

# Specialist Consultancy Services for Environmental Impact Study (EIS) on Southern Tengah

**Executive Summary**

**Housing & Development Board (HDB)**

Project reference: L/025/21

Project number: 60651709

November 1, 2021

## Executive Summary

### Project Description & Objectives

AECOM Singapore Pte Ltd was appointed by Housing & Development Board (HDB) to carry out the Environmental Impact Study (EIS) for the Southern area in Tengah (hereafter referred to as the "Project"). The Project Site is bounded by Pan Island Expressway (PIE) on the south and Bukit Batok Road on the east. Located at the south of the proposed Tengah Town development (Figure 1), the Project Site consists of 60 hectares (ha) which has been safeguarded as mainly "Residential", "Park", "Commercial and Residential", "Health and Medical Care", "Place of Worship" and "Educational Institution" based on the gazetted Master Plan 2019. Currently, the Study Area is mainly covered by vegetated area (about 41 ha), with about 19 ha already cleared for other projects at Tengah, and were accounted for in their respective environmental impact assessments.

With the current proposed developments in Southern Tengah Town, there is a need to: (1) assess its potential impacts on the local biodiversity and environment; (2) to recommend mitigation measures to address the current gaps in connectivity to surrounding green spaces and to safeguard such ecological connectivity in the future development; and (3) to develop an Environmental Monitoring and Management Plan (EMMP).

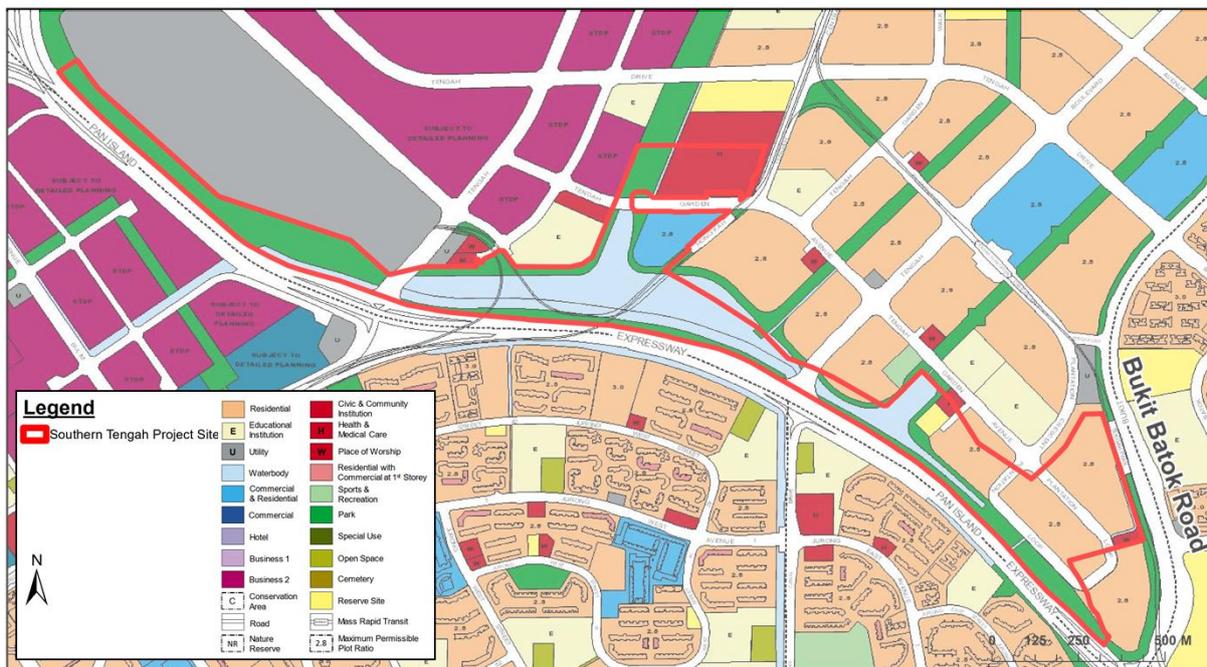


Figure 1 Proposed land use of Project Site

### Environmental Baseline Findings

Baseline studies on biodiversity, hydrology and water quality, air quality and airborne noise were conducted for the Project Site, and a summary of the findings is provided below. More information can be obtained from Sections 7, 8, 9 and 10 of the report.

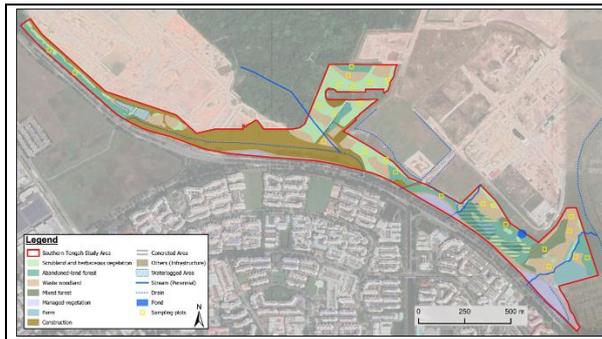


Figure 2 Vegetation distribution in the Project Site

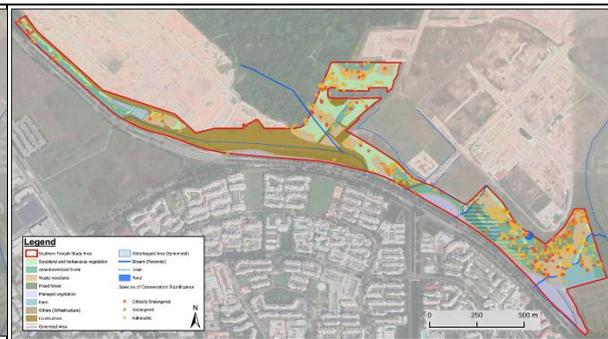


Figure 3 Distribution of flora species of conservation significance in the Project Site

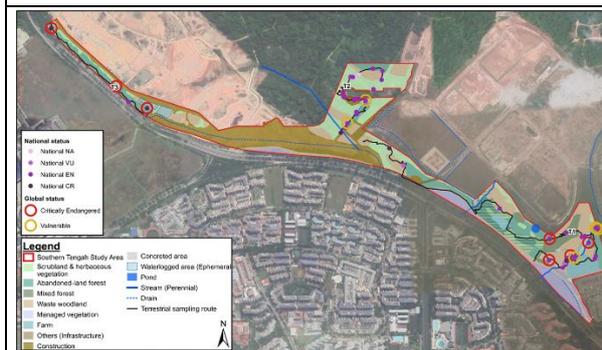


Figure 4 Distribution of fauna species of conservation significance in the Project Site

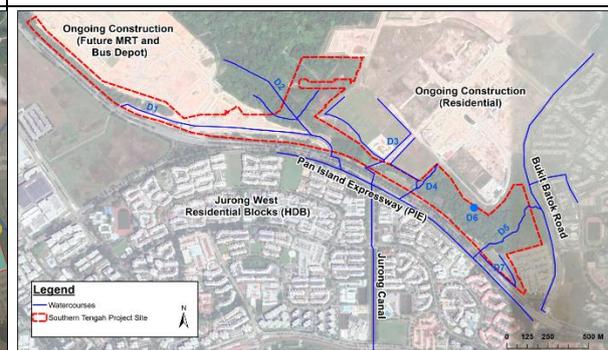


Figure 5 Existing waterbodies in the Project Site

- Vegetation Distribution** (see Figure 2) – Southern Tengah comprises of four types of vegetation of which, the largest vegetation type is scrubland and herbaceous vegetation which takes up 12.9 ha (21.43%) of the Project Site. This is followed by waste woodland, occupying 10.59 ha (17.59%) of the Project Site; abandoned-land forest (9.51 ha; 15.8%), and lastly, mixed forest habitat (2.15 ha; 3.25%). The remaining areas are covered by farms (2.20 ha; 3.65%), managed vegetation (4.23 ha; 7.03%) and other non-vegetation area such as construction area and infrastructure which consists of 15.63 ha (25.96%) and 2.38 ha (3.95%) respectively.
- Biodiversity, Flora** (see Figure 3) – A total of 364 species and 5 species groups (i.e., plants that could not be identified to a species level with certainty) belonging to 109 families were recorded from the floristic surveys. Thirty-three recorded species were considered as species of conservation significance. Notable recorded species include the Critically Endangered mature specimens of *Ficus stricta*, nationally Endangered *Ardisia elliptica*, *Dacryodes cf. costata* and *Tarenna fragrans*, and Vulnerable *Glochidion zeylanicum* var. *zeylanicum* that has an association to the rare butterfly species – Malay staff sergeant butterfly (*Athyma reta moorei*).
- Biodiversity, Large Plant Specimens and Other Specimens of Values** – Malayan banyan (*Ficus microcarpa*) makes up the majority of large specimens, while the second-most abundant large specimen species found is the common roadside tree, angšana (*Pterocarpus indicus*). Other specimens of values recorded at Tengah includes an albizia (*Falcataria moluccana*) in the western portion that was observed to have one raptor nest belonging to the changeable hawk eagle (*Nisaetus cirrhatus*). Majority of the keystone species were concentrated over at the eastern portion of Southern Tengah.
- Biodiversity, Fauna** (see Figure 4) – Nineteen species of conservation significance were observed in the central and eastern part of the Project Site. One of the notable records of fauna includes the very rare Malay staff sergeant (*Athyma reta moorei*). Native host plants for this butterfly species of conservation significance were observed in the central and eastern part of the Project Site. Globally Vulnerable and nationally Endangered Asian softshell turtle (*Amyda cartilaginea*) were encountered at the D5 stream (Figure 5). To add on, the nationally Endangered and globally Critically Endangered straw-headed bulbul (*Pycnonotus*

*zeylanicus*) was recorded in the eastern part of the Project Site (T1), close to the D5 stream, likely due to their preference for riverine habitats. As for non-volant mammals, the globally and nationally Critically Endangered Sunda pangolin (*Manis javanica*) was recorded over at the western portion of the Project Site, probably due to forested areas that remains connected to north of the Project Site and construction site via a forested corridor running along the PIE and KJE, thus possibly explaining its presence here.

- **Hydrological Conditions** (see Figure 5) – Six (6) water catchment areas within the vicinity of the Project mainly contribute to five (5) perennial drains/ streams (i.e. D1 to D5), one pond (D6) and one dry roadside drain (D7).
- **Water Quality** – Surface water quality of waterbodies canal D1, stream D2, drain D3 and stream D4 were relatively poor as they were potentially impacted by surrounding construction site as sampled during the time of field surveys. The natural stream D5 was less impacted by the surrounding construction site and had relatively better water quality. Although some water quality indicators in the natural stream D5 had exceeded the aquatic life criteria<sup>1</sup>, this is commonly observed in natural watercourses in Singapore with its tropical climate and D5 is habitable for aquatic flora and fauna, based on AECOM's previous project experience. This also aligned with biodiversity findings in Section 7, which showed the presence of important aquatic species such as odonates and reptiles in D5.
- **Groundwater Level** – In terms of groundwater level, it ranged between 2.78 m Reduced Level (mRL) and 11.25 mRL, i.e. 0.86 meters below ground surface (m bgs) and 1.87 m bgs. from gauging records in previous study
- **Air Quality** – 3 representative locations were monitored for 1 week each, and it was observed that there was an exceedance of PM<sub>2.5</sub> targets as per the Singapore Ambient Air Quality Long Term Targets at all three monitoring stations (A01 – A03) and an exceedance of the PM<sub>10</sub> targets at A02 station.
- **Airborne Noise** – Baseline monitoring was carried out at thirteen (13) locations within the defined Project Site (i.e. 150 m from the Project Site). Noise monitoring was conducted for one (1) week (inclusive of Weekdays and Weekends) to capture baseline noise levels over time periods of 12 hours (long term), 1 hour and 5 minutes (short term) at each of the locations. Generally, the baseline airborne noise levels exceeded the *NEA Maximum Permissible Noise Levels for Construction Noise Control* criteria, most likely due to the traffic noise from the Bukit Batok Road, PIE, nearby carparks and ongoing construction worksites.

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<sup>1</sup> The aquatic life criteria indicate the threshold concentration of contaminants that can be present in surface waterbodies before it is likely to harm on the aquatic flora and fauna within it.



Environmental Parameter	Recommended Key Mitigation Measures and Best Management Practices	
	During Construction Phase	During Operational Phase
	<ul style="list-style-type: none"> <li>Monthly flora and fauna monitoring on construction site</li> <li>Implement compensatory measures of habitat creation along the Forest Fringe and Tengah Pond to compensate for the major loss of terrestrial and aquatic habitat</li> <li>Enhance wildlife connectivity within Southern Tengah and other green spaces (i.e., Forest Corridor, Central Park) beyond the Study Area</li> </ul>	<p>from edge effects (i.e., change in species composition)</p> <ul style="list-style-type: none"> <li>Elevated or separated footpaths from RAC to reduce trampling of vegetation. Human activities should also avoid major vegetated corridors that is used by fauna species</li> </ul>
<b>Hydrology, Groundwater Level and Surface Water Quality</b>	<ul style="list-style-type: none"> <li>For any construction activities that may alter the alignment of or block drains/stream, appropriate measures such as watercourse diversion should be carried out to avoid localised flooding.</li> <li>Ensure strict compliance with PUB Code of Practice on Surface Water Drainage during the design of roadside drains and diversion drains, as well as during the implementation Earth Control Measures (ECM), to ensure no flooding risk and no water quality impact during the construction.</li> <li>Provide enclosed bins and designated waste disposal facilities, with frequent housekeeping checks conducted.</li> <li>Schedule frequent waste collection by licensed waste operator/collector.</li> <li>Implement CCTV and Silt Imagery Detection System (SIDS) to monitor surface runoff discharges from sites as part of ECM required by PUB.</li> <li>Install piezometers to monitor changes in groundwater levels.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure strict compliance with PUB Code of Practice on Surface Water Drainage during design of storage system, to reduce peak flow during operational phase to be the same or lower than that of the existing condition.</li> <li>Incorporate more softscape areas and pervious areas in the design of the development to increase seepage of surface water into the soil and to reduce the peak flow and flooding risks within the development.</li> <li>Provide sufficient disposal bins surrounding the Project to avoid improper waste disposal.</li> <li>Raise awareness on waste management via community/stakeholder engagement (e.g. signage boards, warning signs).</li> </ul>
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>Implement dust control measures e.g. dust screens, etc.</li> <li>Install hard surfaced haul routes.</li> <li>Only use cutting, grinding and sawing equipment with dust suppression water spray mechanisms.</li> <li>Erect hoarding around dusty activities and site boundary min. 1.8m height in line with BCA guideline.</li> <li>Impose and signpost maximum speed-limit of 25km/hr on paved roads and 15 km/hr on unpaved roads and work areas.</li> <li>No burning of waste allowed on site.</li> <li>Revegetate earthworks and exposed areas / soil stockpiles.</li> </ul>	<p><u>No mitigation measures to be proposed</u> as the predicted increase in air quality pollutant levels is likely to be insignificant, due to:</p> <ul style="list-style-type: none"> <li>Current large traffic volume along existing roads, and thus, any increase in traffic due to the development will not lead to a significant change in air quality</li> <li>Continued implementation of increasingly stringent Euro emission standards on new vehicles</li> </ul>
<b>Airborne Noise</b>	<ul style="list-style-type: none"> <li>Implement airborne noise monitoring programme as part of EMMP as pre-emptive measures to assess potential impacts arising from uncontrolled/ unpredicted events.</li> </ul>	<ul style="list-style-type: none"> <li>Utilize noise attenuators and other Best Available Technology (BAT) and Best Environmental Practice (BEP) to mitigate potential noise from air conditioning and mechanical ventilation (ACMV) systems.</li> <li>Utilize low speed postings, speed humps, speed limit signages at drop-off points</li> </ul>

Environmental Parameter	Recommended Key Mitigation Measures and Best Management Practices	
	During Construction Phase	During Operational Phase
		and parking areas to mitigate noise from increased road traffic.

## Environmental Impact Assessment

For habitats, plants and fauna, the unmitigated impact significance during construction phase is **Moderate to Major**, due to loss of vegetation/habitats resulting from the total site clearance carried out for the Project Site. With the complete implementation of mitigation and compensatory measures in Table 1, the residual impact significance for habitats, plants and fauna is reduced to **Minor to Major**. Some residual impact significance for the construction phase is expected to remain as **Major** due to the permanent and irreversible loss of vegetation/habitat. For operational phase, with the consideration of mitigation measures in Table 1, residual impact significance to plant and fauna receptors are expected to be **Negligible to Moderate**. The detailed impact assessment can be found in Section 7 of the EIS report. With the implementation of these mitigation measures in Table 1, the residual impact significance is assessed to be in the range of **Negligible to Minor** for most of the environmental parameters (i.e. hydrology, groundwater level, surface water quality, air quality and airborne noise) in the construction and operational phase. The detailed impact assessment can be found in Sections 8, 9 and 10 of the EIS report.