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SPECIALIST CONSULTANCY SERVICES FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR TENGAH SITE 1

Environmental Impact Assessment Report

Prepared for:
National Parks Board
14 September 2026

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Prepared for

National Parks Board

For and on behalf of ESC

Liam Hogg
Principal Consultant, Singapore

ESC Project No. J24.00580.SG.01

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LIST OF ABBREVIATIONS

AOO	Area of Occupancy
APHA	American Public Health Association
AQ	Aquatic Transect
BCA	Building and Construction Authority
BIA	Biodiversity Impact Assessment
BOD	Biochemical Oxygen Demand
BTO	Build-To-Order
CCTV	Closed-Circuit Television
CEMMP	Construction Environmental Management and Monitoring Plan
CH2M	CH2M HILL Singapore Pte Ltd
COD	Chemical Oxygen Demand
COP	Code of Practice
CR	Critically Endangered
CS	Conservation Significance
CT	Camera Trap
DD	Data Deficient
DEM	Digital Elevation Model
DO	Dissolved Oxygen
DSTA	Defence Science and Technology Agency
DTM	Digital Terrain Model
ECM	Earth Control Measures
ECMO	Earth Control Measures Officer
ECO	Environmental Control Officer
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Study
EMMP	Environmental Management and Monitoring Plan
EN	Endangered
EOO	Extent of Occurrence
EPM	Environmental Protection and Management

EPMA	Environmental Protection and Management Act
ES	Environmental Score
ESC	EnviroSolutions & Consulting Pte Ltd
EX	Extinct
F&B	Food and Beverage
FOG	Fats, Oils and Grease
FT	Fauna Transect
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HDB	Housing & Development Board
IUCN	International Union for Conservation of Nature
JRL	Jurong Region Line
JTC	JTC Corporation
LAeq	Equivalent Continuous Sound Level
LC	Least Concern
LMP	Light Management Plan
LTA	Land Transport Authority
MRT	Mass Rapid Transit
MSW	Municipal Solid Waste
NA	Not Applicable
NE	Not Evaluated
NEA	National Environment Agency
NEx	Presumed Nationally Extinct
NG	Nature Group
NH_3-N	Ammoniacal Nitrogen
NL	Not Listed
NM	Noise Monitoring
NO_3-N	Nitrate Nitrogen
NParks	National Parks Board
NT	Near Threatened
NTU	Nephelometric Turbidity Unit

PH	Public Holidays
PUB	Public Utilities Board
QECP	Qualified Erosion Control Professional
RAC	Recommended Area of Conservation
RDB1	Singapore Red Data Book, First Edition
RDB2	Singapore Red Data Book, Second Edition
RIAM	Rapid Impact Assessment Matrix
RTK	Real-Time Kinematic
SAC-SINGLAS	Singapore Laboratory Accreditation Scheme
SD	Secure Digital Memory Card
SLA	Singapore Land Authority
SPL	Sound Pressure Level
SRDB3	Singapore Red Data Book, Third Edition
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
UAV	Unmanned Aerial Vehicle
URA	Urban Redevelopment Authority
VU	Vulnerable
WB1	Waterbody 1
WB2	Waterbody 2
WQ	Water Quality
WTE	Waste-to-Energy

1 INTRODUCTION

The National Parks Board (NParks), acting on behalf of the Housing & Development Board (HDB), engaged EnviroSolutions & Consulting Pte Ltd (ESC) to undertake an Environmental Impact Assessment (EIA) for proposed developments within the Tengah Joint EIA Study.

The study area for the Tengah Joint EIA comprises two land parcels, namely Site 1 (Project Site) and Site 2 (Figure 1-1). This EIA report focuses exclusively on Tengah Site 1 (hereinafter referred to as the "Project" or "Project Site"). A separate EIA report, which is currently being developed, will address the assessment of Site 2.

Figure 1-1: Tengah Joint EIA Study Boundaries

An Environmental Impact Study (EIS) was previously conducted in 2021 for the wider Tengah area, which included the Project Site (Figure 1-2), and was approved by the Urban Redevelopment Authority (URA). As the Project Site has remained undeveloped since the completion of the 2021 EIS, NParks has required the preparation of an EIA to revalidate the previously established baseline conditions and assess the potential environmental impacts associated with the Project.

The Project Site covers approximately 16.7 ha and is located within Tengah. It is bounded by upcoming residential developments to the east, Tengah Park Avenue to the south, and forested areas associated with Site 2 to the north and west. The future MRT station and viaduct, currently under construction as part of the Jurong Region Line, runs through the Project Site and divides it into eastern and western segments.

For the purpose of this assessment, it is assumed that the majority of the Project Site will be cleared for the proposed works, with the exception of an approximately 0.8 ha area in the north-western portion that is part of the larger Recommended Area of Conservation (RAC) identified in the 2021 EIS.

This EIA seeks to revalidate the findings of the 2021 EIS and assess the potential environmental impacts associated with both the construction and operational phases of the Project.

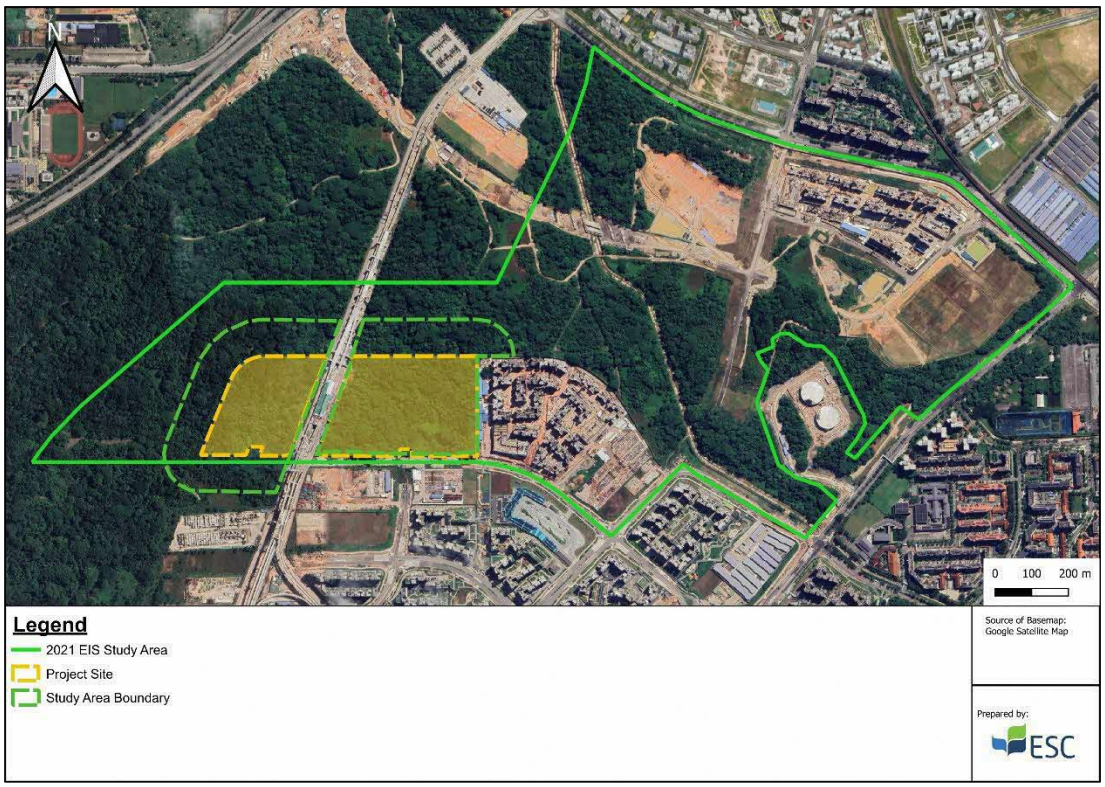


Figure 1-2: Overview of the Project Site and 2021 Tengah EIS Study Area

1.1 EIA Objectives

The objectives of the EIA are as follows:

- To identify and describe the elements of the community and environment that may be affected by the Project and/or may pose constraints to the Project, including both the natural and anthropogenic environmental factors;
- To describe the baseline environmental conditions within the Study Area and identify potential environmental constraints relevant to the development of the Project;
- To review, compare and revalidate the environmental baseline information and key findings from the 2021 EIS, and to assess whether any material changes in the Project Site conditions, ecological attributes, hydrological features, or sensitive receptors have occurred since the earlier study;
- To identify, quantify, and assess the potential environmental impacts of the Project and determine the significance of impacts on sensitive receptors;
- To propose and justify effective mitigation measures, where required, to minimise environmental impacts (e.g. pollution, environmental disturbance, and nuisance) during the construction and operational phases of the Project;

- To identify, predict, and evaluate residual environmental impacts (i.e. impacts remaining after implementation of practicable mitigation measures) and the cumulative effects, with the objective of reducing such impacts to acceptable or minimal levels;
- To investigate potential secondary environmental impacts arising from the proposed mitigation measures and to identify any associated constraints, as well as to recommend necessary modifications, where appropriate; and
- To develop an Environmental Management and Monitoring Plan (EMMP) outlining specific monitoring and environmental impact management procedures for the Project.

1.2 Scope of the EIA

The Project Site, covering approximately 16.7 ha, is zoned for development in URA's gazetted Master Plan 2025 and is to be developed into the future Tengah Town Centre. For the purpose of this assessment, the "Study Area", shown in Figure 1-3, includes the Project Site and a 100 m-wide offset extending beyond the Project Site boundary.

The scope of the EIA includes desktop reviews, baseline environmental surveys, and the identification and assessment of the key environmental impacts arising from the construction and operation of the Project, with respect to the following aspects:

- Ambient noise;
- Hydrology;
- Surface water quality;
- Biodiversity including;
    - Terrestrial flora and fauna;
    - Aquatic fauna

An EMMP has been developed to outline the proposed environmental management, mitigation measures, and monitoring plans to minimise potential environmental impacts throughout the construction and operational phases of the Project. The EIA has been prepared based on information obtained through desktop studies, data and documentation provided by the Client, site visits conducted during the baseline surveys, and the findings from the baseline environmental surveys.

1.3 Assessment Basis and Limitations

The assessments have been undertaken based on professional judgement and analysis of available data and information, and are subject to the following assumptions and conditions:

- The assessment is based on information provided by the Client at the time of study was conducted;
- The assessment utilises findings from site observations, baseline surveys, and monitoring results obtained by ESC, which are representative of the Project Site conditions at the time of assessment;
- The number and locations of monitoring points were determined primarily based on available project information and were approved by the relevant Authorities;
- Baseline monitoring for ambient air quality was not undertaken, as potential impacts are anticipated to be largely short-term and limited to the construction phase; and
- The assessment has been conducted with reference to applicable laws, regulations, and standards in force at the time of the study. Should assessment criteria and/or the legislative requirements change in the future, the findings and recommendations may require further review and revalidation.

1.4 Project Location

The Project Site is located within the Tengah planning area in western Singapore and falls within the area previously assessed under the approved 2021 EIS. The proposed Project Site occupies a 16.7 ha land parcel designated as Tengah Site 1 (Figure 1-3). The Project Site boundary represents the footprint of the proposed construction and operational activities. For the purpose of this assessment, the EIA Study Area includes a 100 m-wide offset from the Project Site boundary, and the combined area will be referred to as the "Study Area".

The Project Site is designated for urban development under the URA Master Plan 2025 and forms part of the planned Tengah Town Centre.

Figure 1-3: Project Location

1.5 Land Use

1.5.1 Historical Land Use

The wider Tengah area was historically utilised for rural settlements and plantation agriculture. Early land use comprised village housing, small-scale community infrastructure and cultivated land, including gambier and pepper plantations. Much of the original vegetation was cleared to facilitate these agricultural and settlement activities (The Straits Times, 1855; Thulaja, 2019).

Remnants of former land uses remain evident within the broader study area, including residual materials associated with past settlements and plantation activities.

Following the reduction of active disturbance in certain areas, natural regeneration occurred across previously cleared land. This has resulted in the secondary vegetation and mosaic habitat structure currently observed within the Project Site. The historical sequence of settlement, plantation use, and subsequent regeneration has shaped the present baseline environmental conditions of the Project Site.

Figure 1-4 presents historical maps of the Project Site (1945, 1987, 2010, and 2025) illustrating changes in land use over time.

Map of Project Site 1945

Map of Project Site 1987

Map of Project Site 2010

Map of Project Site 2025

Source: National University of Singapore (n.d.)

Figure 1-4: Historical Maps of the Project Site

1.5.2 Project Site and Surrounding Land Use

Based on the URA Master Plan 2025 (Figure 1-5), the Project Site is zoned for both Commercial & Residential, and Civic & Community Institution uses. An MRT alignment traverses the central portion of the Project Site, together with the planned road network. This corresponds with the ongoing construction corridor, which physically divides the Project

Site into eastern and western portions. The MRT and associated road infrastructure will form part of the primary transport network serving the future Tengah Town Centre.

Surrounding land uses include Residential, Reserve Site, Educational Institution, Park, Sports & Recreation, and associated Road and Public Transit (MRT) infrastructure. Residential parcels are located to the south and southeast of the Project Site, while an Educational Institution parcel lies to the southwest. Park-zoned areas are located to the west and north.

The zoning confirms that the Project Site will be largely developed in accordance with the Master Plan (URA, 2025), with most of the existing secondary vegetation cleared as part of the planned land use. However, approximately 0.8 ha in the northwestern portion of the Project Site overlapping the proposed RAC from the 2021 EIS is being studied for retention. In the Master Plan (URA, 2025), these Park parcels are largely safeguarded for the future Central Park. Although the introduction of the MRT and road infrastructure will reduce habitat continuity within the Project Site, the 0.8 ha RAC within the Project Site, together with the adjoining park and forested areas beyond the wider Tengah area, is expected to contribute to maintaining localised habitat connectivity within the broader Tengah landscape.

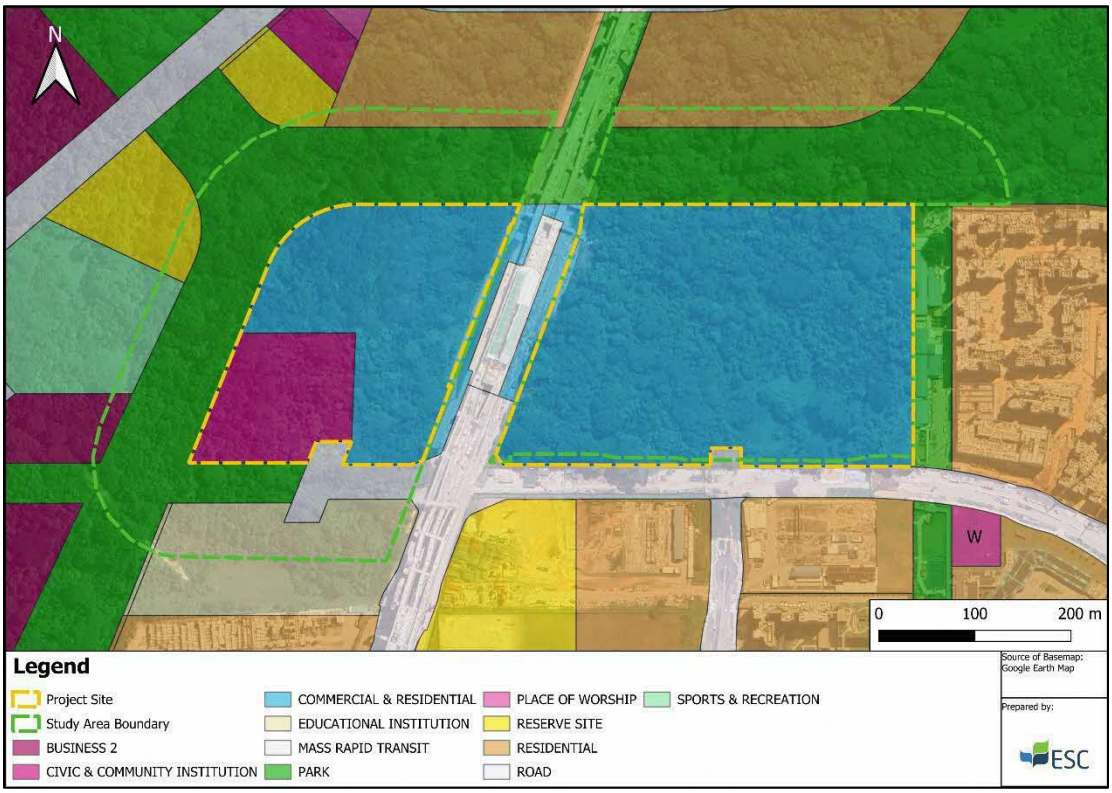


Figure 1-5: URA Master Plan 2025 of the Project Site

1.5.3 Project Site Setting

The Project Site is currently characterised by secondary vegetation that has regenerated on previously disturbed land. The Project Site comprises a mosaic of scrubland, grass-dominated areas, abandoned-land forest and patches of spontaneous woodland, reflecting varying stages of natural succession. Vegetation structure ranges from open scrub to denser regenerating tree stands.

The Project Site is located within a broader forested landscape that historically functioned as part of the ecological linkage between the Western Catchment to the west and the Central Nature Reserves to the east. In this context, the wider Tengah forest area has been recognised for its role in facilitating wildlife movement across western Singapore.

Although the surrounding landscape is undergoing progressive urban development, the remaining vegetated parcels continue to provide ecological connectivity and serve as stepping-stone habitats.

Additionally, the future MRT station and viaduct runs through the central portion of the Project Site and remains under construction, physically dividing the Project Site into eastern and western segments.

Figure 1-6 presents representative photographs illustrating the range of habitat types observed across the Project Site.

Regenerating secondary woodland with dense scrub and grasses

Dense shrub thicket with closed canopy and limited light

Abandoned-land Forest with remnants of former buildings

Active construction corridor that divides the Project Site

Figure 1-6: Photos of the Project Site Setting

1.6 Proposed Project Development

Comprising 16.7 ha of land, the Project Site is characterised by scrubland vegetation and secondary forest growth on abandoned land, with a generally undulating terrain.

The proposed development will include residential, commercial, civic & community institution components, forming part of the planned Tengah Town Centre.

Temporary construction facilities will be established within the Project Site to support construction activities. These may include site offices, storage areas, temporary access roads, workers' rest areas, hoarding, and laydown areas. All temporary facilities will be removed upon completion of works, and affected areas will be reinstated in accordance with approved development plans.

1.6.1 Construction Activities

Construction works will include site clearance, site investigations, earthworks (including cutting, filling, and infilling of the existing waterbody), slope formation, and construction of roads, drainage and sewerage systems. Building works will comprise foundation and piling works, substructure and superstructure construction, and installation of utilities and services.

1.6.2 Operation Activities

Upon completion, the Project Site will support residential, commercial and other urban uses. Operational activities will include occupation of housing units, operation of community and civic facilities, vehicular and pedestrian movement, operation of utilities and infrastructure, routine maintenance, and waste generation and management. These activities will result in a permanent human presence within the Project Site.

1.6.3 Recommended Area of Conservation (RAC)

A Recommended Area of Conservation (RAC) was identified in the 2021 EIS to prioritise the retention of ecologically important habitats within the wider Tengah study area. The delineation of the RAC was guided by key ecological considerations, including the need to maintain habitat connectivity, the presence of habitats and species of higher ecological value, and the potential to sustain biodiversity within the landscape, as seen in Figure 1-7.

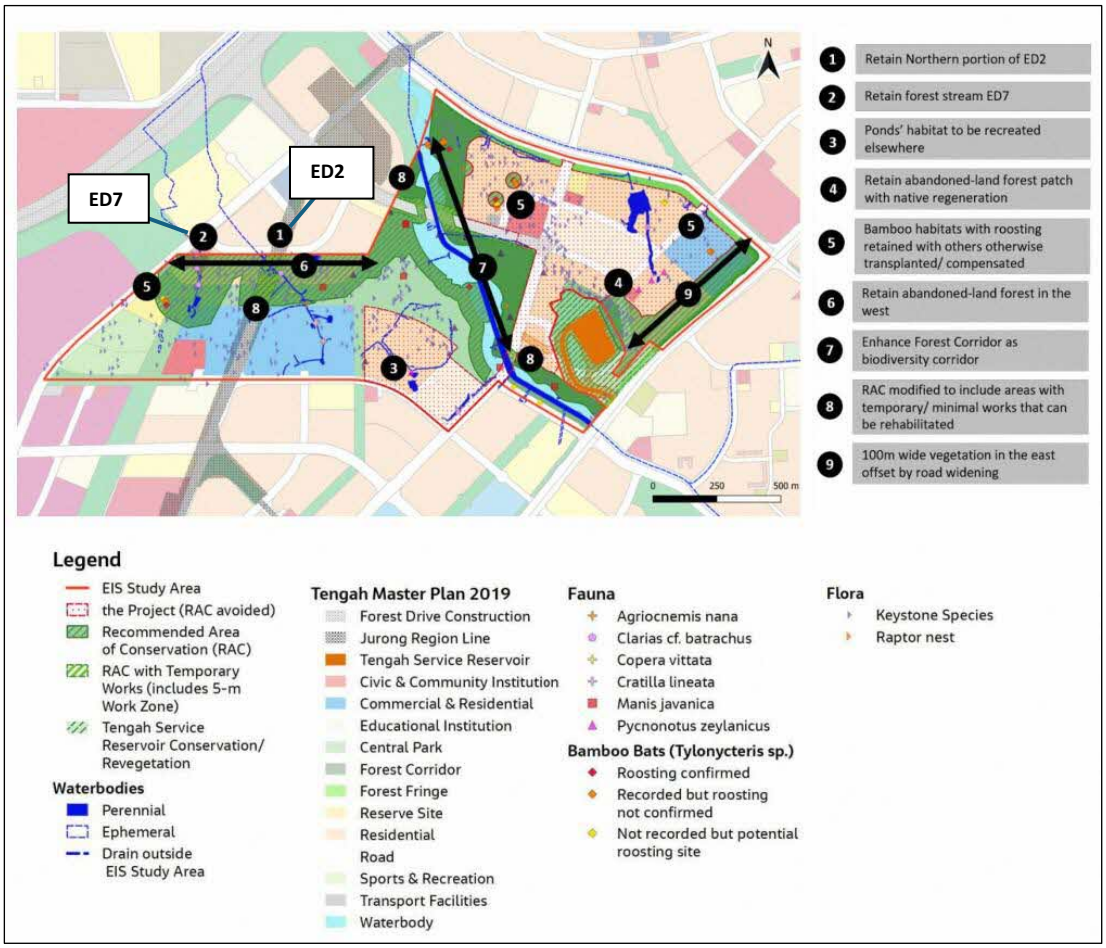
The RAC forms part of a broader network of vegetated areas linking the Project Site to the surrounding forested habitats, particularly those within Site 2 and beyond. This connectivity is important for facilitating the movement and dispersal of flora and fauna across the Tengah landscape, including species of conservation interest recorded in the area. In particular, the RAC incorporates patches of abandoned-land forest and secondary vegetation that provide suitable habitat for forest-edge and generalist fauna.

Within the RAC, several ecological features were prioritised for retention. These include forest streams and their associated sub-catchments, abandoned-land forest patches with native regeneration, and bamboo clusters that provide habitat for fauna such as roosting bats. Buffer zones were also delineated around key habitats, including waterbodies and forest patches, to minimise edge effects, maintain microclimatic conditions, and reduce disturbance from adjacent development activities.

Of particular relevance to the Study Area (Figure 1-8), portions of the RAC overlap with the north-western and northern parts of the Study Area, and 0.8 ha of the RAC is within the Project

Site. The RAC within the Study Area includes sections of forest streams ED7 and ED2 identified in the 2021 EIS (Figure 1-7). In this EIA, these stream systems are referred to as Waterbody 2 (WB2) and Waterbody 1 (WB1) respectively. These streams form part of a broader network of closed-canopy and semi-natural drainage features that support aquatic and riparian habitats and contribute to maintaining local hydrological processes within the area. The surrounding vegetation, comprising abandoned-land forest and scrub habitats, further enhances the ecological value of this area by providing habitat continuity and supporting faunal movement.

Overall, the RAC represents a spatially defined area where habitats and ecological connections have been identified for proposed retention within the wider Tengah development. The approximately 0.8 ha portion within the Project Site forms part of the larger 48.9 ha RAC identified in the 2021 EIS and should not be considered as a separate conservation area. Its proposed retention provides partial avoidance of habitat loss and contributes to habitat continuity with the adjoining RAC in Site 2. However, given its limited area, it does not replace the vegetation and habitat functions that will be lost from the remainder of the Project Site.



Source: CH2M Hill Singapore

Figure 1-7: 2021 EIS RAC

Figure 1-8: RAC and the Project Site

2 ENVIRONMENTAL LEGISLATIONS, POLICIES, REGULATIONS, STANDARDS, AND CRITERIA

This section provides the details of the legislation, policies, regulations, standards, and criteria relevant to the Project and its environmental compliance during the construction and operation phases. The applicable international guidelines are also included to supplement the national standards and criteria.

2.1 Singapore Legislations and Regulations

The Environmental Protection and Management (EPM) Act is Singapore's principal law for pollution control, covering air, water, noise, hazardous substances, and environmental health. It empowers the government and the National Environment Agency (NEA) to set standards, regulate activities, and enforce compliance. Subsidiary legislation under the EPMA addresses specific areas such as vehicular emissions, air impurities, open burning, and trade effluent discharge.

Table 2-1 summarises national legislation and regulations relevant to this EIA.

All laws and regulations referenced in this report are the latest versions as published on the Singapore Statutes Online.

Table 2-1: Applicable Singapore Legislation and Regulations

Legislation/ Regulation and Environmental Aspect	Date	Overview
Environmental Protection		
Environmental Protection and Management (EPM) Act	1999 (Amended 2025)	This Act provides a consolidation of the laws and regulations on environmental pollution control and management. The following provisions were established for each environmental aspect: Part IV: Air pollution control Part V: Water pollution control Part VI: Land pollution control Part VII: Hazardous substances control Part VIII: Noise control
Ambient Noise		
Environmental Protection and Management (Control of Noise at Construction Sites) Regulations	1999 (Amended 2011)	Sets maximum permissible noise levels for construction activities and prescribes measurement and monitoring requirements
Waste Management		

Legislation/ Regulation and Environmental Aspect	Date	Overview
Environmental Public Health Act	1987 (Amended 2025)	Provides framework for public health, sanitation, waste management, and control of environmental health hazards
Biodiversity and Natural Areas		
Parks and Trees Act	2005 (Amended 2024)	Provides for the protection, management, and preservation of parks, public trees, and greenery
Wildlife Act	1965 (Amended 2023)	Regulates the protection, conservation, and management of wildlife, including prohibitions on taking, killing, or keeping certain species

2.2 Standards and Criteria

The standards, guidelines, and criteria applicable to specific environmental aspects are outlined in the succeeding subsections.

2.2.1 Ambient Noise

In Singapore, NEA regulates noise levels from construction sites using a set of permissible noise limits as provided in Table 2-2.

Table 2-2: Maximum Permissible Noise Levels for Construction Work

Type of Affected Building	Worksite Operational Hours		
	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)
Hospitals, Schools, Institutions of higher learning, Aged Care Facilities etc.	60 dBA LAeq 12hr	50 dBA LAeq 12hr	
	75 dBA LAeq 5min	55 dBA LAeq 5min	
Residential Buildings (within 150 m of construction site)	75 dBA LAeq 12hr	65 dBA LAeq 1hr	55 dBA LAeq 1hr
(i) on Mondays to Saturdays	90 dBA LAeq 5min	70 dBA LAeq 5min	55 dBA LAeq 5min
(ii) on Sundays and public holidays	75 dBA LAeq 5min	55 dBA LAeq 5min	55 dBA LAeq 5min
All other buildings	75 dBA LAeq 12hr	65 dBA LAeq 12hr	
	90 dBA LAeq 5min	70 dBA LAeq 5min	

Source: NEA Construction Noise Control (Construction Noise Control)

In addition to the maximum permissible noise limits, contractors must also comply with the no-work rule on Sundays and Public Holidays (PH), unless permits have been issued. This requires that no construction works are carried out on construction sites located within 150 m from residential premises and noise sensitive premises during the following time periods:

- From 10:00pm on Saturday to 7:00am on the following Monday; and

- From 10:00pm on eve of Public Holiday until 7:00am on the day following the Public Holiday.

2.2.2 Water Quality

Trade Effluent Quality Standards for Discharge

The trade effluent quality standard limits for discharge to watercourse and controlled watercourse, as per the EPM (Trade Effluent) Regulations (1999) (Amendment 2008), is presented in Table 2-3.

Table 2-3: Allowable Limits for Trade Effluent Discharge

Parameters	Standard Limits (mg/L or as stated)	
	Watercourse	Controlled Watercourse
Temperature of discharge	45°C	45°C
Colour	7 Lovibond Units	7 Lovibond Units
pH Value	6-9	6-9
BOD (5 days at 20 °C)	50	20
COD	100	60
Total Suspended Solids	50	30
Total Dissolved Solids	-	1000
Chloride (as chloride ion)	-	250
Sulphate (as SO_4)	-	200
Sulphide (as sulphur)	0.2	0.2
Cyanide (as CN)	0.1	0.1
Detergents (linear alkylate sulphonate as methylene blue active substances)	15	5
Grease and Oil	10 (Total)	1 (Total)
	10 (Hydrocarbons)	
Arsenic	0.1	0.01
Barium	2	1
Tin	-	5
Iron (as Fe)	10	1
Beryllium	-	0.5
Boron	5	0.5
Manganese	5	0.5
Phenolic Compounds (expressed as phenol)	0.2	Nil
*Cadmium	0.1	0.003
*Chromium (trivalent and hexavalent)	1	0.05

Parameters	Standard Limits (mg/L or as stated)	
	Watercourse	Controlled Watercourse
*Copper	0.1	0.1
*Lead	0.1	0.1
*Mercury	0.05	0.001
*Nickel	1	0.1
*Selenium	0.5	0.01
*Silver	0.1	0.1
*Zinc	1	0.5
*Metals in Total	1	0.5
Chlorine (Free)	1	1
Phosphates (as PO_4)	5	2
Calcium (as Ca)	-	150
Magnesium (as Mg)	-	150
Nitrate (as NO_3)	-	20

Note:

1. *Controlled Watercourse refers to a watercourse from which water supplied by PUB under the Public Utilities Act is obtained but does not include a watercourse from which water is pumped into a main of the PUB.*
2. **Where two or more of the metals listed in the table are present in the trade effluent, the total concentration of the metals shall not exceed: (i) 1 milligram per litre, if discharged into watercourse other than controlled watercourse; and (ii) 0.5 milligrams per litre, if discharged into controlled watercourse.*
3. *" - " No specified maximum concentrations under the Regulations.*

2.2.3 Biodiversity

Conservation Status and National Classification

The national conservation status for species in Singapore follows the classifications from the 3rd edition of the Singapore Red Data Book (SRDB3) (Davison, et al., 2024). Table 2-4 presents the category definitions for all flora and fauna based on SRDB3.

Table 2-4: Category Definitions in the 3rd Edition of Singapore Red Data Book

Category	Criteria
Globally Extinct (EX)	The species is extinct all over the world, both in the wild and in cultivation.
Presumed Nationally Extinct (NEx)	The species is extinct (extirpated) within Singapore, but it still survives outside Singapore.
Critically Endangered (CR)	There are fewer than 50 mature individuals, OR if more than 50 mature individuals but less than 250, with some evidence of decline or fragmentation.

Category	Criteria
Endangered (EN)	There are fewer than 250 mature individuals and no other evidence of decline or fragmentation.
Vulnerable (VU)	There are fewer than 1,000 mature individuals but more than 250 and there may or may not be any other evidence of decline, small range size or fragmentation.
Near-Threatened (NT)	Approaching but not yet reaching the threshold for being threatened.
Least Concern (LC)	Not approaching the criteria for being threatened.
Data Deficient (DD)	Inadequate information to make an informed assessment.
Not Applicable (NA)	Species that are not eligible for assessment at the national level. (mainly introduced taxa and vagrants)
Not Evaluated (NE)	Species that are possibly eligible for assessment but have not yet been evaluated against the criteria.
Not Listed (NL)	Species not listed in the records (in the IUCN Global Red List database, or the first edition Singapore Red Data Book - RDB1 and second edition Singapore Red Data Book - RDB2) for whatever reason.

Source: NParks (Singapore Red Data Book, 2024)

International Union for Conservation of Nature (IUCN)

The International Union for Conservation of Nature (IUCN) Red List provides a global framework for assessing the conservation status of species. Each species assessed is placed into one of several categories that reflect its level of extinction risk, ranging from Least Concern to Extinct. These categories, as shown in Table 2-5, give a clear and standard way of comparing the status of species across different regions and taxonomic groups.

Table 2-5: IUCN Red List Categories

Category	Criteria
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died.
Extinct in the Wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range.
Critically Endangered (CR)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Table 2-6), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Table 2-6), and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Table 2-6), and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

Category	Criteria
Least Concern (LC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat.
Not Evaluated (NE)	A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

Source: IUCN Red List Categories and Criteria

The IUCN Red List categories set out the levels of extinction risk that species may face. To place a species in one of these categories, the IUCN applies a series of criteria that measure factors such as population decline, distribution, and overall population size, as shown in Table 2-6**.** These criteria ensure that the process is based on consistent thresholds rather than subjective judgment. A species only needs to meet one of the criteria at the required level to be classified under a threatened category such as Vulnerable, Endangered, or Critically Endangered. This system allows for a transparent and evidence-based approach to assessing extinction risk.

Table 2-6: IUCN Red List Criteria for Threatened Categories (CR, EN, VU)

Criterion	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)
A. Population Reduction (10 years or 3 generations)	≥90% decline	≥70% decline	≥50% decline
B. Geographic Range (Extent of Occurrence (OOC) or Area of Occupancy (AOO)	EOO <100 km² or AOO <10 km², with decline/fragmentation	EOO <5,000 km² or AOO < 500 km², with decline/fragmentation	EOO <20,000 km² or AOO <2,000 km², with decline/fragmentation
C. Small Population Size & Decline (mature individuals)	<250, with decline	<2,500, with decline	<10,000, with decline
D. Very Small or Restricted Population	<50 individuals	<250 individuals	<1,000 individuals, or very restricted (AOO <20 km² or ≤5 locations)
E. Quantitative Analysis (extinction probability)	≥50% within 10 years or 3 generations	≥20% within 20 years or 5 generations	≥10% within 100 years

3 EIA APPROACH AND METHODOLOGY

Singapore adopts a systematic framework to determine and mitigate the potential impact of developments on the environment. In general, all developments are subject to a comprehensive evaluation process to address potential impacts on the biotic and abiotic environment.

Developments located in proximity to environmental sensitive receptors such as nature/forested areas, marine or coastal environments, or those with potential transboundary impacts are subject to more stringent requirements. The findings of environmental studies are carefully reviewed by the relevant authorities to determine the significance of potential impact and the adequacy of proposed mitigation measures before a project is permitted to proceed.

The Technical Agencies (TAs) will determine whether an EIA is required for a proposed development, based on factors such as site context, project scope, and the potential magnitude and sensitivity of environmental impacts.

The key aspects of an EIA typically include (i) baseline surveys, (ii) assessment of environmental impact, (iii) formulation of mitigating measures and (iv) Environmental Management and Monitoring Plan (EMMP).

Depending on the nature of the development and site sensitivity, engagement with the nature groups and public disclosure may be required as part of the EIA process. Consultations with relevant TAs are conducted during the scoping phase to confirm the assessment scope and methodologies. Following completion of the EIA report, further consultation with TAs is undertaken prior to public disclosure to obtain agreement on the identified impacts and proposed mitigation measures.

The general EIA framework adopted in Singapore is presented in Figure 3-1 below.

Source: ESC (2025)

Figure 3-1: General EIA Framework in Singapore

3.1 Scoping

The scoping process defines the scope and parameters of the impact assessment to ensure that baseline studies, impact evaluation, and mitigation measures are appropriately focused on the key environmental aspects relevant to the Project.

For this EIA, the scoping exercise comprised the following key steps:

- Definition of the study boundary for the Project to establish the spatial limits within which baseline conditions are assessed;
- Identification of sensitive receptors within the study boundary; and
- Identification of key environmental aspects and potential impacts within the study boundary.

3.1.1 Study Boundary

The study boundary defines the spatial extent within which baseline environmental conditions are established and potential project impacts are assessed.

For this Project, the Study Area, shown in Figure 3-2, covers the Project Site boundary with an additional 100 m-wide offset beyond the boundary. This extent was defined by the Client in the scope of work and adopted as the practical boundary for data collection and assessment of both direct and indirect impacts on biodiversity and physical environment.

Figure 3-2: Study Boundary

3.1.2 Identification of Sensitive Receptors

Sensitive receptors were identified based on the desktop review and site visits conducted by ESC within the Study Area. The 100 m-wide offset of the Project Site mostly consists of forested areas within Site 2, as well as active construction sites as shown in Figure 3-2. Two main waterbody systems were identified within the Project Site and surrounding forested areas, namely WB1 located along the eastern portion of the Project Site and WB2 located along the western portion of the Project Site. These waterbodies form part of the local drainage and aquatic habitat network within the Tengah landscape.

Based on the current conditions, the primary sensitive receptors that may potentially be affected by the Project are the existing waterbodies and biodiversity within the adjacent Tengah forest as presented in Table 3-1 and illustrated in Figure 3-3**.**

Table 3-1: Identified Sensitive Receptors

No.	Sensitive Receptor	Rationale
1	Waterbodies within the Tengah forest (WB1 and WB2)	Waterbodies are located within the Study Area (including the 100 m-wide offset). Existing aquatic fauna and water quality may be affected by Project construction activities.
2	Flora and fauna within the Tengah forest	Existing terrestrial biodiversity at the Project Site boundary and the 100 m-wide offset may be affected by Project construction activities.

3.1.3 Key Environmental Aspects

For this Project, the EIA covers the following key technical aspects and associated impact assessments:

- Ambient noise;
- Waste management;
- Hydrology and surface water quality;
- Topography; and
- Biodiversity.

3.1.4 Impacts Identification

The potential impacts of the proposed Project are identified based on the following considerations:

- Possible effects of the construction and operation activities on the key environmental aspects; and
- The associated impacts of those effects on the sensitive receptors.

The impact identification process forms the basis for the subsequent assessment of impact magnitude, significance, and the development of appropriate mitigation and management measures.

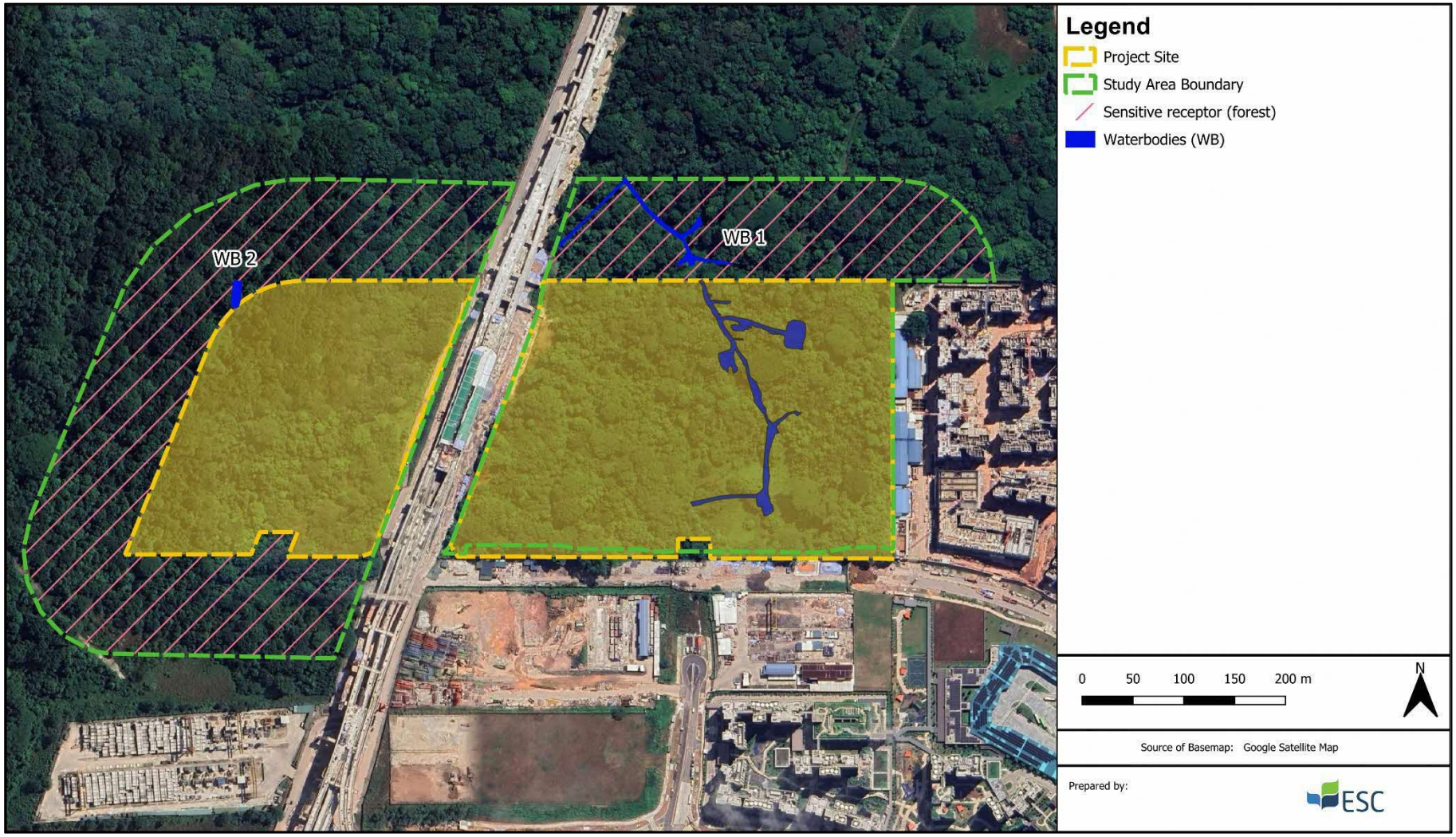


Figure 3-3: Locations of Sensitive Receptors

3.2 Environmental Baseline Surveys

The environmental baseline describes the environmental conditions prior to the commencement of development. Establishing these conditions provides a benchmark for the assessment of impact significance and developing plans for environmental management.

The environmental baseline at the Study Area is established based on the data collected through a combination of field surveys and desktop study on available secondary data. The field surveys were conducted between December 2025 and February 2026.

3.3 Impact Assessment Methodology

The proposed environmental aspects to be assessed by the Project will be compared with applicable local regulations and previous requirements for similar projects in Singapore. The environmental aspects will be evaluated to identify the likely significant environmental effects using the Rapid Impact Assessment Matrix (RIAM) as recommended by NParks for EIAs.

According to NParks' recommended Biodiversity Impact Assessment (BIA) Guidelines (2024), the RIAM method is a comprehensive method recommended for EIAs in Singapore. This method is based on a standard definition of the important assessment criteria as well as how semi-quantitative values for each of these criteria can be collated to provide an accurate and independent score for each environmental impact and receptor.

Five criteria have been developed in the RIAM – Importance of Receptor, Magnitude, Permanence, Recoverability and Cumulative Impact. A score is assigned to each impact and its receptor (e.g., endangered species) and the overall environmental score is calculated as follows:

$$\text{Environmental Score (ES)} = \sum I_n * M_n * (P_n + R_n + C_n)$$

3.3.1 Importance of Receptor Score (I)

The score for the importance of a receptor is determined by its spatial extent or socio-economic value, intrinsic worth, or degree of rarity. The scoring system for deciding the importance of receptors is outlined in Table 3-2.

Table 3-2: Score for Importance of Receptor

Importance (I)	Score
Important to national/international interests	5
Important to regional/national interests	4
Important to areas immediately outside the local condition	3
Important to the local condition (within a large direct impact area)	2
Important only to the local condition (within a small direct impact area)	1

3.4 Magnitude Score (M)

Magnitude is defined as a measure of the scale of benefit/dis-benefit of an impact. This can be measured as the level of deviation from baseline conditions and/or applicable environmental standards, benchmarks, guidelines, or tolerance limits. The scoring system for determining the magnitude of an impact is outlined in Table 3-3.

Table 3-3: Magnitude Score

Magnitude (M)	Score
Major positive benefit or change	+4
Moderate positive benefit or change	+3
Minor positive benefit or change	+2
Slight positive benefit or change	+1
No change/status quo	0
Slight negative disadvantage or change	-1
Minor negative disadvantage or change	-2
Moderate negative disadvantage or change	-3
Major negative disadvantage or change	-4

3.4.1 Permanence, Recoverability, and Cumulative Impact Scores (P, R, and C)

Permanence is a measure of the temporal extent of the impact, whether it is permanent/ long-term or temporary/short-term (Table 3-4).

Table 3-4: Permanence Score

Permanence (P)	Score
Temporary or short-term	2
Permanent or long-term	3

Recoverability (Table 3-5) is defined as whether the impact on the receptor can be reversed naturally, controlled through management and mitigation measures, or is irreversible. This is different from Permanence in that Permanence refers to how long the initial impact lasts, whereas Recoverability refers to whether the initial impact can be reversed. For example, loss of an endemic species and increased soil erosion are both permanent impacts of forest clearance, but the loss of a species is irreversible while the increased soil erosion can be reversed through efforts such as terracing, re-vegetation, and mulching.

Table 3-5: Recoverability Score

Recoverability (R)	Score
Recoverable or reversible, either naturally or via human intervention	2
Irrecoverable/irreversible	3

Cumulative impact (Table 3-6) refers to whether the impact has cumulative or synergistic effects with other projects or activities occurring in the same area, or over time.

Table 3-6: Cumulative Impact Score

Cumulative Impact (C)	Score
Non-cumulative/single	2
Cumulative/multiple	3

3.4.2 Final Environmental Score

Individual scores should not be used to separate or scale impacts, as they are still attributable to subjective assessments. Therefore, the following ranges have been defined (Table 3-7) with set conditions for the maximum and minimum scores in each range, and the final result is represented by the range value so derived. Once the ES score is set into a range band, these can be shown individually or grouped according to component type and presented in whatever graphical or numeric form that the presentation requires.

Table 3-7: Final Environmental Score

Range	Impact Indicators	Description of Range Band
116 to 180	D	Major positive change/impact
81 to 115	C	Moderate positive change/impact
37 to 80	B	Minor positive change/impact
7 to 36	A	Slight positive impact
-6 to +6	N	No Impact/Status quo/Not Applicable
-7 to -36	-A	Slight negative change/impact
-37 to -80	-B	Minor negative change/impact
-81 to -115	-C	Moderate negative change/impact
-116 to -180	-D	Major negative change/impact

3.5 Impact Mitigation

A core function of the EIA is to identify not only potential impacts but also how they can be addressed. Mitigation is therefore central to the assessment, and it is guided by the mitigation hierarchy (Figure 3-4). This framework ensures that impacts are managed systematically rather than reactively. The first step is to avoid impacts at the source, such as by adjusting project siting, design, or timing. Where avoidance is not possible, measures are applied to minimise the scale or duration of impacts. Restoration/rehabilitation is then considered to bring disturbed areas back to their original or near-original condition. Finally, if significant impacts remain, offsetting may be implemented to achieve equivalent or greater environmental outcomes elsewhere. This approach ensures that environmental considerations are integrated into project planning from the outset, with avoidance always taking priority overcompensation.

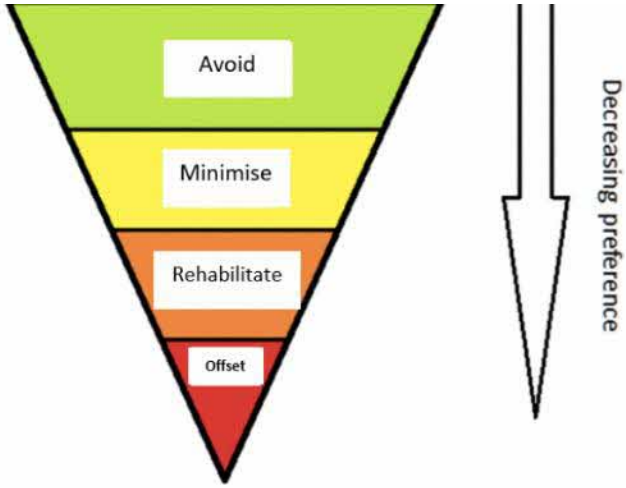


Figure 3-4: Mitigation Hierarchy

3.6 Residual Impact

Residual impacts are the effects that remain once mitigation measures are applied. They represent the more realistic level of environmental change expected during a project, rather than the unmitigated "worst case." Assessing residual impacts is essential because it shows whether the proposed measures are adequate to reduce an impact to a level that is acceptable under regulatory standards and good practice.

In the wider EIA process, residual impacts help decision-makers weigh project benefits against environmental costs. They also guide where monitoring and follow-up are most needed. By identifying the extent of impacts that cannot be fully avoided, the EIA provides a clearer basis for approvals, conditions, and long-term management.

3.7 Cumulative Impact

Cumulative impacts are the combined effects that occur when individual activities or stressors build up over time or overlap with existing conditions. In an EIA, this means looking beyond a single activity to consider how repeated or concurrent impacts may together create greater environmental change.

Within the RIAM framework, cumulative impact is included as a criterion to capture this potential build-up, ensuring that even smaller impacts are not overlooked if they can intensify through repetition. More broadly, assessing cumulative impacts provides a clearer picture of long-term environmental change and supports monitoring and management decisions.

3.8 Environmental Management and Monitoring Plan

Once environmental baseline surveys are completed and potential impacts are assessed using the RIAM Methodology, the predicted impacts and recommended mitigation measures form the basis for developing an EMMP. The EMMP incorporates these findings and establishes a framework for implementing the proposed mitigation measures and monitoring their effectiveness over varying time scales. An effective EMMP should be implemented throughout the project, including the pre-construction, construction, and post-construction phases. The EMMP framework for this Project is provided in Section 7.

3.9 Stakeholder Engagement and Public Disclosure

Stakeholder engagement and public disclosure are important components of the EIA process, providing opportunities for agencies, nature groups, and the public to understand potential environmental impacts and proposed mitigation measures and provide feedback.

Engagement will be carried out with relevant agencies which include activities such as scoping meetings, technical consultations, and presentations.

4 ENVIRONMENTAL BASELINE STUDY

Baseline surveys within the Study Area as set above were conducted between December 2025 and February 2026.

The baseline environment describes the existing physical and biological environment conditions in the Study Area prior to the commencement of development. Establishing baseline conditions provides a reference point for predicting potential environmental changes arising from the Project, assessing the magnitude and significance of potential impacts, and developing appropriate environmental management and mitigation measures.

The baseline assessment also supports the formulation of targeted measures to avoid, minimise, or mitigate adverse impacts associated with Project activities.

Baseline surveys were conducted for the following environmental components:

- Ambient noise;
- Hydrology;
- Surface water quality;
- Topography;
- Terrestrial flora and fauna; and
- Aquatic fauna.

Ambient baseline air quality monitoring is not included within the scope of the current tender specifications, as potential impacts are anticipated to be largely short-term and limited to the construction phase.

The survey locations are summarised in Table 4-1 with details provided therein. Line transects do not have specific coordinates; their locations are illustrated in the relevant accompanying this report.

Table 4-1: Environmental Survey Location Details

Environment	Survey/Sampling Locations ID	Coordinates (Lat, Long)	Location Description
Ambient Noise	NM01	1.36676, 103.72696	NM01 is located at the western area of the 100m influence zone.
Topography		-	Topography survey covers the entire Study Area.
Hydrology	Stream Mapping	-	Stream mapping is conducted on the waterbody that runs north-south across the east side of the Study Area.
Surface Water Quality	WB1-1	1.365374811, 103.7320195	WQ01 to WQ11 are at various locations throughout the waterbody.
	WB1-2	1.365436167, 103.7325849	
	WB1-3	1.365861548, 103.7326598	

Environment	Survey/Sampling Locations ID	Coordinates (Lat, Long)	Location Description
	WB1-4	1.366071599, 103.7327043	
	WB1-5	1.36641182, 103.7325263	
	WB1-6	1.366747683, 103.7323659	
	WB1-7	1.36701758, 103.7322658	
	WB1-8	1.366942059, 103.7324641	
	WB1-9	1.366889253, 103.7328435	
	WB1-10	1.367164766, 103.732179	
	WB1-11	1.367340283, 103.732079	
Terrestrial Flora	Walking Survey	-	Walking survey covers the entire Study Area.
Terrestrial Fauna	CT01	1.365667759, 103.728417	Camera traps CT01 to CT04 are spread out within the Study Area to cover maximum area of the forested areas as possible.
	CT02	1.366798729, 103.7288291	
	CT03	1.365255788, 103.7306471	
	CT04	1.365924245, 103.7334489	
	CT10	1.367681259, 103.7297929	Camera trap CT10 is located at the northern area of the 100 m-wide offset.
	FT01	-	Fauna transects FT01 to FT04 of approximately 200 m each spread out across forested areas of the Study Area.
	FT02	-	
	FT03	-	
	FT04	-	
Aquatic Fauna	AQ01	-	AQ01 to AQ04 are at various locations throughout the waterbody.
	AQ02	-	
	AQ03	-	
	AQ04	-	

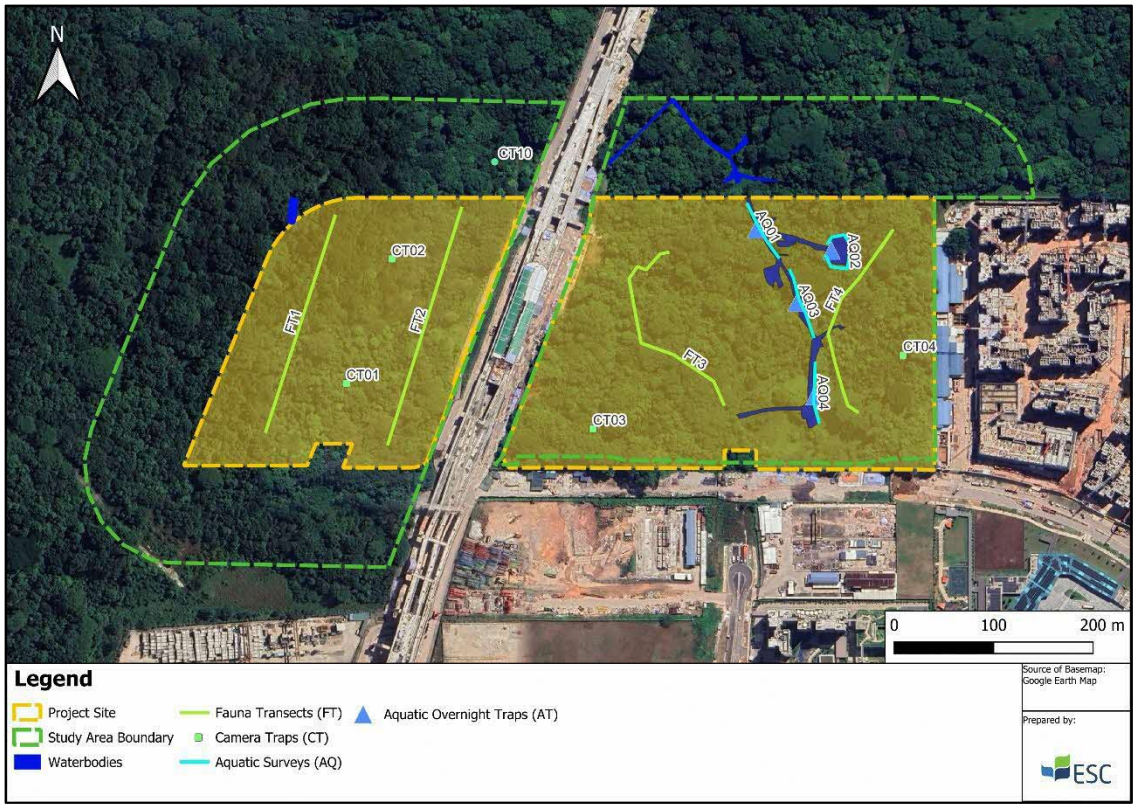


Figure 4-1: Fauna Surveys

Figure 4-2: Noise and Water Sampling Locations

4.1 Topography

4.1.1 Methodology

A conventional ground-based topographical survey was initially considered for the Study Area. However, due to dense vegetation and limited line-of-sight conditions, such an approach would have required extensive vegetation clearance, resulting in unnecessary environmental disturbance and reduced survey efficiency.

In view of these constraints, an aerial survey method was adopted. The topographical survey was conducted using a UAV-mounted LiDAR system equipped with a high-resolution camera, supported by Real-Time Kinematic (RTK) corrections and Global Navigation Satellite System (GNSS) base stations to achieve centimetre-grade positional accuracy. Ground Control Points (GCPs) were established and verified prior to the survey to ensure accurate georeferencing.

Flight operations were pre-planned and executed autonomously to ensure systematic data acquisition, with real-time monitoring by certified personnel. The collected LiDAR and imagery data were processed to generate georeferenced point clouds, which were subsequently classified to derive a Digital Terrain Model (DTM) for contouring and terrain analysis. Necessary approvals were sought from relevant authorities to facilitate the work detailed above.

4.1.2 Topography Results

A topographical map showing contour lines overlaid on a Digital Elevation Model (DEM) with a colour ramp is presented in Figure 4-3 to illustrate elevation variation across the Study Area. The map indicates a generally undulating terrain, with gradual changes in elevation across the Project Site.

Comparison with the topographical mapping presented in the 2021 EIS in Figure 4-4 indicates that the overall terrain profile remains consistent, with no significant changes in elevation patterns observed. This suggests that the Study Area has not undergone major alteration since the previous study.

Lower elevation areas are observed in the vicinity of the Project Site waterbody, reflecting natural drainage patterns where surface runoff converges. This is consistent with expected hydrological behaviour, where water flows from higher to lower ground.

Overall, the terrain reflects largely undisturbed surface characteristics, with elevation patterns corresponding to existing vegetation cover and natural landform conditions.

Full topography results can be found in Appendix A.

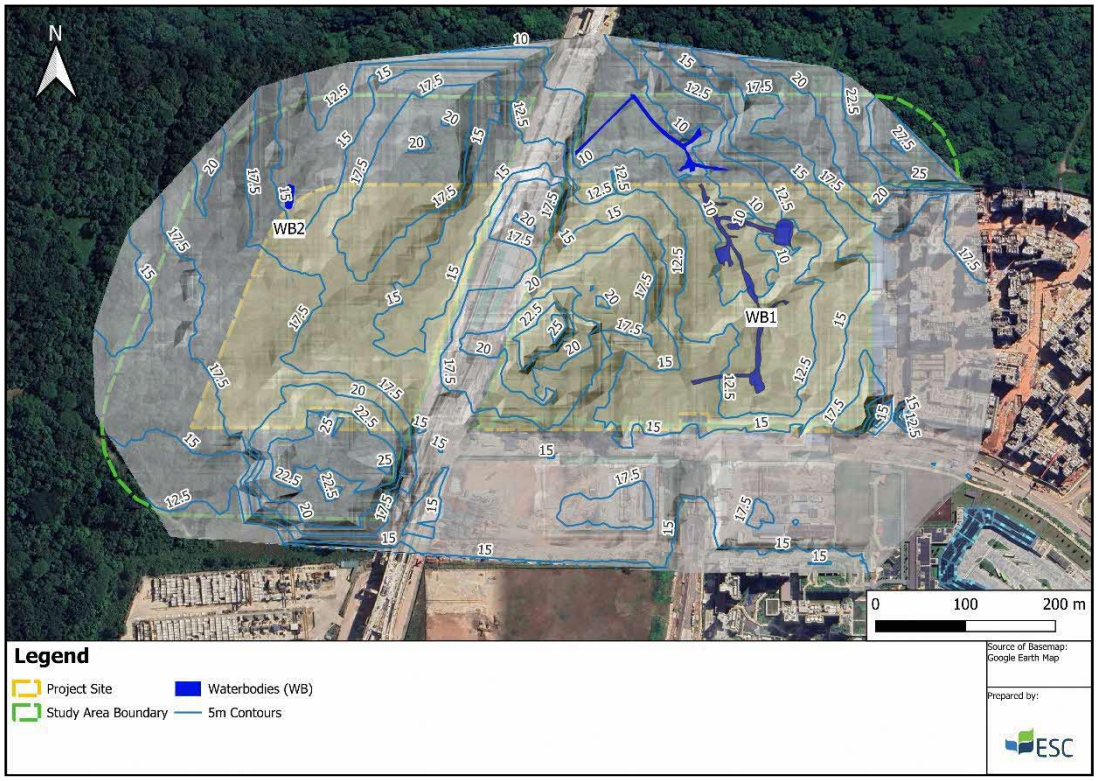


Figure 4-3: Study Area Elevation and Terrain Levels

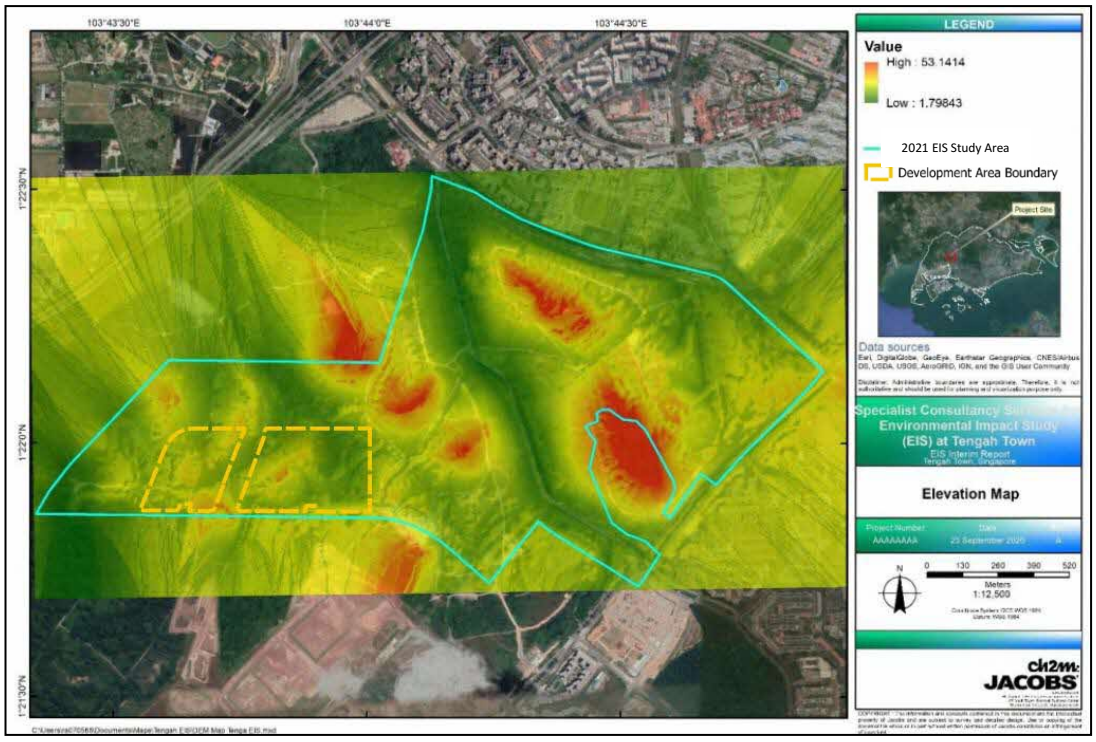


Figure 4-4: 2021 EIS Elevation and Terrain Levels

4.2 Geology

The geological conditions within the Study Area were reviewed using the Singapore Geological Map (BCA, 2021). The previous 2021 EIS referenced the earlier Geological Map of the Republic of Singapore (DSTA, 2009). For this EIA, the updated 2021 mapping was used to confirm the underlying geological units and to identify any changes relevant to the Study Area.

Based on the BCA (2021) map, the Study Area is predominantly underlaid by the Boon Lay Formation (Jblf), which forms part of the Jurong Group (Figure 4-5). The Boon Lay Formation primarily consists of sandstone with interbedded mudstone layers and some volcanic-related rock material. These rocks originated from marine sediment deposits and are characteristic of western Singapore geological setting.

This observation is consistent with the 2021 EIS, which described the Jurong Formation as comprising sedimentary rocks such as sandstone, mudstone, siltstone, conglomerate and limestone. The 2021 EIS also noted that these rocks are generally deeply weathered under local climatic conditions, resulting in residual soils commonly made up of clayey silt and sandy clay. Similar soil conditions were found within the Study Area.

This assessment is based solely on a desktop review of the BCA (2021) geological map and available secondary information. No borehole investigations or other intrusive subsurface works were undertaken as part of this EIA. As geology represents a regional baseline condition and no material changes affecting the Study Area were identified between the 2009 and 2021 mapping, the geological conditions described in the 2021 EIS remain applicable for the purposes of this assessment.

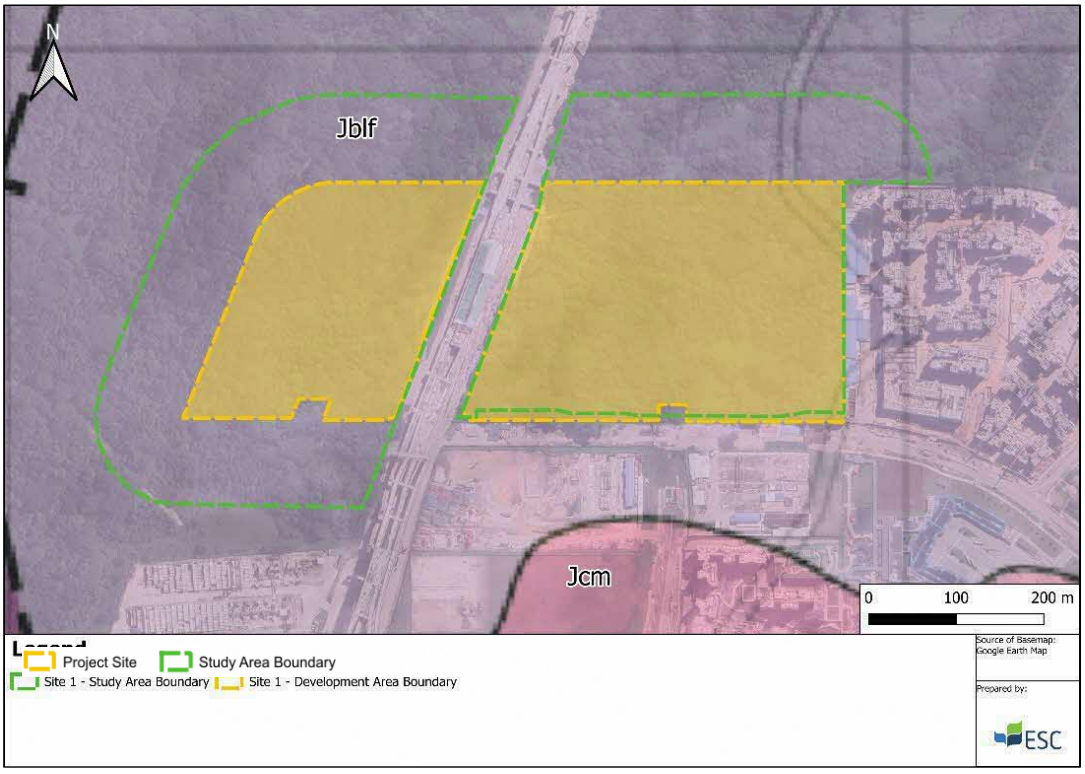


Figure 4-5: Geology of Study Area

4.3 Ambient Noise

This section presents the baseline ambient noise monitoring results. The baseline monitoring findings establish the existing baseline ambient noise in areas where noise may have an impact during the construction and operational phases of the Project.

4.3.1 Methodology

Baseline ambient noise monitoring was conducted at one location for a continuous period of seven days (from 8 January 2026 to 16 January 2026). The monitoring location, indicated in Figure 4-7, was located just beyond the western edge of the Study Area, within the 100 m-wide offset. The sound pressure levels (LAeq 5 mins, LAeq 1 hr, and LAeq 12 hr) were measured and recorded using NEA approved Type 1/Class 1 Sound Level Meter (Figure 4-6). The noise meters were calibrated at a recognised calibration laboratory, and the calibration was valid for the duration of the monitoring.

Source: ESC (2024)

Figure 4-6: Noise Monitoring Station within the Study Area

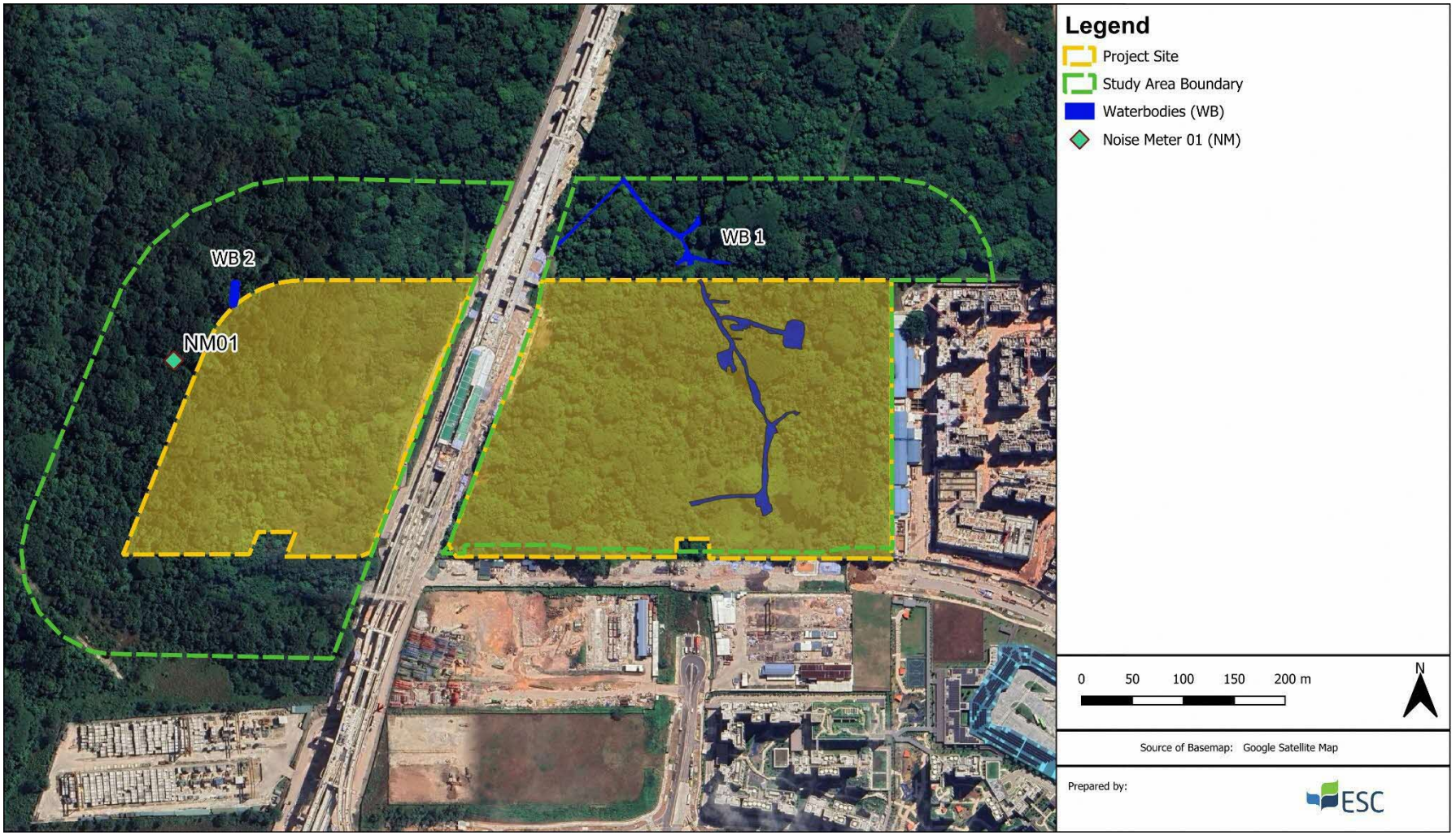


Figure 4-7: Map of Noise Monitoring Station at the Study Area

4.3.2 Ambient Noise Monitoring Results

The baseline noise levels recorded at NM1, were generally within the permissible limits for "All Other Buildings" across all assessed parameters and time periods (Table 4-2). The results were evaluated against the permissible limits for "All Other Buildings" as stated in Table 2-2. The full raw data of the noise monitoring survey are provided in Appendix B.

However, exceedances of the LAeq, 5-minute criterion during the Evening period (1900 to 2200 hrs) were recorded from 12 to 15 January 2026, occurring between approximately 2025 and 2100 hrs. The applicable permissible limit for this period is 70 dBA, and exceedances were observed on three consecutive days. The highest recorded value was 76.2 dBA at 2045 hrs on 15 January 2026.

These exceedances are considered to be temporary and site-specific and are likely attributable to night-time construction activities in the vicinity, particularly works associated with the active construction corridor that cuts through the middle of the Study Area. No similar exceedances were observed outside this period, and noise levels for all other days and time bands remained within the applicable limits.

The short duration and clustered nature of the exceedances suggest that they were associated with specific construction or other adjacent activities undertaken during those evenings.

Comparing to the 2021 EIS, NM01 is situated within the same vicinity as N5, as seen in Figure 4-8 below. While no exceedances were recorded at N5 in the 2021 EIS, the higher noise levels and localised evening exceedances at NM01 in the current Study Area are attributable to an increase in construction works since the 2021 EIS was conducted.

Figure 4-8: Noise Meter Locations

Table 4-2: Baseline Noise Monitoring Results

A1	Range of Measured Noise Levels [dB(A)]												
	Day (0700 - 1900)			Evening (1900 - 2200)					Night (2200 - 0700)				
	Monday - Saturday		Sunday & Public Holiday	Monday - Saturday			Sunday & Public Holiday		Monday - Saturday			Sunday & Public Holiday	
	LAEQ, 5MIN	LAEQ, 12HR	LAEQ, 5MIN	LAEQ, 5MIN	LAEQ, 1HR	LAEQ, 12HR	LAEQ, 5MIN	LAEQ, 12HR	LAEQ, 5MIN	LAEQ, 1HR	LAEQ, 12HR	LAEQ, 5MIN	LAEQ, 12HR
Min-Max	46-89	52-73	47-60	46-77	51-71	50-60	48-54	51-51	47-57	47-56	50-60	47-56	51-51
All other buildings (NEA Construction Noise Control)	90	75	90	70	NA	65	70	65	70	NA	65	70	65
The measured noise levels are compared against the NEA Singapore Construction Noise Regulations Assessment Criteria, 90 dBA is the maximum LAeq, 5min during the Day (0700 – 1900), and 70dBA is the maximum LAeq, 5min during the Evening and Night (1900 –2200, 2200- 0700), for other commercial building receptors. Measurement values are rounded up to the nearest whole number.													

4.4 Hydrology

The surface water features within the Study Area (Figure 4-9) were previously identified and mapped in the 2021 EIS (CH2M, 2021). Their presence and general alignment were reconfirmed during the site reconnaissance survey undertaken for this EIA. Based on current observations, these features comprise two distinct waterbodies within the Study Area, namely WB1 located in the eastern portion of the Project Site and WB2, a forest stream located in the western portion.

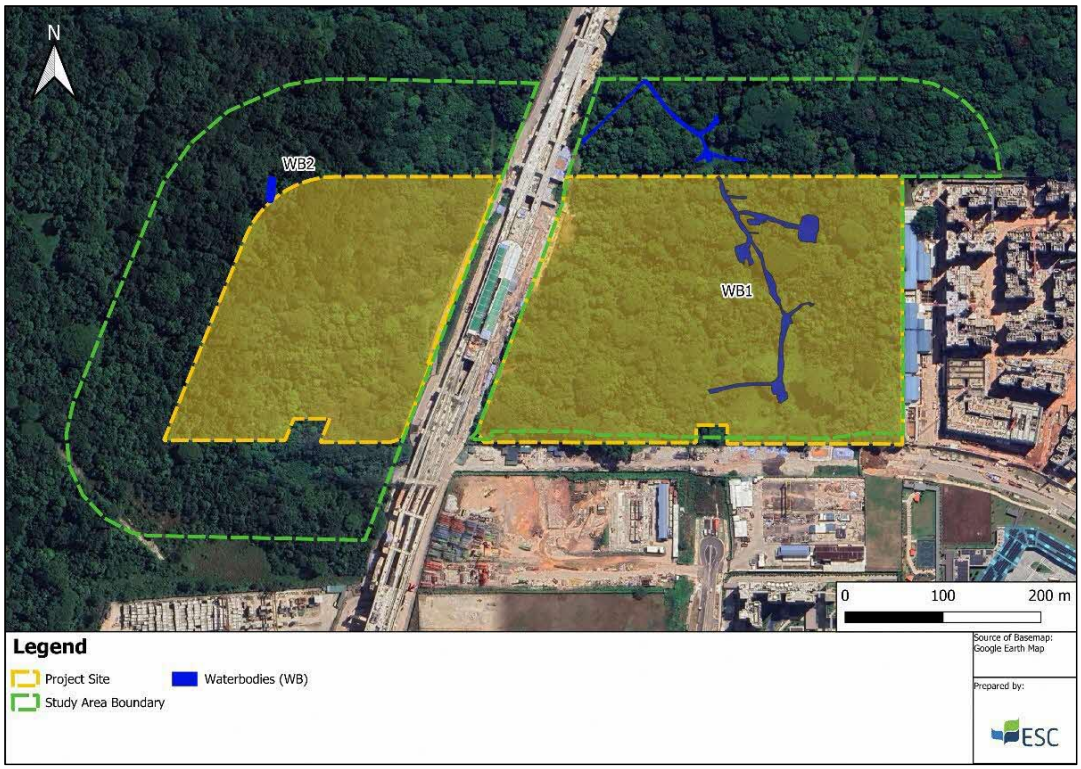


Figure 4-9: Study Area Waterbodies

Stream mapping was conducted at 17 locations along the portion of WB1 within the Project Site in 2025 to verify its alignment, extent and hydraulic characteristics. The northern portion of WB1 and WB2 fall within the Site 2 study area and will be mapped and assessed under the Site 2 EIA. Preliminary observations indicate that WB2 corresponds to a forest stream system and its associated sub-catchment. This stream is identified as part of the RAC, in the 2021 EIS (CH2M, 2021). As earlier mentioned, it is assumed that the majority of the Project Site will be cleared for the proposed works, with the exception of the 0.8 ha RAC proposed for retention.

WB1 is located largely within the Project Site and is expected to be infilled as part of the proposed works. However, the northern segment of WB1, which falls within the 100 m-wide offset, is currently proposed to be retained as part of the RAC. This potentially retained section may help contribute to the local drainage network by maintaining a degree of hydrological continuity beyond the immediate Project Site.

Only the section of WB1 that falls within the Project Site is included in the hydrology survey and surface water quality baseline assessment of this report to revalidate the conditions established in the 2021 EIS. Surface water quality sampling was conducted across dry and wet weather conditions at designated sampling locations within each feature.

The proposed retention of WB2 and the northern segment of WB1 is informed by several key considerations. These features contribute to local drainage continuity and runoff conveyance, potentially reducing the need for substantial modification of existing hydrological pathways. In addition, forest stream systems within the Tengah landscape support aquatic and riparian habitats, with surrounding vegetation providing shading, bank stability, and moderation of in-stream conditions. Their location within a vegetated corridor associated with the RAC may also allow them to continue functioning as hydrological and ecological linkages within the Project Site, subject to the final development layout and design considerations.

WB1 and WB2 collectively constitute the primary surface water receptors within the Study Area and are therefore considered key environmental receptors in the assessment of potential hydrological and water quality impacts associated with the construction and operational phases of the Project. Detailed findings for WB1 on hydrology, surface water quality parameters, and aquatic fauna are provided in the respective baseline sections of this report, while the northern section of WB1 and WB2 will be assessed in the Site 2 report.

WB1

WB1

WB2

WB2

Figure 4-10: Selected Photographs of the Study Area Waterbodies Stream Mapping

4.4.1 Stream Mapping

Stream mapping results are presented in this section to revalidate the findings of the 2021 EIS and document any changes to the mapped hydrological features within the Study Area. For the purpose of this EIA, only the portion of WB1 located within the Project Site has been mapped and evaluated. The northern portion of WB1, as well as WB2, will be mapped and assessed as part of the Site 2 study.

4.4.1.1 Methodology

As part of the hydrological survey, existing waterbodies, including drains, were identified and demarcated on a map. This assessment defined the surface run off and the direction of flow across the Study Area, identifying points where water naturally accumulates or exits the Study Area. The delineation was carried out using a GIS-based approach, using GIS to analyse the topographical data and model surface flow patterns.

Catchment mapping exercise was performed using the following information:

- Topographical data, contour lines and spot heights from survey;
- Field survey inputs such as GPS track of waterbody;
- Land use information including vegetation cover, paved areas, and built infrastructure; and
- Existing drainage systems, such as roads, culverts, and roofed area, which influence flow direction and concentration.

Details of the local hydrological stream networks within the Study Area were captured using a Garmin GPS to a 95% confidence level, with each point taken approximately 5 m apart or less. All drainage lines of 5 m or longer were recorded. Stream dimensions were characterised in intervals of 20 m, providing details including stream cross-section, bank types (e.g. natural bank or artificial bank), stream length and depth, stream bed substrate, riparian vegetation composition, and wetted width and flow velocity during both dry and wet weather conditions.

The methodology adopted for the hydrological survey and stream mapping was developed with reference to the NParks Biodiversity Impact Assessment (BIA) Guidelines (2024).

Table 4-3: Parameters for Stream Mapping

Parameter	Units	Methodology
Wetted width	m	Use of a measuring tape or range finder
Water depth	m	Use of a telescopic pole
Flow	m/s	Use float and measure method
Stream discharge	m^3/s	Calculated from available information
Stream bed substrate	-	Visual assessment and “texture by feel”
Riparian vegetation composition	-	Visual identification

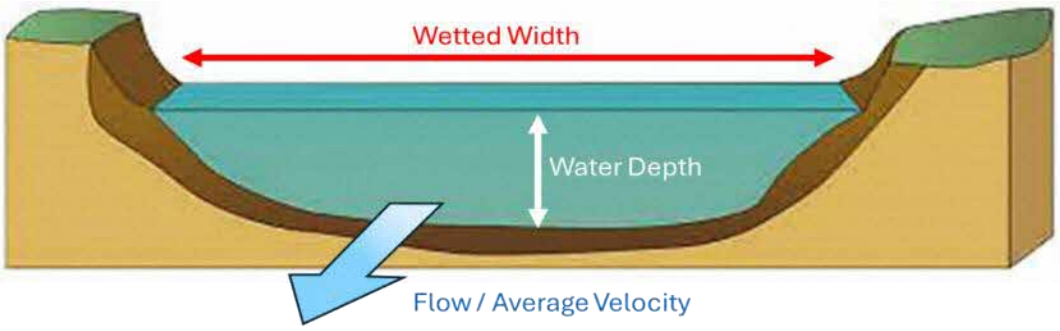


Figure 4-11: Diagram of Stream Mapping Parameters

4.4.1.2 Wetted Width

Wetted width refers to the distance between the two sides/banks of the stream at the point. This was measured using a using a range finder or measuring tape depending upon conditions.

4.4.1.3 Water Depth

Water depth refers to the varying cross-section depth of the stream, at the surveyed location. This was measured at regular horizontal intervals (3 points if width < 1 m; 5 points if width > 1 m).

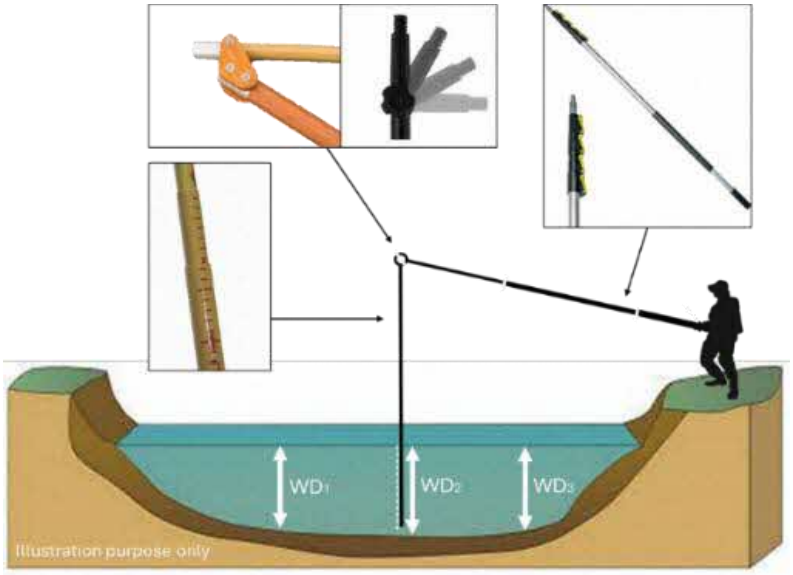


Figure 4-12: Technique for Measuring Stream Depth Using a Telescopic Pole

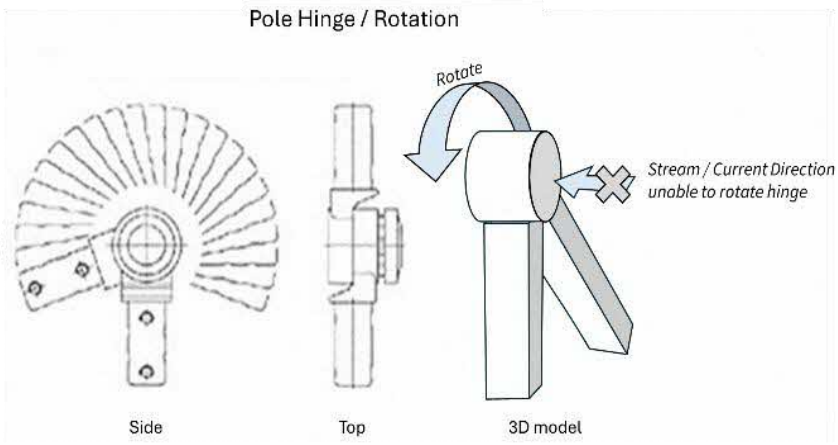


Figure 4-13: Hinge Design Prevents Lateral Movement by Currents

At the surveyed locations, water depth was conducted using a telescopic pole.

The design allows for the measuring rod to remain perpendicular to the stream bed, while not being affected by the stream current. The ESC staff stood perpendicular to the stream and lower the telescopic pole. As a result, the measuring rod located at the tip of the telescopic pole was lowered into the stream. The measuring rod was marked with 10 cm intervals. The measuring rod was carefully submerged into the stream until it reached the bottom, and the water level recorded. This method ensures accurate and straightforward measurement of the water depth.

4.4.1.4 Flow Velocity

Flow, also referred to as Average Velocity, is the speed of the current/water movement within the lotic waterbody. This was measured using a float and timer. The time taken for the float to travel 1 m was measured. This was repeated three times, with the average taken. The flotation object was tethered, eliminating the need for the surveyor to retrieve it from downstream.

Average Velocity (m/s) = (1m/Left-Centre + Centre + Right-Centre) / 3

Left-centre, Centre, and Right-centre indicates three measurement points across the cross-section of the water body. The "Left-centre" refers to a velocity measurement taken closer to the left bank, the "Centre" is in the middle, and the "Right-centre" is near the right bank. By taking velocity measurements from these three points, variations in flow across the width of the water body were recorded. The flow value was then derived by averaging the measurements of these three points.

4.4.1.5 Stream Discharge

Stream discharge, also referred to as flow rate, is the volume of water displaced within the lotic waterbody. This is calculated from the above results (i.e., flow, water depth, wetted width).

The cross-section area of the stream was estimated. This was derived by calculating areas of trapeziums. This was calculated from the wetted width and varying depths of the stream at

regular horizontal intervals. Other information such as the bank height, bank full depth and bank slope was also measured to assist with the calculated estimate of the stream's cross-section area (United States Geological Survey, n.d.)

Flow rate (m^3/s) = Cross-section (m^2) x Average Velocity

4.4.1.6 Stream Bed Substrate Type

The soil substrate on the banks of the stream and in the waterbody was determined using visual assessment as well as the "texture by feel" method, characterised by soil textures and ribbon length (Thein, 1979).

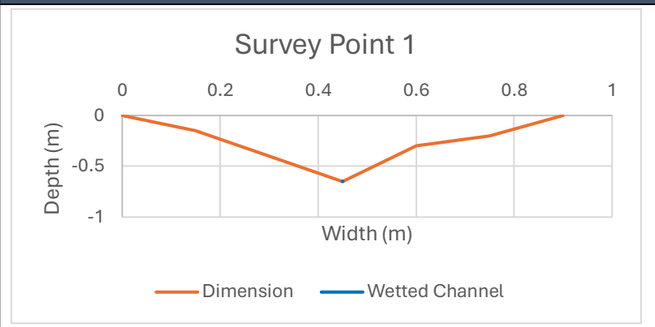
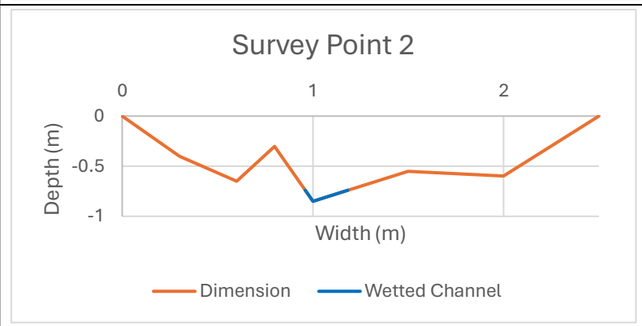
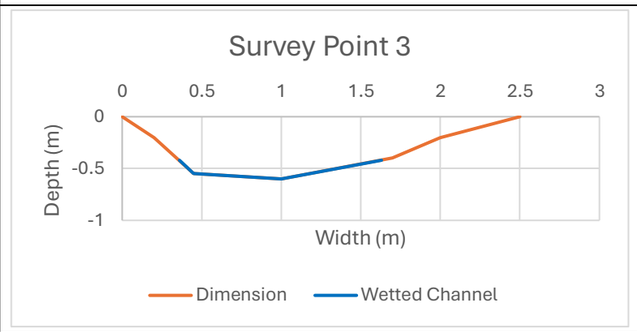
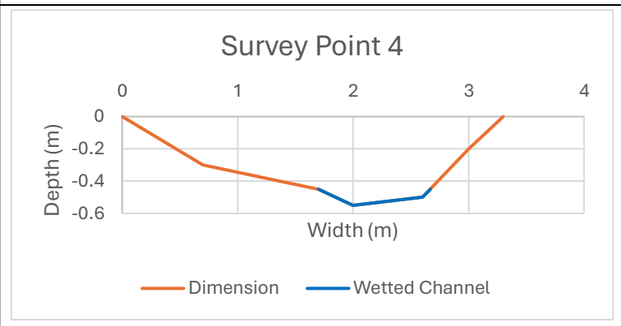
4.4.1.7 Riparian Vegetation

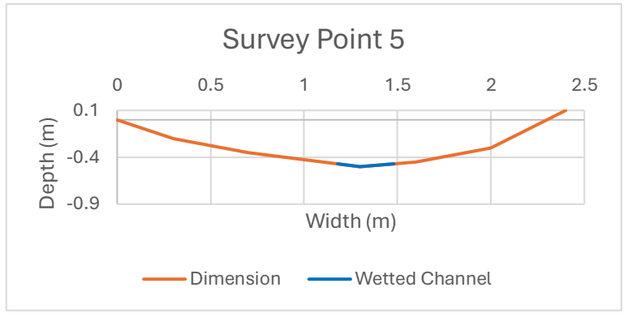
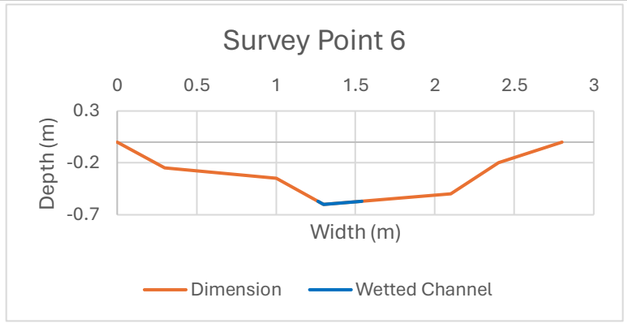
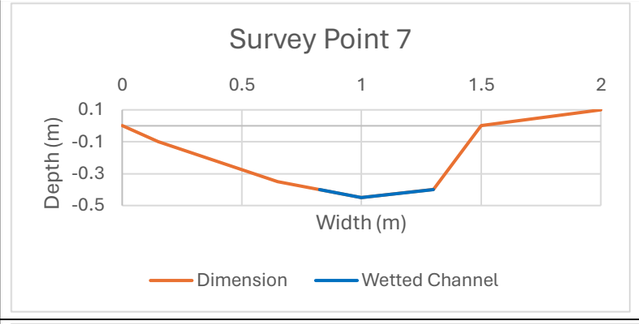
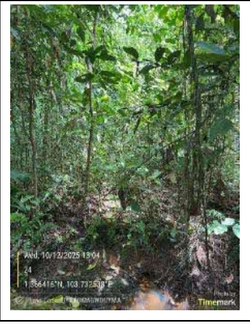
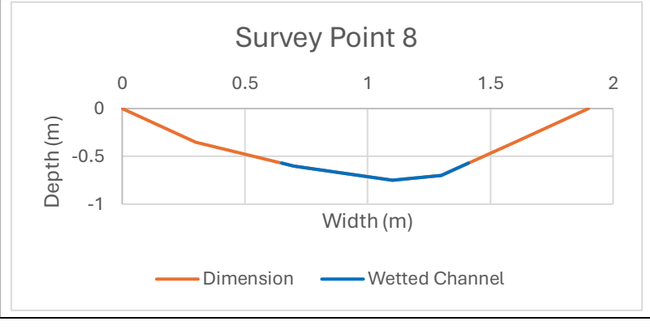
The species of plants that were immediately next to, within or overhead each measuring point were identified by a flora specialist. Measuring points were established at approximately 20 m intervals along the watercourse, subject to site accessibility and field conditions.

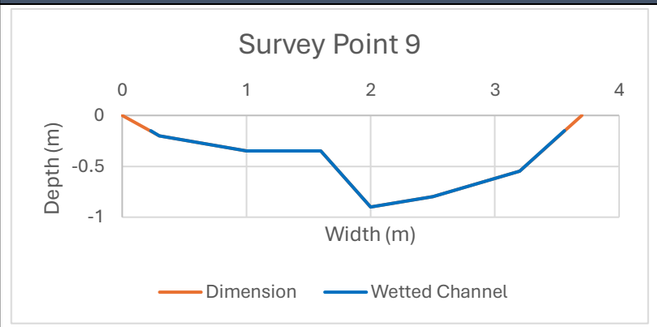
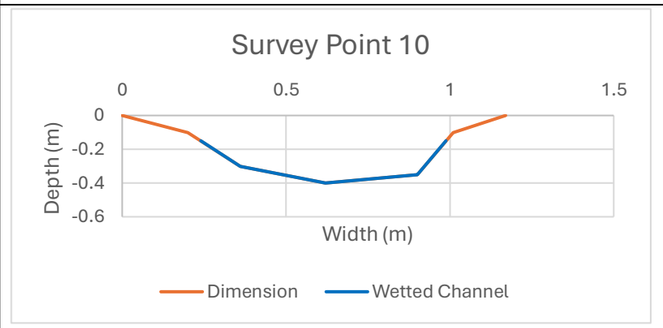
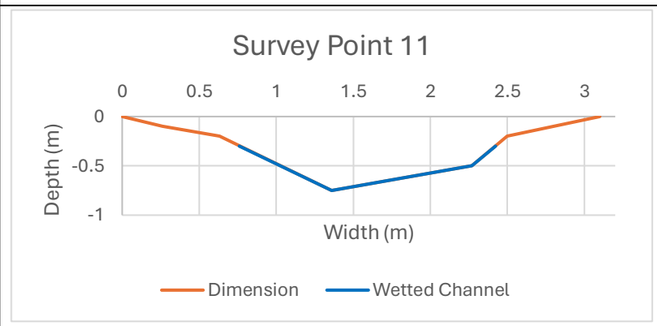
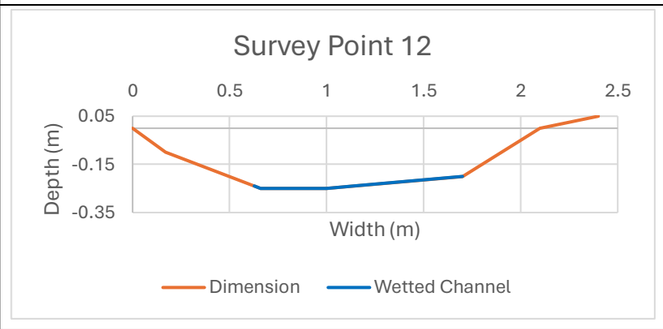
4.4.2 Stream Mapping Results

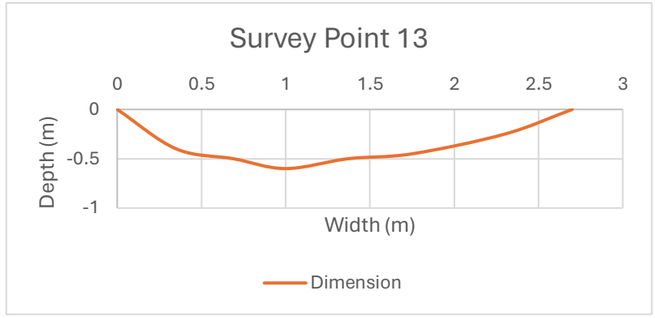
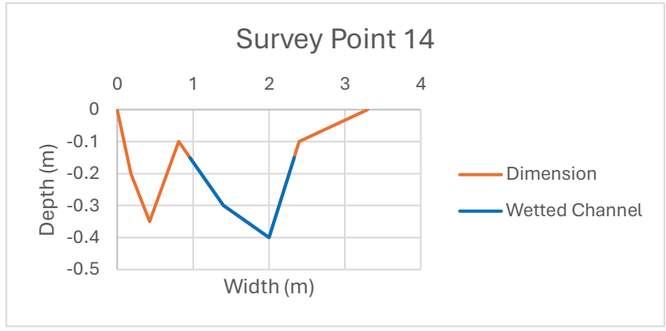
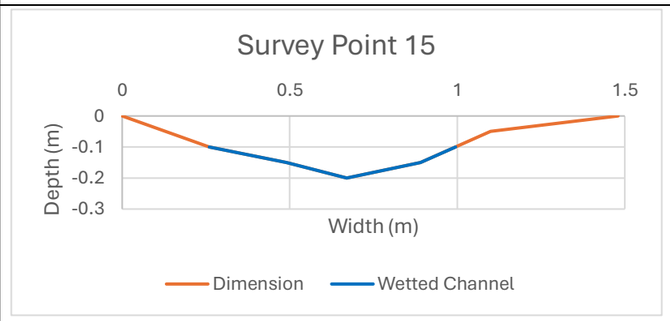
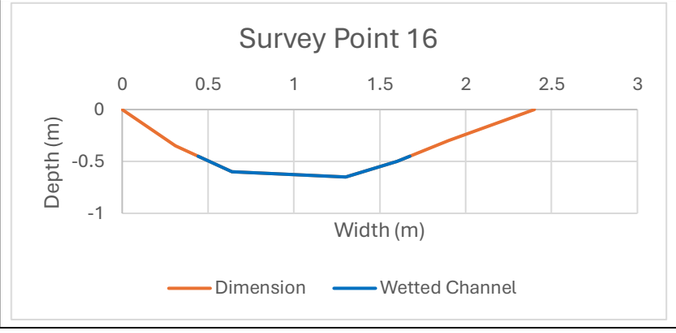
The results of the stream mapping for WB1 are presented in Table 4-4 below.

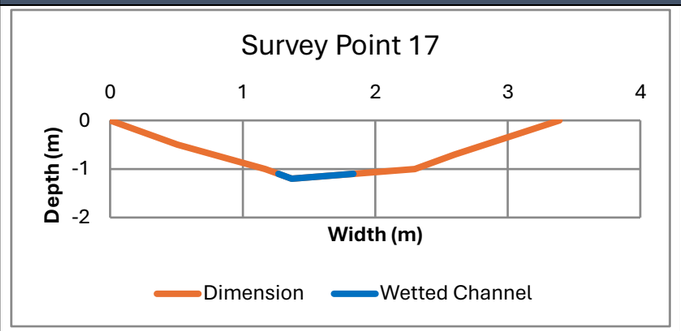
Table 4-4: Stream Mapping Results

Survey ID	Coordinates	Stream	Riparian Vegetation	Cross Section Diagram	Wetted Channel Width (m)	Flow velocity (m/s)	Substrate	Leaf litter, %	Canopy cover, %
1	1.36732, 103.732109				0.0015	0.13 m/s	Sandy Clay	3	28.27
2	1.367226, 103.732163				0.223	0.17 m/s	Silty Clay	21.44	42.22
3	1.367095, 103.732194				1.27	0.13 m/s	Sandy Clay	11.37	27.86
4	1.367057, 103.73224				2.22	0.17 m/s	Silty Clay	3	28.27

Survey ID	Coordinates	Stream	Riparian Vegetation	Cross Section Diagram	Wetted Channel Width (m)	Flow velocity (m/s)	Substrate	Leaf litter, %	Canopy cover, %
5	1.366956, 103.732367				0.3	0.2 m/s	Sandy Clay	21.44	42.22
6	1.366833, 103.732439				0.276	0.17 m/s	Sandy Clay	11.37	27.86
7	1.366562, 103.732482				0.475	0.09 m/s	Sandy Loam	14.01	51.28
8	1.366394, 103.732582				0.761	No movement	Sandy Clay	6.07	67.7

Survey ID	Coordinates	Stream	Riparian Vegetation	Cross Section Diagram	Wetted Channel Width (m)	Flow velocity (m/s)	Substrate	Leaf litter, %	Canopy cover, %
9	1.366214, 103.732644				3.33	Surface not moving	Silty Clay	23.89	60.57
10	1.365747, 103.732677				0.748	No surface flow	Silty Clay	6.53	42.19
11	1.365983, 103.732674				1.663	0.07 m/s	Silty Clay	9.26	63.28
12	1.366009, 103.732748				1.073	0.14 m/s	Silty Clay	23.93	54.99

Survey ID	Coordinates	Stream	Riparian Vegetation	Cross Section Diagram	Wetted Channel Width (m)	Flow velocity (m/s)	Substrate	Leaf litter, %	Canopy cover, %
13	1.366691, 103.732369				0.1	0.08 m/s, NE 32 degree direction	Silty Clay	18.42	45.53
14	1.366754, 103.732354				1.3755	0.08 m/s	Silty Clay	5.78	62.28
15	1.36701, 103.732302				0.735	0.17 m/s, NW direction 294 degree	Silty Clay	6.14	51.24
16	1.367011, 103.732489				1.233	No surface flow	Silty Clay	18.24	47.5

Survey ID	Coordinates	Stream	Riparian Vegetation	Cross Section Diagram	Wetted Channel Width (m)	Flow velocity (m/s)	Substrate	Leaf litter, %	Canopy cover, %
17	1.366891, 103.732703				0.565	No surface flow	Silty Clay	19.96	38.7

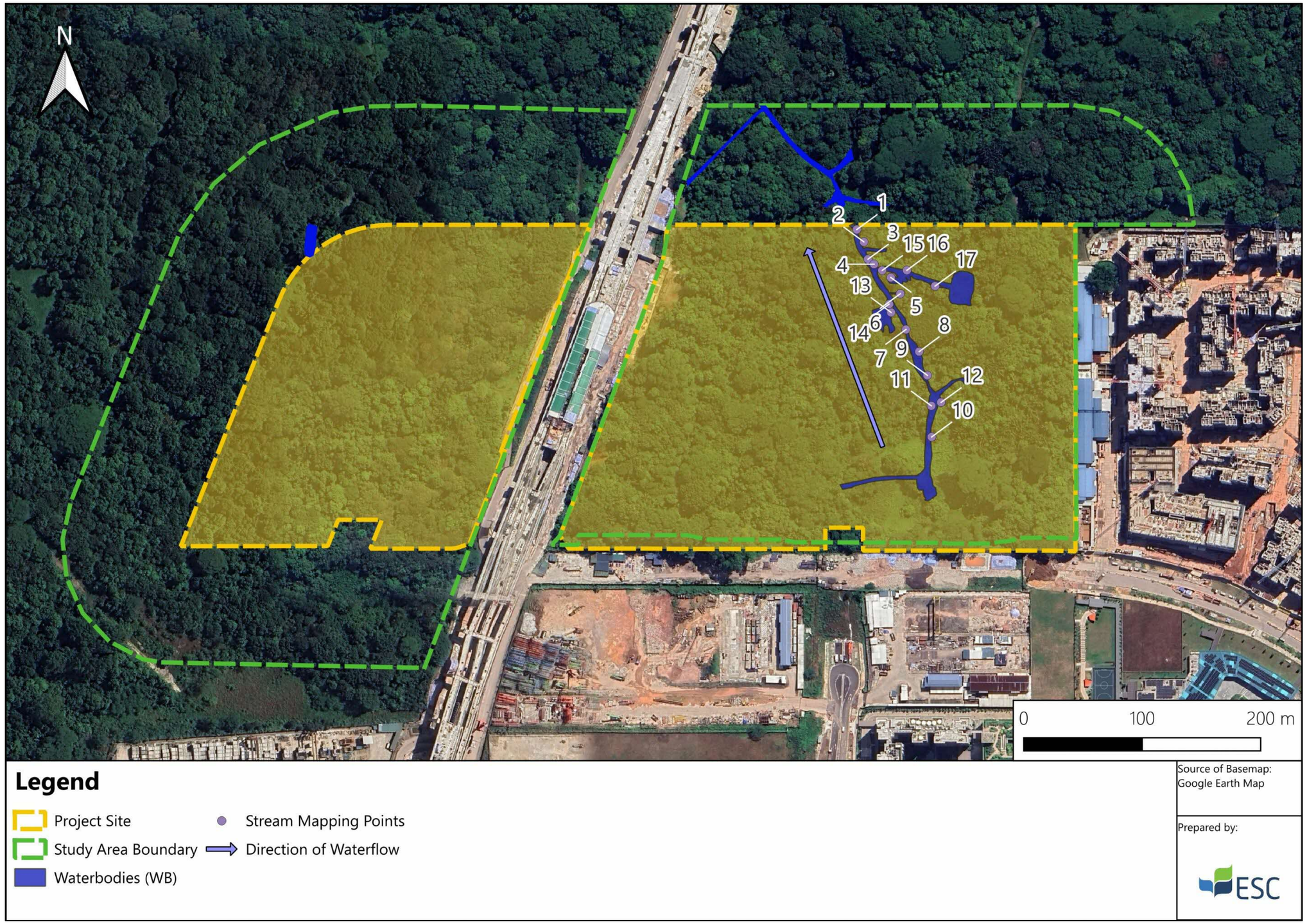


Figure 4-14: Locations of Stream Mapping Points

4.4.3 Stream Mapping Discussion

Figure 4-14 shows the location of the stream mapping exercise conducted to validate the hydrological features of the eastern stream, WB1, within the Study Area. The mapping points were assessed in 2025 to supplement the drainage network previously mapped in 2021.

17 stream mapping points were recorded across the Study Area. These points are denoted in Figure 4-14 above as points 1 through 17 while the coordinates are presented in Table 4-4 above. Generally, the drainage comprises of several hydrological features including channel and ponds, which can be observed based on the field findings and the mapped features. The southern section of the stream was not included in the mapping, due to dense vegetation that restricted access.

The drainage naturally flows from the west into a small pond before flowing north, adjoining by several stream paths recorded in the previous study. Based on the mapped points, the major flow path remains consistent with findings in 2021 (Figure 4-14). However, minor deviations in the waterbody profile were observed during the survey, particularly at points 2, 6, 8, and 12. These points did not align exactly with the previously mapped waterbody polygon, indicating slight changes in the drainage alignment and extent. This is likely due to natural processes such as sediment deposition and vegetation growth, which have altered the channel over time. The updated mapping reflects these observed changes in the waterbody profile.

Drainage at the surveyed points exhibits stagnant to sluggish flow, with recorded velocities from 0.08 m/s up to 0.20 m/s, based on the measurements taken during exercise. The drainage condition is generally shallow, with the deepest section reaching 0.75 m from the measured riverbank height. The shallow profile suggests limited water and promotes vegetation encroachment in the drainage.

In terms of stream substrate, baselines studies generally matched the findings of the 2021 EIS, with majority of substrate observed falling within the sandy clay and silty clay categories.

The Study Area remains forested with canopy cover ranges between 27.9% and 67.7%. The observed condition of the drainage exhibits features of semi-natural stream, where the drainage path is formed from the water flow in contrast to a modified channel.

Overall, the drainage path and stream characteristics are observed to be consistent with the recorded findings in 2021, with some minor deviations, likely due to the natural deposition and vegetation growth. The drainage is generally shallow with sluggish flow, increasing the potential for vegetation encroachment.

4.5 Surface Water Quality

Surface water quality results are presented in this section to revalidate the findings of the 2021 EIS (CH2M, 2021) and to document any changes within the Study Area. Surface water quality sampling under the Site 1 EIA was conducted along WB1. Sampling of WB2 falls under the scope of the Site 2 EIA.

4.5.1 Methodology

During the site reconnaissance conducted on 15 May 2025, surface water features corresponding to WB1 and WB2 were identified within the Study Area. Baseline water

sampling was conducted at WB1 during two dry weather events on 20 and 23 December 2025, while the wet weather sampling event was conducted on 6 April 2026.

Dry weather conditions were defined as a continuous 48-hour period without rainfall, while wet weather conditions were defined as rainfall events exceeding 10 mm, with samples collected within 3 hours after the cessation of rainfall.

A total of 11 indicative sampling locations (WQ01 to WQ11) were established along WB1, positioned at the start of the stream, at approximately 50 m intervals, and at confluence points (Figure 4-15:).

Water samples were analysed for both in-situ and ex-situ parameters as listed in Table 4-6. In-situ measurements were obtained using a HI98194 multiparameter portable meter, while ex-situ parameters were analysed by a SAC-SINGLAS accredited laboratory. Sampling results were compared against the 2021 EIS baseline to assess any changes in water quality conditions. GIS data, including spatial coordinates and survey dates for each sampling location, were recorded and incorporated into the assessment.

Figure 4-15: Surface Water Quality Sampling Locations

Water quality samples collected were assessed against the NEA Allowable Limits for Trade Effluent Discharge to Watercourse. Each parameter from the current sampling exercise was compared with the NEA standards. Any deviations or exceedances from either the regulatory thresholds or past results were analysed and discussed.

Table 4-5: In-situ and Ex-situ Surface Water Quality Analysis Parameters

Parameter	Units	Test Parameters
In-situ		
Temperature	°C	YSI Multiparameter Probe
pH	N/A	
Conductivity	µS/cm	
Dissolved oxygen	mg/l	
Turbidity	NTU	
Salinity	ppt	
Ex-situ		
Biochemical Oxygen Demand (BOD)	mg/l	APHA 5210B
Chemical Oxygen Demand (COD)	mg/l	-
Total alkalinity	mg/l $CaCO_3$	-
Total Phosphorus (P)	mg/l	APHA : Pt 4500-P (J)
Total Nitrogen (N)	mg/l	APHA : Pt 4500-P (J)
Total Organic Carbon (TOC)	mg/l	APHA : Pt 5310B
Nitrate (NO_3-N)	mg/l	APHA : Pt 4500-NO3 (I)
Ammonia (NH_3-N)	mg/l	APHA : Pt 4500-NH3 (H)
Orthophosphate (PO_4 -P)	mg/l	APHA : Pt 4500-P (G)
Total Dissolved Solids (TDS)	mg/l	APHA : Pt 2540D
Total Suspended Solids (TSS)	mg/l	APHA 2540D
Lead	µg/l	APHA 3120B
Zinc	µg/l	APHA 3120B
Mercury	µg/l	APHA 3112B
Arsenic	µg/l	APHA 3125B
Barium	µg/l	APHA 3120B
Tin	µg/l	APHA 3120B
Iron	µg/l	APHA 3120B
Boron	µg/l	APHA 3120B
Manganese	µg/l	APHA 3120B
Cadmium	µg/l	APHA 3120B
Chromium (Cr (III) and Cr (VI))	µg/l	APHA 3120B
Copper	µg/l	APHA 3120B
Nickel	µg/l	APHA 3120B
Silver	µg/l	APHA 3120B
Beryllium	µg/l	APHA 3120B

Parameter	Units	Test Parameters
Selenium	µg/l	APHA 3125B
Metals in total	mg/l	By calculation
Oil and Grease (Total)	mg/l	APHA: Pt5520B
Oil and Grease (Hydrocarbon)	mg/l	APHA: Pt5520F
Bacteria (Enterococcus, etc)	cfu/100ml	APHA 9230C

4.5.2 Surface Water Quality Results

The baseline surface water quality results were mostly within the Allowable Limits for Trade Effluent Discharge to Watercourses, as presented in Table 4-7 and Table 4-8**.** However, five parameters were observed to have exceeded limits for several water sampling locations in the waterbody.

Exceedances for the dry weather survey on 20th December 2025 include:

- COD of 380 mg/L in WB1-9
- TSS of 60.5 mg/L in WB1-2 and 1,188 mg/L in WB1-9
- Fe of 107 mg/L in WB1-9
- Cu of 0.16 mg/L in WB1-9
- Metals in total of 1.13 mg/L in WB1-9

Exceedances for the dry weather survey on 23rd December 2025 include:

- TSS of 53 mg/L in WB1-1, 158 mg/L in WB1-8 and 51.5 mg/L in WB1-10
- Fe of 10.4 mg/L in WB1-3

Exceedances for the wet weather survey on 6th April 2026 include:

- TSS of 62.0 mg/L in WB1-1

WQ01 to WQ11 were located along the downstream section of a stream, where WQ09 represented a small pond connected to the stream. Urban runoff inputs, together with downstream transport of sediments and organic matter, may have accumulated in WQ09 prior to 20th December 2025. These materials could subsequently have settled to the bottom of the waterbody which may explain why they were not detected on the 23rd December 2025 sampling event.

Full ex-situ water quality results can be found in Appendix F.

The parameters with exceedances were summarised in Table 4-6 below.

Table 4-6: Summary of Parameters with Exceedances

Parameters	Exceedances	Watercourse limits	Possible reasons
COD	20th December 2025 (Dry) • 380 mg/L in WB1-9	100 mg/L	Decaying organic matter trapped in slow-flow sections (e.g., leaf litter, fallen trees, stagnant pools) Accidental discharge of organic-rich wastewater upstream (e.g., domestic sewage, food waste/ greywater, small-scale industrial or workshop effluent).
TSS	20th December 2025 (Dry) • 60.5 mg/L in WB1-2 • 1,188 mg/L in WB1-9 23rd December 2025 (Dry) • 53 mg/L in WB1-1 • 158 mg/L in WB1-8 • 51.5 mg/L in WB1-10 6th April 2026 (Wet) • 62 mg/L in WB1-1	50 mg/L	Erosion from disturbed soils of exposed slopes. Channel disturbance from bank collapse and animal activity. Resuspension of sediments during low flow where fine sediments accumulate and are stirred. Stormwater run-off washing soil into waterbodies.
Fe	20th December 2025 (Dry) • 107 mg/L in WB1-9 23rd December 2025 (Dry) • 10.4 mg/L in WB1-3	10 mg/L	Apart from the natural weathering of iron-rich soils or reducing (low-oxygen) conditions mobilising Fe, the high Fe levels may also potentially originate from upstream industrial or construction runoff.
Cu	20th December 2025 (Dry) • 0.16 mg/L in WB1-9	0.1 mg/L	Urban runoff inputs from upstream (e.g., road dust, corroded infrastructure).
Metals in total	20th December 2025 (Dry) • 1.13 mg/L in WB1-9	1 mg/L	

Notably, enterococci levels were also observed to be relatively high across most of the water sampling points in the dry weather sampling events, reaching up to 1,500 cfu/100 mL. Enterococci are commonly used as indicators of faecal contamination in aquatic environments, and the elevated concentrations observed may reflect various environmental inputs associated with surrounding wildlife activity and surface runoff within the catchment.

Findings from 2021 EIS Data

Equivalent or comparable water sampling points from the 2021 EIS study (ED2-7 to ED2-11 and ED2-16 to ED2-18) were compared with WQ01 to WQ11.

During wet weather sampling in the 2021 baseline study, only the TSS levels have exceeded the limits, with a maximum concentration of 184 mg/L. These exceedances were likely associated with silty runoff from upstream areas and surrounding exposed or bare surfaces. During dry weather sampling, a slightly low pH level of 5.9 at ED2-10 (located near WQ04), which was likely related to respiration and decomposition process of aquatic organisms, including algae, within the waterbody.

TSS levels recorded during the 2025 surveys were generally higher than those from the 2021 EIS findings. The increase may be associated with higher amounts of sediment and organic material entering the drainage system, potentially due to surrounding vegetation clearance, exposed soils, and the accumulation of leaf litter, woody debris, and decomposing vegetation from leaf fall, tree fall, and uprooting within adjacent vegetated areas.

In contrast, pH values measured during the 2025-2026 surveys were all within the allowable range of 6 to 9. This may be related to a reduction of algal presence within the waterbody, as observed at WQ04 during the 2025-2026 surveys, resulting in more stable pH conditions.

Table 4-7: In-situ Surface Water Quality Results

	In-situ-meters Readings								
Weather Event	Sample ID	Date	Temperature °C	pH	Conductivity µS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Weather
1st Dry	WB1-1	20 December 2025	27.5	7.23	383.0	5.83	39.60	0.21	Dry
1st Dry	WB1-2	20 December 2025	27.0	7.07	287.8	3.21	67.04	0.16	Dry
1st Dry	WB1-3	20 December 2025	25.2	7.44	311.2	5.14	26.94	0.17	Dry
1st Dry	WB1-4	20 December 2025	25.1	7.56	1602.0	4.18	5.03	0.88	Dry
1st Dry	WB1-5	20 December 2025	25.7	7.17	274.8	6.22	10.90	0.15	Dry
1st Dry	WB1-6	20 December 2025	26.5	7.04	205.7	6.65	22.66	0.11	Dry
1st Dry	WB1-7	20 December 2025	25.2	7.15	248.9	3.93	8.49	0.14	Dry
1st Dry	WB1-8	20 December 2025	25.4	6.85	203.2	2.13	10.53	0.11	Dry
1st Dry	WB1-9	20 December 2025	25.8	6.94	233.0	2.35	68.92	0.13	Dry
1st Dry	WB1-10	20 December 2025	25.3	7.24	247.9	5.26	30.71	0.14	Dry
1st Dry	WB1-11	20 December 2025	25.1	7.27	236.6	5.40	11.63	0.13	Dry
2nd Dry	WB1-1	23 December 2025	27.0	7.14	462.0	3.01	32.25	0.25	Dry
2nd Dry	WB1-2	23 December 2025	28.0	7.17	391.5	3.99	117.62	0.22	Dry
2nd Dry	WB1-3	23 December 2025	26.0	7.10	381.6	2.32	64.06	0.21	Dry
2nd Dry	WB1-4	23 December 2025	26.5	7.2	313.1	3.12	9.66	0.17	Dry
2nd Dry	WB1-5	23 December 2025	25.7	7.32	301.0	3.17	12.77	0.17	Dry
2nd Dry	WB1-6	23 December 2025	25.7	7.18	286.0	3.36	12.21	0.16	Dry
2nd Dry	WB1-7	23 December 2025	25.8	7.53	271.8	5.54	12.39	0.15	Dry
2nd Dry	WB1-8	23 December 2025	25.6	7.09	197.3	2.38	17.95	0.11	Dry
2nd Dry	WB1-9	23 December 2025	25.9	6.93	184.5	2.42	30.41	0.1	Dry
2nd Dry	WB1-10	23 December 2025	25.8	7.41	263.1	4.72	19.21	0.14	Dry
2nd Dry	WB1-11	23 December 2025	26.0	7.62	623.0	4.62	10.69	0.34	Dry
1st Wet	WB1-1	6 April 2026	27.0	6.52	198.5	3.78	169.40	0.12	Wet
1st Wet	WB1-2	6 April 2026	28.2	6.62	216.1	4.36	88.37	0.14	Wet

	In-situ-meters Readings								
Weather Event	Sample ID	Date	Temperature °C	pH	Conductivity µS/cm	DO mg/L	Turbidity NTU	Salinity ppt	Weather
1st Wet	WB1-3	6 April 2026	27.8	6.63	117.8	4.53	724.98	0.07	Wet
1st Wet	WB1-4	6 April 2026	26.9	6.63	202.9	5.18	196.90	0.13	Wet
1st Wet	WB1-5	6 April 2026	27.1	6.68	293.9	4.46	302	0.19	Wet
1st Wet	WB1-6	6 April 2026	27.3	6.70	296.4	4.63	248.35	0.19	Wet
1st Wet	WB1-7	6 April 2026	26.6	6.31	192.1	4.21	181.07	0.12	Wet
1st Wet	WB1-8	6 April 2026	27.7	6.37	108.6	4.32	793.68	0.07	Wet
1st Wet	WB1-9	6 April 2026	27.7	6.48	411.2	1.63	10.51	0.26	Wet
1st Wet	WB1-10	6 April 2026	27.0	6.77	296.8	4.93	196.19	0.19	Wet
1st Wet	WB1-11	6 April 2026	26.87	6.57	194.7	4.53	131.44	0.12	Wet

Table 4-8: Ex-situ Surface Water Quality Results

Test Parameters	WB1-1	WB1-2	WB1-3	WB1-4	WB1-5	WB1-6	WB1-7	WB1-8	WB1-9	WB1-10	WB1-11	Watercourse limits*
20th December 2025 Dry Weather												
Biochemical Oxygen Demand (mg/L)	2.6	<2	2.6	<2	<2	2.7	<2	<2	19.1	<2	<2	50
Chemical Oxygen Demand (mg/L)	<50	<50	<50	<50	<50	<50	<50	<50	**380**	<50	<50	100
Total Alkalinity (mg/L)	179	135	157	135	136	114	121	82.5	114	111	112	-
Total Phosphorus (mg/L)	0.13	0.079	0.035	0.095	0.11	0.48	0.15	0.076	3.55	0.13	0.11	-
Total Nitrogen (mg/L)	1.44	0.79	0.58	0.75	0.59	0.62	0.53	0.63	46.7	0.61	0.6	-
Total Organic Carbon (mg/L)	11.3	12.6	10.5	10.3	9.28	7.51	9.83	3.73	6.85	7.54	7.88	-
Nitrate as NO3-N (mg/L)	<0.015	<0.015	<0.015	<0.015	0.045	0.022	0.038	<0.015	<0.015	0.06	0.06	-
Ammonia as NH3-N (mg/L)	0.77	0.15	0.13	0.13	0.1	0.24	<0.01	0.4	1.53	0.15	0.048	-
Orthophosphate as PO4-P (mg/L)	0.0061	<0.003	0.0082	0.031	0.032	0.12	0.045	0.01	0.0037	0.052	0.041	5
Total Dissolved Solids (mg/L)	241	179	203	178	180	149	163	137	141	154	154	-
Total Suspended Solids (mg/L)	25.5	**60.5**	19	<10	<10	18.5	<10	18	**1,188**	<10	<10	50
Lead as Pb (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1
Zinc as Zn (mg/L)	0.34	0.038	0.022	0.036	0.081	0.043	0.025	0.023	0.61	0.047	0.038	1
Mercury as Hg (mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.05

Test Parameters	WB1-1	WB1-2	WB1-3	WB1-4	WB1-5	WB1-6	WB1-7	WB1-8	WB1-9	WB1-10	WB1-11	Watercourse limits*
Arsenic as As (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1
Barium as Ba (mg/L)	0.038	0.022	0.024	0.018	0.018	0.018	0.015	0.013	0.2	0.015	0.016	2
Tin as Sn (mg/L)	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	-
Iron as Fe (mg/L)	9.5	6.97	5.12	2.27	2.11	4.03	2.49	3.1	**107**	2.53	2.2	10
Boron as B (mg/L)	0.015	0.007	0.0037	<0.0015	<0.0015	0.008	<0.0015	<0.0015	0.074	<0.0015	<0.0015	5
Manganese as Mn (mg/L)	0.28	0.11	0.17	0.064	0.059	0.074	0.047	0.071	0.32	0.062	0.056	5
Cadmium as Cd (mg/L)	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	0.0036	<0.0012	<0.0012	0.1
Chromium as Cr (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0056	0.18	<0.003	<0.003	1
Copper as Cu (mg/L)	0.036	0.0022	0.0032	0.0022	0.0068	0.0026	<0.0015	<0.0015	**0.16**	0.0042	0.0027	0.1
Nickel as Ni (mg/L)	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	0.026	<0.0045	<0.0045	1
Silver as Ag (mg/L)	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.1
Beryllium as Be (mg/L)	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	-
Selenium as Se (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Metals in Total (mg/L)	0.37	<0.045	<0.045	<0.045	0.088	0.045	<0.045	<0.045	**1.13**	0.051	<0.045	1
Oil & Grease (Total) (mg/L)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	10
Oil & Grease (Hydrocarbon) (mg/L)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	10
Enterococci (cfu/100mL)	<1	480	200	200	<1	1,100	600	420	420	360	1,200	-

Test Parameters	WB1-1	WB1-2	WB1-3	WB1-4	WB1-5	WB1-6	WB1-7	WB1-8	WB1-9	WB1-10	WB1-11	Watercourse limits*
23rd December 2025 Dry Weather												
Biochemical Oxygen Demand (mg/L)	2.1	5.1	2.7	<2	<2	<2	<2	2.6	<2	<2	<2	50
Chemical Oxygen Demand (mg/L)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	100
Total Alkalinity (mg/L)	228	190	189	150	150	142	127	75	69.9	122	122	-
Total Phosphorus (mg/L)	0.056	0.066	0.07	0.14	0.13	0.11	0.12	0.098	0.13	0.23	0.14	-
Total Nitrogen (mg/L)	3.72	0.71	0.78	0.65	0.64	0.67	0.62	1.57	1.95	0.63	0.73	-
Total Organic Carbon (mg/L)	6.41	9.86	9.72	6.4	6.94	7.5	7.09	4.05	3.8	6.8	6.52	-
Nitrate as NO3-N (mg/L)	<0.015	<0.015	<0.015	<0.015	<0.015	0.027	0.044	<0.015	<0.015	0.061	0.059	-
Ammonia as NH3-N (mg/L)	1.46	0.081	0.18	0.23	0.22	0.15	0.15	0.5	0.58	0.17	0.15	-
Orthophosphate as PO4-P (mg/L)	0.0095	0.0032	0.004	0.044	0.029	0.03	0.038	0.021	0.012	0.051	0.037	5
Total Dissolved Solids (mg/L)	305	264	441	199	200	190	167	120	117	166	167	-
Total Suspended Solids (mg/L)	**53**	31	20	15.5	<10	<10	<10	**158**	31	**51.5**	<10	50
Lead as Pb (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1
Zinc as Zn (mg/L)	0.031	0.048	0.024	0.011	0.018	0.02	0.024	0.045	0.019	0.014	0.017	1
Mercury as Hg (mg/L)	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.05
Arsenic as As (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1

Test Parameters	WB1-1	WB1-2	WB1-3	WB1-4	WB1-5	WB1-6	WB1-7	WB1-8	WB1-9	WB1-10	WB1-11	Watercourse limits*
Barium as Ba (mg/L)	0.046	0.028	0.031	0.022	0.021	0.017	0.016	0.02	0.014	0.018	0.015	2
Tin as Sn (mg/L)	<0.009	<0.009	0.02	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	-
Iron as Fe (mg/L)	8.78	4.53	**10.4**	5.16	3.65	2.4	2.66	9.2	5.11	5.38	2.38	10
Boron as B (mg/L)	0.0085	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	5
Manganese as Mn (mg/L)	0.29	0.086	0.19	0.12	0.21	0.2	0.12	0.08	0.081	0.11	0.093	5
Cadmium as Cd (mg/L)	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	0.1
Chromium as Cr (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0061	<0.003	<0.003	<0.003	1
Copper as Cu (mg/L)	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.1
Nickel as Ni (mg/L)	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	1
Silver as Ag (mg/L)	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.1
Beryllium as Be (mg/L)	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	-
Selenium as Se (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.5
Metals in Total (mg/L)	<0.045	0.049	<0.045	<0.045	<0.045	<0.045	<0.045	0.051	<0.045	<0.045	<0.045	1
Oil & Grease (Total) (mg/L)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	10
Oil & Grease (Hydrocarbon) (mg/L)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	10
Enterococci (cfu/100mL)	1,000	480	200	<1	480	300	1,500	360	160	720	900	-
Remarks: Exceedances are bolded in **red**												

Test Parameters	WB1-1	WB1-2	WB1-3	WB1-4	WB1-5	WB1-6	WB1-7	WB1-8	WB1-9	WB1-10	WB1-11	Watercourse limits*
6th April 2026 Wet Weather												
Biochemical Oxygen Demand (mg/L)	2.7	2.0	<2	2.2	2.0	<2	2.4	2.4	<2	3.5	<2	50
Chemical Oxygen Demand (mg/L)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	100
Total Alkalinity (mg/L)	110	102	182	67.2	66.2	57.3	31.6	31.6	61.3	55.4	60.3	-
Total Phosphorus (mg/L)	0.18	0.13	0.20	0.15	0.14	0.17	0.15	0.15	0.21	0.15	0.15	-
Total Nitrogen (mg/L)	1.78	1.40	1.69	0.96	1.07	0.82	1.32	1.53	0.82	0.90	0.83	-
Total Organic Carbon (mg/L)	10.4	10.2	10.3	8.66	8.64	8.81	8.46	8.06	10.1	8.28	9.53	-
Nitrate as NO3-N (mg/L)	0.58	0.33	<0.066	0.17	0.068	<0.066	0.66	0.65	0.25	0.28	0.33	-
Ammonia as NH3-N (mg/L)	0.50	0.56	0.75	0.15	0.080	0.070	0.29	0.29	0.086	0.11	0.088	-
Orthophosphate as PO4-P (mg/L)	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	5
Total Dissolved Solids (mg/L)	203	187	262	128	125	128	67.0	80.0	118	109	115	-
Total Suspended Solids (mg/L)	**62.0**	25.3	35.0	24.0	17.0	19.0	36.0	33.0	35.0	12.0	11.2	50
Lead as Pb (mg/L)	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.1
Zinc as Zn (mg/L)	0.046	0.033	0.050	0.030	0.075	0.035	0.060	0.047	0.020	0.091	0.046	1
Mercury as Hg (mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.05

Test Parameters	WB1-1	WB1-2	WB1-3	WB1-4	WB1-5	WB1-6	WB1-7	WB1-8	WB1-9	WB1-10	WB1-11	Watercourse limits*
Arsenic as As (mg/L)	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	0.1
Barium as Ba (mg/L)	0.032	0.028	0.040	0.016	0.016	0.014	0.011	0.011	0.014	0.013	0.012	2
Tin as Sn (mg/L)	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	-
Iron as Fe (mg/L)	8.62	4.67	9.05	2.64	2.27	3.14	2.81	2.91	3.58	2.19	2.22	10
Boron as B (mg/L)	0.031	0.027	0.027	0.019	0.019	0.016	0.014	0.014	0.018	0.016	0.015	5
Manganese as Mn (mg/L)	0.13	0.13	0.11	0.039	0.027	0.034	0.042	0.042	0.032	0.026	0.031	5
Cadmium as Cd (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.1
Chromium as Cr (mg/L)	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	1
Copper as Cu (mg/L)	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.1
Nickel as Ni (mg/L)	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	1
Silver as Ag (mg/L)	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.1
Beryllium as Be (mg/L)	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	-
Selenium as Se (mg/L)	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	0.5
Metals in Total (mg/L)	0.048	0.033	0.050	0.030	0.075	0.035	0.060	0.047	0.020	0.093	0.046	1
Oil & Grease (Total) (mg/L)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	10
Oil & Grease (Hydrocarbon) (mg/L)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	10
Enterococci (cfu/100mL)	2000	1000	2000	1800	800	1200	1200	1500	2000	1800	800	-

4.6 Biodiversity

This section presents the methodologies and findings of the baseline surveys on flora and fauna within the Study Area. Surveys covered both terrestrial and aquatic ecosystems and were conducted between 2 December 2025 to 25 February 2026.

4.6.1 Conservation Status and National Classification Categories

Species observed during the surveys were identified with reference to recognised guidebooks and taxonomic keys. Their conservation status was determined primarily using the 3rd edition of the Singapore Red Data Book (Davison, et al., 2024), with the International Union for Conservation of Nature (IUCN) Red List status also presented where available.

Conservation Significant (CS) species are defined as native species recorded within the Project boundaries that fall under the categories of Vulnerable (VU), Endangered (EN), Critically Endangered (CR), or Presumed Nationally Extinct (NEx) in Singapore (SRDB3) or on the IUCN Red List, whichever is higher.

Please refer to Section 2.2.3 for more in-depth detail regarding the respective legislations and categories for Biodiversity.

4.6.2 Methodology

For the various taxa group and environmental baseline studies at the Study Area, survey locations have been selected based on objectives of the studies. This section details the methodologies for each taxa group.

Terrestrial Flora

Terrestrial flora was surveyed to determine the vegetation types within the Study Area and to locate species of conservation significance, if any.

To achieve these objectives, the following studies were carried out:

- Review previous Habitat and Vegetation mapping from past EIAs and literature review;
- Revalidation of Conservation-significant flora identification and mapping; and
- Revalidation of Large Trees (>1.0m girth) identification and mapping.

Results from the surveys were presented in tabular and spatial forms where appropriate and synthesised to provide baseline data on the diversity, distribution, and condition of the existing flora within the Study Area. Conservation status of flora species was undertaken with reference to the third edition of the Singapore Red Data Book (National Parks Board, 2024).

Habitat and Vegetation Mapping via General Walking Surveys

The objective of this task was to describe the distribution, extent of different vegetation types/habitats, and their respective conditions in the Study Area. The classification of habitat types, such as forests, scrubland, or urban vegetation, was referenced against the Biodiversity Impact Assessment (BIA) Guidelines (NParks, 2024).

Tree mapping and tagging records, based on literature review and environmental baseline information from past EIAs, were reviewed, revalidated, and produced. This covered the forested areas with canopy cover within the Study Area.

Species of Conservation Significance and Large Trees

A terrestrial flora baseline inventory was produced based on review and revalidation of literature and environmental baseline information from past EIAs and EISs.

As part of the topographical survey, large trees of >1.0m girth and species of conservation significance (with national status of Vulnerable, Endangered, Critically Endangered, or Presumed Extinct, or new species records for Singapore) were mapped out. Information on their height, girth, canopy size and species were obtained and produced as well.

The conservation status of flora species was done with reference to the third edition of the Singapore Red Data Book (National Parks Board, 2024; Appendix BC) and the IUCN Red List of Threatened Species for local and international status, respectively.

ESC worked closely and coordinated with the topographical surveyors to incorporate tree mapping and tagging into the report and worked with topographical surveyors to verify tree species and respective locations indicated on the topographical plan when requested.

Terrestrial and Aquatic Fauna

Fauna surveys were conducted within the Study Area to survey birds, mammals (including bats), herpetofauna (reptiles and amphibians), butterflies, and odonates (dragonflies and damselflies) as well as aquatic fauna (including fish and decapod crustaceans). These fauna surveys helped to revalidate the results of the previously conducted 2021 EIS and document any changes within the Study Area. A revalidation survey was necessary as fauna is mobile and thus fauna assemblages may have changed in the past four years between the past study and the present study.

The fauna surveys comprised of line transect surveys, camera trapping, and acoustic sampling. The fauna baseline surveys were conducted at the locations shown in Figure 4-16, following the survey methods and efforts summarised in Table 4-9. The survey locations differed from those used for the 2021 EIS because of differences in the respective study boundaries.

A list of fauna species observed was produced, supplemented by secondary data from literature reviews. All photographs taken during surveys, transect location information, and all terrestrial, aquatic and camera trap footage and location data of the species captured were submitted. The conservation status of fauna species was done with reference to the third edition of the Singapore Red Data Book (National Parks Board, 2024; Appendix D), and the International Union for Conservation of Nature (IUCN) Red List of Threatened Species for local and international status, respectively.

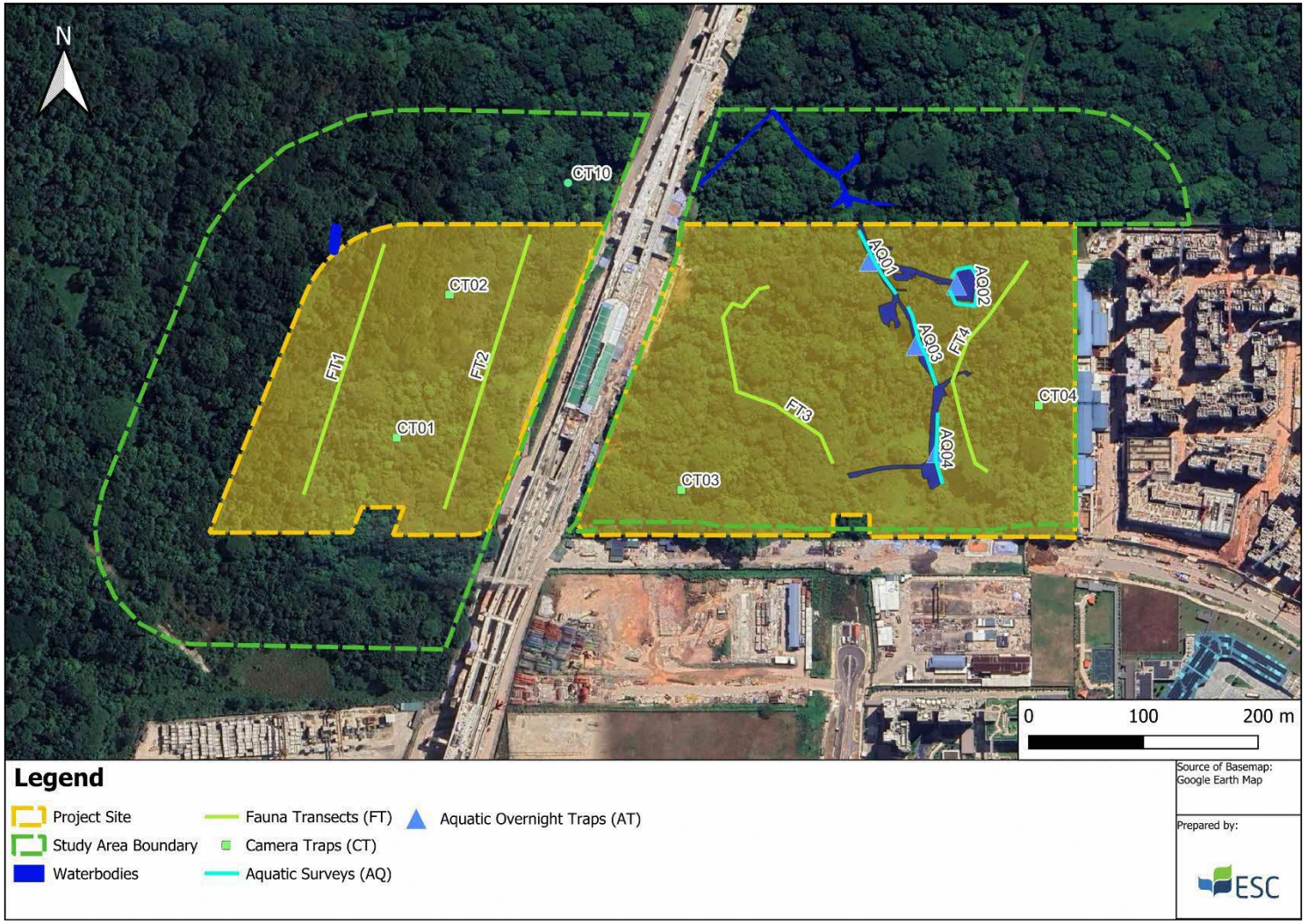


Figure 4-16: Locations of Fauna Baseline Surveys

6	Environmental Impact Assessment Report	DS	SL, NKM	RA	04/06/2026

Table 4-9: Summary of Fauna Survey Methodology and Survey Effort

Taxa	Survey	Replicates	Time	Survey Technique	Equipment
Birds	Four (4) Terrestrial Line Transects FT01 - FT04	4 (Migratory season)	0700h-1000h (Diurnal)	Visual and Auditory	Handheld GPS receiver, binoculars, torches/headlamps & camera
		2 (Migratory season)	1930-2300h (Nocturnal)		
Mammals (Non-volant)	Four (4) Terrestrial Line Transects FT01 - FT04	2	0700h-1000h (Diurnal)	Visual and Auditory	Handheld GPS receiver, binoculars, torches/headlamps & camera
		2	1930h-2300h (Nocturnal)		
	Five (5) Camera Traps CT01 – CT04, and CT10	60 days deployment for each camera trap	24 hours	Visual with auditory aid	Camera traps with accessories i.e., rechargeable batteries, SD cards, padlocks with keys
Mammals (Bats)	Four (4) Terrestrial Line Transects FT01 - FT04	2	1930h-2300h (Nocturnal)	Bioacoustics surveys	Song Meter Mini Bat Ultrasonic Recorder
Herpetofauna (Reptiles & Amphibians)	Four (4) Terrestrial Line Transects FT01 - FT04	2	0700h-1000h (Diurnal)	Visual and Auditory	Handheld GPS receiver, binoculars, torches/headlamps & Camera
		2	1930h-2300h (Nocturnal)		
Butterflies	Four (4) Terrestrial Line Transects FT01 – FT04	2	0900h-1200h	Visual	Handheld GPS receiver, binoculars, insect nets & camera
Odonates	Four (4) Aquatic Line Transects AQ01-AQ04	2	0900h-1200h	Visual	Handheld GPS receiver, binoculars, insect nets & camera
Aquatic Fauna (Fish and Decapod Crustaceans)	Four (4) Aquatic Line Transects AQ01-AQ04 and Four (4) Overnight Bait Traps	1	0900h-1200h (Diurnal)	Visual	Scoop nets/ overnight baiting
			1930h-2300h (Nocturnal)	Visual	

GIS data was provided for the following items, with the metadata to be provided stated in parentheses:

- Locations of all camera traps (species, spatial coordinates, camera trap number, monitoring start date and time, and monitoring end date and time)
- Locations of all transects (species, transect length, transect duration and survey date)
- Locations of all fauna species captured (species, spatial coordinates, conservation status, detection method and survey date and time)
- Areas of high conservation value (species of interest within the highlighted areas)

Transects were determined based on accessibility and habitat type. Each terrestrial fauna transect (FT1-FT4) was between 210 m to 250 m and each aquatic fauna transect (AQ01-AQ04) was between 55 m to 100 m. The table below shows the approximate length of each transect.

Table 4-10: Length of Each Transect

Transect Name	Length (m)
FT 01	225
FT 02	250
FT 03	230
FT 04	210
AQ 01	60
AQ 02	85
AQ 03	70
AQ 04	60

Line Transect Surveys

Terrestrial line-transect surveys covered birds, non-volant mammals, herpetofauna and butterflies. Four terrestrial line transects, FT01 to FT04, were used for these surveys. Odonates were surveyed along four aquatic transects, AQ01 to AQ04. Documentation of fauna during line transects was via visual and auditory means, aided by binoculars, camera, torches, and audio recording devices where necessary. All observed animals were recorded even if they were not the target taxa of that survey. Animals were identified on the spot, with reference to relevant field guides where necessary. If identification was unable to be made on the spot, a photo of the subject was taken for identification ex-situ, with reference to relevant field guides and other resources.

Each transect was surveyed by walking along the transect line at a steady pace, recording each individual fauna encountered within 50 m on either side of the transect and 50 m ahead. Nocturnal surveys were conducted with torches/headlamps to detect herpetofauna and mammals by illumination or eye shine. Where possible, surveyors searched for herpetofauna and mammals on the ground, on vegetation, in burrows, and in any accessible tree holes. Birds, amphibians and mammals were also detected and identified via their calls. All birds, butterflies, odonates, herpetofauna and mammals detected were identified to species level by way of sight, binoculars, and photography.

For each observation, the time of observation and location was recorded using a handheld GPS receiver, along with the number of individuals observed, and any important natural

history notes which included territory defending behaviours, foraging and movements. Any indirect evidence of mammal or herpetofauna presence, such as tracks, scat or other features was also documented. Photographs of fauna observed, including rare species or of conservation significance, were taken where possible included in the report.

Bat Acoustic Sampling

Bats were surveyed via Acoustic Recordings, using handheld Bat Recorders/ Acoustic Recorders during Nocturnal Line Transect Surveys (FT01 to FT04).

Handheld bat recorders were of the full-spectrum broadband detector type and recorded sounds in real time in their original frequency. The recording format of the recorders was set to full spectrum at a sampling rate of 384 kilohertz (kHz) and a minimum trigger frequency of 16 kHz through a paired mobile device. The Bat Recorder functions by detecting and automatically recording ultrasonic sounds in real-time and saving them onto Secure Digital (SD) cards as 16-bit waveform audio file format (.wav) files.

Bat call structure was then visualised and analysed using Kaleidoscope v.5.6.4 (Wildlife Acoustics, Inc.). Key call structure parameters include call shape, frequency (kHz) and duration (ms). Each echolocation recording was identified to species level based on call shape, frequency (minimum, maximum, and peak) and call duration, and compared with Pottie (1996), Kingston et al (2006) for accurate identification to species.

Camera Trapping

Camera Traps (CT) were deployed to capture and monitor target species without human presence. Five camera traps were deployed at the Study Area for 60 days (2 months) each, with maintenance on the 30th day. The camera traps were placed on tree trunks in vegetated areas, mounted 30 to 50 cm off the ground, and were facing away from roads and public paths to reduce the likelihood of being activated by passing vehicles or passers-by.

These cameras were also deployed in areas with potential signs of wildlife activity, and in areas that were not inundated by heavy rain. The camera trap locations shown in Figure 4-16 were selected to cover the forested portions of the Study Area and maximise the likelihood of recording fauna presence. Each camera trap was angled to capture a clear and direct field of view of relatively open areas or any possible wildlife pathways or frequented trails.

All camera traps were deployed at least 100 m apart and kept at least 20 m away from the transects. They operated 24 hours a day and were programmed to record 10-second footage per motion trigger with a 10-second quiet period following each trigger. All the data from the memory cards were downloaded after 60 days, and the footage captured were then sorted. All animals recorded were identified to the lowest taxonomic level possible, and data on the species recorded, activity patterns, and areas used by each species were collated. While non-volant mammals were the target species for camera trap surveys, all fauna species identifiable to species level were recorded and reported.

Aquatic Fauna Trapping

Diurnal aquatic fauna surveys were conducted using 10 m net transects at suitable locations along the surveyed waterbodies. The aquatic survey locations were distributed across four aquatic transects, AQ01 to AQ04, as previously shown in Figure 4-16. Visual encounter surveys were conducted along the aquatic transects, with the use of scoop netting at suitable locations along the transects. Conditions, such as water depth, were considered in assessing suitable scoop netting locations.

Overnight baited traps were deployed at four locations along the streams or perimeters of the one indicative waterbody identified at Top, Middle and End – spaced at least 50 m apart.

Trapping methods such as tray netting and overnight minnow trapping were used, which were securely anchored near the water's edge and left partially submerged to prevent suffocation of amphibious species, as seen in Figure 4-17**.**

All organisms collected were identified visually, counted, and released on the spot. For each observation, the time of observation and location was recorded using a handheld GPS receiver, along with the number of individuals observed, and any important natural history notes.

Surveys of waterbodies within the buffer area are being undertaken as part of the Site 2 EIA and will be presented and assessed in the Site 2 report. These buffer-area surveys are not included in the Site 1 aquatic fauna results.

Figure 4-17: Aquatic Fauna Traps in the Study Area

4.6.3 Terrestrial Flora Revalidation

Habitat Mapping

The vegetation within the Study Area remains broadly consistent with that reported in the 2021 EIS. However, the habitat types were reclassified in accordance with the NParks BIA Guidelines (2024). Areas dominated by African tulip (*Spathodea campanulata*) were classified as Abandoned Land Forest rather than Waste Woodland, while areas dominated by Albizia (*Falcataria falcata*) were classified as Albizia/Acacia/Leucaena/Cecropia-dominated forest. The scrubland and grassland areas remain broadly comparable to those identified in the 2021 EIS (Figure 4-19).

The habitat mapping values presented in Table 4-11 represent only habitats within the Project Site, comprising the RAC and areas that will be affected by the proposed construction works. Potential impacts on flora species and habitats outside this boundary, including flora species of conservation significance, will be assessed as part of the Site 2 EIA.

Within the Project Site boundary, the most dominant habitat type recorded was Abandoned Land Forest (14.36 ha; 85.99%), followed by scrubland/grassland (2.10 ha; 12.57%), infrastructure (0.20 ha; 1.20%), and Albizia/Acacia/Leucaena/Cecropia dominated forest (0.04 ha; 0.24%). A small patch of native-dominated secondary forest was observed outside the Project Site, within the 100 m-wide offset to the south (Figure 4-18).

Table 4-11: Habitat Types in the Project Site

Habitat Type	Project Site	
	Size (ha)/Percentage (%)	
Abandoned land forest	14.36	85.99
Scrubland/grassland	2.10	12.57
Infrastructure	0.20	1.20
Albizia/Acacia/Leucaena/Cecropia dominated forest	0.04	0.24
Grand Total (ha)	**16.70**	

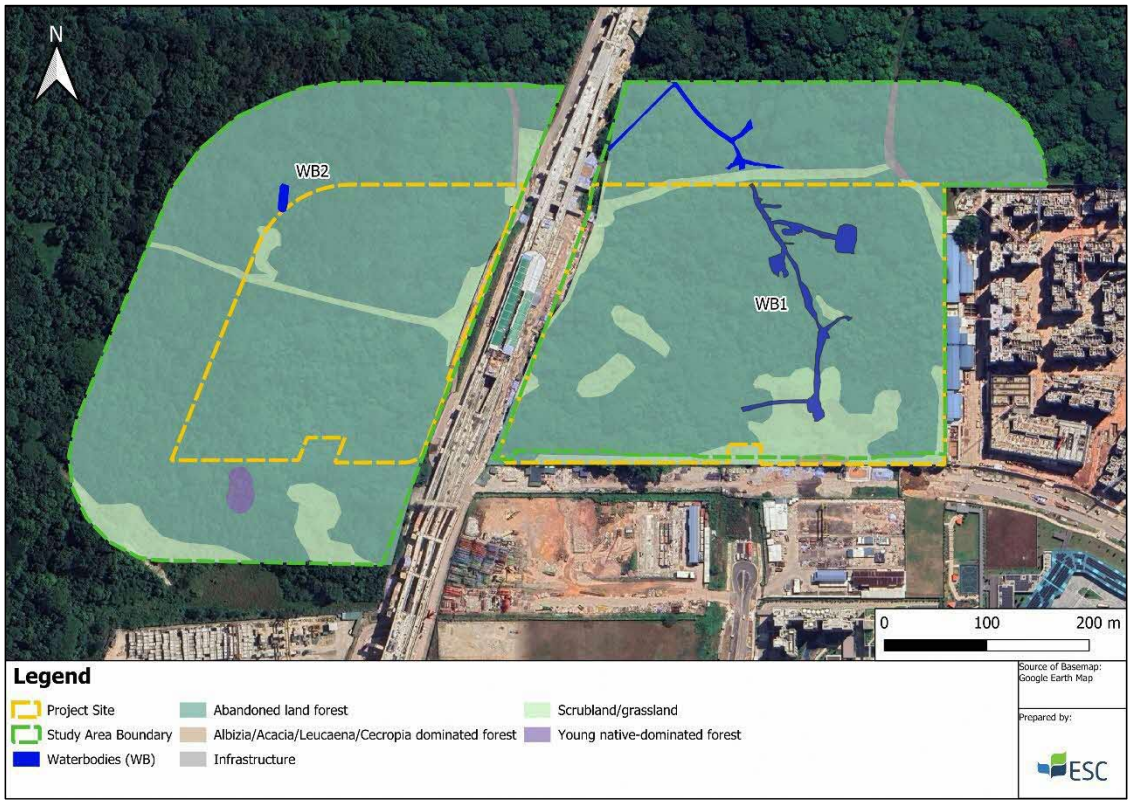


Figure 4-18: Overall Habitat Mapping within the Study Area

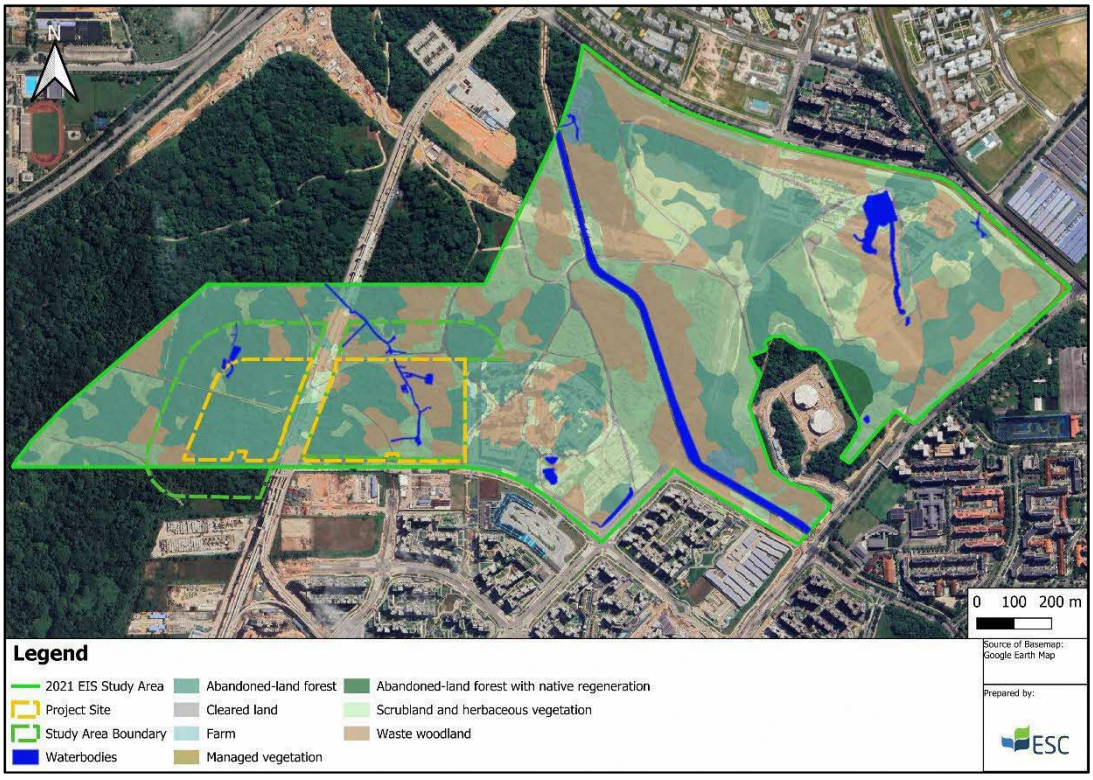


Figure 4-19: 2021 EIS Habitat Mapping

Abandoned Land Forest

Abandoned land forest was the most dominant habitat type, comprising 63.36% of the study area. This vegetation usually occurs in areas previously occupied by kampongs or plantations as recent as 40 to 50 years ago. The canopy is mainly dominated by African tulip (*Spathodea campanulata*), Rubber (*Hevea brasiliensis*), Oil palms (*Elaeis guineensis*), Wild cinnamon (*Cinnamomum iners*) and Rambutan (*Nephelium lappaceum*), with frequent occurrences of other commonly cultivated fruit trees found within this habitat as per Figure 4-20. Strangler figs with large spread, like the native Malayan banyan (*Ficus microcarpa*) and common Red-stem fig (*Ficus variegata*), and the cryptogenic Benjamin's fig (*Ficus benjamina*) were also abundant here. Two rarely occurring strangler species, namely the critically endangered *Ficus binnendijkii*, and the endangered Stem-fruited fig (*Ficus caulocarpa*) were recorded here. Other threatened species included the vulnerable, but frequently observed Mahang bulan (*Macaranga griffithiana*), and lesser observed species like the endangered Ara akar (*Ficus apiocarpa*) and the vulnerable Crescent tree (*Aporosa benthamiana*).

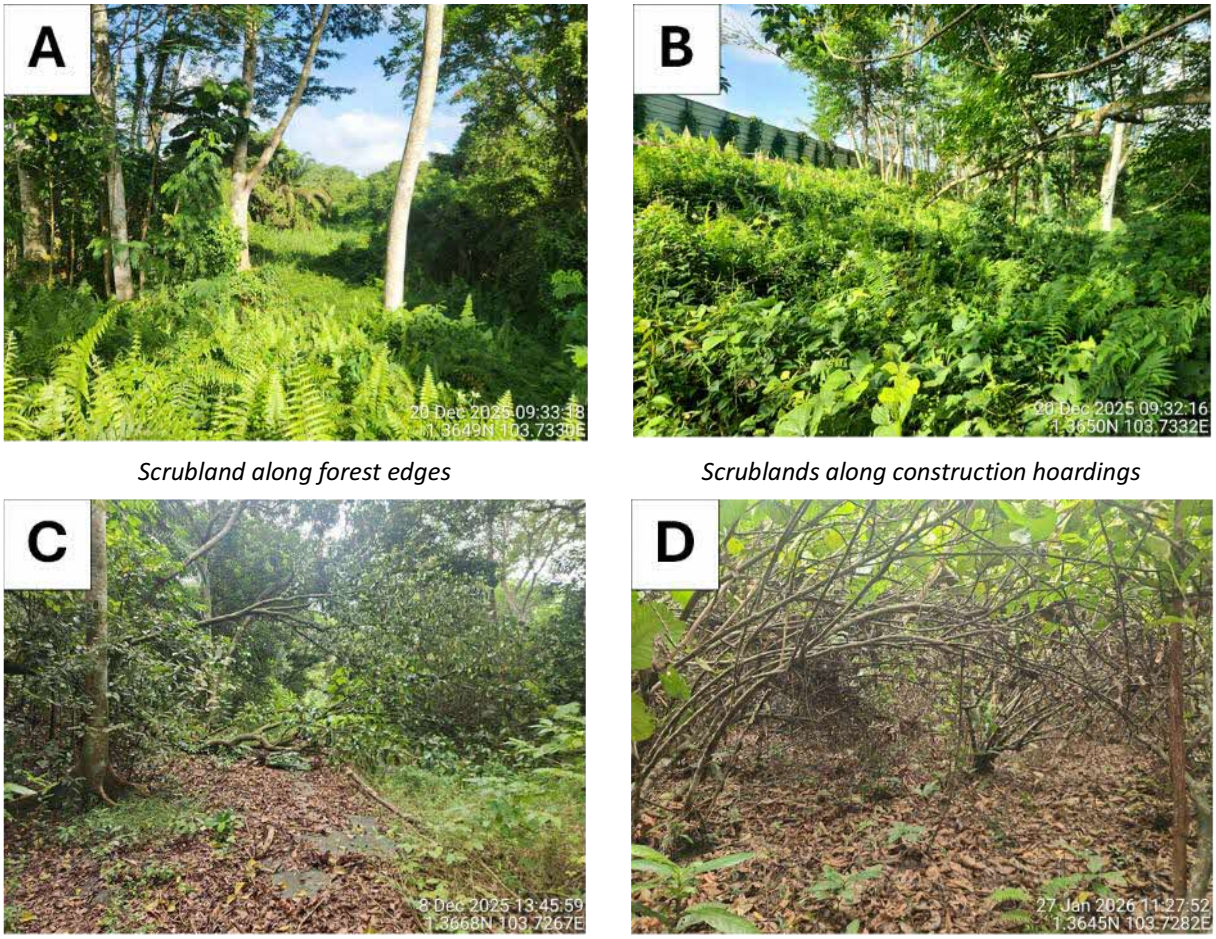
Rambutan tree with climbers on trunk, growing amongst a canopy

Forest vegetation with understorey and canopy layers

Figure 4-20: Vegetation within Abandoned Land Forest

Scrubland/Grassland

This habitat is the second most dominant vegetated habitat, comprising mainly open canopies with climbers, weeds and other herbaceous vegetation. Scrublands were mainly found along the edges of habitat patches or alongside construction hoardings (Figure 4-21 a & b, respectively), as well as scrubland occurring between patches were also likely to be overgrown vegetation on abandoned dirt, or sometimes, asphalt roads (Figure 4-21 c). Less commonly, Simpoh air (*Dillenia suffruticosa*) scrublands were also observed (Figure 4-21 d) within forest patches. Simpoh air in these scrublands typically form dense stands of 3 to 5 m height, and their multiple branches often droop low and criss-cross with branches from other individuals, forming impassable thickets. Trees of other species are seldom observed in these thickets.



Scrubland along forest edges

Scrublands along construction hoardings

Scrublands along abandoned roads

Simpoh air scrubland

Figure 4-21: Scrubland Types Found in the Study Area

Young Native-dominated Secondary Forest

This habitat comprises a small patch within the offset area along slightly elevated terrain, in which saplings and small trees of native species were recorded (Figure 4-22). Species like Simpoh air (*Dillenia suffruticosa*), Wild cinnamon (*Cinnamomum iners*), and Salam (*Syzygium polyanthum*) were found here, as well as saplings of other native species such as *Aphanamixis polytsachya*, *Leea indica*, and *Macaranga griffithiana*, indicating native recruitment and potential for regeneration. However, future seed sources will be limited due to development plans around the area.

Figure 4-22: Native-dominated Patch in the Study Area

Waterbodies

Waterbodies mainly comprised a stream, about 5 m wide, running down from the northeast to northwest of the study area, with occasional pooling at certain points. Riparian vegetation, like native Tree fern (*Alsophila latebrosa*) and the endangered Elephant fern (*Angiopteris evecta*) (Figure 4-23) were recorded along the banks of this major waterbody.

Tree fern growing in proximity to stream

Elephant fern (*Angiopteris evecta*) growing at stream edge

Figure 4-23: Banks of Main Waterbody in the Study Area

Albizia/Acacia/Leucaena/Cecropia Dominated Forest

This was a small patch of Albizia (*Falcataria falcata*) stand in the southeast of the Study Area that has a distinct appearance of sparse to open canopy Figure 4-24. The trees appear to have grown in the last few years. Ground cover usually resembles that of herbaceous scrublands, with fallen branches and grasses like Elephant grass (*Cenchrus setosus*), given the partially exposed understorey.

Figure 4-24: Ground View of the Albizia Stand in the Study Area

Infrastructure

Infrastructure comprises mostly the construction sites in the northeast portion and the middle of the study area. In the middle, tracks of the future Jurong Region Line (JRL) and the future MRT station cut across from north to south, enclosed by hoardings (Figure 4-25). The 100 m-wide offset area of the Study Area also has ongoing development on the southeastern side.

Figure 4-25: Ground Views of Infrastructure within the Study Area

Flora Diversity

A total of 47 flora species were revalidated to be present within the Study Area, nine of which were of conservation significance, and of these, eight were from non-cultivated sources. Of these 47, three species groups (*Bambusa cf. Multiplex, Mangifera cf. x odorata* and *Pinus sp*.) were identified up to family level but could not be identified to certainty (species). The full flora revalidation list is provided in Appendix C.

Similar to the 2021 EIS, *Pinus sp.* was recorded during surveys, and is likely non-native, as there are no listed records of native Pinus species in the Singapore Red Data Book (National Parks Board, 2024).

Tree Density, Forest Structure and Vegetation Classification

A total of 33 tree species comprising 468 individual trees with girth ≥ 1 m within the Study Area were revalidated to be present based on their tags, leaf and bark characteristics (Table 4-12). These exclude the non-native African tulip (*Spathodea campanulata*), Albizia (*Falcataria falcata*), Earleaf acacia (*Acacia auriculiformis*), Silver wattle (*Acacia mangium*), Betel-nut palm (*Areca catechu*), Wild tamarind (*Leucaena leucocephala*), Coconut (*Cocos nucifera*), Oil palm (*Elaeis guineensis*), and Macarthur palm (*Ptychosperma macarthurii*) as these species were not measured and their locations were not recorded during the 2021 EIS.

However, observations indicated that African tulip and Albizia were common canopy trees throughout the Study Area. Apart from these trees, the three most common tree species were Rubber (*Hevea brasiliensis*), Wild cinnamon (*Cinnamomum iners*) and Rambutan (*Nephelium lappaceum*) as Figure 4-26. They made up about 52% of the trees recorded.

Figure 4-26: Rubber tree (left), Wild cinnamon (middle) and Rambutan tree (right)

Of these 33 species, four species of conservation significance were found – Rambai (*Baccaurea motleyana*), *Ficus binnendijkii*, Stem-fruited fig (*Ficus caulocarpa*), and Mahang bulan (*Macaranga griffithiana*). Of these, Rambai is likely from cultivated sources, with only one individual tree of 1.6 m girth being found approximately in the centre of the Study Area along the hoarding of the existing development. There were smaller individuals observed around the adult tree.

Table 4-12: Summary of Large Trees of ≥ 1m Girth Revalidated

No.	Scientific name	Common name	Family	SRDB3	No. of trees	Mean girth (m)	Remarks
1	*Hevea brasiliensis*	Rubber tree	Euphorbiaceae	NA	102	1.38	
2	*Cinnamomum iners*	Wild cinnamon	Lauraceae	LC	75	1.36	
3	*Nephelium lappaceum*	Rambutan	Sapindaceae	NA	66	1.26	
4	*Durio zibethinus*	Durian	Malvaceae	NA	37	1.30	
5	*Ficus microcarpa*	Malayan banyan	Moraceae	LC	28	7.60	
6	*Terminalia catappa*	Ketapang	Combretaceae	LC	18	1.81	
7	*Syzygium polyanthum*	Salam	Myrtaceae	LC	26	1.21	
8	*Pterocarpus indicus*	Angsana	Fabaceae	NA	14	3.81	
9	*Ficus benjamina*	Weeping fig	Moraceae	NA	13	3.95	
10	*Artocarpus integer*	Cempedak	Moraceae	NA	26	1.33	
11	*Ficus variegata*	Common red-stem fig	Moraceae	LC	10	1.73	
12	*Vitex pinnata*	Leban	Lamiaceae	LC	8	1.29	
13	*Claoxylon indicum*	Laping budak	Euphorbiaceae	LC	4	1.00	
14	*Macaranga griffithiana*	Mahang bulan	Euphorbiaceae	VU	3	1.80	
15	*Macaranga hypoleuca*	NA	Euphorbiaceae	LC	3	1.60	
16	*Ficus binnendijkii*	NA	Moraceae	CR	2	4.25	
17	*Tabebuia rosea*	Trumpet flower	Bignoniaceae	NA	2	2.00	
18	*Mangifera x odorata*	Saipan mango	Anacardiaceae	NA	2	1.90	
19	*Syzygium cerasiforme*	Common kelat	Myrtaceae	LC	3	1.17	
20	*Ficus caulocarpa*	Stem-fruited fig	Moraceae	EN	1	6.00	

No.	Scientific name	Common name	Family	SRDB3	No. of trees	Mean girth (m)	Remarks
21	*Alstonia scholaris*	Indian pulai	Apocynaceae	NA	1	4.00	
22	*Alstonia angustiloba*	Common pulai	Apocynaceae	LC	2	1.70	
23	*Pinus sp.*	NA	NA	NA	1	1.85	
24	*Adenanthera pavonina*	Saga	Fabaceae	NA	1	1.60	
25	*Baccaurea motleyana*	Rambai	Phyllanthaceae	CR	1	1.60	Likely from cultivated sources
26	*Macaranga gigantea*	Mahang gajah	Euphorbiaceae	LC	4	1.40	
27	*Mangifera cf. x odorata*	Saipan mango	Anacardiaceae	NA	2	1.35	
28	*Artocarpus heterophyllus*	Jackfruit	Moraceae	NA	3	1.30	
29	*Macaranga conifera*	NA	Euphorbiaceae	LC	1	1.10	
30	*Dimocarpus longan*	Longan	Sapindaceae	DD	3	1.43	
31	*Theobroma cacao*	Cocoa	Malvaceae	NA	1	1.00	
32	*Campnosperma auriculatum*	Terentang	Anacardiaceae	LC	1	2.50	
33	*Aphanamixis polystachya*	Pithraj tree	Meliaceae	LC	1	1.10	

Plants of Conservation Significance

In total, 40 specimens from nine species of conservation significance were recorded within the Study Area (Table 4-13). One of the species, Rambai, is likely from a cultivated source, while the remaining eight are considered to be wild.

Of the eight wild specimens, notable species include the critically endangered *Ficus binnendijkii*, the endangered *Ficus caulocarpa*, Ara akar (*Ficus apiocarpa*), and *Melicope lunu-ankenda,* and the vulnerable *Angiopteris evecta*, a large fern commonly found in riparian habitats.

Table 4-13: Flora Species of Conservation Significance

No.	Scientific name	Common name	Family	SRDB3	Plant habit	Project Site	Offset Area	Cultivated (C) or Wild (W)
1	*Angiopteris evecta*	Elephant fern	Marattiaceae	VU	Fern	Yes		W
2	*Aporosa benthamiana*	Crescent tree	Phyllanthaceae	VU	Tree	Yes		W
3	*Baccaurea motleyana*	Rambai	Phyllanthaceae	CR	Tree	Yes		C
4	*Ficus apiocarpa*	Ara akar	Moraceae	EN	Climber	Yes		W
5	*Ficus binnendijkii*	NA	Moraceae	CR	Tree	Yes		W
6	*Ficus caulocarpa*	Stem-fruited fig	Moraceae	EN	Tree	Yes		W

No.	Scientific name	Common name	Family	SRDB3	Plant habit	Project Site	Offset Area	Cultivated (C) or Wild (W)
7	*Litsea umbellata*	Blue laurel	Lauraceae	VU	Tree	Yes	Yes	W
8	*Macaranga griffithiana*	Mahang bulan	Euphorbiaceae	VU	Tree	Yes	Yes	W
9	*Melicope lunu-ankenda*	Pepauh	Rutaceae	EN	Tree		Yes	W

Wild Plant Species of Conservation Significance

Notable wild species of conservation significance include those mentioned above (some shown in Figure 4-27) and commonly found species like the vulnerable *Macaranga griffithiana* and *Litsea umbellata* (Figure 4-28). These were also found in the previous EIS in 2021, which noted these species together with a few others which were not found in the current study. *Ficus binnendijkii* is not known to be cultivated in the past and hence, the specimens found would likely be from a native population.

Trunk of critically endangered *Ficus binnendijkii* strangler

Base of endangered large *Ficus caulocarpa* strangler

Frond undersides of vulnerable fern *Angiopteris evecta*

Figure 4-27: Selected Notable Wild Species of Conservation Significance Recorded

Melicope lunu-ankenda, a species commonly found in disturbed secondary forests, can also be found in other sites around Singapore, as noted in other EIA studies in Tengah Forest, Bukit Batok, and Jalan Bahar (Jacobs, 2023; Tembusu Asia, 2025; Aecom, 2025). A specimen of the Elephant fern (*Angiopteris evecta*), a large fern commonly found in riparian or riverine habitats, was recorded beside a stream.

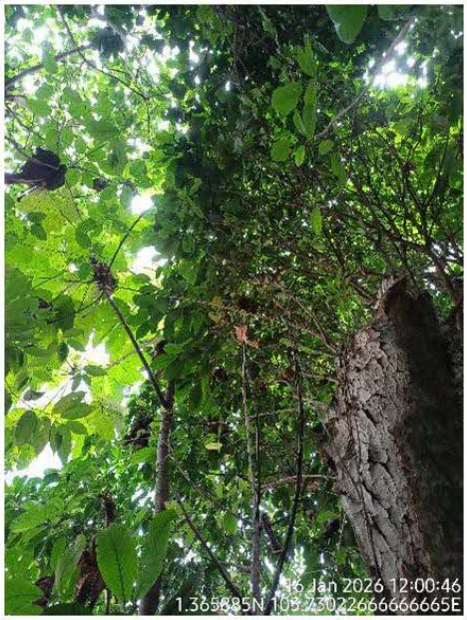
Macaranga griffithiana

Litsea umbellata

Figure 4-28: Commonly Occurring Vulnerable Species

Cultivated Plant Species of Conservation Significance

Three observations of the critically endangered Rambai, counting a total of about 20 saplings and one tree in total, were recorded within the Study Area. Though these are threatened species, they were also a commonly planted fruit tree in the old Kampongs, and would hence be a possible remnant from the past village settlement as mentioned in Section 4.3, or it may likely be originated from cultivated sources in nearby parks where they are recorded to be planted in. This species was also recorded in the 2021 EIS.



Trunk of Rambai (*Baccaurea motleyana*) tree

Foliage of Rambai saplings

Figure 4-29: Cultivated Plant Species of Conservation Significance

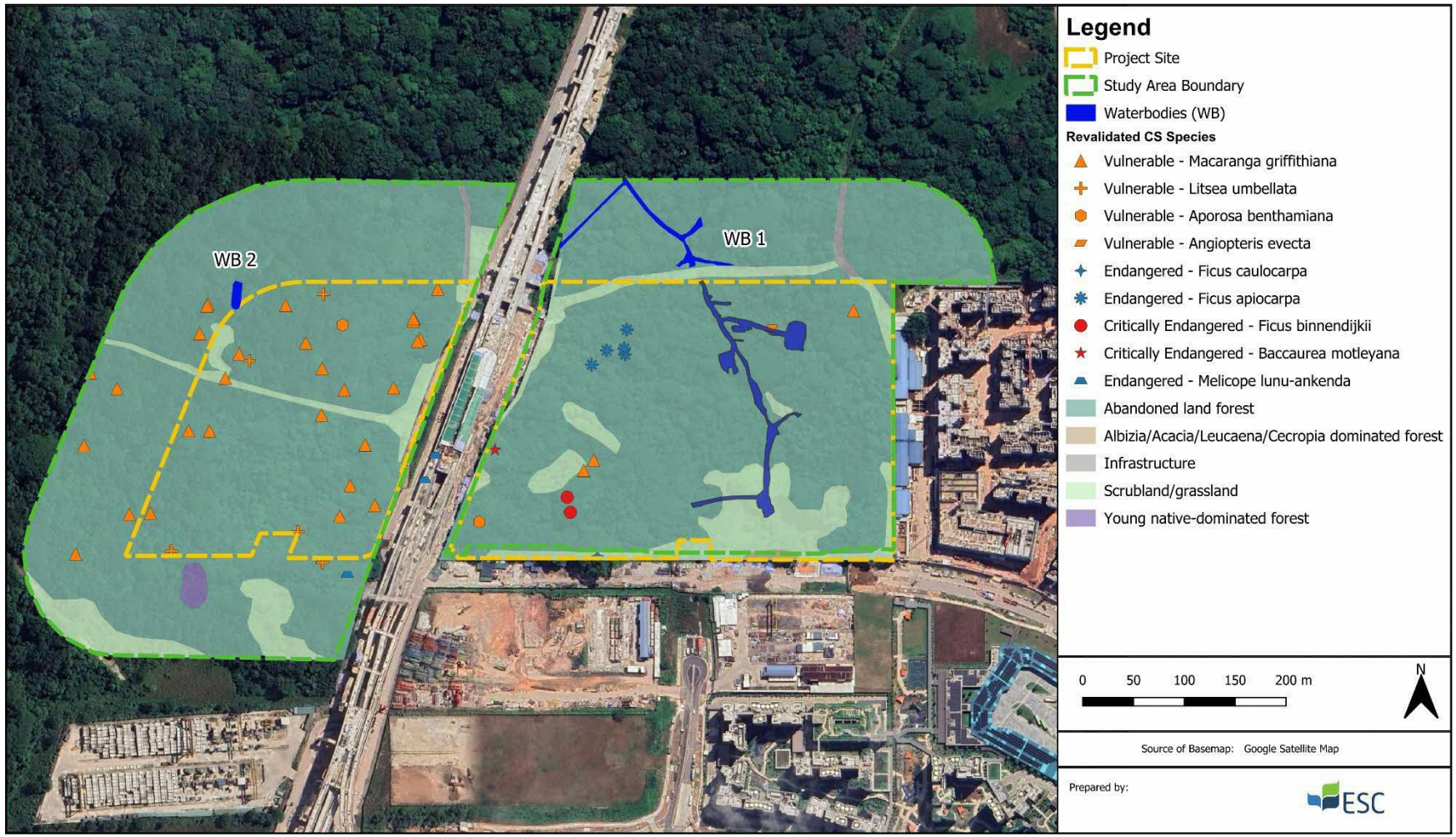


Figure 4-30: Locations of Flora Species of Conservation Significance within the Study Area

4.6.4 Fauna Baseline Results

Overall Findings

A total of 108 species from 8 fauna groups were documented at the Study Area, excluding those that were unidentifiable to species level. 100 species were terrestrial (birds, butterflies, odonates, reptiles, mammals, and amphibians) and 8 were aquatic (fish and aquatic mollusc). Birds made up the largest taxon (58 species), followed by odonates (9 species), then reptiles (8 species) and butterflies (8 species).

A total of 10 species of conservation significance (as per SRDB3 or IUCN) were detected within the Study Area (Table 4-14 and Table 4-15). This does not include non-native species in the IUCN red list (e.g. Javan Myna, IUCN: VU). The full list of fauna species recorded can be found in Appendix D, while camera trap records can be found in Appendix E.

Table 4-14: Fauna Species Distribution Across All Surveyed Taxa with Number of Locally (SRDB3) and Globally (IUCN) Conservation Significant Species

Fauna Taxon	No. of species*	Cumulative No. of CS Species	
		SRDB3	IUCN
Non-volant Mammal	6	1	2
Bat	4	0	0
Amphibian	7	0	0
Reptile	8	0	0
Butterfly	8	0	0
Odonates	9	1	0
Bird	58	6	2
Freshwater Fish	6	0	0
Aquatic Molluscs	2	0	0
Remarks: CS refers to NEx, CR, EN, VU statuses Non-native Globally CS species are not included in this table. **Number of species identified to species level.*			

All CS fauna from the various taxon have been collated and presented in Figure 4-31. The vegetation types have been overlaid to show the various habitat associations.

Table 4-15: List of Conservation Significant Fauna

S/N	Taxon	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
1	Mammal	Sunda Pangolin	*Manis javanica*	Native	CR	CR
2	Mammal	Long-tailed Macaque	*Macaca fascicularis*	Native	LC	EN
3	Avian	Changeable Hawk-eagle	*Nisaetus cirrhatus*	Native	VU	LC
4	Avian	Oriental Magpie-Robin	*Copsychus saularis*	Native	VU	LC
5	Avian	Spotted Wood Owl	*Strix seloputo*	Native	VU	LC
6	Avian	Straw-headed Bulbul	*Pycnonotus zeylanicus*	Native	EN	CR
7	Avian	Long-tailed Parakeet	*Psittacula longicauda*	Native	NT	VU
8	Avian	Brown Shrike	*Lanius cristatus*	Native	VU	LC
9	Avian	Swinhoe's White Eye	*Zosterops simplex*	Native	VU	LC
10	Odonate	Variable Featherlegs	*Copera vittata*	Native	VU	LC

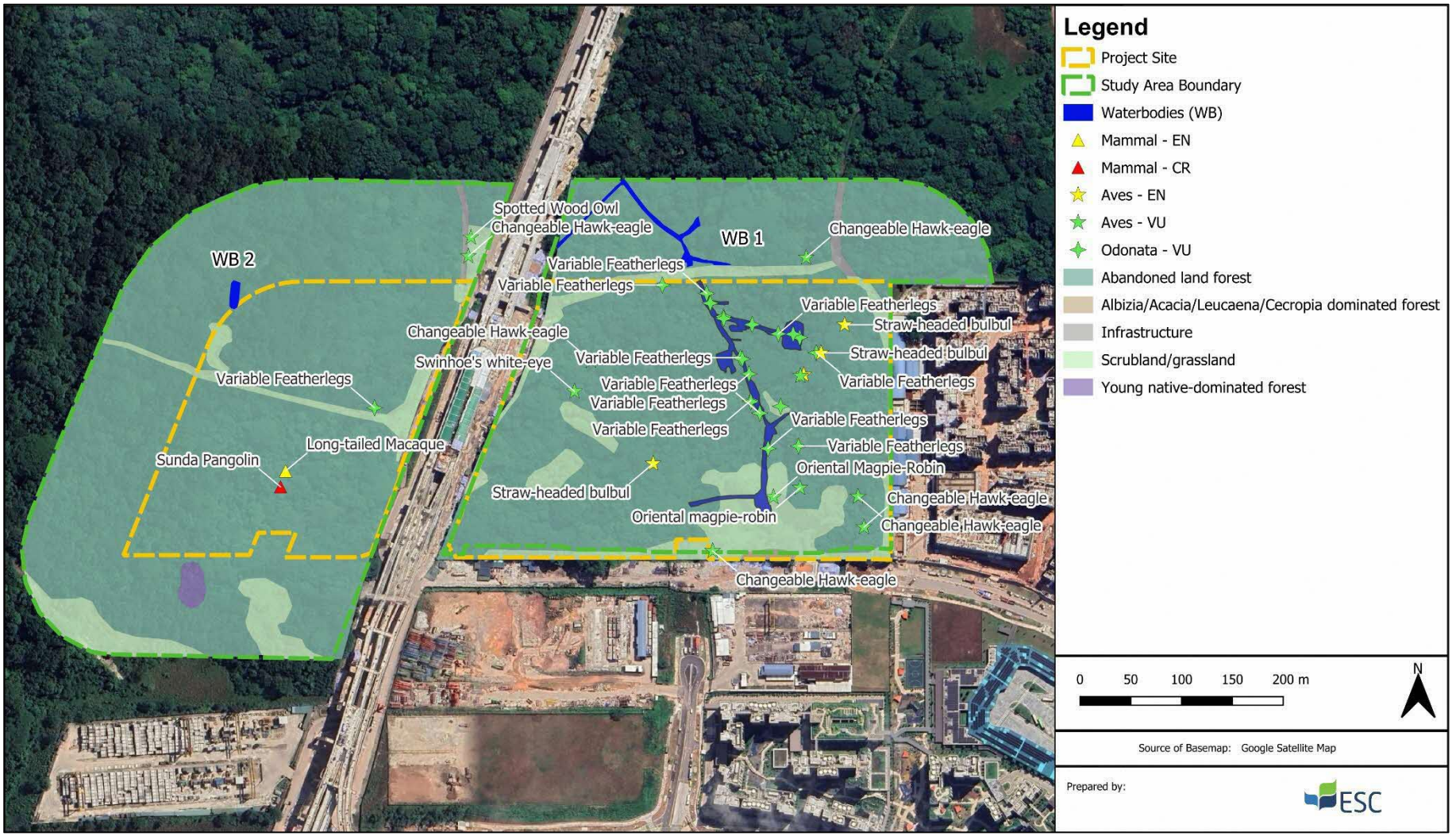


Figure 4-31: All Conservation-Significant Fauna Recorded

Mammals

Non-Volant Mammals

A total of six species of non-volant mammals were recorded during the survey period (Table 4-16). These comprise the Common Treeshrew (*Tupaia glis*), Long-tailed Macaque (*Macaca fascicularis*), Plantain Squirrel (*Callosciurus notatus*), Slender Squirrel (*Sundasciurus tenuis*), Common Palm Civet (*Paradoxurus musangus*), and the Sunda Pangolin (*Manis javanica*).

The Plantain Squirrel and Common Treeshrew were frequently detected through camera trap and transect surveys. The Long-tailed Macaque was recorded three times via camera traps. The Slender Squirrel was detected through vocalisations during diurnal transects, while the Common Palm Civet was observed during a nocturnal survey. The Sunda Pangolin was detected once via camera trap (CT01).

Of the six species recorded, two are of conservation significance: the Sunda Pangolin and the Long-tailed Macaque.

The Sunda Pangolin is listed as Critically Endangered (CR) under both the Singapore Red Data Book (3rd Edition, 2024) and the IUCN Red List (2019). The individual recorded at the Study Area was detected within the western portion, which remains connected to a larger contiguous vegetated area beyond the Study Area. Although only a single detection was obtained, this should not be interpreted as low Project Site usage, as the species is solitary, nocturnal, and cryptic, resulting in reduced detection probability during short-term surveys (Chong, et al., 2020).

The 2021 EIS recorded six independent Sunda Pangolin detections across the wider Tengah study area, with most records located in western Tengah. The present survey recorded the species once at camera trap CT01 within the western portion of the Project Site. This confirms continued use of the vegetated areas in western Tengah by the species.

The survey did not document an active den, confirmed foraging signs or repeated detections at the same location. However, given the solitary, nocturnal and cryptic behaviour of the Sunda Pangolin, the available data are insufficient to determine the frequency or specific purpose of its use of the Project Site. The Project Site may support foraging, shelter, movement or other habitat functions. It should therefore be regarded as confirmed habitat used by the species, with the nature and extent of that use remaining undetermined.

The Long-tailed Macaque is listed locally as Least Concern (LC) but globally as Endangered (EN) on the IUCN Red List, reflecting regional population declines driven by habitat loss and hunting pressures. Within Singapore, the species remains widespread, particularly along forest edges and urban interfaces (Sha et al. 2009). Its presence at the Study Area reflects the continued availability of vegetated habitat and movement space. Further habitat fragmentation within Tengah may increase displacement and the likelihood of human–macaque interactions as development progresses.

The Slender Squirrel, although not currently listed as threatened, is considered forest-dependent in Singapore and has a relatively restricted distribution centred on the Central Catchment Nature Reserve and Bukit Batok Nature Park (Baker & Lim, 2012). Its detection within the Study Area is therefore ecologically meaningful. The 2021 EIS noted that its occurrence in Tengah may represent either a remnant population or individuals utilising fragmented forest patches as stepping stones. The continued detection during the present

survey suggests that parts of the Study Area retain secondary forest characteristics capable of supporting forest-associated fauna.

When considered within the broader Tengah landscape, the mammal assemblage recorded within the Study Area reflects its connection to the larger vegetated areas in western Tengah. The frequency and type of records varied among species. The Plantain Squirrel and Common Treeshrew were frequently detected, the Long-tailed Macaque was recorded three times, while the Sunda Pangolin was recorded once. These records confirm that the Study Area is used by mammals. However, the available data are insufficient to determine the relative importance of the Study Area for foraging, shelter, breeding or movement for each species. The Study Area should therefore be regarded as secondary habitat supporting multiple ecological functions, with the nature and extent of use varying among species.

Table 4-16: List of Non-Volant Mammals Recorded

S/N	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
1	Tupaiidae	Common Treeshrew	*Tupaia glis*	Native	LC	LC
2	**Cercopithecidae**	**Long-tailed Macaque**	***Macaca fascicularis***	**Native**	**LC**	**EN**
3	Sciuridae	Plantain Squirrel	*Callosciurus notatus*	Native	NA	LC
4	Sciuridae	Slender Squirrel	*Sundasciurus tenuis*	Native	LC	LC
5	Viverridae	Sumatran Palm Civet	*Paradoxurus musangus*	Native	LC	LC
6	**Manidae**	**Sunda Pangolin**	***Manis javanica***	**Native**	**CR**	**CR**

Common Palm Civet (*Paradoxurus musangus*)

Source: Ngin Yun Jia

Sunda Pangolin (*Manis javanica*)

Figure 4-32: Selected Photographs of Non-volant Mammal Species Recorded During the Baseline Survey

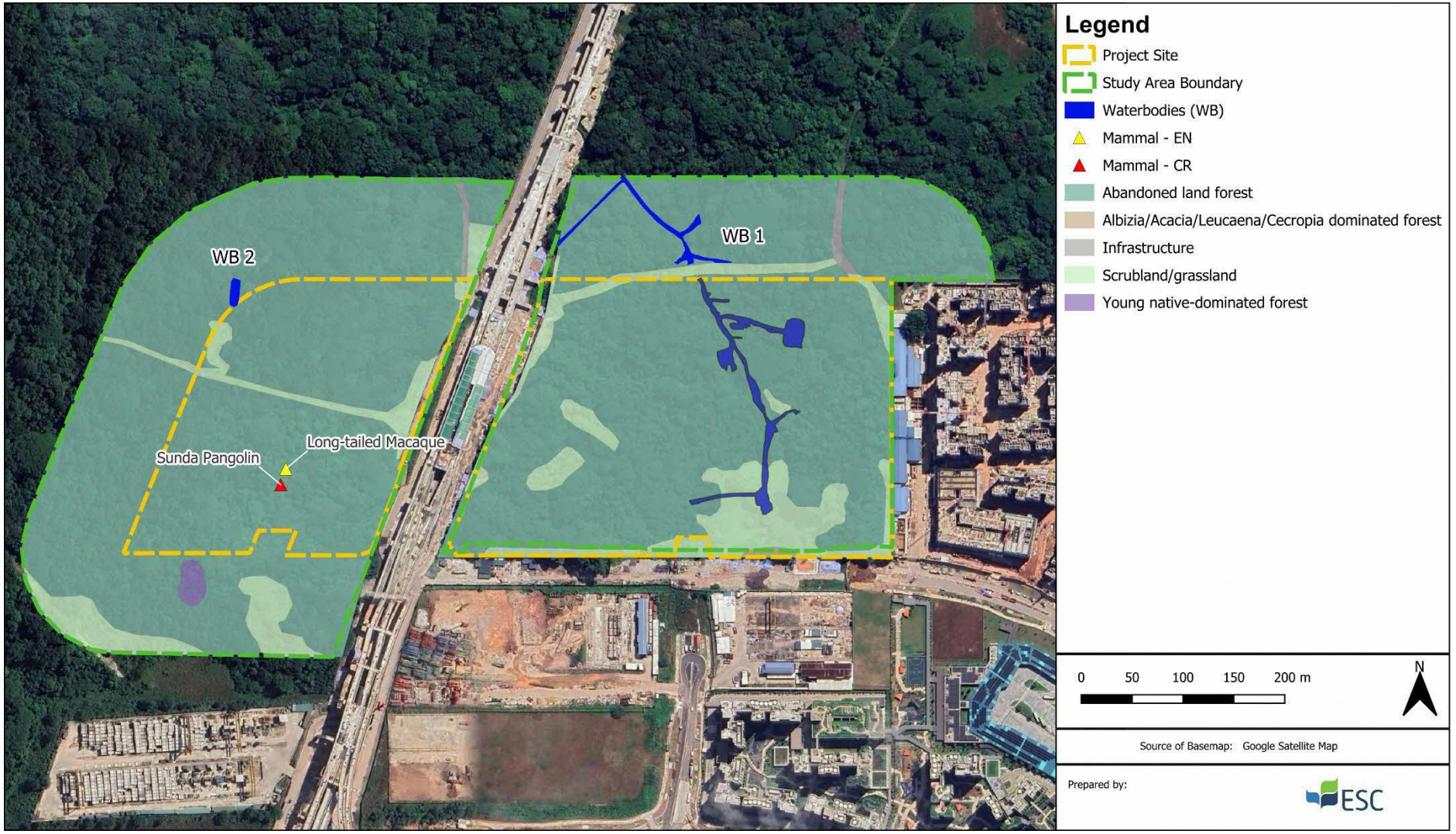


Figure 4-33: Location of Species of Conservation Value (Non-Volant Mammals)

Volant Mammals (Bats)

A total of four bat species were recorded during the survey period through a combination of bat acoustic call analysis and visual encounter surveys, as shown in Table 4-17 and Figure 4-34.

Table 4-17: Mammals (Volant) Species Documented

S/N	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
1.	Vespertilionidae	Asiatic Yellow House Bat	*Scotophilus kuhlii*	Native	LC	LC
2.	Vespertilionidae	Javan Pipistrelle	*Pipistrellus javanicus*	Native	LC	LC
3.	Vespertilionidae	Bent-winged Pipistrelle	*Pipistrellus stenopterus*	Native	LC	LC
4.	Pteropodidae	Lesser short-nosed fruit bat	*Cynopterus brachyotis*	Native	LC	LC

Scotophilus kuhlii

Pipistrellus javanicus

Cynopterus brachyotis

Pipistrellus stenopterus

Source: Nick Baker from ecologyasia.com, Tzi Ming Leong from NParks

Figure 4-34: Bat Species Detected

Bat activity in the Study Area was assessed using handheld bat detectors along four nocturnal fauna transects, with two replicates conducted for each transect. A total of 841 echolocation calls were recorded during the surveys.

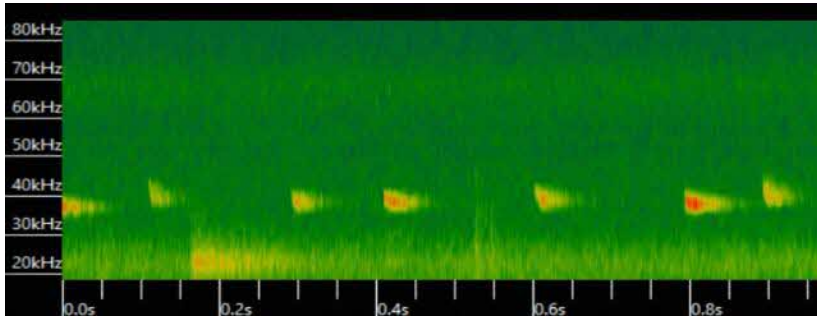
Acoustic analysis confirmed the presence of three *Microchiropteran* species, namely the Asiatic Yellow House Bat (*Scotophilus kuhlii*), Javan Pipistrelle (*Pipistrellus javanicus*), and Bent-winged Pipistrelle (*Pipistrellus stenopterus*). These species are commonly recorded in built-up areas and disturbed habitats and are typical of urban and edge environments in Singapore (Kingston et al., 2006; Baker & Lim, 2012). Representative call structures and spectrograms are presented in Figure 4-35.

One megachiropteran species, the Lesser Short-nosed Fruit Bat (*Cynopterus brachyotis*), was also recorded in the Study Area. As fruit bats do not echolocate, this species was not detected through acoustic monitoring and was instead observed visually during nocturnal fauna surveys. Its presence is consistent with the availability of fruiting and flowering plants within and around the Survey Area (Baker & Lim, 2012).

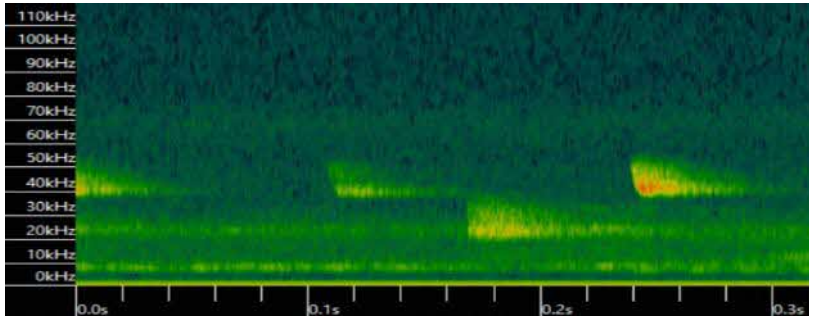
In comparison, the 2021 EIS reported 11 bat species of probable occurrence within the larger study area, of which eight species were recorded (CH2M Hill Singapore, 2021). These included visually observed species such as the Large Flying Fox (*Pteropus vampyrus*) and bamboo bats (*Tylonycteris* spp.), as well as several insectivorous species detected through acoustic sampling. A nationally Endangered species, the Black-bearded Tomb Bat (*Taphozous melanopogon*), was also recorded during the 2021 EIS (CH2M HILL Singapore, 2021; Baker & Lim, 2012).

The four bat species recorded confirm that the Study Area provides habitat used by bats, particularly for foraging and movement. The three insectivorous species recorded are commonly associated with urban-edge and disturbed habitats, while the Lesser Short-nosed Fruit Bat is likely supported by fruiting and flowering vegetation within and around the Study Area. All four species are currently listed as Least Concern locally and globally.

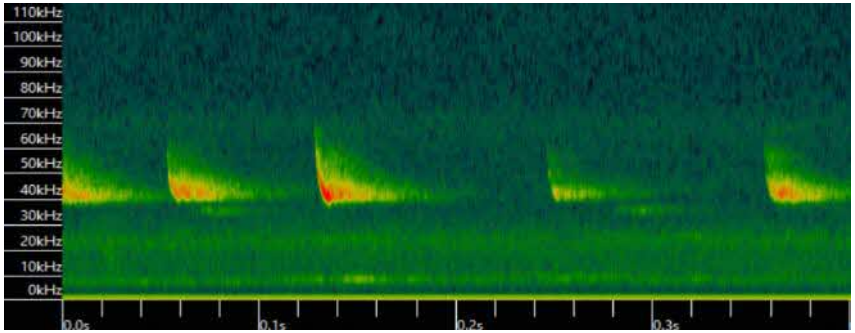
Acoustic detections confirm bat activity but do not, by themselves, establish the presence of roosts or the relative importance of the Study Area compared with other habitats across Tengah. The present survey did not include targeted roost surveys or comparable activity sampling across the wider Tengah area. The available evidence is therefore insufficient to classify the Study Area as either a main bat habitat or solely a supplementary foraging area. It is more accurately described as bat habitat supporting at least four species, with its relative importance within the wider Tengah landscape not established by the present surveys.



Bent-winged Pipistrelle (*Pipistrellus stenopterus*)



Javan Pipistrelle (*Pipistrellus javanicus*)



Asiatic yellow house bat *(Scotophilus kuhlii)*

Figure 4-35: Spectrograms Showing Acoustic Call Characteristics of Detected Bat Species

Herpetofauna

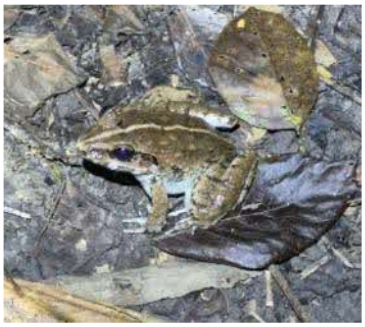
Amphibians

A total of seven amphibian species were recorded during the survey period. None of the species observed are currently listed as being of conservation concern at either the local or global level, based on the third edition of the Singapore Red Data Book (National Parks Board, 2024) and the IUCN Red List of Threatened Species (IUCN, 2024). Most of the species were observed via their calls and so photographs were limited.

The most frequently encountered species was the Dark-sided Chorus Frog (*Microhyla heymonsi*), with a total of 24 records. This was followed by Mukhlesur's Chorus Frog (*Microhyla mukhlesuri*), which was recorded 16 times. Other species documented during the surveys included the Bengal Toad (*Duttaphrynus melanostictus*), Four-lined Tree Frog (*Polypedates leucomystax*), Günther's Frog (*Indosylvirana guentheri*), Malayan Giant Frog (*Limnonectes blythii*), and Painted Chorus Frog (*Microhyla butleri*). All recorded species are widespread and commonly encountered in disturbed habitats, secondary vegetation, and urban-edge environments in Singapore (Baker & Lim, 2012).

Encounter rates were generally higher in areas located close to the stream and low-lying sections where soil moisture was elevated. This distribution pattern is consistent with established amphibian ecology, as most species are dependent on moist microhabitats and standing or slow-moving freshwater bodies for breeding and larval development (Duellman & Trueb, 1994; Wells, 2007). The amphibian assemblage recorded within the Study Area is therefore characteristic of generalist species capable of utilising modified and secondary habitats, rather than forest-dependent or habitat-specialist taxa.

Comparing to the 2021 EIS dataset, eight species of amphibians were recorded within the Study Area boundary. The Banded Bullfrog was recorded in the 2021 EIS but was not detected during the current surveys. Overall, amphibian richness within the Study Area remains broadly comparable between both assessments, with minor differences likely attributable to temporal variation in survey conditions and detectability. A complete list of amphibian species recorded is presented in Table 4-18.



Malayan Giant Frog (*Limnonectes blythii)*
Source: Ngin Yun Jia

Figure 4-36: Selected Photos of Amphibians Recorded During the Survey Period

Table 4-18: Amphibians Documented in the Study Area

No.	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
1	Bufonidae	Bengal Toad	*Duttaphrynus bengalensis*	Introduced	NA	NA
2	Microhylidae	Dark-sided Chorus Frog	*Microhyla heymonsi*	Native	LC	LC
3	Rhacophoridae	Four-lined Tree Frog	*Polypedates leucomystax*	Native	LC	LC
4	Ranidae	Gunther's Frog	*Sylvirana guentheri*	Introduced	NA	LC
5	Microhylidae	Painted Chorus frog	*Microhyla butleri*	Native	LC	LC
6	Dicroglossidae	Malayan Giant Frog	*Limnonectes blythii*	Native	LC	LC
7	Microhylidae	Mukhlesur's Chorus Frog	*Microhyla mukhlesuri*	Introduced	NA	LC

Reptiles

A total of eight reptile species were recorded during the present survey. None of the species documented are currently listed as being of conservation significance under either the Singapore Red Data Book (SRDB3) or the IUCN Red List. All species recorded are generally widespread and commonly encountered in secondary vegetation and human-modified habitats in Singapore.

The most frequently observed species was the Spiny-tailed House Gecko (*Hemidactylus frenatus*), with four records documented during the surveys. Other reptile species recorded included the Green Crested Lizard (*Bronchocela cristatella*), Malayan Water Monitor (*Varanus salvator*), Many-lined Sun Skink (*Eutropis multifasciata*), Oriental Whip Snake (*Ahaetulla prasina*), Painted Bronzeback (*Dendrelaphis pictus*), Spotted House Gecko (*Gekko monarchus*), and the Red-eared Slider (*Trachemys scripta elegans*), which is an introduced species in Singapore.

Species richness within the Study Area was relatively low and comprised primarily habitat generalists tolerant of edge conditions and disturbed habitats. Comparing to the 2021 EIS dataset, four species of reptiles were found within the Study Area, namely the Changeable Lizard (*Calotes versicolor*), Green Crested Lizard (*Bronchocela cristatella*), Oriental Whip

Snake (*Ahaetulla prasina*), and Painted Bronzeback (*Dendrelaphis pictus*) (CH2M HILL Singapore Pte Ltd., 2021). This is consistent with the present survey, where no additional conservation-significant or restricted species were detected within the Study Area.

The full list of reptile species recorded is provided in Table 4-19, and select reptile species can be seen in Figure 4-37.

Table 4-19: Reptiles Documented in the Study Area

No.	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
1	Colubridae	Painted Bronzeback	*Dendrelaphis pictus*	Native	LC	LC
2	Colubridae	Oriental Whip Snake	*Ahaetulla prasina*	Native	LC	LC
3	Varanidae	Malayan Water Monitor	*Varanus salvator*	Native	LC	NT
4	Scincidae	Many-lined Sun Skink	*Eutropis multifasciata*	Native	LC	LC
5	Gekkonidae	Spiny-tailed house gecko	*Hemidactylus frenatus*	Native	LC	LC
6	Agamidae	Green crested lizard	*Bronchocela cristatella*	Native	LC	LC
7	Gekkonidae	Spotted House Gecko	*Gekko monarchus*	Native	LC	LC
8	Emydidae	Red-eared Slider	*Trachemys scripta elegans*	Introduced	NA	LC

Source: Ngo Kang Min

Figure 4-37: Green Crested Lizard (left) and Painted Bronzeback (right)

Birds

A total of 58 avifaunal species were recorded during the present survey period, with all records identified to species level (Table 4-20). Seven species of conservation significance were documented, comprising of six species of local conservation significance and one species of both local and international conservation significance. The species of highest conservation concern recorded was the Straw-headed Bulbul (*Pycnonotus zeylanicus*), which is listed as Critically Endangered on the IUCN Red List and Endangered in the Singapore Red Data Book (SRDB3). The Brown Shrike (*Lanius cristatus*), listed as Vulnerable (VU) in the SRDB3, was recorded as an opportunistic sighting while entering the Study Area and was not detected during formal transect surveys.

Most avifaunal records were obtained through diurnal fauna transects, supplemented by camera trap detections. Species recorded via camera traps included the Changeable Hawk-eagle (*Nisaetus cirrhatus*), Javan Myna (*Acridotheres javanicus*), Laced Woodpecker (*Picus vittatus*), White-crested Laughingthrush (*Garrulax leucolophus*), and Red Junglefowl (*Gallus gallus*). Other species observed during the surveys included Hodgson's Hawk-Cuckoo (*Hierococcyx nisicolor*), Blue-crowned Hanging Parrot (*Loriculus galgulus*), Blue-throated Bee-eater (*Merops viridis*), Greater Racket-tailed Drongo (*Dicrurus paradiseus*), and Oriental Dollarbird (*Eurystomus orientalis*), among others. Selected photographs of recorded avian species are presented in Figure 4-38.

Several species recorded within the Study Area are known migrants or seasonal visitors to Singapore, including the Brown Shrike (*Lanius cristatus*), Arctic Warbler (*Phylloscopus borealis*), Ashy Minivet (*Pericrocotus divaricatus*), Hodgson's Hawk-Cuckoo (*Hierococcyx nisicolor*), and Blue-tailed Bee-eater (*Merops philippinus*). Their presence indicates that the Study Area functions as a transient stopover habitat, likely providing short-term resting and foraging opportunities during migratory movements. Such stopover sites contribute to successful migration by supporting refuelling and recovery between flights (Schmaljohann et al., 2022; Cohen et al., 2022).

Compared to the 2021 EIS dataset, 42 species of birds were found within the Study Area boundary (CH2M HILL Singapore Pte Ltd., 2021). In comparison, the present assessment recorded a higher avifaunal richness within the Study Area (58 species). The current assemblage includes a broader mix of resident, migratory, and edge-associated species, such as Arctic Warbler (*Phylloscopus borealis*), Brown Shrike (*Lanius cristatus*), Yellow-rumped Flycatcher (*Ficedula zanthopygia*), Greater Racket-tailed Drongo (*Dicrurus paradiseus*), and Lineated Barbet (*Psilopogon lineatus*). Species of conservation significance were also recorded, including the Straw-headed Bulbul (*Pycnonotus zeylanicus*) and Changeable Hawk-eagle (*Nisaetus cirrhatus*).

The increase in recorded species richness is likely influenced by temporal variation, survey effort, and seasonal factors. Overall, the present assessment indicates that the Study Area continues to support a relatively diverse avifaunal assemblage within the Tengah landscape.

Table 4-20: Avian Species Documented in the Study Area

No.	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
1	Apodidae	Aerodramus Swiftlet	*Aerodramus sp.*	NA	NA	NA
2	Phylloscopidae	Arctic Warbler	*Phylloscopus borealis*	Native	LC	LC
3	Campephagidae	Ashy Minivet	*Pericrocotus divaricatus*	Native	LC	LC
4	Muscicapidae	Asian Brown Flycatcher	*Muscicapa dauurica*	Native	LC	LC
5	Sturnidae	Asian Glossy Starling	*Aplonis panayensis*	Native	LC	LC
6	Cuculidae	Asian Koel	*Eudynamys scolopaceus*	Native	LC	LC
7	Cuculidae	Banded Bay Cuckoo	*Cacomantis sonneratii*	Native	LC	LC
8	Picidae	Banded Woodpecker	*Chrysophlegma miniaceum*	Native	LC	LC
9	Oriolidae	Black-Naped Oriole	*Oriolus chinensis*	Native	LC	LC
10	Psittaculidae	Blue-Crowned Hanging Parrot	*Loriculus galgulus*	Native	LC	LC
11	Meropidae	Blue-Tailed Bee-Eater	*Merops philippinus*	Native	LC	LC
12	Meropidae	Blue-Throated Bee-Eater	*Merops viridis*	Native	LC	LC
13	**Laniidae**	**Brown Shrike**	***Lanius cristatus***	**Native**	**VU**	**LC**
14	Nectariniidae	Brown-Throated Sunbird	*Anthreptes malacensis*	Native	LC	LC
15	**Accipitridae**	**Changeable Hawk-Eagle**	***Nisaetus cirrhatus***	**Native**	**VU**	**LC**
16	Psittaculidae	Coconut Lorikeet	*Trichoglossus haematodus*	Introduced	NA	LC
17	Strigidae	Collared Scops Owl	*Otus lettia*	Native	LC	LC
18	Columbidae	Common Emerald Dove	*Chalcophaps indica*	Native	LC	LC
19	Picidae	Common Flameback	*Dinopium javanense*	Native	LC	LC
20	Sturnidae	Common Hill Myna	*Gracula religiosa*	Native	NT	LC
21	Aegithinidae	Common Iora	*Aegithina tiphia*	Native	LC	LC
22	Sturnidae	Common Myna	*Acridotheres tristis*	Native	LC	LC
23	Cisticolidae	Common Tailorbird	*Orthotomus sutorius*	Native	LC	LC
24	Megalaimidae	Coppersmith Barbet	*Psilopogon haemacephalus*	Native	LC	LC
25	Nectariniidae	Crimson Sunbird	*Aethopyga siparaja*	Native	LC	LC
26	Cisticolidae	Dark-Necked Tailorbird	*Orthotomus atrogularis*	Native	LC	LC
27	Dicruridae	Greater Racket-Tailed Drongo	*Dicrurus paradiseus*	Native	LC	LC

No.	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
28	Hemiprocnidae	Grey-Rumped Treeswift	*Hemiprocne longipennis*	Native	NT	LC
29	Cuculidae	Hodgson's Hawk-Cuckoo	*Hierococcyx nisicolor*	Native	NT	LC
30	Corvidae	House Crow	*Corvus splendens*	Introduced	NA	LC
31	Sturnidae	Javan Myna	*Acridotheres javanicus*	Introduced	NA	VU
32	Picidae	Laced Woodpecker	*Picus vittatus*	Native	LC	LC
33	Caprimulgidae	Large-Tailed Nightjar	*Caprimulgus macrurus*	Native	LC	LC
34	Cuculidae	Lesser Coucal	*Centropus bengalensis*	Native	LC	LC
35	Megalaimidae	Lineated Barbet	*Psilopogon lineatus*	Introduced	NA	LC
36	**Psittaculidae**	**Long-Tailed Parakeet**	***Psittacula longicauda***	**Native**	**NT**	**VU**
37	Caprimulgidae	Nightjar Sp.	*Caprimulgus sp.*	NA	NA	NA
38	Pycnonotidae	Olive-Winged Bulbul	*Pycnonotus plumosus*	Native	LC	LC
39	Coraciidae	Oriental Dollarbird	*Eurystomus orientalis*	Native	LC	LC
40	**Muscicapidae**	**Oriental Magpie-Robin**	***Copsychus saularis***	**Native**	**VU**	**LC**
41	Nectariniidae	Ornate Sunbird	*Cinnyris ornatus*	Native	LC	LC
42	Campephagidae	Pied Triller	*Lalage nigra*	Native	LC	LC
43	Columbidae	Pink-Necked Green Pigeon	*Treron vernans*	Native	LC	LC
44	Timaliidae	Pin-Striped Tit-Babbler	*Mixornis gularis*	Native	LC	LC
45	Phasianidae	Red Junglefowl	*Gallus gallus*	Native	NT	LC
46	Psittaculidae	Red-Breasted Parakeet	*Psittacula alexandri*	Introduced	NA	NT
47	Rallidae	Red-Legged Crake	*Rallina fasciata*	Native	NT	LC
48	Psittaculidae	Rose-Ringed Parakeet	*Psittacula krameri*	Introduced	NA	LC
49	Caprimulgidae	Savanna Nightjar	*Caprimulgus affinis*	Native	LC	LC
50	Dicaeidae	Scarlet-Backed Flowerpecker	*Dicaeum cruentatum*	Native	LC	LC
51	Strigidae	Spotted Wood Owl	*Strix seloputo*	Native	VU	LC
52	**Pycnonotidae**	**Straw-Headed Bulbul**	***Pycnonotus zeylanicus***	**Native**	**EN**	**CR**
53	**Zosteropidae**	**Swinhoe's White-Eye**	***Zosterops simplex***	**Native + Introduced**	**VU**	**LC**
54	Rallidae	White-Breasted Waterhen	*Amaurornis phoenicurus*	Native	LC	LC
55	Leiotrichidae	White-Crested Laughingthrush	*Garrulax leucolophus*	Introduced	NA	LC

No.	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
56	Alcedinidae	White-Throated Kingfisher	*Halcyon smyrnensis*	Native	LC	LC
57	Muscicapidae	Yellow-Rumped Flycatcher	*Ficedula zanthopygia*	Native	LC	LC
58	Pycnonotidae	Yellow-Vented Bulbul	*Pycnonotus goiavier*	Native	LC	LC

Greater Racket-tailed Drongo
(*Dicrurus paradiseus*)

Hodgson's Hawk-Cuckoo
(*Hierococcyx nisicolor*)

White-crested Laughingthrush
(*Garrulax leucolophus*)

Changeable Hawk-Eagle
(*Nisaetus cirrhatus*)

Source: Henrietta Woo

Figure 4-38: Selected Photos of Birds Recorded During the Survey Period

Butterflies

A total of 11 butterfly observations were recorded within the Study Area, of which nine individuals were identified to species level. None of the recorded species are currently listed as being of conservation significance at either the local or global level. One species, the Fulvous Pied Flat (*Pseudocoladenia dan*), is listed locally as Near Threatened. The most frequently observed species was the Common Mormon (*Papilio polytes*) with five records, followed by the Branded Imperial (*Eooxylides tharis*) with four records. The remaining species were recorded infrequently. A full list of species recorded is presented in Table 4-21.

Comparing to the 2021 EIS dataset, 32 species of butterfly were recorded within the Study Area boundary (CH2M HILL Singapore Pte Ltd., 2021). These comprised a mix of widespread and woodland-associated species, including the Common Birdwing (*Troides helena*), Common Bluebottle (*Graphium sarpedon*), Horsfield's Baron (*Tanaecia iapis*), Malay Baron

(*Euthalia monina*), and the Detached Dart (*Potanthus trachala*), the latter being of conservation interest.

The observed difference in species richness follows a similar pattern to that noted for the previously discussed taxa, where variations in recorded diversity are influenced by site-specific habitat conditions. In the case of butterflies, the assemblage is closely tied to the availability and distribution of host plants and nectar resources. The absence of several species in the present survey therefore suggests that suitable host plants may be limited or occur at low densities within the Study Area. Overall, the butterfly assemblage recorded in the current assessment represents a reduced subset of the community previously documented within the Study Area as part of the 2021 EIS study

Table 4-21: Butterfly Species Documented in the Study Area

No.	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
1	*Nymphalidae*	Baron	*Euthalia aconthea*	Native	LC	NL
2	*Nymphalidae*	Blue glassy Tiger	*Ideopsis vulgaris*	Native	LC	NL
3	*Lycaenidae*	Branded Imperial	*Eooxylides tharis*	Native	LC	NL
4	*Nymphalidae*	Burmese Bush Brown	*Mycalesis perseoides*	Origin Uncertain	LC	NL
5	*Nymphalidae*	Bush Brown Sp.	*Mycalesis sp.*	NA	NA	NA
6	*Lycaenidae*	Common Caerulean	*Jamides celeno*	Native	LC	NL
7	*Papilionidae*	Common Mormon	*Papilio polytes*	Native	LC	NL
8	*Nymphalidae*	Common Sailor	*Neptis hylas*	Native	LC	NL
9	*Pieridae*	Grass Yellow sp.	*Eurema sp.*	NA	NA	NA
10	*Lycaenidae*	Pale grass blue	*Zizeeria maha*	Native	LC	NL
11	*Hesperiidae*	Fulvous Pied Flat	*Pseudocoladenia dan*	Origin Uncertain	NT	NL

Fulvous Pied Flat
(Pseudocoladenia dan)

Blue Glassy Tiger
(*Ideopsis vulgaris*)

Branded Imperial (*Eooxylides tharis*)

Source: Henrietta Woo, Ngo Kang Min

Figure 4-39: Selected Photos of Butterfly Species Recorded During the Survey Period

Odonates

A total of nine identified odonate species and one identified to genus level were recorded during the survey period in the Study Area. Of these, one species is of local conservation significance, while the remaining eight species are not currently considered to be of conservation concern at either the local or international level.

The only species of conservation significance recorded was the Variable Featherlegs (*Copera vittata*), which is listed as Vulnerable (VU) in the Singapore Red Data Book (3rd Edition) (National Parks Board, 2024). Globally, however, the species is assessed as Least Concern (LC) and is regarded as widespread across parts of Tropical Asia. This difference reflects the fact that national conservation assessments are based on local distribution and population size within Singapore, which may differ from regional or global trends (Ngiam & Cheong, 2016).

Notably, *C. vittata* was the most frequently observed odonate species during the present survey, with 23 records, significantly exceeding the counts of all other recorded species. Individuals were consistently associated with the waterbody within the study boundary, indicating that local habitat conditions are suitable for the species. Odonate diversity and distribution are strongly influenced by the availability and quality of freshwater habitats, as well as riparian vegetation structure (Ngiam & Cheong, 2016). The relatively high number of *C. vittata* recorded suggests that the existing waterbody at the Study Area provides favourable microhabitat conditions.

Comparing to the 2021 EIS dataset, 13 species of odonates were detected within the Study Area boundary (CH2M HILL Singapore Pte Ltd., 2021). The Variable Featherlegs (*Copera vittata*) was also recorded along the same stream during the 2021 EIS. Three records were obtained from shaded sections of the ED2 stream in 2021, while 23 records were obtained from the corresponding waterbody during the present surveys. The repeated detection of the species at this waterbody across both survey periods indicates continued habitat use and suitable local conditions.

The 2021 EIS also recorded one Dwarf Wisp (*Agriocnemis nana*) at ED2_03. This nationally Endangered species was considered potentially the first record outside the Central Catchment Nature Reserve. Although it was not recorded during the present surveys, its historical occurrence remains relevant because non-detection during a limited survey period does not confirm its absence.

The 2021 EIS identified ED2 as a habitat of conservation interest and assessed closed-canopy streams supporting these species as having high ecological value. Given the restricted national distribution of *C. vittata*, its repeated occurrence at this waterbody and the limited availability of similar stream habitat nearby, the waterbody may support a locally significant population. However, confirmation that it represents a distinct population would require further population or genetic evidence.

Freshwater habitats in Singapore are limited in spatial extent and have been extensively modified through drainage and urban development (Yeo et al., 2010). As odonates are closely tied to freshwater systems, species may occur in locally concentrated populations where suitable habitat persists (Ngiam & Cheong, 2016). The abundance of *C. vittata* at the Study Area indicates suitable local conditions, suggesting that the Study Area functions as one of several isolated habitat pockets within the wider Tengah landscape.

Overall, the odonate assemblage recorded at the Study Area is broadly consistent with that documented within the same boundary in the 2021 EIS and represents a subset of the wider odonate diversity observed across the Tengah landscape.

Table 4-22: Odonate Species Observed in the Study Area

No.	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
1	Libellulidae	Blue Dasher	*Brachydiplax chalybea*	Native	LC	LC
2	Libellulidae	Common Parasol	*Neurothemis fluctuans*	Native	LC	LC
3	Libellulidae	Dark-Tipped Forest Skimmer	*Cratilla metallica*	Native	LC	LC
4*	Aeshnidae	Duskhawker Sp.	*Gynacantha sp.*	NA	NA	NA
5	Libellulidae	Grenadier	*Agrionoptera insignis*	Native	LC	LC
6	Coenagrionidae	Red-Tailed Sprite	*Teinobasis ruficollis*	Native	NT	NT
7	Libellulidae	Spine-Tufted Skimmer	*Orthetrum chrysis*	Native	LC	LC
8	Platycnemididae	Variable Featherlegs	*Copera vittata*	Native	VU	LC
9	Coenagrionidae	Violet Sprite	*Archibasis viola*	Native	LC	LC
10	Libellulidae	White-Barred Duskhawk	*Tholymis tillarga*	Native	LC	LC
*Unable to be identified to species level						

Dark-tipped Forest Skimmer (*Cratilla metallica*)

Variable Featherlegs (*Copera vittata*)

Spine-tufted Skimmer (*Orthetrum chrysis*)

Violet Sprite (*Archibasis viola*)

Source: Henrietta Woo

Figure 4-40: Selected Photos of Odonates Species Recorded During the Survey

Aquatic Fauna

A total of six freshwater fish species were recorded during the aquatic walking transect and baited trap surveys in the Study Area, with all individuals identified to species level (Table 4-23). In addition, two aquatic mollusc species were observed and identified.

No species of local or global conservation significance were recorded. The most frequently observed fish species was the Guppy (*Poecilia reticulata*), followed by the Pearl Danio (*Danio albolineatus*). The Walking Catfish (*Clarias batrachus*) is listed locally as Near Threatened, while all other recorded taxa are assessed as Least Concern. Other species recorded include the Common Snakehead (*Channa striata*).

The assemblage is dominated by widespread and disturbance-tolerant species commonly associated with modified freshwater systems. Species such as Guppy and Pearl Danio are frequently encountered in urban drains, canals, and artificial ponds, indicating that the waterbody within the Study Area exhibits characteristics of a secondary or altered habitat.

Comparing to the 2021 EIS dataset, six species of freshwater fish were recorded within the Study Area boundary. (CH2M HILL Singapore Pte Ltd., 2021), including the Croaking Gourami (*Trichopsis vittata*), Pearl Danio (*Danio albolineatus*), Guppy (*Poecilia reticulata*), Striped Snakehead (*Channa striata*), Walking Catfish (*Clarias* cf. *batrachus*), and Three-spot Gourami (*Trichopodus trichopterus*), the latter listed as nationally Vulnerable.

In the present assessment, a similar fish assemblage was recorded, alongside two aquatic mollusc species. However, the Three-spot Gourami (*Trichopodus trichopterus*) was not detected. The current assemblage is instead characterised by common, adaptable, and in

several cases introduced species, indicating low habitat specificity and limited ecological sensitivity.

Table 4-23: Aquatic Fauna Documented in the Study Area

No.	Family	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status
1	*Channidae*	Common Snakehead	*Channa striata*	Native	LC	LC
2	*Clariidae*	Common Walking Catfish	*Clarias batrachus*	-	NT	-
3	*Poeciliidae*	Guppy	*Poecilia reticulata*	Introduced	NA	LC
4	*Cyprinidae*	Indochinese Spotted Barb	*Barbodes rhombeus*	Introduced	NA	LC
5	*Thiaridae*	Malaysian Trumpet Snail	*Melanoides tuberculata*	-	NA	LC
6	*Cyprinidae*	Pearl Danio	*Danio albolineatus*	Introduced	NA	LC
7	*Lymnaeidae*	Rust-Coloured Pond Snail	*Radix rubiginosa*	-	NA	NL
8	*Osphronemidae*	Striped Croaking Gourami	*Trichopsis vittata*	Native	LC	LC

Common Walking Catfish

Common Snakehead

Source: Ngin Yun Jia

Figure 4-41: Selected Images of Freshwater Fish Species Recorded During the Survey Period

4.6.5 Overall Biodiversity Discussion

The vegetation at the Study Area is largely non-native, comprising abandoned land forests, Albizia/Acacia/Leucaena/Cecropia dominated forests and scrublands, with infrastructure within the offset area of the Study Area. A small patch of young native-dominated secondary forest was also noted in the southwest of the study boundary. Within the secondary forests, patches of flora species of conservation significance were found scattered throughout the understorey of the surveyed areas, largely of one species, *Macaranga griffithiana*.

Most of these naturally recruited plants of conservation significance were small in size and likely started growing in the last one or two decades. Their presence in these forest patches show that the recovery of species composition was at a nascent stage.

A total of 47 flora species were documented through walking surveys and tree mapping surveys. Nine species were identified as being of conservation significance, with eight of these occurring naturally within the study area (Table 4-24).

Notable findings include two large individuals of *Ficus binnendijkii* and one large individual of *Ficus caulocarpa* within the Study Area. Some saplings of Ficus *binnendijkii* were found during EIS study, but no saplings were mentioned for *Ficus caulocarpa*. During the baseline survey of this study, only these three large individuals were revalidated. These two species were likely part of the original forest landscape because they are not known to be cultivated species in the past and were of large sizes. The two large *Ficus binnendijkii* individuals were the only ones found in the EIS study, while one other large *Ficus caulocarpa* was found in Site 2.

Fauna surveys at the Study Area documented 108 species across eight taxonomic groups (excluding observations that were unidentifiable to species level). Birds were the most diverse group with 58 species, followed by odonates (9 species). Notable fauna species found include the Sunda Pangolin (observed from camera trap), Straw-headed Bulbul (observed on transect surveys), and the Variable Featherlegs damselfly (observed on aquatic transects). Table 4-24 summarizes the species richness and conservation-significant species within each taxon.

4.6.5.1 Comparison with 2021 EIS

A comparison with the 2021 EIS indicates that the overall ecological character of the Study Area remains broadly consistent, with variations in species richness observed across different taxa. The 2021 EIS referenced the second edition of the Singapore Red Data Book (SRDB2), published in 2008, while the current EIA references the third edition (SRDB3), published in 2024. As such, direct comparison of conservation-significant species records should be interpreted with caution, as SRDB3 includes revisions to conservation status categories and additional species that were not previously assessed under SRDB2. Consequently, some species currently classified as conservation-significant may not have been recognised as such during the 2021 EIS.

When the 2021 EIS fauna records are limited to those within the Study Area (Table 4-25), several fauna groups recorded higher species richness in the current study, most notably avifauna, which increased from 42 species in the 2021 EIS to 58 species, alongside an increase in conservation-significant species. Reptiles and non-volant mammals also recorded higher species counts, while amphibians, bats, butterflies, and odonates recorded lower or broadly comparable numbers relative to the 2021 baseline. These differences are expected and may be attributed to variations in survey effort, spatial coverage, survey methodologies,

seasonal timing, and the inherently mobile nature of fauna communities. Overall, the fauna assemblage within the Study Area continues to be dominated by widespread, disturbance-tolerant species characteristic of secondary and regenerating habitats.

When compared against the full 2021 EIS study area, several conservation-significant species previously recorded in the broader Tengah landscape were not detected in this Study Area (Table 4-26). These include Blue-eared Kingfisher (*Alcedo meninting*), Large Flying Fox (*Pteropus vampyrus*), Crested Serpent Eagle (*Spilornis cheela*), Plume-toed Swiftlet (*Collocalia affinis*), Baya Weaver (*Ploceus philippinus*), Common Sandpiper (*Actitis hypoleucos*), Common Kingfisher (*Alcedo atthis*), Chestnut Munia (*Lonchura atricapilla*), Three-spot Gourami (*Trichopodus trichopterus*), Great Swift (*Pelopidas assamensis*), Dwarf Wisp (*Agriocnemis nana*), and Malayan Box Turtle (*Cuora amboinensis*). The absence of these species in the current surveys does not necessarily indicate local extirpation, as several are highly mobile, transient, seasonal, or associated with habitats located outside the current Study Area boundary.

A review of the 2021 spatial records found that the Oriental Magpie-Robin (*Copsychus saularis*) was the only conservation-significant species recorded within the current Site 1 Study Area during the 2021 EIS. This species was also recorded during the current surveys. The other conservation-significant species listed in Table 4-26 were recorded elsewhere within the wider 2021 EIS area and outside the current Site 1 Study Area. Therefore, no conservation-significant species recorded within the current Site 1 Study Area in 2021 remained unrecorded during the present surveys.

For flora, the comparison focuses on vegetation composition and structural characteristics rather than species richness. The current study confirms that the Study Area remains dominated by non-native, early successional vegetation, including abandoned land forests and scrub habitats, consistent with the 2021 EIS. Conservation-significant flora continues to occur as scattered individuals within the understorey, largely represented by early-stage recruitment and small-sized individuals, indicating that ecological succession remains at an early stage. The presence and condition of key species, including large *Ficus* individuals identified in the 2021 EIS, were revalidated in the current study, with no substantial changes observed. Overall, the findings indicate continuity in vegetation type, structure, and regeneration patterns within the Study Area, with no material shift in baseline flora conditions. Table 4-25 shows comparative numbers between the 2021 EIS and the 2025/2026 EIA.

Table 4-24: Species Composition and Conservation Significance by Taxonomic Group for the Study Area

Taxon	Current EIA total no. of species	Current EIA no. native species	Cumulative No. of CS Species	
			SRDB3	IUCN
Flora	47 (32 species in Study Area)	25 (16 species in Study Area)	9 (8 non-cultivated; 1 cultivated) [8 species in Study Area (7 non-cultivated, 1 cultivated]	NA
Non-volant Mammal	6	6	1	2
Bat	4	4	0	0
Amphibian	7	4	0	0
Reptile	8	7	0	0
Butterfly	8	7	0	0
Odonates	9	9	1	0
Bird	58	49	6	2
Freshwater Fish	6	2	0	0
Aquatic Molluscs	2	0	0	0

Table 4-25: Current EIA vs 2021 EIS Biodiversity

Fauna Taxon	Current EIA			2021 EIS (Within Study Area Only)		
	No. of species*	Cumulative No. of CS Species		No. of species	Cumulative No. of CS Species	
		SRDB3	IUCN		SRDB3	IUCN
Non-volant mammal	6	1	2	4	0	1
Bat	4	0	0	6	0	0
Amphibian	7	0	0	9	0	0
Reptile	8	0	0	4	0	0
Butterfly	8	0	0	32	1	0
Odonates	9	1	0	13	0	0
Bird	58	6	2	42	2	1
Freshwater Fish	6	0	0	6	1	0
Aquatic Molluscs	2	0	0	0	0	0
Flora	47**	9	-	338***	70	-

Remarks:

- CS refers to NEx, CR, EN, VU statuses
- Non-native Globally CS species are not included in this table.

*Number of species identified to species level.

** Flora data for 2025/2026 study is based on revalidation of past EIS baseline

*** 2021 EIS values are derived from the wider Tengah North study area and are not limited to this Study Area; values are not directly comparable.

Table 4-26: Current EIA vs 2021 EIS CS Fauna

S/N	Taxon	Common Name	Scientific Name	Origin	SRDB3 Status	IUCN Status	2021 EIS (Whole)	2025/26 EIA (Study Area)
1	Mammal	Sunda Pangolin	*Manis javanica*	Native	CR	CR	Yes	Yes
2	Mammal	Long-tailed Macaque	*Macaca fascicularis*	Native	LC	EN	Yes	Yes
3	Mammal	Large Flying Fox	*Pteropus vampyrus*	Native	CR	NT	Yes	No
4	Avian	Changeable Hawk-eagle	*Nisaetus cirrhatus*	Native	VU	LC	Yes	Yes
5	Avian	Oriental Magpie-Robin	*Copsychus saularis*	Native	VU	LC	Yes	Yes
6	Avian	Spotted Wood Owl	*Strix seloputo*	Native	VU	LC	Yes	Yes
7	Avian	Straw-headed Bulbul	*Pycnonotus zeylanicus*	Native	EN	CR	Yes	Yes
8	Avian	Long-tailed Parakeet	*Psittacula longicauda*	Native	NT	VU	Yes	Yes
9	Avian	Brown Shrike	*Lanius cristatus*	Native	VU	LC	Yes	Yes
10	Avian	Swinhoe's White Eye	*Zosterops simplex*	Native	VU	LC	Yes	Yes
11	Avian	Blue-eared Kingfisher	*Alcedo meninting*	Native	EN	LC	Yes	No
12	Avian	Crested Serpent Eagle	*Spilornis cheela*	Native	CR	LC	Yes	No
13	Avian	Plume-toed Swiftlet	*Collocalia affinis*	Native	VU	LC	Yes	No
14	Avian	Baya Weaver	*Ploceus philippinus*	Native	VU	LC	Yes	No
15	Avian	Common Sandpiper	*Actitis hypoleucos*	Native	VU	LC	Yes	No
16	Avian	Common Kingfisher	*Alcedo atthis*	Native	VU	LC	Yes	No
17	Avian	Chestnut Munia	*Lonchura atricapilla*	Native	VU	LC	Yes	No
18	Fish	Three-spot Gourami	*Trichopodus trichopterus*	Native	VU	LC	Yes	No
19	Lepidoptera	Great Swift	*Pelopidas assamensis*	Origin Uncertain	VU	NL	Yes	No
20	Odonate	Variable Featherlegs	*Copera vittata*	Native	VU	LC	Yes	Yes
21	Odonate	Dwarf Wisp	*Agriocnemis nana*	Native	EN	LC	Yes	No
22	Reptile	Malayan Box Turtle	*Cuora amboinensis*	Native	NT	EN	Yes	No

5 IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 Ambient Noise

This section presents the assessment of direct impacts from construction and operational activities on ambient noise levels. The assessment of potential biodiversity impacts arising from changes in ambient noise levels is provided in Section 5.5.

5.1.1 Construction Phase Impacts

Construction activities at the Project Site are expected to be extensive and relatively long-term, involving vegetation clearance, earthworks, piling, utilities installation, and road construction. Noise generation during this phase will primarily be driven by heavy machinery operation, excavation works, piling activities, and construction-related vehicle movements. Detailed estimates of construction noise levels, based on corresponding sound pressure level of typical equipment, are presented in Table 5-3.

The anticipated construction noise impacts at the Project Site are expected to result in a noticeable increase in ambient noise levels, particularly within an approximate 100 m-wide offset from active works areas.

Within the adjacent regenerating Tengah forest, elevated noise levels may induce avoidance behaviour in mammals and birds. High-frequency equipment noise may also interfere with bat echolocation, potentially disrupting foraging and navigation activities. Such acoustic disturbances may lead to temporary fauna displacement, which could indirectly increase the risk of roadkill or human-wildlife interactions if animals move away from disturbed zones towards active transport corridors or construction access routes.

These effects may be compounded by cumulative noise contributions from concurrent infrastructure projects in the vicinity, including the associated MRT works.

Notwithstanding the intensity of construction activities, the change in the ambient noise environment is expected to be localized and temporary. Noise levels are expected to return to baseline conditions upon completion of construction works.

Proposed Mitigation Measures

Potential noise impacts during the construction phase can be minimised by adopting the following measures:

- Limit high-impact activities to less sensitive hours and implement noise barriers or enclosures where necessary;
- Establish continuous noise monitoring at designated sensitive receptors to ensure compliance with regulatory limits;
- Implement soft-start procedures for noisy machinery to allow mobile fauna to vacate the area before peak noise levels are reached;
- Designate specific routes for heavy vehicles to minimise disturbance to fauna movement paths and reduce noise spread; and

- Train workers on wildlife-encounter protocols to be better equipped to handle situations where fauna are displaced by noise.

Table 5-1: Sound Pressure Level for Construction Machinery, Equipment and Vehicles

Typical Construction Machinery, Equipment and Heavy Vehicles	Sound Pressure Level at 10 m, dB(A) [Note 1]
Handheld Hydraulic Breaker / Jack Hammer	93
Welding/Cutting Equipment	73
Excavator Mounted with Hydraulic Breaker	90
Excavator	78
Mini Excavator	68
Soil Nail Launcher	75
Drilling Rig	74
Crawler Crane	86
Mobile Crane	67
Lorry Cranes	70
Bored Piling Machine	89
Lorry	70
Grader	86
Roller	73
40 Ft Trailer	79
Ready Mix Concrete Truck	80
Dump Trucks	79
Air Compressor	75
Water Pump	68
Concrete Pump	78
Concrete Vibrator	89
Generator	65
Note 1: Sound Pressure Level (SPL) of the equipment are based on "BS 5228-1:2009 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise	

Evaluation of Residual Impact

Following the implementation of the proposed mitigation measures, construction noise impacts are expected to be effectively managed and reduced to acceptable levels. Noise levels at identified sensitive receptors are anticipated to comply with applicable regulatory limits, and the spatial extent and duration of elevated noise conditions will be minimised.

Notwithstanding these controls, temporary and localised increases in ambient noise levels will still occur during active construction periods. Accordingly, the overall magnitude of impact remains categorised as Slight Negative, albeit with a reduced likelihood and extent of occurrence due to the implementation of mitigation measures.

Based on the assessment criteria and significance matrix, the residual impact is therefore assessed to remain within the Slight Negative band, as presented in Table 5-2.

Table 5-2: Ambient Noise Impact Significance During Construction Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Increased ambient noise from construction activities	Ecological receptors	Importance	1	Important only to the local condition (within a small direct impact area)	1	No Change
		Magnitude	-3	Moderate negative disadvantage or change	-1	Slight negative disadvantage or change
		Permanence	2	Temporary or short-term	2	No Change
		Recoverability	2	Recoverable or reversible, either naturally or via human intervention	2	No Change
		Cumulative	3	Cumulative/multiple	3	No Change
		Environmental Score	-21	1*(-3) * (2+2+3)	-7	1*(-1) * (2+2+3)
		Range Band	Slight Negative		Slight Negative	

5.1.2 Operation Phase Impacts

During the operational phase of the Project, ambient noise levels within and around the Project Site will be influenced by a combination of transport-related, residential, and community-facility sound sources. Unlike construction phase noise, operational noise is continuous, predictable, and characteristic of an urban environment, but may still pose localized environmental and ecological concerns.

Key noise levels of operational noise include MRT systems (train movements and ventilation exhaust), vehicular traffic from residents, visitors, and service deliveries, and community and civic institution facilities.

Noise levels are expected to generally comply with NEA's boundary noise limits. For human receptors, impacts are most pronounced at building edges and upper floors facing transport corridors. As Site 1 is zoned for urban development under the URA Master Plan 2025, the predicted noise levels are consistent with planned land use. Peak operational noise is anticipated during the morning (06:30–09:00) and evening (17:30–20:00) traffic periods.

Potential operational noise effects on biodiversity are discussed in Section 5.5 (Terrestrial Fauna).

Proposed Mitigation Measures

Based on the anticipated operational activities and surrounding land use context, operational noise impacts are expected to be limited. As such, no specific operational noise mitigation measures are considered necessary beyond standard building and infrastructure design practices.

Evaluation of Residual Impact

Operational noise impacts are expected to remain localised and low in magnitude during the operational phase. Given the nature of the Project and the existing urban setting surrounding the Project Site, the potential for significant long-term operational noise impacts is limited. Accordingly, the residual impact is assessed to remain within the Slight Negative band, as shown in Table 5-3.

Table 5-3: Ambient Noise Impact Significance During Operation Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Operational urban noise including traffic	Human receptors	Importance	1	Important only to the local condition (within a small direct impact area)	1	No Change
		Magnitude	-2	Minor negative disadvantage or change	-1	Slight negative disadvantage or change
		Permanence	3	Permanent or long-term	3	No Change
		Recoverability	3	Irrecoverable/irreversible	3	No Change
		Cumulative Impact	3	Cumulative/multiple	3	No Change
		Environmental Score	-18	1*(-2)*(3+3+3)	-9	1*(-1)*(3+3+3)
		Range Band	Slight Negative		Slight Negative	

5.2 Waste Management

This section presents the assessment of direct impacts from construction and operational activities on waste management.

5.2.1 Construction Phase Impacts

Construction activities in the Project Site during vegetation clearing, site preparation, utilities installation, roadwork, and building construction will generate several waste streams:

- Construction waste: Concrete debris, asphalt, metal, and packaging materials.
- Biomass/Green Waste: Vegetation and organic matter from site clearance.
- Municipal Solid Waste (MSW): Food waste and general refuse from the onsite construction workforce.

Proposed Mitigation Measures

Potential waste impacts during the construction phase can be minimised by adopting the following measures:

- Segregate recyclable materials (concrete, metal, timber) and send to licensed recycling facilities;
- Store all waste in enclosed, labelled containers or sealed bins to prevent wildlife attraction and odour;
- Provide designated refuse stations with daily collection;
- Ensure all green waste and toxic industrial waste are sent to NEA-licensed biomass and specialized waste collectors, respectively;
- Send toxic industrial waste to NEA-licensed waste collectors;
- Strictly prohibit open burning of any waste on-site;
- Monitor waste generation and disposal records monthly; and
- Train workers on proper waste segregation and reporting.

Evaluation of Residual Impact

Following the implementation of the proposed mitigation measures, waste generation and management impacts are expected to be minimal. Although some residual waste handling activities will continue, the likelihood and extent of adverse impacts are reduced. Accordingly, the residual impact is assessed to remain within the Slight Negative band, as presented in Table 5-4.

Table 5-4: Waste Impact Significance During Construction Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Generation of Construction waste and MSW	Site hygiene	Importance	1	Important only to the local condition (within a small direct impact area)	1	No Change
		Magnitude	-2	Minor negative disadvantage or change	-2	No Change
		Permanence	2	Temporary/ Short-term	2	No Change
		Recoverability	3	Irrecoverable/ irreversible	2	Recoverable or reversible, either naturally or via human intervention
		Cumulative Impact	3	Cumulative/ multiple	3	No Change
		Environmental Score	-16	1*(-2)*(2+3+3)	-14	1*(-2)*(2+2+3)
		Range Band	Slight Negative		Slight Negative	

5.2.2 Operation Phase Impacts

During the operational phase, waste generation will transition from temporary construction-related waste streams to a permanent and continuous flow of MSW. This includes general refuse and food waste from residential units, food waste and packaging waste from F&B outlets, waste generated from the Town Centre developments, and recyclable materials.

Given the scale and mixed-use nature of the Town Centre's developments, waste generation will be consistent with typical high-density urban developments. Without proper management, risks may include odour nuisance, pest attraction, improper segregation, and increased pressure on downstream disposal infrastructure. However, these impacts are localised and manageable within Singapore's established waste management framework.

Proposed Mitigation Measures

Potential waste impacts during the operational phase can be minimised by adopting the following measures:

- Strategically place recycling bins (e.g., blue bins) and e-waste collection points to promote 3R (Reduce, Reuse, Recycle) practices;
- Install clearly labelled recycling points at residential blocks, commercial areas, and the Town Centre developments to encourage proper segregation at source;
- Ensure daily refuse collection from commercial and residential outlets by licensed public waste collectors;

- Ensure all non-recyclable MSW is directed to waste-to-energy (WTE) plants to minimise landfill usage; and
- Conduct periodic public education and awareness campaigns for residents and commercial tenants to reinforce responsible waste disposal practices.

Evaluation of Residual Impact

With the implementation of the above measures, operational waste impacts are expected to be effectively managed within the existing municipal waste system. Although waste generation will be continuous in nature, proper segregation, regular collection, and disposal through licensed channels will significantly reduce environmental risks.

The magnitude of impact is therefore assessed to remain Slight Negative, primarily due to the permanent nature of waste generation. However, the likelihood and extent of adverse environmental effects are low with proper management in place.

Accordingly, the residual impact is assessed to fall within the Slight Negative band, as shown in Table 5-5.

Table 5-5: Waste Impact Significance During Operation Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Generation of MSW from Residents	National waste infrastructure	Importance	1	Important only to the local condition (within a small direct impact area)	1	No Change
		Magnitude	-2	Minor negative disadvantage or change	-1	Slight negative disadvantage or change
		Permanence	3	Permanent or long-term	3	No Change
		Recoverability	2	Recoverable or reversible	2	No Change
		Cumulative Impact	3	Cumulative/multiple	3	No Change
		Environmental Score	-16	1*(-2)*(3+2+3)	-8	1*(-1)*(3+2+3)
		Range Band	Slight Negative		Slight Negative	

5.3 Surface Water Quality

This section presents the assessment of direct impacts from construction and operational activities on surface water quality within the Study Area. The Study Area includes two surface water features, namely WB1 in the eastern portion of the Project Site and WB2, a forest stream located in the western portion.

Under the current development layout, WB1 is expected to be largely infilled or modified as part of the proposed works, with the possible exception of its northern segment within the Study Area, which is proposed to be retained as part of the RAC identified in the 2021 EIS. WB2 and its associated sub-catchment is also proposed to be retained as part of the RAC. As such, while substantial modification to the existing drainage system is anticipated, complete loss of natural drainage within the Study Area is not expected. Downstream portions of both streams extend into Site 2 and will be further studied as part of Site 2.

This section presents the assessment of impacts from construction and operational activities on surface water quality of the waterbodies located within the Study Area. The key potential impacts include:

- Sedimentation and contamination from construction works during the construction phase;
- Loss of existing waterbodies from land preparation activities during the construction phase; and
- Contamination of urban stormwater runoff from human activities during operational phase.

The assessment of potential biodiversity impacts resulting from changes in water quality is provided in Section 5.6.

5.3.1 Construction Phase Impacts

5.3.1.1 Sedimentation and Contamination from Construction Works

Impact Assessment

Construction activities including land clearing, excavation, earthworks, temporary site facility establishment, and infrastructure works will expose bare soils and increase surface runoff during rainfall events. These disturbances may result in uncontrolled runoff entering temporary and permanent drainage systems and subsequently discharging into WB1 and WB2 within the Study Area.

Sediment-laden runoff is expected to elevate sediment loads and turbidity in the receiving waterbodies, thereby reducing light penetration and impairing water quality. In addition, surface runoff may contain traces of oil, grease, chemicals, and heavy metals from the operation of machinery, equipment and vehicles, as well as from temporary storage areas. Accidental spills or leaks of fuel, lubricants, solvents, cement wash, and paints may further contribute to contamination of surface water features.

WB1 will be directly exposed to construction activities and is expected to be progressively infilled as part of the land preparation works, with the exception of its northern segment

within the Study Area which is proposed for retention as part of the RAC. WB2 is also proposed to be retained within the RAC and is to be surrounded by a vegetated buffer (within the RAC) minimising impacts of construction in the Project Site impacting the water quality of WB2. However, there may be some run-off from construction areas into WB2 during periods of heavy rainfall.

As the affected waterbodies form part of a local drainage network connected to surrounding watercourses within the Tengah landscape, the impact pathway is considered direct and localised. The importance of the impact is therefore assessed as being significant at the local scale, affecting a relatively large direct impact area within the Study Area and its immediate drainage network, but not extending beyond the defined Study Area.

Given the direct disturbance and partial loss of WB1, as well as the potential indirect impacts on WB2, the magnitude of impact is expected to be moderate negative.

These impacts are expected to be temporary in nature for the potentially retained portions of WB1 and WB2, as construction activities are confined to the construction period and will cease upon completion of the works. Water quality is expected to recover following the implementation of mitigation measures and the completion of permanent drainage infrastructure. As there are other existing construction activities or planned development around the Study Area that may affect other parts of the watercourse, the impacts are expected to be cumulative.

Therefore, the overall significance of sedimentation and contamination from construction activities is assessed within the Minor Negative Impact band, as shown in Table 5-6.

Proposed Mitigation Measures

Surface water quality impacts from construction runoff can be further minimised through the following mitigation measures:

- Implementation of Earth Control Measures (ECM) with adequate silty water treatment capacity, designed by a Qualified Erosion Control Professional (QECP), with approval of the ECM Plan obtained before work commences;
- Engagement of an ECM Officer (ECMO) to ensure compliance with approved ECM Plans;
- Establishment of a Spill Contingency Plan (where fuel, oil, chemicals, or wet works are involved on site) to manage accidental releases from refuelling, equipment leaks, concrete works, or chemical use, and to prevent contamination of surface runoff and receiving water bodies.;
- Installation of perimeter drains to channel site runoff to ECM treatment systems, with silt fences or sediment traps along drain perimeters;
- Deployment of biodegradable Erosion Control Blankets (ECBs) on excavated areas, with standby blankets prepared for rainfall events;
- Planning of earthworks in consideration of rainfall patterns to minimise exposed soil during monsoon seasons;

- Restriction of construction machinery to designated access paths and re-turfing of excavated areas upon completion;
- Monthly water sampling at ECM discharge points during construction, to be carried out by the EMMP Consultant;
- Compliance of ECM effluent with the Sewerage and Drainage (Surface Water Drainage) Regulations;
- Provision of standby spill kits and an on-site emergency response team;
- Provision of drip trays or secondary containment in areas used for on-site refuelling of machinery and vehicles;
- Use of containers ≤1 L capacity with funnels for refilling of machinery fluids;
- Regular maintenance of heavy machinery, equipment, and vehicles to prevent leakage of fluids and lubricants;
- Storage of chemicals in designated sheltered areas with secondary containment, clear signage, and raised platforms; and
- Provision of secondary containment with 110% capacity for fuel, chemical, and liquid waste storage containers.

Evaluation of Residual Impact

The proposed mitigation measures target the primary impact pathways by containing pollutants at source, treating runoff prior to discharge, and maintaining regular monitoring throughout the construction phase. These measures are expected to reduce the magnitude of impact from moderate negative to minor negative by limiting sediment and contaminant inputs into the receiving waterbodies.

Residual impacts are still expected due to the progressive infilling and modification of WB1, as well as the potential for indirect impacts on WB2 from adjacent construction activities. While the potential retention of WB2 and the northern segment of WB1 within the RAC may help to maintain partial hydrological function and reduce the overall extent of impact, some degree of water quality degradation may still occur during construction.

In view of the above, the residual surface water quality impact during the construction phase is assessed to fall within the Slight Negative Impact band, as shown in Table 5-6.

5.3.1.2 Loss of Existing Waterbodies from Land Preparation Activities

Impact Assessment

Land preparation activities, including land clearing, backfilling, and grading, may result in the partial loss and modification of existing surface water features within the Study Area, leading to degradation of surface water quality. These activities may also alter existing surface water flow patterns, potentially affecting the direction, rate, and timing of surface runoff during rainfall events.

WB1 is located largely within the Project Site and is expected to be progressively infilled as part of the proposed works, with the exception of its northern segment within the offset zone that is proposed for retention under the RAC. The loss of this portion of WB1 will reduce the Project Site's natural filtration and retention capacity, thereby limiting its ability to attenuate sediments and pollutants generated during construction activities.

The infilling and modification of surface water features may further result in changes to local hydrological conditions, including increased runoff velocity and reduced infiltration capacity. Such changes could lead to elevated sediment loads and pollutant concentrations and may influence nutrient levels in downstream or retained water features. Disruption to existing drainage paths may also increase the risk of localised ponding or erosion if not properly managed.

Although the proposed retention of WB2 and northern segment of WB1 may continue to support some degree of hydrological function within the Study Area, the overall drainage regime will be significantly modified due to the scale of development.

Such impacts are generally confined to the immediate Project Site. Hence, the importance can be considered important only to the local conditions, affecting a relatively large direct impact area within the Study Area and its immediate drainage network, but not extending beyond the local Study Area.

Given that WB1 will be largely removed, while the downstream segment within the RAC is being studied for retention, the magnitude of impact is expected to be moderate negative.

These impacts are expected to be permanent with respect to the loss of the infilled portion of WB1 and the alteration of the Project Site's natural drainage regime. However, water quality conditions may improve following the completion of permanent drainage infrastructure and the implementation of mitigation measures. As there are other existing construction activities or planned development around the Study Area that may affect other parts of the watercourse, the impacts are expected to be cumulative.

Therefore, the overall significance of the loss of existing waterbodies from land preparation activities is assessed within the Minor Negative Impact band, as shown in Table 5-6.

Proposed Mitigation Measures

Surface water quality impacts from the loss of waterbody can be further minimised through the following mitigation measures:

- Clearly demarcate no-go or buffer zones around retained drainage features to prevent inadvertent obstruction or infilling.
- Where possible, provide temporary culverts or cross-drain pipes beneath site access roads to maintain natural flow paths.
- Carry out any required infilling or modification of the existing waterbody in a controlled and phased manner, rather than as a single operation.
- Schedule infilling works, where practicable, during drier periods to reduce disruption to surface water flow.

- Regularly inspect temporary and permanent drainage provisions associated with the removal of the waterbody to confirm effective flow conveyance.

Evaluation of Residual Impact

With the implementation of appropriate drainage controls and progressive site stabilisation, the magnitude is expected to reduce from moderate negative to minor negative. In view of this, the surface water quality impact significance during construction phase will be in the Slight Negative Impact band as shown in Table 5-6.

Table 5-6: Surface Water Quality Impact Significance During Construction Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Sedimentation and contamination from construction activities	Waterbody in Tengah Forest	Importance	2	Important only to the local condition (within a large direct impact area)	2	No Change
		Magnitude	-3	Moderate negative	-2	Minor negative
		Permanence	2	Temporary	2	No Change
		Recoverability	2	Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-42	2*(-3)*(2+2+3)	-28	2*(-2)*(2+2+3)
		Range Band	Minor Negative		Slight Negative	
Loss of the existing waterbody from land preparation activities	Waterbody in Tengah Forest	Importance	2	Important only to the local condition (within a large direct impact area)	2	No Change
		Magnitude	-3	Moderate negative	-2	Minor negative
		Permanence	3	Permanent	3	No Change
		Recoverability	2	Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-48	2*(-3)*(3+2+3)	-32	2*(-2)*(3+2+3)
		Range Band	Minor Negative		Slight Negative	

5.3.2 Operation Phase Impacts

Impact Assessment

During the operational phase, surface water quality may be affected by pollutants entrained in stormwater runoff and conveyed via the site drainage system into the retained surface water features. Stormwater runoff may contain oil and grease, suspended solids, and trace heavy metals arising from vehicular use along roads and hardstand areas.

Discharges from food and beverage outlets and other commercial activities may also contribute low levels of organic matter and nutrients if wastewater is not properly managed. In addition, accidental spills of fuels, lubricants, or cleaning agents may occur during routine operations and maintenance. The high proportion of impervious surfaces associated with the development is expected to increase runoff volumes and associated pollutant loads during rainfall events.

Following the infilling of most of WB1, the proposed retained segment within the RAC and WB2 may help to function as the primary receiving waterbodies within the Study Area. These features may therefore be subject to changes in water quality due to urban runoff inputs, although impacts are expected to be limited in extent.

Such impacts are expected to be localised, affecting surface water quality primarily within the Study Area and its immediate drainage network, without extending beyond the local study area. Hence, the importance is considered to be at the local scale, affecting a relatively large direct impact area.

The magnitude is anticipated to be slight negative, as pollutant concentrations are expected to be low and no discharge of toxic, hazardous, or industrial effluents is anticipated under normal operations. These impacts are expected to be intermittent, occurring mainly during rainfall events, and are recoverable as water quality conditions stabilise over time. The impacts are also cumulative with existing and planned developments in the surrounding area.

Therefore, the overall significance of contamination from urban stormwater runoff is assessed within the Slight Negative Impact band, as shown in Table 5-7.

Proposed Mitigation Measures

Surface water quality impacts from urban stormwater runoff can be further minimised through the following mitigation measures:

- The site drainage system can be designed and maintained in accordance with PUB's Code of Practice on Surface Water Drainage
- Wash-down water from F&B outlets, common areas, and refuse chambers can be properly collected and discharged into the public sewer system, in compliance with PUB's Sewerage and Drainage Regulations.
- Grease traps can be installed and regularly maintained for all F&B outlets to prevent fats, oils, and grease (FOG) from entering drainage systems
- Any fuel, lubricants, and chemicals can be stored in designated, bunded areas with secondary containment to prevent accidental releases.

Evaluation of Residual Impact

With the proposed mitigation measures in place, contamination from urban stormwater runoff is expected to be minimal. The magnitude of the impact will remain as slight negative, but with a reduced likelihood and extent of occurrence. Hence, the residual impact is assessed to be within the Slight Negative band as shown in Table 5-7.

Table 5-7: Surface Water Quality Impact Significance During Operation Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Contamination of stormwater runoff from urban activities	WB2 (waterbody proposed for retention within Study Area)	Importance	2	Important only to the local condition (within a large direct impact area)	2	No Change
		Magnitude	-1	Slight negative	-1	No Change
		Permanence	2	Temporary	2	No Change
		Recoverability	2	Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-14	2*(-1)*(2+2+3)	-14	2*(-1)*(2+2+3)
		Range Band	Slight Negative		Slight Negative	

5.4 Terrestrial Flora

This section provides the assessment of potential impacts on terrestrial flora and habitats within the study boundary due to the Project related activities. The assessment considered the direct impacts on biodiversity within the Project boundary and the indirect impacts beyond the Project boundary but within the study boundary.

5.4.1 Construction Phase Impacts

5.4.1.1 Loss of Habitat

Impact Assessment

The Project Site covers approximately 16.70 ha and comprises 14.36 ha of abandoned land forest, 2.10 ha of scrubland/grassland, 0.04 ha of Albizia/Acacia/Leucaena/Cecropia-dominated forest, and 0.20 ha of infrastructure, as presented in Table 4-11. The approximately 0.8 ha RAC proposed for retention is vegetated and forms part of the Project Site. Therefore, approximately 15.70 ha of the existing 16.50 ha of vegetation will be permanently removed. The total area affected by the proposed works is approximately 15.90 ha, comprising 15.70 ha of vegetation and 0.20 ha of existing infrastructure. These habitats are representative of common secondary vegetation types widely found in Singapore (Yee A., Chong, Seah, Lua, & Yang, 2019) and are typically associated with disturbed or regenerating landscapes.

The loss of vegetation is considered localised and permanent within the Project Site. While a small portion of habitat within the RAC will be avoided, the majority of vegetation will be cleared and is therefore largely irrecoverable at the site scale. The RAC is expected to provide limited refuge and contribute to local habitat continuity, although its ecological function will be constrained by its size and edge effects.

The impact is considered cumulative in the long term, as similar secondary habitats within the wider Tengah area are being progressively removed due to planned developments (URA, 2025).

Based on the above analysis, impact significance from loss of habitat is assessed to be within the Slight Negative Impact band, shown in Table 5-8.

Proposed Mitigation Measures

- 0.8 ha Recommended Area of Conservation (RAC) is proposed to be retained and demarcated prior to construction. The construction site will be hoarded to prevent encroachment into the RAC and allow fauna to freely move within the RAC. This patch proposed for retention forms part of a larger, continuous RAC extending into Site 2, supporting habitat continuity at the landscape scale that will be detailed later in a separate study;
- Directional site clearance shall be carried out in a phased manner, where practicable, to allow fauna to relocate towards retained habitats including the RAC and adjacent vegetated areas;

- Tree protection measures shall be implemented for retained vegetation within and adjacent to the RAC, including avoidance of soil compaction and restriction of construction activities within root protection zones; and
- Native planting shall be incorporated along the RAC edges and within the development landscape to enhance habitat continuity and strengthen ecological connectivity with surrounding green spaces.

Evaluation of Residual Impact

As substantial and permanent habitat loss persists despite partial mitigation through avoiding the RAC, the mitigation measures contribute to landscape-level connectivity but does not offset site-scale impacts. The residual impact therefore remains in the Slight Negative Impact band as shown in Table 5-8.

5.4.1.2 Reduction in Flora Species Population

Impact Assessment

Construction activities will result in the removal of most or all vegetation within the Project Site. This will lead to direct and permanent reduction of flora species.

Of the eight species of conservation significance (CS) revalidated within the Project Site, seven were likely from non-cultivated sources, and would have higher conservation priority. Two of the species, *Ficus binnendijkii* (critically endangered; two large trees) and *Ficus apiocarpa* (endangered; one cluster climbing on other plants), were found only within the Project Site from the previous EIS. One large individual of *Ficus caulocarpa* (endangered) was found within the Project Site, and another individual was found within Site 2 from the previous EIS. The individual found in Site 2 falls within the area identified under the 2021 EIS proposed Recommended Area of Conservation (RAC). One *Angiopteris evecta* (vulnerable), two saplings of *Aporosa benthamiana* (vulnerable), four saplings of *Litsea umbellata* (vulnerable) were revalidated within the Project Site. *Macaranga griffithiana* (vulnerable) was the only CS species that was widespread and scattered throughout the study area.

Some saplings of *Ficus binnendijkii* observed during the previous EIS could be transplanted into the RAC, if feasible. It is also possible to take cuttings for propagation from the three CS *Ficus* species within the Project Site. Their fruits and/or seeds could also be collected and propagated before they are removed, if observed. Research from Thailand comparing the performance of a variety of *Ficus* species found that propagation by cuttings was much less successful than by seed (Kuaraksa & Elliott, 2012). An average of 15% survival was observed in their cuttings from Ficus spp., and this could be explained by poor rooting ability from branch cuttings of mature trees (Kuaraksa & Elliott, 2012). Therefore, sapling transplant and collection of seeds should be prioritised, followed by cuttings.

The sensitive receptor significance is categorised as Important to regional/national interests. The loss of flora species within the Project Site is locally significant, and considering the broader ecological context, the magnitude will be moderate negative.

Impacts of vegetation removal are considered permanent and irrecoverable throughout the construction and operation phases. These are based on the consideration that there may be

longer-term impacts such as a reduction in genetic diversity and overall reduced fitness of the species.

The reduction in flora species populations is considered cumulative in the long term. While vegetation clearance within the Project Site will occur as a single event, its effects will combine with the progressive loss of similar secondary habitats arising from planned developments across the wider Tengah area. This will contribute to the reduction of known occurrences and available habitat for conservation-significant flora, particularly *Ficus binnendijkii* and *Ficus apiocarpa*, which were recorded only within the Project Site during the 2021 EIS.

Based on the above analysis, impact significance from reduction of flora species population is assessed to be within the Moderate Negative Impact band, shown in Table 5-8.

Proposed Mitigation Measures

- Development and implementation of Flora Management Plan to be incorporated into the overarching EMMP;
- Engage an ISA Certified Arborist to prepare tree felling plan, verify affected vegetation according to tree felling plan, and recommend appropriate tree conservation measures, if required;
- Removal of trees should be minimised as far as possible and kept within the Project Site based on the Flora Management Plan;
- Conservation-significant plant species should be transplanted or have seeds / cuttings taken from areas that are to be cleared, where feasible;
- Plants to be salvaged should be clearly marked individually or by area on site; and
- NParks will evaluate and carry out the plant salvaging works.

Evaluation of Residual Impact

The proposed mitigation measures may reduce the magnitude from moderate negative to minor negative. Therefore, the residual impacts significance may be reduced to Minor Negative Impact band as shown in Table 5-8.

Table 5-8: Terrestrial Flora Impact Significance During Construction Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Loss of habitat	Terrestrial Flora	Importance	2	Important to the local condition (within a large direct impact area)	2	No Change
		Magnitude	-2	Minor Negative	-2	No Change
		Permanence	3	Permanent	3	No Change
		Recoverability	3	Irrecoverable	3	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-36	2*(-2)*(3+3+3)	-36	2*(-2)*(3+3+3)
		Range Band	Slight Negative		Slight Negative	
Reduction in flora species population	Terrestrial Flora	Importance	4	Important to regional/national interests	4	No Change
		Magnitude	-3	Moderate negative	-2	Minor negative
		Permanence	3	Permanent	3	No Change
		Recoverability	3	Irrecoverable	3	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-108	4*(-3)*(3+3+3)	-72	4*(-2)*(3+3+3)
		Range Band	Moderate Negative		Minor Negative	

5.4.2 Operation Phase Impacts

5.4.2.1 Edge Effects and Human Disturbances

Impact Assessment

The Project will result in the creation of new forest edges at the potentially retained RAC along the Project Site boundary. These edges would then be exposed to increased light, wind, and temperature fluctuations, as well as potential alterations in soil moisture conditions.

Human presence along the forest edges may also result in the introduction of more non-native flora in the potentially retained RAC. There may also be increased soil compaction and trampling of vegetation if people enter the potentially retained forests.

Collectively, edge effects and human disturbances may lead to changes in species composition in the potentially retained forests, with potential increases in non-native species. With other upcoming development in the vicinity, that would further reduce the

total forested area and create more forest edges, there may be long-term ecological simplification of the potentially retained forests from sustained anthropogenic pressures.

The impacted areas are important to the local condition within a large direct impact area and is expected to cause a slight negative change. The impact is considered permanent, recoverable, and cumulative in the long term, as similar secondary habitats within the wider Tengah area are being progressively removed due to planned developments (URA, 2025).

Based on the above analysis, impact significance from edge effects and human disturbance is assessed to be within the Slight Negative Impact band, shown in Table 5-9.

Proposed Mitigation Measures

- Native planting shall be incorporated along the RAC edges and within the development landscape to enhance habitat continuity and strengthen ecological connectivity with surrounding green spaces;
- Plants that were salvaged from the Project Site should be planted back at suitable locations, and other native species plantings should be done within the retained forests, where feasible; and
- Native hedge plant species should be planted along the edges of the development to deter unauthorised entry.

Evaluation of Residual Impact

The mitigation measures can contribute to enhance local habitat quality but does not offset landscape-scale impacts. The residual impact therefore remains in the Slight Negative Impact band as shown in Table 5-9.

Table 5-9: Terrestrial Flora Impact Significance During Operation Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Edge effects and human disturbances	Terrestrial Flora	Importance	2	Important to the local condition (within a large direct impact area)	2	No Change
		Magnitude	-1	Slight Negative	-1	No Change
		Permanence	3	Permanent	3	No Change
		Recoverability	2	Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-16	2*(-1)*(3+2+3)	-16	2*(-1)*(3+2+3)
		Range Band	Slight Negative		Slight Negative	

5.5 Terrestrial Fauna

This section provides the assessment of potential impacts on terrestrial fauna within the study boundary due to the Project activities. The assessment considered the direct impacts on biodiversity within the Project Site and the indirect impacts beyond the Project Site but within the Study Area.

5.5.1 Construction Phase Impacts

5.5.1.1 Habitat Loss and Fauna Displacement

Impact Assessment

The Project will involve the clearance of approximately 15.7 ha of vegetated land at Tengah for the Town Centre's developments, with approximately 0.8 ha potentially to be retained as part of the RAC that extends into Site 2. Works will include removal or modification of existing vegetation, WB1, and drainage-associated habitats.

The Study Area comprises secondary vegetation, scrubland, managed grassed areas, roadside vegetation, and freshwater-associated habitats. These habitats support a range of terrestrial and semi-aquatic fauna and may provide foraging, shelter, breeding and movement functions. The relative importance of these functions varies among species and cannot be fully determined from the available survey data.

Habitat clearance and earthworks will result in direct habitat loss and displacement of fauna, with potential injury or mortality of less mobile species during works. The southern segment of WB1 is expected to be largely infilled as part of the Project, resulting in the loss of associated freshwater and riparian habitats within the Project Site.

Species of conservation significance recorded include the Sunda Pangolin (*Manis javanica*), Straw-headed Bulbul (*Pycnonotus zeylanicus*), and Variable Featherlegs (*Copera vittata*). These records confirm that the Project Site is used by species of conservation significance. However, the survey data do not establish local population size, frequency of use or the relative importance of the Project Site for each species. The permanent removal of the recorded habitats may therefore affect habitat functions that were not fully identified during the survey period. The loss of secondary and freshwater-associated habitats would nonetheless contribute to cumulative pressures, particularly for species such as Variable Featherlegs that are affected by the decline of suitable freshwater habitats

Fauna displaced by vegetation clearance may move into the RAC or other surrounding vegetated areas. However, successful relocation cannot be assumed because the available data do not establish whether these areas contain sufficient resources, shelter or capacity to support displaced individuals. Vegetation clearance may also temporarily increase the risk of fauna injury, roadkill and human-wildlife conflict.

The fauna receptors include the Sunda Pangolin (*Manis javanica*), which is listed as Critically Endangered both nationally and globally, and the Straw-headed Bulbul (*Pycnonotus zeylanicus),* which is listed as Endangered nationally and Critically Endangered globally. Given their conservation status and Singapore's importance to the global conservation of these species, the receptor is assessed as important to national/international interests, with an importance score of 5.

The magnitude of impact is assessed as minor negative, even though approximately 15.7 ha of confirmed terrestrial fauna habitat will be cleared. This is because the direct habitat loss is confined to the Project Site and 0.8 ha of vegetation is proposed to be retained within the RAC. This proposed retention provides partial habitat avoidance and maintains some connection with the larger vegetated network, although it will not replace the habitat functions lost. The conservation significance of recorded fauna, including the Critically Endangered Sunda Pangolin, is reflected separately in the receptor importance score. The impact is considered permanent, irrecoverable and cumulative.

Overall, the impact significance is assessed to fall within the Moderate Negative Impact band.

Proposed Mitigation Measures

The following mitigation measures are proposed to reduce the impacts on terrestrial fauna during the construction phase:

- A wildlife shepherding plan should be developed by the Contractor/EMMP Consultant as part of a fauna management plan. This plan will be used to shepherd the wildlife to the areas that would be cleared last in the planned sequence of clearing, so that they can escape on their own or be trapped for translocation. The wildlife shepherding plan should detail direction of forest clearance, location of wildlife exits, and the hoarding plan;
- Prior to any tree felling, shrub or vegetation clearance, pre-felling inspection of the Project Site should be carried out for the presence of active bird nests, holes, or fauna;
- Clearing of trees should be carried out in a directional manner and be within the Project Site;
- Trapping of wildlife, if required, should be done by a qualified wildlife handler;
- A species-specific Sunda Pangolin response protocol shall be included in the Fauna Management Plan;
- Targeted pre-clearance checks shall be conducted for pangolins, active resting sites, burrows and other signs of habitat use;
- If a Sunda Pangolin or suspected active resting site is recorded, works shall stop within the affected area and NParks shall be informed. Any rescue or relocation shall only be conducted by an authorised wildlife handler;
- Open trenches and excavations shall be covered when not in use or provided with suitable escape ramps;
- Pre-felling inspections shall identify any active Straw-headed Bulbul nests or breeding activity. Where an active nest is recorded, an appropriate protection buffer shall be agreed with NParks and clearance shall be deferred until the young have fledged;
- Mature trees and vegetation providing potential nesting and feeding resources shall be retained where practicable;
- The occupied odonate stream and its riparian vegetation shall be considered for further avoidance. If avoidance is not practicable, a species-specific odonate management and monitoring programme shall be agreed with NParks before stream modification; and

- Fatality monitoring of fauna species should be conducted throughout construction and operational phases of the Project. Fatality monitoring should be carried out by the environmental consultant and site personnel regularly, as this will aid in informing the efficacy of mitigation measures implemented.
- A fauna response plan should be prepared to ensure animals encountered are allowed to escape or be rescued/relocated. It should also detail the following:
    - Emergency protocol in the event of fauna related incidents such as snake or insects' attack/bites, etc;
    - Should animals be observed/found within the Project Site, works are to be stopped to allow animals to escape, where possible;
    - If animal is unable to escape/herded off on its own, the ECO shall immediately contact the EMMP/environmental consultant and a qualified wildlife handler to relocate the animal; and
    - Fauna/biodiversity awareness briefing once every six months (semi-annually) to site staff to elaborate on fauna species that may be observed around site and response plans if such fauna is spotted. Site personnel and construction workers should be briefed on the fauna response protocols, fauna management protocol, and proper construction management practices prior to commencement of works and periodically (refresher briefings) over the course of the construction.

Evaluation of Residual Impact

Protection of the RAC and enforcement of clearing boundaries will limit habitat loss to the assessed clearance footprint. Within this footprint, however, habitat will still be permanently removed, displacing fauna that use it. Wildlife shepherding, pre-clearance inspections, and fauna response measures reduce the risk of injury or mortality during this displacement, but do not prevent the displacement itself or replace the lost habitat. As permanent habitat loss and the resulting fauna displacement remain after mitigation, these measures do not justify a reduction in the magnitude score. The magnitude of habitat loss and fauna displacement therefore remains minor negative, and the residual impact significance remains moderate negative.

5.5.1.2 Disruption of wildlife behaviour due to elevated noise levels

Impact Assessment

Simultaneous operation of heavy machinery, equipment, and vehicles during construction will be the primary sources of elevated noise levels within the Project boundary. Noise levels are expected to vary and fluctuate depending on the type of activities being undertaken, the operating duration of individual equipment, and the combination of machinery in use at any given time. Noise levels at specific locations will be dominated by the loudest operating equipment and will decrease with increasing distance from the source. Based on basic sound propagation principles, construction noise is expected to be localised with limited spatial extent.

The increase in ambient noise levels may disrupt fauna within the study boundary and adjacent vegetated areas. Elevated noise exposure can result in both physiological and

behavioural responses in terrestrial fauna, potentially leading to temporary changes in distribution, habitat use, and activity patterns (Kok, et al., 2023). Studies have shown that terrestrial wildlife may exhibit behavioural responses to anthropogenic noise at levels of approximately 40 dBA, with some documented effects occurring below 50 dBA (Shannon, et al., 2016). In extreme cases, prolonged exposure to high noise levels may result in auditory impairment.

Increased anthropogenic noise may also elevate the masked hearing threshold, defined as the minimum sound level detectable in the presence of background noise (Dowling, Luther, & Marra, 2012). Species that rely on acoustic signals for communication may respond by altering call frequency or bandwidth as a compensatory mechanism, commonly referred to as the Lombard effect. Such changes may reduce the effectiveness of vocal communication used for territory defence, mate attraction, prey detection, and navigation, which may in turn affect reproductive success and survival (Brumm & Slabbekoorn, 2005).

Construction activities at Tengah Site 2, which is located adjacent to the Project Site, may occur concurrently and could contribute to elevated background noise levels in the area. In addition, an existing MRT construction corridor running through the central portion of the Project Site is currently active. While MRT construction activities are expected to be substantially completed prior to the commencement of the main construction works for the Project Site, partial temporal overlap cannot be fully ruled out at this stage.

In the event that construction activities at the Project Site coincide with works at Site 2 and residual MRT construction activities, short-term cumulative increases in ambient noise levels may occur. However, these increases are expected to remain intermittent and spatially constrained, as construction activities will be phased and localised. Furthermore, MRT construction works would represent a temporary baseline disturbance, and completion of these works is expected to reduce overall background noise levels prior to or during the early stages of the Project Site construction.

Baseline fauna surveys confirmed the presence of species of local and international conservation significance within the study boundary. Accordingly, the sensitive receptor importance is assessed as important to national/international interests. Taking into account the potential for limited cumulative noise exposure, the magnitude of impact is assessed as minor negative, as noise impacts are expected to be temporary, localised, and confined primarily to the construction phase.

Elevated noise levels are expected to occur only during active construction periods, after which ambient noise levels are expected to return to baseline conditions. As such, the impacts are assessed to be temporary and recoverable. While limited cumulative effects may occur if construction activities overlap, these are not expected to result in sustained or widespread noise impacts.

Overall, the impact significance is assessed to fall within the Minor Negative Impact band as shown in Table 5-10**.**

Proposed Mitigation Measures

Potential noise impacts from construction activities can be minimised through the following measures:

- Engagement of an Environmental Control Officer (ECO) to oversee and enforce compliance with maximum permissible levels, as found in Section 2.2.1, and implementation of mitigation measures;
- Construction activities should be planned and scheduled, where practicable, to minimise simultaneous operation of multiple high-noise equipment, particularly during periods when works at Tengah Site 2 or residual MRT construction activities may be ongoing;
- Selection of construction equipment and methods that generate lower noise levels, in accordance with Singapore standards, where necessary to achieve permissible limits;
- Coordination with contractors for Tengah Site 2 and the MRT works should be carried out, where feasible, to manage construction phasing and reduce prolonged overlap of high-noise activities in the same areas;
- Temporary hoarding or noise barriers should be installed around active work zones to reduce noise propagation towards adjacent vegetated areas and forest edges;
- Fully switching off vehicles and machinery when not in use;
- Regular maintenance and proper operation of all equipment, machinery, and vehicles to avoid excessive noise emissions;
- Adhere to NEA's Maximum Permissible Noise Levels for Construction Work;
- Consider conducting construction works as far as practically possible from the forest edges during peak bird activity season; and
- Placing noisy machinery as far as possible from forest or vegetation edges.

Evaluation of Residual Impact

Implementation of the proposed mitigation measures may reduce the magnitude of impacts from minor negative to slight negative. Therefore, the impact significance will reduce from Minor Negative to the Slight Negative Impact band, as shown in Table 5-10**.**

5.5.1.3 Roadkill and Human-Wildlife Conflict due to Increased Vehicle and Human Presence

Impact Assessment

During the construction phase at the Project Site, increased human activity and vehicular movement within the Project boundary may result in fauna entering the construction site, which could lead to human–wildlife conflict. Such encounters may pose safety risks to site personnel and could result in injury or mortality of fauna, particularly in areas with active works, temporary access roads, and construction traffic.

Higher vehicular traffic within the Project boundary during construction is expected to increase the risk of roadkill. Based on baseline survey findings, the Sunda Pangolin (*Manis javanica*) is considered particularly vulnerable to vehicle-related mortality due to its low mobility, nocturnal behaviour, and tendency to traverse ground-level habitats. Increased construction traffic may elevate the likelihood of accidental collisions, especially along temporary access routes and areas adjacent to vegetated edges.

Baseline surveys also recorded snake species, including the painted bronzeback and striped bronzeback, within drainage features and roadside habitats in and around the study

boundary. These species may seek shelter within drains, pipes, and roadside curbs where visibility is limited, increasing the risk of accidental encounters with construction personnel and vehicles.

Considering the confirmed presence of fauna species of local and international conservation significance within the study boundary, the sensitive receptor importance is assessed as important to national/international interests.

The magnitude of impact is assessed as moderate negative, given the potential severity of consequences to both fauna and human safety arising from roadkill incidents and wildlife encounters. These impacts are expected to be temporary and largely confined to the construction phase. With the implementation of appropriate mitigation measures, impacts are considered recoverable. However, the impact is assessed to be cumulative, as construction-related vehicular traffic may act in combination with existing traffic along surrounding roads to increase overall risk to wildlife.

Overall, the impact significance is assessed to fall within the Moderate Negative Impact band, as shown in Table 5-10.

Proposed Mitigation Measures

- Adhere to the proposed mitigation measures in Section 5.5.1.1 to reduce injury and mortality of fauna;
- Install barriers with minimal entry points around the Project Site to prevent animals entering the Project Site and reduce potential roadkill and human-wildlife conflict. Equipment and works should be within the Project Site to prevent encroachment into the forested areas;
- Install speed humps to slow down traffic within the Project Site;
- Every incident of human-wildlife conflict or animal encounter that requires intervention shall be documented and reported to the appointed EMMP consultant. The EMMP consultant shall then review the incident and existing measures to recommend additional measures if necessary;
- Daily monitoring and checks for roadkill, conducted by workers who have received biodiversity awareness training
- Fauna shall be closely monitored until the impacts are deemed to be resolved; any observations of dead fauna (e.g., birds, bats, large reptiles or mammals) should be recorded and reported in the monthly EMMP report; and
- Implementation and enforcement of maximum speed limits within the Project Site. A suggested maximum speed limit of 30 km/h is recommended within the Project Site to provide drivers sufficient time to respond to wildlife movements, especially along access roads adjacent to the forest.

Evaluation of Residual Impact

Implementation of the proposed mitigation measures may reduce the impact score slightly, changing the impact significance to the Minor Negative Impact band, as shown in Table 5-10.

5.5.1.4 Light Pollution from Night Works

In the event that construction works are required to be carried out at night at the Project Site, artificial lighting will be introduced within the Project boundary. This may result in light spill into adjacent vegetated areas and remaining freshwater-associated habitats.

Artificial light at night has been shown to disrupt natural circadian rhythms, which regulate key biological functions such as activity cycles, thermoregulation, and behaviour (Pease & Gilbert, 2025). Light pollution may prolong activity periods in some fauna species, particularly birds, and disrupt resting and foraging patterns. Both nocturnal and crepuscular species may be affected through changes in movement behaviour and predator–prey interactions.

Artificial lighting may also attract insects due to the dorsal light response, whereby insects orient towards light sources rather than natural celestial cues (Fabian, Sondhi, Allen, Theobald, & Lin, 2024). This may result in localised increases in insect density around light sources, potentially creating ecological traps. Predators that are tolerant of illuminated conditions may benefit from increased prey availability, while light-sensitive predators may experience reduced foraging success.

Baseline odonate surveys recorded the Variable Featherlegs (*Copera vittata*) along a waterbody within the Study Area. The species was also recorded along the corresponding stream during the 2021 EIS. Its repeated occurrence indicates continued use of the stream and suggests that the waterbody may provide locally important habitat. However, the available survey data are insufficient to determine the size of the local population or whether it represents a distinct population.

The portion of WB1 within the Project Site is expected to be largely infilled, while its northern segment is proposed for retention within the RAC. WB2 falls within the Site 2 study area and is being mapped, surveyed and assessed for potential retention under the Site 2 EIA. Artificial lighting from night works may affect retained or adjacent stream and riparian habitats by altering the activity and habitat use of odonates and other light-sensitive fauna. Artificial lighting may also affect nocturnal avifauna through changes in resting, foraging and predator-prey behaviour (Pease & Gilbert, 2025).

Considering the presence of fauna species of local and international conservation significance within the study boundary, the sensitive receptor importance is assessed as important to national/international interests.

The magnitude of impact is assessed as minor negative, as light pollution from night works is expected to be localised, intermittent, and restricted to specific construction phases. The impact is expected to be temporary and recoverable, as artificial lighting associated with construction will cease upon completion of night works. The impact is considered non-cumulative, as no permanent lighting associated with construction is proposed.

Overall, the impact significance is assessed to fall within the Minor Negative Impact band, as shown in Table 5-10.

Proposed Mitigation Measures

- All planned night works has to be carried out in accordance with the approved Lighting Management Plan (LMP);

- Restricted use of ultraviolet lights and lights of short wavelengths (below 380nm). Positioning of light sources at elevated heights and shielding or focusing within construction areas to reduce light pollution beyond the Project Site. Lights to be dimmed or fully switched off outside working hours or when tasks decrease or cease;
- Positioning of lights at building height for mechanical and electrical works, and installation of lights close to the ground surface for ground-level works; and
- Orientation of lights away from the forest edge, with light screens installed to minimise spillover into adjacent forest during night works.

Evaluation of Residual Impact

Implementation of the proposed mitigation measures may reduce the impact magnitude from minor negative to slight negative. Hence, the impact significance may also be reduced to Slight Negative Impact band, as shown in Table 5-10.

Table 5-10: Terrestrial Fauna Impact Significance During Construction Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Habitat Loss and Fauna Displacement	Fauna in Tengah Forest	Importance	5	Important to national / international interests	5	No Change
		Magnitude	-2	Minor Negative	-2	Minor Negative
		Permanence	3	Permanent	3	No Change
		Recoverability	3	Irrecoverable	3	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-90	5*(-2)*(3+3+3)	-90	5*(-2)*(3+3+3)
		Range Band	Moderate Negative		Moderate Negative	
Disruption of wildlife behaviour due to elevated noise levels	Fauna in Tengah Forest	Importance	5	Important to national / international interests	5	No Change
		Magnitude	-2	Minor Negative	-1	Slight Negative
		Permanence	2	Temporary	2	No Change
		Recoverability	2	Recoverable	2	No Change
		Cumulative Impact	2	Non-cumulative	2	No Change
		Environmental Score	-60	5*(-2)*(2+2+2)	-30	5*(-1)*(2+2+2)
		Range Band	Minor Negative		Slight Negative	
Roadkill and Human-	Fauna in Tengah Forest	Importance	5	Important to national / international interests	5	No Change
		Magnitude	-3	Moderate Negative	-2	Minor Negative

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Wildlife Conflict		Permanence	2	Temporary	2	No Change
		Recoverability	2	Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-105	5*(-3)*(2+2+3)	-70	5*(-2)*(2+2+3)
		Range Band	Moderate Negative		Minor Negative	
Light Pollution from Night Works	Fauna in Tengah Forest	Importance	5	Important to national / international interests	5	No Change
		Magnitude	-2	Minor Negative	-1	Slight Negative
		Permanence	2	Temporary	2	No Change
		Recoverability	2	Recoverable	2	No Change
		Cumulative Impact	2	Non-cumulative	2	No Change
		Environmental Score	-60	5*(-2)*(2+2+2)	-30	5*(-1)*(2+2+2)
		Range Band	Minor Negative		Slight Negative	

5.5.2 Operation Phase Impacts

5.5.2.1 Disruption of Wildlife Behaviour due to Elevated Noise Levels

Impact Assessment

During the operational phase, ambient noise within the Project Site will arise from vehicular traffic, operation of the MRT station, the Town Centre's developments, and associated routine maintenance works. Compared to the construction phase, operational noise levels are expected to be lower in intensity but more continuous as part of the urban environment.

The increase in ambient noise levels may cause disruption to fauna behaviour similar to that described in Section 5.1 (Construction Phase). However, considering the urban context of the Project Site and the presence of similar noise sources from existing and planned developments and transport infrastructure in the surrounding Tengah area, the changes in ambient noise levels are not expected to be significant.

Considering the presence of fauna species of local and international conservation significance within the study boundary and surrounding areas, the sensitive receptor importance is assessed as important to national/international interests. The magnitude of impact is assessed as slight negative, given the expected modest increase in ambient noise levels and the likelihood that fauna in adjacent habitats have some tolerance to urban noise conditions.

The changes in ambient noise levels are considered permanent, as they will persist throughout the operational life of the Project, but are recoverable upon cessation of Project

operations. The increase in ambient noise levels is also considered cumulative, as operational noise will add to existing traffic and human activities in the wider Tengah area.

Therefore, the impact significance is assessed to fall within the Minor Negative Impact band, as shown in Table 5-11.

Proposed Mitigation Measures

Potential noise impacts from operation activities can be minimised through the following measures:

- Minimising unnecessary vehicle movements through efficient planning of maintenance and service activities;
- Promoting the use of lower noise-generating vehicles, such as electric vehicles, where practicable; and
- Enforcing a no-idling rule for vehicles within the Project Site to reduce unnecessary noise emissions.

Evaluation of Residual Impact

Implementation of the proposed mitigation measures may reduce the contribution of operational noise levels but cannot eliminate noise generated by routine activities. The residual impact magnitude is therefore still assessed as slight negative, and the residual impact significance remains within the Minor Negative Impact band, as shown in Table 5-11.

5.5.2.2 Roadkill and Human-Wildlife Conflict due to Increased Vehicle and Human Presence

Impact Assessment

During the operational phase at the Project Site, the completed Town Centre and surrounding developments, and the associated road infrastructure, will introduce sustained vehicular movement and human presence within the Project boundary. Compared to the pre-development condition, this represents a permanent increase in traffic and human activity within the Project Site.

Although vehicular speeds within residential estates are typically controlled and traffic is expected to be regulated, the presence of internal roads, access routes, and surrounding arterial roads may present a continued risk of roadkill to fauna moving between remnant green spaces and adjacent forested areas.

Based on baseline findings, species of conservation significance such as the Sunda Pangolin *(Manis javanica*) may remain vulnerable to vehicle-related mortality due to their ground-dwelling behaviour, low mobility, and nocturnal activity patterns. Snakes and other small vertebrates may also be susceptible to vehicle strikes within estate roads and along drainage corridors.

Considering the confirmed presence of fauna species of local and international conservation significance within the study boundary and its surrounding habitats, the sensitive receptor importance is assessed as Important to national/international interests.

The magnitude of impact is assessed as minor negative. Although vehicle speeds within the development are expected to be regulated, the proposed residential, commercial and community use will generate sustained vehicular and pedestrian activity throughout the operational phase. Traffic volumes may be substantial during peak periods due to the scale and mixed-use nature of the development and its proximity to the MRT station. The permanent road network may therefore present an ongoing risk of roadkill and human-wildlife conflict, particularly where roads are located near retained vegetation, drainage features and movement routes used by fauna.

The impact is considered permanent, as residential occupation and transport infrastructure will remain for the lifespan of the development. The impact is assessed as partially recoverable, as individual incidents may not permanently affect overall population viability if managed appropriately, though mortality events cannot be reversed. The impact is also considered cumulative, as operational traffic within the Project Site will act in combination with existing and planned surrounding developments within Tengah.

Overall, the impact significance is assessed to fall within the Minor Negative Impact band, as shown in Table 5-11.

Proposed Mitigation Measures

- Implementation and enforcement of low-speed limits within the residential estate roads;
- Preparation and implementation of a Fauna Response Plan during operation to manage wildlife encounters;
- Public awareness outreach to residents on wildlife presence and appropriate response protocols; and
- Recording and monitoring of roadkill incidents, by Town Council or public reporting, to identify hotspots and implement adaptive management measures; and
- Implementation and enforcement of low-speed limits along internal roads, particularly near the RAC, drainage features and retained vegetation; and
- Public education on wildlife encounters, including advice against feeding or approaching wildlife.

Evaluation of Residual Impact

Implementation of the proposed monitoring measures is expected to reduce the likelihood and frequency of roadkill and human-wildlife conflict. The residual magnitude is therefore assessed as slight negative. As some residual risk will remain throughout the operational phase, the residual impact significance remains assessed as Minor Negative, as shown in Table 5-11.

5.5.2.3 Light Pollution from Night-time Activities

During the operational phase, permanent lighting will be introduced from residential blocks, internal roads, the MRT station, and other public facilities within the Project Site. This represents a sustained increase in night-time illumination compared to the existing pre-development condition.

Light spill may extend into adjacent vegetated edges and any retained drainage features or green corridors. While the Project Site will be urbanised, these edge habitats may still be used by fauna moving between surrounding forested areas.

Given the presence of fauna species of local and international conservation significance within and around the study boundary, the sensitive receptor importance is assessed as important to national/international interests.

The magnitude is assessed as Minor Negative because unmitigated operational lighting will be permanent and may extend into retained or adjacent fauna habitats. While lighting levels are expected to be typical of residential and commercial development, this does not remove the change from the existing baseline or the potential effects on light-sensitive fauna.

The impact is considered permanent, as operational lighting will remain throughout the lifespan of the development. It is assessed as partially recoverable, as fauna may adjust spatially or behaviourally over time, although baseline dark conditions will not return. The impact is considered cumulative, as the development will add to existing and planned urban lighting within the wider Tengah area.

Overall, the impact significance is assessed to fall within the Minor Negative Impact band, as shown in Table 5-11.

Proposed Mitigation Measures

- Use of full cut-off and shielded lighting fixtures to reduce spill;
- Orientation of lights away from forest edges and drainage corridors;
- Use of warmer colour temperature lighting where feasible; and
- Installation of dimming controls or motion sensors in low-use areas.

Evaluation of Residual Impact

Implementation of the proposed mitigation measures may reduce the impact of light spill and edge disturbance, but impact remains within slight negative. Hence, the impact significance will remain within the Minor Negative Impact band.

Table 5-11: Terrestrial Fauna Impact Significance During Operation Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Disruption of wildlife behaviour due to elevated noise levels	Fauna in Tengah Forest	Importance	5	Important to national / international interests	5	No Change
		Magnitude	-1	Slight Negative	-1	No Change
		Permanence	3	Permanent	3	No Change
		Recoverability	2	Partially Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
		Environmental Score	-40	5*(-1)*(3+2+3)	-40	5*(-1)*(3+2+3)
		Range Band	Minor Negative		Minor Negative	
Roadkill and human-wildlife conflict	Fauna in Tengah Forest	Importance	5	Important to national / international interests	5	No Change
		Magnitude	-2	Minor Negative	-1	Slight Negative
		Permanence	3	Permanent	3	No Change
		Recoverability	2	Partially Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-80	5*(-2)*(3+2+3)	-40	5*(-1)*(3+2+3)
		Range Band	Minor Negative		Minor Negative	
Light pollution from night works	Fauna in Tengah Forest	Importance	5	Important to national / international interests	5	No Change
		Magnitude	-2	Minor negative	-1	Slight Negative
		Permanence	3	Permanent	3	No Change
		Recoverability	2	Partially Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-80	5*(-2)*(3+2+3)	-40	5*(-1)*(3+2+3)
		Range Band	Minor Negative		Minor Negative	

5.6 Aquatic Fauna

5.6.1 Construction Phase Impacts

5.6.1.1 Habitat Loss and Fauna Displacement

Construction activities, including site clearance and earthworks, will result in the loss and modification of freshwater habitats within the Project Site, leading to displacement of aquatic fauna recorded during the baseline surveys. WB1 is expected to be largely infilled as part of the proposed works, resulting in the loss of associated aquatic and marginal habitats, with only its northern segment proposed to be retained within the RAC. While the western stream, WB2, is also proposed to be retained, it may still be subject to indirect impacts from nearby construction activities.

The freshwater features within the Study Area support aquatic fauna and provide suitable habitat for freshwater-associated species, including the Variable Featherlegs (*Copera vittata*). Although these features are limited in spatial extent and occur within a modified landscape, repeated records of conservation-significant odonates indicate that their local ecological importance should not be determined solely from their size or physical condition.

Considering the confirmed presence of aquatic fauna within the Project boundary, the sensitive receptor importance is assessed as important to regional/national interests.

The magnitude of impact is assessed as minor negative because the direct loss is largely confined to the portion of WB1 within the Project Site. This loss will be permanent and will remove aquatic and marginal habitat used by fauna. The northern segment of WB1 is proposed for retention within the RAC, while WB2 is being assessed under the Site 2 EIA. These potentially retained features may provide some habitat continuity, but their condition, ecological function and ability to support affected species will require confirmation through the Site 2 assessment.

Impacts are considered permanent at the site scale with respect to the loss of the infilled portions of WB1. However, impacts on aquatic fauna populations are expected to be partially recoverable at the landscape scale, as some freshwater habitats are being proposed for retention or reintroduced under the broader master plan, although many existing waterbodies across Tengah will be modified. The impact is considered cumulative, as other waterbodies within the wider Tengah development may be filled or altered, contributing to an overall reduction in freshwater habitat availability.

Overall, the impact significance is assessed to fall within the Minor Negative Impact band.

Proposed Mitigation Measures

- A pre-clearance aquatic fauna survey shall be conducted prior to any drainage diversion, dewatering, or infilling of existing waterbodies to confirm the presence of fish and other aquatic organisms.
- Where practicable, aquatic fauna shall be salvaged using appropriate methods such as scoop netting or hand collection and relocated to suitable receiving habitats outside the Project boundary, subject to approval from the relevant authorities.

- Dewatering and infilling works shall be carried out in a phased and controlled manner to allow mobile aquatic fauna to disperse naturally where possible, and to minimise sudden habitat loss.
- Effective Earth Control Measures shall be implemented and maintained to prevent sediment-laden runoff, accidental discharge, or pollution from entering adjacent drains and downstream watercourses outside the Project boundary.
- Site personnel shall be briefed on procedures for managing encounters with aquatic fauna during works involving waterbodies.

Evaluation of Residual Impact

The magnitude of impact remains minor negative because the loss of the affected portion of WB1 will be permanent and cannot be reversed through fauna salvage or relocation. The proposed retention of the northern segment of WB1 may provide partial habitat continuity. However, the availability, suitability and ecological function of WB2 and other freshwater habitats within the surrounding area remain subject to the findings of the Site 2 EIA. Based on the Project-level assessment, the residual impact remains within the Minor Negative Impact band.

Table 5-12: Aquatic Fauna Impact Significance During Construction Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Habitat Loss and Fauna Displacement	Aquatic Fauna in Tengah Waterbody	Importance	4	Important to regional / national interests	4	No Change
		Magnitude	-2	Minor Negative	-2	No Change
		Permanence	3	Permanent	3	No Change
		Recoverability	2	Partially Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-64	4*(-2)*(3+2+3)	-64	4*(-2)*(3+2+3)
		Range Band	Minor Negative		Minor Negative	

5.6.2 Operation Phase Impacts

5.6.2.1 Contamination of Aquatic Habitats from Urban Stormwater Runoff

During the operational phase, impacts to aquatic fauna are expected to be limited, as freshwater habitats will be largely reduced within the Study Area following the infilling of WB1. However, aquatic receptors may remain within the potentially retained WB2 and the northern section of WB1 within the RAC.

Potential impacts may arise from changes in water quality associated with urban stormwater runoff, including inputs of sediments, nutrients, and trace contaminants. These may affect aquatic habitat conditions within the waterbodies being assessed for retention outside the

Project Site, although such effects are expected to be minor under normal operational conditions.

Given the limited extent of the potentially retained aquatic habitats and the absence of direct disturbance during operation, impacts are expected to be localised and of low magnitude. Water quality conditions are expected to stabilise over time, and aquatic fauna within any retained habitats are likely to persist or recolonise where conditions remain suitable.

Overall, the impact significance during the operational phase is assessed to fall within the Slight Negative Impact band

Proposed Mitigation Measures

- Stormwater management measures will be implemented to reduce pollutant loads in runoff prior to discharge into the waterbodies proposed for retention. This may include silt traps, oil interceptors, and vegetated swales and raingardens where applicable.
- Regular inspection and maintenance of the Project Site drainage system will be carried out to ensure proper functioning and to prevent accumulation of sediments, debris, and pollutants.
- Discharges from food and beverage outlets and commercial activities will be properly managed and connected to the sewerage system, in accordance with relevant regulatory requirements, to prevent untreated wastewater from entering surface water features.
- Good housekeeping practices will be implemented across the Project Site to minimise the risk of accidental spills of fuels, lubricants, cleaning agents, and other chemicals. Spill response procedures will be established to ensure prompt containment and cleanup.
- The proposed retained waterbodies within the RAC may be protected from direct disturbance during operation through appropriate site management measures, which may include controlling access and avoidance of unauthorised discharge or dumping.

Evaluation of Residual Impact

The implementation of mitigation measures, including stormwater management controls and good housekeeping practices, will reduce pollutant inputs into the waterbodies during the operational phase. As a result, impacts to aquatic habitats are expected to remain limited to minor and localised changes in water quality, primarily during rainfall events.

Aquatic habitats within the potentially retained WB2 and the northern segment of WB1 may help continue to function as localised receptors within the Study Area. While these habitats may be subject to intermittent exposure to urban runoff, the overall extent and intensity of impact are expected to be low.

Given the limited scale of the aquatic habitats proposed for retention, the absence of direct disturbance during operation, and the availability of alternative freshwater habitats within the wider Tengah landscape, the residual impact is assessed to remain within the Slight Negative Impact band.

Table 5-13: Aquatic Fauna Impact Significance During Operation Phase

Impact	Receptor	Criteria	Before Mitigation		After Mitigation	
			Score	Remarks	Score	Remarks
Contamination of Aquatic Habitats from Urban Stormwater Runoff	Aquatic fauna within WB2 (waterbody proposed for retention)	Importance	4	Important to regional / national interests	4	No Change
		Magnitude	-1	Slight Negative	-1	No Change
		Permanence	3	Permanent	3	No Change
		Recoverability	2	Partially Recoverable	2	No Change
		Cumulative Impact	3	Cumulative	3	No Change
		Environmental Score	-32	4*(-1)*(3+2+3)	-32	4*(-1)*(3+2+3)
		Range Band	Slight Negative		Slight Negative	

6 SUMMARY OF IMPACTS

Aspect	POTENTIAL IMPACTS	SENSITIVE RECEPTORS	IMPACT PREDICTION (BEFORE MITIGATION)							IMPACT PREDICTION (AFTER MITIGATION)		
			Importance	Magnitude	Permanence	Recoverability	Cumulative Impact	Environmental Score	Impact Significance	Magnitude	Environmental Score	Impact Significance
Construction Phase												
Ambient Noise Levels	Increased ambient noise from construction activities	Fauna in Tengah Forest	1	-3	2	2	3	-21	**Slight Negative**	-1	-7	**Slight Negative**
Waste Generation	Generation of construction waste and MSW	Site Hygiene	1	-2	2	3	3	-16	**Slight Negative**	-2	-14	**Slight Negative**
Surface Water Quality	Sedimentation and contamination from construction activities	Waterbody in Tengah Forest	2	-3	2	2	3	-42	**Minor Negative**	-2	-28	**Slight Negative**
	Loss of existing waterbody from land preparation activities	Waterbody in Tengah Forest	2	-3	3	2	3	-48	**Minor Negative**	-2	-32	**Slight Negative**
Terrestrial Flora	Loss of habitat	Terrestrial Flora	2	-2	3	3	3	-36	**Slight Negative**	-2	-36	**Slight Negative**
	Reduction in flora species population	Terrestrial Flora	4	-3	3	3	3	-108	**Moderate Negative**	-2	-72	**Minor Negative**

Aspect	POTENTIAL IMPACTS	SENSITIVE RECEPTORS	IMPACT PREDICTION (BEFORE MITIGATION)							IMPACT PREDICTION (AFTER MITIGATION)		
			Importance	Magnitude	Permanence	Recoverability	Cumulative Impact	Environmental Score	Impact Significance	Magnitude	Environmental Score	Impact Significance
Terrestrial Fauna	Habitat loss and fauna displacement	Fauna in Tengah Forest	5	-2	3	3	3	-90	**Moderate Negative**	-2	-90	**Moderate Negative**
	Disruption of wildlife behaviour due to elevated noise levels	Fauna in Tengah Forest	5	-2	2	2	2	-60	**Minor Negative**	-1	-30	**Slight Negative**
	Roadkill and human-wildlife conflict	Fauna in Tengah Forest	5	-3	2	2	3	-105	**Moderate Negative**	-2	-70	**Minor Negative**
	Light pollution from night works	Fauna in Tengah Forest	5	-2	2	2	2	-60	**Minor Negative**	-1	-30	**Slight Negative**
Aquatic Fauna	Habitat loss and fauna displacement	Aquatic Fauna in Tengah Waterbody	4	-2	3	2	3	-64	**Minor Negative**	-2	-64	**Minor Negative**
Operation Phase												
Ambient Noise Levels	Operational urban noise including traffic	Human Receptors	1	-2	3	3	3	-18	**Slight Negative**	-1	-9	**Slight Negative**
Waste Generation	Generation of MSW from residents	National waste infrastructure	1	-2	3	2	3	-16	**Slight Negative**	-1	-8	**Slight Negative**

Aspect	POTENTIAL IMPACTS	SENSITIVE RECEPTORS	IMPACT PREDICTION (BEFORE MITIGATION)							IMPACT PREDICTION (AFTER MITIGATION)		
			Importance	Magnitude	Permanence	Recoverability	Cumulative Impact	Environmental Score	Impact Significance	Magnitude	Environmental Score	Impact Significance
Surface Water Quality	Contamination of stormwater runoff from urban activities	WB2 (waterbody proposed for retention within Study Area)	2	-1	2	2	3	-14	**Slight Negative**	-1	-14	**Slight Negative**
Terrestrial Flora	Edge Effects and Human Disturbances	Terrestrial Flora	2	-1	3	2	3	-16	**Slight Negative**	-1	-16	**Slight Negative**
Terrestrial Fauna	Disruption of wildlife behaviour due to elevated noise levels	Fauna in Tengah Forest	5	-1	3	2	3	-40	**Minor Negative**	-1	-40	**Minor Negative**
	Roadkill and human-wildlife conflict	Fauna in Tengah Forest	5	-2	3	2	3	-80	**Minor Negative**	-1	-40	**Minor Negative**
	Light pollution from night works	Fauna in Tengah Forest	5	-2	3	2	3	-80	**Minor Negative**	-1	-40	**Minor Negative**
Aquatic Fauna	Contamination of aquatic habitats from urban	Aquatic fauna within WB2 (waterbody proposed for retention)	4	-1	3	2	3	-32	**Slight Negative**	-1	-32	**Slight Negative**

7 ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

The proposed Environmental Management and Monitoring Plan (EMMP) has been developed based on the potential impacts identified in the EIA and in compliance with NParks and relevant regulatory requirements. It outlines the required mitigation measures, monitoring protocols, performance criteria, and implementation responsibilities to ensure effective environmental management throughout all Project phases.

The EMMP serves as the framework for the EMMP Consultant and Environmental Control Officer (ECO) to prepare a contract-specific EMMP in accordance with approval conditions and biodiversity management requirements. As a living document, it shall be updated where necessary, with all revisions formally documented and justified.

7.1 Objective of the Environmental Management and Monitoring Plan

The EMMP will be implemented during the pre-construction, construction and post-construction phases of the Project, with the following objectives:

- To ensure that good environmental management practices and mitigation measures recommended by the EIA report are adequately implemented.
- To establish a suite of baseline environmental parameters against which any short- or long-term environmental impacts can be quantified and assessed.
- To monitor the actual environmental impact levels and should there be any indication of exceedances of control limits, to provide prompt corrective actions to ensure the impacts are brought back within control limits.
- To monitor the performance and effectiveness of the implemented mitigation measures.
- To confirm compliance with regulatory requirements.
- To provide regular documentation on the environmental performance of the Project to HDB for subsequent reporting to NParks, URA, or NEA as required.

Implementation of the EMMP shall include the engagement of qualified specialists, subcontractors, and service providers to supply labour, equipment and professional services for the environmental management and monitoring works, in compliance with the standards, guidelines and procedures prescribed in the EMMP.

7.2 Organisational Chart

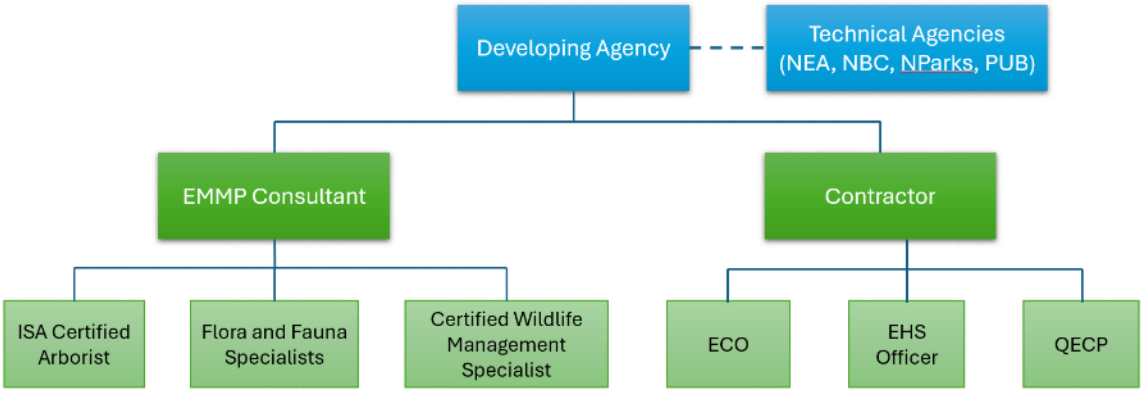


Figure 7-1: Organisation Chart

7.3 Roles and Responsibilities

7.3.1 Developing Agency

The Developing Agency, HDB is responsible for providing oversight on the development and execution of the EMMP, which includes:

- Ensuring that the contractor has properly implemented the EMMP through all phases of the development in accordance with the design and control limits recommended in this EIA;
- Allocating sufficient resources to fulfil the requirements of the EMMP;
- Ensuring that all environmental incidents, near misses, and non-compliances are promptly investigated, addressed, and reported, with input from the Technical Agencies where necessary; and
- Reporting to the Technical Agencies where necessary.

7.3.2 Government and Technical Agencies

The Government and Technical Agencies include, but are not limited to, NEA and NParks. The submission of the EMMP shall be provided to these Technical Agencies prior to the commencement of any construction work. Technical Agencies are also consulted throughout the lifetime of the Project.

The relevant Government and Technical Agencies will also confirm with the developer and their contractor the control limits to be implemented in the EMMP.

7.3.3 Contractor

The Contractor refers to the main contractor engaged by the Developing Agency. The Main Contractor is responsible for:

- Establishing an environmental team to coordinate with the authorities in ensuring the development is compliant to any local and international regulations, policies, and guidelines;
- Working together with the EMMP Consultant, to ensure that all staff and subcontractors are trained on relevant emergency procedures, and are involved in the implementation and enforcement of monitoring and mitigation measures outlined in the approved EMMP; and
- Procuring, installation, and maintaining all monitoring instruments specified in the EMMP, and for ensuring their proper operation and accurate data collection;
- Collaborate closely with the EMMP Consultant to ensure that all EMMP reports prepared during the construction phase are compiled, reviewed, and submitted to the Developing Agency for onward submission to the relevant Technical Agencies in accordance with approval requirements and reporting timelines.

Environmental Control Officer

The Environmental Control Officer (ECO) shall be employed by the main contractor for the Project and must be registered with a valid license, and discharge the duties set out in the Code of Practice (COP) for ECO (National Environment Agency, 2022) for each phase of the development. The type of ECO required is dependent on the Contract Sum of the Project, or as advised by the Authorities.

The ECO is responsible for:

- Developing and implementing practicable action plans and corrective measures to address findings arising from environmental audits and site inspections;
- Implementing all aspects of the environmental monitoring and management programme within their scope of responsibility, as stipulated in the applicable Codes of Practice (COP) and contract requirements, including:
  - Control of disease-bearing vectors and rodents;
  - Proper management and disposal of solid and liquid waste;
  - Control of noise and dust emissions;
  - Drainage management and prevention of surface runoff contamination;
  - General site housekeeping;
  - Implementation and maintenance of Earth Control Measures (ECM).
- Ensuring full compliance with NParks' requirements, guidelines, and biodiversity protection measures, including the implementation of approved mitigation measures under the EIA and EMMP;
- Coordinating with the EMMP Consultant and relevant specialists to safeguard protected trees, flora, fauna, and sensitive ecological receptors within and adjacent to the Project Site; and
- Monitoring and documenting compliance with authority conditions, and promptly reporting any non-compliance, incidents, or ecological disturbances to the relevant stakeholders in accordance with prescribed procedures.

Environmental, Health and Safety Officer (EHS Officer)

The Environmental, Health and Safety Officer (EHS) Officer is responsible for:

- The overall environmental, health and safety during the construction phase of the Project.
- Supporting the ECO in the implementation of measures highlighted in the EMMP
- Conducting regular site inspection and monitoring;
- Reviewing of the adequacy of implemented mitigation measures;
- Identifying and reporting of any adverse environmental impacts; and
- Monitoring and implementation of pollution control and any environmental mitigation measures.

Qualified Erosion Control Professional

The Qualified Erosion Control Professional (QECP) must hold a valid registration with the Institution of Engineers Singapore (IES). The responsibilities of a QECP include:

- Preparing, submitting and securing approval for the ECM Plan from WOB before works commences; and
- Ensuring that all contractors implement the ECM in accordance with the approved ECM Plan.

7.3.4 EMMP Consultant

The Main Contractor is required to engage an EMMP team comprising relevant specialists, including a fauna specialist, a flora specialist, an ISA-certified arborist, and a qualified wildlife management specialist. All members of the EMMP team shall be based in Singapore to undertake the required works. The Lead EMMP Consultant shall attend all regular progress meetings and provide updates to the Main Contractor and Developing Agency on the progress of the EMMP Consultant Team.

The EMMP Consultant is responsible for:

- Preparing and submitting a EMMP Workplan for approval by Technical Agencies prior to the commencement of construction, as per specified under the reporting requirement (Section 7.5);
- Overseeing the implementation of the EMMP Workplan by all responsible parties and ensuring the overall quality and effectiveness of the EMMP;
- Conducting the pre-construction baseline monitoring prior to the commencement of construction phase as per EMMP from approved EIA;
- Conducting regular site inspections during the construction phase;
- Carrying out regular monitoring of environmental data as proposed in the monitoring plan (e.g., noise levels, water quality);

- Reporting, investigating, and addressing any exceedances, non-compliance, or irregularities observed, together with the developing agency, contractor, and technical agencies where necessary;
- Providing advice on environmental issues where relevant and ensuring that all relevant parties receive necessary training as specified under the training requirement (Section 7.4);
- Engaging with stakeholders and authorities;
- Ensuring that all audits, inspections, and monitoring results are well documented; and
- Preparing and submitting reports as specified under the reporting requirements (Section 7.5).

The EMMP measures suggested in the EIA are aimed at addressing the potential impacts based on the construction methodology submitted. This may differ from the EMMP measures proposed by the EMMP Consultant when the detailed construction phases are made available. In addition, regulatory limits for physical environmental impacts (i.e., air quality, noise limits, water quality) should be set by the respective technical agencies, with feedback provided by the EMMP consultant.

Certified Arborist

A certified arborist must be International Society of Arboriculture (ISA) certified and should be engaged to conduct tree inspections and assess their health. The arborist is responsible for:

- Implements environmental mitigation measures for flora aspect as per EMMP Workplan;
- Prepare and obtain NParks' approval for the Tree Protection Plan (TPP) prior to commencement of construction works;
- Establish Tree Protection Zones (TPZs) with appropriate barriers and implement necessary arboricultural measures to safeguard retained trees and maintain tree health throughout the construction phase;
- Conducting a pre-clearance tree inspection and verification survey to confirm tree inventory, tagging, and condition prior to removal works;
- Reviewing and endorsing the contractor's method statements for site clearance and tree felling to ensure safe, systematic, and controlled removal;
- Verifying that tree felling works are carried out in accordance with the approved Tree Felling Plan and relevant NParks permit conditions;
- Supervising and monitoring tree removal activities to minimise unnecessary damage to adjacent vegetation, infrastructure, and ecological receptors (if any);
- Inspecting and certifying that all trees identified for removal have been cleared in accordance with approved boundaries and conditions;
- Providing advisory input on compensatory planting requirements, replacement ratios, and reinstatement strategies in compliance with NParks' guidelines;

- Documenting the tree clearance process, including pre- and post-clearance records, and issuing certification upon completion of felling works; and
- Liaising with the EMMP Consultant and relevant authorities on tree-related compliance matters during the construction phase

Biodiversity Specialists

As part of the EMMP consultant's team, sufficiently experienced flora and fauna specialists should be involved in the preparation of the EMMP.

The flora specialist is responsible for:

- Preparing a project-specific flora management plan as part of the EMMP Workplan and assisting the main contractor obtain the necessary authority approvals;
- Reviewing soil investigation sites and proposed access routes to minimise unnecessary vegetation removal;
- Identifying valuable plant species for seed collection, propagation and harvesting;
- Assessing plant suitability for transplant;
- Supervising the transplantation of designated trees and monitoring the condition of retained and transplanted trees on a monthly basis to ensure their stability, health, and compliance with approved tree management requirements;
- Recommending management strategies for weeds and invasive species if needed; and
- Conducting monthly inspections to oversee the implementation of the flora management plan and preparing relevant reports.

The fauna specialist is responsible for:

- Preparing a project-specific Wildlife Shepherding Plan as part of the EMMP Workplan, in accordance with NParks' requirements, and providing technical support to the contractor in obtaining the necessary permits, approvals from the technical agencies;
- Conducting pre-clearance wildlife inspections to identify the presence of fauna species, active nests, burrows, or roosting sites within the work area, and preparing the corresponding inspection reports for submission to the relevant authorities where required;
- Delivering fauna awareness training sessions to site personnel to ensure compliance with NParks' guidelines on wildlife protection, proper response procedures, and incident reporting protocols;
- Undertaking fauna assessment prior to the backfilling of the existing stream to ensure that no wildlife is trapped or adversely affected, and recommending appropriate mitigation measures where necessary;
- Carrying out wildlife trapping and relocation activities, where required, in accordance with NParks' approved methodology and permit conditions, and coordinating directly with NParks on relocation procedures and release sites;

- Promptly notifying NParks in the event that wildlife is observed, injured, or found deceased within the Project Site, in accordance with regulatory requirements; and
- Preparing and submitting the required Wildlife Incident Report and supporting documentation to NParks within the stipulated timeframe.

The EMMP consultant, together with the biodiversity specialists, are responsible for developing and training of the main contractor and all subcontractors in compliance with the EMMP.

Qualified Wildlife Management Specialist

As part of the EMMP Workplan, a certified Wildlife Management Specialist shall be engaged to undertake wildlife trapping and handling where necessary, particularly in situations where fauna is confined within the construction site. All trapping and relocation activities shall be conducted in accordance with NParks' guidelines, permit conditions, and approved methodologies to ensure humane handling and minimisation of stress to the animals.

The appointed Wildlife Management Specialist shall liaise directly with NParks to obtain the necessary approvals, confirm relocation protocols, and coordinate the release of wildlife at designated locations in compliance with regulatory requirements.

7.4 Training Requirements

Site personnel involved in implementation of the Construction Environmental Management and Monitoring Plan (CEMMP), including subcontractors, should be adequately trained (Table 7-1). Records of all training conducted should be maintained and should include:

- The name of the training provider;
- The name of the personnel receiving the training;
- The date of training; and
- Training topics.

Table 7-1: Training Requirements of Site Personnel

Training	Key Topics	Training Provider	Trainees	Frequency
Pre-construction training	EMMP Workplan requirements: • Key mitigation measures; • Key emergency contacts; • Emergency response protocols (e.g. spill response); • Approved clearance boundaries and tree-felling plans; • Identification of retained vegetation and no-entry areas; • Machinery access and material storage restrictions; • Stop-work and reporting procedures for accidental encroachment; and • Potential consequences of non-compliance.	EMMP Consultant	Site personnel, ECO, project manager, construction manager, site engineers	Once prior to the commencement of activities
	Biodiversity Awareness: • Common fauna which may be encountered and fauna response protocols; • Pre-felling requirements and directional clearance plans; • Key emergency contacts; • Directional clearance phases and wildlife exits; and • Good measures to prevent attracting wildlife.			
Refresher trainings	EMMP Workplan requirements and biodiversity awareness		Site personnel, ECO	Every six (6) months during construction phase

Training	Key Topics	Training Provider	Trainees	Frequency
Toolbox meetings	Brief reminders on key EMMP Workplan requirements and biodiversity awareness	Main contractor	Site personnel	Daily
Site inductions	• Site layout, including emergency exit routes; • Site rules; • Hazards and risk management; and • Emergency procedures and incident reporting.	Main contractor	Site personnel	Once prior to the commencement of activities, or upon a site personnel's first time entering a site

7.5 Reporting Requirements

Upon award of the Contract, the EMMP Team, in collaboration with the Main Contractor, shall develop a comprehensive EMMP Implementation Plan. This plan shall incorporate all relevant details and procedures pertaining to the EMMP. The EMMP shall include, but not be limited to, the following:

- Main contractor's organisation chart for members involved in the implementation of EMMP, including key emergency contacts responsible for managing environmental emergencies associated with the Project;
- Detailed environmental management procedures and timeline;
- Site management plan, which include storage plan, chemical inventory, etc.;
- Details and Method Statements for construction work;
- Hoarding Plan;
- General Emergency Response Plan;
- ECM Plans;
- Emergency Spill Response Plan;
- Flora Management Plan;
- Wildlife Shepherding Plan;
- Fauna Incident Response Plan;
- Waste Management Plan;
- Vector Management Plan;
- Light Management Plan (if nightworks are needed);
- Noise Management Plan (if nightworks are needed); and
- Frequency of EMMP inspections and reporting time schedules.

In addition to the EMMP, the additional reports that are required to be submitted are listed in Table 7-2.

Table 7-2: Reporting Requirements

Report	Key Report Contents	Reporting Agent	Frequency
ECO checklist	• Non-compliances and rectifications measures (if any) from daily site inspections.	ECO	Daily
Pre-construction rapid baseline survey	• Results of pre-construction environmental monitoring programmes to establish baselines.	EMMP Consultant	Before commencement of any works

Report	Key Report Contents	Reporting Agent	Frequency
EMMP Report	• Results of environmental monitoring programmes; • Results of flora, fauna, and arborist inspections, where applicable; • Records of environmental site inspections, non-compliances and rectifications measures (if any); and • Records of all environmental incidents and near miss, as well as any investigations and follow-up.	EMMP Consultant	Monthly
Post-construction EMMP Report	• Results of environmental monitoring programmes.	EMMP Consultant	To be in line with frequency of post-construction surveys, which are to be determined in consultation with HDB and JTC
Pre-felling fauna Inspection Report	• Area inspected; and • Findings (including photos) and recommended next steps.	EMMP Consultant	Before felling of any trees, with a validity period of seven (7) days
TSS and CCTV logs	• Data from TSS and CCTV monitoring at ECM discharge points.	ECO/Contractor	To be provided upon request in the event of non-compliance

7.6 Proposed EMMP

This section presents the key mitigation measures and monitoring regime which is recommended for implementation to address the construction and operation impacts of the Project. Section 7.6.1.1 outlines mitigation measures to be adopted during the planning process, while Section 7.6.1.2 and Section 7.6.1.3 outlines mitigation measures to address the construction and operation impacts respectively. Section 7.6.2 outlines the monitoring regime to be implemented to monitor environmental parameters (e.g. water quality, air quality) and the implementation of mitigation measures to address construction impacts. These include monitoring during the pre-construction, construction, and post-construction phases. Section 7.6.2.1 outlines the monitoring regime to be implemented to monitor environmental parameters and mitigation measures to address operation impacts.

7.6.1 Mitigation and Management Plan

7.6.1.1 Pre-Construction Phase

Table 7-3: Pre-Construction Phase Mitigation and Management Plan

Environmental Aspect	Proposed Mitigation Measure	Implementation Agent
Noise Emission	• Development of Noise Management Plan prior to commencement of construction activities. The plan shall be incorporated into the EMMP /CEMMP Workplan for approval by respective Technical Agencies.	Contractor EMMP Consultant
	• Contractor shall appoint ECO to oversee and ensure compliance with the applicable ambient noise limits in accordance with the Construction Noise Limit • ECO shall ensure that temporary noise barriers are installed and maintained along the Project boundary in accordance with NParks' requirements and the approved EMMP Work Plan.	Contractor ECO
Waste	• Preparation of Waste Management Plan by the contractor and implementation of the plan during construction. The plan should detail the site will be managed to minimise the generation of waste.	Contractor EMMP Consultant
Surface Water	• Contractor to set up the Earth Control Measures (ECM) with adequate silty water treatment capacity, designed by a Qualified Erosion Control Professional (QECP), with approval of the ECM Plan obtained before work commence from PUB and NParks	Contractor EMMP Consultant
	• Contractor to engage ECMO to ensure compliance of approved ECM Plan; • Ensure no uncontrolled runoff leaves the Project boundary.	Contractor EMMP Consultant
Terrestrial Flora	• Development and implementation of a Flora Management Plan to be incorporated into the overarching EMMP during construction phase.	EMMP Consultant

Environmental Aspect	Proposed Mitigation Measure	Implementation Agent
	• A detailed Tree Felling Plan should be prepared. The Tree Felling Plan should include trees within the Project Site and up to 15 m from the Project Site boundary.	EMMP Consultant
	• Engaging an ISA Certified Arborist/Flora Specialist to: ○ Consult with NParks on the species they would like to have salvaged and the number of individuals or areas to be salvaged. If plant salvaging is to be carried out, it should be done before any construction works begin; ○ Verify and assess the affected vegetation at the site according to the tree felling plan, identify any seedlings/saplings with conservation significance for salvaging or trees with conservation significance for transplanting; ○ Identification of suitable species and seed collection, vegetative cuttings, and propagation for habitat restoration; ○ Prepare a method statement for tree transplanting including further detailed surveys on the tree's health, proposed transplanting location, and likelihood of tree survival; ○ Prepare and submit a tree felling/transplanting plan (if needed) and detailed method statement for approval.	Contractor EMMP Consultant Arborist
Terrestrial Fauna	• A wildlife shepherding plan should be developed by the Contractor/EMMP Consultant as part of a fauna management plan. This plan will be used to shepherd the wildlife to the areas that would be cleared last in the planned sequence of clearing, so that they can escape on their own or be trapped for translocation. • Wildlife will be shepherded away from the Project Site construction as well as other adjacent build areas and towards forested areas to the north and west of the Project. • The wildlife shepherding plan should detail direction of forest clearance and the hoarding plan and be consistent with other shepherding plans in place in adjacent developments.	Contractor EMMP Consultant
	• Preparation of a fauna response plan to ensure animals encountered are allowed to escape or be rescued/relocated. It should also detail the following:	EMMP Consultant

Environmental Aspect	Proposed Mitigation Measure	Implementation Agent
	○ Emergency protocol in the event of fauna related incidents such as snake or insects' attack/bites, etc.; ○ Should animals be observed/found within the site, works are to be stopped to allow animals to escape, where possible; and ○ If animal is unable to escape/herded off on its own, the ECO shall immediately contact the EMMP/environmental consultant and a qualified wildlife handler to relocate the animal.	
	• Development of Light Management Plan in the event there would be night works. This should be included into the overarching EMMP covering the following aspects: ○ Expected night construction works; ○ Light pollution impacts on sensitive receptors, wildlife and mitigation measures; ○ Specifications and locations for implementation of artificial lights; ○ Operation and management of artificial lights; ○ Other mitigation measures (e.g., hoarding, position and height of lights, etc.); and ○ Monitoring regime and site inspections.	Contractor EMMP Consultant
Aquatic Fauna	• Contractor shall engage a qualified Fauna Specialist to conduct an aquatic fauna assessment and, where critical or protected species are identified, coordinate directly with NParks on the appropriate relocation procedures in accordance with regulatory requirements.	Contractor EMMP Consultant Fauna Specialist

7.6.1.1.1 Directional Clearance and Wildlife Shepherding Plan

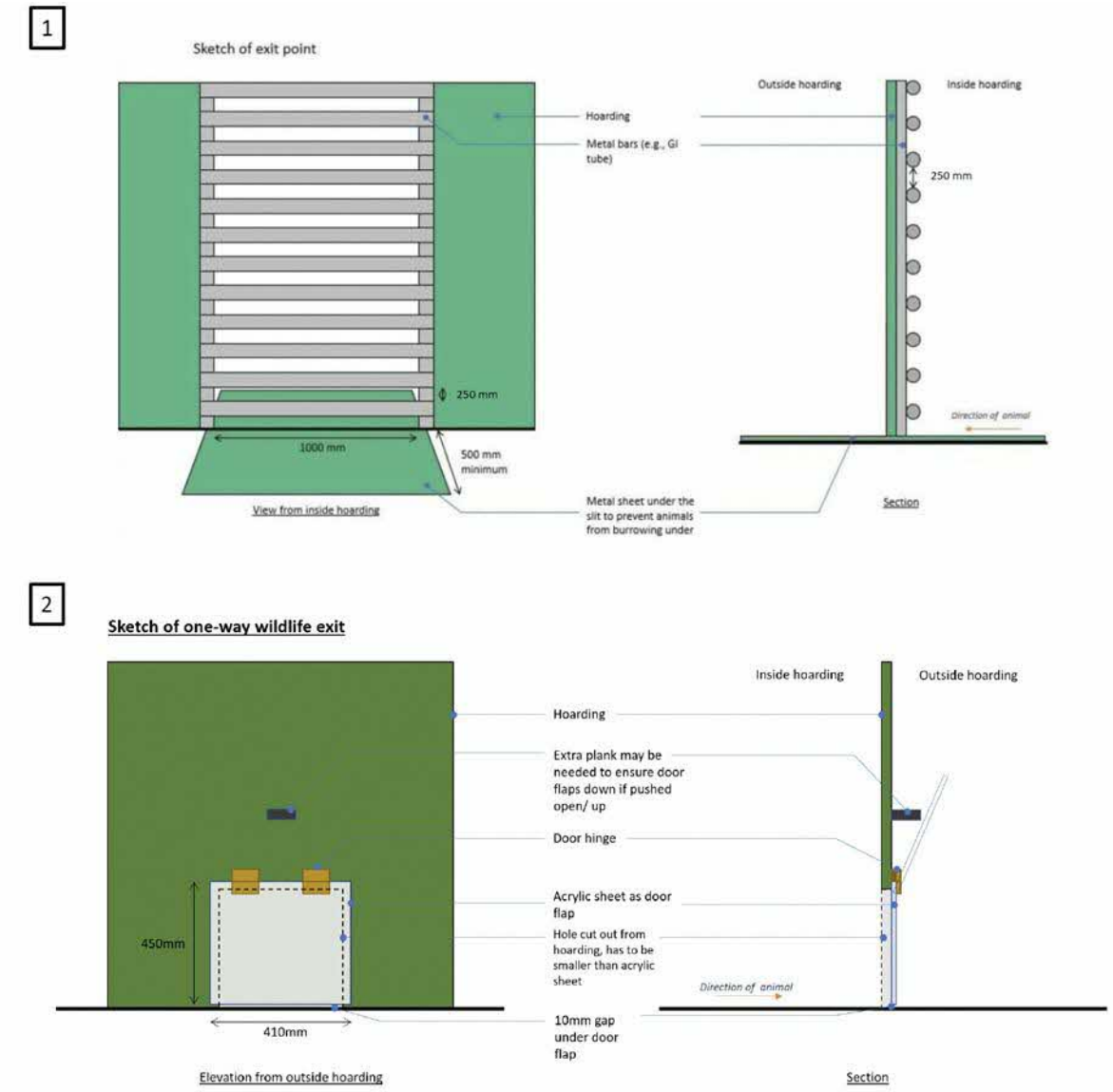
A preliminary Directional Clearance and Wildlife Shepherding Plan has been developed for the Project Site in accordance with the NParks BIA Guidelines (2024). The plan is intended to reduce fauna injury, entrapment and displacement towards roads or developed areas during vegetation clearance. The detailed clearance schedule, hoarding arrangement and wildlife exit locations will be confirmed in the CEMMP before works commence.

As shown in Figure 7-3, the Project Site is divided into seven clearance phases, with clearance progressing generally from east to west and towards the northern vegetated areas and proposed RAC. This sequence was selected to direct fauna away from the more disturbed eastern and central parts of the Project Site, including the future MRT station and viaduct, and towards adjoining vegetation along the northern and western boundaries. The phase boundaries, arrows and wildlife exits shown in Figure 7-3 are indicative and will be checked against the final construction programme, topography, hoarding layout and surrounding site conditions in the CEMMP.

Within each phase, vegetation clearance will proceed towards the intended receiving habitat. Opaque temporary hoarding without gaps will be installed between active and cleared phases to guide fauna towards the open side of the active clearance area and prevent re-entry into completed sections. Wildlife exits will be located along the forested boundary and kept free of construction materials, excavations and other obstructions. Where full perimeter hoarding is required due to wild boar concerns, the hoarding and wildlife exits will be installed in accordance with NParks requirements, including exits at approximately 30 m intervals along the forested edge where applicable. An example of the wildlife exit design provided in the NParks BIA Guidelines is shown in Figure 7-2. The final dimensions and placement of the exits will be confirmed during detailed planning and consultation with NParks.

Clearance within each phase will be undertaken in two stages. Understorey, shrubs and trees not exceeding 1 m girth will first be cleared, followed by a fallow period of at least three days before tree felling. Where an excavator is used, a worker will be stationed ahead of the machinery to regulate its speed, check for fauna, burrows and shelters, and stop works when necessary. Horticultural waste will be removed on the same day, while waterbodies, culverts and other potential shelters within the active phase will be temporarily secured where required to reduce fauna re-entry.

Pre-felling fauna inspections will be conducted by qualified ecologists no more than seven days before tree felling. The inspections will check for active bird nests, tree hollows, bat roosts and less-mobile fauna resting within the vegetation. Active nests will be monitored until they are vacated. Ecological supervision will also be provided during active clearance, and works will stop if fauna is encountered in the path of clearance. Fauna will first be allowed or guided to leave through the designated exit. Where an animal is trapped, injured or cannot be safely guided out, an approved wildlife management company will be engaged. These measures will be repeated for each clearance phase, with regular CEMMP inspections undertaken to confirm that the hoarding, exits and clearance sequence remain effective.



Source: NParks BIA Guidelines & Camphora

Figure 7-2: Example of Wildlife Exit Design for Installation on Full Permanent Hoarding

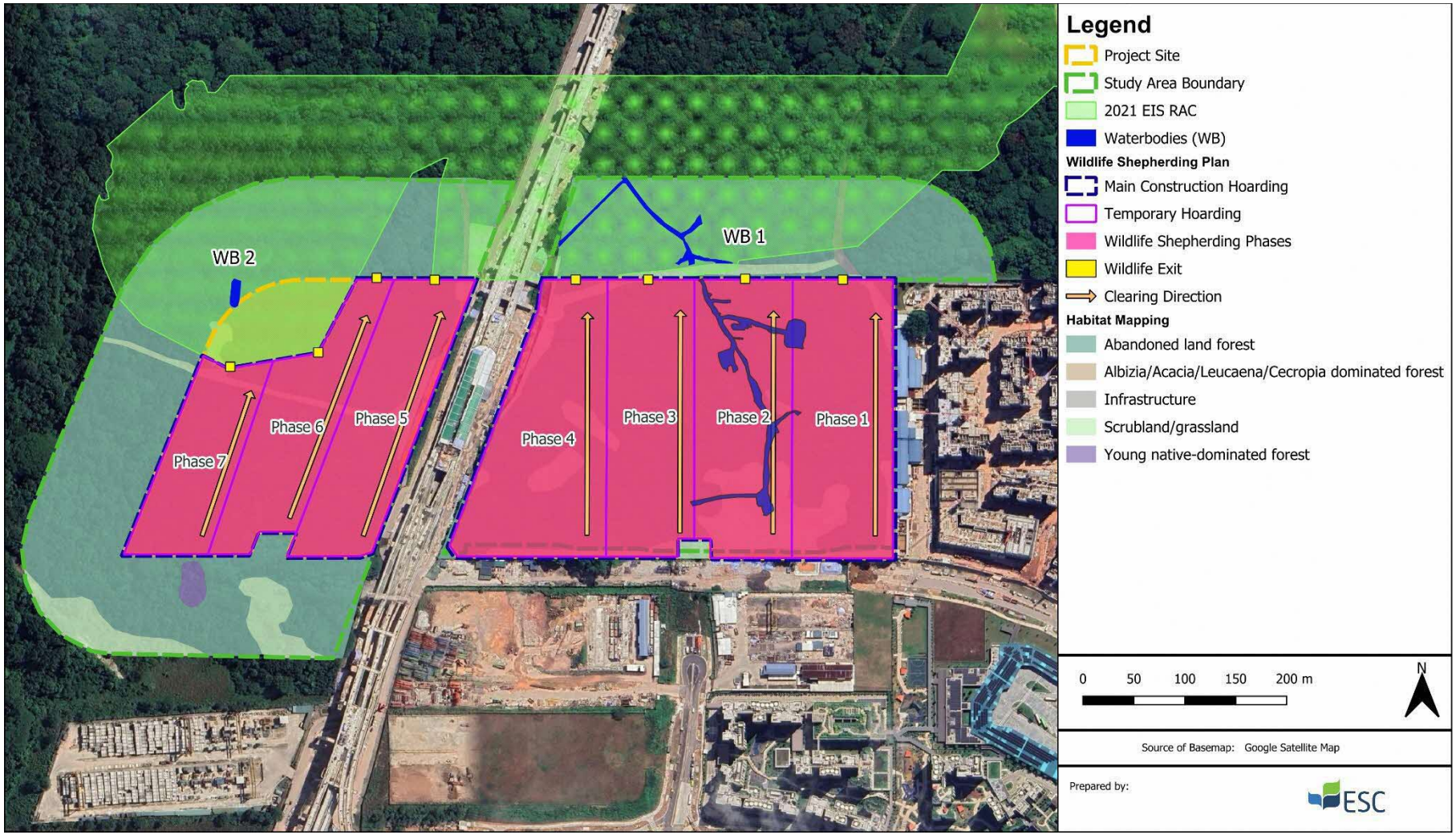


Figure 7-3: Directional Clearance and Wildlife Shepherding Map

7.6.1.2 Construction Phase

Table 7-4: Construction Phase Mitigation and Management Plan

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
Surface Water Quality	Sedimentation and contamination from surface runoff	• Implementation of Earth Control Measures (ECM) with adequate silty water treatment capacity, designed by a Qualified Erosion Control Professional (QECP), with approval of the ECM Plan obtained before work commences; • Engagement of an ECM Officer (ECMO) to ensure compliance with approved ECM Plans; • Establishment of a Spill Contingency Plan (where fuel, oil, chemicals, or wet works are involved on site) to manage accidental releases from refuelling, equipment leaks, concrete works, or chemical use, and to prevent contamination of surface runoff and receiving water bodies.; • Installation of perimeter drains to channel site runoff to ECM treatment systems, with silt fences or sediment traps along drain perimeters; • Deployment of biodegradable Erosion Control Blankets (ECBs) on excavated areas, with standby blankets prepared for rainfall events; • Planning of earthworks in consideration of rainfall patterns to minimise exposed soil during monsoon seasons; • Restriction of construction machinery to designated access paths and re-turfing of excavated areas upon completion; • Compliance of ECM effluent with the Sewerage and Drainage (Surface Water Drainage) Regulations; • Provision of standby spill kits and an on-site emergency response team;	Project Site	Contractor (ECO) EMMP Consultant

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
		• Provision of drip trays or secondary containment in areas used for on-site refuelling of machinery and vehicles; • Use of containers ≤1 L capacity with funnels for refilling of machinery fluids; • Regular maintenance of heavy machinery, equipment, and vehicles to prevent leakage of fluids and lubricants; • Storage of chemicals in designated sheltered areas with secondary containment, clear signage, and raised platforms; and • Provision of secondary containment with 110% capacity for fuel, chemical, and liquid waste storage containers.		
Terrestrial Flora	Habitat loss	• The Project will require full site clearance, including the removal of all existing trees and vegetation within the Project boundary. • As the Project Site is fixed and no avoidance, minimisation, or ecological offset measures are proposed, the loss of terrestrial flora habitat is considered unavoidable. Accordingly, no site-specific mitigation measures are identified for habitat retention within the Project Site, other than compliance with approved tree felling permits and compensatory planting requirements, where applicable. • Before vegetation clearance begins, the approved clearance boundaries and areas of retained vegetation shall be clearly marked on site using visible boundary markers, temporary fencing or hoarding, as appropriate. The markings shall be checked against the approved tree-felling and site clearance plans before each clearance phase commences.	Project Site	Contractor (ECO) EMMP Consultant

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
		• Retained vegetation and areas outside the approved clearance boundary shall be treated as no-entry and no-clearance areas. Machinery, materials and horticultural waste shall not be placed within these areas. • Personnel involved in vegetation clearance shall be briefed before each clearance phase and during the relevant daily toolbox meetings. The briefing shall cover the approved clearance limits, retained vegetation, permitted machinery access, clearance direction, wildlife exits, pre-felling checks and stop-work procedures. • Works shall stop if the clearance boundary is unclear, fauna or active nests are encountered, or clearance may extend beyond the approved limits. Any accidental damage or encroachment shall be reported immediately to the site manager and Environmental Control Officer for corrective action.		
	Reduction of flora population	• Removal of trees should be minimised as far as possible and kept within the Project Site based on the Flora Management Plan. If vegetation removal or trimming will be required outside the Project Site, a certified arborist should be consulted. Discussions should be carried out between the contractor and arborist to determine which areas should be trimmed to minimise the impacts on surrounding flora; • Conservation-significant plant species should be transplanted from areas that are to be cleared, where feasible or if plants cannot be transplanted then seeds collected and propagated to be planted in the RAC; • Plants to be transplanted should be clearly marked individually or by area on site; and • Transplanting should be carried out by qualified contractor and supervised by Arborist.	Project Site	Contractor (ECO) EMMP Consultant ISA Certified Arborist / Flora Specialist

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
	Habitat degradation and edge effects	• Hoarding should be installed along the periphery of the Project Site; • Ensure all access roads are within the hoarded area to prevent encroachment into surrounding vegetation; and • No unauthorised vegetation clearing should be done outside the Project boundaries.	Project Site	Contractor (ECO) EMMP Consultant
Terrestrial Fauna	Habitat loss and fauna displacement	• Prior to any tree felling, shrub or vegetation clearance, pre-felling inspection of the site should be carried out for the presence of active bird nests, holes, or fauna; • Clearing of trees should be carried out in a directional manner and be within the Project Site; • Trapping of wildlife, if required, should be done by a qualified wildlife handler; and • Fauna / biodiversity awareness briefing once every six months (semi-annually) to site staff to elaborate on fauna species that may be observed around site and response plans if such fauna is spotted. Site personnel and construction workers should be briefed on the fauna response protocols, fauna management protocol, and proper construction management practices prior to commencement of works and periodically (refresher briefings) over the course of the construction.	Project Site	Contractor (ECO) EMMP Consultant
	Disruption of wildlife behaviour due to noise	• Engagement of an Environmental Control Officer (ECO) to oversee and enforce compliance with maximum permissible levels and implementation of mitigation measures; • Adhere to NEA's Maximum Permissible Noise Levels for Construction Work;	Project Site	Contractor (ECO) EMMP Consultant

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
		• Installation of hoarding around work zones to reduce noise propagation to surrounding areas; • Selection of construction equipment and methods that generate lower noise levels, in accordance with Singapore standards, where necessary to achieve permissible limits; • Fully switching off vehicles and machinery when not in use; • Regular maintenance and proper operation of all equipment, machinery, and vehicles to avoid excessive noise emissions; • Consider conducting construction works as far as practically possible from the forest edges during peak bird activity season; and • Placing noisy machinery as far as possible from forest or vegetation edges.		
	Roadkill and human wildlife conflict	• Adhere to the proposed mitigation measures for habitat loss and fauna displacement to reduce injury and mortality of fauna; • Install barriers with minimal entry points around the Project Site to prevent animals entering the site and reduce potential roadkill and human-wildlife conflict. Equipment and works should be within the Project Site to prevent encroachment into the forested areas; • Implementation and enforcement of maximum speed limits within the site. A suggested maximum speed limit of 30 km/h is recommended within the site to provide drivers sufficient time to response to wildlife movements, especially along access roads adjacent to the forest. • Daily inspections shall be conducted to check for potential fauna entrapment within the Project Site boundary, designated buffer areas, and ECM ponds, to ensure timely detection and appropriate mitigation of any trapped wildlife;	Project Site	Contractor (ECO) EMMP Consultant

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
		• Every incident of human-wildlife conflict or animal encounter that requires intervention shall be documented and reported to the appointed EMMP consultant. The EMMP consultant shall then review the incident and recommend additional measures where necessary; and • Fauna shall be closely monitored until the impacts are deemed to be resolved; any observations of dead fauna (e.g., birds, bats, large reptiles or mammals) should be recorded and reported.		
	Light Pollution	• Any planned night works to be carried out in conjunction with a Lighting Management Plan (LMP) approved by the relevant Technical Agencies; • Restricted use of ultraviolet lights and lights of short wavelengths (below 380 nm). Positioning of light sources at elevated heights and shielding or focusing within construction areas to reduce light pollution beyond the site. Lights to be dimmed or fully switched off outside working hours or when tasks decrease or cease; • Positioning of lights at building height for mechanical and electrical works, and installation of lights close to the ground surface for ground-level works; and • Orientation of lights away from the forest edge, with light screens installed to minimise spillover into adjacent forest during night works.	Project Site	Contractor (ECO) EMMP Consultant

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
Aquatic Fauna	Loss of Habitat and Population of Aquatic-dependent Fauna Species	• Where reasonably practicable, vegetation clearance and backfilling of the existing stream shall be scheduled during the dry season to minimise adverse impacts on aquatic fauna. Notwithstanding such scheduling, the complete backfilling of the waterbody will result in the permanent loss of aquatic habitat within the Project Site. • Conduct the pre-clearance fauna survey prior to the dewatering or infilling of existing waterbodies • Aquatic fauna salvage operations shall be undertaken by a qualified Fauna Specialist. • Salvage methodology, including capture techniques, handling procedures, relocation methodology and identified recipient site(s), shall be submitted to NParks for review and approval prior to implementation. • All salvage activities shall be systematically documented, including species identification, number of individuals relocated, relocation site details, and photographic records.	Project Site	Contractor (ECO) EMMP Consultant
Waste Generation	Waste Generated from Vegetation Clearance	• Documentation of waste designated for off-site disposal, including type, quantity, recipient, and destination, with full inventory records maintained during construction; • Engagement of a full-time ECO to oversee waste handling on site during construction; • Separate storage of vegetation waste from mixed construction debris and other wastes; • Storage of vegetation stockpiles in dry and covered conditions;	Project Site	Contractor (ECO)

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
		• Prompt removal of vegetation stockpiles from site; • Off-site disposal of vegetation waste only through licensed horticultural waste collectors in accordance with Singapore regulations; • Dissemination of relevant Waste Management Plan information to individual site workers.		
	General construction waste	• Segregation of all construction waste by type (e.g., concrete, metals, paper), with incompatible waste stored separately; • Recovery or recycling of waste on-site where possible (e.g., cardboard, metal, recyclable plastics, pallets), and engagement of external companies for waste not handled on-site; • Proper storage of all waste, especially sharp objects, with caps and lockers where needed; • Prompt removal of construction waste from site; and • Reuse of excavation spoil as backfill, embankment, or site levelling material where suitable.	Project Site	Contractor (ECO)
	Hazardous general construction waste	• Placement of waste and material storage facilities within the hoarding area on paved ground or steel plates, with kerbs provided to prevent spillage or polluted runoff; • Maintenance of fit-for-purpose waste storage facilities to ensure containers can hold predicted hazardous waste volumes without risk to the environment or human health;	Project Site	Contractor (ECO)

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
		• Provision of secondary containment with 110 % capacity for all chemical or liquid waste on site, with no waste, chemicals, or materials placed beyond the site or near tree roots; • Storage of small amounts of hazardous fluids in a locked hazardous material storage box during site operations and mobilisation/demobilisation; • Off-site disposal of hazardous waste only through licensed collectors in accordance with Singapore regulations; and • Scheduling of regular waste removal, particularly organic and potentially hazardous materials, to prevent waste from entering nearby waters.		
	Solid domestic waste	• Use of wildlife-proof waste bins and storage facilities to prevent scattering of waste; • Ensure waste storage bins are kept closed and in good condition; • Regular collection of waste for offsite disposal; • Clear labelling of bins for domestic waste (general waste, recyclables, and food/organic waste); and • Regular cleaning of waste storage areas to remove food residues and prevent odour generation.	Project Site	Contractor (ECO)
	Sewage waste	• Provision of sufficient portable toilets; and • Regular cleaning of portable toilets and collection of sanitary waste for offsite disposal.	Project Site	Contractor (ECO)

7.6.1.3 Operation Phase

Table 7-5: Operation Phase Mitigation and Management Plan

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
Terrestrial Flora	Edge effects and human disturbances	• Native planting shall be incorporated along the RAC edges and within the development landscape to enhance habitat continuity and strengthen ecological connectivity with surrounding green spaces; • Plants that were salvaged from the site should be planted back at suitable locations, and other native species plantings should be done within the retained forests, where feasible; and • Native hedge plant species should be planted along the edges of the development to deter unauthorised entry.	Project Site	HDB
Terrestrial Fauna	Disruption of wildlife behaviour	• Minimising unnecessary vehicle trips by optimising work schedules; • Promote the use of lower noise-generating vehicles such as electric vehicles; and • Promote the implementation of a no-idling rule for vehicles within the Project Site to avoid noise emissions from vehicles not in use.	Project Site	HDB
	Roadkill and human wildlife conflict	• Preparation of a fauna response plan to ensure animals encountered are allowed to escape or be rescued/relocated; • To record observations of dead fauna that are of interest (e.g., large birds, mammals, and reptiles) • Implementation and enforcement of low-speed limits within the residential estate roads;	Project Site	HDB

Environmental Aspect	Impact	Proposed Mitigation Measures	Location	Implementation Agent
		• Preparation and implementation of a Fauna Response Plan during operation to manage wildlife encounters; • Public awareness outreach to residents on wildlife presence and appropriate response protocols; and • Recording and monitoring of roadkill incidents, by Town Council or public reporting, to identify hotspots and implement adaptive management measures.		

7.6.2 Monitoring Plan

Construction Phase

Table 7-6: Construction Phase Monitoring Plan

Environmental Aspect	Impact	Proposed Monitoring Measures	Monitoring Location	Recommended Frequency
Noise Emission	Noise emission from construction activities	• Establish continuous noise monitoring at designated noise-sensitive receptors to ensure compliance with NEA's Construction Noise Emission Requirements; • Schedule high-impact construction activities during less noise-sensitive periods and implement appropriate engineering controls, including temporary noise barriers, acoustic screens, or enclosures, where required; • Install the noise barriers and maintain noise mitigation measures in accordance with the approved EMMP Workplan and conditions by NParks and NEA; • ECO to conducts regular worker briefings on noise management practices and implements soft-start procedures for high-noise machinery to minimise sudden acoustic disturbances; and • Designate and manage specific haul routes for heavy vehicles to reduce noise propagation, minimise disturbance to adjacent sensitive receptors, and avoid interference with identified fauna movement pathways; and	Within Project Site Up to 15 m outside of site hoarding	Daily
		• ECO shall compile and submit the monitored noise data to the EMMP Consultant for review, analysis, and compliance		Monthly

Environmental Aspect	Impact	Proposed Monitoring Measures	Monitoring Location	Recommended Frequency
		assessment in accordance with the approved monitoring programme and reporting requirements. • EMMP consultant to analyse monthly noise data to ensure noise emission from the construction activities have been effectively controlled by the contractor.		
Terrestrial Flora	All impacts to terrestrial flora	• ECO to inspect vegetation and trees immediately surrounding the construction site during and after tree-felling/vegetation clearance to ensure no erroneous removal or damage to surrounding trees/vegetation; and • Contractor to inform HDB/ EMMP consultant and NParks should there be any damages or erroneous removal of vegetation.	Within Project Site Up to 15 m outside of site hoarding	Before and after tree-felling and vegetation clearance
		• EMMP Consultant (Arborist/Flora Specialist) to carry out site supervision when construction works are carried out near sensitive vegetation to ensure that surrounding terrestrial flora are not negatively impacted.	Up to 15 m outside of site hoarding	As needed
		• EMMP Consultant to carry out monthly site inspection to ensure environmental mitigation measures have been correctly implemented by the contractor on site; and • Monitoring trees/vegetation up to 15 m outside of site hoarding study boundary.	Within Project Site Up to 15 m outside of site hoarding	Monthly

Environmental Aspect	Impact	Proposed Monitoring Measures	Monitoring Location	Recommended Frequency
Terrestrial Fauna	All impacts on terrestrial fauna	• EMMP Consultant to carry out monthly site inspection to ensure appropriate measures are adhered to, and to check for any animals present within the site; • Monitoring trees/vegetation within the Project Site boundary and up to 15 m outside of site hoarding study boundary; and • Conduct roadkill surveys in accordance with EMMP.	Within Project Site	Monthly site inspections
	Habitat loss and fauna displacement	• ECO along with the EMMP Consultant (Fauna Specialist) are to conduct pre-felling inspections prior to any clearance of shrub or trees.	Within Project Site	Before felling
	Roadkill and human-wildlife conflict	• Daily inspection to be conducted by the ECO to: • Check for the presence of any trapped/injured/dead fauna within and around the Project Site boundary. This includes checking for gaps in site hoarding which could be potential fauna entrapment; and • Checks within the site boundaries and along the access roads towards the site for any roadkill before the start and at the end of the working day.	Within Project Site Along access roads to the site	Daily
	Light pollution	• A night walk at the forest perimeter along the boundary separating the construction site and the adjacent forest should be conducted by ECO and fauna specialist after the artificial lights have been installed and inspect monthly for any sources of direct light spill from night works that are being carried out within the Project boundary; and	Along the perimeter of Project Site	After installation of artificial lights for night works

Environmental Aspect	Impact	Proposed Monitoring Measures	Monitoring Location	Recommended Frequency
		• If direct light bulbs are visible from the forest edge, curtains or louvre/light shields should be installed to shield lighting. Any non-compliance should be rectified within a week.		
Aquatic Fauna	Impact to aquatic fauna	• Conduct and document a pre-clearance aquatic fauna survey prior to drainage diversion, dewatering, or infilling works, including verification of any required salvage and relocation activities in accordance with authority approvals. • Monitor and supervise dewatering and infilling works on a daily basis during active waterbody works to ensure phased implementation, prevent fauna entrapment, and manage any wildlife encounters in accordance with approved protocols. • Inspect and maintain Earth Control Measures (ECM) regularly, particularly after rainfall events, to prevent sediment-laden runoff or pollution from entering adjacent drains and downstream watercourses. • Record monitoring findings and include them in the EMMP reporting, with prompt notification to the relevant authorities in the event of aquatic fauna injury, mortality, or water pollution incidents	Water bodies area within the Project Site	Before infilling works
Waste	Vegetation waste from site clearance	• Regular visual inspection at site by ECO, to report and rectify any waste management issues.	Within Project Site At waste collection and disposal sites	Daily
	Non-hazardous general construction waste	• EMMP Consultant to conduct monthly site inspection to ensure environmental mitigation measures have been effectively implemented by the contractor.	Within Project Site At waste collection and disposal sites	Monthly

Environmental Aspect	Impact	Proposed Monitoring Measures	Monitoring Location	Recommended Frequency
	Sewage waste	• Regular checks to ensure that sewage from portable toilets do not pollute the surrounding environment from accidental discharge.	Within Project Site Within the portable toilets area	Daily

7.6.2.1 Operation Phase

Table 7-7: Operation Phase Monitoring Plan

Environmental Aspect	Impact	Proposed Monitoring Measures	Monitoring Location	Recommended Frequency
Terrestrial Fauna	Roadkill and human-wildlife conflict	• Observations of dead fauna that are of interest (e.g., large birds, mammals, and reptiles) should be informed to NParks at Animal Response Centre (18004761600) by the communities/town council.	Roads within and along the perimeter of the Project Site	Daily

8 NATURE GROUP ENGAGEMENT

The findings of this EIA were presented during a Nature Group Engagement session, on 30 March 2026, as part of the stakeholder engagement process, with the objective of communicating baseline conditions, key ecological findings, and proposed mitigation measures, as well as to seek feedback on the assessment approach. All feedback made during the NG engagement was reviewed and considered in the refinement of the impact assessment and mitigation measures.

9 CONCLUSION

This EIA was undertaken to assess the potential environmental impacts associated with the proposed development at the Project Site. The assessment considered the existing environmental baseline conditions within the Study Area, evaluated the potential impacts arising from the construction and operational phases of the Project, and identified mitigation measures to avoid, minimise, and manage these impacts.

The assessment findings are based on field surveys, environmental monitoring, desktop review, and stakeholder consultation, with detailed baseline findings presented in Section 4 and impact assessments presented in Section 5.

The biodiversity baseline findings presented in Section 4.6 indicate that the Study Area is dominated by abandoned land forest, scrubland/grassland, and small patches of Albizia/Acacia/Leucaena/Cecropia-dominated vegetation typical of regenerating and disturbed habitats within the wider Tengah landscape. Fauna surveys recorded a range of avifauna, reptiles, amphibians, mammals, butterflies, and odonates, including several species of conservation significance. Nevertheless, the fauna community is largely dominated by widespread and disturbance-tolerant species commonly associated with secondary and urban-edge habitats. Freshwater habitats within the Study Area provide localised refuge and breeding habitats for selected aquatic and semi-aquatic fauna, while the north-western portion of the Project Site overlaps with the Recommended Area of Conservation (RAC) identified in the 2021 EIS, contributing to broader ecological connectivity with adjacent vegetated habitats.

The biodiversity impact assessment presented in Sections 5.4, 5.5 and 5.6 identified habitat loss, fragmentation, fauna displacement, disturbance from construction activities, lighting, noise and hydrological modification as the primary ecological impacts associated with the Project. Construction activities will result in permanent habitat loss and fauna displacement within the Project Site, together with temporary degradation of adjacent habitats and loss of regenerating vegetation and freshwater habitats. The habitat loss and fauna displacement impact is assessed as Moderate Negative both before and after mitigation. This reflects the Minor Negative magnitude of the direct habitat loss, the national/international importance of the fauna receptors, and the permanent, irrecoverable and cumulative nature of the impact. Fauna management measures can reduce the risk of injury and mortality but cannot replace the habitat removed.

At the wider landscape scale, the cumulative biodiversity assessment considered the progressive loss and fragmentation of secondary habitats associated with planned development across Tengah, including the interaction of the Project with Site 2, surrounding residential development, transport infrastructure and habitat areas proposed for retention. The permanent habitat loss arising from Site 1 forms part of this wider cumulative effect. Findings from Site 1 should therefore be carried forward into the Site 2 EIA and considered when assessing the overall function, extent and connectivity of retained habitats within the wider Tengah landscape.

The proposed mitigation measures presented in Section 7 include the implementation of a Wildlife Shepherding Plan, phased and directional vegetation clearance, a Fauna Response Plan, environmental awareness briefings, light management measures for night works, and proper protection and management of retained habitats and drainage features where applicable.

Implementation of the proposed mitigation measures is expected to reduce several biodiversity impacts. However, the permanent loss of vegetation and freshwater habitat within the Project Site cannot be fully avoided, and the Project will contribute to cumulative habitat loss and fragmentation across the wider Tengah area. These residual effects will require continued consideration through the planning of retained habitats, ecological connections and subsequent developments within Tengah.

The baseline findings for hydrology, surface water quality, ambient noise, and waste management are presented in Sections 4.3 to 4.4. The Project Site is currently influenced by surrounding construction activities, urban runoff, vehicular traffic, and other ongoing development activities within the wider Tengah area. Baseline monitoring generally reflects a disturbed urban-edge environment undergoing active development.

The impact assessments presented in Sections 5 identified that the primary construction-phase impacts include noise, sediment-laden runoff, accidental spills and leaks, drainage modification, and waste generation arising from vegetation clearance, earthworks, machinery operation, and general construction activities. Operational-phase impacts are expected to be comparatively lower and primarily associated with routine urban activities, traffic, municipal waste generation, and surface runoff from the completed development.

The mitigation measures presented in Section 7 include the implementation of erosion and sediment control measures, perimeter drainage and treatment systems, spill response procedures, an Air Pollution Control Plan, proper waste management practices, regular environmental monitoring, and implementation of good site practices during construction. With the implementation of these mitigation measures and environmental management controls, residual impacts for the physical environmental components are expected to remain temporary, localised, and manageable.

The EMMP, presented in Section 7, provides the framework for implementing mitigation measures, monitoring environmental performance, and ensuring compliance throughout the Project lifecycle. The EMMP includes environmental monitoring requirements, reporting procedures, incident response protocols, and adaptive management measures where necessary.

Overall, the proposed development will result in environmental impacts primarily associated with the construction phase, including habitat loss, fauna displacement, construction-related disturbance, surface runoff and noise. The recommended mitigation and environmental management measures are expected to avoid or reduce many of the disturbance and pollution impacts. Most residual impacts are expected to remain within the Slight to Moderate Negative Impact bands.

Of the residual impacts, permanent habitat loss and fauna displacement remain within the Moderate Negative Impact band after mitigation. This reflects the permanent removal of approximately 15.7 ha of vegetation, the presence of fauna species of national and international conservation importance, and cumulative habitat loss across the wider Tengah area. Further habitat avoidance and retention should be considered where practicable.

These findings relate to the Project-level assessment for Site 1 and do not constitute a complete assessment of biodiversity effects across the wider Tengah area or at the island-wide scale. Broader cumulative effects should be considered together with the findings of the Site 2 EIA, surrounding planned developments, retained habitat areas, transport infrastructure, and the relevant strategic land-use and biodiversity conservation planning processes.

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Appendix A Topography Data

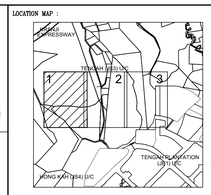
MATCHLINE 2 – 2
MATCHLINE 1 – 1

MK10-0457BP

MK10-0366BK

MATCHLINE 2 – 2
MATCHLINE 1 – 1

LOCATION MAP :



NOT TO SCALE

LEGEND:

- Palm Tree
- Slope
- Tree
- Tree No.
- Coconut Tree

NOTES :

1. Horizontal Datum is in SVY21 Datum
2. Levels are based on SLA SINGAPORE HEIGHT DATUM (SHD).
3. Tree names are identified to the best of our knowledge and should be verified by Specialist. (Trees with Girth exceeding 0.3m).
4. All dimensions shown hereon are in metres unless otherwise stated.

SCALE 1 : 500

METRES 0 10 20 30 40 METRES

CLIENT:

EnviroSolutions & Consulting
133 Cecil Street
#08-01A/01B Keck Seng Tower
Singapore 069535

SURVEYOR :

YJP SURVEYORS PTE LTD
10 GENTING ROAD
#05-00 THE BLUE Building
SINGAPORE 349473
TEL: 6743 0938 FAX: 6743 6732
Email: office@yjpsurveyors.com

PROJECT TITLE :

SPECIALIST CONSULTANCY SERVICES
FOR ENVIRONMENTAL IMPACT
ASSESSMENT (EIA) AT TENGAH NORTH

DRAWING TITLE :

TOPOGRAPHICAL SURVEY PLAN
(SHEET 1 OF 3)

DRAWING NO. :	YJPB0331-ESC-26-TP-01
SCALE :	AO – 1:500
DRAWN BY :	AZILA
CHECKED BY :	DENNIS

Derek Chan Wei Hoong
Registered Surveyor (Singapore)
M.S.I.S.V
BEng. (Hons) Surveying and Spatial Information System (Aust)

MATCHLINE 2 – 2
MATCHLINE 3 – 3

MATCHLINE 2 – 2
MATCHLINE 3 – 3

MATCHLINE 2 – 2
MATCHLINE 1 – 1

MATCHLINE 2 – 2
MATCHLINE 1 – 1

MK10-00260A

MK10-00262N

MK10-00260A Pt.

MK10-00261K

MK10-00719X

MK10-05328A

MK10-00718N

MK10-03672N

MK10-03592V

MK10-00721N

MK10-00720K

MK10-00481P

MK10-03552N

MK10-04580V Pt.

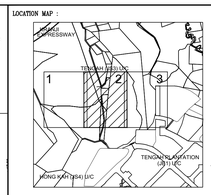
MK10-04580V

MK10-04578P Pt.

MK10-03668K Pt.

MK10-03668K

LOCATION MAP :



NOT TO SCALE

LEGEND:

- Palm Tree
- Slope
- Tree
- Tree No.
- Coconut Tree

NOTES :

1. Horizontal Datum is in SVY21 Datum
2. Levels are based on SLA SINGAPORE HEIGHT DATUM (SHD).
3. Tree names are identified to the best of our knowledge and should be verified by Specialist. (Trees with Girth exceeding 0.3m).
4. All dimensions shown hereon are in metres unless otherwise stated.

SCALE 1 : 500

METRES 0 10 20 30 40 METRES

CLIENT:

ESC **EnviroSolutions & Consulting**
133 Cecil Street
#08-01A/01B Keck Seng Tower
Singapore 069535

SURVEYOR :

YJP SURVEYORS PTE LTD
10 GENTING ROAD
#05–00 THE BLUE Building
SINGAPORE 349473
TEL: 6743 0938 FAX: 6743 6732
Email: office@yjpsurveyors.com

PROJECT TITLE :

SPECIALIST CONSULTANCY SERVICES FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AT TENGAH NORTH

DRAWING TITLE :

TOPOGRAPHICAL SURVEY PLAN (SHEET 2 OF 3)

DRAWING NO. :	YJP80331–ESC–26–TP–01
SCALE :	AO – 1:500
DRAWN BY :	AZILA
CHECKED BY :	DENNIS

Derek Chan Wei Hoong
Registered Surveyor (Singapore)
M.S.I.S.V.
BEng. (Hons) Surveying and Spatial Information System (Aust)

MK10-05446P

MK10-05464T

MK10-05514C

MK10-05442C

MK10-05322C

Building Line

Fence

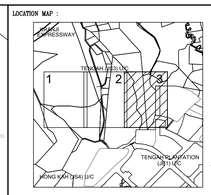
Footpath

Tenaga Area

MATCHLINE 2 – 2
MATCHLINE 3 – 3

MATCHLINE 2 – 2
MATCHLINE 3 – 3

LOCATION MAP :



NOT TO SCALE

LEGEND:

- Palm Tree
- Slope
- Tree
- Tree No.
- Coconut Tree

NOTES :

1. Horizontal Datum is in SVY21 Datum
2. Levels are based on SLA SINGAPORE HEIGHT DATUM (SHD).
3. Tree names are identified to the best of our knowledge and should be verified by Specialist. (Trees with Girth exceeding 0.3m).
4. All dimensions shown hereon are in metres unless otherwise stated.

SCALE 1 : 500

METRES 0 10 20 30 40 METRES

CLIENT:

EnviroSolutions & Consulting
133 Cecil Street
#08-01A/01B Keck Seng Tower
Singapore 069535

SURVEYOR :

YJP SURVEYORS PTE LTD
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TEL: 6743 0938 FAX: 6743 6732
Email: office@yjpsurveyors.com

PROJECT TITLE :

SPECIALIST CONSULTANCY SERVICES FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AT TENGAH NORTH

DRAWING TITLE :

TOPOGRAPHICAL SURVEY PLAN (SHEET 3 OF 3)

DRAWING NO. :	YJP80331-ESC-26-TP-01
SCALE :	AO – 1:500
DRAWN BY :	AZILA
CHECKED BY :	DENNIS

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BEng. (Hons) Surveying and Spatial Information System (Aust)

Appendix B Baseline Noise Monitoring Data

Noise Monitoring Report

Report Date : **08-Jan-26**

BCA Reference : -
Contractor's Name : EnviroSolutions & Consulting Pte Ltd
Project Title : Tengah North
Location Details : Tengah North Site 1
Sensor Reference : M1113N_ESC8-NM1
Monitoring Category : Category C - Other Buildings
Sensor Brand : Rion
Sensor Model : NL-52
Sensor Serial No. : 1287615
Calibration Date : 20-Jun-25
Start Date : 08-Jan-26
Latitude (deg) : 1.36676
Longitude (deg) : 103.72696
Altitude (m) : 0

Day	Time hr/min	Leq 5min												Leq 1hr /Accum	Leq 12hr /Accum	Current Dose %	Max Allow Leq 5min
		00	05	10	15	20	25	30	35	40	45	50	55				
Thu 08-Jan-26	7am	-	-	-	-	-	-	-	-	-	-	-	-	-	72.7	20.6	90
	8am	-	-	-	-	-	-	-	-	-	-	-	-	-			
	9am	-	-	-	-	-	-	-	-	-	-	-	-	-			
	10am	-	-	-	-	-	-	-	-	-	-	-	-	-			
	11am	-	-	-	-	-	-	-	-	-	-	-	-	-			
	12pm	-	-	-	-	-	-	-	-	-	-	-	-	-			
	1pm	-	-	-	-	-	-	-	-	-	-	-	-	-			
	2pm	-	-	-	-	-	-	-	-	-	-	79.2	88.8	86.2			
	3pm	58.1	60.3	58.9	51.2	75.1	63.7	76.2	61.3	52.2	53.8	53.7	55.6	68.3			
	4pm	54.5	52.7	52	51.5	51.7	52.4	52.3	52.3	57.6	50.6	52.4	51.7	53.1			
	5pm	51.8	51.9	51.9	52	52.3	52.8	52.2	52.1	52.8	53	52.6	52.1	52.3			
	6pm	51.9	53.1	52.1	51	50.1	51.7	52.3	51.9	53.2	51.4	51	51.1	51.8			
	7pm	50.4	49.8	50.8	51	57.5	57.4	59.1	53	52.9	54.8	54.9	53.9	54.8	52.9	6.1	70
	8pm	54.3	53.8	54.1	55.1	54.7	54.7	54.5	54.2	54.6	54.9	54.3	54.3	54.5			
	9pm	54.6	55.3	55.1	54.3	53.5	52.9	52.4	52.6	52.6	52.8	52.3	52.3	53.5			
	10pm	52.1	52.9	52.9	53.2	52.8	52.8	52.8	52.6	52.8	52.9	53.5	53	52.9			
	11pm	53.6	52.9	52.8	52.5	52.7	51.8	51.8	51.6	51.4	50.8	51.2	51	52.1			
Fri 09-Jan-26	12am	50.6	51	51.5	50.8	50.6	50.6	50.8	51.5	51.2	53.8	54.4	52.9	51.8			
	1am	51	51.2	54.9	54.3	54	53.7	54.4	53.3	53.3	51.6	52.9	51.6	53.2			
	2am	53.6	53.7	53.6	54	50.4	51.1	51.4	52.2	51.3	50.8	50.7	52.2	52.3			
	3am	52.2	51.9	52.5	53.3	52.2	52.2	51.6	51.7	51.7	51.3	51.7	51.6	52			
	4am	51.7	51.8	51.5	51.3	51.3	51.7	51.9	52	52	52.8	52.1	51.5	51.8			
	5am	51.2	51.4	51.6	51.2	52	54	56.3	55.5	53.4	51.6	52.3	51.8	53			
	6am	51.4	51.2	51.8	51.2	51.2	51.1	51.6	51.3	50.6	50.4	49.9	50.6	51.1			

LEGEND : NORMAL | Readings Above Permissible | Dose Above 70% | No Data recorded

Noise Monitoring Report

Report Date : **09-Jan-26**

BCA Reference : -
Contractor's Name : EnviroSolutions & Consulting Pte Ltd
Project Title : Tengah North
Location Details : Tengah North Site 1
Sensor Reference : M1113N_ESC8-NM1
Monitoring Category : Category C - Other Buildings
Sensor Brand : Rion
Sensor Model : NL-52
Sensor Serial No. : 1287615
Calibration Date : 20-Jun-25
Start Date : 08-Jan-26
Latitude (deg) : 1.36676
Longitude (deg) : 103.72696
Altitude (m) : 0

Day	Time hr/min	Leq 5min												Leq 1hr /Accum	Leq 12hr /Accum	Current Dose %	Max Allow Leq 5min
		00	05	10	15	20	25	30	35	40	45	50	55				
Fri 09-Jan-26	7am	50.2	50.4	51	54.1	56.5	57.3	53.7	58.5	61.2	54.2	58.1	54.5	56.2	53.3	0.7	90
	8am	52.3	50.5	49.6	49.8	48.9	50	50.1	49.1	49.5	49.8	50.8	50.6	50.2			
	9am	51	51.8	50.9	51.1	50.9	51.6	53.2	54.5	52.5	54.2	54.3	54.2	52.8			
	10am	53.3	53	52.5	52.4	52.7	52.5	51.7	52.4	52.3	52.5	53.8	55.6	53			
	11am	54.9	51.3	50.5	49.8	50.9	54.6	54.9	52.4	52.8	53.1	53.1	54.3	53			
	12pm	52.3	52.1	51.3	49.6	49.3	49.1	50.5	51.6	49.6	51.3	52	53.7	51.3			
	1pm	50.8	53.2	53.7	54.7	54.2	55.8	56.3	56.1	55.5	56.2	55.7	52.5	54.8			
	2pm	50.6	50.1	50.2	53.3	53.1	53.7	55	54.3	54.8	55	55.8	55.6	53.9			
	3pm	56	55.2	55.4	55.7	54.7	54.6	55	53.4	55.3	53.5	53.8	53.3	54.7			
	4pm	51.8	53.5	52.7	51.9	52.4	53.6	53.5	52.6	54.5	53.1	52.2	52.2	52.9			
	5pm	51.9	52.2	51.2	50.9	51.4	52.8	52.6	52.6	52.6	51.8	52.1	52.1	52.1			
	6pm	51.6	51.4	51.2	51	50.4	49.5	50	49.8	49.5	49.7	49.5	50.7	50.4			
	7pm	49.9	50	50	49.4	51.3	49.3	49.7	50.2	50.4	50.9	52.2	52	50.5	52	5	70
	8pm	52	52.4	52.3	52.2	52.9	52.9	52.6	53	53	52.7	52.7	52.8	52.6			
	9pm	53.2	53	53	52.9	52.8	52.7	52.8	52.6	52.8	52.5	53.2	53	52.9			
	10pm	54.1	52	52.4	52.4	52.2	52.2	52.2	52.7	52.9	52.8	51.9	51.7	52.5			
	11pm	51.9	52	51.9	52.5	52.9	53.3	52.9	52.7	52	51.8	51.6	51.8	52.3			
Sat 10-Jan-26	12am	52.2	51.9	51.2	51.6	51.7	51.3	51	51.7	51.4	51.6	52.3	52.3	51.7			
	1am	52.1	51.7	51.6	51.8	51.7	53	52.4	53.2	55.3	54	53.9	53.8	53			
	2am	54.5	53	53.3	53.6	52.3	50.9	51.3	51.3	50.8	51	53.1	51.2	52.4			
	3am	51.1	54.2	53.9	52.2	50.9	50.6	51.7	52.1	51.3	51.2	51.3	51.1	52			
	4am	51.5	51	51.1	50.9	51.3	51.2	51.2	51.4	51.3	51.3	51.6	50.5	51.2			
	5am	50.5	50.5	52	50.7	50.9	55.1	54.8	54.2	53.3	51.8	51.4	51.2	52.5			
	6am	51.3	50.2	49.5	49.1	49	49.1	48.6	48.6	49.4	47.6	47.7	49.2	49.2			

LEGEND : NORMAL | Readings Above Permissible | Dose Above 70% | No Data recorded

Noise Monitoring Report

Report Date : **10-Jan-26**

BCA Reference : -
Contractor's Name : EnviroSolutions & Consulting Pte Ltd
Project Title : Tengah North
Location Details : Tengah North Site 1
Sensor Reference : M1113N_ESC8-NM1
Monitoring Category : Category C - Other Buildings
Sensor Brand : Rion
Sensor Model : NL-52
Sensor Serial No. : 1287615
Calibration Date : 20-Jun-25
Start Date : 08-Jan-26
Latitude (deg) : 1.36676
Longitude (deg) : 103.72696
Altitude (m) : 0

Day	Time hr/min	Leq 5min												Leq 1hr /Accum	Leq 12hr /Accum	Current Dose %	Max Allow Leq 5min
		00	05	10	15	20	25	30	35	40	45	50	55				
Sat 10-Jan-26	7am	49	57.4	47.9	50.5	51.5	61.3	50.8	50.9	49.3	49.6	52.1	57.7	54.6	54.7	0.9	90
	8am	58.9	54	49.1	53.7	49.9	55.4	49.7	53.6	50.2	50.9	51.2	50.9	53.3			
	9am	56.9	52.3	51.7	52.1	63.2	61.3	54.2	59.8	53.4	52.1	53.4	50.4	57.2			
	10am	55.5	61.9	52	66	53.5	53.4	54.4	56.2	56.9	58.3	56.9	57.5	58.9			
	11am	53	52.1	53.3	54.2	52.2	51.9	53.7	51.6	53.3	54.5	53.4	53.5	53.1			
	12pm	52.4	52.7	52.3	56.9	53.2	53.2	54	53.8	53.1	53.6	53	53.9	53.7			
	1pm	53.1	54.3	55.1	55.3	55.3	56.4	55.8	55	54.5	54.9	54.8	54.6	55			
	2pm	55.1	53.7	55	57	53.1	56	54.6	54.5	51.2	53.4	53	52.8	54.4			
	3pm	52.6	53.1	55.3	52.1	53.7	54.4	54.5	54.3	53.6	53.2	51.9	52.1	53.5			
	4pm	53.1	53.5	53.3	52.6	51.7	52.4	54.5	54	54.3	54.9	54.2	54.6	53.7			
	5pm	54.6	53.9	50.6	51.8	50.8	50.5	50.3	51.2	50.9	49.6	50.2	49.8	51.5			
	6pm	49.7	50.7	49.9	50.1	49.7	49	47.8	47.6	48.8	48.5	49	48.6	49.2			
	7pm	48.1	48.2	48.5	47.4	48.2	49	58.4	48	48.7	48.9	51.5	52.8	51.4	51.6	4.5	70
	8pm	52.4	51.8	52	52.1	53.1	55.5	54.4	53.4	53.6	53.7	53	52.7	53.3			
	9pm	52.6	51.8	52.2	53	53	52.9	53	52.6	52.2	52.4	52.1	52.1	52.5			
	10pm	52.3	52.8	52.9	53.3	53.2	52.8	53.5	53	53	52.6	52.9	52.8	52.9			
	11pm	52.4	52.3	52	51.9	52.1	52.2	51.9	51.9	52.3	52.5	51.8	52	52.1			
Sun 11-Jan-26	12am	51.7	51.8	52.5	52.4	52.2	52.1	51.4	51.4	51.2	51.2	51.7	51.3	51.8			
	1am	50.7	50.9	50.7	51.8	51.9	51.3	51.1	51.5	51.2	51.3	50.8	51.1	51.2			
	2am	51.7	51.9	55.9	55.6	54.9	54.5	53.6	50.9	50.7	50	51.7	52.3	53.2			
	3am	51.5	51	50.7	49.6	49.6	49.6	50.7	50.6	50.2	49.9	49.6	49.5	50.3			
	4am	49.9	50	50	50	49.5	49.8	49.6	50	49.6	49.4	49.2	49.6	49.7			
	5am	49.2	49.2	49.4	49.5	49.9	49.2	49.2	49.3	48.8	50.4	48.7	47.7	49.3			
	6am	47.6	47.6	47.9	47.2	47	49.5	49.3	53.1	50.2	47.7	47.1	47	48.9			

LEGEND : NORMAL | Readings Above Permissible | Dose Above 70% | No Data recorded

Noise Monitoring Report

Report Date : **11-Jan-26**

BCA Reference : -
Contractor's Name : EnviroSolutions & Consulting Pte Ltd
Project Title : Tengah North
Location Details : Tengah North Site 1
Sensor Reference : M1113N_ESC8-NM1
Monitoring Category : Category C - Other Buildings
Sensor Brand : Rion
Sensor Model : NL-52
Sensor Serial No. : 1287615
Calibration Date : 20-Jun-25
Start Date : 08-Jan-26
Latitude (deg) : 1.36676
Longitude (deg) : 103.72696
Altitude (m) : 0

Day	Time hr/min	Leq 5min												Leq 1hr /Accum	Leq 12hr /Accum	Current Dose %	Max Allow Leq 5min
		00	05	10	15	20	25	30	35	40	45	50	55				
Sun 11-Jan-26	7am	47.4	48.2	48.4	50.1	59.9	50.8	47.1	50.3	49.5	48	47.1	47.5	-	51.9	0.5	90
	8am	47.7	46.4	47.1	49.4	46.4	47.8	47.6	47.8	50.1	50.5	48.5	49.8				
	9am	48.9	49.2	47.9	50	48.6	48.1	49.4	49.7	48.7	49.1	51.3	51.9				
	10am	51.6	51.8	51.7	-	53.5	53.2	50.5	50.9	51.5	53.4	53.1	51.7				
	11am	52.4	52	54.3	52.6	51.9	52.7	52.7	53.2	51.9	49.9	50.4	52.2				
	12pm	53.2	52.4	52.1	52.8	53	52.8	53.6	53	52	51.3	53.2	53.6				
	1pm	53.5	52.8	52.6	50.8	53.2	52.9	52.3	53.1	54.6	55.1	54.1	52.5				
	2pm	55.2	55.1	56.6	56.4	51.4	53.6	54.2	55	53	52.7	53.4	53.1				
	3pm	52.7	51.6	52.6	52.4	53.4	52.3	54.4	53.6	53.2	54.4	52.8	51.7				
	4pm	48.5	50.1	53.7	54	53.1	52.8	51.9	51.2	52	50	49.7	49.2				
	5pm	51.1	50.5	50.8	49.8	50.4	50.9	49.9	49.8	49.5	49.8	49.3	50.4				
	6pm	51.1	51.3	51.2	50.3	49.4	49.2	49.4	49.7	48.7	49	49.3	49.7				
	7pm	48	48.4	49.9	49.5	49.9	48.8	48.8	51.5	53.2	51.8	50.8	51.9	-	50.2	3.2	70
	8pm	52.1	52.7	52.6	52.3	52	51.5	51.2	51.8	51.8	51.7	52.1	52.1				
	9pm	51.6	51.9	52.1	52.2	52.1	51.8	52.7	51.7	51.8	52.2	51.6	51.2				
	10pm	51.8	51.9	51.6	51.2	51.5	52.6	51.9	51.7	51.5	50.8	51.3	55.6				
	11pm	52.7	50.3	50.1	49.4	49.3	49.8	49.9	50.1	50.1	52	52.1	52.1				
Mon 12-Jan-26	12am	52.1	49.6	49.7	50.6	49.7	49.1	49.6	49.5	48.9	50	49.8	49.1				
	1am	48.2	49.1	48.8	49.2	50.4	50.1	49.8	49.5	49.2	48.9	48.6	48				
	2am	47.5	47.4	47.5	47.6	47.8	49.9	47.8	47.5	48.1	49.2	48.8	48				
	3am	49.3	50.1	49.9	49.7	50.1	49.2	48.6	47.1	47.6	47.8	49.7	50.8				
	4am	49.4	46.8	46.8	47	47.3	47.5	49	46.9	47.1	47.3	47.2	47.1				
	5am	47.3	47.2	47.5	46.8	46.8	47.5	47.5	48.2	48.9	52.8	46.8	46.6				
	6am	47	47.2	47.6	48	48.1	47.7	47.9	52.2	50.5	49.9	48.9	48.8				

LEGEND : NORMAL | Readings Above Permissible | Dose Above 70% | No Data recorded

Noise Monitoring Report

Report Date : **12-Jan-26**

BCA Reference : -
Contractor's Name : EnviroSolutions & Consulting Pte Ltd
Project Title : Tengah North
Location Details : Tengah North Site 1
Sensor Reference : M1113N_ESC8-NM1
Monitoring Category : Category C - Other Buildings
Sensor Brand : Rion
Sensor Model : NL-52
Sensor Serial No. : 1287615
Calibration Date : 20-Jun-25
Start Date : 08-Jan-26
Latitude (deg) : 1.36676
Longitude (deg) : 103.72696
Altitude (m) : 0

Day	Time hr/min	Leq 5min												Leq 1hr /Accum	Leq 12hr /Accum	Current Dose %	Max Allow Leq 5min
		00	05	10	15	20	25	30	35	40	45	50	55				
Mon 12-Jan-26	7am	49.4	48.3	48.4	48.8	48.8	49.7	49.4	49.4	56.4	49	47.9	48.6	50.3	63.1	6.5	90
	8am	48.3	50.5	49.2	51	50.8	48.7	48.1	49.9	50.5	49.7	50.6	51	50			
	9am	51.3	50.7	50.7	51	51.8	52.2	53.2	53.2	53	52.8	53.2	53.1	52.3			
	10am	69.5	69.5	58.5	55.3	54.9	55.8	55.3	66.1	56	55.4	64.2	71.6	65.4			
	11am	74.1	54.9	53.4	53.8	53.3	53.2	53.7	54.5	55.2	55.7	54.7	55.1	63.8			
	12pm	56.7	61	53.9	53.6	53.9	54.7	58	57.7	54.1	53.3	54.3	51.8	56.1			
	1pm	60.7	72.2	68.8	69.6	57.3	56.5	69.1	63	70.7	57.8	68.2	58.6	67.4			
	2pm	67.3	70.5	59	75.3	67.6	55	66.7	63.3	53.9	53.4	55.1	54.1	67.4			
	3pm	54.3	64	65.1	52.7	54.8	65.4	53.1	63.2	55.4	53.5	51.4	51.6	60.4			
	4pm	75.6	51.7	52.7	57.7	52.7	56.4	54.3	67.9	54.5	56.3	54.4	53	65.8			
	5pm	67.1	72.8	52.3	53.9	52.6	56.3	51	52	50.4	50.6	51.6	52.7	63.4			
	6pm	58.2	56.1	52	49.2	50.5	49.2	50	50.4	49.8	50.8	51.6	50.9	52.6			
	7pm	56.4	52.4	50.8	50.1	50.7	52.6	53	52.5	50.4	54.1	56.4	54.1	53.3	54	7.9	70
	8pm	53.9	54.7	52.9	54.4	53.7	70.5	67.3	53.9	53.4	52.2	51.7	57.5	62			
	9pm	53.1	51.4	50.6	51.4	55.9	52.7	65.2	51.7	51.5	52	52.1	51.3	56.4			
	10pm	50.9	50.2	50	50.8	50.7	51.1	51.6	51.3	50.8	50.7	50.3	49.8	50.7			
	11pm	50.2	50.3	50.1	51	49.4	48.7	48.7	50	51.1	51.8	50.6	50.5	50.3			
Tue 13-Jan-26	12am	50.3	49.8	48.7	49.3	49.1	48.2	47.9	48.1	47.7	50.4	51.1	47.4	49.2			
	1am	47.4	47	49.6	51.4	51.2	48.1	48.5	48.2	49.6	49.8	49.9	48.7	49.3			
	2am	47.7	47.9	47.7	49.3	48.1	47.8	47.6	47.7	51.3	47.8	49	47.2	48.4			
	3am	47.3	47	46.3	46.9	48.3	48.2	47.4	47.8	48	46.7	47.4	49.6	47.7			
	4am	49.6	47.5	47.5	47.6	47.9	48	49	48.1	48.5	48.1	48.1	49.1	48.3			
	5am	48.8	48.8	49.5	48.2	47.8	49.1	48.9	48.9	48.2	49.1	48.6	48.3	48.7			
	6am	48.5	48.4	48.4	48.4	47.7	50.1	48.1	51.7	55.5	48.4	47.6	48.4	50			

LEGEND : NORMAL | Readings Above Permissible | Dose Above 70% | No Data recorded

Noise Monitoring Report

Report Date : **13-Jan-26**

BCA Reference : -
Contractor's Name : EnviroSolutions & Consulting Pte Ltd
Project Title : Tengah North
Location Details : Tengah North Site 1
Sensor Reference : M1113N_ESC8-NM1
Monitoring Category : Category C - Other Buildings
Sensor Brand : Rion
Sensor Model : NL-52
Sensor Serial No. : 1287615
Calibration Date : 20-Jun-25
Start Date : 08-Jan-26
Latitude (deg) : 1.36676
Longitude (deg) : 103.72696
Altitude (m) : 0

Day	Time hr/min	Leq 5min												Leq 1hr /Accum	Leq 12hr /Accum	Current Dose %	Max Allow Leq 5min
		00	05	10	15	20	25	30	35	40	45	50	55				
Tue 13-Jan-26	7am	48.4	49.4	54.4	52.6	53.3	49.3	62.1	54.5	52.8	47.2	48.5	46.1	54.2	58.4	2.2	90
	8am	46.6	46.5	47.7	46.3	46.3	46.8	47.4	47.2	48.2	48.4	49.6	50.9	47.9			
	9am	49.4	49.1	58	51.4	50.4	52	53.2	65.7	53.8	53.6	52.6	60.2	57.6			
	10am	66.7	52.4	52.6	51.9	51.8	51.7	52.1	52.1	52.2	52.9	52.2	53.6	57.4			
	11am	54.9	54.3	53.2	54.1	55.7	54.8	55	54.7	54.7	53.3	53	54	54.4			
	12pm	52.8	53.6	54.6	52.1	58	52.2	57.6	64.4	57.7	67.6	59	64.2	60.9			
	1pm	52	53.7	56.1	52.7	53.6	55.7	58.8	55.4	71.5	52.4	53.3	63.9	62.1			
	2pm	62.3	53.5	54	55.8	56.3	55.7	54.6	53.5	56	65.6	68.9	52.4	61.2			
	3pm	52.4	54.4	52.6	53.1	52.7	53.1	55.6	53.7	53.2	53.4	58.6	58.7	54.9			
	4pm	58.4	57.6	53.6	54.6	66.4	57.9	49.4	52	48.9	49.5	48.7	62.6	58.8			
	5pm	62.6	62.1	63.8	64.4	58	52.4	62	63.4	61.1	54.2	50.6	49	60.9			
	6pm	47.8	47.2	46.9	48.6	46.4	45.6	46.4	46.8	46.1	52.4	57.3	51.2	50.3			
	7pm	50	47.4	47.1	53	45.8	48.6	55.2	46	48.3	50.1	51.1	51.4	50.4	54.9	9.7	70
	8pm	51	58.1	53.2	69.2	70.7	57.3	67.3	53.9	53.4	52.2	51.7	65.4	63.3			
	9pm	49.3	49.4	60.3	49.8	57.4	65	52.8	50.7	51.3	51.2	50.6	50.4	56.9			
	10pm	51.1	51	50.6	50	51	51	51.4	50.7	50.8	50	50.3	49.7	50.7			
	11pm	49.1	49.3	50	49.8	51.3	51.1	50.3	50	49.4	49.7	50.5	49.8	50.1			
Wed 14-Jan-26	12am	49.7	50.1	50.1	49.3	49.3	49.6	50.9	50.2	49.3	50	49.7	49.5	49.8			
	1am	49.3	49.3	49.3	50	49.9	50.5	49.9	50.2	49.8	49.5	49.7	50	49.8			
	2am	49.9	51.2	50.4	49.3	50.7	49.1	48.9	48.6	49.8	50.3	49.6	49	49.8			
	3am	49.2	49.5	49.5	52.1	50.4	49.6	49.4	49.2	49.7	49.5	49.2	49	49.8			
	4am	51.5	51.7	50.2	51.1	51.9	50.9	50.9	50.3	50.3	50	49.8	50.2	50.8			
	5am	49.8	49.5	49.6	49.5	50.5	54	49.8	49.4	49.8	50.4	50.4	50.6	50.5			
	6am	49.8	49.9	50	50.3	50.2	50	49.7	49.5	50.1	48.7	47.3	48	49.5			

LEGEND : NORMAL | Readings Above Permissible | Dose Above 70% | No Data recorded

Noise Monitoring Report

Report Date : **14-Jan-26**

BCA Reference : -
Contractor's Name : EnviroSolutions & Consulting Pte Ltd
Project Title : Tengah North
Location Details : Tengah North Site 1
Sensor Reference : M1113N_ESC8-NM1
Monitoring Category : Category C - Other Buildings
Sensor Brand : Rion
Sensor Model : NL-52
Sensor Serial No. : 1287615
Calibration Date : 20-Jun-25
Start Date : 08-Jan-26
Latitude (deg) : 1.36676
Longitude (deg) : 103.72696
Altitude (m) : 0

Day	Time hr/min	Leq 5min												Leq 1hr /Accum	Leq 12hr /Accum	Current Dose %	Max Allow Leq 5min
		00	05	10	15	20	25	30	35	40	45	50	55				
Wed 14-Jan-26	7am	49.8	48.8	48.6	49.2	51.8	51.4	50.8	49.2	51	53.8	48.9	49.4	50.5	62.6	5.8	90
	8am	48.1	47.6	47.8	47.7	47.1	46.9	50.1	51	51.5	50.9	48.8	48.5	49.1			
	9am	48.8	49.4	49.8	49.6	50.5	49.4	49.3	49.8	50.9	50.7	50.9	52.1	50.2			
	10am	60.3	53.8	51	50.7	53.2	58.1	54.4	59.2	58.5	57.4	68.9	80	69.7			
	11am	72.3	59.7	68.9	53.6	53.3	53.8	53.4	54.1	54.6	54.4	54.6	57.2	63.7			
	12pm	53.8	55.3	56.3	55.8	53.6	52.9	54.4	56.5	55.5	58.7	62.1	55.2	56.7			
	1pm	53.3	53.6	54.3	53.4	54.2	52.8	52	51.5	51.3	59.5	58.5	75.6	65.2			
	2pm	74.2	51.6	51.4	53.1	56.8	52.7	57.1	52.6	57.3	52.9	55.4	55.9	63.9			
	3pm	54.4	54.6	54.8	53.3	54.4	54.5	54.9	61.5	61.5	55.1	48.9	51.6	56.5			
	4pm	50	52.4	61.1	52	63.5	50.6	64.2	70.1	53.9	54.4	69.2	57.2	63.4			
	5pm	55.6	52.4	50.9	51.9	49.1	48.8	49	48.4	53.4	63	51.5	51.3	54.8			
	6pm	46.5	55.6	65.1	61	62.5	55.9	58.4	49.9	52.5	52	49.4	52	58.5			
	7pm	48.3	53.4	48.3	47.6	48.2	48	55.5	52.8	53.9	52.2	50.4	50.5	51.6	54.8	9.6	70
	8pm	64.5	66.1	53.8	55.8	70.7	52.1	52.2	52.5	52.3	52.4	52.4	52.3	62.3			
	9pm	52.1	52.2	62.3	52.2	54.7	57.8	53.4	53.2	53	52.9	52.6	52.6	55.5			
	10pm	52.1	51.7	52.2	52.4	53.1	53.2	53.5	52.8	52.6	52	51.6	51.2	52.4			
	11pm	51.4	51.3	51.8	52.1	52	51	50.9	50.7	51	50.3	50.3	51	51.2			
Thu 15-Jan-26	12am	52.3	52	51.9	50.9	50.6	50.4	50.8	50.7	50.7	50.5	52.9	52.5	51.4			
	1am	51.8	51.2	51.2	51	51.3	51.3	51.1	50.9	51.1	51.4	51.3	51.2	51.2			
	2am	50.7	50.5	50.3	50.4	50.5	50.9	52.1	53.8	51.9	51.2	50.8	50.7	51.3			
	3am	51.2	51.2	51.3	51.3	51.3	51.6	52	52	52.3	52.7	53.8	53	52.1			
	4am	52.4	52.1	52	52.3	52.5	52.1	52	52.2	54.4	52.7	52.1	52.8	52.5			
	5am	53	53.7	55.2	55.2	55.3	55.2	52.2	52.1	54	52.8	52.5	52.1	53.8			
	6am	52.3	52.4	52.4	51.7	52	51.1	50.9	51.2	51.3	50.9	52.3	51.5	51.7			

LEGEND : NORMAL | Readings Above Permissible | Dose Above 70% | No Data recorded

Noise Monitoring Report

Report Date : **15-Jan-26**

BCA Reference : -
Contractor's Name : EnviroSolutions & Consulting Pte Ltd
Project Title : Tengah North
Location Details : Tengah North Site 1
Sensor Reference : M1113N_ESC8-NM1
Monitoring Category : Category C - Other Buildings
Sensor Brand : Rion
Sensor Model : NL-52
Sensor Serial No. : 1287615
Calibration Date : 20-Jun-25
Start Date : 08-Jan-26
Latitude (deg) : 1.36676
Longitude (deg) : 103.72696
Altitude (m) : 0

Day	Time hr/min	Leq 5min												Leq 1hr /Accum	Leq 12hr /Accum	Current Dose %	Max Allow Leq 5min
		00	05	10	15	20	25	30	35	40	45	50	55				
Thu 15-Jan-26	7am	50.7	50.4	51.8	51.2	49.8	54	49.3	48.3	51	53.8	48.9	49.4	51.1	60.4	3.4	90
	8am	48.1	47.6	48.6	48.5	48.8	46.9	50.1	49.6	51.5	50.9	52.5	49.4	50.4			
	9am	50.4	51.3	51	50.6	51.2	51.7	52.4	51.2	52.2	51.9	52.1	52.1	51.6			
	10am	60.3	53.8	52.1	51.3	51.1	52	52.9	53	52.1	51.9	52	52.9	52.2			
	11am	52.4	53.5	53	52.2	52.6	53.8	52.5	51.2	52.2	52.2	52	51.7	52.5			
	12pm	50.9	52.7	57.5	59.5	60.5	60	59.8	60.4	63.9	66.6	61.1	53.8	60.8			
	1pm	54.1	52.9	53.5	54.4	52.8	57.2	54.8	53.3	54.3	69.4	59.4	65.4	61.1			
	2pm	71.1	68.9	53.6	54.8	56.1	61.1	71.8	54.7	54.4	-	-	53.4	65.8			
	3pm	55.9	53.8	55.2	56.5	54.6	54.2	54.6	54.8	55	56.5	53.6	58.8	55.5			
	4pm	53.1	54.9	53.7	69.3	53.7	63.3	64.1	51.9	54.7	53.6	52.4	51.7	61			
	5pm	76	62.3	70.4	59.4	61.8	60.5	52.1	52.3	51.9	50.4	51.7	52.5	66.8			
	6pm	50.2	51.4	51.6	50.8	50.7	51.8	56.8	55.6	55.9	56.6	54.4	54.4	54			
	7pm	49.4	50.5	50.3	51.5	50.2	47.9	54.1	51.8	53.5	56	57.7	56.8	53.5	60.4	35	70
	8pm	55.2	54.8	54.8	54.3	69.2	74	58.6	65.5	57.4	76.2	76	71.1	70.5			
	9pm	53.6	56.4	54.3	54	53.5	53.5	59.7	58.6	54.7	54.4	53.7	52.6	55.5			
	10pm	52.8	53.8	53.7	53.3	53.3	53.5	53.3	53.1	53	53.6	53.5	52.8	53.3			
	11pm	52.6	52.8	53.4	53.3	52.6	52.5	52.2	52.1	52.1	52.4	52	51.7	52.5			
Fri 16-Jan-26	12am	51.5	52.1	52	51.7	52	51.9	51.6	51	51	51.4	51.2	51.2	51.6			
	1am	51.1	51.3	51.6	51.7	52	52.1	51.7	51.3	51.7	51.6	53.3	51	51.7			
	2am	51.6	52.3	53.5	52.7	52.3	52.4	52	52	51.6	51.1	51.2	51.2	52			
	3am	51.9	52.2	52.1	52.2	51.4	52.3	52.5	52.8	52.7	53.2	55.5	52	52.7			
	4am	52.8	51.7	52.1	52	52.4	52.2	51.8	52.6	52.7	53.5	54.4	56.2	53.1			
	5am	51.8	51.9	51.9	51.5	51.5	51.4	51.5	51.6	50.8	51.2	51.1	51.3	51.5			
	6am	51.2	51.2	51.3	51	49.1	48.3	48.7	49.1	49.3	48	47.6	48.8	49.7			

LEGEND : NORMAL | Readings Above Permissible | Dose Above 70% | No Data recorded

Noise Monitoring Report

Report Date : **16-Jan-26**

BCA Reference : -
Contractor's Name : EnviroSolutions & Consulting Pte Ltd
Project Title : Tengah North
Location Details : Tengah North Site 1
Sensor Reference : M1113N_ESC8-NM1
Monitoring Category : Category C - Other Buildings
Sensor Brand : Rion
Sensor Model : NL-52
Sensor Serial No. : 1287615
Calibration Date : 20-Jun-25
Start Date : 08-Jan-26
Latitude (deg) : 1.36676
Longitude (deg) : 103.72696
Altitude (m) : 0

Day	Time hr/min	Leq 5min												Leq 1hr /Accum	Leq 12hr /Accum	Current Dose %	Max Allow Leq 5min
		00	05	10	15	20	25	30	35	40	45	50	55				
Fri 16-Jan-26	7am	48	49.1	48	49.6	50.1	50	50	48.6	50.8	50	49.5	60.4	52.4	52.7	0.2	76.7
	8am	52.4	50.1	48.7	48.8	48.4	50.5	49.1	50.3	49.9	48.6	49.6	49.9	49.8			
	9am	49.1	50	53.1	53	52.9	52.6	51.5	53	52.6	54.5	52.9	52.8	52.5			
	10am	53	53.6	55.9	54.2	54.6	55.1	54.1	55.7	57.5	54.6	-	-	55			
	11am	-	-	-	-	-	-	-	-	-	-	-	-	-			
	12pm	-	-	-	-	-	-	-	-	-	-	-	-	-			
	1pm	-	-	-	-	-	-	-	-	-	-	-	-	-			
	2pm	-	-	-	-	-	-	-	-	-	-	-	-	-			
	3pm	-	-	-	-	-	-	-	-	-	-	-	-	-			
	4pm	-	-	-	-	-	-	-	-	-	-	-	-	-			
	5pm	-	-	-	-	-	-	-	-	-	-	-	-	-			
	6pm	-	-	-	-	-	-	-	-	-	-	-	-	-			
	7pm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8pm	-	-	-	-	-	-	-	-	-	-	-	-	-			-
	9pm	-	-	-	-	-	-	-	-	-	-	-	-	-			-
	10pm	-	-	-	-	-	-	-	-	-	-	-	-	-			-
	11pm	-	-	-	-	-	-	-	-	-	-	-	-	-			-
Sat 17-Jan-26	12am	-	-	-	-	-	-	-	-	-	-	-	-	-			-
	1am	-	-	-	-	-	-	-	-	-	-	-	-	-			-
	2am	-	-	-	-	-	-	-	-	-	-	-	-	-			-
	3am	-	-	-	-	-	-	-	-	-	-	-	-	-			-
	4am	-	-	-	-	-	-	-	-	-	-	-	-	-			-
	5am	-	-	-	-	-	-	-	-	-	-	-	-	-			-
	6am	-	-	-	-	-	-	-	-	-	-	-	-	-			-

LEGEND : NORMAL | Readings Above Permissible | Dose Above 70% | No Data recorded

Appendix C Revalidated Flora Species List

s/n	Species	Origin	Status
1	Adenanthera pavonina	Non-Native	Naturalised
2	Alstonia angustiloba	Native	Least Concern
3	Alstonia scholaris	Non-Native	Naturalised
4	Angiopteris evecta	Native	Vulnerable
5	Aphanamixis polystachya	Native	Least Concern
6	Aporosa benthamiana	Native	Vulnerable
7	Artocarpus heterophyllus	Non-Native	Casual
8	Artocarpus integer var. integer	Cryptogenic	Cryptogenic
9	Baccaurea motleyana	Native	Critically Endangered (Cultivated)
10	Bambusa cf multiplex	Non-Native	Indeterminate
11	Bambusa vulgaris	Non-Native	Cultivated
12	Campnosperma auriculatum	Native	Least Concern
13	Cinnamomum iners	Native	Least Concern
14	Claoxylon indicum	Native	Least Concern
15	Dillenia suffruticosa	Native	Least Concern
16	Dimocarpus longan	Non-Native	Cultivated
17	Durio zibethinus	Non-Native	Casual
18	Elaeis guineensis	Non-Native	Casual
19	Falcataria falcata	Non-Native	Naturalised
20	Ficus apiocarpa	Native	Endangered
21	Ficus benjamina	Cryptogenic	Cryptogenic
22	Ficus binnendijkii	Native	Critically Endangered
23	Ficus caulocarpa	Native	Endangered
24	Ficus fistulosa	Native	Least Concern
25	Ficus microcarpa	Native	Least Concern
26	Ficus variegata	Native	Least Concern
27	Hevea brasiliensis	Non-Native	Naturalised
28	Litsea umbellata	Native	Vulnerable
29	Macaranga conifera	Native	Least Concern
30	Macaranga gigantea	Native	Least Concern
31	Macaranga griffithiana	Native	Vulnerable
32	Macaranga hypoleuca	Native	Least Concern
33	Mangifera indica	Non-Native	Casual
34	Mangifera x odorata	Non-Native	Casual
35	Mangifera cf x odorata	Non-Native	Casual
36	Melicope lunu-ankenda	Native	Endangered
37	Nephelium lappaceum	Cryptogenic	Cryptogenic

38	Pinus sp.	Non-Native	Indeterminate
39	Pterocarpus indicus	Non-Native	Casual
40	Ptychosperma macarthurii	Non-Native	Naturalised
41	Spathodea campanulata	Non-Native	Naturalised
42	Syzygium cerasiforme	Native	Least Concern
43	Syzygium polyanthum	Native	Least Concern
44	Tabebuia rosea	Non-Native	Casual
45	Terminalia catappa	Native	Least Concern
46	Theobroma cacao	Non-Native	Cultivated
47	Vitex pinnata	Native	Least Concern

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.366945	103.7327	ESC001	Marattiaceae	Angiopteris evecta	N.A	N.A	Vulnerable	NE	Fern
1.367203	103.7293	TE0482	Apocynaceae	Alstonia angustiloba	2.4	19	Least Concern	LC	Tree
1.364662	103.7288	TE1718	Apocynaceae	Alstonia angustiloba	1	15	Least Concern	LC	Tree
1.366972	103.7289	ESC002	Phyllanthaceae	Aporosa benthamiana	< 0.08	1	Vulnerable	LC	Tree
1.365221	103.7301	ESC003	Phyllanthaceae	Aporosa benthamiana	0.1	2	Vulnerable	LC	Tree
1.365861	103.7302	TE1651	Phyllanthaceae	Baccaurea motleyana	1.6	13	Critically Endangered	LC	Tree
1.366618	103.7311	ESC100	Moraceae	Ficus apiocarpa	N.A	N.A	Endangered	LC	Climber
1.367551	103.728	TE0856	Meliaceae	Aphanamixis polystachya	1.1	15	Least Concern	LC	Tree
1.366709	103.7314	ESC101	Moraceae	Ficus apiocarpa	N.A	N.A	Endangered	LC	Climber
1.366763	103.7314	ESC102	Moraceae	Ficus apiocarpa	N.A	N.A	Endangered	LC	Climber
1.366746	103.7312	ESC103	Moraceae	Ficus apiocarpa	N.A	N.A	Endangered	LC	Climber
1.36693	103.7314	ESC104	Moraceae	Ficus apiocarpa	N.A	N.A	Endangered	LC	Climber
1.36544	103.7309	TE1771	Moraceae	Ficus binnendijkii	2.5	20	Critically Endangered	LC	Tree
1.365317	103.7303	TE1690	Fabaceae	Adenanthera pavonina	1.6	18	NA	LC	Tree
1.365732	103.7305	TE1672	Apocynaceae	Alstonia scholaris	4	16	NA	LC	Tree
1.365247	103.7273	TE1466	Moraceae	Artocarpus heterophyllus	1.3	15	NA	NE	Tree
1.366974	103.7271	TE1192	Moraceae	Artocarpus heterophyllus	1	8	NA	NE	Tree
1.367359	103.7273	TE1209	Moraceae	Artocarpus heterophyllus	1.6	10	NA	NE	Tree
1.366492	103.729	TE0559	Moraceae	Artocarpus integer	1.3	2	NA	LC	Tree
1.367336	103.729	TE0583	Moraceae	Artocarpus integer	1	12	NA	LC	Tree
1.367041	103.7284	TE0845	Moraceae	Artocarpus integer	1	11	NA	LC	Tree
1.367243	103.7283	TE0848	Moraceae	Artocarpus integer	1.1	14	NA	LC	Tree
1.366952	103.7282	TE0852	Moraceae	Artocarpus integer	1	14	NA	LC	Tree
1.366906	103.7286	TE0873	Moraceae	Artocarpus integer	2.1	16	NA	LC	Tree
1.366188	103.7306	TE1659	Moraceae	Artocarpus integer	1	16	NA	LC	Tree
1.367933	103.7277	TE0888	Moraceae	Artocarpus integer	1.2	16	NA	LC	Tree
1.367943	103.7276	TE0889	Moraceae	Artocarpus integer	1.3	16	NA	LC	Tree
1.366797	103.7274	TE1180	Moraceae	Artocarpus integer	1.4	18	NA	LC	Tree
1.366816	103.7273	TE1182	Moraceae	Artocarpus integer	1.6	12	NA	LC	Tree
1.366735	103.7273	TE1184	Moraceae	Artocarpus integer	1.8	16	NA	LC	Tree
1.366778	103.7271	TE1186	Moraceae	Artocarpus integer	1.6	14	NA	LC	Tree
1.366823	103.727	TE1188	Moraceae	Artocarpus integer	1.5	12	NA	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.366927	103.7272	TE1193	Moraceae	Artocarpus integer	1.1	14	NA	LC	Tree
1.366933	103.7273	TE1194	Moraceae	Artocarpus integer	1.2	8	NA	LC	Tree
1.366892	103.7274	TE1195	Moraceae	Artocarpus integer	2	8	NA	LC	Tree
1.366616	103.7295	TE0515	Malvaceae	Durio zibethinus			NA	NE	Tree
1.367139	103.7276	TE1212	Moraceae	Artocarpus integer	1.2	14	NA	LC	Tree
1.366463	103.7266	TE1397	Moraceae	Artocarpus integer	1.3	16	NA	LC	Tree
1.366652	103.7272	TE1402	Moraceae	Artocarpus integer	1.3	8	NA	LC	Tree
1.366507	103.7269	TE1407	Anacardiaceae	Campnosperma auriculatum	2.5	18	Least Concern	LC	Tree
1.367327	103.7299	TE0431	Lauraceae	Cinnamomum iners	1.2	9	Least Concern	LC	Tree
1.366546	103.7272	TE1403	Moraceae	Artocarpus integer	1	8	NA	LC	Tree
1.367306	103.7299	TE0432	Lauraceae	Cinnamomum iners	1.1	10	Least Concern	LC	Tree
1.366908	103.7298	TE0440	Lauraceae	Cinnamomum iners	1.1	10	Least Concern	LC	Tree
1.366528	103.727	TE1405	Moraceae	Artocarpus integer	1.3	10	NA	LC	Tree
1.365888	103.7266	TE1419	Moraceae	Artocarpus integer	1.3	17	NA	LC	Tree
1.367153	103.7296	TE0476	Lauraceae	Cinnamomum iners	1	12	Least Concern	LC	Tree
1.367133	103.7295	TE0479	Lauraceae	Cinnamomum iners	1.9	12	Least Concern	LC	Tree
1.367096	103.7294	TE0481	Lauraceae	Cinnamomum iners	1.1	15	Least Concern	LC	Tree
1.367038	103.7295	TE0489	Lauraceae	Cinnamomum iners	1.2	13	Least Concern	LC	Tree
1.366758	103.7296	TE0496	Lauraceae	Cinnamomum iners	2.1	14	Least Concern	LC	Tree
1.367086	103.7289	TE0568	Lauraceae	Cinnamomum iners	1.1	12	Least Concern	LC	Tree
1.36714	103.729	TE0569	Lauraceae	Cinnamomum iners	1	10	Least Concern	LC	Tree
1.367146	103.7289	TE0570	Lauraceae	Cinnamomum iners	1.2	12	Least Concern	LC	Tree
1.367063	103.7289	TE0571	Lauraceae	Cinnamomum iners	1.1	12	Least Concern	LC	Tree
1.367191	103.729	TE0589	Lauraceae	Cinnamomum iners	1.1	11	Least Concern	LC	Tree
1.366207	103.7337	TE0711	Lauraceae	Cinnamomum iners	1.3	12	Least Concern	LC	Tree
1.366881	103.7282	TE0839	Lauraceae	Cinnamomum iners	1.2	12	Least Concern	LC	Tree
1.366506	103.7272	TE1450	Moraceae	Artocarpus integer	1.7	18	NA	LC	Tree
1.367131	103.7286	TE1161	Lauraceae	Cinnamomum iners	1.2	8	Least Concern	LC	Tree
1.367013	103.7287	TE1167	Lauraceae	Cinnamomum iners	1.2	14	Least Concern	LC	Tree
1.366505	103.7272	TE1451	Moraceae	Artocarpus integer	1	8	NA	LC	Tree
1.365632	103.7273	TE1455	Moraceae	Artocarpus integer	1.3	10	NA	LC	Tree
1.367	103.7287	TE1169	Lauraceae	Cinnamomum iners	1.4	12	Least Concern	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.366533	103.7287	TE1174	Lauraceae	Cinnamomum iners	1	12	Least Concern	LC	Tree
1.366363	103.728	TE1448	Lauraceae	Cinnamomum iners	1.4	10	Least Concern	LC	Tree
1.365428	103.7272	TE1457	Lauraceae	Cinnamomum iners	1.4	10	Least Concern	LC	Tree
1.36549	103.7274	TE1459	Lauraceae	Cinnamomum iners	2.2	11	Least Concern	LC	Tree
1.36554	103.7275	TE1461	Lauraceae	Cinnamomum iners	1.5	9	Least Concern	LC	Tree
1.365431	103.7276	TE1462	Lauraceae	Cinnamomum iners	1.3	10	Least Concern	LC	Tree
1.366448	103.7277	TE1479	Lauraceae	Cinnamomum iners	1.1	11	Least Concern	LC	Tree
1.365986	103.7294	TE1537	Lauraceae	Cinnamomum iners	1.4	9	Least Concern	LC	Tree
1.365837	103.7292	TE1543	Lauraceae	Cinnamomum iners	1.5	8	Least Concern	LC	Tree
1.365355	103.7286	TE1580	Lauraceae	Cinnamomum iners	1.7	10	Least Concern	LC	Tree
1.365642	103.7288	TE1594	Lauraceae	Cinnamomum iners	1.2	12	Least Concern	LC	Tree
1.366049	103.7293	TE1601	Lauraceae	Cinnamomum iners	1.5	12	Least Concern	LC	Tree
1.365369	103.73	TE1631	Lauraceae	Cinnamomum iners	1.6	12	Least Concern	LC	Tree
1.36578	103.7302	TE1647	Lauraceae	Cinnamomum iners	3.5	20	Least Concern	LC	Tree
1.366365	103.7305	TE1657	Lauraceae	Cinnamomum iners	1	12	Least Concern	LC	Tree
1.366039	103.7307	TE1663	Lauraceae	Cinnamomum iners	1.1	12	Least Concern	LC	Tree
1.366312	103.7337	ESC106	Poaceae	Bambusa cf multiplex	10	6	NA	NE	Bamboo
1.366046	103.7307	TE1664	Lauraceae	Cinnamomum iners	1.5	14	Least Concern	LC	Tree
1.367372	103.7272	ESC108	Poaceae	Bambusa vulgaris	4	10	NA	NE	Grass
1.36606	103.7307	TE1665	Lauraceae	Cinnamomum iners	1.3	12	Least Concern	LC	Tree
1.365937	103.7308	TE1667	Lauraceae	Cinnamomum iners	1.1	10	Least Concern	LC	Tree
1.365958	103.7308	TE1668	Lauraceae	Cinnamomum iners	1.3	8	Least Concern	LC	Tree
1.365897	103.7308	TE1670	Lauraceae	Cinnamomum iners	1.4	9	Least Concern	LC	Tree
1.365796	103.7306	TE1674	Lauraceae	Cinnamomum iners	1	9	Least Concern	LC	Tree
1.365686	103.7304	TE1675	Lauraceae	Cinnamomum iners	1	12	Least Concern	LC	Tree
1.36557	103.7303	TE1677	Lauraceae	Cinnamomum iners	1.8	16	Least Concern	LC	Tree
1.365516	103.7302	TE1678	Lauraceae	Cinnamomum iners	1.1	12	Least Concern	LC	Tree
1.365625	103.7302	TE1680	Lauraceae	Cinnamomum iners	1.4	9	Least Concern	LC	Tree
1.365556	103.7304	TE1687	Lauraceae	Cinnamomum iners	1	10	Least Concern	LC	Tree
1.365598	103.7304	TE1688	Lauraceae	Cinnamomum iners	1.7	12	Least Concern	LC	Tree
1.365343	103.7307	TE1699	Lauraceae	Cinnamomum iners	1	10	Least Concern	LC	Tree
1.36588	103.731	TE1776	Lauraceae	Cinnamomum iners	1.5	12	Least Concern	LC	Tree
1.366074	103.7311	TE1780	Lauraceae	Cinnamomum iners	1.5	13	Least Concern	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.365392	103.7313	TE1784	Lauraceae	Cinnamomum iners	1.8	13	Least Concern	LC	Tree
1.365379	103.7314	TE1786	Lauraceae	Cinnamomum iners	1.5	10	Least Concern	LC	Tree
1.3661	103.7311	TE1794	Lauraceae	Cinnamomum iners	2.3	16	Least Concern	LC	Tree
1.365952	103.731	TE1796	Lauraceae	Cinnamomum iners	1.3	10	Least Concern	LC	Tree
1.366201	103.7317	TE1827	Lauraceae	Cinnamomum iners	1.1	15	Least Concern	LC	Tree
1.366161	103.7319	TE1829	Lauraceae	Cinnamomum iners	1.1	10	Least Concern	LC	Tree
1.36664	103.7326	TE1860	Lauraceae	Cinnamomum iners	1.4	11	Least Concern	LC	Tree
1.36578	103.733	TE1876	Lauraceae	Cinnamomum iners	1.5	12	Least Concern	LC	Tree
1.367423	103.7281	TE0854	Lauraceae	Cinnamomum iners	1	16	Least Concern	LC	Tree
1.367508	103.7281	TE0857	Lauraceae	Cinnamomum iners	1.1	9	Least Concern	LC	Tree
1.367654	103.7283	TE0860	Lauraceae	Cinnamomum iners	1.1	12	Least Concern	LC	Tree
1.367982	103.7282	TE0862	Lauraceae	Cinnamomum iners	1	12	Least Concern	LC	Tree
1.367659	103.7277	TE0880	Lauraceae	Cinnamomum iners	1	10	Least Concern	LC	Tree
1.367351	103.7271	TE1017	Lauraceae	Cinnamomum iners	1.4	10	Least Concern	LC	Tree
1.366721	103.7275	TE1179	Lauraceae	Cinnamomum iners	1.6	14	Least Concern	LC	Tree
1.367076	103.7271	TE1202	Lauraceae	Cinnamomum iners	1	10	Least Concern	LC	Tree
1.367128	103.7271	TE1204	Lauraceae	Cinnamomum iners	1	12	Least Concern	LC	Tree
1.367197	103.7272	TE1206	Lauraceae	Cinnamomum iners	1	12	Least Concern	LC	Tree
1.367359	103.7275	TE1216	Lauraceae	Cinnamomum iners	1.4	13	Least Concern	LC	Tree
1.367455	103.7275	TE1219	Lauraceae	Cinnamomum iners	1	10	Least Concern	LC	Tree
1.366518	103.727	TE1406	Lauraceae	Cinnamomum iners	2.3	15	Least Concern	LC	Tree
1.365766	103.7265	TE1421	Lauraceae	Cinnamomum iners	2.3	14	Least Concern	LC	Tree
1.366461	103.7275	TE1439	Lauraceae	Cinnamomum iners	1.4	12	Least Concern	LC	Tree
1.365533	103.7272	TE1456	Lauraceae	Cinnamomum iners	1.5	9	Least Concern	LC	Tree
1.365022	103.727	TE1473	Lauraceae	Cinnamomum iners	1	10	Least Concern	LC	Tree
1.364916	103.7277	TE1496	Lauraceae	Cinnamomum iners	1.2	14	Least Concern	LC	Tree
1.367059	103.7298	TE0439	Euphorbiaceae	Claoxylon indicum	1	10	Least Concern	LC	Tree
1.365782	103.7303	TE1650	Euphorbiaceae	Claoxylon indicum	1	11	Least Concern	LC	Tree
1.367217	103.7314	TE1810	Euphorbiaceae	Claoxylon indicum	1	11	Least Concern	LC	Tree
1.366305	103.7319	TE1832	Euphorbiaceae	Claoxylon indicum	1	12	Least Concern	LC	Tree
1.367697	103.7283	TE0859	Dilleniaceae	Dillenia suffruticosa	1.5	6	Least Concern	NE	Shrub
1.366723	103.7314	TE1824	Sapindaceae	Dimocarpus longan	1	10	Data Deficient	DD	Tree
1.367303	103.7282	TE0850	Sapindaceae	Dimocarpus longan	2.1	12	Data Deficient	DD	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.367321	103.7282	TE0853	Sapindaceae	Dimocarpus longan	1.2	15	Data Deficient	DD	Tree
1.366803	103.7297	TE0442	Malvaceae	Durio zibethinus	1.6	18	NA	NE	Tree
1.367058	103.7292	TE0484	Malvaceae	Durio zibethinus	1.1	20	NA	NE	Tree
1.366949	103.7293	TE0485	Malvaceae	Durio zibethinus	1	15	NA	NE	Tree
1.366704	103.7294	TE0500	Malvaceae	Durio zibethinus	1.25	16	NA	NE	Tree
1.367066	103.7294	TE0503	Malvaceae	Durio zibethinus	1.3	18	NA	NE	Tree
1.366546	103.7295	TE0511	Malvaceae	Durio zibethinus	1.3	18	NA	NE	Tree
1.366522	103.7295	TE0512	Malvaceae	Durio zibethinus	1.1	18	NA	NE	Tree
1.366281	103.7293	TE0530	Malvaceae	Durio zibethinus	1.3	20	NA	NE	Tree
1.367319	103.7289	TE0581	Malvaceae	Durio zibethinus	1	18	NA	NE	Tree
1.366556	103.7282	TE0836	Malvaceae	Durio zibethinus	1.1	20	NA	NE	Tree
1.366919	103.7281	TE0838	Malvaceae	Durio zibethinus	1.1	16	NA	NE	Tree
1.366452	103.7277	TE1477	Malvaceae	Durio zibethinus	1.3	20	NA	NE	Tree
1.36646	103.7277	TE1478	Malvaceae	Durio zibethinus	1	20	NA	NE	Tree
1.365268	103.7291	TE1567	Euphorbiaceae	Hevea brasiliensis			NA	LC	Tree
1.365236	103.7289	TE1569	Euphorbiaceae	Hevea brasiliensis			NA	LC	Tree
1.365646	103.728	TE1491	Malvaceae	Durio zibethinus	1.1	20	NA	NE	Tree
1.366005	103.7282	TE1538	Malvaceae	Durio zibethinus	1.1	13	NA	NE	Tree
1.366131	103.729	TE1600	Malvaceae	Durio zibethinus	1.7	17	NA	NE	Tree
1.366164	103.7306	TE1661	Malvaceae	Durio zibethinus	1	16	NA	NE	Tree
1.365962	103.7305	TE1671	Malvaceae	Durio zibethinus	1.2	12	NA	NE	Tree
1.367294	103.7336	TE1882	Malvaceae	Durio zibethinus	1.2	18	NA	NE	Tree
1.367424	103.7276	TE0877	Malvaceae	Durio zibethinus	1.2	20	NA	NE	Tree
1.367792	103.7276	TE0882	Malvaceae	Durio zibethinus	1	20	NA	NE	Tree
1.367945	103.7276	TE0890	Malvaceae	Durio zibethinus	1.4	20	NA	NE	Tree
1.36807	103.728	TE0896	Malvaceae	Durio zibethinus	1.1	15	NA	NE	Tree
1.367263	103.7277	TE1003	Malvaceae	Durio zibethinus	1.1	15	NA	NE	Tree
1.366947	103.7276	TE1005	Malvaceae	Durio zibethinus	1.7	18	NA	NE	Tree
1.366802	103.7274	TE1181	Malvaceae	Durio zibethinus	1	20	NA	NE	Tree
1.366958	103.7271	TE1191	Malvaceae	Durio zibethinus	1.3	23	NA	NE	Tree
1.366952	103.7273	TE1196	Malvaceae	Durio zibethinus	3.2	18	NA	NE	Tree
1.367154	103.7271	TE1203	Malvaceae	Durio zibethinus	2	25	NA	NE	Tree
1.367052	103.7276	TE1214	Malvaceae	Durio zibethinus	1.1	20	NA	NE	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.367617	103.7273	TE1222	Malvaceae	Durio zibethinus	1.1	22	NA	NE	Tree
1.367611	103.7274	TE1223	Malvaceae	Durio zibethinus	1.5	22	NA	NE	Tree
1.36643	103.7267	TE1398	Malvaceae	Durio zibethinus	1.2	20	NA	NE	Tree
1.366329	103.7266	TE1399	Malvaceae	Durio zibethinus	1.6	20	NA	NE	Tree
1.366543	103.7271	TE1404	Malvaceae	Durio zibethinus	1.3	14	NA	NE	Tree
1.366621	103.7273	TE1437	Malvaceae	Durio zibethinus	1.2	10	NA	NE	Tree
1.366484	103.7272	TE1452	Malvaceae	Durio zibethinus	1.4	12	NA	NE	Tree
1.367205	103.7298	TE0438	Moraceae	Ficus benjamina	4	18	NA	LC	Tree
1.36683	103.7298	TE0441	Moraceae	Ficus benjamina	4	19	NA	LC	Tree
1.367017	103.7294	TE0487	Moraceae	Ficus benjamina	3.6	18	NA	LC	Tree
1.365465	103.7293	TE1551	Moraceae	Ficus benjamina	5	15	NA	LC	Tree
1.36593	103.729	TE1599	Moraceae	Ficus benjamina	4	15	NA	LC	Tree
1.365342	103.7311	TE1785	Moraceae	Ficus benjamina	7	22	NA	LC	Tree
1.367225	103.7298	TE0437	Moraceae	Ficus microcarpa	10	18	Least Concern	LC	Tree
1.366709	103.7297	TE0443	Moraceae	Ficus microcarpa	10	20	Least Concern	LC	Tree
1.367257	103.7284	TE1132	Moraceae	Ficus microcarpa	15	25	Least Concern	LC	Tree
1.366259	103.7277	TE1446	Moraceae	Ficus microcarpa	6	16	Least Concern	LC	Tree
1.366343	103.7279	TE1447	Moraceae	Ficus microcarpa	10	25	Least Concern	LC	Tree
1.36576	103.7311	TE1795	Moraceae	Ficus benjamina	1.7	8	NA	LC	Tree
1.366147	103.7275	TE1453	Moraceae	Ficus microcarpa	3	18	Least Concern	LC	Tree
1.366258	103.7285	TE1484	Moraceae	Ficus microcarpa	6	20	Least Concern	LC	Tree
1.36599	103.7282	TE1486	Moraceae	Ficus microcarpa	4	20	Least Concern	LC	Tree
1.365657	103.7282	TE1489	Moraceae	Ficus microcarpa	10	22	Least Concern	LC	Tree
1.365902	103.7293	TE1541	Moraceae	Ficus microcarpa	6	18	Least Concern	LC	Tree
1.365931	103.7292	TE1542	Moraceae	Ficus microcarpa	3	16	Least Concern	LC	Tree
1.365725	103.7294	TE1544	Moraceae	Ficus microcarpa	6	18	Least Concern	LC	Tree
1.366238	103.7306	TE1658	Moraceae	Ficus microcarpa	10	20	Least Concern	LC	Tree
1.36533	103.7302	TE1683	Moraceae	Ficus microcarpa	3	20	Least Concern	LC	Tree
1.366498	103.7307	TE1801	Moraceae	Ficus microcarpa	12	25	Least Concern	LC	Tree
1.366976	103.7315	TE1811	Moraceae	Ficus microcarpa	10	18	Least Concern	LC	Tree
1.367157	103.7335	TE1852	Moraceae	Ficus microcarpa	10	20	Least Concern	LC	Tree
1.366587	103.7327	TE1859	Moraceae	Ficus microcarpa	12	20	Least Concern	LC	Tree
1.368044	103.7282	TE0864	Moraceae	Ficus microcarpa	2.5	18	Least Concern	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.367545	103.7276	TE0879	Moraceae	ficus microcarpa	3	20	Least Concern	LC	Tree
1.367994	103.7278	TE0892	Moraceae	Ficus microcarpa	4	18	Least Concern	LC	Tree
1.366827	103.7272	TE1183	Moraceae	Ficus microcarpa	10	12	Least Concern	LC	Tree
1.36731	103.7272	TE1207	Moraceae	Ficus microcarpa	1	18	Least Concern	LC	Tree
1.367928	103.7278	TE1232	Moraceae	Ficus microcarpa	2.2	25	Least Concern	LC	Tree
1.366424	103.7268	TE1414	Moraceae	Ficus microcarpa	20	20	Least Concern	LC	Tree
1.365987	103.7273	TE1430	Moraceae	Ficus microcarpa	10	19	Least Concern	LC	Tree
1.364909	103.7281	TE1495	Moraceae	Ficus microcarpa	10	18	Least Concern	LC	Tree
1.364736	103.7279	TE1536	Moraceae	Ficus microcarpa	4	17	Least Concern	LC	Tree
1.366584	103.7337	TE1847	Moraceae	Ficus benjamina	3	18	NA	LC	Tree
1.366168	103.7288	TE1603	Moraceae	Ficus variegata	1.3	10	Least Concern	LC	Tree
1.364985	103.7303	TE1701	Moraceae	Ficus variegata	2.5	12	Least Concern	LC	Tree
1.365914	103.7336	TE1845	Moraceae	Ficus variegata	2	14	Least Concern	LC	Tree
1.366	103.7334	TE1846	Moraceae	Ficus variegata	2.5	17	Least Concern	LC	Tree
1.367172	103.7329	TE1853	Moraceae	Ficus variegata	3.2	15	Least Concern	LC	Tree
1.366747	103.7322	TE1865	Moraceae	Ficus variegata	1.4	14	Least Concern	LC	Tree
1.366675	103.7269	TE1410	Moraceae	Ficus variegata	1.1	16	Least Concern	LC	Tree
1.36525	103.7269	TE1442	Moraceae	Ficus variegata	1.2	12	Least Concern	LC	Tree
1.364584	103.7287	TE1720	Moraceae	Ficus variegata	1.1	15	Least Concern	LC	Tree
1.364608	103.7287	TE1721	Moraceae	Ficus variegata	1	15	Least Concern	LC	Tree
1.36751	103.7278	TE0875	Moraceae	ficus benjamina	3.3	18	NA	LC	Tree
1.367514	103.7278	TE0876	Moraceae	ficus benjamina	2.8	18	NA	LC	Tree
1.366886	103.7276	TE1007	Moraceae	Ficus benjamina	4	16	NA	LC	Tree
1.367325	103.7274	TE1217	Moraceae	Ficus benjamina	7	20	NA	LC	Tree
1.364789	103.7277	TE1498	Moraceae	Ficus benjamina	2	20	NA	LC	Tree
1.366697	103.7296	TE0505	Euphorbiaceae	Hevea brasiliensis	1.5	18	NA	LC	Tree
1.365464	103.7309	TE1772	Fabaceae	Pterocarpus indicus			NA	EN	Tree
1.366568	103.7295	TE0513	Euphorbiaceae	Hevea brasiliensis	1.8	16	NA	LC	Tree
1.366359	103.7293	TE0532	Euphorbiaceae	Hevea brasiliensis	1.2	14	NA	LC	Tree
1.366263	103.729	TE0534	Euphorbiaceae	Hevea brasiliensis	1.4	13	NA	LC	Tree
1.366379	103.729	TE0535	Euphorbiaceae	Hevea brasiliensis	1.3	12	NA	LC	Tree
1.366438	103.7292	TE0537	Euphorbiaceae	Hevea brasiliensis	1.3	12	NA	LC	Tree
1.366404	103.729	TE0539	Euphorbiaceae	Hevea brasiliensis	1.1	11	NA	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.366402	103.729	TE0541	Euphorbiaceae	Hevea brasiliensis	1.6	12	NA	LC	Tree
1.366387	103.7289	TE0544	Euphorbiaceae	Hevea brasiliensis	1.1	13	NA	LC	Tree
1.366329	103.7289	TE0545	Euphorbiaceae	Hevea brasiliensis	1.1	13	NA	LC	Tree
1.366332	103.7289	TE0546	Euphorbiaceae	Hevea brasiliensis	1.7	15	NA	LC	Tree
1.366402	103.7288	TE0548	Euphorbiaceae	Hevea brasiliensis	1.1	13	NA	LC	Tree
1.366427	103.7288	TE0549	Euphorbiaceae	Hevea brasiliensis	1.1	13	NA	LC	Tree
1.36645	103.7288	TE0550	Euphorbiaceae	Hevea brasiliensis	1.2	13	NA	LC	Tree
1.366551	103.7287	TE0551	Euphorbiaceae	Hevea brasiliensis	1.1	13	NA	LC	Tree
1.366615	103.7291	TE0560	Euphorbiaceae	Hevea brasiliensis	1.1	12	NA	LC	Tree
1.366618	103.7291	TE0561	Euphorbiaceae	Hevea brasiliensis	2	12	NA	LC	Tree
1.367067	103.729	TE0567	Euphorbiaceae	Hevea brasiliensis	1	14	NA	LC	Tree
1.367074	103.7289	TE0572	Euphorbiaceae	Hevea brasiliensis	1.1	12	NA	LC	Tree
1.366955	103.7288	TE0573	Euphorbiaceae	Hevea brasiliensis	1.3	14	NA	LC	Tree
1.366936	103.7288	TE0574	Euphorbiaceae	Hevea brasiliensis	1.2	14	NA	LC	Tree
1.366882	103.7287	TE0575	Euphorbiaceae	Hevea brasiliensis	1.5	15	NA	LC	Tree
1.366777	103.7287	TE0576	Euphorbiaceae	Hevea brasiliensis	1	12	NA	LC	Tree
1.367117	103.7287	TE1162	Euphorbiaceae	Hevea brasiliensis	1.3	16	NA	LC	Tree
1.367077	103.7287	TE1163	Euphorbiaceae	Hevea brasiliensis	1.4	14	NA	LC	Tree
1.367056	103.7287	TE1164	Euphorbiaceae	Hevea brasiliensis	1.8	16	NA	LC	Tree
1.366613	103.7315	TE1826	Sapindaceae	Nephelium lappaceum			NA	LC	Tree
1.365882	103.7292	TE1596	Lauraceae	Cinnamomum iners			Least Concern	LC	Tree
1.367106	103.7288	TE1165	Euphorbiaceae	Hevea brasiliensis	1	14	NA	LC	Tree
1.366996	103.7287	TE1168	Euphorbiaceae	Hevea brasiliensis	1.4	16	NA	LC	Tree
1.366886	103.7287	TE1170	Euphorbiaceae	Hevea brasiliensis	1	12	NA	LC	Tree
1.366591	103.7285	TE1171	Euphorbiaceae	Hevea brasiliensis	1.2	12	NA	LC	Tree
1.366444	103.7286	TE1176	Euphorbiaceae	Hevea brasiliensis	1.5	12	NA	LC	Tree
1.365234	103.7284	TE1494	Euphorbiaceae	Hevea brasiliensis	2.1	15	NA	LC	Tree
1.365369	103.7291	TE1548	Euphorbiaceae	Hevea brasiliensis	1.2	18	NA	LC	Tree
1.365358	103.7291	TE1549	Euphorbiaceae	Hevea brasiliensis	1.2	18	NA	LC	Tree
1.365404	103.7291	TE1550	Euphorbiaceae	Hevea brasiliensis	1.5	16	NA	LC	Tree
1.365606	103.7292	TE1552	Euphorbiaceae	Hevea brasiliensis	1.8	18	NA	LC	Tree
1.365714	103.7303	TE1648	Lamiaceae	Vitex pinnata			Least Concern	LC	Tree
1.365679	103.7303	TE1649	Lauraceae	Cinnamomum iners			Least Concern	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.365653	103.7292	TE1553	Euphorbiaceae	Hevea brasiliensis	1.3	18	NA	LC	Tree
1.365748	103.7292	TE1554	Euphorbiaceae	Hevea brasiliensis	1.8	16	NA	LC	Tree
1.3654	103.729	TE1562	Euphorbiaceae	Hevea brasiliensis	1.1	16	NA	LC	Tree
1.365359	103.729	TE1563	Euphorbiaceae	Hevea brasiliensis	1	14	NA	LC	Tree
1.365438	103.729	TE1565	Euphorbiaceae	Hevea brasiliensis	1.7	15	NA	LC	Tree
1.365275	103.7288	TE1570	Euphorbiaceae	Hevea brasiliensis	1.2	14	NA	LC	Tree
1.365292	103.7288	TE1571	Euphorbiaceae	Hevea brasiliensis	2.2	16	NA	LC	Tree
1.365294	103.7288	TE1572	Euphorbiaceae	Hevea brasiliensis	1.8	14	NA	LC	Tree
1.365487	103.7285	TE1579	Euphorbiaceae	Hevea brasiliensis	1.3	14	NA	LC	Tree
1.365119	103.7292	TE1704	Euphorbiaceae	Hevea brasiliensis	2	15	NA	LC	Tree
1.364911	103.7291	TE1705	Euphorbiaceae	Hevea brasiliensis	2	15	NA	LC	Tree
1.364998	103.729	TE1706	Euphorbiaceae	Hevea brasiliensis	1.7	15	NA	LC	Tree
1.364903	103.7285	TE1740	Euphorbiaceae	Hevea brasiliensis	2	15	NA	LC	Tree
1.364915	103.7286	TE1745	Euphorbiaceae	Hevea brasiliensis	2	15	NA	LC	Tree
1.36498	103.7286	TE1746	Euphorbiaceae	Hevea brasiliensis	1.5	15	NA	LC	Tree
1.36497	103.7288	TE1753	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.364977	103.7289	TE1754	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.365018	103.7288	TE1755	Euphorbiaceae	Hevea brasiliensis	1.5	15	NA	LC	Tree
1.365059	103.7287	TE1756	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.365028	103.7287	TE1757	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.365076	103.7287	TE1758	Euphorbiaceae	Hevea brasiliensis	1.5	15	NA	LC	Tree
1.365132	103.7287	TE1759	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.365183	103.7286	TE1761	Euphorbiaceae	Hevea brasiliensis	2.5	15	NA	LC	Tree
1.365166	103.7285	TE1762	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.36522	103.7284	TE1763	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.365281	103.7287	TE1765	Euphorbiaceae	Hevea brasiliensis	1.5	2	NA	LC	Tree
1.365194	103.7288	TE1766	Euphorbiaceae	Hevea brasiliensis	1.6	15	NA	LC	Tree
1.365175	103.7289	TE1767	Euphorbiaceae	Hevea brasiliensis	1.6	16	NA	LC	Tree
1.365119	103.7288	TE1768	Euphorbiaceae	Hevea brasiliensis	1	15	NA	LC	Tree
1.366894	103.7315	TE1812	Euphorbiaceae	Hevea brasiliensis	1.4	15	NA	LC	Tree
1.366941	103.7315	TE1813	Euphorbiaceae	Hevea brasiliensis	1	15	NA	LC	Tree
1.366922	103.7314	TE1815	Euphorbiaceae	Hevea brasiliensis	1.2	12	NA	LC	Tree
1.36693	103.7314	TE1817	Euphorbiaceae	Hevea brasiliensis	2.7	15	NA	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.366873	103.7315	TE1818	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.36686	103.7315	TE1819	Euphorbiaceae	Hevea brasiliensis	1.4	15	NA	LC	Tree
1.366813	103.7315	TE1820	Euphorbiaceae	Hevea brasiliensis	1.5	15	NA	LC	Tree
1.366788	103.7315	TE1821	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.364788	103.729	TE1711	Euphorbiaceae	Hevea brasiliensis	1.8	15	NA	LC	Tree
1.364762	103.7289	TE1713	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.364752	103.7289	TE1714	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.364787	103.7289	TE1715	Euphorbiaceae	Hevea brasiliensis	1.1	15	NA	LC	Tree
1.364643	103.7287	TE1719	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.364673	103.7285	TE1723	Euphorbiaceae	Hevea brasiliensis	1.6	15	NA	LC	Tree
1.364702	103.7285	TE1724	Euphorbiaceae	Hevea brasiliensis	1.1	16	NA	LC	Tree
1.36476	103.7285	TE1725	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.364828	103.7284	TE1726	Euphorbiaceae	Hevea brasiliensis	1.5	15	NA	LC	Tree
1.364795	103.7284	TE1727	Euphorbiaceae	Hevea brasiliensis	1.8	15	NA	LC	Tree
1.364945	103.7284	TE1730	Euphorbiaceae	Hevea brasiliensis	1	15	NA	LC	Tree
1.364947	103.7284	TE1731	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.365004	103.7284	TE1732	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.365045	103.7284	TE1733	Euphorbiaceae	Hevea brasiliensis	1	10	NA	LC	Tree
1.365071	103.7284	TE1734	Euphorbiaceae	Hevea brasiliensis	1.1	15	NA	LC	Tree
1.36508	103.7284	TE1735	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.36508	103.7285	TE1736	Euphorbiaceae	Hevea brasiliensis	1	15	NA	LC	Tree
1.365047	103.7284	TE1737	Euphorbiaceae	Hevea brasiliensis	1.1	12	NA	LC	Tree
1.365003	103.7284	TE1738	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.364945	103.7284	TE1739	Euphorbiaceae	Hevea brasiliensis	1.5	15	NA	LC	Tree
1.364874	103.7285	TE1741	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.36484	103.7285	TE1742	Euphorbiaceae	Hevea brasiliensis	1.1	12	NA	LC	Tree
1.364854	103.7286	TE1743	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.364899	103.7287	TE1747	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree
1.364879	103.7286	TE1748	Euphorbiaceae	Hevea brasiliensis	1	15	NA	LC	Tree
1.364808	103.7288	TE1749	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.364768	103.7288	TE1750	Euphorbiaceae	Hevea brasiliensis	1.3	15	NA	LC	Tree
1.364783	103.7288	TE1751	Euphorbiaceae	Hevea brasiliensis	1.2	10	NA	LC	Tree
1.364892	103.7289	TE1752	Euphorbiaceae	Hevea brasiliensis	1.2	15	NA	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.366979	103.7282	TE0851	Euphorbiaceae	Macaranga conifera	1.1	18	Least Concern	LC	Tree
1.366688	103.7286	TE0577	Euphorbiaceae	Macaranga gigantea	1.6	15	Least Concern	LC	Tree
1.366611	103.7267	TE1394	Euphorbiaceae	Macaranga gigantea	1.5	14	Least Concern	LC	Tree
1.367139	103.7296	TE0478	Anacardiaceae	Mangifera cf x odorata	1.5	13	NA	DD	Tree
1.367798	103.7275	TE0884	Anacardiaceae	Mangifera cf x odorata	1.2	16	NA	#REF!	#REF!
1.367122	103.7295	TE0480	Anacardiaceae	Mangifera x odorata	1.6	12	NA	DD	Tree
1.366184	103.7277	TE1445	Anacardiaceae	Mangifera x odorata	2.2	20	NA	DD	Tree
1.367308	103.7298	TE0434	Sapindaceae	Nephelium lappaceum	1.5	11	NA	LC	Tree
1.367226	103.7298	TE0436	Sapindaceae	Nephelium lappaceum	1.1	10	NA	LC	Tree
1.366753	103.7295	TE0497	Sapindaceae	Nephelium lappaceum	1	15	NA	LC	Tree
1.366717	103.7294	TE0498	Sapindaceae	Nephelium lappaceum	1.35	15	NA	LC	Tree
1.366693	103.7295	TE0504	Sapindaceae	Nephelium lappaceum	1	18	NA	LC	Tree
1.366662	103.7294	TE0516	Sapindaceae	Nephelium lappaceum	1	16	NA	LC	Tree
1.366382	103.7271	TE1434	Euphorbiaceae	Macaranga gigantea	1.1	16	Least Concern	LC	Tree
1.366201	103.7291	TE0533	Sapindaceae	Nephelium lappaceum	1.2	14	NA	LC	Tree
1.366379	103.7288	TE0547	Sapindaceae	Nephelium lappaceum	1	13	NA	LC	Tree
1.366996	103.7291	TE0565	Sapindaceae	Nephelium lappaceum	1.3	11	NA	LC	Tree
1.367263	103.7288	TE0578	Sapindaceae	Nephelium lappaceum	1	15	NA	LC	Tree
1.367269	103.7288	TE0579	Sapindaceae	Nephelium lappaceum	1.3	12	NA	LC	Tree
1.367309	103.7289	TE0580	Sapindaceae	Nephelium lappaceum	1.1	10	NA	LC	Tree
1.367262	103.7291	TE0588	Sapindaceae	Nephelium lappaceum	1	10	NA	LC	Tree
1.366839	103.7283	TE0840	Sapindaceae	Nephelium lappaceum	2.4	17	NA	LC	Tree
1.367004	103.7282	TE0842	Sapindaceae	Nephelium lappaceum	1.4	16	NA	LC	Tree
1.367034	103.7284	TE0846	Sapindaceae	Nephelium lappaceum	1.8	12	NA	LC	Tree
1.367199	103.7283	TE0847	Sapindaceae	Nephelium lappaceum	1.3	16	NA	LC	Tree
1.367228	103.7283	TE0849	Sapindaceae	Nephelium lappaceum	1.3	16	NA	LC	Tree
1.366754	103.7286	TE0874	Sapindaceae	Nephelium lappaceum	1	16	NA	LC	Tree
1.366409	103.7283	TE1120	Sapindaceae	Nephelium lappaceum	1.3	15	NA	LC	Tree
1.36675	103.7284	TE1121	Sapindaceae	Nephelium lappaceum	1	12	NA	LC	Tree
1.366754	103.7284	TE1122	Sapindaceae	Nephelium lappaceum	1.1	12	NA	LC	Tree
1.366718	103.7284	TE1123	Sapindaceae	Nephelium lappaceum	1.1	10	NA	LC	Tree
1.366761	103.7284	TE1124	Sapindaceae	Nephelium lappaceum	1.2	12	NA	LC	Tree
1.367101	103.7284	TE1127	Sapindaceae	Nephelium lappaceum	3	12	NA	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.367163	103.7286	TE1129	Sapindaceae	Nephelium lappaceum	1	12	NA	LC	Tree
1.367313	103.7285	TE1131	Sapindaceae	Nephelium lappaceum	1	15	NA	LC	Tree
1.36729	103.7286	TE1159	Sapindaceae	Nephelium lappaceum	1	10	NA	LC	Tree
1.365396	103.7276	TE1463	Sapindaceae	Nephelium lappaceum	1.3	14	NA	LC	Tree
1.365627	103.7277	TE1475	Sapindaceae	Nephelium lappaceum	1.6	14	NA	LC	Tree
1.365462	103.7277	TE1476	Sapindaceae	Nephelium lappaceum	1.6	13	NA	LC	Tree
1.366314	103.7285	TE1483	Sapindaceae	Nephelium lappaceum	1.1	11	NA	LC	Tree
1.366182	103.7286	TE1485	Sapindaceae	Nephelium lappaceum	1.1	15	NA	LC	Tree
1.365629	103.7287	TE1487	Sapindaceae	Nephelium lappaceum	2	18	NA	LC	Tree
1.365917	103.7294	TE1540	Sapindaceae	Nephelium lappaceum	1.3	13	NA	LC	Tree
1.365347	103.7302	TE1684	Sapindaceae	Nephelium lappaceum	1.1	14	NA	LC	Tree
1.365484	103.7304	TE1686	Sapindaceae	Nephelium lappaceum	1	12	NA	LC	Tree
1.365409	103.7304	TE1689	Sapindaceae	Nephelium lappaceum	1.5	16	NA	LC	Tree
1.365285	103.7303	TE1691	Sapindaceae	Nephelium lappaceum	1	8	NA	LC	Tree
1.365221	103.7304	TE1693	Sapindaceae	Nephelium lappaceum	1.2	18	NA	LC	Tree
1.365217	103.7304	TE1694	Sapindaceae	Nephelium lappaceum	1.2	18	NA	LC	Tree
1.365154	103.7305	TE1695	Sapindaceae	Nephelium lappaceum	1	16	NA	LC	Tree
1.365324	103.7306	TE1697	Sapindaceae	Nephelium lappaceum	1	16	NA	LC	Tree
1.36535	103.7306	TE1698	Sapindaceae	Nephelium lappaceum	1.1	20	NA	LC	Tree
1.365471	103.7314	TE1788	Sapindaceae	Nephelium lappaceum	1.1	12	NA	LC	Tree
1.365731	103.7312	TE1792	Sapindaceae	Nephelium lappaceum	1.1	13	NA	LC	Tree
1.366717	103.7314	TE1825	Sapindaceae	Nephelium lappaceum	1.4	18	NA	LC	Tree
1.367312	103.7279	TE0855	Sapindaceae	Nephelium lappaceum	1.2	10	NA	LC	Tree
1.367472	103.7283	TE0868	Sapindaceae	Nephelium lappaceum	1.1	15	NA	LC	Tree
1.367722	103.7275	TE0885	Sapindaceae	Nephelium lappaceum	1.2	18	NA	LC	Tree
1.367897	103.7277	TE0887	Sapindaceae	Nephelium lappaceum	1	16	NA	LC	Tree
1.366813	103.7269	TE1011	Sapindaceae	Nephelium lappaceum	1.2	15	NA	LC	Tree
1.366736	103.7271	TE1185	Sapindaceae	Nephelium lappaceum	1.1	14	NA	LC	Tree
1.36675	103.7271	TE1187	Sapindaceae	Nephelium lappaceum	1.3	14	NA	LC	Tree
1.366833	103.727	TE1189	Sapindaceae	Nephelium lappaceum	1.4	16	NA	LC	Tree
1.367107	103.7274	TE1197	Sapindaceae	Nephelium lappaceum	1.3	16	NA	LC	Tree
1.367072	103.7274	TE1199	Sapindaceae	Nephelium lappaceum	1.2	9	NA	LC	Tree
1.367035	103.7271	TE1200	Sapindaceae	Nephelium lappaceum	1.3	10	NA	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.367136	103.7272	TE1205	Sapindaceae	Nephelium lappaceum	1	7	NA	LC	Tree
1.367389	103.7274	TE1218	Sapindaceae	Nephelium lappaceum	1.1	16	NA	LC	Tree
1.367437	103.7272	TE1220	Sapindaceae	Nephelium lappaceum	1.5	16	NA	LC	Tree
1.365878	103.7266	TE1420	Sapindaceae	Nephelium lappaceum	1	16	NA	LC	Tree
1.365967	103.7265	TE1426	Sapindaceae	Nephelium lappaceum	1.1	11	NA	LC	Tree
1.366388	103.7274	TE1432	Sapindaceae	Nephelium lappaceum	2	11	NA	LC	Tree
1.366518	103.7274	TE1438	Sapindaceae	Nephelium lappaceum	1.5	12	NA	LC	Tree
1.364873	103.7277	TE1497	Sapindaceae	Nephelium lappaceum	1.1	15	NA	LC	Tree
1.365028	103.7308	ESC123	Fabaceae	Pterocarpus indicus	3.7	16	NA	EN	Tree
1.365025	103.7306	TE1696	Fabaceae	Pterocarpus indicus	3.8	20	NA	EN	Tree
1.365131	103.7301	TE1700	Fabaceae	Pterocarpus indicus	4	20	NA	EN	Tree
1.365565	103.731	TE1773	Fabaceae	Pterocarpus indicus	3.5	25	NA	EN	Tree
1.365079	103.7307	TE1781	Fabaceae	Pterocarpus indicus	3.8	16	NA	EN	Tree
1.366574	103.731	TE1800	Fabaceae	Pterocarpus indicus	3.6	18	NA	EN	Tree
1.366328	103.7311	TE1802	Fabaceae	Pterocarpus indicus	2.2	18	NA	EN	Tree
1.366224	103.7312	TE1803	Fabaceae	Pterocarpus indicus	3.4	18	NA	EN	Tree
1.366365	103.7315	TE1805	Fabaceae	Pterocarpus indicus	4.4	18	NA	EN	Tree
1.367143	103.7312	TE1809	Fabaceae	Pterocarpus indicus	3	14	NA	EN	Tree
1.366558	103.7319	TE1835	Fabaceae	Pterocarpus indicus	5	18	NA	EN	Tree
1.366867	103.7318	TE1836	Fabaceae	Pterocarpus indicus	5	18	NA	EN	Tree
1.365075	103.7332	TE1844	Fabaceae	Pterocarpus indicus	3.2	17	NA	EN	Tree
1.366961	103.7333	TE1850	Fabaceae	Pterocarpus indicus	4.8	18	NA	EN	Tree
1.365875	103.7267	TE1443	Euphorbiaceae	Macaranga gigantea	1.4	14	Least Concern	LC	Tree
1.366866	103.7286	TE0872	Euphorbiaceae	Macaranga hypoleuca	1.2	15	Least Concern	LC	Tree
1.367077	103.7285	TE1125	Euphorbiaceae	Macaranga hypoleuca	2.3	15	Least Concern	LC	Tree
1.367144	103.7285	TE1126	Euphorbiaceae	Macaranga hypoleuca	1.3	15	Least Concern	LC	Tree
1.366264	103.7294	TE0527	Bignoniaceae	Tabebuia rosea	2.2	16	NA	LC	Tree
1.365701	103.7313	TE1791	Bignoniaceae	Tabebuia rosea	1.8	11	NA	LC	Tree
1.366423	103.7316	TE1806	Malvaceae	Theobroma cacao	1	9	NA	NE	Tree
1.365306	103.7309	TE1783	Moraceae	Ficus binnendijkii	6	20	Critically Endangered	LC	Tree
1.364917	103.7312	TE1782	Moraceae	Ficus caulocarpa	6	25	Endangered	LC	Tree
1.367245	103.7287	ESC019	Lauraceae	Litsea umbellata	-	-	Vulnerable	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.366653	103.7281	ESC020	Lauraceae	Litsea umbellata	0.05	1.1	Vulnerable	LC	Tree
1.364962	103.7274	ESC022	Lauraceae	Litsea umbellata	0.1	4	Vulnerable	LC	Tree
1.365133	103.7285	ESC024	Lauraceae	Litsea umbellata	0.05	2	Vulnerable	LC	Tree
1.364858	103.7287	ESC023	Lauraceae	Litsea umbellata	0.1	2.5	Vulnerable	LC	Tree
1.366394	103.7289	ESC032	Euphorbiaceae	Macaranga griffithiana	< 0.05	1	Vulnerable	LC	Tree
1.366585	103.7287	ESC033	Euphorbiaceae	Macaranga griffithiana	-	-	Vulnerable	LC	Tree
1.366715	103.728	ESC036	Euphorbiaceae	Macaranga griffithiana	< 0.05	1.5	Vulnerable	LC	Tree
1.366812	103.7286	ESC038	Euphorbiaceae	Macaranga griffithiana	< 0.05	0.3	Vulnerable	LC	Tree
1.365298	103.7272	ESC058	Euphorbiaceae	Macaranga griffithiana	0.1-0.2	45750	Vulnerable	LC	Tree
1.366501	103.7279	ESC060	Euphorbiaceae	Macaranga griffithiana	0.05-0.1	0.5-1	Vulnerable	LC	Tree
1.365543	103.729	ESC067	Euphorbiaceae	Macaranga griffithiana	< 0.05	0.5	Vulnerable	LC	Tree
1.365273	103.7289	ESC070	Euphorbiaceae	Macaranga griffithiana	0.05	1.6	Vulnerable	LC	Tree
1.365904	103.7291	ESC072	Euphorbiaceae	Macaranga griffithiana	0.1	4	Vulnerable	LC	Tree
1.36577	103.7311	ESC082	Euphorbiaceae	Macaranga griffithiana	< 0.05	2	Vulnerable	LC	Tree
1.365368	103.7292	ESC088	Euphorbiaceae	Macaranga griffithiana	0.05	1	Vulnerable	LC	Tree
1.365678	103.731	ESC090	Euphorbiaceae	Macaranga griffithiana	< 0.05	1	Vulnerable	LC	Tree
1.367291	103.7297	TE0435	Euphorbiaceae	Macaranga griffithiana	0.5	8	Vulnerable	LC	Tree
1.367027	103.7295	TE0490	Euphorbiaceae	Macaranga griffithiana	0.3	7	Vulnerable	LC	Tree
1.367006	103.7295	TE0491	Euphorbiaceae	Macaranga griffithiana	0.5	8	Vulnerable	LC	Tree
1.367027	103.7295	TE0492	Euphorbiaceae	Macaranga griffithiana	0.9	9	Vulnerable	LC	Tree
1.366826	103.7296	TE0495	Euphorbiaceae	Macaranga griffithiana	0.6	11	Vulnerable	LC	Tree
1.367146	103.7284	TE0870	Euphorbiaceae	Macaranga griffithiana	0.4	8	Vulnerable	LC	Tree
1.366032	103.7275	TE1444	Euphorbiaceae	Macaranga griffithiana	0.6	8	Vulnerable	LC	Tree
1.366172	103.7287	TE1604	Euphorbiaceae	Macaranga griffithiana	0.6	8	Vulnerable	LC	Tree
1.3671	103.7334	TE1851	Euphorbiaceae	Macaranga griffithiana	0.8	18	Vulnerable	LC	Tree
1.367345	103.7291	TE0587	Myrtaceae	Syzygium cerasiforme	1.2	17	Least Concern	NE	Tree
1.365406	103.7275	TE1464	Myrtaceae	Syzygium cerasiforme	1.1	8	Least Concern	NE	Tree
1.367159	103.7277	ESC043	Euphorbiaceae	Macaranga griffithiana	0.1	3	Vulnerable	LC	Tree
1.367427	103.7283	TE0869	Myrtaceae	Syzygium cerasiforme	1.2	16	Least Concern	NE	Tree
1.366968	103.7294	TE0488	Myrtaceae	Syzygium polyanthum	1.1	18	Least Concern	NE	Tree
1.367233	103.7286	TE1130	Myrtaceae	Syzygium polyanthum	1.2	12	Least Concern	NE	Tree
1.365276	103.7273	TE1465	Myrtaceae	Syzygium polyanthum	1.2	19	Least Concern	NE	Tree
1.365242	103.7273	TE1467	Myrtaceae	Syzygium polyanthum	1.3	18	Least Concern	NE	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.365116	103.7273	TE1470	Myrtaceae	Syzygium polyanthum	1.1	18	Least Concern	NE	Tree
1.365475	103.7283	TE1490	Myrtaceae	Syzygium polyanthum	1.8	20	Least Concern	NE	Tree
1.365403	103.7281	TE1492	Myrtaceae	Syzygium polyanthum	1	20	Least Concern	NE	Tree
1.365542	103.7286	TE1582	Myrtaceae	Syzygium polyanthum	1.5	18	Least Concern	NE	Tree
1.365529	103.7288	TE1587	Myrtaceae	Syzygium polyanthum	1.3	15	Least Concern	NE	Tree
1.365633	103.7285	TE1593	Myrtaceae	Syzygium polyanthum	1.2	18	Least Concern	NE	Tree
1.365688	103.7288	TE1595	Myrtaceae	Syzygium polyanthum	1	16	Least Concern	NE	Tree
1.366137	103.7288	TE1602	Myrtaceae	Syzygium polyanthum	1	10	Least Concern	NE	Tree
1.365951	103.7286	TE1605	Myrtaceae	Syzygium polyanthum	1.2	14	Least Concern	NE	Tree
1.366154	103.7321	TE1871	Myrtaceae	Syzygium polyanthum	1	18	Least Concern	NE	Tree
1.366062	103.7328	TE1875	Myrtaceae	Syzygium polyanthum	1	16	Least Concern	NE	Tree
1.367628	103.7281	TE0858	Myrtaceae	Syzygium polyanthum	1	16	Least Concern	NE	Tree
1.367957	103.7282	TE0861	Myrtaceae	Syzygium polyanthum	1.3	18	Least Concern	NE	Tree
1.36815	103.7282	TE0865	Myrtaceae	Syzygium polyanthum	1.2	18	Least Concern	NE	Tree
1.368188	103.7283	TE0866	Myrtaceae	Syzygium polyanthum	1.3	18	Least Concern	NE	Tree
1.368046	103.7279	TE0895	Myrtaceae	Syzygium polyanthum	1.2	20	Least Concern	NE	Tree
1.366713	103.7274	TE1178	Myrtaceae	Syzygium polyanthum	1.2	16	Least Concern	NE	Tree
1.367282	103.7273	TE1210	Myrtaceae	Syzygium polyanthum	2	20	Least Concern	NE	Tree
1.366406	103.7269	ESC049	Euphorbiaceae	Macaranga griffithiana	0.2	6	Vulnerable	LC	Tree
1.365901	103.7266	ESC051	Euphorbiaceae	Macaranga griffithiana	0.1	3	Vulnerable	LC	Tree
1.364935	103.7265	ESC055	Euphorbiaceae	Macaranga griffithiana	0.1	1	Vulnerable	LC	Tree
1.366844	103.7296	TE0494	Euphorbiaceae	Macaranga griffithiana	1.2	7	Vulnerable	LC	Tree
1.36756	103.7272	TE1221	Myrtaceae	Syzygium polyanthum	1.1	6	Least Concern	NE	Tree
1.366095	103.7265	TE1425	Myrtaceae	Syzygium polyanthum	1.2	18	Least Concern	NE	Tree
1.365022	103.727	TE1472	Myrtaceae	Syzygium polyanthum	1.1	18	Least Concern	NE	Tree
1.36489	103.7276	TE1499	Myrtaceae	Syzygium polyanthum	1	20	Least Concern	NE	Tree
1.365922	103.7274	TE1440	Combretaceae	Terminalia catappa	1.6	16	Least Concern	LC	Tree
1.36637	103.7282	TE1480	Combretaceae	Terminalia catappa	3.1	18	Least Concern	LC	Tree
1.36627	103.7282	TE1481	Combretaceae	Terminalia catappa	2.1	18	Least Concern	LC	Tree
1.366146	103.7318	TE1828	Combretaceae	Terminalia catappa	1.4	18	Least Concern	LC	Tree
1.366173	103.7319	TE1830	Combretaceae	Terminalia catappa	1.1	13	Least Concern	LC	Tree
1.366344	103.7319	TE1833	Combretaceae	Terminalia catappa	1.3	14	Least Concern	LC	Tree
1.36637	103.732	TE1834	Combretaceae	Terminalia catappa	1.3	12	Least Concern	LC	Tree

lat	lon	Tag ID	Family	Scientific name	Girth (m)	Height (m)	SRDB3	IUCN status	Plant habit
1.366911	103.7319	TE1837	Combretaceae	Terminalia catappa	1.2	10	Least Concern	LC	Tree
1.366965	103.732	TE1838	Combretaceae	Terminalia catappa	1.5	10	Least Concern	LC	Tree
1.366883	103.7316	TE1841	Combretaceae	Terminalia catappa	1.4	13	Least Concern	LC	Tree
1.36687	103.7316	TE1842	Combretaceae	Terminalia catappa	1.6	13	Least Concern	LC	Tree
1.366637	103.7332	TE1849	Combretaceae	Terminalia catappa	1.3	14	Least Concern	LC	Tree
1.366451	103.7329	TE1858	Combretaceae	Terminalia catappa	2.3	14	Least Concern	LC	Tree
1.366752	103.7323	TE1864	Combretaceae	Terminalia catappa	3	15	Least Concern	LC	Tree
1.36624	103.7327	TE1866	Combretaceae	Terminalia catappa	2.6	15	Least Concern	LC	Tree
1.366351	103.7323	TE1868	Combretaceae	Terminalia catappa	1.2	12	Least Concern	LC	Tree
1.366388	103.7322	TE1869	Combretaceae	Terminalia catappa	2.6	14	Least Concern	LC	Tree
1.366323	103.7321	TE1870	Combretaceae	Terminalia catappa	2	16	Least Concern	LC	Tree
1.366555	103.7286	TE1172	Lamiaceae	Vitex pinnata	1.2	12	Least Concern	LC	Tree
1.365971	103.7307	TE1666	Lamiaceae	Vitex pinnata	1.3	12	Least Concern	LC	Tree
1.365887	103.7308	TE1669	Lamiaceae	Vitex pinnata	1.5	10	Least Concern	LC	Tree
1.36543	103.7303	TE1685	Lamiaceae	Vitex pinnata	1.1	16	Least Concern	LC	Tree
1.365358	103.7262	TE1424	Lamiaceae	Vitex pinnata	1.5	14	Least Concern	LC	Tree
1.366094	103.7274	TE1431	Lamiaceae	Vitex pinnata	1.3	12	Least Concern	LC	Tree
1.364897	103.7269	TE1471	Lamiaceae	Vitex pinnata	1.4	8	Least Concern	LC	Tree
1.364852	103.7284	TE1729	Lamiaceae	Vitex pinnata	1	10	Least Concern	LC	Tree
1.366413	103.7294	TE0523	Euphorbiaceae	Macaranga griffithiana	2.2	14	Vulnerable	LC	Tree
1.366029	103.7277	TE1449	Euphorbiaceae	Macaranga griffithiana	2	8	Vulnerable	LC	Tree
1.36714	103.7277	TE1004	Euphorbiaceae	Macaranga griffithiana	0.3	3.5 & 5	Vulnerable	LC	Tree
1.366895	103.7276	TE1006	Euphorbiaceae	Macaranga griffithiana	0.5	7	Vulnerable	LC	Tree
1.366544	103.7267	TE1395	Euphorbiaceae	Macaranga griffithiana	0.6	8	Vulnerable	LC	Tree
1.365287	103.727	TE1474	Euphorbiaceae	Macaranga griffithiana	0.4	4	Vulnerable	LC	Tree
1.364756	103.7289	TE1712	Rutaceae	Melicope lunu-ankenda	0.3	6	Endangered	LC	Tree
1.367262	103.7337	TE0704	Pinaceae	Pinus sp.	1.85	16	#N/A	#N/A	#N/A

Appendix D Terrestrial & Aquatic Fauna List

Date	Survey Type	Lat	Lon	Scientific Name	Common Name	Family	Taxon	Count	Heard/Seen	Local Status	Global IUCN Status	Origin
2025-12-08	Diurnal (Butterflies)	1.364973	103.733709	*Bronchocela cristatella*	Green Crested Lizard	*Agamidae*	Reptile	1	S	LC	LC	Native
2025-12-08	Diurnal (Butterflies)	1.365395	103.733078	*Jamides celeno aelianus*	Common Caerulean	*Lycaenidae*	Lepidoptera	1	S	LC	NL	Native
2025-12-08	Diurnal (Butterflies)	1.365395	103.733078	*Papilio polytes romulus*	Common Mormon	*Papilionidae*	Lepidoptera	1	S	LC	NL	Native
2025-12-08	Diurnal (Butterflies)	1.366201	103.730989	*Mycalesis sp.*	Bush Brown Sp.	*Nymphalidae*	Lepidoptera	1	S	NA	NA	NA
2025-12-08	Diurnal (Butterflies)	1.366201	103.730989	*Cratilla metallica*	Dark-Tipped Forest Skimmer	*Libellulidae*	Odonata	1	S	LC	LC	Native
2025-12-08	Diurnal (Butterflies)	1.366062	103.731271	*Papilio polytes romulus*	Common Mormon	*Papilionidae*	Lepidoptera	2	S	LC	NL	Native
2025-12-08	Diurnal (Butterflies)	1.365695	103.731749	*Mycalesis perseoides perseoides*	Burmese Bush Brown	*Nymphalidae*	Lepidoptera	1	S	LC	NL	Origin Uncertain
2025-12-08	Diurnal (Butterflies)	1.364975	103.733784	*Eurema sp.*	Grass Yellow Sp.	*Pieridae*	Lepidoptera	1	S	NA	NA	NA
2025-12-08	Diurnal (Butterflies)	1.364975	103.733784	*Dendrelaphis pictus*	Painted Bronzeback	*Colubridae*	Reptile	1	S	LC	LC	Native
2025-12-08	Diurnal (Butterflies)	1.365855	103.727829	*Otus lettia*	Collared Scops Owl	*Strigidae*	Aves	1	S	LC	LC	Native
2025-12-08	Diurnal (Butterflies)	1.366624	103.727567	*Eooxylides tharis distanti*	Branded Imperial	*Lycaenidae*	Lepidoptera	1	S	LC	NL	Native
2025-12-08	Nocturnal	1.368760	103.729679	*Duttaphrynus bengalensis*	Bengal Toad	*Bufonidae*	Amphibian	1	S	NA	NL	Introduced
2025-12-08	Nocturnal	1.367501	103.730088	*Paradoxurus musangus*	Sumatran Palm Civet	*Viverridae*	Mammalia	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.366240	103.729229	*Microhyla heymonsi*	Dark-Sided Chorus Frog	*Microhylidae*	Amphibian	3	H	LC	LC	Native
2025-12-08	Nocturnal	1.366175	103.729076	*Microhyla butleri*	Painted Chorus Frog	*Microhylidae*	Amphibian	1	H	LC	LC	Native
2025-12-08	Nocturnal	1.365975	103.728959	*Duttaphrynus bengalensis*	Bengal Toad	*Bufonidae*	Amphibian	1	S	NA	NL	Introduced
2025-12-08	Nocturnal	1.365207	103.727782	*Otus lettia*	Collared Scops Owl	*Strigidae*	Aves	1	H	LC	LC	Native
2025-12-08	Nocturnal	1.365610	103.727719	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2025-12-08	Nocturnal	1.366810	103.728274	*Cynopterus brachyotis*	Lesser Short-Nosed Fruit Bat	*Pteropodidae*	Mammalia	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.367140	103.728474	*Sylvirana guentheri*	Gunther'S Frog	*Ranidae*	Amphibian	2	H	NA	LC	Introduced
2025-12-08	Nocturnal	1.367140	103.728474	*Microhyla heymonsi*	Dark-Sided Chorus Frog	*Microhylidae*	Amphibian	5	H	LC	LC	Native
2025-12-08	Nocturnal	1.367140	103.728474	*Polypedates leucomystax*	Four-Lined Tree Frog	*Rhacophoridae*	Amphibian	1	H	LC	LC	Native
2025-12-08	Nocturnal	1.367322	103.729738	*Microhyla mukhlesuri*	Mukhlesur'S Chorus Frog	*Microhylidae*	Amphibian	1	S	NA	LC	Introduced
2025-12-08	Nocturnal	1.367294	103.729864	*Cynopterus brachyotis*	Lesser Short-Nosed Fruit Bat	*Pteropodidae*	Mammalia	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.365071	103.733744	*Dendrelaphis pictus*	Painted Bronzeback	*Colubridae*	Reptile	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.365071	103.733744	*Ahaetulla prasina*	Oriental Whip Snake	*Colubridae*	Reptile	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.365376	103.733744	*Hemidactylus frenatus*	Spiny-Tailed House Gecko	*Gekkonidae*	Reptile	4	S	LC	LC	Native
2025-12-08	Nocturnal	1.366184	103.733746	*Gekko monarchus*	Spotted House Gecko	*Gekkonidae*	Reptile	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.366931	103.733492	*Rallina fasciata*	Red-Legged Crake	*Rallidae*	Aves	1	S	NT	LC	Native
2025-12-08	Nocturnal	1.366931	103.733492	*Cynopterus brachyotis*	Lesser Short-Nosed Fruit Bat	*Pteropodidae*	Mammalia	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.366416	103.732867	*Limnonectes blythii*	Malayan Giant Frog	*Dicroglossidae*	Amphibian	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.366416	103.732867	*Microhyla mukhlesuri*	Mukhlesur'S Chorus Frog	*Microhylidae*	Amphibian	10	H	NA	LC	Introduced
2025-12-08	Nocturnal	1.366416	103.732867	*Microhyla butleri*	Painted Chorus Frog	*Microhylidae*	Amphibian	2	H	LC	LC	Native
2025-12-08	Nocturnal	1.366416	103.732867	*Duttaphrynus bengalensis*	Bengal Toad	*Bufonidae*	Amphibian	1	H	NA	NL	Introduced
2025-12-08	Nocturnal	1.366416	103.732867	*Microhyla heymonsi*	Dark-Sided Chorus Frog	*Microhylidae*	Amphibian	1	H	LC	LC	Native
2025-12-08	Nocturnal	1.366416	103.732867	*Polypedates leucomystax*	Four-Lined Tree Frog	*Rhacophoridae*	Amphibian	1	H	LC	LC	Native
2025-12-08	Nocturnal	1.366304	103.732861	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2025-12-08	Nocturnal	1.366133	103.732894	*Sylvirana guentheri*	Gunther'S Frog	*Ranidae*	Amphibian	1	H	NA	LC	Introduced
2025-12-08	Nocturnal	1.365911	103.732965	*Muridae*	Rat Sp.	*Muridae*	Mammalia	2	S	NA	NA	NA
2025-12-08	Nocturnal	1.365734	103.733093	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2025-12-08	Nocturnal	1.365567	103.733016	*Microhyla heymonsi*	Dark-Sided Chorus Frog	*Microhylidae*	Amphibian	4	H	LC	LC	Native
2025-12-08	Nocturnal	1.365323	103.733081	*Bronchocela cristatella*	Green Crested Lizard	*Agamidae*	Reptile	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.365012	103.732357	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	1	H	LC	LC	Native
2025-12-08	Nocturnal	1.365782	103.731604	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2025-12-08	Nocturnal	1.366571	103.730997	*Polypedates leucomystax*	Four-Lined Tree Frog	*Rhacophoridae*	Amphibian	2	H	LC	LC	Native
2025-12-08	Nocturnal	1.366571	103.730997	*Microhyla heymonsi*	Dark-Sided Chorus Frog	*Microhylidae*	Amphibian	10	H	LC	LC	Native
2025-12-08	Nocturnal	1.366571	103.730997	*Microhyla mukhlesuri*	Mukhlesur'S Chorus Frog	*Microhylidae*	Amphibian	5	H	NA	LC	Introduced
2025-12-08	Nocturnal	1.366886	103.731395	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2025-12-08	Nocturnal	1.366963	103.731427	*Polypedates leucomystax*	Four-Lined Tree Frog	*Rhacophoridae*	Amphibian	1	H	LC	LC	Native
2025-12-08	Nocturnal	1.367450	103.731948	*Limnonectes blythii*	Malayan Giant Frog	*Dicroglossidae*	Amphibian	1	S	LC	LC	Native
2025-12-08	Nocturnal	1.367504	103.732372	*Duttaphrynus bengalensis*	Bengal Toad	*Bufonidae*	Amphibian	1	S	NA	NL	Introduced
2025-12-11	Diurnal	1.367270	103.729554	*Chrysophlegma miniaceum*	Banded Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.367270	103.729554	*Dinopium javanense*	Common Flameback	*Picidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.367270	103.729554	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.367270	103.729554	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.367073	103.729424	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	H	NA	LC	Introduced
2025-12-11	Diurnal	1.367073	103.729424	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	1	H	NA	VU	Introduced
2025-12-11	Diurnal	1.367073	103.729424	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.366899	103.729383	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	3	H	NA	VU	Introduced
2025-12-11	Diurnal	1.366643	103.729348	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	3	H	LC	LC	Native
2025-12-11	Diurnal	1.366454	103.729281	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	2	H	LC	LC	Native
2025-12-11	Diurnal	1.366454	103.729281	*Chrysophlegma miniaceum*	Banded Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.366454	103.729281	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	1	S	LC	LC	Native

Date	Survey Type	Lat	Lon	Scientific Name	Common Name	Family	Taxon	Count	Heard/Seen	Local Status	Global IUCN Status	Origin
2025-12-11	Diurnal	1.366176	103.729242	*Pycnonotus goiavier*	Yellow-Vented Bulbul	*Pycnonotidae*	Aves	2	H	LC	LC	Native
2025-12-11	Diurnal	1.366176	103.729242	*Eurystomus orientalis*	Oriental Dollarbird	*Coraciidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.366176	103.729242	*Merops viridis*	Blue-Throated Bee-Eater	*Meropidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.366176	103.729242	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	2	H	NA	LC	Introduced
2025-12-11	Diurnal	1.366181	103.729148	*Eutropis multifasciata*	Many-Lined Sun Skink	*Scincidae*	Reptile	1	S	LC	LC	Native
2025-12-11	Diurnal	1.366176	103.729242	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	2	H	NA	LC	Introduced
2025-12-11	Diurnal	1.366176	103.729242	*Psittacula longicauda*	Long-Tailed Parakeet	*Psittaculidae*	Aves	1	H	NT	VU	Native
2025-12-11	Diurnal	1.365994	103.729195	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	2	H	NA	LC	Introduced
2025-12-11	Diurnal	1.365873	103.729018	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365841	103.728944	*Microhyla heymonsi*	Dark-Sided Chorus Frog	*Microhylidae*	Amphibian	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365834	103.728842	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365772	103.728765	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	H	NA	LC	Introduced
2025-12-11	Diurnal	1.365591	103.728790	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365474	103.728848	*Chrysophlegma miniaceum*	Banded Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365474	103.728848	*Callosciurus notatus*	Plantain Squirrel	*Sciuridae*	Mammalia	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365474	103.728848	*Chalcophaps indica*	Common Emerald Dove	*Columbidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365326	103.728824	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365258	103.728802	*Callosciurus notatus*	Plantain Squirrel	*Sciuridae*	Mammalia	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365088	103.728775	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2025-12-11	Diurnal	1.365046	103.728423	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	2	H	LC	LC	Native
2025-12-11	Diurnal	1.365455	103.727703	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365526	103.727672	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	1	H	NA	VU	Introduced
2025-12-11	Diurnal	1.365769	103.727797	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365769	103.727797	*Callosciurus notatus*	Plantain Squirrel	*Sciuridae*	Mammalia	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365948	103.727860	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	3	H	LC	LC	Native
2025-12-11	Diurnal	1.365983	103.727878	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	5	S	NA	LC	Introduced
2025-12-11	Diurnal	1.366053	103.727908	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	3	H	NA	LC	Introduced
2025-12-11	Diurnal	1.366053	103.727908	*Orthotomus atrogularis*	Dark-Necked Tailorbird	*Cisticolidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.366142	103.727974	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.366748	103.728225	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves		H	LC	LC	Native
2025-12-11	Diurnal	1.366822	103.728271	*Dicrurus paradiseus*	Greater Racket-Tailed Drongo	*Dicruridae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.366822	103.728271	*Orthotomus atrogularis*	Dark-Necked Tailorbird	*Cisticolidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.366822	103.728271	*Dicrurus paradiseus*	Greater Racket-Tailed Drongo	*Dicruridae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.366822	103.728271	*Orthotomus atrogularis*	Dark-Necked Tailorbird	*Cisticolidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365441	103.733479	*Picus vittatus*	Laced Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365441	103.733479	*Nisaetus cirrhatus*	Changeable Hawk-Eagle	*Accipitridae*	Aves	1	H	VU	LC	Native
2025-12-11	Diurnal	1.365613	103.733011	*Mixornis gularis*	Pin-Striped Tit-Babbler	*Timaliidae*	Aves	2	H	LC	LC	Native
2025-12-11	Diurnal	1.365773	103.733047	*Merops viridis*	Blue-Throated Bee-Eater	*Meropidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365890	103.732953	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2025-12-11	Diurnal	1.365890	103.732953	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	H	NA	LC	Introduced
2025-12-11	Diurnal	1.365890	103.732953	*Psittacula alexandri*	Red-Breasted Parakeet	*Psittaculidae*	Aves	2	H	NA	NT	Introduced
2025-12-11	Diurnal	1.365890	103.732953	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2025-12-11	Diurnal	1.366129	103.732852	*Aerodramus sp.*	Aerodramus Swiftlet	*Apodidae*	Aves	1	S	NA	NA	NA
2025-12-11	Diurnal	1.366529	103.733008	*Psittacula alexandri*	Red-Breasted Parakeet	*Psittaculidae*	Aves	1	H	NA	NT	Introduced
2025-12-11	Diurnal	1.366529	103.733008	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	1	H	NA	VU	Introduced
2025-12-11	Diurnal	1.367520	103.733187	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	2	S	NA	LC	Introduced
2025-12-11	Diurnal	1.367512	103.733008	*Tholymis tillarga*	White-Barred Duskhawk	*Libellulidae*	Odonata	1	S	LC	LC	Native
2025-12-11	Diurnal	1.367509	103.732533	*Neurothemis fluctuans*	Common Parasol	*Libellulidae*	Odonata	5	S	LC	LC	Native
2025-12-11	Diurnal	1.367403	103.731681	*Neurothemis fluctuans*	Common Parasol	*Libellulidae*	Odonata	1	S	LC	LC	Native
2025-12-11	Diurnal	1.367301	103.731392	*Tholymis tillarga*	White-Barred Duskhawk	*Libellulidae*	Odonata	1	S	LC	LC	Native
2025-12-11	Diurnal	1.367217	103.731342	*Neurothemis fluctuans*	Common Parasol	*Libellulidae*	Odonata	1	S	LC	LC	Native
2025-12-11	Diurnal	1.366912	103.731405	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	2	H	LC	LC	Native
2025-12-11	Diurnal	1.366687	103.731206	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365915	103.731355	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365915	103.731355	*Mixornis gularis*	Pin-Striped Tit-Babbler	*Timaliidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365915	103.731355	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	2	H	NA	VU	Introduced
2025-12-11	Diurnal	1.365861	103.731422	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	S	NA	LC	Introduced
2025-12-11	Diurnal	1.365861	103.731422	*Orthotomus atrogularis*	Dark-Necked Tailorbird	*Cisticolidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365798	103.731568	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365578	103.731790	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	4	H	LC	LC	Native
2025-12-11	Diurnal	1.365578	103.731790	*Merops viridis*	Blue-Throated Bee-Eater	*Meropidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365578	103.731790	*Orthotomus sutorius*	Common Tailorbird	*Cisticolidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365578	103.731790	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365578	103.731790	*Anthreptes malacensis*	Brown-Throated Sunbird	*Nectariniidae*	Aves	1	H	LC	LC	Native
2025-12-11	Diurnal	1.365448	103.732377	*Halcyon smyrnensis*	White-Throated Kingfisher	*Alcedinidae*	Aves	1	S	LC	LC	Native

Date	Survey Type	Lat	Lon	Scientific Name	Common Name	Family	Taxon	Count	Heard/Seen	Local Status	Global IUCN Status	Origin
2025-12-11	Odonates	1.365437	103.732732	*Copsychus saularis*	Oriental Magpie-Robin	*Muscicapidae*	Aves	1	S	VU	LC	Native
2025-12-11	Odonates	1.365548	103.732641	*Muscicapa dauurica*	Asian Brown Flycatcher	*Muscicapidae*	Aves	1	H	LC	LC	Native
2025-12-11	Odonates	1.365548	103.732641	*Aethopyga siparaja*	Crimson Sunbird	*Nectariniidae*	Aves	1	H	LC	LC	Native
2025-12-11	Odonates	1.366013	103.732683	*Teinobasis ruficollis*	Red-Tailed Sprite	*Coenagrionidae*	Odonata	1	S	NT	NT	Native
2025-12-11	Odonates	1.366048	103.732737	*Chrysophlegma miniaceum*	Banded Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2025-12-11	Odonates	1.366295	103.732531	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2025-12-11	Odonates	1.366677	103.732439	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2025-12-11	Odonates	1.366919	103.732359	*Hemiprocne longipennis*	Grey-Rumped Treeswift	*Hemiprocnidae*	Aves	1	S	NT	LC	Native
2025-12-11	Odonates	1.366791	103.732980	*Orthetrum chrysis*	Spine-Tufted Skimmer	*Libellulidae*	Odonata	2	S	LC	LC	Native
2025-12-11	Odonates	1.366856	103.732964	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2025-12-11	Odonates	1.366856	103.732964	*Brachydiplax chalybea*	Blue Dasher	*Libellulidae*	Odonata	4	S	LC	LC	Native
2025-12-11	Odonates	1.366886	103.732906	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2025-12-11	Odonates	1.367011	103.732625	*Agrionoptera insignis*	Grenadier	*Libellulidae*	Odonata	1	S	LC	LC	Native
2025-12-11	Odonates	1.367043	103.732290	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2025-12-11	Odonates	1.367460	103.732081	*Orthetrum chrysis*	Spine-Tufted Skimmer	*Libellulidae*	Odonata	2	S	LC	LC	Native
2025-12-11	Odonates	1.367460	103.732081	*Neurothemis fluctuans*	Common Parasol	*Libellulidae*	Odonata	1	S	LC	LC	Native
2025-12-11	Odonates	1.367425	103.733117	*Neurothemis fluctuans*	Common Parasol	*Libellulidae*	Odonata	2	S	LC	LC	Native
2025-12-11	Odonates	1.366525	103.733000	*Pycnonotus zeylanicus*	Straw-Headed Bulbul	*Pycnonotidae*	Aves	2	H	EN	CR	Native
2025-12-12	Diurnal	1.367217	103.731342	*Pseudocoladenia dan dhyana*	Fulvous Pied Flat	*Hesperiidae*	Lepidoptera	1	S	NT	NL	Origin Uncertain
2025-12-15	Nocturnal Aquatic	1.367383	103.732144	*Danio albolineatus*	Pearl danio	*Cyprinidae*	Freshwater Fish	4	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.367383	103.732144	*Melanoides tuberculata*	Malaysian trumpet snail	*Thiaridae*	Gastropoda	1	S	NA	LC	0
2025-12-15	Nocturnal Aquatic	1.367383	103.732144	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	3	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.367332	103.732155	*Danio albolineatus*	Pearl danio	*Cyprinidae*	Freshwater Fish	3	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.367332	103.732155	*Melanoides tuberculata*	Malaysian trumpet snail	*Thiaridae*	Gastropoda	2	S	NA	LC	0
2025-12-15	Nocturnal Aquatic	1.367371	103.732213	*Danio albolineatus*	Pearl danio	*Cyprinidae*	Freshwater Fish	7	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.367371	103.732213	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	12	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.367371	103.732213	*Melanoides tuberculata*	Malaysian trumpet snail	*Thiaridae*	Gastropoda	5	S	NA	LC	0
2025-12-15	Nocturnal Aquatic	1.366971	103.732814	*Danio albolineatus*	Pearl danio	*Cyprinidae*	Freshwater Fish	7	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.366971	103.732814	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	20	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.366946	103.732837	*Channa striata*	Common snakehead	*Channidae*	Freshwater Fish	1	S	LC	LC	Native
2025-12-15	Nocturnal Aquatic	1.366946	103.732837	*Trichopsis vittata*	Striped croaking gourami	*Osphronemidae*	Freshwater Fish	2	S	LC	LC	Native
2025-12-15	Nocturnal Aquatic	1.366946	103.732837	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	10	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.366946	103.732837	*Danio albolineatus*	Pearl danio	*Cyprinidae*	Freshwater Fish	3	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.366826	103.732953	*Channa striata*	Common snakehead	*Channidae*	Freshwater Fish	2	S	LC	LC	Native
2025-12-15	Nocturnal Aquatic	1.366826	103.732953	*Barbodes rhombeus*	Indochinese Spotted Barb	*Cyprinidae*	Freshwater Fish	1	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.365889	103.732722	*Clarias batrachus*	Common walking catfish	*Clariidae*	Freshwater Fish	1	S	NT	0	0
2025-12-15	Nocturnal Aquatic	1.365889	103.732722	*Barbodes rhombeus*	Indochinese Spotted Barb	*Cyprinidae*	Freshwater Fish	2	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.365889	103.732722	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	55	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.365889	103.732722	*Danio albolineatus*	Pearl danio	*Cyprinidae*	Freshwater Fish	1	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.365889	103.732722	*Channa striata*	Common snakehead	*Channidae*	Freshwater Fish	1	S	LC	LC	Native
2025-12-15	Nocturnal Aquatic	1.365889	103.732722	*Trichopsis vittata*	Striped croaking gourami	*Osphronemidae*	Freshwater Fish	1	S	LC	LC	Native
2025-12-15	Nocturnal Aquatic	1.366178	103.732614	*Trichopsis vittata*	Striped croaking gourami	*Osphronemidae*	Freshwater Fish	11	S	LC	LC	Native
2025-12-15	Nocturnal Aquatic	1.366178	103.732614	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	55	S	NA	LC	Introduced
2025-12-15	Nocturnal Aquatic	1.366178	103.732614	*Danio albolineatus*	Pearl danio	*Cyprinidae*	Freshwater Fish	14	S	NA	LC	Introduced
2025-12-16	Overnight bait trap	1.367150	103.732133	*Clarias batrachus*	Common walking catfish	*Clariidae*	Freshwater Fish	1	S	NT	0	0
2025-12-16	Diurnal Aquatic	1.367154	103.732140	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	20	S	NA	LC	Introduced
2025-12-16	Diurnal Aquatic	1.367154	103.732140	*Danio albolineatus*	Pearl danio	*Cyprinidae*	Freshwater Fish	1	S	NA	LC	Introduced
2025-12-16	Diurnal Aquatic	1.367154	103.732140	*Barbodes rhombeus*	Indochinese Spotted Barb	*Cyprinidae*	Freshwater Fish	1	S	NA	LC	Introduced
2025-12-16	Diurnal Aquatic	1.366904	103.732828	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	14	S	NA	LC	Introduced
2025-12-16	Diurnal Aquatic	1.366904	103.732828	*Radix rubiginosa*	Rust-coloured Pond Snail	*Lymnaeidae*	Gastropoda	2	S	NA	NL	0
2025-12-16	Diurnal Aquatic	1.366913	103.732805	*Trichopsis vittata*	Striped croaking gourami	*Osphronemidae*	Freshwater Fish	1	S	LC	LC	Native
2025-12-16	Diurnal Aquatic	1.366913	103.732805	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	36	S	NA	LC	Introduced
2025-12-16	Overnight bait trap	1.366867	103.732833	*NA*	No observation	*NA*	NA	-	-	NA	NA	NA
2025-12-16	Overnight bait trap	1.366467	103.732517	*Trichopsis vittata*	Striped croaking gourami	*Osphronemidae*	Freshwater Fish	1	S	LC	LC	Native
2025-12-16	Diurnal Aquatic	1.366228	103.732565	*Melanoides tuberculata*	Malaysian trumpet snail	*Thiaridae*	Gastropoda	1	S	NA	LC	0
2025-12-16	Diurnal Aquatic	1.366228	103.732565	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	4	S	NA	LC	Introduced
2025-12-16	Overnight bait trap	1.365717	103.732667	*Trichopsis vittata*	Striped croaking gourami	*Osphronemidae*	Freshwater Fish	1	S	LC	LC	Native
2025-12-16	Overnight bait trap	1.365717	103.732667	*Radix rubiginosa*	Rust-coloured Pond Snail	*Lymnaeidae*	Gastropoda	5	S	NA	NL	0
2025-12-16	Diurnal Aquatic	1.365923	103.732721	*Barbodes rhombeus*	Indochinese spotted barb	*Cyprinidae*	Freshwater Fish	1	S	NA	LC	Introduced
2025-12-16	Diurnal Aquatic	1.365923	103.732721	*Poecilia reticulata*	Guppy	*Poeciliidae*	Freshwater Fish	2	S	NA	LC	Introduced
2025-12-22	Nocturnal	1.370550	103.728590	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	1	S	LC	LC	Native
2025-12-22	Nocturnal	1.369713	103.729093	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	2	H	LC	LC	Native
2025-12-22	Nocturnal	1.368250	103.729959	*NA*	Firefly Sp.	*NA*	NA	1	S	NA	NA	NA

Date	Survey Type	Lat	Lon	Scientific Name	Common Name	Family	Taxon	Count	Heard/Seen	Local Status	Global IUCN Status	Origin
2025-12-22	Nocturnal	1.367747	103.730056	*Strix seloputo*	Spotted Wood Owl	*Strigidae*	Aves	1	H	VU	LC	Native
2025-12-22	Nocturnal	1.365902	103.729060	*Duttaphrynus bengalensis*	Bengal Toad	*Bufonidae*	Amphibian	1	S	NA	NL	Introduced
2025-12-22	Nocturnal	1.365902	103.729060	*Amaurornis phoenicurus*	White-Breasted Waterhen	*Rallidae*	Aves	1	S	LC	LC	Native
2025-12-22	Nocturnal	1.365579	103.728848	*Cynopterus brachyotis*	Lesser Short-Nosed Fruit Bat	*Pteropodidae*	Mammalia	1	S	LC	LC	Native
2025-12-22	Nocturnal	1.365526	103.727755	*Varanus salvator*	Malayan Water Monitor	*Varanidae*	Reptile	1	S	LC	LC	Native
2025-12-22	Nocturnal	1.365906	103.727830	*Cynopterus brachyotis*	Lesser Short-Nosed Fruit Bat	*Pteropodidae*	Mammalia	1	S	LC	LC	Native
2025-12-22	Nocturnal	1.366732	103.728212	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	1	H	LC	LC	Native
2025-12-22	Nocturnal	1.367131	103.728550	*NA*	Dog	*NA*	NA	2	H	NA	NA	NA
2025-12-22	Nocturnal	1.365629	103.733039	*Duttaphrynus bengalensis*	Bengal Toad	*Bufonidae*	Amphibian	1	S	NA	NL	Introduced
2025-12-22	Nocturnal	1.365679	103.733094	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2025-12-22	Nocturnal	1.365988	103.732934	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	1	H	LC	LC	Native
2025-12-22	Nocturnal	1.365986	103.732961	*Duttaphrynus bengalensis*	Bengal Toad	*Bufonidae*	Amphibian	1	S	NA	NL	Introduced
2025-12-22	Nocturnal	1.367019	103.733452	*Muridae*	Rat Sp.	*Muridae*	Mammalia	2	S	NA	NA	NA
2025-12-22	Nocturnal	1.367418	103.731744	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	1	H	LC	LC	Native
2025-12-22	Nocturnal	1.366347	103.731011	*Muridae*	Rat Sp.	*Muridae*	Mammalia	2	S	NA	NA	NA
2025-12-22	Nocturnal	1.364987	103.732513	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	1	S	LC	LC	Native
2025-12-26	Diurnal	1.367128	103.729466	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2025-12-26	Diurnal	1.367128	103.729466	*Pycnonotus goiavier*	Yellow-Vented Bulbul	*Pycnonotidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.367128	103.729466	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.367128	103.729466	*Chrysophlegma miniaceum*	Banded Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.367128	103.729466	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.367128	103.729466	*Picus vittatus*	Laced Woodpecker	*Picidae*	Aves	1	S	LC	LC	Native
2025-12-26	Diurnal	1.367128	103.729466	*Dinopium javanense*	Common Flameback	*Picidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.367128	103.729466	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2025-12-26	Diurnal	1.367128	103.729466	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	H	NA	LC	Introduced
2025-12-26	Diurnal	1.366796	103.729372	*Pycnonotus goiavier*	Yellow-Vented Bulbul	*Pycnonotidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.366796	103.729372	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2025-12-26	Diurnal	1.366796	103.729372	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.366497	103.729281	*Anthreptes malacensis*	Brown-Throated Sunbird	*Nectariniidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.366369	103.729242	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.366216	103.729181	*Hierococcyx nisicolor*	Hodgson'S Hawk-Cuckoo	*Cuculidae*	Aves	1	S	NT	LC	Native
2025-12-26	Diurnal	1.366216	103.729181	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	2	H	LC	LC	Native
2025-12-26	Diurnal	1.366216	103.729181	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	1	S	LC	LC	Native
2025-12-26	Diurnal	1.366039	103.729008	*Chalcophaps indica*	Common Emerald Dove	*Columbidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365749	103.728770	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2025-12-26	Diurnal	1.365749	103.728770	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365566	103.728820	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365462	103.728819	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365215	103.728768	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365215	103.728768	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	3	H	NA	LC	Introduced
2025-12-26	Diurnal	1.365029	103.728416	*Hemiprocne longipennis*	Grey-Rumped Treeswift	*Hemiprocnidae*	Aves	1	H	NT	LC	Native
2025-12-26	Diurnal	1.364900	103.728205	*Halcyon smyrnensis*	White-Throated Kingfisher	*Alcedinidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365177	103.727678	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	1	H	NA	VU	Introduced
2025-12-26	Diurnal	1.365397	103.727769	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365604	103.727746	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2025-12-26	Diurnal	1.365854	103.727823	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365854	103.727823	*Anthreptes malacensis*	Brown-Throated Sunbird	*Nectariniidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365891	103.727838	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365891	103.727838	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.366229	103.728058	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.366440	103.728096	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	3	H	NA	LC	Introduced
2025-12-26	Diurnal	1.366440	103.728096	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.366440	103.728096	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	S	LC	LC	Native
2025-12-26	Diurnal	1.366440	103.728096	*Eurystomus orientalis*	Oriental Dollarbird	*Coraciidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.366948	103.728310	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	S	LC	LC	Native
2025-12-26	Diurnal	1.367265	103.729757	*Sundasciurus tenuis*	Slender Squirrel	*Sciuridae*	Mammalia	1	H	LC	LC	Native
2025-12-26	Diurnal	1.368902	103.729491	*Dicrurus paradiseus*	Greater Racket-Tailed Drongo	*Dicruridae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.369556	103.729178	*Dicrurus paradiseus*	Greater Racket-Tailed Drongo	*Dicruridae*	Aves	2	S	LC	LC	Native
2025-12-26	Diurnal	1.370042	103.728840	*Pericrocotus divaricatus*	Ashy Minivet	*Campephagidae*	Aves	2	H	LC	LC	Native
2025-12-26	Diurnal	1.365540	103.732993	*Psittacula longicauda*	Long-Tailed Parakeet	*Psittaculidae*	Aves	1	H	NT	VU	Native
2025-12-26	Diurnal	1.365540	103.732993	*Psittacula alexandri*	Red-Breasted Parakeet	*Psittaculidae*	Aves	1	H	NA	NT	Introduced
2025-12-26	Diurnal	1.366154	103.732849	*Aerodramus sp.*	Aerodramus Swiftlet	*Apodidae*	Aves	1	H	NA	NA	NA
2025-12-26	Diurnal	1.366363	103.732855	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	H	NA	LC	Introduced

Date	Survey Type	Lat	Lon	Scientific Name	Common Name	Family	Taxon	Count	Heard/Seen	Local Status	Global IUCN Status	Origin
2025-12-26	Diurnal	1.366767	103.733226	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	4	H	NA	VU	Introduced
2025-12-26	Diurnal	1.366962	103.733314	*Orthotomus atrogularis*	Dark-Necked Tailorbird	*Cisticolidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.367567	103.733021	*Nisaetus cirrhatus*	Changeable Hawk-Eagle	*Accipitridae*	Aves	1	H	VU	LC	Native
2025-12-26	Diurnal	1.366847	103.731445	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.366698	103.731155	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	1	H	NA	VU	Introduced
2025-12-26	Diurnal	1.365785	103.731573	*Mixornis gularis*	Pin-Striped Tit-Babbler	*Timaliidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365785	103.731573	*Aerodramus sp.*	Aerodramus Swiftlet	*Apodidae*	Aves	2	S	NA	NA	NA
2025-12-26	Diurnal	1.365490	103.731786	*Psittacula alexandri*	Red-Breasted Parakeet	*Psittaculidae*	Aves	1	H	NA	NT	Introduced
2025-12-26	Diurnal	1.365490	103.731786	*Dinopium javanense*	Common Flameback	*Picidae*	Aves	1	S	LC	LC	Native
2025-12-26	Diurnal	1.365490	103.731786	*Eurystomus orientalis*	Oriental Dollarbird	*Coraciidae*	Aves	2	S	LC	LC	Native
2025-12-26	Diurnal	1.365305	103.731976	*Anthreptes malacensis*	Brown-Throated Sunbird	*Nectariniidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.364957	103.732194	*Merops viridis*	Blue-Throated Bee-Eater	*Meropidae*	Aves	4	S	LC	LC	Native
2025-12-26	Diurnal	1.364957	103.732194	*Nisaetus cirrhatus*	Changeable Hawk-Eagle	*Accipitridae*	Aves	1	H	VU	LC	Native
2025-12-26	Diurnal	1.365031	103.732669	*Cinnyris ornatus*	Ornate Sunbird	*Nectariniidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365031	103.732669	*Aegithina tiphia*	Common Iora	*Aegithinidae*	Aves	1	H	LC	LC	Native
2025-12-26	Diurnal	1.365031	103.732669	*Lalage nigra*	Pied Triller	*Campephagidae*	Aves	1	S	LC	LC	Native
2026-01-13	Nocturnal	1.367575	103.730053	*Limnonectes blythii*	Malayan Giant Frog	*Dicroglossidae*	Amphibian	1	S	LC	LC	Native
2026-01-13	Nocturnal	1.365491	103.728858	*Eleutherodactylus planirostris*	Greenhouse Frog	*Eleutherodactylidae*	Amphibian	1	H	NA	LC	Introduced
2026-01-13	Nocturnal	1.365086	103.728711	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2026-01-13	Nocturnal	1.366004	103.727933	*Otus lettia*	Collared Scops Owl	*Strigidae*	Aves	1	H	LC	LC	Native
2026-01-13	Nocturnal	1.366140	103.728016	*Rallina fasciata*	Red-Legged Crake	*Rallidae*	Aves	1	H	NT	LC	Native
2026-01-13	Nocturnal	1.366262	103.728072	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2026-01-13	Nocturnal	1.367111	103.728451	*Sylvirana guentheri*	Gunther'S Frog	*Ranidae*	Amphibian	1	H	NA	LC	Introduced
2026-01-13	Nocturnal	1.367094	103.728564	*Microhyla heymonsi*	Dark-Sided Chorus Frog	*Microhylidae*	Amphibian	2	H	LC	LC	Native
2026-01-13	Nocturnal	1.364931	103.733754	*Ahaetulla prasina*	Oriental Whip Snake	*Colubridae*	Reptile	1	S	LC	LC	Native
2026-01-13	Nocturnal	1.365044	103.733062	*Microhyla mukhlesuri*	Mukhlesur'S Chorus Frog	*Microhylidae*	Amphibian	2	H	NA	LC	Introduced
2026-01-13	Nocturnal	1.365796	103.733000	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2026-01-13	Nocturnal	1.365796	103.733000	*Caprimulgus affinis*	Savanna Nightjar	*Caprimulgidae*	Aves	1	H	LC	LC	Native
2026-01-13	Nocturnal	1.365971	103.732974	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2026-01-13	Nocturnal	1.366070	103.732935	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2026-01-13	Nocturnal	1.366675	103.733237	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2026-01-13	Nocturnal	1.367464	103.732457	*Cynopterus brachyotis*	Lesser Short-Nosed Fruit Bat	*Pteropodidae*	Mammalia	1	S	LC	LC	Native
2026-01-13	Nocturnal	1.367462	103.732368	*Duttaphrynus bengalensis*	Bengal Toad	*Bufonidae*	Amphibian	1	S	NA	NL	Introduced
2026-01-13	Nocturnal	1.367457	103.732027	*Microhyla heymonsi*	Dark-Sided Chorus Frog	*Microhylidae*	Amphibian	1	H	LC	LC	Native
2026-01-13	Nocturnal	1.367457	103.732027	*Otus lettia*	Collared Scops Owl	*Strigidae*	Aves	1	H	LC	LC	Native
2026-01-13	Nocturnal	1.364991	103.732247	*Caprimulgus sp.*	Nightjar Sp.	*Caprimulgidae*	Aves	1	S	NA	NA	NA
2026-01-14	Diurnal	1.367236	103.729596	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	H	NA	LC	Introduced
2026-01-14	Diurnal	1.367123	103.729424	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.367123	103.729424	*Mixornis gularis*	Pin-Striped Tit-Babbler	*Timaliidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.367123	103.729424	*Callosciurus notatus*	Plantain Squirrel	*Sciuridae*	Mammalia	1	H	LC	LC	Native
2026-01-14	Diurnal	1.367057	103.729335	*Acridotheres tristis*	Common Myna	*Sturnidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.367057	103.729335	*Pycnonotus goiavier*	Yellow-Vented Bulbul	*Pycnonotidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.367057	103.729335	*Callosciurus notatus*	Plantain Squirrel	*Sciuridae*	Mammalia	1	S	LC	LC	Native
2026-01-14	Diurnal	1.366839	103.729356	*Chrysophlegma miniaceum*	Banded Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366730	103.729313	*Psittacula longicauda*	Long-Tailed Parakeet	*Psittaculidae*	Aves	1	H	NT	VU	Native
2026-01-14	Diurnal	1.366730	103.729313	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366730	103.729313	*Halcyon smyrnensis*	White-Throated Kingfisher	*Alcedinidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366730	103.729313	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	2	H	NA	LC	Introduced
2026-01-14	Diurnal	1.366730	103.729313	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366590	103.729293	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366590	103.729293	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	2	H	NA	LC	Introduced
2026-01-14	Diurnal	1.366590	103.729293	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	1	H	NA	VU	Introduced
2026-01-14	Diurnal	1.366590	103.729293	*Aethopyga siparaja*	Crimson Sunbird	*Nectariniidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366590	103.729293	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	5	H	LC	LC	Native
2026-01-14	Diurnal	1.366149	103.729214	*Aerodramus sp.*	Aerodramus Swiftlet	*Apodidae*	Aves	1	H	NA	NA	NA
2026-01-14	Diurnal	1.366149	103.729214	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365806	103.728854	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365372	103.728859	*Chrysophlegma miniaceum*	Banded Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365372	103.728859	*Picus vittatus*	Laced Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365181	103.728822	*Anthreptes malacensis*	Brown-Throated Sunbird	*Nectariniidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365181	103.728822	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365181	103.728822	*Dicrurus paradiseus*	Greater Racket-Tailed Drongo	*Dicruridae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365629	103.727688	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native

Date	Survey Type	Lat	Lon	Scientific Name	Common Name	Family	Taxon	Count	Heard/Seen	Local Status	Global IUCN Status	Origin
2026-01-14	Diurnal	1.365728	103.727807	*Treron vernans*	Pink-Necked Green Pigeon	*Columbidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365807	103.727824	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366106	103.727933	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366355	103.728042	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	1	H	NA	LC	Introduced
2026-01-14	Diurnal	1.366455	103.728011	*Cratilla metallica*	Dark-Tipped Forest Skimmer	*Libellulidae*	Odonata	1	S	LC	LC	Native
2026-01-14	Diurnal	1.366585	103.728043	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366717	103.728192	*Callosciurus notatus*	Plantain Squirrel	*Sciuridae*	Mammalia	1	S	LC	LC	Native
2026-01-14	Diurnal	1.366378	103.728289	*Sundasciurus tenuis*	Slender Squirrel	*Sciuridae*	Mammalia	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366230	103.729204	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Diurnal	1.367699	103.729991	*Centropus bengalensis*	Lesser Coucal	*Cuculidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365169	103.733532	*Nisaetus cirrhatus*	Changeable Hawk-Eagle	*Accipitridae*	Aves	1	H	VU	LC	Native
2026-01-14	Diurnal	1.365338	103.733062	*Ficedula zanthopygia*	Yellow-Rumped Flycatcher	*Muscicapidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365543	103.733017	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365543	103.733017	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	10	H	LC	LC	Native
2026-01-14	Diurnal	1.365543	103.733017	*Amaurornis phoenicurus*	White-Breasted Waterhen	*Rallidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365543	103.733017	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365543	103.733017	*Psittacula alexandri*	Red-Breasted Parakeet	*Psittaculidae*	Aves	1	H	NA	NT	Introduced
2026-01-14	Diurnal	1.365728	103.733100	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2026-01-14	Diurnal	1.365929	103.732950	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	20	H	LC	LC	Native
2026-01-14	Diurnal	1.366035	103.732924	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2026-01-14	Diurnal	1.366035	103.732924	*Pycnonotus goiavier*	Yellow-Vented Bulbul	*Pycnonotidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366035	103.732924	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366170	103.732835	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	1	S	NA	VU	Introduced
2026-01-14	Diurnal	1.366227	103.732810	*Cacomantis sonneratii*	Banded Bay Cuckoo	*Cuculidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366468	103.732915	*Picus vittatus*	Laced Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366515	103.732970	*Nisaetus cirrhatus*	Changeable Hawk-Eagle	*Accipitridae*	Aves	1	H	VU	LC	Native
2026-01-14	Diurnal	1.366721	103.733111	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	H	VU	LC	Native
2026-01-14	Diurnal	1.366718	103.733153	*Muscicapa dauurica*	Asian Brown Flycatcher	*Muscicapidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366718	103.733153	*Pycnonotus zeylanicus*	Straw-Headed Bulbul	*Pycnonotidae*	Aves	1	H	EN	CR	Native
2026-01-14	Diurnal	1.367068	103.733412	*Merops viridis*	Blue-Throated Bee-Eater	*Meropidae*	Aves	1	S	LC	LC	Native
2026-01-14	Diurnal	1.367485	103.733195	*Aegithina tiphia*	Common Iora	*Aegithinidae*	Aves	2	H	LC	LC	Native
2026-01-14	Diurnal	1.367462	103.732123	*#N/A*	Fish Eagle Sp.	*#N/A*	#N/A	1	S	#N/A	#N/A	#N/A
2026-01-14	Diurnal	1.367323	103.731749	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Diurnal	1.366934	103.731397	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2026-01-14	Diurnal	1.366649	103.731118	*Mixornis gularis*	Pin-Striped Tit-Babbler	*Timaliidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.366649	103.731118	*Nisaetus cirrhatus*	Changeable Hawk-Eagle	*Accipitridae*	Aves	1	H	VU	LC	Native
2026-01-14	Diurnal	1.366578	103.731032	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	3	H	NA	VU	Introduced
2026-01-14	Diurnal	1.366578	103.731032	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	3	H	LC	LC	Native
2026-01-14	Diurnal	1.366350	103.730978	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2026-01-14	Diurnal	1.366121	103.731105	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	2	H	LC	LC	Native
2026-01-14	Diurnal	1.365565	103.731751	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2026-01-14	Diurnal	1.365536	103.731827	*Muscicapa dauurica*	Asian Brown Flycatcher	*Muscicapidae*	Aves	1	S	LC	LC	Native
2026-01-14	Diurnal	1.365536	103.731827	*Phylloscopus borealis*	Arctic Warbler	*Phylloscopidae*	Aves	1	S	LC	LC	Native
2026-01-14	Diurnal	1.365094	103.733300	*Eurystomus orientalis*	Oriental Dollarbird	*Coraciidae*	Aves	2	H	LC	LC	Native
2026-01-14	Diurnal	1.365657	103.733059	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	H	NA	LC	Introduced
2026-01-14	Odonates	1.365868	103.732684	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	3	S	VU	LC	Native
2026-01-14	Odonates	1.365967	103.732684	*Orthetrum chrysis*	Spine-Tufted Skimmer	*Libellulidae*	Odonata	1	A	LC	LC	Native
2026-01-14	Odonates	1.365967	103.732684	*Gynacantha sp.*	Duskhawker Sp.	*Aeshnidae*	Odonata	1	S	NA	NA	NA
2026-01-14	Odonates	1.365967	103.732684	*Archibasis viola*	Violet Sprite	*Coenagrionidae*	Odonata	1	S	LC	LC	Native
2026-01-14	Odonates	1.366183	103.732611	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Odonates	1.366285	103.732532	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Odonates	1.366377	103.732477	*Orthetrum chrysis*	Spine-Tufted Skimmer	*Libellulidae*	Odonata	1	S	LC	LC	Native
2026-01-14	Odonates	1.366532	103.732516	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Odonates	1.366542	103.732493	*Agrionoptera insignis*	Grenadier	*Libellulidae*	Odonata		S	LC	LC	Native
2026-01-14	Odonates	1.366665	103.732456	*Orthetrum chrysis*	Spine-Tufted Skimmer	*Libellulidae*	Odonata	1	S	LC	LC	Native
2026-01-14	Odonates	1.366665	103.732456	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	2	S	VU	LC	Native
2026-01-14	Odonates	1.366665	103.732456	*Orthetrum chrysis*	Spine-Tufted Skimmer	*Libellulidae*	Odonata	1	S	LC	LC	Native
2026-01-14	Odonates	1.366971	103.732543	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Odonates	1.366971	103.732543	*Orthetrum chrysis*	Spine-Tufted Skimmer	*Libellulidae*	Odonata	1	S	LC	LC	Native
2026-01-14	Odonates	1.366889	103.732775	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Odonates	1.366889	103.732775	*Picus vittatus*	Laced Woodpecker	*Picidae*	Aves	1	S	LC	LC	Native
2026-01-14	Odonates	1.366882	103.732835	*Trachemys scripta*	Red-Eared Slider	*Emydidae*	Reptile	1	S	NA	LC	Introduced
2026-01-14	Odonates	1.366882	103.732835	*Brachydiplax chalybea*	Blue Dasher	*Libellulidae*	Odonata	1	S	LC	LC	Native

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2026-01-14	Odonates	1.366882	103.732835	*Chalcophaps indica*	Common Emerald Dove	*Columbidae*	Aves	1	H	LC	LC	Native
2026-01-14	Odonates	1.366882	103.732835	*Orthetrum chrysis*	Spine-Tufted Skimmer	*Libellulidae*	Odonata	2	S	LC	LC	Native
2026-01-14	Odonates	1.366882	103.732835	*Psittacula krameri*	Rose-Ringed Parakeet	*Psittaculidae*	Aves	1	H	NA	LC	Introduced
2026-01-14	Odonates	1.366882	103.732835	*Archibasis viola*	Violet Sprite	*Coenagrionidae*	Odonata	1	S	LC	LC	Native
2026-01-14	Odonates	1.367162	103.732173	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Odonates	1.367343	103.732093	*Eutropis multifasciata*	Many-Lined Sun Skink	*Scincidae*	Reptile	1	S	LC	LC	Native
2026-01-14	Odonates	1.367326	103.732101	*Archibasis viola*	Violet Sprite	*Coenagrionidae*	Odonata	1	S	LC	LC	Native
2026-01-14	Odonates	1.367248	103.732141	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Odonates	1.367026	103.732292	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-14	Odonates	1.366237	103.732535	*Cratilla metallica*	Dark-Tipped Forest Skimmer	*Libellulidae*	Odonata	1	S	LC	LC	Native
2026-01-16	Diurnal (Butterflies)	1.367356	103.729978	*Zizeeria maha serica*	Pale Grass Blue	*Lycaenidae*	Lepidoptera	1	S	LC	NL	Native
2026-01-16	Diurnal (Butterflies)	1.367356	103.729978	*Ideopsis vulgaris macrina*	Blue Glassy Tiger	*Nymphalidae*	Lepidoptera	1	S	LC	NL	Native
2026-01-16	Diurnal (Butterflies)	1.367356	103.729978	*NA*	Eggfly Sp.	*NA*	NA	1	S	NA	NA	NA
2026-01-16	Diurnal (Butterflies)	1.367356	103.729978	*Neurothemis fluctuans*	Common Parasol	*Libellulidae*	Odonata	2	S	LC	LC	Native
2026-01-16	Diurnal (Butterflies)	1.366169	103.729174	*Eurema sp.*	Grass Yellow Sp.	*Pieridae*	Lepidoptera	2	S	NA	NA	NA
2026-01-16	Diurnal (Butterflies)	1.366169	103.729174	*Ideopsis vulgaris macrina*	Blue Glassy Tiger	*Nymphalidae*	Lepidoptera	1	S	LC	NL	Native
2026-01-16	Diurnal (Butterflies)	1.366229	103.727977	*Eooxylides tharis distanti*	Branded Imperial	*Lycaenidae*	Lepidoptera	2	S	LC	NL	Native
2026-01-16	Diurnal (Butterflies)	1.367964	103.730021	*Euthalia aconthea gurda*	Baron	*Nymphalidae*	Lepidoptera	1	S	LC	NL	Native
2026-01-16	Diurnal (Butterflies)	1.369007	103.729510	*NA*	Lascar Sp.	*NA*	NA	1	S	NA	NA	NA
2026-01-16	Diurnal (Butterflies)	1.370595	103.728558	*NA*	Frog Sp.	*NA*	NA	1	S	NA	NA	NA
2026-01-16	Diurnal (Butterflies)	1.370595	103.728558	*Jamides celeno aelianus*	Common Caerulean	*Lycaenidae*	Lepidoptera	1	S	LC	NL	Native
2026-01-16	Diurnal (Butterflies)	1.370595	103.728558	*NA*	Odonate Sp.	*NA*	NA	1	S	NA	NA	NA
2026-01-16	Diurnal (Butterflies)	1.370595	103.728558	*Papilio polytes romulus*	Common Mormon	*Papilionidae*	Lepidoptera	1	S	LC	NL	Native
2026-01-16	Diurnal (Butterflies)	1.365009	103.733779	*Eurema sp.*	Grass Yellow Sp.	*Pieridae*	Lepidoptera	10	S	NA	NA	NA
2026-01-16	Diurnal (Butterflies)	1.366490	103.730994	*Papilio polytes romulus*	Common Mormon	*Papilionidae*	Lepidoptera	1	S	LC	NL	Native
2026-01-16	Diurnal (Butterflies)	1.366490	103.730994	*Mycalesis sp.*	Bush Brown Sp.	*Nymphalidae*	Lepidoptera	1	S	NA	NA	NA
2026-01-28	Diurnal	1.364953	103.733094	*Picus vittatus*	Laced Woodpecker	*Picidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365518	103.732967	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	1	H	NA	LC	Introduced
2026-01-28	Diurnal	1.365518	103.732967	*Psilopogon haemacephalus*	Coppersmith Barbet	*Megalaimidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365518	103.732967	*Copsychus saularis*	Oriental Magpie-Robin	*Muscicapidae*	Aves	1	H	VU	LC	Native
2026-01-28	Diurnal	1.365670	103.733059	*Gallus gallus*	Red Junglefowl	*Phasianidae*	Aves	1	S	NT	LC	Native
2026-01-28	Diurnal	1.365670	103.733059	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365760	103.733109	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365760	103.733109	*Pycnonotus plumosus*	Olive-Winged Bulbul	*Pycnonotidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365760	103.733109	*Pycnonotus goiavier*	Yellow-Vented Bulbul	*Pycnonotidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.366049	103.732911	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	1	H	NA	VU	Introduced
2026-01-28	Diurnal	1.366049	103.732911	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	H	NA	LC	Introduced
2026-01-28	Diurnal	1.366049	103.732911	*Corvus splendens*	House Crow	*Corvidae*	Aves	1	H	NA	LC	Introduced
2026-01-28	Diurnal	1.366136	103.732864	*Aerodramus sp.*	Aerodramus Swiftlet	*Apodidae*	Aves	16	S	NA	NA	NA
2026-01-28	Diurnal	1.366136	103.732864	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.366136	103.732864	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	3	H	NA	LC	Introduced
2026-01-28	Diurnal	1.366244	103.732795	*Pycnonotus plumosus*	Olive-Winged Bulbul	*Pycnonotidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.366244	103.732795	*Copera vittata*	Variable Featherlegs	*Platycnemididae*	Odonata	1	S	VU	LC	Native
2026-01-28	Diurnal	1.366374	103.732911	*Psittacula alexandri*	Red-Breasted Parakeet	*Psittaculidae*	Aves	1	H	NA	NT	Introduced
2026-01-28	Diurnal	1.366374	103.732911	*Dinopium javanense*	Common Flameback	*Picidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.366472	103.732934	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	2	H	NA	VU	Introduced
2026-01-28	Diurnal	1.366472	103.732934	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	1	H	NA	LC	Introduced
2026-01-28	Diurnal	1.366472	103.732934	*Chalcophaps indica*	Common Emerald Dove	*Columbidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.366970	103.733361	*Pycnonotus zeylanicus*	Straw-Headed Bulbul	*Pycnonotidae*	Aves	1	H	EN	CR	Native
2026-01-28	Diurnal	1.366935	103.731363	*Psilopogon lineatus*	Lineated Barbet	*Megalaimidae*	Aves	2	H	NA	LC	Introduced
2026-01-28	Diurnal	1.366669	103.731186	*Trichoglossus haematodus*	Coconut Lorikeet	*Psittaculidae*	Aves	1	H	NA	LC	Introduced
2026-01-28	Diurnal	1.366376	103.730972	*Zosterops simplex*	Swinhoe'S White-Eye	*Zosteropidae*	Aves	2	H	VU	LC	Native + Introduced
2026-01-28	Diurnal	1.365734	103.731668	*Orthotomus sutorius*	Common Tailorbird	*Cisticolidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365734	103.731668	*Pycnonotus zeylanicus*	Straw-Headed Bulbul	*Pycnonotidae*	Aves	1	H	EN	CR	Native
2026-01-28	Diurnal	1.365734	103.731668	*Aegithina tiphia*	Common Iora	*Aegithinidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365734	103.731668	*Neptis hylas papaja*	Common Sailor	*Nymphalidae*	Lepidoptera	1	H	LC	NL	Native
2026-01-28	Diurnal	1.365734	103.731668	*Oriolus chinensis*	Black-Naped Oriole	*Oriolidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365734	103.731668	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365411	103.731800	*Chalcophaps indica*	Common Emerald Dove	*Columbidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365411	103.731800	*Merops philippinus*	Blue-Tailed Bee-Eater	*Meropidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.364949	103.732225	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	5	H	LC	LC	Native
2026-01-28	Diurnal	1.364942	103.733016	*Eudynamys scolopaceus*	Asian Koel	*Cuculidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.372621	103.731730	*Lanius cristatus*	Brown Shrike	*Laniidae*	Aves	1	H	VU	LC	Native

Date	Survey Type	Lat	Lon	Scientific Name	Common Name	Family	Taxon	Count	Heard/Seen	Local Status	Global IUCN Status	Origin
2026-01-28	Diurnal	1.367178	103.729431	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.367178	103.729431	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	*Dicaeidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.367085	103.729391	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.366170	103.729064	*Aerodramus sp.*	Aerodramus Swiftlet	*Apodidae*	Aves	2	S	NA	NA	NA
2026-01-28	Diurnal	1.365978	103.729026	*Loriculus galgulus*	Blue-Crowned Hanging Parrot	*Psittaculidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365978	103.729026	*Aethopyga siparaja*	Crimson Sunbird	*Nectariniidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365978	103.729026	*Psittacula longicauda*	Long-Tailed Parakeet	*Psittaculidae*	Aves	2	H	NT	VU	Native
2026-01-28	Diurnal	1.365652	103.728819	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365080	103.728781	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	3	H	NA	LC	Introduced
2026-01-28	Diurnal	1.364957	103.728262	*Pericrocotus divaricatus*	Ashy Minivet	*Campephagidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.365121	103.727723	*Garrulax leucolophus*	White-Crested Laughingthrush	*Leiotrichidae*	Aves	2	H	NA	LC	Introduced
2026-01-28	Diurnal	1.365121	103.727723	*Aplonis panayensis*	Asian Glossy Starling	*Sturnidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.366279	103.728082	*Eooxylides tharis distanti*	Branded Imperial	*Lycaenidae*	Lepidoptera	1	H	LC	NL	Native
2026-01-28	Diurnal	1.366782	103.728218	*Acridotheres javanicus*	Javan Myna	*Sturnidae*	Aves	1	H	NA	VU	Introduced
2026-01-28	Diurnal	1.366838	103.728767	*Merops philippinus*	Blue-Tailed Bee-Eater	*Meropidae*	Aves	1	H	LC	LC	Native
2026-01-28	Diurnal	1.367580	103.730033	*Nisaetus cirrhatus*	Changeable Hawk-Eagle	*Accipitridae*	Aves	1	H	VU	LC	Native
2026-01-28	Diurnal	1.368864	103.729575	*Gracula religiosa*	Common Hill Myna	*Sturnidae*	Aves	1	H	NT	LC	Native
2026-01-28	Diurnal	1.371196	103.729349	*Orthotomus atrogularis*	Dark-Necked Tailorbird	*Cisticolidae*	Aves	1	H	LC	LC	Native
2026-01-29	Nocturnal	1.365539	103.732990	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	2	H	LC	LC	Native
2026-01-29	Nocturnal	1.365539	103.732990	*Caprimulgus affinis*	Savanna Nightjar	*Caprimulgidae*	Aves	1	H	LC	LC	Native
2026-01-29	Nocturnal	1.366231	103.732877	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	1	H	LC	LC	Native
2026-01-29	Nocturnal	1.366886	103.733239	*Cynopterus brachyotis*	Lesser Short-Nosed Fruit Bat	*Pteropodidae*	Mammalia	1	S	LC	LC	Native
2026-01-29	Nocturnal	1.367071	103.733422	*Otus sp.*	Scops Owl Sp.	*Strigidae*	Aves	1	H	NA	NA	NA
2026-01-29	Nocturnal	1.366982	103.731386	*Rallina fasciata*	Red-Legged Crake	*Rallidae*	Aves	1	H	NT	LC	Native
2026-01-29	Nocturnal	1.366702	103.731112	*Caprimulgus macrurus*	Large-Tailed Nightjar	*Caprimulgidae*	Aves	1	H	LC	LC	Native
2026-01-29	Nocturnal	1.366318	103.730995	*Cynopterus brachyotis*	Lesser Short-Nosed Fruit Bat	*Pteropodidae*	Mammalia	2	S	LC	LC	Native
2026-01-29	Nocturnal	1.366718	103.729307	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2026-01-29	Nocturnal	1.366266	103.729237	*Cynopterus brachyotis*	Lesser Short-Nosed Fruit Bat	*Pteropodidae*	Mammalia	1	S	LC	LC	Native
2026-01-29	Nocturnal	1.365281	103.728792	*Muridae*	Rat Sp.	*Muridae*	Mammalia	1	S	NA	NA	NA
2026-01-29	Nocturnal	1.366170	103.728011	*Dicrurus paradiseus*	Greater Racket-Tailed Drongo	*Dicruridae*	Aves	1	H	LC	LC	Native
2026-01-29	Nocturnal	1.366558	103.728047	*Otus sp.*	Scops Owl Sp.	*Strigidae*	Aves	1	H	NA	NA	NA

Appendix E Camera Trap Records

Retrieval Date	File Name	Camera Trap	Date	Time	Species count	Common name	Count	SRDB3 Status	Comments
5/2/2026	CT01_DCIM0001_251205.AVI	CT01	5/12/2025	12:46:42	-	-	-	-	
5/2/2026	CT01_DCIM0002_251205.AVI	CT01	5/12/2025	12:47:14	-	-	-	-	
5/2/2026	CT01_DCIM0003_251205.AVI	CT01	5/12/2025	12:47:34	-	-	-	-	
5/2/2026	CT01_DCIM0004_251205.AVI	CT01	5/12/2025	12:48:04	-	-	-	-	
5/2/2026	CT01_DCIM0005_251205.AVI	CT01	5/12/2025	12:48:26	-	-	-	-	
5/2/2026	CT01_DCIM0006_251206.AVI	CT01	6/12/2025	5:02:28	1	Sunda Pangolin	1	CR	
5/2/2026	CT01_DCIM0007_251211.AVI	CT01	11/12/2025	16:40:16	1	Long-tailed Macaque	4	LC	
5/2/2026	CT01_DCIM0008_251211.AVI	CT01	11/12/2025	16:40:46	1	Long-tailed Macaque	2	LC	
5/2/2026	CT01_DCIM0009_251223.AVI	CT01	23/12/2025	12:21:44	-	-	-	-	
5/2/2026	CT01_DCIM0010_260103.AVI	CT01	3/1/2026	13:40:48	1	Wild Dog	2	#N/A	
5/2/2026	CT02_DCIM0001_261205.AVI	CT02	5/12/2025	13:20:06	-	-	-	-	
5/2/2026	CT02_DCIM0002_261205.AVI	CT02	5/12/2025	13:20:26	-	-	-	-	
5/2/2026	CT02_DCIM0003_261205.AVI	CT02	5/12/2025	13:21:22	-	-	-	-	
5/2/2026	CT02_DCIM0004_261211.AVI	CT02	11/12/2025	9:01:02	-	-	-	-	
5/2/2026	CT02_DCIM0005_261230.AVI	CT02	30/12/2025	18:46:26	-	-	-	-	
5/2/2026	CT02_DCIM0006_270102.AVI	CT02	2/1/2026	13:18:16	-	-	-	-	
5/2/2026	CT02_DCIM0007_270102.AVI	CT02	2/1/2026	13:20:18	-	-	-	-	
5/2/2026	CT02_DCIM0008_270102.AVI	CT02	2/1/2026	13:22:38	-	-	-	-	
5/2/2026	CT02_DCIM0009_270104.AVI	CT02	4/1/2026	10:10:52	-	-	-	-	
5/2/2026	CT02_DCIM0010_270104.AVI	CT02	4/1/2026	10:11:16	-	-	-	-	
5/2/2026	CT03_DCIM0001_251203.AVI	CT03	3/12/2025	13:48:16	-	-	-	-	
5/2/2026	CT03_DCIM0002_251203.AVI	CT03	3/12/2025	13:48:54	-	-	-	-	
5/2/2026	CT03_DCIM0003_251203.AVI	CT03	3/12/2025	13:49:14	-	-	-	-	
5/2/2026	CT03_DCIM0004_251220.AVI	CT03	20/12/2025	11:32:08	-	-	-	-	
5/2/2026	CT03_DCIM0005_251220.AVI	CT03	20/12/2025	11:32:36	-	-	-	-	
5/2/2026	CT03_DCIM0006_251220.AVI	CT03	20/12/2025	11:33:22	-	-	-	-	
5/2/2026	CT03_DCIM0007_251230.AVI	CT03	30/12/2025	19:10:40	1	Plantain Squirrel	1	LC	
5/2/2026	CT03_DCIM0008_260104.AVI	CT03	4/1/2026	11:51:00	-	-	-	-	
5/2/2026	CT04_DCIM0001_260101.MP4	CT04	1/1/2026	6:22:56	-	-	-	-	
5/2/2026	CT04_DCIM0002_260101.MP4	CT04	1/1/2026	7:19:10	-	-	-	-	
5/2/2026	CT04_DCIM0003_260101.MP4	CT04	1/1/2026	9:55:58		Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0004_260101.MP4	CT04	1/1/2026	13:52:04	-	-	-	-	
5/2/2026	CT04_DCIM0005_260101.MP4	CT04	1/1/2026	15:35:08	-	-	-	-	
5/2/2026	CT04_DCIM0006_260101.MP4	CT04	1/1/2026	17:02:40	-	-	-	-	
5/2/2026	CT04_DCIM0007_260102.MP4	CT04	2/1/2026	0:45:36	-	-	-	-	
5/2/2026	CT04_DCIM0008_260102.MP4	CT04	2/1/2026	2:14:36	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0009_260102.MP4	CT04	2/1/2026	2:32:40	-	-	-	-	
5/2/2026	CT04_DCIM0010_260102.MP4	CT04	2/1/2026	8:21:44	-	-	-	-	
5/2/2026	CT04_DCIM0011_260102.MP4	CT04	2/1/2026	14:04:38	-	-	-	-	
5/2/2026	CT04_DCIM0012_260102.MP4	CT04	2/1/2026	14:12:58	-	-	-	-	
5/2/2026	CT04_DCIM0013_260102.MP4	CT04	2/1/2026	15:30:52	-	-	-	-	
5/2/2026	CT04_DCIM0014_260102.MP4	CT04	2/1/2026	15:35:38	-	-	-	-	
5/2/2026	CT04_DCIM0015_260102.MP4	CT04	2/1/2026	15:37:00	-	-	-	-	
5/2/2026	CT04_DCIM0016_260102.MP4	CT04	2/1/2026	16:32:30	-	-	-	-	
5/2/2026	CT04_DCIM0017_260102.MP4	CT04	2/1/2026	16:36:58	-	-	-	-	
5/2/2026	CT04_DCIM0018_260102.MP4	CT04	2/1/2026	18:28:52	-	-	-	-	
5/2/2026	CT04_DCIM0019_260102.MP4	CT04	2/1/2026	23:50:30	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0020_260103.MP4	CT04	3/1/2026	0:02:52	-	-	-	-	
5/2/2026	CT04_DCIM0021_260103.MP4	CT04	3/1/2026	7:12:08	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0022_260103.MP4	CT04	3/1/2026	7:15:30	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0023_260103.MP4	CT04	3/1/2026	7:24:30	-	-	-	-	
5/2/2026	CT04_DCIM0024_260103.MP4	CT04	3/1/2026	15:48:30	-	-	-	-	
5/2/2026	CT04_DCIM0025_260103.MP4	CT04	3/1/2026	16:57:02	-	-	-	-	
5/2/2026	CT04_DCIM0026_260103.MP4	CT04	3/1/2026	16:58:14	-	-	-	-	
5/2/2026	CT04_DCIM0027_260103.MP4	CT04	3/1/2026	17:59:36	-	-	-	-	
5/2/2026	CT04_DCIM0028_260103.MP4	CT04	3/1/2026	18:00:42	-	-	-	-	
5/2/2026	CT04_DCIM0029_260103.MP4	CT04	3/1/2026	19:17:06	-	-	-	-	
5/2/2026	CT04_DCIM0030_260103.MP4	CT04	3/1/2026	19:26:36	-	-	-	-	
5/2/2026	CT04_DCIM0031_260104.MP4	CT04	4/1/2026	5:48:42	-	-	-	-	
5/2/2026	CT04_DCIM0032_260104.MP4	CT04	4/1/2026	5:49:52	-	-	-	-	
5/2/2026	CT04_DCIM0033_260104.MP4	CT04	4/1/2026	5:50:08	-	-	-	-	
5/2/2026	CT04_DCIM0034_260104.MP4	CT04	4/1/2026	5:51:56	-	-	-	-	
5/2/2026	CT04_DCIM0035_260104.MP4	CT04	4/1/2026	7:02:46	-	-	-	-	
5/2/2026	CT04_DCIM0036_260104.MP4	CT04	4/1/2026	9:52:26	-	-	-	-	
5/2/2026	CT04_DCIM0037_260104.MP4	CT04	4/1/2026	11:26:06	1	Red Junglefowl	1	NT	
5/2/2026	CT04_DCIM0038_260104.MP4	CT04	4/1/2026	11:26:20	1	Red Junglefowl	1	NT	

Retrieval Date	File Name	Camera Trap	Date	Time	Species count	Common name	Count	SRDB3 Status	Comments
5/2/2026	CT04_DCIM0039_260104.MP4	CT04	4/1/2026	11:58:36	-	-	-	-	
5/2/2026	CT04_DCIM0040_260104.MP4	CT04	4/1/2026	12:41:16	-	-	-	-	
5/2/2026	CT04_DCIM0041_251203.MP4	CT04	3/12/2025	11:15:50	-	-	-	-	
5/2/2026	CT04_DCIM0042_251203.MP4	CT04	3/12/2025	11:16:08	-	-	-	-	
5/2/2026	CT04_DCIM0043_251203.MP4	CT04	3/12/2025	11:16:22	-	-	-	-	
5/2/2026	CT04_DCIM0044_251203.MP4	CT04	3/12/2025	11:16:54	-	-	-	-	
5/2/2026	CT04_DCIM0045_251203.MP4	CT04	3/12/2025	11:17:12	-	-	-	-	
5/2/2026	CT04_DCIM0046_251203.MP4	CT04	3/12/2025	11:17:26	-	-	-	-	
5/2/2026	CT04_DCIM0047_251203.MP4	CT04	3/12/2025	11:17:44	-	-	-	-	
5/2/2026	CT04_DCIM0048_251203.MP4	CT04	3/12/2025	11:18:00	-	-	-	-	
5/2/2026	CT04_DCIM0049_251203.MP4	CT04	3/12/2025	11:18:16	-	-	-	-	
5/2/2026	CT04_DCIM0050_251203.MP4	CT04	3/12/2025	11:54:34	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0051_251203.MP4	CT04	3/12/2025	11:56:40	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0052_251204.MP4	CT04	4/12/2025	6:54:46	-	-	-	-	
5/2/2026	CT04_DCIM0053_251204.MP4	CT04	4/12/2025	7:20:54	-	-	-	-	
5/2/2026	CT04_DCIM0054_251204.MP4	CT04	4/12/2025	7:49:02	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0055_251204.MP4	CT04	4/12/2025	7:52:14	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0056_251204.MP4	CT04	4/12/2025	8:02:22	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0057_251204.MP4	CT04	4/12/2025	8:02:56	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0058_251204.MP4	CT04	4/12/2025	16:51:44	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0059_251204.MP4	CT04	4/12/2025	16:52:02	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0060_251204.MP4	CT04	4/12/2025	18:37:54	-	-	-	-	
5/2/2026	CT04_DCIM0061_251204.MP4	CT04	4/12/2025	18:58:42	-	-	-	-	
5/2/2026	CT04_DCIM0062_251204.MP4	CT04	4/12/2025	22:50:48	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0063_251205.MP4	CT04	5/12/2025	8:07:54	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0064_251205.MP4	CT04	5/12/2025	8:08:34	-	-	-	-	
5/2/2026	CT04_DCIM0065_251205.MP4	CT04	5/12/2025	10:07:16	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0066_251205.MP4	CT04	5/12/2025	10:11:06	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0067_251206.MP4	CT04	6/12/2025	6:50:08	-	-	-	-	
5/2/2026	CT04_DCIM0068_251206.MP4	CT04	6/12/2025	6:55:42	-	-	-	-	
5/2/2026	CT04_DCIM0069_251207.MP4	CT04	7/12/2025	6:57:12	-	-	-	-	
5/2/2026	CT04_DCIM0070_251207.MP4	CT04	7/12/2025	7:05:04	-	-	-	-	
5/2/2026	CT04_DCIM0071_251207.MP4	CT04	7/12/2025	7:05:58	-	-	-	-	
5/2/2026	CT04_DCIM0072_251207.MP4	CT04	7/12/2025	7:55:30	-	-	-	-	
5/2/2026	CT04_DCIM0073_251207.MP4	CT04	7/12/2025	7:56:08	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0074_251207.MP4	CT04	7/12/2025	8:33:44	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0075_251208.MP4	CT04	8/12/2025	9:50:16	-	-	-	-	
5/2/2026	CT04_DCIM0076_251209.MP4	CT04	9/12/2025	6:52:14	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0077_251210.MP4	CT04	10/12/2025	7:09:30	-	-	-	-	
5/2/2026	CT04_DCIM0078_251210.MP4	CT04	10/12/2025	7:57:14	1	Red Junglefowl	1	NT	
5/2/2026	CT04_DCIM0079_251210.MP4	CT04	10/12/2025	8:00:06	-	-	-	-	
5/2/2026	CT04_DCIM0080_251210.MP4	CT04	10/12/2025	10:52:06	-	-	-	-	
5/2/2026	CT04_DCIM0081_251210.MP4	CT04	10/12/2025	17:32:06	1	Laced Woodpecker	1	LC	
5/2/2026	CT04_DCIM0082_251210.MP4	CT04	10/12/2025	17:58:08	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0083_251211.MP4	CT04	11/12/2025	8:51:22	-	-	-	-	
5/2/2026	CT04_DCIM0084_251211.MP4	CT04	11/12/2025	13:46:44	1	Plantain Squirrel	2	LC	
5/2/2026	CT04_DCIM0085_251211.MP4	CT04	11/12/2025	13:47:22	-	-	-	-	
5/2/2026	CT04_DCIM0086_251211.MP4	CT04	11/12/2025	13:49:30	1	White-crested Laughingthrush	3	NA	
5/2/2026	CT04_DCIM0087_251212.MP4	CT04	12/12/2025	8:51:36	-	-	-	-	
5/2/2026	CT04_DCIM0088_251212.MP4	CT04	12/12/2025	9:29:02	1	Plantain Squirrel	1	NA	
5/2/2026	CT04_DCIM0089_251212.MP4	CT04	12/12/2025	9:33:18	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0090_251212.MP4	CT04	12/12/2025	9:33:32	-	-	-	-	
5/2/2026	CT04_DCIM0091_251212.MP4	CT04	12/12/2025	10:35:24	1	Red Junglefowl	2	NT	
5/2/2026	CT04_DCIM0092_251212.MP4	CT04	12/12/2025	10:39:40	1	Red Junglefowl	3	NT	
5/2/2026	CT04_DCIM0093_251213.MP4	CT04	13/12/2025	10:07:18	1	Red Junglefowl	1	NT	
5/2/2026	CT04_DCIM0094_251213.MP4	CT04	13/12/2025	10:07:34	1	Red Junglefowl	1	NT	
5/2/2026	CT04_DCIM0095_251213.MP4	CT04	13/12/2025	10:36:52	1	Red Junglefowl	2	NT	
5/2/2026	CT04_DCIM0096_251213.MP4	CT04	13/12/2025	14:04:46	-	-	-	-	
5/2/2026	CT04_DCIM0097_251213.MP4	CT04	13/12/2025	21:24:54	-	-	-	-	
5/2/2026	CT04_DCIM0098_251214.MP4	CT04	14/12/2025	12:24:26	-	-	-	-	
5/2/2026	CT04_DCIM0099_251214.MP4	CT04	14/12/2025	12:24:42	-	-	-	-	
5/2/2026	CT04_DCIM0100_251218.MP4	CT04	18/12/2025	11:10:24	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0101_251218.MP4	CT04	18/12/2025	16:36:34	-	-	-	-	
5/2/2026	CT04_DCIM0102_251219.MP4	CT04	19/12/2025	0:05:16	-	-	-	-	
5/2/2026	CT04_DCIM0103_251219.MP4	CT04	19/12/2025	13:42:28	-	-	-	-	
5/2/2026	CT04_DCIM0104_251219.MP4	CT04	19/12/2025	13:43:40	-	-	-	-	

Retrieval Date	File Name	Camera Trap	Date	Time	Species count	Common name	Count	SRDB3 Status	Comments
5/2/2026	CT04_DCIM0105_251220.MP4	CT04	20/12/2025	1:01:38	-	-	-	-	
5/2/2026	CT04_DCIM0106_251220.MP4	CT04	20/12/2025	4:54:22	-	-	-	-	
5/2/2026	CT04_DCIM0107_251220.MP4	CT04	20/12/2025	7:04:34	-	-	-	-	
5/2/2026	CT04_DCIM0108_251220.MP4	CT04	20/12/2025	7:37:40	-	-	-	-	
5/2/2026	CT04_DCIM0109_251220.MP4	CT04	20/12/2025	8:18:46	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0110_251220.MP4	CT04	20/12/2025	11:40:50	-	-	-	-	
5/2/2026	CT04_DCIM0111_251221.MP4	CT04	21/12/2025	5:04:44	-	-	-	-	
5/2/2026	CT04_DCIM0112_251221.MP4	CT04	21/12/2025	7:05:30	-	-	-	-	
5/2/2026	CT04_DCIM0113_251221.MP4	CT04	21/12/2025	7:26:06	-	-	-	-	
5/2/2026	CT04_DCIM0114_251221.MP4	CT04	21/12/2025	18:37:54	-	-	-	-	
5/2/2026	CT04_DCIM0115_251221.MP4	CT04	21/12/2025	21:03:56	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0116_251221.MP4	CT04	21/12/2025	23:04:14	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0117_251221.MP4	CT04	21/12/2025	23:21:54	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0118_251221.MP4	CT04	21/12/2025	23:27:34	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0119_251221.MP4	CT04	21/12/2025	23:39:34	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0120_251221.MP4	CT04	21/12/2025	23:54:12	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0121_251222.MP4	CT04	22/12/2025	0:06:54	-	-	-	-	
5/2/2026	CT04_DCIM0122_251222.MP4	CT04	22/12/2025	0:10:48	-	-	-	-	
5/2/2026	CT04_DCIM0123_251222.MP4	CT04	22/12/2025	0:22:34	-	-	-	-	
5/2/2026	CT04_DCIM0124_251222.MP4	CT04	22/12/2025	2:24:58	-	-	-	-	
5/2/2026	CT04_DCIM0125_251222.MP4	CT04	22/12/2025	6:56:44	-	-	-	-	
5/2/2026	CT04_DCIM0126_251222.MP4	CT04	22/12/2025	6:58:26	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0127_251222.MP4	CT04	22/12/2025	6:58:48	1	Plantain Squirrel	2	LC	
5/2/2026	CT04_DCIM0128_251222.MP4	CT04	22/12/2025	6:59:28	-	-	-	-	
5/2/2026	CT04_DCIM0129_251222.MP4	CT04	22/12/2025	6:59:46	-	-	-	-	
5/2/2026	CT04_DCIM0130_251222.MP4	CT04	22/12/2025	7:04:32	-	-	-	-	
5/2/2026	CT04_DCIM0131_251222.MP4	CT04	22/12/2025	7:40:40	-	-	-	-	
5/2/2026	CT04_DCIM0132_251222.MP4	CT04	22/12/2025	7:41:08	-	-	-	-	
5/2/2026	CT04_DCIM0133_251222.MP4	CT04	22/12/2025	7:48:50	-	-	-	-	
5/2/2026	CT04_DCIM0134_251222.MP4	CT04	22/12/2025	7:49:34	-	-	-	-	
5/2/2026	CT04_DCIM0135_251222.MP4	CT04	22/12/2025	11:20:42	-	-	-	-	
5/2/2026	CT04_DCIM0136_251222.MP4	CT04	22/12/2025	11:43:12	-	-	-	-	
5/2/2026	CT04_DCIM0137_251222.MP4	CT04	22/12/2025	12:02:54	-	-	-	-	
5/2/2026	CT04_DCIM0138_251222.MP4	CT04	22/12/2025	12:04:52	-	-	-	-	
5/2/2026	CT04_DCIM0139_251222.MP4	CT04	22/12/2025	12:05:56	-	-	-	-	
5/2/2026	CT04_DCIM0140_251222.MP4	CT04	22/12/2025	12:24:52	-	-	-	-	
5/2/2026	CT04_DCIM0141_251222.MP4	CT04	22/12/2025	13:05:16	-	-	-	-	
5/2/2026	CT04_DCIM0142_251222.MP4	CT04	22/12/2025	13:38:00	-	-	-	-	
5/2/2026	CT04_DCIM0143_251222.MP4	CT04	22/12/2025	13:58:40	-	-	-	-	
5/2/2026	CT04_DCIM0144_251222.MP4	CT04	22/12/2025	14:01:40	-	-	-	-	
5/2/2026	CT04_DCIM0145_251222.MP4	CT04	22/12/2025	14:12:04	-	-	-	-	
5/2/2026	CT04_DCIM0146_251222.MP4	CT04	22/12/2025	14:40:30	-	-	-	-	
5/2/2026	CT04_DCIM0147_251222.MP4	CT04	22/12/2025	14:41:00	-	-	-	-	
5/2/2026	CT04_DCIM0148_251222.MP4	CT04	22/12/2025	14:42:58	-	-	-	-	
5/2/2026	CT04_DCIM0149_251222.MP4	CT04	22/12/2025	14:57:32	-	-	-	-	
5/2/2026	CT04_DCIM0150_251222.MP4	CT04	22/12/2025	14:58:34	-	-	-	-	
5/2/2026	CT04_DCIM0151_251222.MP4	CT04	22/12/2025	15:02:02	-	-	-	-	
5/2/2026	CT04_DCIM0152_251222.MP4	CT04	22/12/2025	15:10:40	-	-	-	-	
5/2/2026	CT04_DCIM0153_251222.MP4	CT04	22/12/2025	15:16:08	-	-	-	-	
5/2/2026	CT04_DCIM0154_251222.MP4	CT04	22/12/2025	15:39:38	-	-	-	-	
5/2/2026	CT04_DCIM0155_251222.MP4	CT04	22/12/2025	15:47:44	-	-	-	-	
5/2/2026	CT04_DCIM0156_251222.MP4	CT04	22/12/2025	16:04:08	-	-	-	-	
5/2/2026	CT04_DCIM0157_251222.MP4	CT04	22/12/2025	16:12:46	-	-	-	-	
5/2/2026	CT04_DCIM0158_251222.MP4	CT04	22/12/2025	16:13:26	-	-	-	-	
5/2/2026	CT04_DCIM0159_251222.MP4	CT04	22/12/2025	16:30:44	-	-	-	-	
5/2/2026	CT04_DCIM0160_251222.MP4	CT04	22/12/2025	16:31:44	-	-	-	-	
5/2/2026	CT04_DCIM0161_251222.MP4	CT04	22/12/2025	16:37:40	-	-	-	-	
5/2/2026	CT04_DCIM0162_251222.MP4	CT04	22/12/2025	16:40:48	-	-	-	-	
5/2/2026	CT04_DCIM0163_251222.MP4	CT04	22/12/2025	16:45:16	-	-	-	-	
5/2/2026	CT04_DCIM0164_251222.MP4	CT04	22/12/2025	17:04:10	-	-	-	-	
5/2/2026	CT04_DCIM0165_251222.MP4	CT04	22/12/2025	17:13:26	-	-	-	-	
5/2/2026	CT04_DCIM0166_251222.MP4	CT04	22/12/2025	17:15:12	-	-	-	-	
5/2/2026	CT04_DCIM0167_251222.MP4	CT04	22/12/2025	17:16:16	-	-	-	-	
5/2/2026	CT04_DCIM0168_251222.MP4	CT04	22/12/2025	17:18:58	-	-	-	-	
5/2/2026	CT04_DCIM0169_251222.MP4	CT04	22/12/2025	17:35:38	-	-	-	-	
5/2/2026	CT04_DCIM0170_251222.MP4	CT04	22/12/2025	17:38:32	-	-	-	-	

Retrieval Date	File Name	Camera Trap	Date	Time	Species count	Common name	Count	SRDB3 Status	Comments
5/2/2026	CT04_DCIM0171_251222.MP4	CT04	22/12/2025	17:45:50	-	-	-	-	
5/2/2026	CT04_DCIM0172_251222.MP4	CT04	22/12/2025	17:49:10	-	-	-	-	
5/2/2026	CT04_DCIM0173_251222.MP4	CT04	22/12/2025	17:52:38	-	-	-	-	
5/2/2026	CT04_DCIM0174_251222.MP4	CT04	22/12/2025	17:53:10	-	-	-	-	
5/2/2026	CT04_DCIM0175_251222.MP4	CT04	22/12/2025	18:40:44	-	-	-	-	
5/2/2026	CT04_DCIM0176_251222.MP4	CT04	22/12/2025	18:50:42	-	-	-	-	
5/2/2026	CT04_DCIM0177_251222.MP4	CT04	22/12/2025	21:58:48	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0178_251222.MP4	CT04	22/12/2025	22:09:12	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0179_251223.MP4	CT04	23/12/2025	6:55:24	-	-	-	-	
5/2/2026	CT04_DCIM0180_251223.MP4	CT04	23/12/2025	7:31:22	-	-	-	-	
5/2/2026	CT04_DCIM0181_251223.MP4	CT04	23/12/2025	7:57:48	-	-	-	-	
5/2/2026	CT04_DCIM0182_251223.MP4	CT04	23/12/2025	9:07:18	-	-	-	-	
5/2/2026	CT04_DCIM0183_251223.MP4	CT04	23/12/2025	10:01:44	-	-	-	-	
5/2/2026	CT04_DCIM0184_251223.MP4	CT04	23/12/2025	10:51:04	-	-	-	-	
5/2/2026	CT04_DCIM0185_251223.MP4	CT04	23/12/2025	11:53:46	-	-	-	-	
5/2/2026	CT04_DCIM0186_251223.MP4	CT04	23/12/2025	11:54:08	-	-	-	-	
5/2/2026	CT04_DCIM0187_251223.MP4	CT04	23/12/2025	12:13:06	-	-	-	-	
5/2/2026	CT04_DCIM0188_251223.MP4	CT04	23/12/2025	14:00:28	-	-	-	-	
5/2/2026	CT04_DCIM0189_251223.MP4	CT04	23/12/2025	14:03:34	-	-	-	-	
5/2/2026	CT04_DCIM0190_251223.MP4	CT04	23/12/2025	14:16:52	-	-	-	-	
5/2/2026	CT04_DCIM0191_251223.MP4	CT04	23/12/2025	14:28:30	-	-	-	-	
5/2/2026	CT04_DCIM0192_251223.MP4	CT04	23/12/2025	15:05:40	-	-	-	-	
5/2/2026	CT04_DCIM0193_251223.MP4	CT04	23/12/2025	15:07:20	-	-	-	-	
5/2/2026	CT04_DCIM0194_251223.MP4	CT04	23/12/2025	15:10:14	-	-	-	-	
5/2/2026	CT04_DCIM0195_251223.MP4	CT04	23/12/2025	15:12:34	-	-	-	-	
5/2/2026	CT04_DCIM0196_251223.MP4	CT04	23/12/2025	15:23:46	-	-	-	-	
5/2/2026	CT04_DCIM0197_251223.MP4	CT04	23/12/2025	15:24:28	-	-	-	-	
5/2/2026	CT04_DCIM0198_251223.MP4	CT04	23/12/2025	16:11:50	-	-	-	-	
5/2/2026	CT04_DCIM0199_251223.MP4	CT04	23/12/2025	16:28:18	-	-	-	-	
5/2/2026	CT04_DCIM0200_251223.MP4	CT04	23/12/2025	16:46:22	-	-	-	-	
5/2/2026	CT04_DCIM0201_251223.MP4	CT04	23/12/2025	16:49:56	-	-	-	-	
5/2/2026	CT04_DCIM0202_251223.MP4	CT04	23/12/2025	17:18:06	-	-	-	-	
5/2/2026	CT04_DCIM0203_251223.MP4	CT04	23/12/2025	18:37:56	-	-	-	-	
5/2/2026	CT04_DCIM0204_251223.MP4	CT04	23/12/2025	18:43:58	-	-	-	-	
5/2/2026	CT04_DCIM0205_251223.MP4	CT04	23/12/2025	18:47:04	-	-	-	-	
5/2/2026	CT04_DCIM0206_251224.MP4	CT04	24/12/2025	1:05:46	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0207_251224.MP4	CT04	24/12/2025	7:21:40	-	-	-	-	
5/2/2026	CT04_DCIM0208_251224.MP4	CT04	24/12/2025	7:52:06	-	-	-	-	
5/2/2026	CT04_DCIM0209_251224.MP4	CT04	24/12/2025	8:29:48	-	-	-	-	
5/2/2026	CT04_DCIM0210_251224.MP4	CT04	24/12/2025	8:49:46	-	-	-	-	
5/2/2026	CT04_DCIM0211_251224.MP4	CT04	24/12/2025	8:50:34	-	-	-	-	
5/2/2026	CT04_DCIM0212_251224.MP4	CT04	24/12/2025	11:58:00	-	-	-	-	
5/2/2026	CT04_DCIM0213_251224.MP4	CT04	24/12/2025	12:05:00	-	-	-	-	
5/2/2026	CT04_DCIM0214_251224.MP4	CT04	24/12/2025	12:44:52	-	-	-	-	
5/2/2026	CT04_DCIM0215_251224.MP4	CT04	24/12/2025	13:38:34	-	-	-	-	
5/2/2026	CT04_DCIM0216_251224.MP4	CT04	24/12/2025	14:41:32	-	-	-	-	
5/2/2026	CT04_DCIM0217_251224.MP4	CT04	24/12/2025	14:42:12	-	-	-	-	
5/2/2026	CT04_DCIM0218_251224.MP4	CT04	24/12/2025	14:47:10	-	-	-	-	
5/2/2026	CT04_DCIM0219_251224.MP4	CT04	24/12/2025	14:53:56	-	-	-	-	
5/2/2026	CT04_DCIM0220_251224.MP4	CT04	24/12/2025	15:26:34	-	-	-	-	
5/2/2026	CT04_DCIM0221_251224.MP4	CT04	24/12/2025	15:29:16	-	-	-	-	
5/2/2026	CT04_DCIM0222_251224.MP4	CT04	24/12/2025	15:30:40	-	-	-	-	
5/2/2026	CT04_DCIM0223_251224.MP4	CT04	24/12/2025	15:32:28	-	-	-	-	
5/2/2026	CT04_DCIM0224_251224.MP4	CT04	24/12/2025	15:42:30	-	-	-	-	
5/2/2026	CT04_DCIM0225_251224.MP4	CT04	24/12/2025	15:43:44	-	-	-	-	
5/2/2026	CT04_DCIM0226_251224.MP4	CT04	24/12/2025	16:45:42	-	-	-	-	
5/2/2026	CT04_DCIM0227_251224.MP4	CT04	24/12/2025	16:53:00	-	-	-	-	
5/2/2026	CT04_DCIM0228_251225.MP4	CT04	25/12/2025	4:49:58	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0229_251225.MP4	CT04	25/12/2025	6:10:58	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0230_251225.MP4	CT04	25/12/2025	6:33:08				#N/A	
5/2/2026	CT04_DCIM0231_251225.MP4	CT04	25/12/2025	6:58:28	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0232_251225.MP4	CT04	25/12/2025	7:16:54	-	-	-	-	
5/2/2026	CT04_DCIM0233_251225.MP4	CT04	25/12/2025	11:39:44	-	-	-	-	
5/2/2026	CT04_DCIM0234_251225.MP4	CT04	25/12/2025	14:22:16	-	-	-	-	
5/2/2026	CT04_DCIM0235_251225.MP4	CT04	25/12/2025	15:01:04	-	-	-	-	
5/2/2026	CT04_DCIM0236_251225.MP4	CT04	25/12/2025	15:05:34	-	-	-	-	

Retrieval Date	File Name	Camera Trap	Date	Time	Species count	Common name	Count	SRDB3 Status	Comments
5/2/2026	CT04_DCIM0237_251225.MP4	CT04	25/12/2025	15:06:30	-	-	-	-	
5/2/2026	CT04_DCIM0238_251225.MP4	CT04	25/12/2025	15:07:02	-	-	-	-	
5/2/2026	CT04_DCIM0239_251225.MP4	CT04	25/12/2025	15:35:22	-	-	-	-	
5/2/2026	CT04_DCIM0240_251225.MP4	CT04	25/12/2025	15:56:04	-	-	-	-	
5/2/2026	CT04_DCIM0241_251225.MP4	CT04	25/12/2025	17:14:02	-	-	-	-	
5/2/2026	CT04_DCIM0242_251226.MP4	CT04	26/12/2025	7:57:48	-	-	-	-	
5/2/2026	CT04_DCIM0243_251226.MP4	CT04	26/12/2025	8:21:30	-	-	-	-	
5/2/2026	CT04_DCIM0244_251226.MP4	CT04	26/12/2025	15:34:40	-	-	-	-	
5/2/2026	CT04_DCIM0245_251226.MP4	CT04	26/12/2025	15:49:46	-	-	-	-	
5/2/2026	CT04_DCIM0246_251226.MP4	CT04	26/12/2025	15:51:30	-	-	-	-	
5/2/2026	CT04_DCIM0247_251226.MP4	CT04	26/12/2025	15:54:44	-	-	-	-	
5/2/2026	CT04_DCIM0248_251227.MP4	CT04	27/12/2025	1:08:02	-	-	-	-	
5/2/2026	CT04_DCIM0249_251227.MP4	CT04	27/12/2025	1:08:38	-	-	-	-	
5/2/2026	CT04_DCIM0250_251227.MP4	CT04	27/12/2025	15:48:54	-	-	-	-	
5/2/2026	CT04_DCIM0251_251227.MP4	CT04	27/12/2025	16:01:36	1	Red Junglefowl	1	NT	
5/2/2026	CT04_DCIM0252_251228.MP4	CT04	28/12/2025	4:16:00	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0253_251228.MP4	CT04	28/12/2025	7:02:12	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0254_251228.MP4	CT04	28/12/2025	7:04:06	-	-	-	-	
5/2/2026	CT04_DCIM0255_251228.MP4	CT04	28/12/2025	7:06:20	-	-	-	-	
5/2/2026	CT04_DCIM0256_251228.MP4	CT04	28/12/2025	7:23:08	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0257_251228.MP4	CT04	28/12/2025	7:23:26	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0258_251228.MP4	CT04	28/12/2025	7:23:42	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0259_251228.MP4	CT04	28/12/2025	7:24:04	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0260_251228.MP4	CT04	28/12/2025	7:24:30	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0261_251228.MP4	CT04	28/12/2025	7:35:18	-	-	-	-	
5/2/2026	CT04_DCIM0262_251229.MP4	CT04	29/12/2025	3:39:00	-	-	-	-	
5/2/2026	CT04_DCIM0263_251229.MP4	CT04	29/12/2025	5:12:50	-	-	-	-	
5/2/2026	CT04_DCIM0264_251229.MP4	CT04	29/12/2025	6:24:18	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0265_251229.MP4	CT04	29/12/2025	7:05:56	-	-	-	-	
5/2/2026	CT04_DCIM0266_251229.MP4	CT04	29/12/2025	11:12:02	-	-	-	-	
5/2/2026	CT04_DCIM0267_251229.MP4	CT04	29/12/2025	15:36:54	-	-	-	-	
5/2/2026	CT04_DCIM0268_251229.MP4	CT04	29/12/2025	16:08:44	-	-	-	-	
5/2/2026	CT04_DCIM0269_251229.MP4	CT04	29/12/2025	16:09:00	-	-	-	-	
5/2/2026	CT04_DCIM0270_251229.MP4	CT04	29/12/2025	16:09:42	-	-	-	-	
5/2/2026	CT04_DCIM0271_251229.MP4	CT04	29/12/2025	16:20:50	-	-	-	-	
5/2/2026	CT04_DCIM0272_251229.MP4	CT04	29/12/2025	17:16:40	1	Red Junglefowl	1	NT	
5/2/2026	CT04_DCIM0273_251230.MP4	CT04	30/12/2025	0:56:16	-	-	-	-	
5/2/2026	CT04_DCIM0274_251230.MP4	CT04	30/12/2025	7:47:28	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0275_251230.MP4	CT04	30/12/2025	8:19:24	-	-	-	-	
5/2/2026	CT04_DCIM0276_251230.MP4	CT04	30/12/2025	9:32:58	-	-	-	-	
5/2/2026	CT04_DCIM0277_251230.MP4	CT04	30/12/2025	12:09:18	-	-	-	-	
5/2/2026	CT04_DCIM0278_251230.MP4	CT04	30/12/2025	12:39:26	-	-	-	-	
5/2/2026	CT04_DCIM0279_251230.MP4	CT04	30/12/2025	12:40:36	-	-	-	-	
5/2/2026	CT04_DCIM0280_251230.MP4	CT04	30/12/2025	14:11:42	-	-	-	-	
5/2/2026	CT04_DCIM0281_251230.MP4	CT04	30/12/2025	14:28:16	-	-	-	-	
5/2/2026	CT04_DCIM0282_251230.MP4	CT04	30/12/2025	14:34:32	-	-	-	-	
5/2/2026	CT04_DCIM0283_251230.MP4	CT04	30/12/2025	15:01:02	-	-	-	-	
5/2/2026	CT04_DCIM0284_251230.MP4	CT04	30/12/2025	15:06:28	-	-	-	-	
5/2/2026	CT04_DCIM0285_251230.MP4	CT04	30/12/2025	15:35:16	-	-	-	-	
5/2/2026	CT04_DCIM0286_251230.MP4	CT04	30/12/2025	15:39:54	-	-	-	-	
5/2/2026	CT04_DCIM0287_251230.MP4	CT04	30/12/2025	15:41:54	-	-	-	-	
5/2/2026	CT04_DCIM0288_251230.MP4	CT04	30/12/2025	15:46:00	-	-	-	-	
5/2/2026	CT04_DCIM0289_251230.MP4	CT04	30/12/2025	15:55:08	-	-	-	-	
5/2/2026	CT04_DCIM0290_251230.MP4	CT04	30/12/2025	15:57:58	-	-	-	-	
5/2/2026	CT04_DCIM0291_251230.MP4	CT04	30/12/2025	16:23:46	-	-	-	-	
5/2/2026	CT04_DCIM0292_251230.MP4	CT04	30/12/2025	16:47:18	-	-	-	-	
5/2/2026	CT04_DCIM0293_251230.MP4	CT04	30/12/2025	16:55:02	-	-	-	-	
5/2/2026	CT04_DCIM0294_251230.MP4	CT04	30/12/2025	17:17:26	-	-	-	-	
5/2/2026	CT04_DCIM0295_251230.MP4	CT04	30/12/2025	17:29:54	-	-	-	-	
5/2/2026	CT04_DCIM0296_251230.MP4	CT04	30/12/2025	17:35:44	-	-	-	-	
5/2/2026	CT04_DCIM0297_251230.MP4	CT04	30/12/2025	18:51:18	-	-	-	-	
5/2/2026	CT04_DCIM0298_251231.MP4	CT04	31/12/2025	0:31:02	1	Rattus sp.	1	NA	
5/2/2026	CT04_DCIM0299_251231.MP4	CT04	31/12/2025	7:06:24	-	-	-	-	
5/2/2026	CT04_DCIM0300_251231.MP4	CT04	31/12/2025	7:06:52	1	Plantain Squirrel	1	LC	
5/2/2026	CT04_DCIM0301_251231.MP4	CT04	31/12/2025	8:56:18	-	-	-	-	
5/2/2026	CT04_DCIM0302_251231.MP4	CT04	31/12/2025	12:31:10	1	Red Junglefowl	1	NT	

Retrieval Date	File Name	Camera Trap	Date	Time	Species count	Common name	Count	SRDB3 Status	Comments
5/2/2026	CT04_DCIM0303_251231.MP4	CT04	31/12/2025	13:15:02	-	-	-	-	
5/2/2026	CT04_DCIM0304_251231.MP4	CT04	31/12/2025	13:29:28	-	-	-	-	
5/2/2026	CT04_DCIM0305_251231.MP4	CT04	31/12/2025	14:38:30	-	-	-	-	
5/2/2026	CT04_DCIM0306_251231.MP4	CT04	31/12/2025	21:06:38	-	-	-	-	
5/2/2026	CT10_DCIM0001_251203.AVI	CT10	3/12/2025	16:23:42	-	-	-	-	
5/2/2026	CT10_DCIM0002_251203.AVI	CT10	3/12/2025	16:23:56	-	-	-	-	
5/2/2026	CT10_DCIM0003_251203.AVI	CT10	3/12/2025	16:24:14	-	-	-	-	
5/2/2026	CT10_DCIM0004_251203.AVI	CT10	3/12/2025	16:24:28	-	-	-	-	
5/2/2026	CT10_DCIM0005_251203.AVI	CT10	3/12/2025	16:25:30	-	-	-	-	
5/2/2026	CT10_DCIM0006_251203.AVI	CT10	3/12/2025	16:25:44	-	-	-	-	
5/2/2026	CT10_DCIM0007_251205.AVI	CT10	5/12/2025	13:04:40	1	Stray dog	1	#N/A	
5/2/2026	CT10_DCIM0008_251205.AVI	CT10	5/12/2025	14:37:50	-	-	-	-	
5/2/2026	CT10_DCIM0009_251216.AVI	CT10	16/12/2025	21:41:48	1	UnID	1	#N/A	
5/2/2026	CT10_DCIM0010_251221.AVI	CT10	21/12/2025	9:34:24	1	Changeable hawk-eagle	1	VU	
5/2/2026	CT10_DCIM0011_251222.AVI	CT10	22/12/2025	20:00:20	-	-	-	-	
5/2/2026	CT10_DCIM0012_251222.AVI	CT10	22/12/2025	21:03:42	-	-	-	-	
5/2/2026	CT10_DCIM0013_251222.AVI	CT10	22/12/2025	21:04:14	-	-	-	-	
5/2/2026	CT10_DCIM0014_260104.AVI	CT10	4/1/2026	9:50:16	-	-	-	-	
5/2/2026	CT01_DCIM0001_260104.AVI	CT01	4/1/2026	10:35:46	-	-	-	-	
5/2/2026	CT01_DCIM0002_260106.AVI	CT01	6/1/2026	23:45:58	1	Rattus sp.	1	NA	
5/2/2026	CT01_DCIM0003_260107.AVI	CT01	7/1/2026	18:02:42	1	UnID mammal	1	#N/A	close up
5/2/2026	CT01_DCIM0004_260115.AVI	CT01	15/1/2026	14:59:56	1	UnID mammal	1	#N/A	close up
5/2/2026	CT01_DCIM0005_260126.AVI	CT01	26/1/2026	19:03:26	1	Long-tailed macaque	3	LC	
5/2/2026	CT01_DCIM0006_260205.AVI	CT01	5/2/2026	13:19:44	-	-	-	-	
5/2/2026	CT02_DCIM0001_260104.AVI	CT02	4/1/2026	11:53:16	-	-	-	-	
5/2/2026	CT02_DCIM0002_260104.AVI	CT02	4/1/2026	11:55:24	-	-	-	-	
5/2/2026	CT02_DCIM0003_260108.AVI	CT02	8/1/2026	1:34:36	1	Rattus sp.	1	NA	
5/2/2026	CT02_DCIM0004_260205.AVI	CT02	5/2/2026	11:24:46	-	-	-	-	
5/2/2026	CT02_DCIM0005_260205.AVI	CT02	5/2/2026	11:25:06	-	-	-	-	
5/2/2026	Have confirmed that CT03 was working functionally and there were no videos recorded the second round								
11/2/2026	CT04_DCIM0019_260205.MP4	CT04	5/2/2026	13:09:30	-	-	-	-	
11/2/2026	CT04_DCIM0020_260205.MP4	CT04	5/2/2026	15:11:00	-	-	-	-	
11/2/2026	CT04_DCIM0021_260205.MP4	CT04	5/2/2026	15:13:42	-	-	-	-	
11/2/2026	CT04_DCIM0022_260205.MP4	CT04	5/2/2026	15:15:42	-	-	-	-	
11/2/2026	CT04_DCIM0023_260205.MP4	CT04	5/2/2026	15:21:50	-	-	-	-	
11/2/2026	CT04_DCIM0024_260206.MP4	CT04	6/2/2026	5:53:36	1	Rattus sp.	2	NA	
11/2/2026	CT04_DCIM0025_260206.MP4	CT04	6/2/2026	13:15:26	-	-	-	-	
11/2/2026	CT04_DCIM0026_260206.MP4	CT04	6/2/2026	16:33:34	-	-	-	-	
11/2/2026	CT04_DCIM0027_260206.MP4	CT04	6/2/2026	16:42:12	-	-	-	-	
11/2/2026	CT04_DCIM0028_260206.MP4	CT04	6/2/2026	16:48:10	-	-	-	-	
11/2/2026	CT04_DCIM0029_260206.MP4	CT04	6/2/2026	16:54:12	-	-	-	-	
11/2/2026	CT04_DCIM0030_260206.MP4	CT04	6/2/2026	16:56:24	-	-	-	-	
11/2/2026	CT04_DCIM0031_260206.MP4	CT04	6/2/2026	17:01:58	-	-	-	-	
11/2/2026	CT04_DCIM0032_260206.MP4	CT04	6/2/2026	17:28:24	1	Common treeshrew	1	LC	
11/2/2026	CT04_DCIM0033_260206.MP4	CT04	6/2/2026	17:28:38	1	UnID squirrel/treeshrew	1	#N/A	
11/2/2026	CT04_DCIM0034_260206.MP4	CT04	6/2/2026	19:37:58	-	-	-	-	
11/2/2026	CT04_DCIM0035_260207.MP4	CT04	7/2/2026	2:43:52	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0036_260207.MP4	CT04	7/2/2026	11:57:36	-	-	-	-	
11/2/2026	CT04_DCIM0037_260207.MP4	CT04	7/2/2026	16:39:08	1	Red Junglefowl	1	NT	
11/2/2026	CT04_DCIM0038_260207.MP4	CT04	7/2/2026	17:10:40	1	Plantain Squirrel	1	LC	
11/2/2026	CT04_DCIM0039_260207.MP4	CT04	7/2/2026	17:36:18	1	Laced woodpecker	1	LC	
11/2/2026	CT04_DCIM0040_260207.MP4	CT04	7/2/2026	17:37:02	1	Laced woodpecker	1	LC	
11/2/2026	CT04_DCIM0041_260207.MP4	CT04	7/2/2026	18:51:30	-	-	-	-	
11/2/2026	CT04_DCIM0042_260207.MP4	CT04	7/2/2026	23:43:28	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0043_260208.MP4	CT04	8/2/2026	0:57:30	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0044_260208.MP4	CT04	8/2/2026	1:00:16	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0045_260208.MP4	CT04	8/2/2026	1:00:48	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0046_260208.MP4	CT04	8/2/2026	8:45:52	-	-	-	-	
11/2/2026	CT04_DCIM0047_260208.MP4	CT04	8/2/2026	11:36:44	1	Plantain Squirrel	1	LC	
11/2/2026	CT04_DCIM0048_260208.MP4	CT04	8/2/2026	11:51:12	-	-	-	-	
11/2/2026	CT04_DCIM0049_260208.MP4	CT04	8/2/2026	14:16:14	-	-	-	-	
11/2/2026	CT04_DCIM0050_260208.MP4	CT04	8/2/2026	14:25:30	-	-	-	-	
11/2/2026	CT04_DCIM0051_260208.MP4	CT04	8/2/2026	16:34:58	1	Common treeshrew	1	LC	
11/2/2026	CT04_DCIM0052_260208.MP4	CT04	8/2/2026	16:35:42	1	Common treeshrew	1	LC	
11/2/2026	CT04_DCIM0053_260208.MP4	CT04	8/2/2026	19:04:10	-	-	-	-	
11/2/2026	CT04_DCIM0054_260209.MP4	CT04	9/2/2026	2:50:26	1	Rattus sp.	1	NA	

Retrieval Date	File Name	Camera Trap	Date	Time	Species count	Common name	Count	SRDB3 Status	Comments
11/2/2026	CT04_DCIM0055_260209.MP4	CT04	9/2/2026	7:24:10	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0056_260209.MP4	CT04	9/2/2026	7:26:02	-	-	-	-	
11/2/2026	CT04_DCIM0057_260209.MP4	CT04	9/2/2026	9:45:10	1	Common treeshrew	1	LC	
11/2/2026	CT04_DCIM0058_260209.MP4	CT04	9/2/2026	9:45:54	1	Common treeshrew	1	LC	
11/2/2026	CT04_DCIM0059_260209.MP4	CT04	9/2/2026	11:01:10	1	Javan myna	1	NA	
11/2/2026	CT04_DCIM0060_260209.MP4	CT04	9/2/2026	11:34:26	-	-	-	-	
11/2/2026	CT04_DCIM0061_260209.MP4	CT04	9/2/2026	15:02:12	-	-	-	-	
11/2/2026	CT04_DCIM0062_260209.MP4	CT04	9/2/2026	15:40:22	-	-	-	-	
11/2/2026	CT04_DCIM0063_260209.MP4	CT04	9/2/2026	15:41:36	-	-	-	-	
11/2/2026	CT04_DCIM0064_260209.MP4	CT04	9/2/2026	15:42:08	-	-	-	-	
11/2/2026	CT04_DCIM0065_260209.MP4	CT04	9/2/2026	15:42:48	-	-	-	-	
11/2/2026	CT04_DCIM0066_260209.MP4	CT04	9/2/2026	15:45:28	-	-	-	-	
11/2/2026	CT04_DCIM0067_260209.MP4	CT04	9/2/2026	17:14:00	-	-	-	-	
11/2/2026	CT04_DCIM0068_260209.MP4	CT04	9/2/2026	17:28:38	-	-	-	-	
11/2/2026	CT04_DCIM0069_260209.MP4	CT04	9/2/2026	17:29:16	-	-	-	-	
11/2/2026	CT04_DCIM0070_260209.MP4	CT04	9/2/2026	17:31:54	-	-	-	-	
11/2/2026	CT04_DCIM0071_260209.MP4	CT04	9/2/2026	17:35:20	-	-	-	-	
11/2/2026	CT04_DCIM0072_260209.MP4	CT04	9/2/2026	17:51:24	-	-	-	-	
11/2/2026	CT04_DCIM0073_260210.MP4	CT04	10/2/2026	5:03:26	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0074_260210.MP4	CT04	10/2/2026	8:37:36	-	-	-	-	
11/2/2026	CT04_DCIM0075_260210.MP4	CT04	10/2/2026	8:40:10	1	Common treeshrew	1	LC	
11/2/2026	CT04_DCIM0076_260210.MP4	CT04	10/2/2026	8:41:16	1	Common treeshrew	1	LC	
11/2/2026	CT04_DCIM0077_260210.MP4	CT04	10/2/2026	9:19:58	-	-	-	-	
11/2/2026	CT04_DCIM0078_260210.MP4	CT04	10/2/2026	9:50:28	-	-	-	-	
11/2/2026	CT04_DCIM0079_260210.MP4	CT04	10/2/2026	10:18:32	-	-	-	-	
11/2/2026	CT04_DCIM0080_260210.MP4	CT04	10/2/2026	11:39:22	-	-	-	-	
11/2/2026	CT04_DCIM0081_260210.MP4	CT04	10/2/2026	14:59:06	-	-	-	-	
11/2/2026	CT04_DCIM0082_260210.MP4	CT04	10/2/2026	15:47:08	-	-	-	-	
11/2/2026	CT04_DCIM0083_260210.MP4	CT04	10/2/2026	15:59:30	-	-	-	-	
11/2/2026	CT04_DCIM0084_260210.MP4	CT04	10/2/2026	16:00:52	-	-	-	-	
11/2/2026	CT04_DCIM0085_260210.MP4	CT04	10/2/2026	16:04:44	-	-	-	-	
11/2/2026	CT04_DCIM0086_260210.MP4	CT04	10/2/2026	16:16:00	-	-	-	-	
11/2/2026	CT04_DCIM0087_260210.MP4	CT04	10/2/2026	16:24:16	-	-	-	-	
11/2/2026	CT04_DCIM0088_260210.MP4	CT04	10/2/2026	16:25:54	-	-	-	-	
11/2/2026	CT04_DCIM0089_260210.MP4	CT04	10/2/2026	16:32:48	-	-	-	-	
11/2/2026	CT04_DCIM0090_260210.MP4	CT04	10/2/2026	16:34:04	-	-	-	-	
11/2/2026	CT04_DCIM0091_260210.MP4	CT04	10/2/2026	16:39:02	-	-	-	-	
11/2/2026	CT04_DCIM0092_260210.MP4	CT04	10/2/2026	16:39:54	-	-	-	-	
11/2/2026	CT04_DCIM0093_260210.MP4	CT04	10/2/2026	16:56:00	-	-	-	-	
11/2/2026	CT04_DCIM0094_260210.MP4	CT04	10/2/2026	17:31:18	-	-	-	-	
11/2/2026	CT04_DCIM0095_260210.MP4	CT04	10/2/2026	17:44:46	-	-	-	-	
11/2/2026	CT04_DCIM0096_260210.MP4	CT04	10/2/2026	17:50:00	-	-	-	-	
11/2/2026	CT04_DCIM0097_260210.MP4	CT04	10/2/2026	17:55:30	-	-	-	-	
11/2/2026	CT04_DCIM0098_260210.MP4	CT04	10/2/2026	18:04:54	-	-	-	-	
11/2/2026	CT04_DCIM0099_260210.MP4	CT04	10/2/2026	18:09:22	-	-	-	-	
11/2/2026	CT04_DCIM0100_260210.MP4	CT04	10/2/2026	18:12:12	-	-	-	-	
11/2/2026	CT04_DCIM0101_260210.MP4	CT04	10/2/2026	19:58:16	-	-	-	-	
11/2/2026	CT04_DCIM0102_260210.MP4	CT04	10/2/2026	21:20:58	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0103_260210.MP4	CT04	10/2/2026	22:13:34	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0104_260210.MP4	CT04	10/2/2026	22:15:46	1	Rattus sp.	1	NA	
11/2/2026	CT04_DCIM0105_260211.MP4	CT04	11/2/2026	9:23:50	1	Common treeshrew	1	LC	
11/2/2026	CT04_DCIM0106_260211.MP4	CT04	11/2/2026	9:24:26	1	Common treeshrew	1	LC	
11/2/2026	CT04_DCIM0107_260211.MP4	CT04	11/2/2026	10:37:16	-	-	-	-	
11/2/2026	CT04_DCIM0108_260211.MP4	CT04	11/2/2026	10:48:34	-	-	-	-	
11/2/2026	CT04_DCIM0109_260211.MP4	CT04	11/2/2026	10:48:56	-	-	-	-	
11/2/2026	CT10_DCIM0008_260104.AVI	CT10	4/1/2026	9:53:44	-	-	-	-	
11/2/2026	CT10_DCIM0009_260104.AVI	CT10	4/1/2026	9:56:38	-	-	-	-	
11/2/2026	CT10_DCIM0010_260104.AVI	CT10	4/1/2026	11:04:42	-	-	-	-	
11/2/2026	CT10_DCIM0011_260115.AVI	CT10	15/1/2026	11:53:50	-	-	-	-	
11/2/2026	CT10_DCIM0012_260123.AVI	CT10	23/1/2026	12:49:46	-	-	-	-	
11/2/2026	CT10_DCIM0013_260211.AVI	CT10	11/2/2026	11:09:18	-	-	-	-	

Appendix F Ex-situ Water Quality Results

TEST REPORT

(This Report is issued subject to the terms & conditions set out below)

Setsco Services Pte Ltd
531 Bukit Batok Street 23
Singapore 659547
Tel : (65) 6566 7777
Fax: (65) 6566 7718
www.setsco.com
Business Reg No 196900269D

Your Ref:

Date : 16/04/2026

Our Ref : ZEN1-8500408206

Subject : Analysis of water samples submitted by **EnviroSolutions & Consulting Pte Ltd** on **06/04/2026** and testing commenced on **06/04/2026**.

Tested for : **EnviroSolutions & Consulting Pte Ltd**
133 Cecil Street
#08-01A Keck Seng Tower
Singapore 069535
Attn : Ong Jun / Esther Suhla / Kaylene Ho / Dang Trung Hieu

Sample Reference : Eleven (11) water samples were received.

Results : Refer to next page.

MARIVIE VIANA GAPUD
SENIOR CHEMIST

LEE WEI WAH
SENIOR MANAGER

BIOLOGICAL AND CHEMICAL TECHNOLOGY DIVISION

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RESULTS :

Test Parameters	Units	Test Methods	Tengah North WQ						Specification (Provided by client)
			WQ1	WQ2	WQ3	WQ4	WQ5	WQ6	
			06/04/2026	06/04/2026	06/04/2026	06/04/2026	06/04/2026	06/04/2026	
			1340 hrs	1330 hrs	1320 hrs	1310 hrs	1305 hrs	1250 hrs	
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA : Pt 5210B	2.7	2.0	<2	2.2	2.0	<2	**2**
Chemical Oxygen Demand	mgO_2/L	APHA : Pt 5220B	<50	<50	<50	<50	<50	<50	-
Total Alkalinity as $CaCO_3$	mg/L	APHA : Pt 2320B	110	102	182	67.2	66.2	57.3	-
Total Phosphorus	mg/L	APHA : Pt 4500-P (J)	0.18	0.13	0.20	0.15	0.14	0.17	**0.01**
Total Nitrogen	mg/L	APHA : Pt 4500-P (J)	1.78	1.40	1.69	0.96	1.07	0.82	**0.01**
Total Organic Carbon	mg/L	APHA : Pt 5310B	10.4	10.2	10.3	8.66	8.64	8.81	**1**
Nitrate as NO_3	mg/L	APHA : Pt 4500-NO_3 (I)	0.58	0.33	<0.066	0.17	0.068	<0.066	**0.015**
Ammonia Nitrogen as NH_3-N	mg/L	APHA : Pt 4500-NH_3 (H)	0.50	0.56	0.75	0.15	0.080	0.070	**0.01**
Phosphate as PO_4-P	mg/L	APHA : Pt 4500-P (G)	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	**0.025**
Total Dissolved Solids	mg/L	APHA : Pt 2540C	203	187	262	128	125	128	**10**
Total Suspended Solids	mg/L	APHA : Pt 2540D	62.0	25.3	35.0	24.0	17.0	19.0	**10**
Lead as Pb	mg/L	APHA : Pt 3125B	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	-
Zinc as Zn	mg/L	APHA : Pt 3120B	0.046	0.033	0.050	0.030	0.075	0.035	-
Mercury as Hg	mg/L	APHA : Pt 3112B	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Arsenic as As	mg/L	APHA : Pt 3125B	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	-
Barium as Ba	mg/L	APHA : Pt 3120B	0.032	0.028	0.040	0.016	0.016	0.014	-
Tin as Sn	mg/L	APHA : Pt 3120B	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	-
Iron as Fe	mg/L	APHA : Pt 3120B	8.62	4.67	9.05	2.64	2.27	3.14	-
Boron as B	mg/L	APHA : Pt 3120B	0.031	0.027	0.027	0.019	0.019	0.016	-
Manganese as Mn	mg/L	APHA : Pt 3120B	0.13	0.13	0.11	0.039	0.027	0.034	-
Cadmium as Cd	mg/L	APHA : Pt 3120B	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	-
Chromium as Cr (Total)	mg/L	APHA : Pt 3120B	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-
Copper as Cu	mg/L	APHA : Pt 3120B	0.0024	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	-
Nickel as Ni	mg/L	APHA : Pt 3120B	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	-
Silver as Ag	mg/L	APHA : Pt 3120B	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	-
Beryllium as Be	mg/L	APHA : Pt 3120B	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	-
Selenium as Se	mg/L	APHA : Pt 3125B	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	-
Metals in Total	mg/L	(by calculation)	0.048	0.033	0.050	0.030	0.075	0.035	**0.005**
Oil & Grease (Total)	mg/L	APHA : Pt 5520B	<10	<10	<10	<10	<10	<10	-
Oil & Grease (Hydrocarbon)	mg/L	APHA : Pt 5520F	<10	<10	<10	<10	<10	<10	-
Enterococcus	cfu/100mL	APHA : Pt 9230C	2,000	1,700	110	600	900	1,100	**1**
Total *E.coli*	cfu/100mL	APHA : Pt 9222H	8,000	8,000	1,500	8,000	1,000	2,000	-

RESULTS :

Test Parameters	Units	Test Methods	Tengah North WQ					Specification (Provided by client)
			WQ7	WQ8	WQ9	WQ10	WQ11	
			06/04/2026	06/04/2026	06/04/2026	06/04/2026	06/04/2026	
			1240 hrs	1230 hrs	1220 hrs	1210 hrs	1205 hrs	
Biochemical Oxygen Demand (BOD_5)	mg/L	APHA : Pt 5210B	2.4	2.4	<2	3.5	<2	**2**
Chemical Oxygen Demand	mgO_2/L	APHA : Pt 5220B	<50	<50	<50	<50	<50	-
Total Alkalinity as $CaCO_3$	mg/L	APHA : Pt 2320B	31.6	31.6	61.3	55.4	60.3	-
Total Phosphorus	mg/L	APHA : Pt 4500-P (J)	0.15	0.15	0.21	0.15	0.15	**0.01**
Total Nitrogen	mg/L	APHA : Pt 4500-P (J)	1.32	1.53	0.82	0.90	0.83	**0.01**
Total Organic Carbon	mg/L	APHA : Pt 5310B	8.46	8.06	10.1	8.28	9.53	**1**
Nitrate as NO_3	mg/L	APHA : Pt 4500-NO_3 (I)	0.66	0.65	0.25	0.28	0.33	**0.015**
Ammonia Nitrogen as NH_3-N	mg/L	APHA : Pt 4500-NH_3 (H)	0.29	0.29	0.086	0.11	0.088	**0.01**
Phosphate as PO_4-P	mg/L	APHA : Pt 4500-P (G)	<0.025	<0.025	<0.025	<0.025	<0.025	**0.025**
Total Dissolved Solids	mg/L	APHA : Pt 2540C	67.0	80.0	118	109	115	**10**
Total Suspended Solids	mg/L	APHA : Pt 2540D	36.0	33.0	35.0	12.0	11.2	**10**
Lead as Pb	mg/L	APHA : Pt 3125B	<0.015	<0.015	<0.015	<0.015	<0.015	-
Zinc as Zn	mg/L	APHA : Pt 3120B	0.060	0.047	0.020	0.091	0.046	-
Mercury as Hg	mg/L	APHA : Pt 3112B	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Arsenic as As	mg/L	APHA : Pt 3125B	<0.023	<0.023	<0.023	<0.023	<0.023	-
Barium as Ba	mg/L	APHA : Pt 3120B	0.011	0.011	0.014	0.013	0.012	-
Tin as Sn	mg/L	APHA : Pt 3120B	<0.009	<0.009	<0.009	<0.009	<0.009	-
Iron as Fe	mg/L	APHA : Pt 3120B	2.81	2.91	3.58	2.19	2.22	-
Boron as B	mg/L	APHA : Pt 3120B	0.014	0.014	0.018	0.016	0.015	-
Manganese as Mn	mg/L	APHA : Pt 3120B	0.042	0.042	0.032	0.026	0.031	-
Cadmium as Cd	mg/L	APHA : Pt 3120B	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	-
Chromium as Cr (Total)	mg/L	APHA : Pt 3120B	<0.003	<0.003	<0.003	<0.003	<0.003	-
Copper as Cu	mg/L	APHA : Pt 3120B	<0.0015	<0.0015	<0.0015	0.0020	<0.0015	-
Nickel as Ni	mg/L	APHA : Pt 3120B	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	-
Silver as Ag	mg/L	APHA : Pt 3120B	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	-
Beryllium as Be	mg/L	APHA : Pt 3120B	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	-
Selenium as Se	mg/L	APHA : Pt 3125B	<0.045	<0.045	<0.045	<0.045	<0.045	-
Metals in Total	mg/L	(by calculation)	0.060	0.047	0.020	0.093	0.046	**0.005**
Oil & Grease (Total)	mg/L	APHA : Pt 5520B	<10	<10	<10	<10	<10	-
Oil & Grease (Hydrocarbon)	mg/L	APHA : Pt 5520F	<10	<10	<10	<10	<10	-
Enterococcus	cfu/100mL	APHA : Pt 9230C	1,200	1,500	2,000	1,800	800	**1**
Total *E.coli*	cfu/100mL	APHA : Pt 9222H	9,000	5,000	3,000	7,000	10,000	-

Remarks:

1. APHA is a Standard Method for the Determination of Water and Waste Water (APHA 24th Edition : 2023)
2. The tested result applies only to the sample as received by the laboratory.
3. "<" = Not Detectable (The reported values are less than (<) the detection limits of the test methods).

TEST REPORT

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Setsco Services Pte Ltd
531 Bukit Batok Street 23
Singapore 659547
Tel : (65) 6566 7777
Fax: (65) 6566 7718
www.setsco.com
Business Reg. No. 196900269D

Your Ref: **Date : 06/01/2026**

Our Ref : EN8500395169/LWW

Subject : Analysis of water samples submitted by **EnviroSolutions & Consulting Pte Ltd** on **20/12/2025** and testing commenced on **20/12/2025**.

Tested for : **EnviroSolutions & Consulting Pte Ltd**
133 Cecil Street
#08-01A Keck Seng Tower
Singapore 069535
Attn : Ngin Yun Jia / Darryl Seah

Sample Reference : Eleven (11) water samples were received.

Results : Refer to next page.

MARIVIE VIANA GAPUD
SENIOR CHEMIST

LEE WEI WAH
SENIOR MANAGER

BIOLOGICAL AND CHEMICAL TECHNOLOGY DIVISION

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RESULTS :

Test Parameters	Units	Test Methods	WQ01	WQ02	WQ03	WQ04	WQ05	WQ06	WQ07	WQ08	WQ09	WQ10	WQ11
			20/12/2025	20/12/2025	20/12/2025	20/12/2025	20/12/2025	20/12/2025	20/12/2025	20/12/2025	20/12/2025	20/12/2025	20/12/2025
			12:14 pm	11:56 am	9:25 am	9:17 am	11:26 am	11:17 am	10:00 am	10:18 am	11:02 am	9:59 am	9:50 am
Biochemical Oxygen Demand	mg/L	APHA 5210B	2.6	<2	2.6	<2	<2	2.7	<2	<2	19.1	<2	<2
Chemical Oxygen Demand	mgO_2/L	APHA 5220B	<50	<50	<50	<50	<50	<50	<50	<50	380	<50	<50
Total Alkalinity	mg/L	APHA 2320B	179	135	157	135	136	114	121	82.5	114	111	112
Total Phosphorus	mg/L	APHA 4500-P (J)	0.13	0.079	0.035	0.095	0.11	0.48	0.15	0.076	3.55	0.13	0.11
Total Nitrogen	mg/L	APHA 4500-P (J)	1.44	0.79	0.58	0.75	0.59	0.62	0.53	0.63	46.7	0.61	0.60
Total Organic Carbon	mg/L	APHA 5310B	11.3	12.6	10.5	10.3	9.28	7.51	9.83	3.73	6.85	7.54	7.88
Nitrate as NO3-N	mg/L	APHA 4500-NO3 (I)	<0.015	<0.015	<0.015	<0.015	0.045	0.022	0.038	<0.015	<0.015	0.060	0.060
Ammonia as NH3-N	mg/L	APHA 4500-NH3 (H)	0.77	0.15	0.13	0.13	0.10	0.24	<0.01	0.40	1.53	0.15	0.048
Orthophosphate as PO4-P	mg/L	APHA 4500-P (G)	0.0061	<0.003	0.0082	0.031	0.032	0.12	0.045	0.010	0.0037	0.052	0.041
Total Dissolved Solids	mg/L	APHA 2540C	241	179	203	178	180	149	163	137	141	154	154
Total Suspended Solids	mg/L	APHA 2540D	25.5	60.5	19.0	<10	<10	18.5	<10	18.0	1,188	<10	<10
Lead as Pb	mg/L	APHA 3125B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn	mg/L	APHA 3120B	0.34	0.038	0.022	0.036	0.081	0.043	0.025	0.023	0.61	0.047	0.038
Mercury as Hg	mg/L	APHA 3112B	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic as As	mg/L	APHA 3125B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium as Ba	mg/L	APHA 3120B	0.038	0.022	0.024	0.018	0.018	0.018	0.015	0.013	0.20	0.015	0.016
Tin as Sn	mg/L	APHA 3120B	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Iron as Fe	mg/L	APHA 3120B	9.50	6.97	5.12	2.27	2.11	4.03	2.49	3.10	107	2.53	2.20
Boron as B	mg/L	APHA 3120B	0.015	0.0070	0.0037	<0.0015	<0.0015	0.0080	<0.0015	<0.0015	0.074	<0.0015	<0.0015
Manganese as Mn	mg/L	APHA 3120B	0.28	0.11	0.17	0.064	0.059	0.074	0.047	0.071	0.32	0.062	0.056
Cadmium as Cd	mg/L	APHA 3120B	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	0.0036	<0.0012	<0.0012
Chromium as Cr	mg/L	APHA 3120B	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0056	0.18	<0.003	<0.003
Copper as Cu	mg/L	APHA 3120B	0.036	0.0022	0.0032	0.0022	0.0068	0.0026	<0.0015	<0.0015	0.16	0.0042	0.0027
Nickel as Ni	mg/L	APHA 3120B	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	0.026	<0.0045	<0.0045
Silver as Ag	mg/L	APHA 3120B	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Beryllium as Be	mg/L	APHA 3120B	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006
Selenium as Se	mg/L	APHA 3125B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Metals in Total	mg/L	By Calculation	0.37	<0.045	<0.045	<0.045	0.088	0.045	<0.045	<0.045	1.13	0.051	<0.045
Oil & Grease (Total)	mg/L	APHA 5520B	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Oil & Grease (Hydrocarbon)	mg/L	APHA 5520F	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Enterococci	cfu/100mL	APHA 9230C	<1	480	200	200	<1	1,100	600	420	420	360	1,200
Salinity	ppt	APHA 2520B	0.18	0.14	0.15	0.14	0.14	0.12	0.13	0.10	0.11	0.12	0.12

Remarks:

1. APHA is a Standard Method for the Determination of Water and Waste Water (APHA 24th Edition : 2023).
2. The tested result applies only to the sample as received by the laboratory.
3. "<" = Not Detectable (The reported values are less than (<) the detection limits of the test methods).

TEST REPORT

(This Report is issued subject to the terms & conditions set out below)

SETSCO

Setsco Services Pte Ltd
531 Bukit Batok Street 23
Singapore 659547
Tel : (65) 6566 7777
Fax: (65) 6566 7718
www.setsco.com
Business Reg. No. 196900269D

Your Ref: **Date : 06/01/2026**

Our Ref : EN8500395408/LWW

Subject : Analysis of water samples submitted by **EnviroSolutions & Consulting Pte Ltd** on **23/12/2025** and testing commenced on **23/12/2025**.

Tested for : **EnviroSolutions & Consulting Pte Ltd**
133 Cecil Street
#08-01A Keck Seng Tower
Singapore 069535
Attn : Ngin Yun Jia / Darryl Seah

Sample Reference : Eleven (11) water samples were received.

Results : Refer to next page.

MARIVIE VIANA GAPUD
SENIOR CHEMIST

LEE WEI WAH
SENIOR MANAGER

BIOLOGICAL AND CHEMICAL TECHNOLOGY DIVISION

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RESULTS :

Test Parameters	Units	Test Methods	WQ01	WQ02	WQ03	WQ04	WQ05	WQ06	WQ07	WQ08	WQ09	WQ10	WQ11
			23/12/2025	23/12/2025	23/12/2025	23/12/2025	23/12/2025	23/12/2025	23/12/2025	23/12/2025	23/12/2025	23/12/2025	23/12/2025
			12:25 pm	12:11 pm	12:04 pm	11:49 am	11:41 am	11:30 am	10:59 am	11:11 am	11:21 am	10:51 am	10:42 am
Biochemical Oxygen Demand	mg/L	APHA 5210B	2.1	5.1	2.7	<2	<2	<2	<2	2.6	<2	<2	<2
Chemical Oxygen Demand	mgO_2/L	APHA 5220B	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Total Alkalinity	mg/L	APHA 2320B	228	190	189	150	150	142	127	75.0	69.9	122	122
Total Phosphorus	mg/L	APHA 4500-P (J)	0.056	0.066	0.070	0.14	0.13	0.11	0.12	0.098	0.13	0.23	0.14
Total Nitrogen	mg/L	APHA 4500-P (J)	3.72	0.71	0.78	0.65	0.64	0.67	0.62	1.57	1.95	0.63	0.73
Total Organic Carbon	mg/L	APHA 5310B	6.41	9.86	9.72	6.40	6.94	7.50	7.09	4.05	3.80	6.80	6.52
Nitrate as NO3-N	mg/L	APHA 4500-NO3 (I)	<0.015	<0.015	<0.015	<0.015	<0.015	0.027	0.044	<0.015	<0.015	0.061	0.059
Ammonia as NH3-N	mg/L	APHA 4500-NH3 (H)	1.46	0.081	0.18	0.23	0.22	0.15	0.15	0.50	0.58	0.17	0.15
Orthophosphate as PO4-P	mg/L	APHA 4500-P (G)	0.0095	0.0032	0.0040	0.044	0.029	0.030	0.038	0.021	0.012	0.051	0.037
Total Dissolved Solids	mg/L	APHA 2540C	305	264	441	199	200	190	167	120	117	166	167
Total Suspended Solids	mg/L	APHA 2540D	53.0	31.0	20.0	15.5	<10	<10	<10	158	31.0	51.5	<10
Lead as Pb	mg/L	APHA 3125B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn	mg/L	APHA 3120B	0.031	0.048	0.024	0.011	0.018	0.020	0.024	0.045	0.019	0.014	0.017
Mercury as Hg	mg/L	APHA 3112B	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic as As	mg/L	APHA 3125B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium as Ba	mg/L	APHA 3120B	0.046	0.028	0.031	0.022	0.021	0.017	0.016	0.020	0.014	0.018	0.015
Tin as Sn	mg/L	APHA 3120B	<0.009	<0.009	0.020	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Iron as Fe	mg/L	APHA 3120B	8.78	4.53	10.4	5.16	3.65	2.40	2.66	9.20	5.11	5.38	2.38
Boron as B	mg/L	APHA 3120B	0.0085	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Manganese as Mn	mg/L	APHA 3120B	0.29	0.086	0.19	0.12	0.21	0.20	0.12	0.080	0.081	0.11	0.093
Cadmium as Cd	mg/L	APHA 3120B	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012
Chromium as Cr	mg/L	APHA 3120B	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0061	<0.003	<0.003	<0.003
Copper as Cu	mg/L	APHA 3120B	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Nickel as Ni	mg/L	APHA 3120B	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045	<0.0045
Silver as Ag	mg/L	APHA 3120B	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Beryllium as Be	mg/L	APHA 3120B	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006
Selenium as Se	mg/L	APHA 3125B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Metals in Total	mg/L	By Calculation	<0.045	0.049	<0.045	<0.045	<0.045	<0.045	<0.045	0.051	<0.045	<0.045	<0.045
Oil & Grease (Total)	mg/L	APHA 5520B	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Oil & Grease (Hydrocarbon)	mg/L	APHA 5520F	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Enterococci	cfu/100mL	APHA 9230C	1,000	480	200	<1	480	300	1,500	360	160	720	900
Total *E.coli*	cfu/100mL	APHA 9222H	<1	1,400	200	500	<1	700	500	1,900	4,000	1,200	400

Remarks:

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EnviroSolutions & Consulting Ltd
Solutions for Environment | Safety | Sustainability

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We understand the importance of being accountable to each other and our clients.

Passion

We are completely passionate about providing practical solutions and outcomes that deliver for our clients.

Insight

We work in an environment that encourages and values insight as a critical quality which informs our decisions and our clients and supports practical solutions and project delivery.

Integrity

We behave with respect and honesty toward each other, our clients and our stakeholders.