operational phase, the Board shall ensure that the following minimum controls are implemented:

Work Activities	Minimum Controls
General	• Ensure noise levels are within approved limits. • Ensure dust levels are within approved limits. • Avoid fogging by implementing preventive measures for mosquito to remove sources of stagnant water or water-bearing receptacles (e.g., provide well-maintained pitched roof, clear discarded items daily, store materials appropriately, level up ground depression/uneven surfaces, ensure effective drainage flow). • The Wildlife Act, Section 5, 2020. "A person must not intentionally release any wildlife in any place unless the person has the Director-General's written approval to do so". "A person who contravenes (the above) shall be liable on conviction to a fine not exceeding $5,000.

Work Activities	Minimum Controls
	• The Wildlife Act, Section 5, 2020. "A person must not intentionally kill, trap, take or keep any wildlife in any place unless the person has the Director-General's approval to do so". "A person who contravenes (the above) shall be liable on conviction – o in the case where the offence is committed in respect of a protected wildlife, to a fine not exceeding $50,000 or to imprisonment for a term not exceeding 2 years or to both; and o in any other case – ▪ for a first offence, to a fine not exceeding $10,000 or to imprisonment for a term not exceeding 6 months or to both; and ▪ for a second or subsequent offence, to a fine not exceeding $20,000 or to imprisonment for a term not exceeding 12 months or to both."